JSW Energy PSP Two Limited
Regd. Office : JSW Centre,
Bandra Kurla Complex,
Bandra (East), Mumbai - 400 051

CIN U40106MH2021PLC367136
Phone +91 22 4286 1000
Fax +91 22 4286 3000
Website www.jsw.in

JSW/PSP-BHAVALI/FC/2025-26/ 47
January 6, 2026

To,

The Deputy Conservator of Forests
Shahapur Division.
District Thane, Maharashtra

Sub: Proposal for seeking prior approval of the Central Government under section 2 (i) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 in favour of JSW Energy PSP Two Limited for non-forestry use of 243.74 ha. (Shahpur Division 181.45 ha and West Nashik Division 62.29 Ha) of forest land (reserved forest, protected forest and private forest) for Bhavali Pumped Storage Project (1500 MW) in Thane & Nashik District in the State of Maharashtra (Online proposal No. FP/MH/HYD/153240/2022) – reg.

Ref: (I) Letter No. 8-06/2025-FC dated 15.12.2025
(II) Nodal Office, Nagpur Letter No- Desk-17/FCA- S1/PID/153240/Thane/ 2205/2025-26 dated 17.12.2025
(III) CCF Thane Office Forwarding Outward No. A-1723, dated- 29.12.2025.
(iv) Your Good Office Letter No. Room-10/FCA/3189/2025-26, dated 05.01.2026

Dear Sir,

With reference to the above, we are submitting herewith our point-wise compliances to the shortcomings as desired by the Government of India, MoEF&CC vide letter dated 15.12.2025 along with the supporting documents attached as an Annexures for your reference and to process it further.

Thanking you,

Yours faithfully,
For-JSW Energy PSP Two Limited

[Lalit Parab]
Authorized Signatory

Encl.: Compliance letter along with Supporting Documents in 5 Sets.

JSW Energy PSP Two Limited

JSW Energy PSP Two Limited
Regd. Office : JSW Centre,
Bandra Kurla Complex,
Bandra (East), Mumbai - 400 051

CIN. U40106MH2021PLC367136
Phone : +91 22 4286 1000
Fax : +91 22 4286 3000
Website : www.jsw.in

JSW/PSP-BHAVALI/FC/2025-26/49
January 6, 2026

To,

The Deputy Conservator of Forests
West-Nashik Division
District Nashik, Maharashtra

Sub: Proposal for seeking prior approval of the Central Government under section 2 (i) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 in favour of JSW Energy PSP Two Limited for non-forestry use of 243.74 ha. (Shahpur Division 181.45 ha and West Nashik Division 62.89 Ha) of forest land (reserved forest, protected forest and private forest) for Bhavali Pumped Storage Project (1500 MW) in Thane & Nashik District in the State of Maharashtra (Online proposal No. FP/MH/HYD/153240/2022) – reg.

Ref: (I) Letter No. 8-06/2025-FC dated 15.12.2025
(II) Nodal Office, Nagpur Letter No- Desk-17/FCA- S1/PID/153240/Thane/ 2205/2025-26 dated 17.12.2025
(III) CCF Thane Office Forwarding Outward No. A-1723, Dated- 29.12.2025.
(iv) DCF Shahapur Office Letter No. Room-10/FCA/3189/2025-26, dated 05.01.2026

Dear Sir,

With reference to the above, we are submitting herewith our point-wise compliances to the shortcomings as desired by the Government of India, MoEF&CC vide letter dated 15.12.2025 along with the supporting documents attached as an Annexures for your reference and to process it further.

Thanking you,

Yours faithfully,
For JSW Energy PSP Two Limited

[Lalit Parab]
Authorized Signatory

JSW Energy PSP Two Limited

Encl.: Compliance letter along with Supporting Documents in 3 Sets.

महाराष्ट्र वन विभाग

महाराष्ट्र शासन
वनविभाग

उप वनसंरक्षक, शहापूर वनविभाग, शहापुर यांचे कार्यालय
शहापुर आसनगांव जुना आग्रा रोड४२५६०१ .शहापुर.ता.जि.ठा.,
दुरध्वनी क्र.- ०२५२७- २७२०९६
ईमेल आयडी-dcfshahapur@mahaforest.gov.in/dcfshahapur@gmail.com

क्रमांक - कक्ष-10/FCA/ 3189 /2025-26 दिनांक 05 / 01 / 2026

प्रति,

मे. जेएसडब्ल्यु एनर्जी पीएसपी टु लि.,
जेएसडब्ल्यु सेंटर, बांद्रा कुर्ला कॉम्प्लेक्स,
बांद्रा (पूर्व) मुंबई - 400 051.

विषय:- वनजमिन- ठाणे व नाशिक

मे. जेएसडब्ल्यु एनर्जी पीएसपी टु लि., मुंबई यांनी भावली पंप स्टोरेज प्रोजेक्टचे बांधकाम करण्यासाठी ठाणे व नाशिक जिल्हयातील 243.74 हे. वनजमिन वळतीकरणाबाबत.

संदर्भ:-
1. मे. जेएसडब्ल्यु एनर्जी पीएसपी टु लि., मुंबई यांचेकडील पत्र क्र. JSWNEL/ BHAVALI/FC/—- 2023-24, दिनांक 6/03/2022
2. या कार्यालयाचे पत्र क्रमांक कक्ष-6(3)/20/जमीन/1390, दिनांक 13/2/2025.
3. मुख्य वनसंरक्षक, ठाणे यांचेकडील पत्र क्र . कक्ष-10/वंस/CR-80/24-25/13/25-26, दि. 05/05/2024.
4. अप्पर प्रधान मुख्य वनसंरक्षक व केंद्रस्थ अधिकारी, मरा. नागपूर यांचेकडील पत्र क्र.कक्ष-17/नोडल/एस-1/पीआयडी-153240/ठाणे/357/25-26, दि.19.05.2025.
5. अपर सचिव, महसूल व वनविभाग, मंत्रालय, मुंबई- 400 032, दि.04.06.2025.
6. अप्पर प्रधान मुख्य वनसंरक्षक व केंद्रस्थ अधिकारी, मरा. नागपूर यांचेकडील पत्र क्र.कक्ष-17/नोडल/एस-1/पीआयडी-153240/ठाणे/543/25-26, दि.05.06.2025.
7. मुख्य वनसंरक्षक, ठाणे यांचेकडील पत्र क्र. कक्ष-10/वंस/CR-80/24-25/86/25-26, दि.10/06/2024.
8. या कार्यालयाचे पत्र क्रमांक कक्ष-6(3)/20/जमीन/911, दिनांक 24/06/2025
9. आपले कडील पत्र क्र. JSW/PSP-BHAVALISITE /25-26/027, दिनांक 24/06/2025
10. या कार्यालयाचे पत्र क्रमांक कक्ष-6(3)/20/जमीन/388, दिनांक 02/07/2025.
11. मुख्य वनसंरक्षक, ठाणे यांचेकडील पत्र क्र. कक्ष-10/वंस/CR-80/24-25/57/25-26, दि.08/07/2025.
12. अपर सचिव, महसूल व वनविभाग, मंत्रालय, मुंबई- 400 032, दि.04.06.2025 क्र.. FLD1225/CR-101/F-10 dated 05.08.2025.
13. केंद्र शासन, दिल्ली यांचेकडील दि.02.09.2025 रोजीचे पत्र.
14. अप्पर प्रधान मुख्य वनसंरक्षक व केंद्रस्थ अधिकारी, मरा. नागपूर यांचेकडील पत्र क्र.कक्ष-17/नोडल/एस-1/पीआयडी-153240/ठाणे/322/25-26, दि.04.09.2025.
15. मुख्य वनसंरक्षक, ठाणे यांचेकडील पत्र क्र. कक्ष-10/वंस/CR-80/24-25/206/25-26, दि. 04/09/2025.

16 या कार्यालयाचे पत्र क्रमांक कक्ष-10/FCA/1765/25-26, दिनांक 18/09/2025

17. आपले कडील पत्र क्र. JSW/PSP-BHAVALISITE /25-26/ , दिनांक 28/10/2025

18 या कार्यालयाचे पत्र क्रमांक कक्ष-10/FCA/1147/25-26, दिनांक 04/11/2025.

18. मुख्य वनसंरक्षक, ठाणे यांचेकडील पत्र क्र. कक्ष-10/वंस/CR-80/24-25/270/25-26, दि. 07/11/2025.

19. अप्पर प्रधान मुख्य वनसंरक्षक व केंद्रस्थ अधिकारी, मरा. नागपूर यांचेकडील पत्र क्र.कक्ष-17/नोडल/एस-1/पीआयडी-153240/ठाणे/2154/25-26, दि.12.12.2025.

20. केंद्र शासन, दिल्ली यांचेकडील दि.15.12. 2025 रोजीचे पत्र.

21. अप्पर प्रधान मुख्य वनसंरक्षक व केंद्रस्थ अधिकारी, मरा. नागपूर यांचेकडील पत्र क्र.कक्ष-17/नोडल/एस-1/पीआयडी-153240/ठाणे/2205/25-26, दि.17.12.2025.

22. मुख्य वनसंरक्षक, ठाणे यांचेकडील पत्र क्र. कक्ष-10/वंस/CR-80/24-25/359/25-26, दि. 29/12/2025.

विषयांकित प्रकरणी मे. जेएसडब्ल्यु एनर्जी पीएसपी टु लि., मुंबई यांनी 1500 MW आवली पंप स्टोरेज प्रोजेक्ट (PSP) करीता आवश्यक असलेल्या ठाणे जिल्हयातील शहापूर वनविभागाचे कार्यक्षेत्रातील मौजे कळभोंडे व मौजे कोथळे, ता. शहापूर येथील एकुण 181.45 हे.आर व नाशिक जिल्हयातील नाशिक पश्चिम वनविभागाचे कार्यक्षेत्रातील मौजे जामुंडे, ता. इगतपूरी येथील एकुण 94.3 हे.आर असे एकुण एकंदर 275.75 पैकी 243.74 हे.आर वनजमीनीचे वळतीकरणास केंद्र शासनाची मंजूरी मिळणेकामी वन (संवर्धन) अधिनियम, 1980 चे कलम 2 अंतर्गत सुधारीत प्रस्ताव ऑनलाईन www.forest clearance.in वर सादर केलेला असून सदर प्रस्तावाचा सांकेतांक क्रमांक FP/MH/HYD/153240/2022 असा आहे. सदर प्रस्तावाची हार्ड कॉपी या कार्यालयास पुढील कार्यवाहीसाठी सादर केलेली होती.

प्रस्तुत प्रकरणी राज्य शासनाने दि.05.08.2025 रोजीचे पत्रान्वये सदरचा प्रस्ताव तत्वत: मंजुरीकामी केंद्र शासनास सादर केला असून सदर प्रस्तावात केंद्र शासनाकडून 15 मुददयांवर आक्षेप घेण्यांत आलेला असून संदर्भ क्र.13 अन्वये पुर्तता अहवाल मागविण्यांत आला आहे. अप्पर प्रधान मुख्य वनसंरक्षक, म.रा. नागपूर यांनी संदर्भ क्र.14 अन्वये सदर पुर्तता अहवाल इंग्रजीमध्ये सादर करणेकामी प्रकल्प यंत्रणेस कळविले असून त्याची एक प्रत या कार्यालयास पृष्ठांकीत करण्यांत आलेली होती. तसेच मुख्य वनसंरक्षक, ठाणे यांनी आवश्यक कार्यवाहीकामी या कार्यालयास सूचित करण्यांत आलेले होते. त्या अनुषंगाने प्रकल्प यंत्रणेकडून संदर्भ क्र.16 अन्वये पुर्तता अहवाल मागविण्यांत आला असून प्रकल्प यंत्रणेने सदंर्भ क्र.17 अन्वये पुर्तता अहवाल सादर केला होता. सदर प्रस्ताव पुढील कार्यवाही कामी दि.07/11/2025 रोजी सदंर्भ क्र.18 अन्वये मुख्य वनसंरक्षक, ठाणे यांना सादर केला असून सदंर्भ क्र.19 अन्वये अप्पर प्रधान मुख्य वनसंरक्षक व केंद्रस्थ अधिकारी, मरा.नागपूर यांना पुर्तता अहवाल सादर केला आहे.

प्रस्तुत प्रकरणी सादर करण्यांत आलेल पुर्तता अहवालानंतर दि.02.12.2025 रोजी झालेल्या सल्लागार समितीच्या बैठकीत या प्रस्तावात विचार करण्यांत आला असून प्रस्तावाची तपासणी केल्या नंतर काही माहितीच्या आभावी सदर प्रस्तावात केंद्र शासनाकडून 7 मुददयांबाबत त्रुटी काढण्यांत आलेला असून संदर्भ क्र. 20 अन्वये पुर्तता अहवाल मागविण्यांत आला आहे.

तरी आपणांस सुचित करण्यांत येते की , केंद्र शासनाचे दि.15.12.2025 रोजीचे पत्रामध्ये उपस्थित केलेल्या नाशिक वनविभागासंबंधी असलेल्या त्रुटींची पुर्तता पशिचम नाशिक, वनविभागास देणे व उर्वरीत त्रुटींचा पुर्तता अहवाल 5 संचामध्ये अंग्लभाषेत (English) या कार्यालयास लवकरात लवकर सादर करणे, जेणे करुन पुढील कार्यवाही योजणे या कार्यालयाकडून शक्य होईल .

सहपत्र- वरीलप्रमाणे.

(दीपेश [illegible]होत्रा)
उप वनसंरक्षक
शहापूर वनविभाग, शहापूर

प्रतिलिपी:- मुख्य वनसंरक्षक (प्रा.) ठाणे यांजकडे माहितीसाठी सविनय सादर.

प्रतिलिपी:- उपवनसंरक्षक, नाशिक पश्चिम यांना माहितीसाठी व उचित कार्यवहीसाठी सस्नेह आग्रेषित.

OFFICE OF THE PRINCIPAL CHIEF CONSERVATOR OF FORESTS (HEAD OF FOREST FORCE), MAHARASHTRA STATE, NAGPUR

ADDITIONAL PRINCIPAL CHIEF CONSERVATOR OF FORESTS AND NODAL OFFICER, MAHARASHTRA STATE, NAGPUR,
First Floor, 'B' Wing, Van Bhavan, Civil Lines, Nagpur-440001.
Tel no. (0712) 2530166, 2556916, Fax no. (0712) 2559675 E-mail- pccfnodal@mahaforest.gov.in

मुख्य वनसंरक्षक (प्रा.) ठाणे वनवृत्त ठाणे
यांचे कार्यालय
कक्ष क्रमांक 10
29 DEC 2025
आपक क्रमांक A-1723
मुख्य वनसंरक्षक (प्रा.) ठाणे

Sub:- Proposal for seeking prior approval of the Central Government under Section 2 (i) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 in favour of JSW Energy PSP Two Limited for non-forestry use of 243.74 ha. (Shahapur Division 181.45 ha and West Nasik Division 62.29 Ha) of forest land (reserved forest, protected forest and private forest) for Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik District in the State of Maharashtra (Online proposal No. FP/MH/HYD/153240/2022)– reg.

No. Desk-17/FCA-S1/PID-153240/Thane/2205/2025-26
Nagpur – 440 001. Date :- 17/12/2025

To,
Shri. Lalit Parab, Authorized Signatory,
JSW Energy PSP Two Limited,
JSW Centre, Bandra Kurla Complex,
Bandra (East) Mumbai-40051

Ref:- 1) Minutes of the Meeting of the Advisory Committee (AC) meeting held on 02/12/2025
2) This office letter No. Desk-17/FCA-S1/PID-153240/Thane/2154, dated 12/12/2025.
3) The Government of India, MoEF&CC (FC Division), New Delhi leter No.8-06/2025-FC, dated 15/12/2025.

The copy of the query letter received from Government of India, MoEF&CC, R.O.Nagpur is enclosed herewith for information and necessary action.

It is therefore requested to submit compliance of the shortcoming as desired by the Government of India vide query letter dated 15/12/2025 along with all relevant documents in English through proper channel to this office for consideration of the Ministry

Encl:-As above

(Naresh Zurmure)
Addl. Principal Chief Conservator of Forests & Nodal Officer

Copy submitted to the Additional Chief Secretary (Forests), Revenue & Forest Department, Mantralaya Mumbai -32 for information.
Copy to the Chief Conservator of Forests (T), Thane & Nashik for information and necessary action.
Copy to the Deputy Conservator of Forests, Shahapur and West Nashik for information and necessary action.

Back query

8-06/2025-FC

File No. 8-06/2025-FC
Government of India
Ministry of Environment, Forest and Climate Change
(Forest Conservation Division)
....

Indira Paryavaran Bhawan
Aliganj, Jor Bagh Road
New Delhi- 110003
Dated: 15-12-2025

To

The Principal Secretary (Forests)
Government of Maharashtra
Mumbai.

Subject: Proposal for seeking prior approval of the Central Government under Section 2 (i) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 in favour of JSW Energy PSP Two Limited for non-forestry use of 243.74 ha. (Shahapur Division 181.45 ha and West Nasik Division 62.29 Ha) of forest land (reserved forest, protected forest and private forest) for Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik District in the State of Maharashtra (Online proposal No. FP/MH/HYD/153240/2022)– reg.

Madam/Sir,

I am directed to refer to the Govt. of Maharashtra's letter No. FLD-1225/CR-101/F-10 dated 05.08.2025 on the subject proposal seeking prior approval of the Central Government in accordance with Section 2 (1) (ii) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 and to say that the proposal was considered in the Advisory Committee meeting held on 02.12.2025. The detailed minutes of the said meeting is placed on the website of this Ministry www.parivesh.nic.in. After examination of the proposal, the Committee deferred the proposal for want of the following information:

i. Both the reservoirs are being constructed afresh. Further, there is no water source in the vicinity and the lower reservoir is proposed to be filled with rain water. Keeping above in view the site specificity of the project is not established. The site specificity of the project is therefore required to be examined in detail and state shall explore to locate the project over non-forest land.
ii. An area of 40.91 ha forest land is proposed to be used for muck dumping and job facilities which are not site specific and may be shifted over non-forest land.
iii. The feasibility of filling the huge reservoir with rain water and maintaining the water level throughout the year needs justification. A detailed report shall be submitted in this regard.
iv. As per the recommendations of Regional Office, 20 ha NFL proposed for CA is unsuitable for plantation. Accordingly CA scheme shall be revised to carry out plantation in degraded forest areas at double the extent of unsuitable area. The improvement plan is required for the remaining non forest area where canopy density is more than 0.4. The detail of demilled DFL along

with KML files shall be submitted.

v. The DFO Nasik in his recommendations submitted that the project involves construction of tunnel work, which may require stability studies from national level institutions. The details/report in this regard shall be submitted.

vi. The DFO West Nasik has recommended that in case of land that were allotted prior to 1980, lying in the project area, the user agency shall not utilize/acquire said land parcel without a separate/ additional diversion proposal. The state/user agency has not provided any appropriate justification in this regard. A detailed justification along with a list of such areas involved in the project shall be submitted.

vii. The state has informed that 13.814 ha area has been excluded as these patches do not fall within the working area. Since these patches are interspersed in between the working area, the state shall provide the justification for their exclusion and the plan for the protection of these patches.

3. In view of above, the State Government is requested to furnish the information, as indicated above, for further consideration of the proposal in the Ministry.

Yours faithfully,

Digitally signed by
SUNEET BHARDWAJ
Date: 16-12-2025
15:16:53

Sd/-
(Suneet Bhardwaj)
Assistant Inspector General of Forests

Copy to:-

1. The Principal Chief Conservator of Forests & HoFF, Department of Forest, Government of Maharashtra, Nagpur.
2. DDGF (Central), Regional Office, Ministry of Environment, Forest and Climate Change, Nagpur.
3. The APCCF cum-Nodal Officer (FCA), Government of Maharashtra, Nagpur.
4. The User Agency.
5. The Monitoring Cell, FC Division, MoEF&CC, New Delhi for uploading the letter on PARIVESH portal.

Desk-10/FCA/A-20/CR-80/24-25/ 359 /25-26
Thane- 400 603 Date -29/12/2025

Copy to the Chief Conservator of Forests (T.), Nashik for information and necessary action.

Copy to the Deputy Conservator of Forests, Shahapur and West Nashik for information and necessary action.

Copy to Authorized signatory, JSW Energy PSP Two Limited at JSW centre, Bandra Kurla Complex, Bandra (East) Mumbai-400 051 for information and necessary action.

Encl. :- As Stated.

Rathod
(Roshan Rathod)
Divisional Forest Officer(V.),Thane
office of the Chief Conservator of Forests (T.), Thane.

Following are information asked by the MOEF&CC and our comments:

Sr. No.	Observation / Shortcoming	Clarification & req. Docs Annexures
1.	Both the reservoirs are being constructed afresh. Further, there is no water source in the vicinity and the lower reservoir is proposed to be filled with rain water. Keeping above in view, the site specificity of the project is not established. The site specificity of the project is therefore required to be examined in detail and state shall explore to locate the project over non-forest land.	It is respectfully submitted that the Bhavali Pumped Storage Project (PSP) is inherently site-specific in nature, as pumped storage schemes are governed by stringent topographical, geological, hydrological and engineering requirements. The selected site offers the essential natural elevation difference (head) between the upper and lower reservoirs, favorable geological conditions for underground powerhouse and tunnel construction, and optimal proximity between reservoirs to ensure operational efficiency and safety along with the required catchment area for availability of water for one-time filling and annual recoup. Such a unique combination of parameters is not available over non-forest land in the surrounding region. Hydrology and water availability approval obtained from Central govt. agency CWC and Water Resource Department (WRD), Govt. of Maharashtra are **attached as Annexure-1.1 & 1.2.** The project location is site specific, selected site minimize forest land diversion, avoid critical wildlife habitats, and ensure optimal engineering feasibility for the construction of both dams and associated facilities. The justification alongwith summary note regarding site selected **attached as Annexure-1.3.** The construction of new reservoirs is a standard and accepted design feature for Off-stream pumped storage projects, which do not depend on perennial rivers. During DPR preparation, alternative locations, including non-forest land options, were examined; however, these were found unsuitable due to inadequate head, unfavorable geology, excessive tunnel length, and higher environmental and social impacts. The project DPR has already been examined and approved by the Central Electricity Authority (CEA) on 24.09.2024 **(Attached as an Annexure-1.4).** The project has been recommended for Environmental Clearance from MoEF&CC after due appraisal by the Expert Appraisal Committee (EAC) on 31.08.2024. During these appraisals, **alternative locations and layouts were examined**, and the present configuration was found to be **most optimal with minimal environmental and social impacts**.

		Accordingly, relocation of the project to non-forest land is not technically feasible, and the site specificity of the Bhavali PSP stands fully established based on engineering necessity and accepted pumped storage design principles.
2.	An area of 40.91 ha forest land is proposed to be used for muck dumping and job facilities which are not site specific and may be shifted over non-forest land.	It is to kindly mention that the requirement of 40.91 ha forest land for muck dumping and job facilities in the Bhavali Pumped Storage Project has been assessed from technical, environmental, Forest and operational perspectives, and the proposed locations are functionally site-specific. We have examined in detail the availability of 40.91 hectares of contiguous Non Forest land in close vicinity of the project in Thane district, Maharashtra. Among the few options identified, the nearest option is more than 75 km away and that too outside Thane district. With Adjacent forest areas, constructing permanent access to these land options and transportation of muck for such long distances would be unviable and unsuitable for the project while also resulting in a higher environmental footprint and additional ecological risks. The proposed muck disposal sites are located in areas having low vegetation density and have been selected to avoid dense forest patches. A comprehensive and approved Muck Management Plan has been prepared, incorporating engineering stabilization measures and biological reclamation, ensuring environmental protection, slope stability and long-term restoration of the sites. The muck disposal areas are directly linked to tunnel portals, dam excavation zones and underground works. Location of these facilities in close proximity to the excavation sites is essential to: • **Minimize environmental impacts on ecology:** Shorter haulage routes limit repeated movement of heavy vehicles through forest areas, thereby reducing dust generation, disturbance to vegetation, and stress on local fauna. • **Improve construction efficiency and reduce duration of forest disturbance:** Proximity of dumping areas enables faster disposal of excavated material, improving construction efficiency and reducing the overall time of construction activities within forest land, thereby limiting the duration of environmental impact. • **Reduce haulage distance of excavated material:** Locating disposal areas nearby significantly reduces transportation distance, resulting in lower fuel

consumption by dumpers and machinery and consequently reducing air pollution and greenhouse gas emissions. This also help in lowering noise levels within the forest area.

- **Minimizing Safety Risks**
  The closed proximity of dumping sites ensures construction safety by preventing movement of heavy equipment & reducing traffic congestion, thereby minimizing spatial footprint.
- **Reducing Social Impact**
  Given mega size of the proposed project, Shifting muck disposal to private or revenue land would require land acquisition and may lead to social impacts, which are avoided by utilizing limited forest land proposed for diversion.

- **Ease of environmental monitoring and compliance**:
  Proximity of disposal areas facilitates regular monitoring of dumping practices, and implementation of environmental safeguards. Localized disposal areas can be systematically stabilized and rehabilitated through landscaping and plantation, ensuring faster ecological recovery.

The Expert Appraisal Committee (River Valley & Hydroelectric Projects), MoEF&CC, during its conducted a site visit on 2nd & 3rd Jan., 2025 **(Attached as an Annexure-2.1).** The findings of the site visit were discussed amongst the Hon'ble EAC members under Additional Agenda Item 22.4 in the 22nd EAC Meeting held on 10th Jan., 2025. As per the recommendations of Minutes of the Meeting, reproduced hereunder

"the relocation of muck disposal site may not be insisted on while considering the proposal for clearance since the muck disposal site was found to have been selected properly. Further, ecologically better sites were not appeared available in nearby areas. Any relocation at this stage might lead to much changes and may lead to more adverse consequences. However, safety measures as contained in EMP and in other documents should be adhered into".

With regard to the working space, the same is essential near the main construction area due to non-availability of private land. Locating this facility away from the project site would increase movement of men and machinery, adversely affecting environmental quality and project safety. Further The job facilities proposed on forest land are **temporary and construction-phase requirements only** and will be:

		• Dismantled after completion of construction • Restored to original contours plans. • Post-construction reclamation and afforestation shall be carried out through an integrated approach combining appropriate engineering and biological measures. to ensure long-term slope stability, ecological restoration, and regeneration of local biodiversity, in accordance with the approved plan in the Environmental Clearance (EC) recommendation. Utilization of forest land for muck disposal in hilly hydropower has precedents, subject to stringent safeguards and post-project restoration, as permitted by Ministry of Environment, Forest and Climate Change (MoEF&CC) and the Hon'ble FAC in similar projects. **(List of the projects attached as Annexure-2.2).** In this regards, we have already submitted an undertaking to concern Forest divisions and mentioned that the Muck disposal sites will be properly stabilize and scientifically reclaimed with vegetation after completion of disposal activities. After commissioning of the project, these sites shall not be using for any Non Forest activity. **(Attached as an Annexure-2.3).** In view of the above, it is submitted that the proposed use of forest land for muck dumping and job facilities has been **minimized, carefully planned, and adequately mitigated**, and shifting of these components to non-forest land is neither technically feasible nor environmentally preferable. The details justification note is **(attached as an Annexure-2.4).**
3.	The feasibility of filling the huge reservoir with rain water and maintaining the water level throughout the year needs justification. A detailed report shall be submitted in this regard.	The Bhavali PSP is designed as an Off-stream pumped storage scheme, wherein water is cyclically transferred between the upper and lower reservoirs for power generation and pumping operations. The one time initial filling of the reservoirs is proposed through monsoon runoff from the self-catchment area. Thereafter, water will be reused repeatedly, and only marginal losses due to evaporation and seepage will occur. These losses shall be replenished annually during the monsoon season. The assessment of initial reservoir filling and subsequent make-up water requirements has been carried out in line with the Guidelines for Formulation of Detailed Project Reports for Pumped Storage Schemes (CEA, Version 3.0). As

		per Clause 2.7 – Aspects to be appraised (Hydrology), the Guidelines specify that "*for on-stream and off-stream open-loop pumped storage schemes, accurate hydrological assessment is required, and appraisal of project hydrology shall include water availability studies, design flood estimation, diversion flood estimation and sedimentation studies for estimating the life of the project*". Relevant extracts of the DPR guidelines are (**attached as an Annexure-3.1).** In compliance with the above provisions, detailed rainfall analysis, catchment yield assessment, initial reservoir filling studies, evaporation and seepage loss estimation, water balance analysis, flood studies and sedimentation studies have been carried out and incorporated in the approved DPR. These studies establish that the one-time initial filling of the reservoirs is feasible through monsoon runoff from the self-catchment area, and that subsequent operation involves recycling of water with only marginal annual losses, which are replenishable during the monsoon season. The initial reservoir filling and subsequent make-up water requirements have been assessed through detailed rainfall analysis, catchment yield assessment, evaporation and seepage studies, which form part of the approved DPR. The hydrological studies and water availability aspects have been examined and Concurred by the Hydrology Directorate, Central Water Commission (CWC). **(Attached as an Annexure- 3.2)** Further, the State Government, through the competent Water Resources Department, Maharashtra has accorded approval for water availability and issued the Water Availability Certificate, confirming adequacy of water for one-time reservoir filling as well as for annual make-up requirements during operation, **(Attached as an Annexure-3.3).** The same aspects were also considered during the recommendation of Environmental Clearance by MoEF&CC, Delhi. Accordingly, the feasibility of filling the reservoir with rainwater and maintaining the water level throughout the year is duly established through detailed DPR studies and stands approved by the competent Central and State authorities.
4.	As per the recommendations of Regional Office, 20 ha NFL proposed for CA is unsuitable for plantation.	We hereby confirm our acceptance to provide the plantation cost of double degraded forest land in respect 20 ha NFL proposed for CA is unsuitable for plantation, as recommendation by the Integrated Regional Office (IRO),

	Accordingly, CA scheme shall be revised to carry out plantation in degraded forest areas at double the extent of unsuitable area. The improvement plan is required for the remaining non forest area where canopy density is more than 0.4. The detail of identified DFL along with KML files shall be submitted.	Nagpur, Maharashtra. In this regards we are submitting herewith undertaking **(Attached as an Annexure-4).** Accordingly, we request to your good office, please allocate the CA land in your division and provide the details of identified degraded forest land (DFL) along with KML files for further processing.
5.	The DFO Nasik in his recommendations submitted that the project involves construction of tunnel work, which may require stability studies from national level institutions. The details/report in this regard shall be submitted.	In compliance with the recommendation of the Divisional Forest Officer (DFO), Nashik, a detailed tunnel construction and stability study has also been carried out by the **Central Institute of Mining and Fuel Research (CIMFR), Council of Scientific & Industrial Research (CSIR)**, Bilaspur a national-level research institution. **(Attached as Annexure-5.1)** The study provides specific recommendations for safe excavation, support systems and construction methodology for tunnel works during execution, thereby further strengthening the safety framework of the project. In addition to the above, it is submitted that the Detailed Project Report (DPR) for the Project has been prepared strictly in accordance with the Central Electricity Authority (CEA) Guidelines for Formulation, Examination and Concurrence of Detailed Project Reports for Pumped Storage Schemes (July 2024, Version 3.0). As per the above Guidelines, the design, alignment and stability of underground works including tunnels form an integral part of the DPR and are required to be examined and vetted by national-level central agencies during the appraisal and concurrence process. In this regard, the Guidelines provide that: • The Central Water Commission (CWC), in consultation with its concerned Directorates, is the designated authority for vetting hydel civil design as stated in Sec 2.7 "Aspects to be appraised" of Guidelines for Formulation of Detailed Project Reports for Pumped Storage Schemes (CEA, Version 3.0) (**Attached as Annexure 5.2).** The relevant extract is reproduced hereunder: *"iv. Hydraulic Structures/ Hydel Civil Design: Techno-economic evaluation of water conductor system and power house comprising of intake, de-silting*

		arrangement, head race tunnel, surge shaft, pressure shaft/ penstock, tailrace tunnel/ channel and the type/ layout and dimensions of the power house is made to ensure that the surveys and investigations carried to finalize the layout & designs are adequate, layout is optimum & is evolved after evaluation of various alternatives; projectcomponents are safe, planning & design has been carried out utilizing state of the art technology and relevant standards." • The Geological Survey of India (GSI) is responsible for examination and clearance of geological aspects, including subsurface conditions along tunnel alignments. • The Central Soil and Materials Research Station (CSMRS) examines construction material, geotechnical and rock mechanics aspects, which directly govern tunnel stability and support measures. Accordingly, the geological, geotechnical and tunnel-related aspects of the project have been examined through the prescribed statutory mechanism. The DPR incorporates detailed geological mapping, subsurface investigations, geotechnical characterization, tunnel alignment studies, rock mass classification, and preliminary support measures, which have been examined and accepted by GSI, CSMRS and the concerned Directorates of CWC as part of the DPR appraisal process. Further, the Hydel Civil Design Directorate of CWC is mandated under the Guidelines to vet tunnel design and associated civil structures, and the same has been carried out during DPR examination. The Central Electricity Authority (CEA), acting as the nodal authority under Section 8 of the Electricity Act, 2003, accords concurrence to the scheme only after satisfying itself, through consultation with CWC, GSI and CSMRS, that the proposed project meets the norms related to design safety, dam and tunnel stability, and construction feasibility. Accordingly, DPR concurrence for the project has been accorded by CEA vide letter dated 24.09.2024, after due appraisal of all such aspects.
6.	The DFO West Nasik has recommended that in case of land that were allotted prior to 1980, lying in the project area, the user agency shall not utilize/acquire said land parcel without a separate/	It is respectfully submitted that during detailed scrutiny of revenue records and forest land status, the land parcels allotted prior to 1980, falling within Village Jamunde, Tehsil Igatpuri, District Nashik, have been identified and excluded from the project area. Accordingly, the said land parcels, comprising Gut Nos. 37 to 41 of Village Jamunde, do not form

	additional diversion proposal. The state/user agency has not provided any appropriate justification in this regard. A detailed justification along with a list of such areas involved in the project shall be submitted.	part of the present forest diversion proposal and shall not be utilized or acquired for any component of the project. In this regards, We have already submitted an undertaking to concern Forest divisions, clearly stating that no construction activity or project infrastructure shall be taken up on land allotted prior to 1980, unless a separate and additional forest diversion proposal is submitted and approved under the provisions of the Forest (Conservation) Act, 1980, as applicable. Since these land parcels are excluded from the project footprint, no forest diversion is involved at this stage. Hence, a separate diversion proposal does not arise presently. A list of such excluded land parcels along with the undertaking has already been submitted and is enclosed again for ready reference. **(Attached as Annexure-6)**
7.	The state has informed that 13.814 ha area has been excluded as these patches do not fall within the working area. Since these patches are interspersed in-between the working area, the state shall provide the justification for their exclusion and the plan for the protection of these patches.	The exclusion of 13.814 ha forest land is intentional, as these patches do not fall within the actual construction or operational footprint of the project. The exclusion aims to avoid unnecessary and minimization diversion of forest land. A suitable protection and conservation mechanism shall be implemented for these interspersed patches, including demarcation, access restriction, and monitoring during construction and operation, so as to ensure no adverse impact on these forest areas.

Annexure -1.1

Government of India
Central Water Commission
Hydrology (South) Directorate
7th Floor (S), Sewa Bhawan
R.K.Puram, New Delhi-110066
Phone/Fax:011-29583507
Email: hydsouth@nic.in

Sub– JSW Energy PSP Two Limited- Submission of Feasibility Study Report for Bhavali PSP (1500MW), Maharashtra -Techno Economic Clearance (TEC) from CEA.

Reference– 1) Lr No.-JSWNEL/BHAVALI/2021-22/014 dated 07.03.2022

2) Lr. No. 7/Maha-210/2021-Hyd(S)/83 dated: 09/05/2022

3) JSWNEL/BHAVALI/2022-23/024 dated 26.05.2022

Please refer to the letter cited in Ref 1 wherein Feasibility Study Report (FSR) in respect of proposed Bhavali PSP in the state of Maharashtra has been sent to this office and vide the letter cited in Ref 2 the comments/observations pertaining to Hydrology were issued by the Hydrology(S) directorate. In compliance to this, the project developer has sent the revised hydrology report of the proposed PSP vide Ref. 3 and requested the comments/observations of this office. The revised hydrology report has been examined by this office and comments/observation are given as below-

A. PROJECT PROPOSAL

The proposed Bhavali Pumped Storage Project (PSP) is located bordering Thane and Nashik districts of Maharashtra. The project with 1500MW of pumped storage capacity is proposed for development near Jamunde and Kalbhonde village. Bhavali PSP will comprise of two reservoirs i.e Upper Reservoir & lower reservoir; both the reservoirs are to be constructed newly. The geographical coordinates of the proposed upper reservoir are at $19^0$36'31.69"N & $73^0$35'45.06"E and that of lower reservoir are at $19^0$34'32.56.38"N and $73^0$35'10"E. The proposed Upper & lower reservoir for the Pumped storage scheme have Full Reservoir Levels of 737.0m and 300.0m, Minimum draw down level of 711.0 m and 270.0 m respectively.

The proposed upper reservoir is on a small stream of Dharna river, which is a part of Godavari Upper sub basin and lower reservoir is located on a stream which is a tributary of Ulhas River which is a part of western flowing river system. The proposed storage project is being planned on the allocated water for utilization from surplus flows of Bhatsa dam. One time filling of the PSP reservoir will be carried out from the yield into the lower reservoir, part of Bhatsa dam catchment whereas water into the Upper reservoir is not obstructed for filling the Upper Reservoir, either during the construction or operation of the PSP scheme as the upper dam is constructed on a small stream which joins the existing Bhavali dam.

Since the proposed scheme is a pumped storage scheme and envisages utilizing the water from newly proposed reservoirs, no consumptive use of water is envisaged. As mentioned in the report submitted by the Project Authorities, the water requirements for one time filling of the reservoir is **14.50 MCM**. Moreover, only recycling of water stored in the reservoirs is utilized for PSP operation and the Losses will be fulfilled by annual yield from the catchment area of the Bhavali PSP.

Impact on Bhatsa Dam:

As mentioned in the report by the project authorities, Bhatsa dam has a catchment area of 388.50sqkm and that of proposed lower reservoir is 7.32 km^2. So the contribution of catchment interrupted by the proposed lower reservoir of Bhavali PSP is minimal during first filling. Subsequently during the operation of PSP, all the flows including non-monsoon flows will be let downstream, as the PSP reservoir will not have the capacity to fill over and above the proposed gross storage capacity. Moreover, during monsoon in most of the years, water spills through Bhatsa dam as the reservoir level reaches FRL. This aspect is also confirmed with WRD Department, wherein the spillage from Bhatsa dam in a 75% dependable year is 64.970 MCM of water.

B.1 Observations & findings

1. It is observed in the study that the rainfall data of Kothale rain gauge station as provided by the project authorities is found inconsistent for the year 1976 and from the year 2013 to 2019. Hence this office has used IMD gridded rainfall data for the nearest grid to the project site from the year 1970 to 2020 to estimate the annual yield for the project, and the corresponding dependability analysis is shown in the table below, which can be used for the planning purpose of the proposed Bhavali PSP.

S. No.	Dependability	Yield at Lower Dam(MCM)
1	90%	12.96
2.	75%	15.83
3.	50%	19.14

C. DESIGN FLOOD STUDIES

The Bhavali PSP, upper & lower reservoir can be classified as "Large dam" by hydraulic head criterion being more than 30m, hence the upper and lower dam should be design for Probable maximum flood as its design flood. Project authorities have used rational approach to estimate the Probable Maximum Flood for proposed Upper and Lower Dam and the estimated values are presented in the table given below:

Dam	Probable Maximum Flood (m^3/sec)
Upper Dam	256
Lower Dam	431

C.1 Observations & findings

1. The estimated Probable Maximum Flood for upper and lower dam by the project authorities **appears to be generally in order.**
2. Hence the Probable Maximum Flood of **256m^3/sec** and **431m^3/sec** may be used for the design purpose of upper and lower dam respectively.

D. DIVERSION FLOOD STUDIES

According to IS 14815:2000, Project authorities have used 25 year return period rainfall from the atlas of state wise generalized Isopluvial maps prepared by IMD for computing the diversion flood. Accordingly estimated diversion flood by the project authorities for upper and lower dam are **63m^3/sec** and **104m^3/sec** respectively.

Annexure-1.2

मुख्य अभियंता,
जलविज्ञान व धरण सुरक्षितता
सीडीओ बिल्डींगच्या मागे,
दिंडोरी रोड , नाशिक - ४२२००४
दूरध्वनी :०२५३-२५३०२२७

महाराष्ट्र शासन
जलसंपदा विभाग

Chief Engineer,
Hydrology & Dam Safety
Behind C.D.O. Building,
Dindori Road,
Nashik – ४२२००४
Ph.No. : ०२५३-२५३०२२७

Web: www.mahahp.gov.in Email: cehpswnasik@gmail.com / cehp.nashikwrd@maharashtra.gov.in

फक्त ई-मेलद्वारे

जा.क्र.मुअ/जवधसु/तांशा-६/(१४/२०२२)/२३६७/सन २०२२ दिनांक:- २१/११/२०२२

प्रति,

मुख्य अभियंता,
जलसंपदा विभाग, कोंकण प्रदेश,
मुंबई-४००००१.

विषय :- Request for allocation of water to Proposed Bhavali Pumped Storage Project (1500 MW) of JSW Energy limited.

संदर्भ :-१) शासन पत्र संकिर्ण-२००८/१६०४/(४६४/२००८)/जसंअ, दि. २७/०५/२००९.
२) शासन पत्र क्रं. जविप्र २०२१/ (प्र.क्र.७४/२१)/जवि, दिनांक - ०४/१०/२०२१.
३) मुख्य अभियंता, जलसंपदा विभाग, कोकण प्रदेश, मुंबई या कार्यालयाचे पत्र जा.क्र.मुअ/ जसंविकोप्र/पाऊप्र/तां-५/२७०१, दिनांक - ०६/०७/२०२२.
४) या कार्यालयाचे मा. सचिव (जसंव्य व लाक्षेवि), जलसंपदा विभाग मंत्रालय यांना उद्देशून पत्र जा.क्र.मुअ/जवधसु/तांशा-६/(१४/२०२२)/१८५०/सन २०२२, दि. २३/०८/२०२२.
५) शासन पत्र संकिर्ण-२००८/(४६४/२००८)/जसंअ, दि. १४/१०/२०२२.
६) शासन पत्र जा.क्र. जविप्र २०२१/(प्र.क्र. ७४/२१) जवि, दि. २१.१०.२०२२.

उपरोक्त संदर्भ पत्र क्र. २ अन्वये आपले कार्यालयाने विषयांकित प्रकल्पास पाणी उपलब्धता प्रमाणपत्र मिळणेबाबतचा प्रस्ताव शिफारशी सह सादर केलेला आहे.

संदर्भिय शासन पत्र क्र. १ नुसार खाजगी संस्थांना पाणी उपलब्धतेचे निष्कर्ष निर्गमित करण्यापुर्वी त्या अभ्यासांना शासनाची मान्यता घेण्यात यावी असे निर्देश होते. या अनुषंगाने विषयांकित प्रकल्पाची संकल्पन टिप्पणी शासन मान्यतेसाठी या कार्यालयाचे संदर्भिय पत्र क्र. ४ अन्वये सादर करण्यात आलेली होती. तथापि दि. १४.१०.२०२२ रोजीच्या संदर्भिय शासन पत्र क्र. ५ अन्वये मुद्दा क्र. ३ मध्ये "अनुज्ञेय शिल्लक पाण्यापैकी किती पाणी/प्रस्तावित पाणी प्रत्यक्षात प्रस्तावित प्रकल्पाच्या ठिकाणी उपलब्ध आहे किंवा कसे याबाबत पाणी उपलब्धता प्रमाणपत्र मुख्य अभियंता, जलविज्ञान व धरण सुरक्षितता, नाशिक यांनी जलशास्त्रीय अभ्यास करुन त्याआधारे देणे अपेक्षित आहे. मुख्य अभियंता, जलविज्ञान व धरण सुरक्षितता, नाशिक हे जलशास्त्रीय अभ्यासासाठी सक्षम कार्यालय असून व त्यासाठी शासनाने प्राधिकृत केलेले असल्याने परत या अभ्यासास शासनाची मान्यता घेण्याची आवश्यकता नाही" असे नमूद आहे.

त्यानुसार संदर्भिय शासन पत्र क्र. ६ अन्वये शासनाने खाजगी संस्थांकडून पाणी उपलब्धता मागणी प्रस्तावाबाबत करावयाच्या कार्यावाही संदर्भात जलसंपदा विभाग, जसंअ कार्यासनाने दिनांक १४/१०/२०२२

रोनीच्या पत्रान्वये (संदर्भ पत्र क्र. ५) अभिप्राय दिले असून,सदर अभिप्रायास अनुसरुन पुढिल उचित कार्यवाही आपल्या स्तरावर त्वरीत करण्यात यावी असे कळविले आहे.

या अनुषंगाने या कार्यालयाने पाणी उपलब्धता प्रमाणपत्र क्र. WFR/Ulhas/894,Dated- 21/11/2022 अन्वये विषयांकित प्रकल्पास ०.९९१ द.ल.घ.मी. चे प्रमाणपत्र जा. क्र. CE/H&DS/TS-6/(14/2022)/2350 /2022, दि. 21/11/2022 प्रदान केलेले आहे. सोबत सदर प्रमाणपत्र व संकल्पन टिपणी जोडण्यात आलेली आहे.

प्रस्तावित प्रकल्पाचा समावेश राज्य एकात्मिक जल आराखड्यात (ISWP) करण्याची जबाबदारी क्षेत्रिय मुख्य अभियंता यांची राहील.

हे आपले माहिती व आवश्यक कार्यवाहीसाठी सस्नेह अग्रेषीत.

सोबत –वरीलप्रमाणे

(अ. अ. पंडित)
सहायक मुख्य अभियंता
जलविज्ञान व धरण सुरक्षितता
नाशिक.

स्थळ प्रत मा. मु.अ. यांनी मान्य केली आहे.

प्रत:-मा. सचिव (जसंव्य व लाक्षेवि), जलसंपदा विभाग, मंत्रालय, मुंबई यांना माहितीस्तव सविनय सादर.
(लक्षवेध- न.गौ. बसेर, उपसचिव (जवि), जलसंपदा विभाग, मंत्रालय, मुंबई)
प्रत:-मा. कार्यकारी संचालक, कोंकण पाटबंधारे विकास महामंडळ, ठाणे यांना माहितीस्तव सादर.
प्रत:-अधीक्षक अभियंता, आधार सामग्री पृथ:करण मंडळ, नाशिक यांना माहितीसाठी.
सोबत: वरीलप्रमाणे.
प्रत:- JSW Neo Energy Ltd, JSW Centre, Bandra Kurla Complex, Mumbai-४०००५१.
D.A.-Design Note.

Annexure-1.3

13

Full title of the Project: Diversion of Forest Land for construction of Bhavali Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State
File No.: FP/ MH/HYD/153240/2022
Date of Proposal: 06/03/2022

(Sr. No. 2 of Checklist)

JUSTIFICATION

Of Site Specificity

The Pumped Storage Project is essentially a "site-specific" project as it requires a particular type of topographical and geo- technical conditions with availability of water source at a close proximity to the identified project site. The sites of elevation variance are required to create upper & lower reservoirs of desired capacity. The reservoirs are critical for storing water for long duration. Their location should compulsorily be fulfilling the geo-technical criteria needed for establishing the Pumped Storage Project. Since this project requires water as a means to store energy, a techno-commercially viable water source, with sufficient capacity, to fill up the reservoir one time at the beginning of its operation and to supply for losses during its operation (mainly evaporation loss, quarterly or semi-annually or annually) has to be available in close proximity of project.

The proposed site has initially been identified by the Government of Maharashtra. Attempts were also made to explore the possibilities for alternate sites based on topographical, geological, geo-technical and techno-economic feasibility parameters. However, the JSW Energy PSP Two Limited has found proposed 275.00 Ha. of land, including Forest & Non-Forest, in Jamunde village of Igatpuri Tehsil of Nasik District and Kalbhonde, Kothale villages in Shahapur Tehsil of Thane District as most suitable site for the proposed project. The Government of Maharashtra has entered into an agreement by signing the Memorandum of Understanding for setting up of the extant project in Jamunde village of Igatpuri Tehsil of Nasik District and Kalbhonde, Kothale villages in Shahapur Tehsil of Thane District.

A detailed alternative study to find out the best optimized alignment of water conductor system on left bank of the upper reservoir along with other appurtenant structures was carried out. The location of powerhouse has also been selected based on the due consideration being given to topographical and Geological features. An attempt to optimize the orientation of PH on account of Geo- logical requirements viz-a-viz angle of deviation w.r.t. to the flow direction along the WCS has been done. The location of powerhouse is positioned in such way as to avoid the requirement of upstream surge shaft on the Headrace tunnel.

Underground power house is more suitable as compare to surface powerhouse. Therefore, the **following three "alternative layouts" of the project have been developed for techno economic comparison** and the pros and cons of all the alternatives are discussed below: -

Alternative I:

This alternative envisages the construction of following Major Components:

- Construction of Upper and lower dam of Height 47.0 m and 70.0 m respectively from the lowest natural surface level.
- Construction of Upper and Lower intake.
- one number of 11m dia water conductor system comprising of about 475.0 m long Head Race Tunnel (HRT) bifurcated into two penstocks of 7.7m dia of 647.107m length and each penstock is trifurcated into 3 branch penstocks of 4.0m dia and 135.32m long, 6 No's of each 5.0m TRT of length 90m is connected to the surge chamber in the downstream end in-turn connected to one number of tail race tunnel (TRT) of 11m dia and 808.75 m long.
- Downstream underground surge chamber on Tail Race Tunnel

- An underground power house and Transformer cavern, the arrangement of powerhouse is positioned under high cover zone of about 365m or more.

Alternative II:
This alternative envisages the construction of following Major Components:
Upper and Lower dam is similar to Alternative-1.
Construction of Upper intake, the location of lower intake is same as Alternative-1.
one number of 11m dia water conductor system would comprise of about 1605.302 m long Head race tunnel bifurcated into two numbers of 7.7m dia penstocks of length 169.90m in which each penstock intern trifurcated into small branch penstock of 4.0m dia and tail race tunnel (TRT) 358.52m long
Underground Powerhouse location is similar to Alternative-1 but positioned under optimized top covet to avoid problems related to high cover zone on the underground caverns.

Alternative III:
This alternative envisages the construction of following Major Components:
- Upper and Lower dam is similar to Alternative-1.
- Construction of Upper intake, the location of lower intake is same as Alternative-1.
- One number of HRT of 11m dia 653m long bifurcated into two numbers of 7.7m dia with a length of 1704.11m at the upstream surge chamber of 25m dia and each penstock is divided into branch penstock of 4.0 m dia and 76m long and tail race tunnel (TRT) 213.5m long.
- Surface Powerhouse location shifted downstream towards lower reservoir but involves deep surface cut

Conclusion
- Both the alternative for underground scheme has similar arrangement except minor changes in the length of various tunnels. In Alternative 2 the Power House location is located such that D/S Surge Chamber get eliminated. The overall impact is reduction in the overall cost. Hence Alternative-2 has been selected for the further studies as compare to Alternative-1.
- Also, based on Techno-Economic comparison of all the alternatives, Alternative-2 has less Levellised Tariff as compared to Alternative-1 & 3.

Hence, considering Techno-Economic Parameter underground power house with Alternative-2 is chosen for the development of the proposed PSP.

The above layout was received by the CEA/ CWC and further modification in Water Conductor System was suggested; like, instead as one HRT and Pressure Shaft, three HRT(s) & PS(s) were suggested. Accordingly, further layout was optimized and details of the same are given in the Salient Features mentioned in this note.

The proposed site involves 243.74 Ha. of Forest Land and 31.08 Ha. of Non- Forest Land. Attempts have been made to minimize the use of Forest Land for the project. However, the Forest Land cannot be avoided or no alternative can be substituted. The Forest Land proposed for diversion is, thus, unavoidable. The barest minimum Forest Land, to the extent of 243.74 Ha., is proposed to be diverted in the extant proposal.

JSW Energy PSP Two Limited

(Lalit Parab)
Authorized Signatory
JSW Energy PSP Two Limited, Mumbai

Date: / /2025
Place: Mumbai
Office Seal:

Summary Note on Alternative Analysis for Bhavali Pumped Storage Project

Conceptualization of Bhavali Pumped Storage Project was done through adopting careful evaluation criteria to ensure technical feasibility, economic viability and environmental sustainability. The foremost considerations involve identifying suitable locations for both the upper and lower reservoirs, ensuring the availability of reliable water sources, determining the most techno-economically viable alignment for the Water Conductor System (WCS) and finalizing the most optimal powerhouse location.

In addition to these technical aspects, the process of alternative site analysis was done following a holistic approach that incorporates the following criteria:

- **Minimization of ecological and social impacts:** ensure minimum disruption to local ecosystems, wildlife habitats, and communities.
- **Optimal utilization of available head:** The natural elevation difference at the project site should be maximized to achieve higher efficiency and energy output.
- **Minimum land acquisition:** Reducing the extent of land required for reservoirs, access roads, and associated facilities helps lower costs and mitigate displacement.
- **Ease and feasibility of construction:** Select site with most suitable Geological conditions & terrain, safety of construction activities and accessibility to all major components with minimum conflict and disruption adjoining areas.
- **Minimal interference with existing infrastructure:** Project layout was finalized keeping in minimum conflict with other infrastructures like nearby roads, settlements, transmission lines, and other facilities to avoid conflicts and additional costs.
- **Geological suitability and stability of reservoir banks:** Site configuration was firmed up while ensuring long-term structural stability, minimizing risks of seepage, slope failure, or reservoir-induced hazards.

Based on these considerations, a detailed analysis of potential alternatives was undertaken for the upper reservoir, lower reservoir, WCS alignment, powerhouse location, and transmission line corridor. This comparative study was carried out as part of investigation and Detailed Project Report (DPR) preparation stage. These alternatives were discussed in detail with concerned departments in Central Electricity Authority (CEA) before awarding Technical concurrence to this project.

The layout alternatives were discussed in detail during the Expert Appraisal Committee (EAC), MoEF&CC meeting. Furthermore, the proposal was appraised for Grant of Environmental Clearance before the Expert Appraisal Committee (River Valley and Hydroelectric Projects), MoEF&CC, in its 14th meeting held on 31st August 2024.. In the meeting, it was recommended that *"As the project cover area is located in Western Ghats, the EAC sub-committee shall conduct site visit for assessing the ground conditions and possible environmental impacts due to project comprehensively before further consideration of the proposal".*

In compliance of the above, Dr. Ajay Kumar Lal, Member EAC (Hydro & River Valley project) and Dr. P. R. Sakhare Members & Representative from MoEF&CC visited the Proposed Bhavali Pumped Storage Project" site on 2nd & 3rd Jan., 2025 and the findings of the site visit were discussed amongst the Hon'ble EAC members at Additional Agenda Item 22.4 in the 22nd EAC Meeting held on 10th Jan., 2025. In the site visit report, it has been recommended

that," The proposed project site is topographically stable and not prone to landslides, with minimal risk of adverse geological impacts, provided safeguards and TOR conditions are followed.

Considering the above, the Hon'ble Expert Appraisal Committee (River Valley and Hydroelectric Projects) recommended the proposal for grant of prior Environmental Clearance in its 32nd meeting held on 29th May, 2025.

Alternatives Examined

During the planning phase, three alternative project layouts were identified and investigated thoroughly. Extensive surface and sub-surface investigations were conducted at multiple potential sites to assess technical, environmental, and social implications. The selection process aimed to achieve an optimal balance between techno-economic viability, environmental conservation, and social acceptability. Ultimately, the most suitable alternative was chosen as the basis for further project development. These detailed analyses for these three alternatives is already submitted as part of the Forest Diversion Proposal (Proposal no: FP/MH/HYD/153240/2022 for ready reference summary of these three options is placed below;

A detailed alternative study has been carried out to find out the best optimized location for upper and lower dam, powerhouse location and water conductor system based on topographical survey and geological traverse. The main parameters considered during identification & finalization of the reservoirs were: proximity between the two reservoirs; capacity; topography & geological setup; reservoir water tightness & head. Typically, in a Pumped storage hydropower project, the lower and upper reservoir locations are selected in local depressions at close vicinity which can be connected by a short water conductor system

Selection of Upper Reservoir

The Topography of the proposed area of upper reservoir depicts small depression around the top of hill area showing possibility of creation of reservoir. The capacity of the upper reservoir is proposed with a target live storage of 0.40 TMC), so as the scheme can be operated for a peaking power generation of about 8 hours. The vegetation density in most of the reservoir is very low. The boundary of the project has been fixed keeping in view the safe distance from the nearby Villages, Wildlife and ESZ. During detailed geological assessment, no adverse geological features were observed in this area and this location appears to be geologically suitable for water retention in the reservoir. No major social environmental issues are expected to be involved in this particular location.

Selection of Lower Reservoir

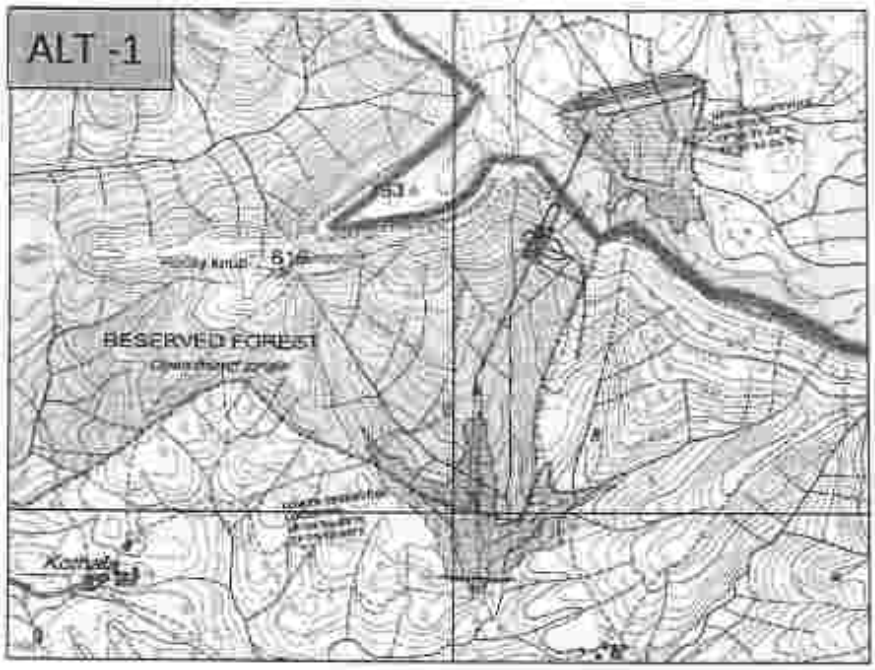
Having Finalized the location of upper reservoir and based on the basic technical parameters required for the pumped storage project only one location was found suitable for lower reservoir which is located in natural depression and allowing to create the desired live storage capacity of 0.40 TMC. This location is within the technical suitability requirements and no major Social and environmental issues were noticed for this particular area.

Selection of Water Conductor System & Power house

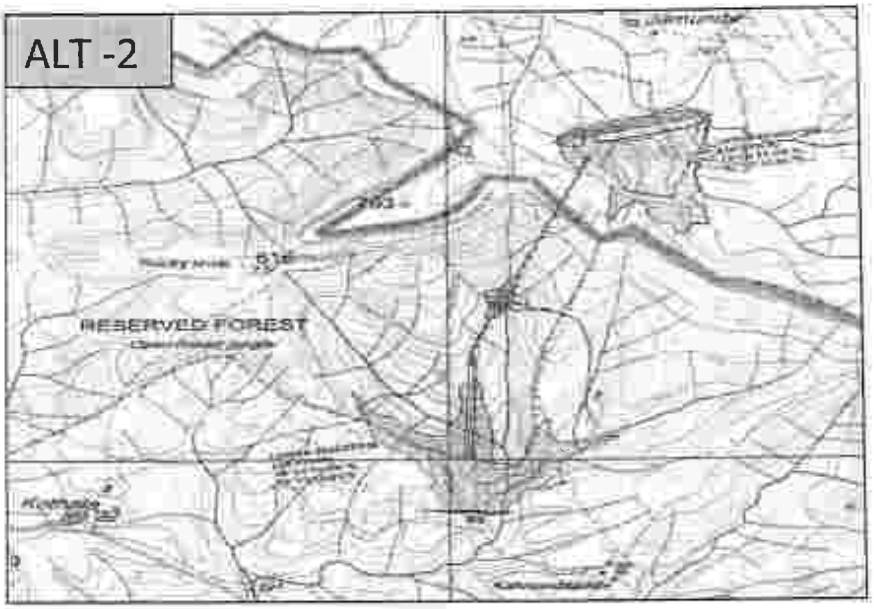
The alignment of water conductor system along the left bank of the upper reservoir has been selected based on the study of various alternate arrangements to arrive at the most optimized alignment of WCS based on the present level of Geological features, Topographical features and availability of sufficient rockmass cover. Further, detailed

alternative study has been carried to find out the best optimized sizing/configuration of water conductor system along with other appurtenant structures having minimum length to avoid energy losses with due considerations on the requirement of surge arrestors for both upstream and downstream. Three alternatives of Powerhouse were studied (1) near upper reservoir with underground power house (2) near lower reservoir with underground power house (3) near lower reservoir with surface power house option. The arrangement of powerhouse is positioned in such way to avoid/minimize the requirements of additional large underground surge chambers at u/s and d/s of the water conductor system.

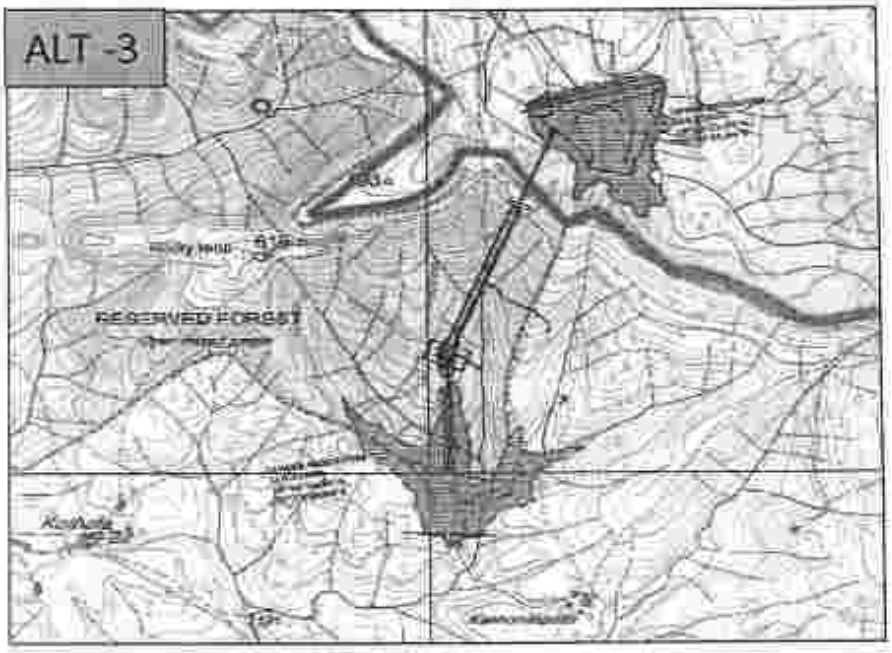
Topomap of Alternative-1



Topomap of Alternative-2



Topomap of Alternative-3



Comparative Assessment of Alternatives

Sl. No.	Parameter	Alternative – 1	Alternative – 2	Alternative – 3
1	Storage Capacity	12000 MWh	12000 MWh	12000 MWh
2	Installed Capacity	1500 MW	1500 MW	1500 MW

Sl. No.	Parameter	Alternative – 1	Alternative – 2	Alternative – 3
3	Upper Reservoir FRL/MDDL	EL. 737m / EL. 711m	EL. 737m / EL. 711m	EL. 737m / EL. 711m
4	Upper Reservoir Available Live Storage	0.40 TMC	0.40 TMC	0.40 TMC
5	Type of powerhouse	Underground	Underground	Surface
6	Upper Dam Type / Length	Rockfill dam, 956 m	Rockfill dam, 956 m	Rockfill dam, 956 m
7	Lower Reservoir FRL/MDDL	EL. 300m / EL. 270m	EL. 300m / EL. 270m	EL. 300m / EL. 270m
8	Lower Reservoir Live Storage	0.40 TMC	0.40 TMC	0.40 TMC
9	Lower Dam Type / Length	Rockfill Dam, 470 m	Rockfill Dam, 470 m	Rockfill Dam, 470 m
10	Maximum Gross Head	467m	467m	467m
11	L/H Ratio of Water Conductor System	4.4m	4.4m	5.0m
12	Water Availability (Initial Filling & Replenishment)	Self- yield from the catchment	Self- yield from the catchment	Self- yield from the catchment
13	Type of Land for Project	Mostly Forest	Mostly Forest	Mostly Forest
14	Environmental Impacts	Moderate, manageable with mitigation plans (CAT, Comp. Afforestation, Wildlife Plan)	Moderate, manageable with mitigation plans (CAT, Comp. Afforestation, Wildlife Plan)	Comparably High - larger forest diversion, greater disturbance
15	Social impact	Limited R&R	Limited R&R	Limited R&R
16	Social Issues	None	None	None
17	Technical Viability	Technically feasible, but higher project & forest cost	Fully feasible, stable, and optimized layout with minimum project & forest cost	Technically feasible, but higher project & forest cost
18	Land Requirement			

Sl. No.	Parameter	Alternative – 1	Alternative – 2	Alternative – 3
i	Total Area (Ha.)	301.64	291.51	314.13
ii	Forest Area (ha.)	272.64	261.51	283.13

Conclusion

- ✓ Both the **Alternative-1** and **Alternative-2** for underground scheme has similar arrangement except changes in the length of various tunnels and location of Powerhouse. In Alternative-1 the underground power house is seated in high rockmass cover of about 400 m near upper reservoir which leads to longer lengths of Access tunnels and large surge chamber in the tail race tunnel. In **Alternative -2** the Power House location is located such that D/S Surge Chamber get eliminated and tunnel lengths are small. The overall impact is reduction in the **land requirement, construction period and the project cost for Alternative-2**.
- ✓ **Alternative-3** which envisages a surface powerhouse scheme, entails very deep cutting of more than 130 m near the lower reservoir. This raises concerns regarding long-term operational issues such as flooding, continuous dewatering and slope stability. Moreover, the scheme would require massive excavation works, leading to an increased land requirement for project components and disposal of excavated material as well as extended timelines for execution. The overall impact of additional mitigations for dewatering arrangements, increased land requirements and slope stabilization measures for deep pit shall increase the project cost.

Considering above aspects, **Alternative-2** (Underground Power house Scheme) is more feasible than any other alternative in terms of techno-economic parameters and environmental impact.

During the review process by **CEA/CWC**, it was recommended that the Water Conductor System be optimized for operational flexibility. Instead of a single Head Race Tunnel (HRT) and pressure shaft, the design was revised to include **three HRTs and pressure shafts**. These modifications has optimized the project layout for constructability, operational flexibility and successfully reduced the overall land requirement to **275.00 ha**.

It is respectfully submitted that the selected project site involves **243.74 ha of Forest land** and **31.05 ha of** non-forest land. Every effort has been made to minimize forest land use; however, due to the specific topographical configuration of the reservoirs and the essential nature of the project components, diversion of forest land is unavoidable. Accordingly, only the barest minimum extent—**243.74 ha of Forest land** is proposed for diversion under the present proposal.

*****

Annexure -I.4

भारत सरकार
Govt. of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
जल विद्युत परियोजना मूल्यांकन प्रभाग
Hydro Project Appraisal Division

OFFICE MEMORANDUM

Subject: Accord of Concurrence to Bhavali Off-stream Open Loop Pumped Storage Project, 1500 MW (5 x 250 MW + 2 x 125 MW) in Maharashtra by M/s. JSW Energy PSP Two Limited under Section 8 of the Electricity Act, 2003 - regarding.

Detailed Project Report (DPR) of the Bhavali Off-stream Open Loop Pumped Storage Project, 1500 MW (5 x 250 MW + 2 x 125 MW) in Maharashtra by M/s. JSW Energy PSP Two Limited was uploaded in the DPR Approval Process Monitoring System (DAPMS) portal of CEA on 05.09.2024 for concurrence, as per Guidelines for Acceptance, Examination and Concurrence of Detailed Project Reports for Pumped Storage Schemes Version 3.0

2. Undersigned is directed to convey the decision of Authority taken in the meeting held on 06.09.2024, to accord concurrence to Bhavali Off-stream Open Loop Pumped Storage Project (PSP) in exercise of the powers conferred upon the Authority under Section 8 of the Electricity Act, 2003.

3. The undertaking by M/s. JSW Energy PSP Two Limited is attached at **Annex- I**. The salient features of the scheme are given in **Annex-II**.

4. This concurrence is subject to fulfilment of the following conditions: -

i. M/s. JSW Energy PSP Two Limited shall comply with the suggestions/ observations of Central Water Commission (CWC) as given in **Annex-III.**

ii. M/s. JSW Energy PSP Two Limited shall comply with the suggestions/ observations of Central Electricity Authority (CEA) as given in **Annex-IV.**

iii. M/s. JSW Energy PSP Two Limited shall comply with the suggestions/ observations of Geological Survey of India as given in **Annex- V.**

iv. M/s. JSW Energy PSP Two Limited shall comply with the suggestions/ observations of CSMRS as given in **Annex-VI.**

v. M/s. JSW Energy PSP Two Limited shall make provisions to install the instruments (list attached at **Annex-VII**) in appropriate number at suitable locations in project as per relevant IS codes in consultation with CWC. Further, it is to mention that the list of instruments attached at **Annex-VII** is not exhaustive and may be modified by CEA in future. M/s. JSW Energy PSP Two Limited shall be responsible for installing adequate instrumentation in the project to ensure safety and monitor project health effectively.

vi. M/s. JSW Energy PSP Two Limited shall communicate results of explorations/ investigations from time to time for appraisal of CEA/ CWC/ GSI/ CSMRS regularly.

vii. Examination of Cost Estimates of Pumped Storage Projects is exempted from Concurrence Process. However, additional chapters as per Guidelines for Formulation of Detailed Project Reports for Pumped Storage Schemes Version 3.0, shall be submitted by M/s. JSW Energy PSP Two Limited to the Authority within 60 days from date of uploading the DPR on CEA portal so as to ascertain the project cost in accordance with the limit specified by the Central government from time to time. It will not be vetted by CEA/CWC.

viii. M/s. JSW Energy PSP Two Limited shall use the NCSDP approved parameters for design purposes.

ix. In case geological surprises in works of the project are met, M/s. JSW Energy PSP Two Limited shall systematically maintain a record of geological surprises and treatment provided. The same may be immediately brought to the knowledge of Standing Committee for matters pertaining to Geological Uncertainties/ Surprises and Natural Disaster Events faced in the Hydroelectric Projects constituted vide OM date 23.10.2023 (**Annex-VIII**).

x. M/s. JSW Energy PSP Two Limited shall obtain Environment and Forest clearance from MoEF&CC and shall submit a copy to CEA.

xi. M/s. JSW Energy PSP Two Limited shall obtain Clearance from National Board of Wildlife and shall submit a copy to CEA, if applicable.

xii. M/s. JSW Energy PSP Two Limited shall obtain Land availability certificate before actual start of the project and shall submit a copy to CEA.

xiii. M/s. JSW Energy PSP Two Limited shall obtain NoC from Ministry of Defence and shall submit a copy to CEA, if applicable.

xiv. If Scheduled Tribe population is getting affected at project site, clearance under Forest Right Act/ Ministry of Social Justice & Empowerment/ State Government shall be obtained by M/s. JSW Energy PSP Two Limited and shall submit the same to CEA.

xv. Suitable R&R plan shall be prepared by M/s. JSW Energy PSP Two Limited and submitted to MoEF&CC for obtaining their clearance.

xvi. M/s. JSW Energy PSP Two Limited shall set up a sound and scientific safety management system which shall include:

- Establishing procedures to identify hazards that could give rise to the potential of injury, health impairment or death and measures to control impact of such hazards.
- Setting up an Early Warning System to deal with hazardous events such as Glacial Lake and Landslide Outburst Floods, Earthquakes, cloudburst, Flash Floods, Avalanches, Dam Break event, etc.
- Establishing Standard Operating Procedure to deal with these hazardous events.

xvii. M/s. JSW Energy PSP Two Limited shall obtain clearance from Ministry of Home Affairs regarding participation of foreign companies in tender works packages and shall comply with the conditioned stipulated therein.

xviii. M/s. JSW Energy PSP Two Limited shall take measures for averting the flooding of the powerhouse as per conditions contained in **Annex-IX** and appropriate preventive measures of Disaster Management in case of Dam failure or sudden release of water as per conditions contained in **Annex-X.**

xix. M/s. JSW Energy PSP Two Limited shall comply with the "Guidelines for participation of foreign Companies in tender work packages of Hydroelectric Projects in sensitive areas, 2009" as issued by Ministry of Power vide letter no. 7/1/2002-DO (NHPC Limited) [Vol.II] dated 03.09.2009 **(Annex-XI)**.

xx. M/s. JSW Energy PSP Two Limited shall deploy modern tools / software for construction monitoring of the project by establishing IT based monitoring systems and linking the same to CEA network.

xxi. M/s. JSW Energy PSP Two Limited shall ensure availability of adequate quantities of rock/sand from quarries/excavated muck/burrow areas to meet the requirement of coarse & fine aggregates for both wearing & non-wearing surfaces.

xxii. Fly ash and fly ash based products shall be used in the construction of various works to the extent possible in accordance with MoEF&CC (Erstwhile MoEF) notification dated 14.09.1999 and its amendment dated 27.08.2003 and as revised on 06.11.2008. Construction material surveys shall include the required investigations for use of fly ash and fly ash based products in various works, infrastructure facilities etc. and their feasibility shall be ascertained by M/s. JSW Energy PSP Two Limited.

xxiii. Information in respect of tying up essential inputs/statutory clearances, results of investigations/ studies shall be submitted by M/s. JSW Energy PSP Two Limited to CEA/CWC/GSI/CSMRS on receipt of same from time to time.

xxiv. The broad technical aspects of the project proposal in the project report have been scrutinized in CEA in consultation with CWC, GSI and other concerned agencies. The scrutiny is based on the data, assessment and certificates presented in the report and information/clarifications received as compliances to the observations on the assumption that the data and information furnished

are accurate and have been collected reliably by the project authorities from dependable sources and/or after carrying out detailed surveys and investigations as presented in the report.

xxv. M/s. JSW Energy PSP Two Limited shall comply strictly the "Public Procurement (Preference to make in India) Order, 2017 (PPP-MII Order)" issued by Department of Industrial Policy and Promotion, Ministry of Commerce & Industry, Govt. of India vide its letter no. P-45021/2/2017-B.E.-II dated 15.06.17. **(Copy enclosed Annex-XII).**

xxvi. M/s. JSW Energy PSP Two Limited shall register units of the project in e-gen portal and map data on PM Gati Shakti Portal.

xxvii. M/s. JSW Energy PSP Two Limited shall strictly comply with the provisions mentioned in Central Electricity Authority regulations for "Safety requirements for construction, operation and maintenance of electrical plants and electrical lines, 2011" and amendment thereof, if any.

xxviii. M/s. JSW Energy PSP Two Limited shall strictly comply with the provisions mentioned in Central Electricity Authority regulations for "Measures relating to Safety and Electric Supply, 2010" and amendment thereof, if any.

xxix. M/s. JSW Energy PSP Two Limited shall approach CTU to seek connectivity as per CERC Regulations.

xxx. M/s. JSW Energy PSP Two Limited shall submit the updated DPR to the State Govt., Appropriate Electricity Regulatory Commission, Central Transmission Utility and co-basin States within seven days from the date of issue this Office Memorandum.

5. Developer has informed that project is scheduled to be completed in 46 months from zero date, i.e., 01.03.2025.

6. Concurrence is subject to compliance by M/s. JSW Energy PSP Two Limited of various policies/ guidelines etc. issued by Govt. of India from time to time.

7. Monthly Status Report of compliance of the conditions stipulated in para 4 of this Concurrence letter shall be submitted by M/s. JSW Energy PSP Two Limited to HPA division, CEA.

8. Monthly Progress Report of the project shall be submitted to Hydro Project Monitoring (HPM) Division of CEA. Three (3) copies of half-yearly reports both on physical progress of the scheme and expenditure actually incurred, duly certified by statutory auditors shall be submitted to the Authority till the Commercial Operation Date of the plant. The project authorities shall give free accessibility to CEA officers and staff to have on the spot assessment of various aspects of the project.

9. Monthly status of the project from date of concurrence to date of Commercial Operation (COD) shall be furnished by M/s. JSW Energy PSP Two Limited to HPA division, CEA as per the proforma enclosed at **Annex –XIII.**

10. In case time gap between Concurrence accorded to the scheme by CEA and award of one of major civil packages (either of Dam/ Embankment/ HRT/ Powerhouse) by M/s. JSW Energy PSP Two Limited is three years or more, a fresh Concurrence of CEA shall be obtained by M/s JSW. Energy PSP Two Limited.

Revalidation of Concurrence can also be considered, in case, the reason for delay in award of one of major civil packages (either of Dam/Embankment/HRT/ Powerhouse) is beyond the control of developer. However, proposal for revalidation shall be submitted three months before the expiry of validity of the Concurrence, which is three years from the date of issue of this Concurrence Memorandum.

11. In case, changes are made in design parameters, during construction, due to site conditions or otherwise, the same shall be submitted to CEA under intimation to concerned appraising Organization (CWC/GSI/CSMRS) for their approval at the design stage itself, well before execution of work in the form of Memorandum of Changes (MoC). The execution of such changes shall remain suspended till approval of the Authority on MoC.

12. The Authority reserves the right to revoke the concurrence, if the conditions stipulated in the concurrence letter are not complied with to the satisfaction of the Authority.

This issues with the approval of the Competent Authority.

Signed by Jyoti Singh
Date: 24-09-2024 17:19:38

(Jyoti Singh)
Deputy Director

To,

1. Whole Time Director, M/s. JSW Energy PSP Two Limited , NTH Complex 4th Floor, A-2, Shaheed Jeet Singh Marg, Qutab Institutional Area, New Delhi 110016.
2. Secretary, MoEF&CC, Govt. of India, Paryavaran Bhawan, CGO Complex, Lodhi Road, New Delhi-110003.
3. Chairperson, Central Electricity Regulatory Commission, 3rd & 4th Floor, Chanderlok Building, 36, Janpath, New Delhi-110001.
4. Chairperson, Central Water Commission, Sewa Bhawan, R.K. Puram, New Delhi-110066.
5. Additional Chief Secretary to Government, Department of Energy, 3rd Floor, Main Building, Mantralay, Mumbai-32. (email: ministertanpure@gmail.com)
6. Chairman-cum-Managing Director, Power Grid Corporation of India Limited, Saudamini, Plot No.2, Sector 29, Gurgaon-122001 (Haryana).

7. Chairman, Central Transmission Utility of India Limited, Floors No. 5-10, Tower 1, Plot No. 16, IRCON International Tower, Institutional Area, Sector 32, Gurugram, Haryana - 122001
8. Adviser (Energy), NITI Aayog, Yojana Bhawan, New Delhi-110001.
9. Member (D&R), Central Water Commission, Sewa Bhawan, RK Puram, New Delhi-110066.
10. Joint Secretary (Hydro), Ministry of Power, Shram Shakti Bhawan, Rafi Marg, New Delhi-110119.
11. Chief Engineer (HPA/ PSP&PA-I/ F&CA/ CD/ Legal/ HPP&I/ HETD&RM/ HPM), CEA, Sewa Bhawan, RK Puram, New Delhi-110066.
12. Chief Engineer Design (NW&S) & Nodal Officer for Single Window Clearance Cell, CWC, Sewa Bhawan (S), RK Puram, New Delhi-110066.
13. Director (LHIM & EPE Division), Geological Survey of India, A-II, Pushpa Bhawan, Madangir Road, New Delhi-110062.
14. Director, CSMRS, Olof Palme Marg, Hauz Khas, New Delhi-110016.
15. Director PA(N) & Nodal Officer for Single Window Clearance Cell, CWC, Sewa Bhawan(S), RK Puram, New Delhi-110066.
16. Director {Hydrology(S)/ CMDD (E&NE)/ Embankment (E&NE)/ HCD(E&NE)/ Gates Design (E&NE)/ FE&SA/ ISM-1/ CA-HWF/ CB&PM/ Instrumentation}, CWC, Sewa Bhawan (S), RK Puram, New Delhi-110066.

Copy to:

17. Chairperson, Central Electricity Authority, Sewa Bhawan, RK Puram, New Delh-110066.
18. Member (Power System/ Hydro/ Planning/ Grid Operation & Distribution/ Thermal/ Economic & Commercial), CEA, Sewa Bhawan, RK Puram, New Delhi-110066.

***

Annexure - 2.1

ANNEXURE 2
[SITE VISIT REPORT]

सत्यमेव जयते

Government of India
Ministry of Environment, Forest and Climate Change
IA Division
(River Valley and Hydroelectric Projects)
***

Minutes of 22ND MEETING OF THE EXPERT APPRAISAL COMMITTEE meeting River Valley and Hydroelectric Projects held from 10/01/2025 to 10/01/2025 Date: 22/01/2025

MoM ID: EC/MOM/EAC/580839/1/2025

Agenda ID: EC/AGENDA/EAC/580839/1/2025

Meeting Venue: INDIRA PARYAVARAN BHAWAN, NEW DELHI

Meeting Mode: Physical

Date & Time:

10/01/2025	10:30 AM	05:30 PM

1. Opening remarks

The 22nd meeting of the EAC for River Valley & Hydro-electric Projects organized by the Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi, was held on Physical Mode, under the Chairmanship of Prof. G. J. Chakrapani.

2. Confirmation of the minutes of previous meeting

The Minutes of the Meeting held on 21st EAC meeting on 31st December, 2024 were confirmed.

3. Details of proposals considered by the committee

Day 1 -10/01/2025

3.1. Agenda Item No 1:

3.1.1. Details of the proposal

Proposed Expansion of Tembhu Lift Irrigation Project Taluka Karad, District Satara, Maharashtra by Department of Irrigation located at **SATARA,MAHARASHTRA**			
Proposal For		Fresh EC	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/MH/RIV/482689/2024	J-12011/48/2023-IA.I (R)	06/01/2025	River Valley/Irrigation projects (1(c))

22.4.3 The EAC deliberated on the information submitted and as presented in the meeting and observed that the proposal is for grant of corrigendum in amendment in Terms of Reference (ToR) to the project for Sukhpura Off-Stream Closed Loop Pumped Storage Project (OCPSP)-2560 MW in an area of 788.6761Ha in Village Sukhpura, Lakshmikhera, and Nahargarh etc, Sub District Rawatbhata, District Chittaurgarh, Rajasthan by M/s Greenko Energies Private Limited.

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

The Ministry granted the Terms of Reference (ToR) for the proposed project vide letter dated 28.02.2020. Subsequently, an amendment to the ToR was granted on 03.08.2022 for changes in water requirement and land area.

The Expert Appraisal Committee (EAC) noted that, due to further revised details regarding land area requirements and minor adjustments in component sizing and levels, another amendment to the ToR was granted by MoEF&CC on 04.12.2024. It was further noted that due to inadvertent submission of incorrect information regarding the ToR date by the Project Proponent (PP), the wrong date, i.e., 28.02.2020, was mentioned in the Minutes of the 19th EAC meeting and the corresponding ToR letter.

22.4.4 The EAC after examining the information submitted and detailed deliberations recommended the proposal grant of corrigendum in amendment in Terms of References as proposed by the PP to Sukhpura Off-Stream Closed Loop Pumped Storage Project (OCPSP)-2560 MW in an area of 788.6761Ha in Village Sukhpura, Lakshmikhera, and Nahargarh etc, Sub District Rawatbhata, District Chittaurgarh, Rajasthan by M/s Greenko Energies Private Limited, under the provisions of EIA Notification, 2006 and as amended with subject to the following additional conditions:

i. All ToR points mentioned in the ToR letter dated 28.02.2020 and amendment in TOR dated 03.08.2022 and shall remain unchanged.
ii. EIA/EMP, collection of baseline data, other statuary clearance and the public hearing shall be carried out as per revised layout.
iii. Validity of ToR shall be counted from original date of grant to ToR i.e. 28.02.2020.

22.4 Additional Agenda item:

Site visit Report on Proposed Bhavali Pumped Storage Project" (1500MW) at Village Jamunde, Tehsil Igatpuri, District Nashik and villages Kalbhonde and Site visit Report on Proposed Bhavali Pumped Storage Project" (IS00MW) at Village Jamunde, Tehsil Igatpuri, District Nashik and villages Kalbhonde and Kothale, Tehsil Shahpur Thane (Maharashtra)

The Member Secretary, EAC informed that the Terms of Reference (TOR) was granted by the MoEF&CC, vide letter no. J-12011/08/2022-IA.I(R), 27.06.2022 and accordingly, Public hearing were conducted on 10.01.2024 for Nashik District and on 13.02.2024 for Thane District (Maharashtra). Final EIA report was submitted to MoEF&CC on18.06.2024 and an EDS was generated on 03.07.2024, in which clarification w.r.t. change in project area from ToR was asked. Reply of the same has been submitted on 23.07.2024 with proper justification for change in the project area. Thereafter, proposal was considered by Expert Appraisal Committee (EAC) in the 14" meeting conducted on dated 30.08.2024. In meeting, it was recommended that the Sub-committee of EAC shall conduct a site visit prior to reconsideration for EC.

The Sub-committee comprising of Ajay Kumar Lal, Member EAC (Hydro & River Valley project) and Dr. P. R. Sakhare, Scientist E Representative from MoEF&CC undertook site visit to the proposed Bhavali Pumped Storage Project" on 02.01.2025 and 03.01.2025. The sub-committee visited the upper dam, upper reservoir, lower dam, lower reservoir, muck disposal areas of Bhavali PSP.

The Sub-committee after detailed deliberation observations and recommendations are as follows:

i. The selected location is topologically stable and non prone to landslides as such. It is not therefore so fragile or sensitive The proposed project is not likely to cause considerable negative impacts on the geological conditions; rights and interests of people related to water resources of downstream locations if the conditions and safeguards imposed vide the TOR granted are complied with fully and comprehensibly. Further, the Project Proponent is also to ensure strict compliance of the assurances given during public hearing.

ii. The relocation of muck disposal site may not be insisted on while considering the proposal for clearance since the muck disposal site was found to have been selected properly. Further, ecologically better sites were not appeared available in nearby areas. Any relocation at this stage might lead to much changes and may lead to more adverse consequences. However, safety measures as contained in EMP and in other documents should be adhered to in toto.

iii. Water for operation of project will be sourced from self-yield from catchment area. There will be no dependency on the nearby streams and already established dams/reservoirs as confirmed and assured by the proponent. As stated above, since there are not much agricultural or drinking requirements in or nearby areas, the dam intervention should not be a matter of concern. Nevertheless, project proponent, as assured, will ensure maintenance of e-flow and minimum threshold water availability all year around.

iv. Nalla passing through the lower reservoir is a non-perennial and was containing very thin layer of water at the time of visit. However, as per the discussion held with the PP, natural flow of nallas/streams will not be restricted/diverted. Provision of ungated slipways has been considered to maintain natural flow of non-perineal nallas/streams.

v. Out of total forest area of 243.74ha, 160.21ha is reserved forest,73.85 ha is deemed forest and 9.68 ha is protected forest. The forest density in the proposed forest land involved in the project site is approx. 150 trees/la. A total of around 35000 trees and saplings are likely to be sacrificed. Therefore, it is important to insist on submitting the case under FCA and receive stage-I clearance at the earliest by the Project Proponent.

vi. PP has started the CER/CSR activities in the affected villages which includes the construction of public toilets, classrooms in the Govt. School, Mid-day Meal kitchens, and distribution of study materials, Shoes etc. to the students, blankets to the villagers.

vii. Wildlife conservation and biodiversity management plan has been approved by CWLW on 29.11 .2024 with a cost of Rs. 326.50 Lakhs.

The EAC after detailed deliberation accepted the site visit report and suggested to forward the recommendations to the PP for appropriate response.

The detailed site visit report is annexed at **Annexure-I**.

*****

Annexure I

Site visit Report on Proposed Bhavali Pumped Storage Project" (1500MW) at Village Jamunde, Tehsil Igatpuri, District Nashik and villages Kalbhonde and Kothale, Tehsil Shahpur Thane (Maharashtra)

In compliance to the MoEF&CC office order no. J-12011/08/2022-IA I(R) (E-183170) dated 30.12.2024 the Sub-committee comprising of Ajay Kumar Lal, Member EAC (Hydro & River Valley project) and Dr. P. R. Sakhare, Scientist E Representative from MoEF&CC undertook site visit to the proposed Bhavali Pumped Storage Project" on 02.01.2025 and 03.01.2025. The sub-committee visited the upper dam, upper reservoir, lower dam, lower reservoir, muck disposal areas of Bhavali PSP. The attendees of the site visit included project proponent authorised representatives, their consultants, local staff and a few locals.

Background

The proposed Bhavali Pumped Storage Project (5X250MW+2X125MW) is a self-identified, green field project by the JSW Energy PSP Two Ltd, a subsidiary of JSW Energy Limited. The need for Bhavali PSP in Nashik and Thane district, Maharashtra, has been considered in context of the focus of State Government to stabilize the grid by installation of Pumped Storage project which leads to increase the share of renewable energy which is available in plenty within the state in general and in the country as whole. The project is an off-stream project, where water will be recycled between the proposed upper and lower reservoir in one daily cycle of peaking (7.78 hour) and one daily pumping cycle (8.79 hour). The total land requirement for the project has been assessed as 278.92 ha of which private land is 35.18 ha and forest land is 243.74 ha. Forest land diversion case has been submitted vide FP/MH/HYD/153240/2022, dated 06.03.2022 on Parivesh Portal.

In this background, Terms of Reference (TOR) was granted by the MoEF&CC, vide letter no. J-12011/08/2022-IA.I(R), 27.06.2022 and accordingly, Public hearing were conducted on 10.01.2024 for Nashik District and on 13.02.2024 for Thane District (Maharashtra). Final EIA report was submitted to MoEF&CC on18.06.2024 and an EDS was generated on 03.07.2024, in which clarification w.r.t. change in project area from ToR was asked. Reply of the same has been submitted on 23.07.2024 with proper justification for change in the project area. Thereafter, proposal was considered by Expert Appraisal Committee (EAC) in the 14th meeting conducted on dated 30.08.2024. In meeting, it was recommended that the Sub-committee of EAC shall conduct a site visit prior to reconsideration for EC. The sub-committee undertook site visit on 2nd and 3rd January, 2025 to assess ground conditions and likely environmental impacts due to project intervention.

General Observations

Topography : Located in the north western edge of the Deccan Plateau along Sahyadri Range of the Western Ghat, the proposed project area is hilly terrain-with undulating rocky (mainly volcanic basalt) subsurface and having thin layer of dominant reddish brown top soil. Slope of the land varies unevenly from comparatively flattened near proposed upper reservoir (5-15 %) to steeper (30-45 %) at the proposed lower reservoir area.

Vegetative cover : Hard strata with sparse bushy covering of ground has resulted in devoid natural thick greening. The area was found to have a few barren patches too. Some patches contain good forest cover while majority covered with mixed species bushes and scrub as undergrowth. Proposed lower reservoir and dam axis site support moderately dense (40%) forest having adequate number of trees mainly *Terminalia bellirica, Dalbergia latifolia, Madhuca longifolia, Adina cordifolia* etc. Upper Reservoir site cover is mixed moist subtropical sub type with less canopy density and open forest (10-20 %). NTFPs such as herbal and commercial leaves, *amla, mahua*, ber, etc are found but not in abundance. Soil being shallow with rocky base, the vegetative growth and productivity is sluggish resulting in not much variability in floral diversity. First hand assessment of faunal diversity could not be possible in a day visit. At a glance, no evidence of big mammals or cats could be traced or found. Available documents and certificates relating to their presence, movements or corridors will lead in drawing conclusions on this aspect.

Water availability and impact on flow of water : The area records an average annual rainfall of 3000 mm which is much above normal and therefore it can be termed as wet region. Notwithstanding, due to impervious rocky land surface water infiltration or holding capacity is not befitting. However since water requirement is not being high (no cropping or habitation as such around) water scarcity is not an issue in spite of non poundage or storage. The rivulet on which the dam is proposed is in gorge shape cross sections and appears to be seasonal massive carrier of water during monsoon. During lean season, as at present, it has thin volume of water flowing.

Human Settlement and Habitation : The area mostly being a reserve and protected forest land and in interior of the Tehsil, only scattered few houses in a couple of villages were noticed in the fringe connecting areas. In addition, agricultural or cultivated lands were found to be nominal. Rehabilitation and Resettlement issues therefore are not of much concern.

Specific Observations and Recommendations

1. The selected location is topologically stable and non prone to landslides as such. It is not therefore so fragile or sensitive The proposed project is not likely to cause considerable negative impacts on the geological conditions; rights and interests of people related to water resources of downstream locations if the conditions and safeguards imposed vide the TOR granted are complied with fully and comprehensibly. Further, the Project Proponent is also to ensure strict compliance of the assurances given during public hearing.
2. The relocation of muck disposal site may not be insisted on while considering the proposal for clearance since the muck disposal site was found to have been selected properly. Further, ecologically better sites were not appeared available in nearby areas. Any relocation at this stage might lead to much changes and may lead to more adverse consequences. However, safety measures as contained in EMP and in other documents should be adhered to in toto.
3. Water for operation of project will be sourced from self-yield from catchment area. There will be no dependency on the nearby streams and already established dams/reservoirs as confirmed and assured by the proponent. As stated above, since there are not much agricultural or drinking requirements in or nearby areas, the dam intervention should not be a matter of concern. Nevertheless, project proponent, as assured, will ensure maintenance of e-flow and minimum threshold water availability all year around.
4. Nalla passing through the lower reservoir is a non-perinnial and was containing very thin layer of water at the time of visit. However, as per the discussion held with the PP, natural flow of nallas/streams will not be restricted/diverted. Provision of ungated slipways has been considered to maintain natural flow of non-perinnial nallas/streams.
5. Out of total forest area of 243.74 ha, 150.21 ha is reserved forest, 73.85 ha is deemed forest and 9.68 ha is protected forest. The forest density in the proposed forest land involved in the project site is approx. 130 trees/ha. A total of around 35000 trees and saplings are likely to be sacrificed. Therefore, it is important to insist on submitting the case under FCA and receive stage-I clearance at the earliest by the Project Proponent.
6. PP has started the CER/CSR activities in the affected villages which includes the construction of public toilets, classrooms in the Govt. School, Mid-day Meal kitchens, and distribution of study materials, Shoes etc. to the students, blankets to the villagers.

- Wildlife conservation and biodiversity management plan has been approved by CWLW on 29.11.2024 with a cost of Rs. 32o.50 Lakhs.

Photographs of the site visit:

Upper Reservoir (2nd Jan 2024)

Lower Reservoir (3rd Jan 2024)

09.01.25 (A K Lal)

Signature of member

09/01/2025

Signature of MoEFCC Representative

ANNEXURE

ATTENDANCE

ATTENDANCE SHEET

22nd MEETING OF EXPERT APPRAISAL COMMITTEE (E.A.C)

(River Valley & Hydroelectric Sector)

DATE & TIME : 10th January 2025 from 10:30 AM to 2:30 PM

VENUE : Narmada Conference Hall Ground Floor Jal Wing
Indira Paryavaran Bhawan New Delhi

Sl. No.	Name of Member	Role	Signature [10.01.2025]
1.	Prof. G.J. Chakrapani	Chairman	
2.	Shri Ajay Kumar Lal	Member	Online
3.	Dr. Udaykumar R.Y.	Member	Online
4.	Dr. Mukesh Sharma	Member	
5.	Dr. I.V. Tyagi	Member	Online
6.	Shri Kartik Supre	Member	
7.	Dr. A.K. Saraf	Member	Online
8.	Dr. B.K. Das	Member	Online
8.	Dr. J. A. Johnson	Member	
9.	Shri Rajeev Varshney	Member	
10	Representative of CWC	Member	
11.	Shri Yogendra Pal Singh	Member Secretary	

Aporoval of the Chairman

Re: [WARNING: ATTACHMENT(S) MAY CONTAIN MALWARE]Fwd: Draft MOM of the 22nd EAC meeting held on 10.1.2025-reg.

CG Chakrapani GovindaJoseph <govind.chakrapani@es.iitr.ac.in>
Wed, 22 Jan 2025 10:20:19 AM +0530
To "Yogendra Pal Singh" <yogendra78@nic.in>
Cc "chakrapani govind" <chakrapani.govind@gmail.com>

Approved.
Chakrapani

From: "Yogendra Pal Singh" <yogendra78@nic.in>
To: "Chakrapani GovindaJoseph" <govind.chakrapani@es.iitr.ac.in>, "chakrapani govind" <chakrapani.govind@gmail.com>
Sent: Wednesday, January 22, 2025 10:07:13 AM
Subject: [WARNING: ATTACHMENT(S) MAY CONTAIN MALWARE]Fwd: Draft MOM of the 22nd EAC meeting held on 10.1.2025-reg.

Dear Sir,

The draft MOM of the 22nd EAC meeting was circulated to all members of the EAC. No comments received so far. Accordingly, the draft MOM of 22nd EAC meeting held on 10.01.2025 is attached herewith for approval please.

With Regards,

Yogendra Pal Singh
Scientist 'F'
Government of India
M/o Environment, Forest and Climate Change
Room No. 236, 2nd Floor, Vayu Wing
Indira Paryavaran Bhawan
Jor Bagh, New Delhi-110003
Tele-fax: 011-20819364

Annexure - 2.2

ANNEXURE-2.2

Sr.No	Project Name	Installed Capacity	State	Documents
1	Rampur HEP	412 MW	Himachal Pradesh	Appendix-A
2	Etalin HEP	3097MW	Arunachal Pradesh	Appendix-B
3	Devsari HEP	252 MW	Uttarakhand	Appendix-C
4	Dugar HEP	500 MW	Himachal Pradesh	Appendix-D
5	Chamera HEP Stage-II	300 MW	Himachal Pradesh	Appendix-E
6	Shongtong–Karchham HEP	450 MW	Himachal Pradesh	Appendix-F
7	Holi Bajoli HEP	180 MW	Himachal Pradesh	Appendix-G
8	Iron Ore Mining in Daitari Mining lease -M/s OMC Ltd.	Mining	Odisha	Appendix-H
9	Dibang HEP	3000 MW	Arunachal Pradesh	Appendix-I
10	Lurhi HEP	219 MW	Himachal Pradesh	Appendix-J
11	Gogri HEP	144 MW	Arunachal Pradesh	Appendix-K
12	Karcham Wangtoo HEP	1000MW	Himachal Pradesh	Appendix-L
13	Kuther HEP	240 MW	Himachal Pradesh	Appendix-M

The Conditions imposed by the Ministry of Environment & Forests, GoI while granting Forest Clearance Vide letter no. 8-114/2005-FC Dated- April 07, 2006 & May 28, 2009 for 69.3762 ha+0.9274 ha forest land (Total-70.3036 ha)

Sr. No	Conditions Imposed	Compliance Status	
i)	Legal Status of the forest land shall remain unchanged.	• The legal status of the forest land diverted is unchanged as on date	
ii)	Compensatory Afforestation will be raised and maintained over degraded forest land twice in the extent to the forest land proposed to be diverted, at the cost of user agency. And same shall be raised and maintained by State Forest Department.	• A sum of INR 88, 28,620/- has been released to HP Forest Department (INR 86, 42, 620/- for 69.3762 ha + INR 1, 86,000/- for 0.9274 ha). • Utilization of INR 86, 42,620/- reported, hence 139 ha afforested. • Utilization of INR 1, 24,400/- reported, hence 0.9274 ha afforested.	
iii)	Felling of trees shall be done only when necessary and that too with the prior permission of the State Forest Department.	• Tree felling was done through HP Forest Corporation.	**Complied**
iv)	The State Government shall deposit NPV and all other funds with Compensatory Afforestation Fund Management and Planning Authority (CAMPA), which has already been constituted and notified by the Central Government on 23.04.2004. Till such time the CAMPA intimates the Head of Account for deposition of funds, the funds shall be maintained in the form of fixed deposits in the name of Nodal Officer or concerned Divisional Forest Officer of the State Government. The funds realized towards the NPV shall not be utilized by the State Government.	• INR 4,10, 00,196/- has been deposited with H.P. Forest Department on account of NPV (Net Present Value).	
v)	An undertaking from the user agency may be obtained stating that in case the rates of NPV are revised upward the additional / differential amount shall be paid by the user agency.	• The necessary undertaking in this regard has been submitted vide GM (Rampur HPS) letter no. 927-38, February 18, 2006.	**Complied**
vi)	Demarcation of the area shall be done on the ground at the project cost by fixing 4 feet high RCC pillars showing forward and backward bearings.	• The job of constructing 4 feet high RCC pillars for demarcation of land diverted in favour of the project has already been completed.	**Complied**
vii)	The green belt of adequate width shall be raised on the vacant area, at the cost of the project.	• Ensured.	**Complied**
viii)	All steps shall be taken to prevent landslides, slope	• Ensured.	**Complied**

	stability and to ensure that no damage to the roads, human life and flora and fauna is caused.		
ix)	The dumping area for muck disposal shall be stabilized and reclaimed, and plantation of suitable species shall be carried out over dumping areas at the cost of the user agency under the supervision of State Forest Department. Stabilization and reclamation of such dumping sites shall be completed as soon as the excavation work is over before the project is closed.	• Ensured; • Land diverted for muck disposal was stabilized & restored. Now the said areas stand taken back by HP Forest Department, reference is to letter no. SJVN/RHEP/P&A/14-5662-69, August 13, 2015.	**Complied**
x)	The user agency shall ensure that muck does not roll down the slopes. All such areas where muck has rolled down the slopes shall be rehabilitated at the cost of user agency and under the supervision of State Forest Department.	• All the dumping sites have been provided with suitable retaining walls/protection measures along their edges to prevent sliding of muck.	**Complied**
xi)	While constructing approach roads sufficient safety measure shall be adopted to avoid rolling down of muck/ debris along the slope. Also, damage to forest area should be avoided.	• The same was ensured.	**Complied**
xii)	The quarrying for the collection of stones/boulders shall be allowed till the construction works of the project are complete. After that, the area shall be handed back to the State Forest Department after proper reclamation and rehabilitation.	• Area diverted for quarrying taken over by HP Forest Department without any change in the nature of the land, reference is to letter no. SJVN/RHEP/P&A/14-5662-69, August 13, 2015.	**Complied**
xiii)	The Catchment Area Treatment (CAT) Plan shall be implemented at the project cost.	• CAT plan of Rampur HPS being implemented by HP Forest Department; • Complete plan cost remitted to HP Forest Department.	**Being Complied**
xiv)	Displaced families shall not be settled on forest land.	• The same was ensured.	**Complied**
xv)	All efforts should be made for the protection of the environment at the cost of the project.	• Ensured.	**Being Complied**
xvi)	No labour camps shall be set up in the forest area nor should any habitation be allowed to come up in the forest area.	• The same was ensured.	**Complied**
xvii)	All efforts shall be made by the user agency to avoid any damage to the wildlife found in the area.	• The same was ensured.	**Complied**
xviii)	Steps may be taken to minimize biotic pressure over adjoining /nearby forests.	• Ensured.	***Complied***

xix)	The forest land shall not be used for any purpose other than that specified in the proposal.	• Ensured.	**Complied**
xx)	The forest land thus diverted shall be non – transferable. Whenever and whatever extent of forest land is not required, shall be surrendered to the State Forest Department under intimation to this ministry.	• Total land diverted 70.3036 ha; • Out of this total diverted land, 29-03-76 ha of the diverted forest land has been taken back by HP Forest Department. • Now, Rampur HPS is left with 41-26-60 ha of the diverted land; • The status of surrendered land was intimated to Addl. Pr. CCF(C), MoEF&CC, RO, Dehradun vide. Letter No. SJVN/RHEP/P&A/14-5662-69, August 13, 2015.	
Additional Conditions imposed in the Forest Clearance of 0.9274 ha (Some of the conditions mentioned in the FC of 0.9274 ha has been covered above, avoiding repetition)			
1.	User agency shall implement all the conditions of the Muck Rehabilitation Plan under supervision of the State Forest Department at the project cost.	• Ensured.	**Complied**
2.	In addition to above, following activity shall be undertaken by the User Agency under the supervision of State Forest Department at the project cost : Construction of check dams, retention/toe walls to arrest sliding down of the excavated material along the contour.	• The same was ensured.	**Complied**
3.	The total area diverted so far, for the project in favour of Satluj Jal Vidyut Nigam Limited in Kullu district of Himachal Pradesh will become 70.3036 ha(69.3762 ha+0.9274ha).	• Ensured.	
4	All the relevant conditions which have been stipulated in the approval granted by this Ministry vide letter of even no. dated 07.04.2006 for diversion 69.3762 ha of forest land for construction of 434 MW Rampur Hydro Electric Project in favour of Satluj Jal Vidyut Nigam Limited in Kullu	• Ensured.	

	district of Himachal Pradesh shall remain applicable.		
5.	Any other condition that the Conservator of Forests (Central), Regional Office, Chandigarh, may impose from time to time for the protection and improvement of flora and fauna in the forest area shall also be applicable.	• Conditions imposed by Conservator of Forests (Central) for the protection and improvement of flora and fauna in the forest area will be complied with.	-

Form-A (Part-I): Diversion of Forest Land

Common Application Form

Project Details

1. Details of Project

1.1. Name of the Project	Etalin Hydro Electric Project
1.2. Project Proposal For	New
1.3. Project ID (Single Window Number)	SW/171869/2024
1.4. Description of Project	The Etalin H.E. Project is located in Dibang Valley District of Arunachal Pradesh and is proposed to be developed as a run-of river. The project involves constructing concrete gravity dams of 101.5m on Dri river and 80m high on Talo (Tangon) river and diverting the water through two (2) separate waterway systems to utilize the available head in a common underground powerhouse located just upstream of the confluence of Dri and Talo (Tangon) rivers. Project will generate 3097 MW of power or 12991.52 MU of design Energy (90% dependable year with 95% machine availability) through 10no. francis turbines of 307MW each.

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

2.1. Legal Status of the Company/Organization/User Agency	Central PSU (eg. NHAI, AAI, NTP, CIL, SAIL)
2.2. Name of the Company/ Organization/User agency	SJVN LIMITED

Registered address

2.3. Address	HOD, Corporate Environment Department, SJVN Ltd., Shanan, Shimla-171006, Himachal Pradesh, India
2.4. State	HIMACHAL PRADESH
2.5. District	SHIMLA
2.6. Pin Code	171006
2.7. E-mail address	sjvn.ecfc@gmail.com
2.8. Landline Number	2660110
2.9. Mobile number	xxxxxx1073

3. Details of the person making application

3.1. Name	Rakesh Sehgal
3.2. Designation	CHIEF GENERAL MANAGER

Correspondence address

3.3. Address	HOD, Corporate Environment Department, SJVN Ltd., Shanan, Shimla-171006, Himachal Pradesh, India
3.4. State	HIMACHAL PRADESH
3.5. District	SHIMLA
3.6. Pin Code	171006
3.7. E-mail address	sjvn.ecfc@gmail.com
3.8. Landline Number	2660110

3.8. Landline Number	266010
3.9. Mobile number	xxxxxx1073

Project Location

4. Location of the Project or Activity

4.1. Upload KML	kml_etalin_componentwise_justification.kml
4.2. Whether the project/activity falling in the state/UT sharing international borders	YES
4.1. Aerial Distance from the International Border/LOC/LAC in km	30
5. Shape of the Project	Hybrid

Location Details

Toposheet No	State/UT	District	Sub District	Village	Plot/Survey/Khasra No.
H47S2	ARUNACHAL PRADESH	Upper Dibang Valley	Etalin	Athunli	LA21, LA21A
H47S2	ARUNACHAL PRADESH	Upper Dibang Valley	Etalin	Edilin	LA18, LA21, LA21A
H46X14	ARUNACHAL PRADESH	Upper Dibang Valley	Etalin	Apunli	LA8
H46X14	ARUNACHAL PRADESH	Upper Dibang Valley	Etalin	Aguli	LA20A
H46X14	ARUNACHAL PRADESH	Upper Dibang Valley	Anini	Akobe	LA1, LA2, LA3, LA4, LA4A, LA20
H46X14	ARUNACHAL PRADESH	Upper Dibang Valley	Etalin	Etalin Bridge Point-A	LA7, LA8, LA9, LA10, LA11
H46X14	ARUNACHAL PRADESH	Upper Dibang Valley	Anini	Ayeso	LA1
H46X13	ARUNACHAL PRADESH	Upper Dibang Valley	Anini	Emuli	LA11, LA11A, LA12
H46X14	ARUNACHAL PRADESH	Upper Dibang Valley	Etalin	Etalin H.Q.	LA7, LA8, LA9, LA10, LA11
H46X14	ARUNACHAL PRADESH	Upper Dibang Valley	Etalin	Immuli	LA10, LA13, LA13A, LA14A, LA14RB
H46X14	ARUNACHAL PRADESH	Upper Dibang Valley	Anini	Punli-A	LA4, LA5, LA6, LA6A
H46X14	ARUNACHAL PRADESH	Upper Dibang Valley	Etalin	Punli	LA15
H46X14	ARUNACHAL PRADESH	Upper Dibang Valley	Etalin	Chanli	LA14A, LA14RB, LA15A, LA15RB, LA16
H46X14	ARUNACHAL PRADESH	Upper Dibang Valley	Etalin	Aunli	LA16, LA17, LA19, LA20, LA21, LA21A, LA18
H46X14	ARUNACHAL PRADESH	Upper Dibang Valley	Etalin	Etalin-A	LA7A, LA9, LA10A, LA11A, LA11B
H46X14	ARUNACHAL PRADESH	Upper Dibang Valley	Etalin	New Etalin	LA7, LA8, LA9, LA10, LA11
H46X14	ARUNACHAL PRADESH	Upper Dibang Valley	Etalin	Yuron	LA1, LA20, LA20A, LA20B, LA20C

Remarks

Apayee Vill is included in Yuron Vill. Aropo Vill is included in Immuli Vill Atiyi Vill is included in New Etalin Vill. Weya Vill is included in Aunli Vill

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

6.1. Nature of Land involved	
6.2. Non-Forest Land [A]	0
6.3. Forest Land [B]	1175.03
6.4. Total Land [A+B]	1175.03

Project Activity Cost

7. Project/Activity Cost

7.1. Total Cost of the Project at current price level (in Lakhs)	2529595 Amount in Words : **Twenty Five Lakh Twenty Nine Thousand Five Hundred Ninety Five Lakh(s) Only**

8. Employment likely to be generated

8.1. During construction phase

Permanent employment

8.1.1. No. of permanent employment (No.s) [A]	250
8.1.2. Period of employment (No. of days) [B]	2980
8.1.3. No. of man-days [X]=[A]*[B]	745000

Temporary employment

8.1.4. Temporary / Contractual employment (No. of Man days) [Y]	10214890
8.1.5. Total [X] +[Y]	10959890

8.2. During operational phase

Permanent employment

8.2.1. No. of permanent employment (No.s) [A]	300
8.2.2. Period of employment (No. of days) [B]	14600
8.2.3. No. of man-days [X]=[A]*[B]	4380000

Temporary employment

8.2.4. Temporary / Contractual employment (No. of Man days) [Y]	14600000
8.2.5. Total [X] +[Y]	18980000

Others

9. Whether Rehabilitation and Resettlement (R&R) involved?	YES
9.1. No. of Villages	21
9.2. No. of Project Displaced Families	176
9.3. No. of Project Affected Families	284
9.4. Status of Rehabilitation & Resettlement	In-Progress
10. Whether project area involves shifting of watercourse/road/rail/Transmission line/water pipeline, etc. required?	NO
11. Whether any alternative site(s) examined or part thereof for the non-site-specific component?	Not applicable as the project or activity is site specific
12. Whether there is any Government Order or Policy/ Court order relevant or restricting to the site?	NO
13. Whether there is any litigation pending against the project and/or land in which the project is proposed to be set up?	NO
14. Whether the proposal involves violation of Act/Rule/Regulation/Notification of Central/State Government?	NO

Project Details

1. Forest Clearance

1.1. State	ARUNACHAL PRADESH
1. Upload a copy of note containing justification for 2 locating the Project in forest land	justification pdf.pdf
1.3. Project Category	Hydel / Irrigation
1.4. Exempted Category	NA
1.5. Is Related to Encrochment?	No
1.6. Whether any proposal seeking prior approval of Central Government under the Van (Sanrakshan Evam Samvardhan) Adhiniyam, 1980 for diversion of forest land required for this project has been submitted in the past?	Yes

Proposal No.	Proposal Status.	Project Name	MoEFCC File No	Area proposed for Diversion (ha)	Area Diverted (ha)	Recommened Area For Diversion	Date of in-principle approval	Date of final approval	Date of Application
FP/AR/HYD/7696/2014	Submitted and under process	Revised Proposal for diversion of 1165.66 ha (including 91.33 ha underground) of forest land for construction of Etalin Hydro Electric Project (3097 MW) in Dibang Valley District of Arunachal Pradesh by M/s Etalin Hydro	8-20/2014 FC-I /60877/2023	1165.66	NA	NA			24/03/2014

	Hydro Electric Power Company Ltd.

Proposed Land

2. Details of Forestland proposed to be diverted (Village / Division / District Wise Breakup)

2.1. Total area of forestland proposed for diversion (ha.)	1175.03
2.2. Total area of non- forestland required for this project (ha.)	0

2.3. Legal Status of forest land proposed for diversion

Area (ha)	**Legal Status of Forest Land**
1175.03	USF/Community forest land

2.3.1. Total Area (ha)	1175.0300
2.4. Total period for which the forestland is proposed to be diverted (No. of years)	50

KML Details

Division	Anini Forest Division, Anini
No. of Patches	1
KML	46379129_FC_KML_1744719727562_kml_etalin_componentwise_justification.kml

Location Details

Toposheet No.	**District**	**Village**	**Range**	**Linear**		**Non-Linear**	
				Forest land proposed for diversion	**Non Forest Land (ha)**	**Forest land proposed for diversion (ha)**	**Non Forest Land (ha)**
				Area (ha)	**Area (ha)**		
H46X14	Upper Dibang Valley	Aguli	Etalin Forest Rang,e, Etalin	0	0	4.86	0
H46X14	Upper Dibang Valley	Ayeso	Etalin Forest Rang,e, Etalin	0	0	1.80	0
H47S2	Upper Dibang Valley	Punli	Etalin Forest Rang,e, Etalin	5.50	0	56.16	0
H46X14	Upper Dibang	Chanli	Etalin Forest Rang,e, Etalin	47.16	0	54.24	0

	Valley		Rang,e, Etalin				
H46X14	Upper Dibang Valley	Edilin	Etalin Forest Rang,e, Etalin	0	0	42.26	0
H46X14	Upper Dibang Valley	Etalin-A	Etalin Forest Rang,e, Etalin	10.25	0	20.47	0
H46X14	Upper Dibang Valley	Punli-A	Etalin Forest Rang,e, Etalin	26.06	0	32.54	0
H46X13	Upper Dibang Valley	Youron	Etalin Forest Rang,e, Etalin	0	0	104.62	0
H46X14	Upper Dibang Valley	Akobe	Etalin Forest Rang,e, Etalin	112.99	0	100.22	0
H46X14	Upper Dibang Valley	Etalin H.Q.	Etalin Forest Rang,e, Etalin	62.07	0	64.82	0
H46X14	Upper Dibang Valley	Apunli	Etalin Forest Rang,e, Etalin	0	0	0.22	0
H46X13	Upper Dibang Valley	Emuli	Etalin Forest Rang,e, Etalin	112.84	0	60.07	0
H46X14	Upper Dibang Valley	Athunli	Etalin Forest Rang,e, Etalin	0	0	7.88	0
H46X14	Upper Dibang Valley	Etalin Bridge Point-A	Etalin Forest Rang,e, Etalin	0	0	140.77	0
H46X14	Upper Dibang Valley	Aunli	Etalin Forest Rang,e, Etalin	11.93	0	95.30	0

Patch Details

Patch/ Segment ID	Forest Area (ha)	Non-Forest Area (ha)	Remarks if any
2	1175.03	0	

Remarks Details

Apayee Vill is included in Etalin HQ Aropo Vill is included in Emuli Vill Atiyi Vill is included in Etalin Bridge Point Weya Vill is included in Aunli Vill Azuli Vill is included in Punli

Total Patch-wise Forest Land in the division (ha)

2.5. Total Forest Land Area (ha)	1175.0300
2.6. Total Non Forest Land Area (ha)	0.0000

Total KML-wise Forest Land in the division (ha.)

2.7. Total Forest Land Area (ha)	1175.03

2.8. Total Non Forest Land Area (ha)	0
2.9. Total Area (ha)	1175.03

3. Component Wise Break Up (Including underground works such as tunnel and similar purpose)-if applicable

Component	Forest Land Proposed for Diversion (ha)	Non-forest Land (ha)
Dumping Area	113.7	0
Quarry	67.11	0
Dri submergence	83.32	0
Slope protection and foot path along Dri reservoir	9.32	0
Dri Dam Complex	34.37	0
Tangon Submergence	36.12	0
Foot path along Tangon reservoir	6.89	0
Tangon Dam Complex	91.36	0
Approach Road to Tangon Dam Complex	5.54	0
Area for ITI and Hospital	12.02	0
Adit T1, T2, T3 construction facility, BP, APP, Workshop, site offices, contractors temporary colony, labour camps, explosive magazine, rehandling area	68.22	0
Approach road and bridge to Adit T1, T2, T3	97.24	0
Owners Main Office & Residential Colony including School	15.2	0
Adit T4 construction facility, BP, APP, Workshop, site offices & stores, contractors temporary colony, labour camps, penstock fabrication area	38.86	0
Approach road to Adit T4, construction facility and dumping areas	56.52	0
Powerhouse complex, surge shaft, pot head yard including labour camps, workshops, offices & stores, BPP, APP, Fuel Depot and construction facility area	122.22	0
Adit D3 construction facility, BP, APP & stockpilling, Workshop, site offices & stores,	18.75	0
Approach road to Adit D3 and construction facilities	62.07	0
Approach road to Power House and Adit D4	1.19	0
Adit D2 construction facility area, BP, APP, Workshop, site offices, labour camps, explosive magazine,	18.22	0
Approach road for Adit D2 and construction facilities	22.5	0
Dri Dam and Adit D1 construction facility area, BP, APP, Workshop & stores, site offices, contractors and owners colony, labour camps, explosive magazine	50.36	0
Underground area for Dri HRT and Adits	14.27	0
Underground area for Tangon HRT and Adits	14.84	0
Underground area for Tangon Desilting Chambers	6.39	0

Approach road for Dri Dam Complex, Adit D1 and construction facilities	108.43	0

4. Total Forest Land(ha)	1175.0300000000002
5. Total Non Forest Land (ha)	0.0000
6. Upload map of the forest land proposed to be diverted prepared by using DGPS or Total Station (pdf only)	geo reference map.pdf

Afforestation Details

7. Details of land identified for Compensatory Afforestation

7.1. Whether Compensatory Afforestation is applicable or not?	Yes
7.1.1. Type of Compensatory Afforestation	Degraded Forest Land

Others

8. Cost-Benefit analysis

8.1. Whether Cost-Benefit analysis for the Project has been made?	Yes
8.1. Total Loss (Against the proposed forest land Diversion in crore)	664.64
8.2. Estimated Benefits of Forest Diversion (in crore)	8240.36
8.3. Cost Benefit Ratio	12.3982
8.4. Upload a copy of Cost-Benefit analysis	cba revised latest.pdf

9. Environmental clearance Details

9.1. Whether the Project requires Clearance under the Environment (Protection) Act 1986 (Environmental clearance)?	Yes
9.1.1. Status of Environmental Clearance	Application submitted
9.1.1.1. Proposal No	IA/AR/RIV/10114/2009
9.1.1.2. Date of application	09/01/2015
9.1.1.3. MoEFCC / SEIAA File Number	J-12011/60/2009-IA-I
9.1.1.4. Status of application [Submitted recently / ToR Granted / PH Conducted / Under appraisal]	Under appraisal

10. Wildlife clearance Details

10.1. Whether the Project or a part thereof is located in any Protected Area or their Eco sensitive zone?	No

any Protected Area or their Eco sensitive zone?

Category Specific Details

11. Hydel, Irrigation, Drinking Water	Drinking Water ✔Hydel Irrigation
12. Whether project involves Hydroelectric power project?	Yes
12.1. Production Capacity (MW)	3097
12.2. Whether cumulative impact assesment study to access the carrying capacity of the river basing has been done?	Yes
13. Whether project involves construction of Dam/Barrage/Weir?	Dam
14. Name of the River (source)	Dri and Tangon (Talo) rivers

15. Project configuration & Capacity for Hydel project

Plant / Equipment / Facility	Configuration	Remarks
Type of Dam	Concrete Gravity Dam	N/A
Dam height from the deepest foundation level (m)	101.5	Dri limb- 101.5 m Tangon limb- 80 m (Dam height from the deepest foundation level)
Length of the Dam (m)	213.7	Dri limb- 213.7m Tangon limb-184.1m
Maximum Height of the Embankment (m)	0	Not Applicable as there is no embankment
Type of Spillways	spillways	N/A
No. of Spillways	7	Dri limb-7no Tangon limb- 6no.
Head Race Tunnel (HRT) (diameter)	11.3	Dri limb-11.3 m Tangon limb-9.7 m
Head Race Tunnel (HRT) (length (m))	10722	Dri limb- 10722m Tangon limb- 13045m
Surge shaft (diameter (m))	26	Dri limb- 26m Tangon limb- 21m
Surge shaft (height (m))	132	Dri limb- 132m Tangon limb- 137m
Pressure Shaft (Nos)& Penstock	3	Dri limb- 3no Tangon limb- 2no

Power House

(i) No. of Turbine Generating unit (MW)	10	N/A
(ii) Capacity of each turbine (MW)	307	Dri Dam-toe Powerhouse: 19.6 MW, Tangon Dam-toe Powerhouse: 7.4 MW
(iii) Size of the Power House Cavern (m3) (L*W*H)	9321.72	N/A

(iii) Size of the Power House Cavern (m3) (L*W*H)	8331.73	N/A
Tail Race Tunnel (TRT) (diameter)(m)	11.3	Dri TRT 11.3m and Tangon TRT 9.5m
Tail Race Tunnel (TRT) (length)(m)	555	Dri TRT 555m and Tangon TRT 544m
Total design discharge (Cumec)	800.5	Dri limb- 480.3 cumecs Tangon limb- 320.2 cumecs

Other information, if any	There are two separate Dams on Dri and Tangon Rivers with individual HRTs & surge shafts which converge into a single Power House Complex
Installed Capacity (MW)	3097
Whether installed power generation capacity of the project is greater than 10 MW	Yes
Copy of the approval of competent authority to the Catchment Area Treatment Plan (CAT Plan) (pdf)	cat plan approval latest by state govt..pdf
Copy of the approved CAT plan (pdf)	etalin cat plan report 5 mb.pdf

16. Catchment Area (ha)	625800
17. Average rainfall (mm)	4000
18. Water availability (MCM) (approx.)	13710

19. Submergence Area (ha), if any

Area submerged	**Area (ha)**
Dri Submergence Area	83.32
Tangon submergence area	36.12

20. Upload Muck Restoration Plan	Etalin Muck Management.pdf
21. Presence of Schedule I species within the study area	1-Mammals: Himalayan serow (Capricornis thar), Asian golden cat (Catopuma temmincki) and Leopard cat (Prionailurus bengalensis). 2-Herpetofauna: Bengal Monitor Lizard (Varanus bengalensis), Burmese Python (Python bivittatus) and King Cobra (Ophiophogus Hannah). 3-Bird species: Crested Goshawk (Accipiter trivirgatus), Eurasian sparrowhawk (Accipiter nisus), Grey peacock pheasant (Polyplectron bicalcaratum), Kalij pheasant (Lophura leucomelanos) and Shikra (Accipiter badius). 3-Butterfly: Pale Jezebel (Delias samaca Moore), Scarce Jester (Symbrenthia silana de) and Spotted Black Crow (Euploea crameri nicevillei).
22. Brief on E flow	E-flows are proposed to be released as per Cumulative Impact Assessment Study of the Basin. In Dri Dam 20% (lean season), 12.2% (monsoon), 13.3 (intermediate) seasons shall be released. In Tangon Dam 20% in lean season, 10% during monsoon and 13.3% during intermediate months shall be released..

23. Provision of fish pass envisaged		No
23.1. Reason thereof		Since the Dam is 101.5 and 80m high therefore Fish pass is not feasible. However, Fisheries Management Plan involving development of hatcheries and Stocking of fingerlings in the reservoir is proposed to be implemented.

Note: Alternative examined: kindly refer detail provided under Sl. No. 10 of CAF

24. Copy of Additional Information, if any

S. No.	Document Name	Remark	Document
1	Complete Reply to MoEF&CC EDS dated 10.04.25	Complete reply to MoEF&CC EDS dated 10.04.25 alongwith all annexures.	eds reply combined.pdf
2	Approval letter of CAT Plan	Copy of approval letter of CAT Plan dated 17.12.2024.	cat plan approval latest by state govt.pdf
3	Certificate of non-availability of non-forest land	Certificate of non-availability of non-forest land for Compensatory Afforestation issued by State Government.	certificate for non availability land for ca.pdf
4	Muck Restoration Plan for the Project.	Muck Restoration Plan stands approved by DFO.	etalin muck management.pdf
5	Quarry Area Restoration Plan	The Quarry area restoration plan prepared as part of Environment Management Plan which is apprised by Expert Appraisal Committee of MoEF&CC in its meeting held in Jan 2017.	quarry plan pdf.pdf
6	Approved Catchment Area Treatment Plan	Approved Catchment Area Treatment Plan	etalin cat plan report 20 mb.pdf
7	KML	KML file showing project components	Etalin HEP Components in colour.kml
8	FRA Certificate Issued by DC, Anini	FRA Certificate Issued by DC, Anini	FRA FORM-II.pdf
9	R&R Plan Approved by Competent Authority	R&R Plan Approved by Competent Authority	R& R approval.pdf
10	Wildlife Management Plan	Wildlife Conservation and Management Plan	Etalin_WII Final_ Report2.pdf
11	PPT	PPT of the project	PPT.pdf
12	Infrastructure layout Plan	Infrastructure layout plan	Infrastructure Layout Plan.pdf
13	Reclamation Plan	Reclamation plan for 424.83 ha of land proposed to be returned to Forest Deptt after COD	Reclaimation Plan.pdf
14	Undertaking	For estimated number of trees not to be felled in the reclaimed area of 424.83ha	Undertaking for trees in reclaimed area.pdf
15	Undertaking	For NPV	Undertaking for NPV.pdf

16	Undertaking	For providing support for improvement and infrastructure development in Anini Forest Division	Undertaking for improvement infrastructure.pdf
17	Undertaking	Undertaking for Compensatory Afforestation	Undertaking for CA.pdf
18	Undertaking	Additional NPV	Undertaking for additional NPV.pdf
19	Undertaking	Undertaking for reclamation of 424.83 ha of forest land to be returned to Forest after COD	Undertaking estimated area reclaimed.pdf
20	KML file	KML file for reclamation of 424.83 ha to Forest Deptt. after COD	KML of Reclaimation Area.kml
21	Joint inspection	Joint inspection with DFO	Joint inspection report.pdf
22	General Undertaking	General Undertaking	General Undertaking.pdf
23	ESZ Distance	Certificate issued by DFO for distance from ESZ	ESZ distance certificate.pdf
24	MOU with Govt. of Arunachal Pradesh	MOU with Govt. of Arunachal Pradesh	Etalin HEP 3097MW Signed MoA.pdf
25	Authorised signatory	Authorised signatory	Authority letter of AP for SJVN.pdf

Undertaking

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

25. Name	Rakesh Sehgal
26. Designation	CHIEF GENERAL MANAGER
27. Company	SJVN LIMITED
28. Address	HOD, Corporate Environment Department, SJVN Ltd., Shanan, Shimla-171006, Himachal Pradesh, India
29. Date	15/02/2024

3. Shri Ritu Raj Singh, Deputy Conservator of Forests (Central), Regional Office, Lucknow on 11th August, 2012 inspected the forest land proposed for diversion.

4. Important additional information furnished in the inspection report submitted by the Regional Office (Central Zone) of this Ministry vide their letter dated 29.08.2012 are as below:

(i) Sutluj Jal Vidyut Nigam Limited (SJVN) is a Schedule "A", Mini Ratna central PSU, under the aegis of Ministry of Power, Govt. of India and is amongst the largest organizations dealing is construction, operation and maintenance of Hydro Electric Projects. It is already operating and maintaining the India's largest Nathpa Jhakri Hydro Electric Project (1500MW) which was commissioned in the year 2004 and working on many other projects to add about 4000 MW capacity in the near future.

(ii) Government of Uttarakhand has allotted three projects to Satluj Jal Vidyut Nigam Ltd. (SJVN Ltd.), one in Chamoli district and two in Uttarkashi District. The implementation agreement for the execution of 300 MW Devsari Hydro Electric Project in Chamoli District had been signed between SJVNL and Govt. of Uttarakhand on Build, Operate, Own & Maintain (BOOM) basis on Nov. 21, 2005. The storage dam (300 MW Devsari HEP) has been converted into Run of the river scheme as Devsari HEP Stage-I 252 MW on Oct. 16, 2007 and agreed by Govt. of Uttarakhand.

(iii) The project is located on River Pinder, which is one of the main tributaries of River Alaknanda in Ganga basin in the state of Uttarakhand. Devsari HEP is essentially a run-of -river project with peaking diurnal pondage utilizing the flows of Pinder river to harness the head available between the proposed dam location near Devsari village with FRL of EL 1300m also at approx. 2 km downstream of confluence of Kail Ganga river with Pinder river and the underground Power House located on the right bank of the Pinder with tail water level fixed at elevation 1046.97 m a.s.l. (under normal operating condition), upstream of its confluence with Simili Gad.

(iv) Devsari Hydro-Electric Project (252MW) is currently in survey & investigation stage. Pre-Environment Clearance has been obtained from Ministry of Environment and Forest, Govt. of India based on which the Environmental Impact Assessment studies has been got done through M/s WAPCOS Ltd. a Govt. of India undertaking. Further, SJVN has already prepared the Detailed Project Report (DPR) and submitted to Central Electricity Authority (CEA) and Forest & Private land diversion/ acquisition works are also in progress.

(v) Legal status of the forest land proposed for diversion is as below:-

SI. No.	Description	Area in Ha.
1)	Reserve Forest	28.492
2)	Civil Land	129.661
3)	Van Panchayat	39.020
4)	**Total Forest Area in ha.**	197.173
5)	Non Forest area in Ha.	**30.991**
	Total Area in Ha.	**228.164**

(vi) Item-wise break-up details of the forest land proposed for diversion:-

Sr. No	Component	Reserve Forest Land (Ha.)	Van Panchayat Land (Ha.)	Civil Land (Ha.)	Forest Land (Ha.)	Private Land (Ha.)	Total Land (Ha.)
1.	Dam, Intake Reservoir Area	0.598	9.623	89.860	100.081	17.076	117.157
2.	Waterway, Adit, Road for Adit	3.860	0.000	4.394	8.254	5.880	14.134
3.	Power House, Switch Yard & Surge Shaft	0.000	24.401	8.534	32.935	2.009	34.944
4.	Colony	0.000	0.000	0.000	0.000	3.000	3.000
5.	Office & Store	0.000	0.000	0.922	0.922	0.000	0.922
6.	Muck Disposal Area	4.000	4.000	11.974	19.974	3.026	23.000
7.	Quarry Area	9.000	0.996	5.041	15.037	0.000	15.037
8.	Underground Land (HRT)	11.034	0.000	8.936	19.970	0.000	19.970
	Total	**28.492**	**39.020**	**129.661**	**197.173**	**30.991**	**228.164**

(i) Total cost of the project at present rates: is Rs.1357.75 crores.

(ii) Vegetation Density 0.1.

(iii) Total no. of trees to be felled in the proposed area is 7434. (Seven thousand four Hundred and thirty four only). Effect of removed of trees on the general ecosystem in the area: In 197.173 Ha Forest Civil land with proposed felling of will have 7434 trees which is to the tune of 38 trees per ha. However, It was noticed that regeneration of Chir Pine is coming up as such the proposed project activity would not affect the general ecology in long run. Important species are Chir (pine), Utish, Kafal, Kukat, Kharik, Banz, Mango, Tun, Akharot, Buransh etc.

(iv) Number of trees of girth below 60 cm. is 6821 No. as per the list enclosed in the proposal and Number of trees of girth above 60 cm. 613 No. as per the list enclosed in the proposal.

(v) Compensatory Afforestation is proposed in total area of 395 Ha. in civil forest land.

(vi) Land identified for raising compensatory is In District Chamoli, total 17 locations as per proposal. All patches are compact.

(vii) Total financial outlay of the project is Rs. 86200505.00.

(viii) 26 family of Shoding Hamlet of revenue village Sarkot is proposed to be displaced. further informed that Rehabilitation Plan has already been submitted to office of District Magistrate, Gopeshwar.

(ix) The river Kail Ganga and other small rivulets which forms the tributaries of Pinder River are flowing in the near by area. The proposed area forms the catchment for which catchment area treatment plan amounting Rs.23.72 crores is already approved in principle by PCCF (Project).

(x) Cost benefit ratio: is 1:7.06

(xi) The project will generate 910.16 Million Energy Units annually. This generation of energy will become boon for the people of the state, country and also help in growth of Industrial, Agriculture & Financial sector.

(xii) The nearest protected area, the Rajaji National Park is at a distance of 220 km from the Site.

(xiii) A significant quantity of muck is expected to be generated as a result of construction of Dam, Head Race Tunnel (HRT), power house and other appurtenant work. The component wise details of muck to be generated are given in the table on next page.

(xiv) Component wise details of muck to be generated is as below:

Sl. No.	**Component**	**Total Quantity (m3)**
1	Concrete dam	268800
2	Intake structure	12600
3	Diversion tunnel	26391
4	Coffer Dam	1860
5	Head Race Tunnel	1166124
6	Tail Race Tunnel	25041
7	Pressure Shaft	11774
8	Switch Yard	40000
9	Power House	45925
10	Surge Shaft	51628
11	Adits	80000
12	Access Tunnel	34676

13	Transformer Hall Cavern	27775
14	Project Roads	187000
	Total	**1,979,594 say 1.98 Mm^3**

(xv) The total quantity of muck expected to be generated has been estimated to be of the order of 1.980 Mm^3. Based on the geological nature of the rocks and engineering properties of the soil, a part of the muck generated can be used as construction material. The balance needs to be suitably disposed. Normally, muck is disposed in low-lying areas or depressions. Trees, if any, are cut before muck disposed, however, shrubs, grass or other types of undergrowth in the muck disposal at sites perish. The muck disposal sites will be suitably stabilized on completion of the muck disposal.

(xvi) There will be six dumping sites for the muck disposal namely dam dumping area, dumping area adit-3, and dumping area near power house. The capacities of dumping sites and their distance from HFL of river are given in Table below.

IDENTIFIED MUCK DISPOSAL AREA:

Sr. No.	Dumping Sites	Quantity (m^3)	Area (ha)	Distance from HFL (m)
RD-1	Dumping area near Dam	152388	3.5	30
RD-2	Dumping area near Adit-1	342500	3.0	30
RD-3	Dumping area near Pranmati Portal	208100	4.0	30
RD-4	Dumping area near Adit-2	134775	2.5	30
RD-5	Dumping area near Adit-3	998975	6.0	30
RD-6	Dumping area near Power House	220188	4.0	30
	Total	**2,056,926**	**23.0**	

(xvii) The muck disposal sites were shown to the undersigned during the site inspection. The entire area is having status Reserve Forest, Civil Soyam forest, Van Panchayat and a meager private land. It is clear that muck disposal plan has been conceived.

(xviii) The Project has already been examined at various levels and has been reduced from storage scheme of 300 MW to run of the river of 252 MW, further this is the maiden project on river Pinder. Under the aforesaid facts and observations the present proposal is fit for favorable consideration.

5. The Comments of the Regional Chief Conservator of Forest, Regional Office (Central Zone), Lucknow are as below:

(i) Devsari HEP is a run of river project on river Pinder a tributary of Alaknanda, which is about 60 Km. from Karan Prayag. The dam site is 500 meter upstream of Nand Kesri Bridge on river Pinder which is about 1.7 km downstream on confluence of river Pinder and its tributary Kailganga on the Tharali Devel Road. The proposal involves building of concrete gravity dam of 35 meter height from river bed with concrete lime head raise tunnel (HRT) of 17.9 Km length having diameter of 6.9 meter which will be underground entire length. The total land requirement is 228.164 ha out of which 197.173 ha is forest land 30.991 is private land. About 100 ha will be for construction of dam and reservoir i.e. submergence area and total 491 families from 16 villages would affected out of which 26 families would be displaced completely and remaining will lose land partially. It is informed that the project authorities have already submitted rehabilitation plan to the District Magistrate, Gopeshwar.

(ii) Alternative alignment has not been worked out and it is mentioned that hydro electric project is site specific which can not be done elsewhere.

(iii) For collection of stones for the project, quarrying is proposed in an area of 9 ha in reserve forest and about 6 ha in van Panchayat and civil soyam forest for collection of boulder and bajri. The quarrying area of reserve forest is about 16-17 Km. from the construction site and boulder, bajri collection is about is 5-6 Km from the site. Quarrying of stone in geological sensitive area of Chamoli is matter of concern. The area geologically sensitive and as per the report in last 200 years this area has experienced 116 earthquakes out of which 28 were of high intensity. The project area is in zone V as per map showing seismic zone of India. Therefore the proposal need to be assessed geologically and required safety measures should taken.

(iv) The MOEF has accorded environmental clearance vide their No. J-12011/93/2007-IA-I dated 25.04.2009, wherein the total area is mentioned as 143.5 ha out of which 112 ha is forest land and 31.5 ha is agriculture land. Whereas the proposed area mentioned in the proposal which submitted for FCA Clearance is for 197.173 ha of forest land out of total area 228.164 ha.

(v) For Devsari Hydro Electric Project the catchment area is spread over 34 micro water shed. The total catchment area is 86818 ha of which 12452 ha is rocky and snow bound, 12867 ha is agriculture area, 57790 ha is forest and 3709 ha is blank. Total 74336 ha area is treatable. The estimated cost of CAT plan is 23.72 crores which is about 2% of the project cost.

(vi) The area is not a part of wildlife sanctuary or national park but some rare animals like Himalayan Tahar, Himalayan Black Bear, Snow leopard, and musk deer are found in higher reaches. These animals would be affected by the project therefore the area needs special treatment from wildlife point of view.

6. Specific recommendations of the Regional Chief Conservator of Forest, Regional Office (Central Zone), Lucknow are as below:

The proposed hydro electric project is taken up by M/s Satluj Jal Vidyut Nigam Ltd on BOOM basis (built, operation, own and maintain basis) for production of 252M/W of electricity in the State. The proposal submitted has incorporated all the required ingredients for safety and eco restoration. However as mentioned above the area is geologically sensitive and prone to earthquake it requires special safety measures for which proper study from some recognize institute such as IIT, Roorkee should be carried out. The proposed activity would augment the energy requirement in the State. There have been scale protests against the hydro electric project being taken up in Uttarakhand particularly on the river on which there some religious sentiments are attached. The Pinder River is one of the only northward bound Himalayan Rivers in India. It is one of the main tributaries of River Ganga. The confluence at Deval is the only confluence in the country where the waters of 5 rivers meet - the karganga, the Pinderi Ganga, Saraswati Ganga, Pandi ganga, Pushpa Ganga, it is called the Panch Mahaprayag (five great confluence). Therefore it has high religious sentimental value and is revered like Badrinath or Kedarnath. Therefore the ministry has to take policy decision if such HEP facing public agitation will be considered to meet the energy requirement. As per information a study ordered by the Ministry of Environment and Forests (MOEF) has recommended shelving of projects in the ëco-sensitive" Alaknanda and Bhagirathi river basins in Uttarakhand.

The proposal was considered in the last FAC meeting held on dated 31.12.2015.The FAC discussed the above proposal and noted as below:

1. The above mentioned proposal was considered by the FAC in its meeting held on 28th January, 2015 and the FAC after examination of the proposal and interaction with representatives of the user agency observed as below:

(i) Forest land proposed to be diverted is required for setting up of a 252 MW Run of the River Devsari HEP Stage-I 252 by the Sutluj Jal Vidyut Nigam Limited (SJVN), a Schedule "A", Mini Ratna Central PSU, under the aegis of Ministry of Power, Govt. of India;

(ii) Legal status of 28.492 hectares of forest land proposed to be diverted is Reserve Forest, 129.661 hectares is Civil Soyam land and 39.020 hectares of Van Panchayat land. Apart from the total 197.173 hectares of forest land, 30.991 hectares of non-forest land is also required for the project;

(iii) Item-wise requirement of forest and non-forest land required for the project is as below:

Sr. No	Component	Reserve Forest Land (Ha.)	Van Panchayat Land (Ha.)	Civil Land (Ha.)	Forest Land (Ha.)	Private Land (Ha.)	Total Land (Ha.)
1.	Dam, Intake	0.598	9.623	89.860	**100.081**	**17.076**	**117.157**

	Reservoir Area						
2.	Waterway, Adit, Road for Adit	3.860	0.000	4.394	**8.254**	**5.880**	**14.134**
3.	Power House, Switch Yard & Surge Shaft	0.000	24.401	8.534	**32.935**	**2.009**	**34.944**
4.	Colony	0.000	0.000	0.000	**0.000**	**3.000**	**3.000**
5.	Office & Store	0.000	0.000	0.922	**0.922**	**0.000**	**0.922**
6.	Muck Disposal Area	4.000	4.000	11.974	**19.974**	**3.026**	**23.000**
7.	Quarry Area	9.000	0.996	5.041	**15.037**	**0.000**	**15.037**
8.	Underground Land (HRT)	11.034	0.000	8.936	**19.970**	**0.000**	**19.970**
Total		**28.492**	**39.020**	**129.661**	**197.173**	**30.991**	**228.164**

(iv) Crown density of vegetation available in the forest land proposed to be diverted is 0.40;

(v) Project involves felling of total 7,434 trees out of which 6,134 trees are available in the 197.173 hectares of the forest land proposed to be diverted. The remaining 1,300 trees are available in the non-forest land required for the project;

(vi) Forest land proposed to be diverted does not form part of National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger Reserve, Elephant Corridor *etc.* However, some rare animals like Himalayan Thar, Himalayan Black Bear, Snow leopard, and musk deer are found in higher reaches. These animals would be affected by the project therefore the area needs special treatment from wildlife point of view. Concerned Divisional forest officer has reported that the nearest Protected Area is located at 100 Kilometer distance from boundary of the forest land proposed to be diverted. The area is not a part of wildlife sanctuary or national park;

(vii) The project is located on River Pinder, which is one of the main tributaries of River Alaknanda in Ganga river basin in the State of Uttarakhand. It is essentially a run-of -river project with peaking diurnal pondage utilizing the flows of Pinder river to harness the head available between the proposed dam location near Devsari village with FRL of 1300 meters above mean sea level (msl) at *approx.* 2 km downstream of confluence of Kail Ganga river with Pinder river and the underground Power House located on the right bank of the Pinder river with tail water level fixed at 1046.97 meters above MSL

(viii) Catchment area of the project is spread over 34 micro watersheds having the total area of 86,818 hectares, out of which 12,452 hectares is rocky and snow bound, 12,867 hectares is agriculture area, 57,790 hectares is forest land and the remaining 3,709 hectares is blank. Total 74,336 hectares area falling in catchment area of the project is treatable. A catchment area treatment (CAT) Plan at an estimated outlay of Rs. 23.72 crores has been prepared. The same has been approved in-principle by the Principal Chief Conservator of Forests (Projects), Government of Uttarakhand:

(ix) State Government has submitted documentary evidence in support of settlement of rights in accordance with the provisions of the Scheduled tribes and other traditional forest dwellers (Recognition of Forest Rights) Act, 2006 on the forest land proposed to be diverted;

(x) Compensatory afforestation is proposed to be raised over degraded civil soyam land twice in extent to the area of forest land proposed to be diverted in 18 patches. As per Decision Support System the most of the patches identified for CA are having dense forest cover. Therefore the CA sites need to be changed.

(xi) Project involves displacement of 26 families of Shoding Hamlet of Sarkot revenue village; However R&R plan has not been submitted.

(xii) Additional Principal Chief Conservator of Forests (Central), Regional Office (Central Zone) Lucknow has *inter-alia* reported as below:

(a) The proposal submitted has incorporated all the required ingredients for safety and eco restoration. However, as the area is geologically sensitive and prone to earthquakes, it requires special safety measures for which proper study from some recognized institute such as IIT, Roorkee should be carried out. The proposed activity would augment the energy requirement in the State. There have been large scale protests against the hydro electric project being taken up in Uttarakhand, particularly on rivers on which some religious sentiments are attached.

(b) Pinder river is the only northward bound Himalayan Rivers in India. It is one of the main tributaries of River Ganga. The confluence at Deval is the only confluence in the country where the waters of 5 rivers namely, Kar Ganga, Pinderi Ganga, Saraswati Ganga, Pandi Ganga and Pushpa Ganga meet. It is therefore, called the *Panch Mahaprayag* (five great confluence). It therefore, has high religious value and is revered like Badrinath and Kedarnath. Therefore; the Ministry has to take policy decision if such HEPs facing public agitation will be considered to meet the energy requirement.

(c) As per information, a study ordered by the Ministry of Environment, Forest and Climate Change (MoEFCC) has recommended shelving of projects in the ëco-sensitive Alaknanda and Bhagirathi river basins in Uttarakhand.

(xiii) Representatives of the user agency have however; questioned the veracity of the afore-mentioned observations of the Addl. PCCF (Central);

(xiv) The proposal was again placed before the Forest Advisory Committee in their Meeting held on 21st-22nd December 2012;

(xv) The FAC after examination of the proposal observed that in consideration of a recommendation made by the National Ganga River basin Authority (NGRBA) in their 3rd Meeting, the NGBRA vide O.M. dated 15.06.2012 constituted an Inter-Ministerial Group (IMG) under Chairmanship of Shri B.K. Chaturvedi, Member, Planning Commission to look at the various options with regard to conservation, irrigation use and running of Hydroelectric projects to ensure uninterrupted flow of river Ganga. The Terms of Reference of the said IMG *inter-alia* include review of the environmental impacts of the projects that are proposed on Bhagirathi, Alaknanda and other tributaries of the River Ganga and recommend necessary remedial action;

(xvi) Keeping in view that the site selected for construction of the Devsari project is located in the Alaknanda basin, the FAC decided that it may await receipt of the report of the said IMG before making recommendation on the application seeking prior approval of Central Government under the FC Act for diversion of forest land required for execution of the said project;

(xvii) Meanwhile, Supreme Court in their Judgment dated 13th August 2013 directed the MoEF as well as State of Uttarakhand to not to grant any further environmental clearance or forest clearance for any hydroelectric project in the State of Uttarakhand, until further orders;

(xviii) Supreme Court in their said Judgment dated 13th August 2013 also directed the MoEF to examine, as noticed by WII in its report, as to whether the proposed 24 projects are causing significant impact on the biodiversity of Alaknanda and Bhagirathi basins;

(xix) Government of Uttarakhand has however, brought to notice of the MoEFCC the orders passed by the Hon'ble Supreme Court in the Civil Appeal No. 6736/2013 on 12th August 2014. Relevant portion of the said order reads as below:

> *"that this Court had passed on order in respect of not granting of any environmental clearance or forest clearance for any hydroelectric project in respect of the projects on Alaknanda and Bhagirathi rivers basin. Paragraph 52.3 further specifically states about 24 projects. A report has been produced before us wherein name of 24 projects have been mentioned at Table-5, on a perusal of the same, it is manifest that the Court has shown concern in respect of the projects which found place in the report. The three projects of the applicant company are not covered by the said 24 project. In view of the aforesaid, we only clarify our earlier judgment to the effect it would not be applicable to them"*

(xx) Forest Conservation Division in the MoEFCC sought opinion of Impact Assessment (IA) Division in the MoEFCC which dealt with the above matter. In reply, the IA Division informed that Supreme Court while hearing this case on 7th May 2014 has micromised the order by stating no further construction shall be taken up by 24 flagged projects. These 24 projects have reference to WII studies. It may be inferred that order dated 7th May 2014 speaks only about "further construction restrain "whereas order originally dated 12th August 2013 speaks about not to grant any EC or FC to any HEP in the State. This state has been clearly spelt out by SC in their order dated 12th August 2013 – wherein it is evident that order in para 52 of 2013 August relate to 24 projects only. Accordingly the court has removed ban on grant/ approval EC/FC on HEPs other than 24 projects.

(xxi) Accordingly, the proposal along with the additional information received from the Government of Uttarakhand was again placed before the FAC.

2. FAC after detailed deliberations recommended that before taking any further action in the matter, the following actions may be taken:

(i) Details of recommendations of the Inter-Ministerial Group constituted by NGRBA vide O.M. dated 15th June 2012 and decision, if any, of NGRBA on these recommendations may be obtained from the NGRBA;

(ii) Addl. Principal Chief Conservator of Forests (Central), Regional Office (North Central Zone), Dehradun may be requested to re-examine, in consultation with the

State Government and user agency his earlier comments regarding need for a study from some recognized institute such as IIT, Roorkee to assess vulnerability of the Project to earthquakes and impact of the project on *Panch Mahaprayag*; and

(iii) Comments of the Impact Assessment division on status of applications, if any, received by them for grant of Environmental Clearance to the Project may be obtained.

3. The above recommendation of the FAC were communicated to all concerned vide this Ministry's letter of even dated 4th March, 2015. The State Government of Uttarakhand vide their letter no. 2909/1G-3112(Chamoli) dated 15.04.2015 submitted a copy of documents submitted by the user agency in respect of observation of FAC which were communicated by the Ministry vide its letter of even number dated 04.03.2015. Summary of the same is given as under:

i. With regards to the need for a study from IIT, Roorkee to assess the vulnerability of the project area to earthquakes and impact of the project on Panch Mahaprayag, it is informed that to assess the impact of earthquakes, study has been carried out by the Department of Earthquake Engineering, IIT, Roorkee. The summary of the findings of IIT Roorkee on various studies related to Seismic Aspects of Devsari HEP and the copies of the reports on the studies carried out by IIT Roorkee are submitted.

ii. Report no. EQ-2012-42 named "DYNAMIC ANALYSIS OF CONCRETE GRAVITY DAM AT DEVSARI HEP" (VOL-I & VOL-I1).

iii. Report No. EQ-2014-16 named "SITE SPECIFIC DESIGN EARTHQUAKE PARAMETERS FOR DEVSARI H.E. PROJECT SITE, UTTRAKI-IAND" (March 2014).

iv. Copy of the relevant pages of the report EQ-2011-24 named "SITE SPECIFIC DESIGN EARTHQUAKE PARAMETERS FOR DEVSARI H.E. PROJECT SITE, UTTRAKHAND" (July 2011).

v. Approved copy of seismic parameters by National Committee on Seismic Design Parameters (NCSDP)

4. From the perusal of the above documents and reports summary of the important finding of the report of the IIT Roorkee, as indicated in the enclosed documents, is given as under:

i. As per the executive summary of the report no. EQ-2014-16 named "SITE SPECIFIC DESIGN EARTHQUAKE PARAMETERS FOR DEVSARI H.E. PROJECT SITE, UTTRAKHAND" (March 2014)(copy of the report enclosed as Annex-V by IIT Roorkee, the horizontal & Vertical design seismic coefficients for preliminary design of dam (primary structure) are evaluated as α_h= 0.24 and α_v = 0.16 respectively. These seismic design parameters have been approved by National Committee on Seismic Design Parameters (NCSDP) vide its letter no. 2/2/2014 (vol.-I)/FE & SA/175 dated 31/03/2014 (copy enclosed as Annexure.-VI)

ii. Dynamic Analysis of Devsari Dam has been carried out by IIT, Roorkee based on the report no. EQ-2011-24 named "SITE SPECIFIC DESIGN EARTHQUAKE PARAMETERS FOR DEVSARI H.E. PROJECT SITE, UTTRAKHAND""(July 2011) by IIT, Roorkee (copy of the relevant pages of the report enclosed Annex.-V). As per Executive Summary of this July 2011 report, the horizontal design seismic coefficient for preliminary design of dam (primary structure) is evaluated as α_h = 0.272. A copy of the report by the IIT, Roorkee as per Sr. No. 4 of recommendation

on page 96 of the report"the adopted sections, both overflow and non- overflow are found to exhibit stresses within permissible limits".

iii. Since the dynamic Analysis Studies for Devsari Dam have been carried out by corresponding to design horizontal seismic coefficient of higher value i.e. 0.272 as compared to the design horizontal seismic coefficient α_h = 0.24 approved by the NCSDP in March 2014, the dam can be assumed to be safe against earthquakes.

5. Further, with regards to the matter of confluence of five rivers i.e. "Panch Mahaprayag" at Dewal was taken up with the Director (River Management) it is informed that the matter was taken up with the Central Water Commission, New Delhi to clarify the existence of following rivers and as to whether these rivers confluence at Dewal or not.

   i. Kar Ganga

   ii. Pinderi Ganga

   iii. Sarsawati Ganga

   iv. Pandi Ganga and

   v. Pushpa Ganga

6. The Central Water Commission New Delhi, vide their letter No. 3/129/2014-RS/173 dated 07/04/2015 has clarified that none of the river could be identified in India-WRIS database. The said letter of the Central Water Commission is available at Page 545/c as Annex. VIII.

7. In view of the above, it is also informed by the user agency that the observation of Additional Principal Chief Conservator of Forest (Central), Regional office (Central Zone) Lucknow regarding existing of Panch Mahaprayag at Dewal on the confluence of five rivers named above does not hold good as the very existence of the five rivers could not be identified in India-WRIS database by CWC.

8. Comments of the Regional Office: the Regional Office vide its letter no. 8A/03/UCP/1147/2012/140 dated 23.04.2015, adverting to this Ministry's letter no. 4.03.2015, has enclosed a copy of APCCF & Nodal Officer, Uttarakhand's letter No-2909/1G-3112 (Chamoli) dated: 15.04.2015 vide which the following information sought by MoEF has been submitted to the Regional Office as under:

   i. To assess the impact of earthquakes, study has been carried out by the Department of Earthquake Engineering, IIT Roorkee. The summary of the findings of IIT Roorkee on various studies related to Seismic Aspects of Devsari HEP and the copies of the reports on the studies carried out by IIT Roorkee are enclosed.

   ii. The matter regarding confluence of five rivers i.e. "Panch Mahaprayag" at Dewal was taken up with the Central Water Commission, New Delhi by User Agency vide letter No SJVN/DHEP/FLA/15-90 dated 25/03/2015 (Copy enclosed) with respect to the existence of Kar Ganga, Pinderi Ganga, Sarsawati Ganga, Pandi Ganga and Pushpa Ganga rivers, at Dewal. Central Water Commission, New Delhi, vide their letter No. 3/129/2014-RS/173 dated 07/04/2015 (Copy enclosed) has clarified that the dam site which is located near Nandkesri HO site of CWC is examined using India-WRIS web portal (india-wris.nrsc.gov.in) and it is observed that near Nandkesri site there is confluence of two rivers only i.e. Pindar and Pranmati. The rivers listed in the letter could not be identified in India —WRIS database.

   iii. In this connection, this is to be stated that the proposed project site is approximately 300 Km. from the Regional Office, Dehradun. In view of the large extent of forest

land proposed for diversion, it is realized that frequent and intensive monitoring will have to be done by the Regional Office at regular interval both during construction as well as post approval monitoring of conditions including implementation of CA and CAT Plan. The Regional Office is facing acute shortage of LMVs. Therefore, it is requested to incorporate a condition in the in-principle approval for providing one Toyota Innova (Top Model) LMV to be provided in kind by the user agency for use of Regional Office, Dehradun for effective and proper monitoring of the project.

9. Further, with regards to the environment clearance, it is informed Expert Appraisal Committee has already recommended for their environment clearance during the EAC meeting held on 27.12.2011. However, updated status of grant of environment clearance has not been provided by the IA Division of this Ministry so far.

After thorough deliberation the FAC recommended that following information/clarification may be sought from the state government

i. Whether the forest area proposed for office and store use can be avoided and shifted to non forest area

ii. May explore the possibilities of shifting muck disposal site to non forest land.

iii. Revised CA scheme, after identifying the fresh CA sites, along with the shape files of the identified CA sites and a site suitability certificate from the competent authority.

iv. R&R Plan.

10. Accordingly based on the recommendation of FAC, the state government was requested to furnish the information vide this Ministry's letter dated **(F/S)**. The PCCF and Nodal Officer, (FCA) has replied vide his letter No. 2377/1G-3112 (Chamoli, Dehradun) dated 10.02.2016. The response of the state government may kindly be seen at **(F/T).** The information sought and reply thereof is given in the below table:

S. No.	Information sought on recommendation of FAC	Response of the State Government
1.	Whether the forest area proposed for office and store use can be avoided and shifted to non-forest area.	In this regard it is informed that the user agency has re-assessed the forest land required as per the requirement and the same forest land is proposed in the proposal. As far as possible the provisions for dumping and construction facilities in private land has been made in the proposal. **Therefore, it is not possible to reduce the forest land in the proposal.** It is also reported by the state that the proposed 0.92 ha land and 19.97 ha for store and dumping would be transferred to Forest Department after
2.	May explore the possibilities of shifting muck disposal site to non-forest land.	

		construction.
3.	Revised CA scheme, after identifying the fresh CA sites, along with the shape files of the identified CA sites and a site suitability certificate from the competent authority.	In this regard the state government has submitted the GPS coordinate and KML/ shape file of CA along with site suitability certificate **(F/U)**from the competent authority.
4.	R&R Plan.	In this regard, the state government has intimated that **the proposed R & R plan, as furnished by District Magistrate Chamoli at time of land acquisition,** has been given. **(F/V)**

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Date: August 23, 2016

To,

The Divisional Forest Officer,
Pangi Forest Division,
Pangi, District Chamba, H.P.

Ref.: **Endst. No. Ft. 48-2931/2014 (FCA) dated 26 May 2016 and reminder Endst. No. Ft. 48-2931/2014 (FCA) dated 3 Jun 2016.**

Sub.: **Diversion of 211.842 ha of Forest land in favour of Dugar Hydro Power Ltd., Block-A, Plot No. A/2, 4th Floor, MGF Metropolitan Mall, Saket District Centre, New Delhi for implementation of 449 MW Dugar Hydro Electric Project within the jurisdiction of Pangi Forest Division, Pangi, District Chamba, H.P.**

Dear Sir,

With reference to subject matter and regarding observations raised vide above referred endorsements by worthy Nodal cum APCCF (FCA), Shimla, H.P. on diversion of 211.842 ha forest land proposal please find below the point wise replies to the observations pertaining to User Agency in **bold** & *Italic* letters.

1. Project has been proposed over 127.75 ha Reserve Forest. As per GoI instructions normally diversion of reserve forest has to be avoided. As per para 2.1 (vii) I, Chapter-2 of GoI guidelines, "Any proposal for diversion in Reserve Forest should be carefully examined and detailed justification after exhausting all alternatives for locating the project in this forest area should be given while forwarding the proposal. May explore possibility of avoiding/minimizing reserve forest and full justification for involving reserve forest.

In observation no. 1 the total Reserve forest shown is 127.75 ha whereas as per proposal the total Reserve forest including NDPF is 123.44 ha only. Out of this 123.44 ha reserve forest, the net affected reserve forest will be 114.58 ha (i.e. 123.44 ha – total un affected reserve forest i.e. 8.86 ha) only because the reserve forest in following Project Components will not get affected by any Project activities at any given time

i.	*Reserve Forest in Underground structures*	*: 8.52 ha*
ii.	*Reserve forest in Borrow areas*	*: 0.34 ha*
Total unaffected reserve forest area		*: 8.86 ha*

This net affected reserve forest 114.58 ha lies in proposed alternative which is a compact and optimized one enabling the whole project to be executed by single unit of each infrastructure facilities and contains the following obligatory Project components that are properly located and technically neither be relocated nor reduced in size

i.	*Submergence including river*	*: 91.01 ha,*
ii.	*Muck Disposal Area*	*: 8.58 ha,*
iii.	*Quarry*	*: 6.07 ha,*
iv.	*Project roads*	*: 4.4.5 ha,*
v.	*Dam & Pothead Yard*	*: 4.20 ha*
vi.	*Explosive magazine*	*: 0.27 ha.*
Total		*: 114.58 ha*

Furthermore, three alternatives i.e. II-A, III-A & IV-A were examined within the allotted elevations / concession limits of the Project for implementing the 449 MW Dugar HE, which stands uploaded against the column no. D of online part-I i.e. Justification for locating the project in forest land and details of alternatives examined. Summarily, the proposed alternative i.e. III-A is the only technically & commercially viable location for implementing the Project than other two alternatives i.e. II-A & IV-A, which are not Techno Commercially viable and neither feasible nor suitable. Also, there is no non forest land available in the near vicinity for three alternatives and each alternative has the reserve forest in it.

In view of above, the diversion of reserve forest can neither be minimized further nor avoided within the allotted elevations / concession limits of River Chenab for implementing the 449 MW Dugar HEP in Pangi Valley.

2. Against column No. 4 (ii) to (v) of online part –II, the detail of trees shown on the portal does not tally with detail of trees shown on the portal. As per detail of trees placed in the proposed folder in all 4324 trees are coming over the forest land proposed for diversion whereas in the detail of trees mentioned in online portal, against 4(ii) trees, against 4(iv) 4292 trees, against 4(v) 4175 trees have been shown. Necessary corrections are required to be made against column 4(ii) in online part-II as per number of trees involved in the proposal.

This observation pertains to worthy DFO, Pangi Forest Division, Pangi.

3. Approximate distance of the proposed site for diversion from boundary of forest (in km) 20 has been mentioned which doesn't seem to be correct.

This observation pertains to worthy DFO, Pangi Forest Division, Pangi.

4. Against column 13 (iii) of online part-II, instead of uploading the digital map of CA site, the project site digital map has been uploaded. GoI has desired that digital map with geo-referenced boundaries in respect of forest land proposed for CA showing name/ boundaries of forest areas in the vicinity and other important features like habitation, roads, rivers, etc. to be provided.

This observation pertains to worthy DFO, Pangi Forest Division, Pangi.

5. Against Column 13 iii of online part-II, instead of uploading copy of Survey of India Toposheet indicating boundary of forest land proposed for CA, project site map on Toposheet has been shown.

This observation pertains to worthy DFO, Pangi Forest Division, Pangi.

6. Site inspection report uploaded and placed in the proposal folder is not on proper format. Site inspection report with specific recommendations on the proper format is required to be uploaded.

This observation pertains to worthy DFO, Pangi Forest Division, Pangi.

7. Against column of recommendations, copy of part-II duly signed by DFO placed in the hard copy of proposal, is required to be uploaded whereas a note has been uploaded against this column. Once the recommendations uploaded cannot be uploaded again, hence hardcopy of part-II is required to be uploaded against additional information details.

This observation pertains to worthy DFO, Pangi Forest Division, Pangi.

8. Cost Benefit Analysis placed in the proposed folder at P. No. 34-39, has not been signed by DFO.

This observation pertains to worthy DFO, Pangi Forest Division, Pangi.

9. Map of the proposed project placed in the proposal at P. No. 40 has neither been signed by UA nor by DFO. Signed copy of the map is required to be placed in the proposed folder with heading.

As suggested the Map of proposed Project placed at P.No. 40 has been signed accordingly and heading marked.

10. At the time of submission of proposal online, the UA has given an undertaking for the submission of FRA. Still the undertaking has been placed at P.No.53 of the hard copy of the proposal.

Substantial progress has been done in this respect and instead of undertaking, the FRA case is pending with DC, Chamba now. Hardcopy of Sub Divisional Level Committee meeting forwarded by SDO©, Pangi to DC, Chamba is attached for placing in the proposal folder.

11. The CA scheme placed at P.No. 59-62 of the proposal folder has not been approved by the CF.

This observation pertains to worthy CF, Chamba.

12. Digital Map of CA site is not as per requirement of GoI and CA site map on Toposheet has not been found placed in the proposal folder.

This observation pertains to worthy DFO, Pangi Forest Division, Pangi.

13. Digital map of project site has not been placed in the proposal folder.

Digital map signed by User Agency is available at P.No. 41-45 of the proposal folder.

14. Status of Wildlife clearance is also required to be placed in the proposal folder.

Hardcopies of letter applied for getting wildlife clearance is attached herewith for placing in the proposal folder.

15. Status of Environmental Clearance is also required to be placed in the proposal folder.

Hardcopy of Terms Of Reference (TOR) having validity upto 31-12-2016 is available at P. No. 22. of the proposal folder

16. Status of TEC is also required to be placed in the proposal folder.

Hardcopies of letter about status of TEC is attached herewith for placing in the proposal folder.

17. Status of CAT plan is also required to be placed in proposal folder.

Hardcopies of letter about status of CAT plan is attached herewith for placing in the proposal folder.

Hope the above replies satisfy the respective observations.

Thanking you, in advance.

Yours Sincerely,
For Dugar Hydro Power Limited

O/C Kotwal 23/08/16

Sandeep Kotwal
Site in Charge

Encl.: As above

Received copy

DUGAR HYDRO POWER LIMITED

(Joint Venture of Tata Power and SN Power)

DHPL/DoE/Misc./20131021-03

October 21, 2013

To

DFO-Wild Life
Forest Division (WL)
Chamba Distt, Himachal Pradesh

Ph no- **01899-222639**

Kind Attention: **Sri Rakesh Kumar**

Sub: Request for issuance of No Objection Certificate for 380 MW (4 units of 95 MW) Dugar Hydro Electric Project in Chamba District of Himachal Pradesh being implemented by: The TATA Power Co Ltd & M/s. SN Power holding Singapore Pte Ltd in consortium.

Sir

The State Government of Himachal Pradesh (GOHP) has signed Pre Implementation Agreement with consortium of M/s. The TATA Power Co Ltd and SN Power holding Singapore Pte Ltd on 31st May 2011 for the implementation of Dugar Hydro Electric Project on the Chenab River, between EL ±2105 m upto EL ±2006 m. The project is located near Killar, Pangi Valley. As per the terms of PIA, **Dugar Hydro Power Ltd** has been incorporated as a SPV for the development of the Project.

The Project is into the Investigation stage and detailed survey and investigation is undergoing for making of Detailed Project Report (DPR). The DPR of the project is likely to be completed by the May 2014. As per the present assessment, the project envisages construction of a 99 m high concrete gravity dam above river bed, on Chenab River about 800m downstream of junction of Luj Nala with Chenab river. Diversion is envisaged for a design discharge of 452 m^3/s through four intakes, into 6.5 m diameter HRT and 5.5 m diameter pressure shaft on the left bank. A gross head of 99 m is available at the power station, which shall be utilized to generate 380 MW (4 x 95 MW) of power. However, these aspects of the Project would be optimized during the DPR stage.

As a part of the project development process, we seek "**No Objection Certificate**" from Department of Wild life. The detail layout and the salient features of the project are attached herewith for your kind reference. The layout and the salient features may change post finalization of Detailed Project Report in May 2014.

Corporate Office: DUGAR HYDRO POWER LTD., C/o SN Power India Pvt. Ltd., Block 'A', Plot A/2, 4th Floor, NSP Metropolitan Mall, Saket Distt. Center, New Delhi – 110017.
Registered Office: Santosh Bhawan, 1st Floor, Near Govt. Middle School, PO: Kasumpti, Shimla – 171009, HP, India

DUGAR HYDRO POWER LIMITED

(Joint Venture of Tata Power and SN Power)

It is requested to kindly process the proposal for the issuance of 'No Objection Certificate' for the timely execution of the project

Thanking You.

With Best Regards,
For and on behalf of Dugar Hydro Power Ltd.

163.
28-4-2014

Pramod K Shrivastava
Project Director

CC: Range Forest Officer, Saichu, Pangi, Killar

Encl:

1. Dugar HEP- Project Layout
2. Dugar HEP- Salient Features

Endst No. 222. dated Chamba, the 29-4-2014

Copy alongwith its enclosures is forwarded to R.O. W.L. Saichu for information and necessary action. He is directed to measure the aerial distance from the boundary of wild life Sanctuary to the proposed site of the project and submit the report to this office. The report with regards to status of W.L. Sanctuary surrounding the project its location & likely impact on wild life after installing the project.

Encl: As above.

D.F.O. Chamba

DUGAR HYDRO POWER LIMITED

(A Joint Venture of Tata Power & Statkraft)
Corporate Identity Number: U40101HP2011PLC031626

DUGAR/CEA/Consultation-Meeting/20160516-01
May 16, 2016

To,

The Secretary,
Central Electricity Authority,
Seva Bhawan, R.K. Puram,
New Delhi- 110066,

Sub: Status of Hydro Electric Projects under survey & Investigation
- **Submission of the DPR of Dugar HEP (449 MW) for detail examination in CEA.**

Ref: Your letter no. 2/HP/52/2013/CEA/PAC/454-55, dated 12.05.2016.

Dear Sir,

This is with reference to the submission of DPR for Dugar HEP. We thank you for giving us opportunity for submitting the hard copies of the DPR. As suggested by you vide your letter dated 12.05.16, we are hereby submitting Twenty Five (25) sets of DPR along with six (6) copies on pen drive including Pre-DPR chapters approved by various appraising authorities, as per following detail:

1. VOLUME I : MAIN REPORT
2. VOLUME II : COST ESTIMATE & ECONOMIC EVALUATION
3. VOLUME III : GEOLOGY
4. VOLUME III [A] : GEOLOGICAL & GEOTECHNICAL STUDIES
   VOLUME III [B] : GEOLOGICAL MAPS, SECTIONS & 3-D DRIFT LOGS
   VOLUME III [C] : FIELD & LABORATORY INVESTIGATIONS
   VOLUME III [D] : CONSTRUCTION MATERIAL
5. VOLUME IV : DRAWINGS
6. VOLUME V : HYDROLOGY
7. VOLUME VI : APPENDIX
   VOLUME VI [A] : DAM STABILITY REPORT
   VOLUME VI [B] : TRANSIENT ANALYSIS REPORT
   VOLUME VI [C] : ROCK SUPPORT DESIGN
   VOLUME VI [D] : TUNNEL LINING DESIGN
   VOLUME VI [E] : STEEL LINER DESIGN
   VOLUME VI [F] : HYDRO-MECHANICAL DESIGN
   VOLUME VI [G] : GLOF STUDY
   VOLUME VI [H] : RESERVOIR SEDIMENTATION STUDY

Corporate Office: DUGAR HYDRO POWER LTD., C/o Statkraft, Block-A, Flat A/2, 4th Floor, MGF Metropolitan Mall, Saket District Centre, New Delhi - 110017
Phone: +91-11-6688 5110, Telefax: +91-11-6600 5128
Registered Office: Santosh Bhawan, 1st Floor, Near Govt. Middle School, PO: Kasumpti, Shimla – 171009, HP, India

In view of above, it is requested to forward the DPR copies to concern authorities for further examination as per revised CEA guidelines.

Thanking You,

With Best Regards,
For and on behalf of Dugar Hydro Power Ltd.

Pramod K Shrivastava
Project Director

o/c **Encl: As above**

Copy: The Director - PAC, CEA, Seva Bhawan, R.K. Puram, New Delhi – for kind information.

DUGAR HYDRO POWER LIMITED

(A Joint Venture of TATA Power &Statkraft)
Corporate Identity Number: U40101HP2011PLC031626

DUGAR/MOEF/CAT-Plan/20160729-01
Jul29, 2016

To,

The Additional Principal CCF (CAT Plan),
Himachal Pradesh Forest Department,
Talland,
Shimla – 171 001.

Sub: Development of 449 MW Dugar HEP in Pangi Valley, Chamba district of Himachal Pradesh- **Submission of CAT Plan.**

Ref: (1) Our office letter No. DHPL/Forests/20150226-01, dated 26.02.2015.
(2) Your office letter No. Ft. CAMPA/2015/Dugar HEP/Vol. I, dated 08.04.2015.

Dear Sir,

In continuation to your letter dated 08.04.15 vide which it was communicated that draft CAT plan submitted vide DHPL letter dated 26.02.15, was not prepared in accordance with the standard requirements of Himachal Pradesh Forest Department, along with various shortcomings. Further, it was also instructed that CAT plan has to be re-formulated in consultation with local forest officers/DFO/CF.

Accordingly, CAT plan has been recast in consultation with local Forest Officers/ DFO/CF for revised approved capacity of 449 MW for Dugar HEP and the same has been attached herewith for your kind information and approval. We understand that final approval of CAT plan would be possible after issue of Techno Economic Clearance (TEC) from CEA, which is under process at present.

In view of above, it is humbly requested to accord your approval for the same.

Thanking You,

With Best Regards,
For and on behalf of Dugar Hydro Power Ltd.

Pramod K Shrivastava
Project Director

Encl: Dugar CAT Plan (2 Copies)

Corporate Office: Dugar Hydro Power Ltd., C/o Statkraft, 403, 4thFloor, Saicon Rasvilas Building, Saket District Centre, Delhi-110017
Phone: +91-11-66161200, Telefax: +91-11-66161299, email: dugarhydro@dugarhydro.com
Registered Office: Santosh Bhawan, 1st Floor, Near Govt. Middle School, Mehli PO Kasumpti, Shimla – 171009, HP, India

F. No. - 8-59/2012-FC

Sub.: Diversion of 197.173 hectares of forest land in favour of M/s. SJVN, Limited for construction of 252 MW Devsari Hydro-electric Project on Pinder river in Chamoli district of Uttarakhand.

1. The State Government of Uttarakhand vide their letter dated 30.06.2012 submitted a proposal to obtain prior approval of the Central Government, in terms of the Section-2 of the Forest (Conservation) Act, 1980 for diversion of 197.173 ha. of forest land in favour of M/S SJVN, Limited for construction of 252 MW Devsari Hydro-electric Project on Pinder river in Chamoli district of Uttarakhand.

2. Details indicated in the proposal submitted by the State Government of Uttarakhand are as below:

FACT SHEET

1.	**Name of the Proposal**	Diversion of 197.173 ha. of forest land in favour of M/S SJVN, Limited for construction of 252 MW Devsari Hydro-electric Project on Pinder river in Chamoli district of Uttarakhand.
2	**Location:**	
	State	Uttarakhand.
	District	Chamoli.
3.	**Particular of Forests**	
i	Name of Forest Division	Badrinath Forest Division, Gopeshwar.
ii	Area of Forest land for Diversion	197.173 ha.
iii	Legal Status of Forest land	Reserve forest land-**28.492 ha.** Civil and Soyam forest land-**129.661 ha.** Van Panchayat land-**39.020 ha.** **Total: 197.173 ha.**
iv	Density of Vegetation	The area proposed for diversion has density of vegetation 0.4.
v	Species-wise and diameter class wise enumeration of trees	Project involves felling of total 7,434 trees out of which 6134 trees are available in the 197.173 ha. of forest land. The remaining 1300 trees are available in the non-forest land

		required for the project. Diameter-class wise breakup of the above trees is as below: **Forest land:** 0-10 cm: 807, 10-20 cm: 1,997, 20-30 cm- 955, 30-40 cm: 828, 40-50 cm: 511, 50-60 cm: 497, > 60 cm: 580. Non-forest land: 0-10 cm: 240, 10-20 cm: 425, 20-30 cm- 305, 30-40 cm: 181, 40-50 cm: 75, 50-60 cm: 41, > 60 cm: 33.
4.	Vulnerability of area to vegetation	Nil.
5	Approximate distance of proposed site for diversion from boundary of forest	2 Km
6.	Whether forms part of National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger Reserve, Elephant Corridor etc. (if so, the details of the area the comments of the Chief Wildlife Warden to be annexed)	No. 100 km distance.
7.	Whether any rare/ endangered/ unique species of flora and fauna found in the area if so, details thereof.	No.
8.	Whether any protected archaeological/ heritage site/ defence establishment or any other important monument is located in the area. If so, the details thereof with NOC from competent authority, if required.	No.
9.	Whether the requirement of	Requirement of forest land is

	forest land as proposed by the User Agency in col.2 of Part-I is unavoidable and bare minimum for the project. If no, recommended area item-wise with details of alternatives examined.	minimum.
10.	Whether any work in violation of the Act has been carried out (Yes/ No). If yes, details of the same including period of work done, action taken on erring officials. Whether work in violation is still under progress.	Work has not been initiated.
11.	Details of Compensatory Afforestation Scheme:	The State Forest Department has prepared a detailed proposal for planting five year maintenance of 74,340 (ten times the 7434 tress required to be felled for execution of the project) at an estimated outlay of Rs. 6,08,60, 465. Apart from the above, compensatory afforestation is proposed to be raised over 395 ha. (double the area of forest land proposed for diversion) degraded forest land at an estimated outlay of Rs. 2,53,40,000/- The DFO has certified the
12.	**Recommendation**	
	DFO	Recommended.
	CF	Recommended.
	Nodal Officer & Addl. PCCF	Recommended.
	State Govt.	Recommended.

(Oct-2022 to Mar-2023)

1.	Name of the Project	Chamera Hydropower Station, Stage-III (231MW)
2.	Project Type	Hydroelectric Project
3.	Clearance letter (s). C.M No. & dates a. Environment Clearance b. Forest Clearance	 J-12011/6/2004-IA-I dated 10.03.2005. (i) 8-111/2002-FC dated 19.09.2005. (ii) 8-111/2002-FC dated 09.07.2009
4.	Location a) District (s) b) State (s) c) Latitude d) Longitude	 Chamba Himachal Pradesh 32^0 26'N to 32^0 30'N 76^o 17'E to 76^o 28'E
5.	Address for Correspondence: a) Address of concerned HOP (with pin code and telephone/ fax nos.) b) Address of concerned HoD in Corporate Office (with pin code & telephone/ fax nos.)	 General Manager (I/C) Chamera-III Power Station, NHPC Ltd. Dharwala, Post Bag No.9, Distt. Chamba H.P.-176311 Tele-01899-279536, Fax: 01899-279698 Executive Director (Environment & Diversity Management) NHPC Ltd., Sector-33, Faridabad 121003 Tele: 0129-2254674
6.	Details of Environmental Management Plans (EMPs)	As Per Annexure-I
7.	Break – up of the project area : a) Submergence area i) Forest area ii) Non-forest b) Others i) Forest area ii) Non-forest	 a) Submergence area i) 29.900 ha ii) 0.0072 ha (Pvt.Land) b) Others i) 69.075 ha ii) 11.5322 ha (Pvt. Land) Total: 110.5114 ha
8	Break-up of the Project affected population with enumeration of those losing houses/dwelling units only, agricultural land only, both dwelling units and agricultural land and landless labourers / artisans. a) SC/ST/Adivasis b) Others	(i) PAF details as per R&R Scheme-2011 i. PAFs whose entire land has been acquired — Nil ii. PAFs who have become landless *(i.e balance agriculture land left after acquisition is less than 5 bigha as per R&R Scheme)* — 92 iii. Other PAFs *(i.e whose balance agriculture land left after acquisition is more than 5 bigha as per R&R Scheme-2011)* — 180 Sub-total PAF — 272 (a) SC/ST PAFs : SC-09, ST-16 (b) Others : 247

		(ii)Further, State Government has issued notification for R&R Award amounting Rs 14.13 Crores under RFCTLARR Act 2013 on 05.01.2018 (R&R Award) & 24.03.2018 (Corrigendum) for acquisition of 93-02-02 bigha land with a list of additional 241 numbers of PAFs. Break-up details of PAFS (241 nos.) (a) SC-17, ST-15 (b) Others: 209
9.	Financial details a) Project cost as originally planned and subsequent revised estimates and the years of price reference: b) Actual expenditure incurred on the Project so far. c) Allocation made for environmental management plans. d) Actual expenditure incurred on the environmental management plans so far	(a) Rs.1405.63 Crores at Feb'05 PL. Rs.2048.12 Crores (revised cost submitted for approval) (b) Rs.1877.66 Crores till Commercial Operation Date(COD) (c)Rs. 4659.80 Lakhs (EMP) + 1000.00 Lakhs (R&R) = Rs.5659.80 Lakhs (d)Rs. 5406.95 Lakhs (Annexure-I)
10.	Forest Land requirements a) Status of approval for diversion of forestland for non-forestry use. (b)The status of clear felling in Forestland.	(i) Forest Clearance (Stage-II) for diversion of 96.145 ha of forestland was accorded vide MoEF letter No. 8-111/2002-FC dated 19.09.2005. (ii) Forest clearance (St-II) for diversion of additional 2.83 ha of forestland for muck disposal sites was accorded vide MoEF letter No. 8-111/2002-FC dated 09.07.2009. *After commissioning of Chamera-III, project authority has surrendered 33.33 ha of diverted forest land back to the concerned Forest Divisions(DFO Chamba, Bharmour & Wild life Division,Chamba) vide Project's letter No. NH/CPS-III/CE(civil)/2018-64 dated 13.7.2018 in compliance to the condition no. xvii stipulated in FC letter dated 19.9.2005. The acknowledgement of the same is still awaited from State Forest Department.* Total clear felling: 541 trees.
11.	Status of construction a) Date of commencement (actual and/ or planned) b) Date of completion (actual and/ or planned).	a) 01.09.2005 (Actual) b) 04.07.2012 (Actual)
12.	Reasons for the delay. If the project is yet to start:	Not applicable, as Project has already been Commissioned.

Filed

13.	Details of site visits a) By Monitoring Committee b) By Regional Office,MOEF	Last site visit/Meeting held: a) 4th meeting of Monitoring committee held on 16th & 17th December, 2020. b) The representative of RO, MOEF&CC,Dehradun visited site from 3rd-4th Nov 2020. Also, Site visit conducted during EMC meeting held on 16th-17th December 2020.
14.	Brief note on the status of compliance of the conditions stipulated by MoEF.	Enclosed at Annexure – 'II'.

Annexure-I

Budget allocation and Expenditure incurred on Environment Management Plan of Chamera-III Power Station(till March,2022)

S.No.	EMP	Budget Allocation	Expenditure
		(Rs. in lakhs)	
1.	Catchment Area Treatment	2981.53	2967.92
2.	Biodiversity Conservation		
3.	Fisheries Development	120.00	120.00
4.	Public Health Delivery System	148.95	69.54 + 143.28*
5.	Fuel Arrangement	150.00	103.81*
6.	Restoration of Muck Dumping Sites	807.12	1482.26* +210.29
7.	Restoration of quarries & construction area	148.00	**
8.	Green Belt Development	25.00	15.00
9.	Dam break modelling & Disaster Management Plan	199.20	**
10.	Env. Monitoring Program#	80.00	167.21
11.	R&R Plan	1000.00	1856.99
	Total (Rs in lakhs)	**5659.80**	**5406.95**

* Cost for providing free fuel, health facilities to labourers and protection works in dumping sites by the contractor is included in the unit price for other item of civil work therefore it is not included in the expenditure made on EMP.

**Various activities already accomplished under different financial heads of project.

Himachal Pradesh SPCB and Chamera-III Power Station(NHPC) has signed an environment monitoring Planfor air,water sampling.

Annexure-II

Status of Compliance of conditions stipulated in EC letter No.J-12011/6/2004-IA-I dated 10.03.2005 of Chamera HEP Stage-III(231MW)

	Part-A Special Conditions	Compliance Report
i	Catchment Area Treatment Plan as has been proposed should be completed in five years.	Chamera-III Project has deposited total amount of Rs.2926.53 Lakhs to H.P State Forest Department for implementation of CAT works. Activities of Wildlife & Biodiversity Conservation and management are integrated in the CAT Plan. In addition, articles (in kind) amounting to Rs.41.39 lakhs provided to H.P Forest Department against the total provision for infrastructure development under the CAT Plan. Out of total fund deposited for CAT works, it also includes Rs.87.00 lakhs deposited with Deputy Commissioner, Chamba on 26.10.2007 towards development of Rural Infrastructure, Agriculture & Horticulture Support and Animal Husbandry Support under CAT Plan. The CAT works are being implemented by State Forest Deptt, Distt. Chamba and progress in this regard is being submitted to this Power Station. The details of progress are as under: (i) Out of Rs 87 lakh deposited to DC,Chamba, utilization certificate of Rs 1.5 lakh has been received vide letter 21.10.2019. (ii) The DFO, Bharmour H.P. Forest Division, vide letter dated 05.01.2023 has submitted cumulative financial progress of Rs. 1381.192 lakhs up to December 2022. (iii)The DFO (Wildlife Division), Chamba vide letter No. 2270 dated 05.11.2020 had provided cumulative financial progress report of Rs 687.87 lakhs till Sep 2020. Therefore, cumulative financial progress of Rs 2070.562 Lakhs has been forwarded by State Forest Deptt. to Chamera-III Power Station. During the Environment Monitoring Committee meeting held on 16th & 17th Dec 2020 at Karian, it was decided to reconcile total expenditure incurred under CAT works and availability of balancefunds for execution of CAT works. Power Station had requested to CCF,Chamba vide letter dated 20.3.2021 to constitute Biodiversity Conservation Cell as per EMP to expedite CAT works. The reply is awaited. The updated status of CAT works and utilization details of fund thereof have been requested from DFO,Chamba, DFO,Bharmour, DFO(WL),Chamba, DC,Chamba vide Power Station's letter dated 12.4.2021, 29.9.2021, 4.10.2021, 26.05.2022 & 21.10.2022. The reply is awaited.
ii	NHPC should submit the information regarding adequacy of spillway capacity of Chamera-I Dam in case of extreme	NHPC had provided requisite information/data to CWC for analysis. Accordingly, CWC vide letter dated 21.11.2008 conveyed its views, which is confirming that PMF of 24417cumecs can be passed from spillway and sluices with 10% In operative condition.

	eventuality of floods from upstream projects to Central Water Commission and any suggestions made by CWC will be taken care of by NHPC.	
iii	157 families of the three villages of Churi, Moukhari and Sulakhar will be affected. The affected families should be rehabilitated as per R&R Plan proposed & submitted.	(i) The Deputy Commissioner, Chamba (vide letter no. RRO/CBA/R&RScheme/CHEP-III/2010/4809-18 dated 01.03.2011) had notified R&R Scheme for the Project Affected Families (PAF). As per the said scheme, 272 nos. of PAFs have already been given compensation. (ii) In addition, 241 nos. of PAFs have also been given compensation under new land acquisition Act "RFCTLARR, Act 2013 (vide R&R award dated 05.01.2018 & Corrigendum dated 24.3.2018) for acquisition of 93-02-02 bigha land.
	Part B: **General Conditions**	
i	Adequate free fuel arrangement should be made for the labour force engaged in construction work at project cost so that indiscriminate felling of trees is prevented.	Project has been commissioned in 2012. As such no labour is residing at Project site now.
ii	Fuel depot may be openedat the site to provide thefuel (kerosene/wood/LPG). Medical facilities as well asrecreational facilities shouldalso be provided to thelabourers.	Project has been commissioned in 2012. As such no labour is residing at Project site now. Moreover, Chamera-III Power Station has its own dispensaries at powerhouse and dam site. Doctors and paramedical staffs are available for primary and emergency treatments for NHPC staff as well as local people. One ambulance is also available. Details of patients treated at dispensaries during the last six month period (Oct-2022 to Mar-2023) are given below:

Patient Treated(nos.)	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	Mar 2023	Total
NHPC staff	320	396	440	430	365	380	2331
Contract Staff/CISF	130	135	158	157	107	164	851
Locals/Project affected	432	591	699	487	641	564	3414
Total patients treated	882	1122	1297	1074	1113	1108	6596

iii	All the labourers to be engaged for construction	The project has been commissioned. As such no labour is residing at Project site now.

3/INC

	works should be thoroughly examined by health personnel and adequately treated before issuing them work permit.	
iv	Restoration of construction area including dumping site of excavated materials should be ensured by leveling, filling up of burrow pits, landscaping etc. The area should be properly treated with suitable plantation.	Restoration of Muck disposal sites have been done by suitable plantation by HP State Forest Department. In this regard, Chamera-III Project had released total Rs. 135.55 lakhs (Rs113.21+6.34+16) to H.P. Forest Department for undertaking reclamation/plantation and maintenance works at dumping sites. Out of which, the utilization certificate of fund amounting to Rs 124.14 lakh (up to March 2019)has been submitted by State Forest Deptt (O/o DFO,Chamba) vide letter dated 03.04.2019 for executing reclamation measures (Afforestation, soil conservation) at 14 nos. of dumping sites. Further, progress report/UC in this regard is awaited. Dumping Sites and other forestland (33.33ha) which are not in use of Power Station has been surrendered back to State Forest Deptt., Chamba vide letter No. NH/CPS-III/CE(civil)/2018-64 dated 13.7.2018. However, acknowledgement of State Forest Department is still awaited. The matter has been appraised to DFO during Environment monitoring committee meeting held on 16th -17th December 2020 at Karian.
v	Financial provision should be made in the total budget of the project for implementation of the above suggested measures.	Complied with. Appropriate financial provision was made in total budget of the project for implementation of the above safeguard measures/EMP.
vi	A monitoring Committee for R & R should be constituted which must include representatives of project affected persons from a woman beneficiary.	R & R Plan was notified by Deputy Commissioner, Chamba on 01.03.2011. Project has requested to Deputy Commissioner, Chamba vide letter no. NH/CH-III/Env.4/2012/652 dated 16.02.2012 for constitution of a monitoring committee to oversee implementation of R&R Plan. Further, vide project's letters dated 11.02.2015, 10.02.2017, 14.10.2017 & 08.03.2018 have also been requested for constitution of monitoring committee for R&R, however reply is awaited. Presently, compensation to the eligible PAF has already been disbursed by the Land Acquisition Officer. During the Meeting of EMC held on 16th & 17th December 2020, the DC,Chamba informed that R&R committee shall be constituted to oversee the matter related to R&R Scheme-2011.
vii	A multidisciplinary committee should be constituted with representative from various disciplines of forestry, ecology, wildlife, soil conservation, NGO etc. to oversee the effective	Complied with. A multidisciplinaryCommittee was constituted vide circular dated NH/CH- III/Env/10/06/345 dated 15.09.2006 and further revised vide letterNNH/CH-III/Env/10/2017/44-57 dated 13.10.2017.

	implementation of the suggested safeguard measures.	
viii	Six monthly monitoring reports should be submitted to the Ministry and its Regional Office, Chandigarh for review.	Six monthly monitoring report is being submitted regularly to MOEF&CC, Regional office, Dehradun and MOEF&CC, New Delhi. The last six monthly report was submitted vide letter No. NH/Env & DM/Env.110/239 dated 28.11.2022 as an attachment with email to iro.shimla-mefcc@gov.in and env.iroshimla-moefcc@gov.in.

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No. 1561
H.P. Forest Department

Dated Rampur, the 15-07-2023

From :- CCF Rampur

To :- Nodal Officer-cum- APCCF (FCA)
O/o Pr. CCF (HoFF) H.P. Shimla-1.

Subject: - Diversion of 7.3722 hac of forest land as additional forest land requirement in already approved diversion in favour of Shongtong Karchham Hydro Electric Project HPPCL under the jurisdiction of Kinnaur Forest Division Distt Kinnaur H.P. (Online Proposal No. FP/HYD/40611/2019) regarding.

Memo:

Kindly refer to your office online observations dated 15.07.2023 on the subject cited above.

2. As desired the point wise reply to the observations as raised vide letter under reference submitted by DFO Kinnaur are as under: -

Sr.No	Observations	Reply of the observations
1.	From the monitoring report done by Sub-office (SO), Shimla, it is noticed that out of 08 sites for 128 ha, no plantation work has been started in 4 sites i.e., C-169, C-170, C-172, C-241, and nil survival percentage was recorded in C-176. In addition, the CA site provided by State Govt. is not matching with Plantation General of the particular CA sites. This needs clarification with justification and detail report.	It is submitted that out of total 8 sites having area of 128 ha. proposed for raising of compensatory afforestation under the project, afforestation has been carried out in four sites having area of 75 ha. The remaining area of 53 ha under CA will be undertaken during the next financial year. So far as survival percentage in respect of C. No. 176 is concerned and regard to mismatch of CA site with plantation general, necessary scrutiny of the record as well as field verification is being carried out at level of DFO Kinnaur and due to current heavy flood in the state , the area could not be verified immediately. The detailed report will be communicated separately.

2.	With regard to Catchment Area Treatment (CAT) Plan, the Nodal Officer (FCA) informed that the utilization/ implementation of CAT plan is Rs. 41,06,94,500 against deposited fund of Rs. 60.40,00,000 for the CAT plan of Shongtong Karchham HEP whereas SO Shimla mentioned in their monitoring report that against the outlay of Rs. 701.95 million for Catchment Area Treatment (CAT) Plan, Rs. 604.4 million has only been deposited in CAMPA account with utilization of Rs. 50.07 lakhs. Therefore, the reason for non-depositing of balance approved amount of CAT plan along-with poor implementation of CAT plan shall be required.	The total outlay against CAT plan as approved by HP Forest Deptt in respect of Shongtong Karchham HEP was Rs. 60,40,00,000/- which was already deposited HPPCL. As far as deposition of funds in CAMPA account as per the revised cost of project is concerned , HPPCL has deposited the remaining amount of Rs.97.55 million . The implementation part is being followed with the Forest Department . The payment details are attached as **Annexure-I.**
3.	There is a mismatch in dumping sites (DS). As per the component wise break-up provided by User Agency, there are 5 dumping sites whereas 8 number of dumping sites found during site inspection by Sub-office of this Ministry, Shimla. Moreover the muck is not being carried out in the designated site of DS-4. Some quantity of muck has been dumped opposite to DS-4 on the other site of the highway of the bank of river.	Regarding dumping sites, it is submitted that there are 6 dumping sites in Forest Land Diversion proposal of 63.5015 ha. These sites are dumping sites no. 1,2,3,4,5 and 6. Out of above, 5 sites i.e. 2,3,4,5& 6 have been used for dumping of muck. Dumping site 1 could not be used by HPPCL because with time the area got vanished due to change of course by the Satluj river. Area and location wise detail along with actual status of all these sites is attached as **Annexure-II.** In EMP for Shongtong-Karchham HEP total 8 no. dumping sites have been shown. In this proposal dumping site no. 6 of original FCA proposal has been designated as dumping site no. 8. Additionally 2 job facility areas were proposed as dumping sites with the intention that some dumping may be required for creation of working spaces although no such dumping were carried out in these job facility areas. Area and location wise detail along with actual status of all these sites is attached as **Annexure-III.** **So in total HPPCL has used only 5 dumping sites i.e. 2,3,4,5 & 6.** Regarding dumping site no. 4, it is submitted that muck has been dumped in the designated dumping site.

		As it is evident from the status of dumping sites **(Annexure-II)** due to landslides in and around the dumping sites and change of river course the capacity of designated sites reduced drastically. To make up for above deficit HPPCL has dumped muck on private land on specific request of the local people. In addition to above, forest land measuring 5.2248 ha at four locations has been requested for diversion in instant proposal for dumping of muck.
4.	It is mentioned in the monitoring report of SO Shimla that the muck disposable capacity of the sites have reduced drastically due to change in course of river landslides nearby designated muck duping of the project. It was further submitted by the proponent that a committee has been formed to assess the capacity of all the designated dumping sites 8-78/2010-FC I/47836/2023and the revised muck management plan will be finalized after finalization of land and the same shall be submitted for approval to MoEF&CC. The revised approved muck management plan need to be submitted before consideration of the instant proposal.	Status regarding reduction in the muck dumping capacity and measures to mitigate the same has been clarified above at point No.3. A revised Muck Management Plan reflecting above position has been prepared and draft copy submitted to regional office HP State Pollution Control Board Rampur. Final copy shall soon be submitted after approval of the HP State Pollution Control Board. The approved copy shall be submitted to the MoEF& CC, New Delhi before Stage-II approval. Undertaking to this affect is attached at **Annexure-IV.**
5.	The condition no. 8 of forest clearance approval dated 14.11.2012 which states that *"the entire reservoir created due to submergence shall be declared Reserve Forest under Indian Forest Act. 1927 within six months"* has not yet been complied.	The process of declaration of Reservoir area as Reserve Forest under Indian Forest Act 1927 has already been initiated and a formal request has been submitted to Deputy Commissioner Kinnaur. The process shall be concluded well before creation of actual reservoir . Letter to this affect is attached as **Annexure-V.**

6	The condition no. 10 of forest clearance approval dated 14.11.2012 regarding green belt plantation has not yet been complied	The green belt development is to be carried around the reservoir, it will be created after construction of the barrage whose work has been started recently and is expected to be completed by March 2027. Once the reservoir is constructed and settles, green belt plantation shall be done by the HPPCL in consultation with H.P Forest Deptt. Undertaking to this affect is attached as **Annexure-VI.**
7.	The river basin study on the impact of HEP's on the flora & fauna area in compliance to condition no. 11 of forest clearance approval dated 14.11.2012 has not yet been complied.	The work of cumulative impact assessment (CEIA) was initially taken up by GoHP and studies of all the five river basins was awarded to different consultants. Later on these studies were taken over by GoI. The CEIA study of Satluj basin is being carried out by MoEF&CC GoI through ICFRE Dehradun. GoHP is extending all necessary help towards finalization of the study.
8.	The user agency has now been provided the KML file of diverted forest area in polygon format. However, the total area of given KML is found 68.979 ha instead of 63.5015 ha. Moreover, in the said KML file, the dumping site namely 'Dumping Site-3' has been included which is a part of present diversion proposal. Therefore, it needs clarification whether the dumping site No. 3 was the part of earlier approved proposal and if so, why it is again being proposed for diversion. The correct KML file of 63.5015 ha may also be provided.	Area of old diversion is 63.5015 ha and KML file of the diverted areas has been uploaded accordingly. The compact disc of old diversion is also attached. Dumping site no. 3 was certainly the part of old proposal. One of the proposed new dumping sites is adjacent to the dumping site no. 3 and it has now been corrected as Dumping Site "C" on the online portal. Due to same numbering this confusion was created. As a matter of fact it is otherwise a new dumping site. The new dumping sites have been named as DS- A, DS-B, DS-C and DS-D.
9.	In the present proposal the KML file of Dumping site No. 3 has been uploaded comprising 3.115 ha forest land whereas in the component-wise break-up it is mentioned 1.447 ha . Therefore, the correct KML file based on the component wise breakup as shown in Part-I needs to be uploaded on PARIVESH.	KML file of Dumping Site "C" (wrongly written earlier as no. 3) having area 1.447 ha has been uploaded. The compact disc of the same is attached .

10.	KML file of 8 dumping sites along with the status of land as per the latest monitoring report furnished by the SO, Shimla against Stage-II approval granted for 63.5015 ha forest land may also be furnished.	KML files of 6 dumping sites of old diversion and 2 job facility areas (mentioned as dumping sites 6&7 in the EMP) have been uploaded on the portal. The compact disc of KML file is also attached. The status of land of 6 dumping sites as per latest monitoring report is in **Annexure II.**
11.	With regard to condition no. 15 regarding regeneration of equivalent area of degraded forest land, SO Shimla in the report has mentioned that the staff of Forest department was not present during the site inspection, which has been intimated by SO, Shimla to the State Govt. vide letter dated 09.05.2023. Due to this, the site regenerated could not be visited. The State shall submit a detailed report in this regard.	Regeneration of degraded forest land area measuring 125 ha has been carried out and expenditure of Rs 1,36,73,737/- incurred during the financial year FY 2016-17 and FY 2017-18 and necessary utilization certificate in this respect has been submitted by the DFO. The reason for not attending the inspection during the visit of SO Shimla team was sought from DFO concerned and the report will be submitted in this regard shortly.

Submitted for favour of kind information and further necessary action please.

15/07/2023

Chief Conservator of Forests,
Rampur Bsr, H.P.

Agenda No. 4

F. No. 8-28/2015-FC

Sub: Proposal for diversion of balance forest land of 746.3325 ha including 11.8305 ha for safety zone (excluding 95.60 ha of pre-1980 broken up forest land already diverted and 4.467 ha of forest land being proposed for diversion in separate proposal for mining infrastructure of Daitari ML) within total forest land of 846.3995 ha located within approved Mining lease area of 1018.3085 ha for Iron Ore Mining in Daitari Mining lease in Cuttack Forest Division of Jajpur District and Keonjhar (WL) Division of Keonjhar District, Odisha) M/s OMC Ltd. during Mining lease period as extended under the amended provision MMDR Act

1. The State Government of Odisha, Department of Environment, Forests & Climate Change, vide his letter No. 10F (Cons) 210/2015, 16637/F/E, Bhubaneshwar, dated 19.09.15. submitted a proposal to obtain prior approval of the Central Government.
2. The proposal was placed before FAC in its meeting held on **12.07.2016 and 20.07.2017.**
3. Total lease area is 1018.3085 ha. Out of which forest area is 846.3995 ha. Out of 846.3995 ha forest land, diversion is sought for 746.3325 ha. and 95.60 ha had already been diverted in 2005. Remaining 4 ha is included in another proposal which is in the process of submission for diversion.
4. The mining lease was originally granted over an area of 7 Sq. Miles in Talpada (Daitari) for iron ore mining in favour of Orissa Mining Corporation by the erstwhile Mining and Geology Department of State Government vide Proceedings No. III (G) M - 1/ 65-2272 MG dated 16.03.1965 and the Mining lease was executed on 27. 01.1966 for a period of 30 years. Thus, the original lease period expired on 26.1.1996. The surface rights were granted to OMC Ltd. by the Collector, Cuttack vide his letter dt. 17.11.1966. First renewal was done on 27.1.96 up to 26.1.2016. which was extended up to 21.3.2020 under the amended provision MMDR Act.
5. The lease area is located in two forest divisions i.e. in Keonjhar WL Division (533.659 ha) and Cuttack Forest Division (193.2666 ha).
6. Legal status of forest land is Reserve Forest & Gramya Jungle in Keonjhar WLD and Daitri DPF in Cuttack FD.
7. **Density of vegetation as reported by state is 0.8-1.0 (Eco-class-I in Keonjhar WLD) and 0.6 (Eco-class-I in Cuttack FD).**
8. A total no. of trees of 1,65,869 in Keonjhar WLD and 70,697 & 35,838 No. of poles in Cuttack FD are assessed to be used under this mining project.
9. **Keonjhar WL:** The area applied for diversion does not involve any notified Eco-sensitive Zone/ National Park / sanctuary. However, this area was supporting Royal Bengal Tigers. **Recently, National Tiger Conservation Authority (NTCA) has proposed a tiger corridor interlinking Similipal Tiger & Satkosia Tiger Reserve in Odisha which is essential for long term Tiger/Wildlife conservation in our country.** Field verification of the proposed corridor is going on. **The area proposed for forest diversion comes within the proposed tiger corridor.**
10. **Cuttack FD:** Do not form part of National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger Reserve etc.
11. No protected archaeological/ heritage site/defence establishment or any other important monument is located in the area such type of monument is noticed while conducted SIR by the respective DFO. However, the user agency advised to obtain NOC from concerned authority in this regard.

12. **Keonjhar WL division:** Upon scrutiny of the high resolution satellite image provided by the user agency, **it was noticed that a big patch of Gramya Jungle was found without vegetative cover, which was abnormal considering the dense canopy of the adjacent forest. Moreover, the area was adjacent to village Talapada. So, during field inspection the area was verified in detail and approximately 28.67 ha. of Gramya Jungle coming within the lease hold area was found to be Podu/Jhoom/shifting cultivation ravaged.** GPS readings of that area were taken and it was cross verified in Google Earth imagery using timeline feature. The Google Earth image dated 16.04.2010 corroborated the above findings. So, this is a violation of Forest (Conservation) Act, 1980 as Podu/Jhoom /shifting cultivation within the lease hold area is a non-forestry activity. **The matter is under further investigation.**
13. **Cuttack forest division:** No violation noticed.
14. Total financial outlay for compensatory Afforestation scheme.is Rs. 7,24,66,200 (Rs.5,56, 66, 000 for an area of 717.853 ha.+1,68, 00, 200 for an area of 16.649 ha.
15. Cost Benefit Analysis for **Keonjhar WL is** 1:7.72 and **Cuttack FD is** 1:622
16. The DFO, Kalahandi (South) Division has certified that the land identified for C.A. is found suitable for plantation
17. The DFO, Kalahandi (South) Division has certified that the land identified for C.A. is found suitable for plantation
18. Environment clearance has already been obtained by the user agency vide Ministry's letter No. J-11015/1003/2007-IA.II (M) dated 22.09.2010 of MoEF, Govt. of India.
19. Documentary evidences in support of settlements of rights under the Scheduled Tribe and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 has been given separately

20. DFO **Keonjhar WL and RCCF Rourkela in their recommendation had mentioned that the project may be considered on merits and DFO Cuttack had recommended the project. RCCF** Angul Circle recommended the project subject of implementation of a site Specific Wildlife Conservation Plan, in view of the area to the potential Tiger and Elephant migration route
21. Nodal officer/PCCF and State Government had recommended the project.
22. **Site inspection Report by Regional Office, Bhubaneswar:**
The Site inspection report of this project has been carried out by Conservator of Forests (Central), Regional Office, Bhubaneswar during 05-06 November, 2015 along with Sri Sangram Behera, Divisional Forest Officer, Keonjhar Wildlife Division, Anandapur, Sri Sudarshan Behera, Divisional Forest Officer, Cuttack Forest Division and Shri D.K. Pattanaik, Sr. Manager (Geology, F&E), & Representatives from M/S OMC Ltd M/s OMC The details of SIR are as under:

1. **Legal status of the forest land proposed for diversion:**
Keonjhar WL Division : Reserve Forest & Gramya Jungle.

Cuttack Forest Division : Daitari DPF.

2. **Item-wise break-up details of the forest land proposed for diversion:**
The purpose-wise break-up of the total land of 746.3325 ha is furnished below:

(A) Area coming within Keonjhar Wildlife Division in Keonjhar district:

Item wise break up of Forest land proposed for diversion.	**Item**	**Forest area in (ha)**			
		Rebana RF	**Daitari PF**	**Gramya Jungle**	**Total**
	Mining	383.1188	Nil	18.5965	401.7153
	Dumping	16.0229	Nil	34.5754	50.5983
	Magazine & its Safety	91.9608	Nil	Nil	91.9608
	Safety zone	8.2554	Nil	0.5361	8.7915
	Total	499.3579	Nil	53.7080	553.0659

(B) Area-coming within Cuttack Forest Division in Jajpur district.

Item -wise break up of Forest land proposed for diversion.	**Item**	**Forest area in (ha)**			
		Rebana RF	**Daitari PF**	**Gramya Jungle**	**Total**
	Mining	Nil	190.2276	Nil	**190.2276**
	Safety zone	Nil	3.0390	Nil	**3.0390**
	Total	**Nil**	**193.2666**	**Nil**	**193.2666**

(C) Table-C (Area in Ha)

S.NO.	Purpose	Keonjhar (Wildlife) Division				Cuttack Division					
		Diverted (Rebena RF)	Now Proposed for diversion		Remarks	Total	Diverted (Daitari PF)	Now proposed (Daitari PF)	Total	Total Forest	Non Forest	Grand total
			Rebena RF	V.F								

1	Mining	27.064	383.1188	18.5965	4.4670 ha out of the MI. area has been proposed for diversion separately	42E1793	34.566	190.2276	224.7936	653.5729	171.90 (including 0.272 ha private land) in village Talapada in Keonjhar district	653.5729
2	Dumping	4.22	16.0229	34.5754		54:8183	1.28		1.28	56.0983		56.1283
3	Ore stacking	13.50				13.50	0.50		0.50	14.00		14.00
4	Camp office. workshop etc.	5.50	-			5.50			-	5.50		5.50
5	Construction of mad	8.97				8.97		-	-	8.97		8.97
6	Magazine & its safety zone		91.9608			91.9608			-	91.9608		91.9608
	Total	59.254	491.1025	533719		603.5284	36.346	190.2276	226.5736	830.102		830.102
7	Safety zone	-	8.2554	0.5361		8.7915		3.0390	3.0390	11.8305		11.8305
	Grand Total	59.254	499.3579	53.7080	4_4670	612.3199 4.467= 616.7869 d	36.346	193.2666	229.6126	841.9325 4.467= 846.3995	171.909	841.9325 + 4.467+ 171.909= 1018.3085

3. **Whether proposal involves any construction of buildings (including residential) or not. If yes, details thereof:** As reported in Point No.2 above.

4. **Total cost of the project at present rates:** The total cost of this project is Rs. 198.78 Crores.

5. **Wildlife:** Forest area proposed for diversion is a known habitat of various wild animals including Schedule I species like Indian Elephant (*Elephas maximus*), Indian wolf (*Canis lupus pallipes)* etc. Other wildlife animals found in the area are Mouse deer (*Trangulus meminna*), Ratel (*Mellivora capensis*), Sloth Bear (*Melursus ursinus*), Jackal (*Canis aureus linnaeus*), Barking deer (*Muntiacus muntjak*), Sambar (*Cervus unicolor*), Peafowl (*Pavo cristatus*), King Cobra (*Ophiophagus hannah*), Russel's viper (*Vipera russelli*), Hill Myna (*Gracula religiosa*), Indian soft-shelled turtle *(Lissemys* ***punctata*** *punctata*), Large Bengal monitor lizard (*Varanus*

bengalensis) etc. As reported by the DFO, Keonjhar(WL) division and RCCF, Rourkela, **the area was supporting Royal Bengal Tigers in the past.** The last confirmed presence of Tigers in this area was in the year 1997. **It has been further reported that National Tiger Conservation Authority has proposed a Tiger corridor interlinking Similipal Tiger Reserve and Satkosia Tiger Reserve in Odisha for long term Tiger/ Wildlife conservation in the country. Field verification of the proposed corridor is going on. The area proposed for forest diversion for this infrastructure project comes within the proposed Tiger corridor.**

Similarly, a part of **Daitari PF coming within Cuttack Forest Division is included in this mining lease. The area is having dry deciduous forest land dominated by Sal species. Density of vegetation is reported to be 0.6.** Wildlife species such as Migratory Elephant , spotted deer, wild boar, fox, Barking Deer, Common Languor, Jackal, Sloth Bear, Hyena, Squirrel, Mongoose, Ratel, Hare, Pangolin, Peacock, Red Jungle fowl, Porcupine, Ringed dove, parrot, Koel, Indian wild lizard, King cobra, Python etc. are found in the area.

Whether forest area proposed for diversion is important from wildlife point of view or not:

The State Government has suggested the following two plans:

(a) **Regional Wildlife Management Plan:** Though the area does not form a part of any National Park/Wildlife Sanctuary/Elephant Corridor, due care is to be taken for conservation of wildlife. For this purpose, user agency is required to proportionately contribute towards implementation Regional Wildlife Manage Plan @ revised rate of Rs.43,000/- per hectare over the mining lease of 1018.3085 ha. The user agency has furnished an undertaking to bear the cost of Regional Wildlife Management Plan.

(a) **Site Specific Wildlife Conservation Plan:** Due care has to be taken for conservation and protection of Wildlife. PCCF (WL) & Chief Wildlife Warden, Odisha has approved the Combined Site Specific Wildlife Conservation Plan prepared by M/s OMC Ltd. for Daitari Mining project and Daitari Extension area at a financial out lay of Rs 1798.70 lakhs. Out of this amount, an amount of Rs 1518.35 lakh is to be spent by DFOs of Keonjhar (WL) Division and Cuttack Forest Division for implementation of approved components of Plan in Project impact area and Rs. 280.35 lakh is to be spent by M/s OMC Ltd in project area coming within the jurisdiction of Cuttack and Keonjhar (WL) Division as per approved components of the Plan., The financial break-up of the amount is given as under:

For activities to be implemented in Project area:

a.	By M/s OMC Ltd in Keonjhar WL Division	Rs. 211.26 lakh
b.	By M/s OMC Ltd in Cuttack Division	Rs.69.09 Lakh
	Sub-Total	**Rs. 280.35 Lakhs**

For activities to be implemented at project impact area:

a.	By DFO, Keonjhar WL Division	Rs. 1092.83 Lakh
b.	By DFO, Cuttack Division	Rs. 425.52 Lakh
	Sub-Total	**Rs. 1518.35 Lakh**
	Grand total	**Rs. 1798.70 Lakh**

The user agency has already deposited an amount of Rs 15, 18, 35,000/- in the account of Ad-hoc CAMPA in Corporation Bank, Lodhi Road, New Delhi through RTGS mode on 24.03.2014.

6. **Vegetation:** Average density of vegetation appears to be about 0.8 in Keonjhar WL Division and 0.6 in Cuttack Forest division.

(a) Total number of trees to be felled: It is reported by the State Government, in the area proposed for diversion under this project in Keonjhar (WL) Division, sample enumeration has been taken up over 38 plots of 2 ha each, where 22793 no. of trees has been reported to be existing. By extrapolating this figure over 553.0659 ha of forest land of this lease coming within Keonjhar (WL) Division, **1,65,869 no. of trees are assessed to be existing over the forest land proposed to be used in this mining project.** Similarly in the area proposed for diversion under this project in Cuttack Forest Division, sample enumeration has been taken up over 22 plots of 2 ha. each, where 16095 no. of trees has been reported to be existing. By extrapolating this figure over 193.2666 of forest land of this lease coming within Cuttack Division, **70,697 no. of trees are assessed to be existing over the forest land proposed to be used in this mining project.**

The impact of felling of such large number of trees can be minimized by taking up tree felling in phased manner strictly as and when required.

Effect of removal of trees on the general ecosystem in the area: As there are a large number of trees to be felled, it will naturally adversely affect the general eco-system in the area.

(b) Important species:
The type of forest found in the area is 3 C/C2e Moist. Peninsular Valley Sal, 5B/C2 Northern Dry Mixed Deciduous Forests, E4 Lateritic Semi Evergreen Forest and 5B/Clo Dry Peninsular Sal Forests. As reported by RCCF, Rourkela in his site inspection report, tree Species which are commonly noticed in this area are Sal (*Shorea robusta*), Piasal (*Pterocarpus marsupium*), Gambhar (*Gmelina arborea*), Kangara (*Xylia xylocarpa*) Asan (*Terminalia tomentosa*), Jamun (*Syzygium cumini*), Ku rum (*Adina cordifolia*), Dhaura (*Anogeissus latifolia*), Mango (*Mangifera indica*),Pansa (*Artocarpus heterophyllus*), Siris (*Albizzia lebbek*), Kasi (*Bridelia retusa*), Neem (*Azadirachta indica*), Kendu (*Diospyros melanoxylon*) etc., Sal (*Shorea robusta*) being the predominant species.

Number of trees of girth below 60 cm: The No. of trees of girth below 60 cm in Cuttack division is 41189 and in Keonjhar WL division are 99013.

Number of trees of girth above 60 cm. : The No. of trees of girth above 60 cm in Cuttack division is 29508 and in keonjhar WL division is 66856.

7. **Background note on the proposal:** Originally the mining lease was granted over an area of 7 Sq. Miles in Talpada (Daitari) for iron ore mining in favour of Orissa Mining Corporation by the erstwhile Mining and Geology Department of State Government vide Proceedings No. III (G) M - 1/ 65-2272 MG dated 16.03.1965. Accordingly the Mining lease was executed on 27. 01.1966 for a period of 30 years. Thus the original lease period expired on 26.1.1996. Surface rights were granted in favour of OMC Ltd, by the Collector, Cuttack vide his letter dt. 17.11.1966. The 1st renewal application was filed by the user agency on 21.01.1995 over an area of 1812.99 ha of Daitari iron ore Mining lease for a period of 20 years more than one year prior to expiry of original lease period. While the application for 1st RML was under consideration, the user agency decided to surrender part of the Mining lease retaining only 190.20 ha of forest land and accordingly they submitted revised RML application on 22.5.1997. over 190.20 ha for a period of 20 years. During this period, the user agency had also filed a forest diversion proposal for 95.60 ha of pre-1980 broken-up forest land only thereby excluding 94.60 ha of forest land which is prohibited and protected for safety zone. Government of India, MoEF vide their letter F.No. 8-164/ 1997-FC dt. 27.1.2005 accorded final forest clearance to this diversion of 95.60 ha which was consisting of 59.254 ha in Rebana RF in Keonjhar (WL) Division of Keonjhar district and 36.346 ha of Daitari PF of Cuttack division of Jajpur district. While the application for 1st RML was yet to be disposed by the State Government, the user agency, considering the market demand and requirement of more area for exploitation, requested the State Government in Steel 86 Mines Department vide their representation dt. 9.2.2006 to consider their case for 1st RML over entire leasehold area of 1812.99 ha. Accordingly, the scheme of Mining along with Progressive Mine Closure Plan in respect of Daitari iron ore mines was approved by IBM vide their letter No.314(3)2012-MCCM(CZ)/MS-52/223 dt. 12.7.2013. Subsequently based on the report of Geological Survey of India, the user agency decided to surrender 794..6815 ha of land in this lease citing it to be non-ore bearing area and accordingly represented before the Steel 86 Mines Department vide their letter dt. 9.1.2012 to retain 1018.3085 ha land only. The State Government vide their order No. 6450 dt. 15.7.2015 have extended the validity period of this mining lease over 1018.3085 ha up to 31.3.2020. The surrendered area of 794.6815 ha of land is entirely within Daitari PF of Cuttack Forest division of Jajpur district.

Similarly the retained area of 1018.3085 ha in this lease, which is valid till31.3.2020, consists of 846.3995 ha of forest land (i.e. 616.7869 ha of forest land in Keonjhar (WL) division of Keonjhar district (53.708 ha of village forest in Talapada village and 563.0789 ha of Rebana RF) and 229.6126 ha of Daitari PF of Cuttack Forest division of Jajpur district), 171.637 ha of Government non-forest land and 0.272 ha of Tenanted land in Talapada village of Keonjhar district. Out of 846.3995 ha of forest land in Daitari Iron ore Mining lease, 95.60 ha of pre-1980 broken up forest land has already been diverted by MoEF, GoI vide their letter F.No. 8-164/ 1997-FC dt. 27.1.2005 in course of 1st RML, the validity of which has got extended up to 31.3.2020 as per MoEF&CC guidelines bearing F.No. 11-51/2015-FC dt. 1.4.2015. Besides, an area of 4.467 ha of forest land in Rebana RF of Daitari Mining lease has been proposed for diversion separately within a total area of 106.016 ha for the proposed mechanized facilities to be set up for facilitation of mining in Daitari Iron ore Mines. Hence the instant forest diversion proposal

has been filed/processed for the reduced forest area of 746.3325 ha for Daitari mines out of total forest land of 846.3995 ha as per provision of MOB' F&CC guidelines bearing F:No.11- 51/2015-FC dt. 1.5.2015.

8. **Compensatory afforestation:** Out of 746.3325 ha of forest land proposed for diversion under this project, Mining arallied activity is proposed to be taken up over 734.502 ha. 11.8305 ha of forest land has been earmarked as safety zone. As such, compensatory afforestation is required to be raised over 734.502 ha of non-forest land against this proposed diversion. As non-forest land of large extent is not available in Keonjhar/Jajpur district, an extent of 734.502ha of non-forest land has been identified in two patches i.e. 717.853 ha in village Tebhakalam and 16.649 ha in Barkaudi village, both under Thuamul Rampur Tehsil of Kalahandi District in lieu of the virgin forest land of 734.502 ha excluding the safety zone area of 11.8305 ha proposed for diversion in the instant proposal.

The identified non-forest land is reported to be suitable for plantation in ANR mode. The Tahasildar has also furnished non-encroachment and non-encumbrance certificate for the identified non-forest land.

Similarly, 16.649 ha of non-forest land has also been identified in Barkaudi village under Thuamul Rampur Tahasil of Kalahandi district for compensatory afforestation purpose. The identified non-forest land is also reported to be suitable for plantation in ANR mode. The Tahasildar has also furnished non-encroachment and non-encumbrance certificate for the identified non-forest land.

The DFO, Kalahandi (South) has prepared two separate schemes for compensatory afforestation in ANR mode details of which are given below. (i) The scheme of Compensatory Afforestation over 717.853 ha of non-forest land in village Tebhakalam has been prepared by the Divisional Forest Officer, Kalahandi (South) Division with provision of ANR plantation @ 200 Plants per ha. according to suitability of the site as per current wage rate of Rs. 200/ - per manday, which has been technically approved by Addl. PCCF(Forest Diversion)& Nodal Officer, FC Act with a financial forecast of Rs. 5,61,53,500/-including maintenance cost of 10 years. The approved CA scheme has also provisions for Barbed wire fencing and Soil Conservation measures etc. Trees to be planted under the scheme are Teak (*Tectona grandis*), Karanja (*Pongamia pinnata*), Neem (*Azadirachta indica*), Amla (*Emblica officinalis)* Bahada (*Terminalia bellerica*), Mahul (*Madhuca indica,*) Sissoo (*Dalbergia Sissoo)* etc. The user agency has furnished an undertaking to bear the cost of the CA scheme.

(ii) Similarly another scheme of Compensatory Afforestation over 16.649 ha of non-forest land in village Barkaudi has also been prepared by the Divisional Forest Officer, Kalahandi (South) Division with provision of ANR plantation @ 200 Plants per ha. according to suitability of the site as per current wage rate of Rs. 200/- per manday, which has been technically approved by Addl. PCCF (Forest Diversion) Nodal Officer, FC Act with a financial forecast of Rs.1,70,59,500/- including maintenance cost of 10 years.

The approved C.A. scheme has also provisions for Barbed wire fencing and Soil Conservation measures etc. Tree species to be planted under the scheme are Teak (*Tectona grandis*), Karanja (*Pongamia pinnata*), Neem (*Azadirachta indica*), Amla (*Emblica officinalis*), Bahada (*Terminalia bellerica*), Mahul (*Madhuca indica,*) Sissoo (*Dalbergia Sissoo*) etc. The user agency has furnished an undertaking to bear the cost of the CA scheme.

C.A. sites could not be visited as they are quite far from the lease area. However, survival rate, status etc. can be monitored when C.A. is raised in the sites.

(a) Whether land for compensatory afforestation is suitable from plantation and management point of view or not: The Divisional Forest Officer, Kalahandi (South) Division has certified that the land identified for C.A is found suitable for plantation.

(b) Whether land for compensatory afforestation is free from encroachment/other encumbrances: The Tehsildar, Thuamulrampur has certified that the land identified for C.A. is free from encroachment and encumbrances.

(c) Whether land for compensatory afforestation is important from Religious/Archaeological point of view: Not reported.

(d) Land identified for raising compensatory afforestation is in how many patches, whether patches are compact or not: 02 (two) patches

(e) Map with details: Enclosed.

(f) Total financial outlay: As reported at Point No.8 above.

9. **Whether proposal involves violation of Forest (Conservation) Act, 1980 or not. If yes, a detailed report on violation including action taken against the concerned officials:** The State Government has reported that a big patch of Gramya Jungle was found to be without vegetative cover, which was abnormal considering the dense canopy of the adjacent forest. **The area was adjacent to village Talapada. During field inspection by the DFO,**

Keonjhar (WL) Division, the area was verified in detail and approximately 28.67 ha of Gramya Jungle coming within the lease hold area was found to be under Podu/Jhum/ Shifting cultivation.
During the site inspection by the RCCF, Rourkela Circle on 24.04.2015, the said patch of Gramya Jungle was also inspected and through local enquiry it was ascertained that the area was used for Podu cultivation by the adjoining villagers.

The said patch was also inspected by the CF, RO, Bhubaneswar and found that it is near Talapada village and also verified that the area was used for podu cultivation. Since the area comes within the mining lease, a suitable PCA may be imposed by the Ministry.

10. **Whether proposal involves rehabilitation of displaced persons. If yes, whether rehabilitation plan has been prepared by the State Government or not:** As reported by user agency, DFO, Cuttack, DFO, Keonjhar (WL), RCCF, Rourkela and RCCF, Angul, this project does not involve displacement of any human habitation. The User agency informed during inspection that no mining activity will be carried out in the inhabited area as it is not ore bearing area.

11. **Reclamation plan:** The user agency has furnished a Phased Reclamation Plan with afforestation scheme. The user agency has furnished an undertaking for reclamation of the mined out area as per plan approved by IBM. As of now, no reclamation has been started.
Details and financial allocation: Not submitted.

12. **Details on catchment and command area under the project**: Not applicable.

Catchment area treatment plan to prevent siltation of reservoir: Not applicable.

13. **Cost benefit ratio:**

The cost benefit analysis has been computed for both the Divisions i.e. Keonjhar (WL) Division and Cuttack Forest Division. The details of the Cost Benefit Analysis of the project duly reported by the DFOs concerned are given below:

Keonjhar (Wildlife) Division:

(i) Total loss of this project = Rs. 242,83,76,919/-
(ii) Total benefit of this project = Rs. 1875.3900 Crore
(iii) Cost Benefit Ratio = Rs. 1875.3900 /242.8376 = **1:7.72**

Cuttack Forest Division:
(i) Total loss of this project = Rs. 27.76 Crore
(ii) Total benefit of this project = Rs. 17287.20 Crore
(iii) Cost Benefit Ratio = Rs. 27.76 /17287.20 = **1:622**

14. **Recommendations of the Principal Chief Conservator of Forests/State Government:**

Recommended by PCCF, Odisha / State Government.

15. **Recommendations of Additional Principal Chief Conservator of Forests (Central) along with detailed reasons:** Appended separately.

16. **Conservator of Forests (Central) shall give detailed comments on whether there are any alternative routes/alignment for locating the project on the non-forest land:** The mining project is site specific; hence alternative alignment is not possible.

17. **Utility of the project:** As reported, this project will help in generating employment opportunity for 1064 persons. Besides, this being a large mining project should provide indirect livelihood opportunities to thousands of tribal population in this Maoist infested region.

Numbers of Scheduled Caste/Scheduled Tribes to be benefited by the project: Not reported separately.

18. **(a) Whether land being diverted has any socio-cultural/ religious value:** Not reported.

(b) Whether any sacred grove or very old growth trees/ forests exist in the areas proposed for diversion: Not reported.
(c) Whether the land under diversion forms part of any unique ecosystem: Not reported.

19. **Situation with respect to any Protected Area:** The nearest Protected Area is Hadgarh WL sanctuary which is at a distance of about 45 km from the project site.

20. **Any other information relating to the project in SIR:**

i. Demarcation of boundary pillars was not proper and complete though DGPS survey has been conducted and DGPS map has been submitted. The User agency was asked to complete the job within 10 days of inspection. The State Government was also asked to comply vide this office letter dated 12th November, 2015 (enclosed as Annexure-V-Pg.1181-1182). In response to the above letter, the State Government vide their letter dated 15.02.16 has informed that this condition has been complied (enclosed as Annexure-VI-Pg.1183-1186/c).

ii. Felling of trees at one go of the entire area proposed for diversion is not required as the mineral reserve in the broken area has not been exhausted and therefore only after complete extraction of iron ore from the broken area, user agency may be allowed to mine out in the mineral bearing area of the virgin **forest and felling of trees may be permitted accordingly.**

iii. **The User agency has been asked to produce joint verification certificate of surrendered area of 794.6815 ha within 10 days of inspection. State Government was also asked to comply** vide this office letter dated 12th November, 2015 . In response to the above letter, the State Government vide their letter dated 15.02.16 has informed that this condition has been complied

iv. Like other Greenfield projects in Keonjhar district, a study of environmental impact of mining may be conducted by NEERI or other reputed institute.

v. Since the proposed tiger corridor passes through the mining lease, a suitable ameliorative/ mitigative measures may be advised by Ministry regarding this.

vi. The copies of DGPS and Topo-sheets are given in Annexure-I and Annexure-II respectively.

vii. The Collector Jajpur and Keonjhar have submitted the FRA certificates.

21. **Recommendations of APCCF (Central), Regional Office, Bhubaneswar) :** It is reported by the Addl.PCCF, Regional Office , Bhunaneswar that he endorsed the SIR of CF(Central) for the instant proposal and accordingly recommended for consideration.

23. **The proposal was considered in meeting of Forest Advisory Committee (FAC) held on 12.07.2016 and FAC recommended that:**

I. It has been reported by the DFO, Keonjhar(WL) division and RCCF, Rourkela, that the area was supporting Royal Bengal Tigers in the past. The last confirmed presence of Tigers in this area was in the year 1997. National Tiger Conservation Authority has proposed a Tiger corridor interlinking Similipal Tiger Reserve and Satkosia Tiger Reserve in Odisha for long term Tiger/ Wildlife conservation in the country. Field verification of the proposed corridor is going on. The area proposed for forest diversion for this infrastructure project comes within the proposed Tiger corridor. The same shall be examined by National Tiger Conservation Authority in view of section 38(G) of Wild life protection Act 1972 and their views will be provided to FAC for consideration.

II. Upon examination of the proposal under Decision support System of the MOEF and CC, it is evident that the area falls in the proposed *inviolate* category as per the draft criteria of MOEF and CC for classifying forest area as *inviolate*. The shape files of the proposed area shall be provided to FSI Dehradun so that the status of the forest land can be reconfirmed in accordance with the draft criteria for classifying forest area as *inviolate*.

III. Comments of IA Division of MOEF and CC may be sought regarding applicability of NEERI report.

24. Ministry vide its letter dated 03.08.2016 requested to the Impact Assessment (IA) Division, Forest Survey of India and National Tiger Conservation Authority to submit clarification/comments/document as per FAC recommendation to this Ministry.

25. Shri Vaibhav C. Mathur, Assistant Inspector General (NTCA), **National Tiger Conservation Authority** of this Ministry vide their letter no. 7-27/2016-NTCA dated 08.03.2017 **(Pg-1220-1239/c)** submitted a report in respect of Ministry's letter dated 03.10.2016 on above said proposal. Comments of National Tiger Conservation Authority under Section 38 O (1) of the Wildlife (Protection) Act, 1972 is as under:
Recommendations of NTCA:

1. The proposed mining activity with the observation that proposed mining should be limited to the iron ore bearing areas per the geological map with different ore bearing areas that has been provided.
2. **No human settlement or colony will be allowed in the forest area of proposed extension.**

The following are the suggestions for improving biodiversity value within and in surrounding landscape:

a) Monitoring committee to be formed comprising of DFOs of concerned Divisions, Member from NTCA, Odisha Pollution Control Board, OMC and Civil society representative (to be decided by State Govt.). this monitoring committee will oversee the wildlife and environmental issues on annual basis and suggest the action needed for betterment of wildlife conservation in the area.

b) OMC should provide an annually when production is three million tones per annum, not less than Rs. 3 crore annually.when production is stepped up to four million tones per annum, not less than Rs. 4 crore when production is steeped up to six million tones per annum to do conservation work in surrounding landscape especially in the Forest Divisions through which there is forest connectivity with protected areas. The OMC Ltd should deposit Rs. 10 crore with the PCCF (WL) at the beginning of each five year block period and further amount if any may be deposited on a year to year basis based on iron ore production and the profitability of this mine. At present there is undertaking of providing Rs. 280.35 lakhs towards implementation of conservation measure inside ML areas of Daitari and Daitari Extension areas.

c) OMC through its corporate responsibility fund ensure that people dependent on biomass extraction from extension are as well as its own staff colonies should be provided with LPG connections. OMC should adopt green technology for its colonies and ensure minimum carbon foot print.

d) The conservation work from the overall compensation money to be paid for extension and annual recurring grant proposed in point (b) above should include following:
   - Improving quality of forest by Afforestation of native species including at least 10% of bamboo, reducing dependencies of people in terms of biomass requirement.
   - Resettlement of villages from protected areas as per policy of the State Govt.
   - Development appropriate protection mechanism, inclusive of personnel needed and guard chowkies.
   - Development of Eco-development infrastructure for betterment of wildlife and people.
   - Add other neighboring forest Diversion and protected area for improving the overall biodiversity value and conservation.
   - Implement wildlife monitoring protocol developed by NTCA-WII

e) At present only compensatory Afforestation plan in Kalahandi of few tree species is envisaged which need to be extended to include more native species with at least 10% of bamboo species. The plan should be to reclaim land mimicking natural forest. It is better to relook at this option and instead areas in the divisions having elephant and tiger corridors should be chosen for Afforestation to improve the quality of connectivity and gaps if any.

26. Forest Survey of India (FSI) vide letter no. 308/2016-NFDMC/1733 dated 15.09.2016 **(Pg-1240-1254/c)** has informed that the **area is falling under inviolate category** as per DSS application.

27. Director (S), IA Division of this Ministry vide their letter no. Z-11013/40/2017-IA-II (M) dated 23.06.2017 **(Pg-1257/c)** has informed that the Mine leases of Iron Ore & Manganese Ore are in the ambit of carrying Capacity Study in the State of Odisha. The Final Study Report is awaited as of now.

28. The above mentioned facts was considered by the **FAC in its meeting held on 20.07.2017**. FAC after thorough deliberations and discussion with the user agency, the representative of state government and regional office observed that the forest area is of pristine nature which has more than 2,72,535 trees with density about 0.8 and National Tiger Conservation Authority (NTCA) has proposed a tiger corridor interlinking Similipal Tiger & Satkosia Tiger Reserve in Odisha which is essential for long term Tiger / Wildlife conservation in our country. In this backdrop FAC recommended that:

(i) State government in consultation with Regional Office shall take a holistic view of all mines existing in that area and analyse how this mine along with other existing mines in the area will affect the corridor connectivity and biodiversity value of the area.

(ii) It is reported that a big patch of Gramya Jungle was found without vegetative cover, which was abnormal considering the dense canopy of the adjacent forest, the area is adjacent to village Talapada. Approximately 28.67 ha. of Gramya Jungle coming within the lease area. The state government shall enquire the reason for less vegetation in the lease area under the control of the user agency and submit the report to the ministry.

29. Accordingly, the State Government was requested vide this Ministry's letter dated 24.08.2017 **(Pg No. 1259/c)** to take necessary action in accordance with recommendation of FAC on 20.07.2017 as given in para (28) above.

30. The Regional Office, Bhubaneswar vide their letter dated 25.04.2018(**Pg.1285-86/c)** informed that this office organized a meeting on 07.02.2018 with the State Govt. officials to discuss various aspects of the existing mines and its possible impact on wildlife and biodiversity of the area with request to different Departments of State Govt. including the user agency i.e. OMC Limited to furnish additional information as discussed in the meeting, so that a holistic view may be taken up by the Ministry on the consolidated report from the State Govt. and the Regional Office. **The formal consolidated view of the State Govt. has not been received from the State Govt. yet.** Since, the matter has already been examined holistically and views of the concerned Departments of the State Govt. have also been received, the State Govt. is advised herewith to send its formal endorsement directly to the Ministry marking a copy of the this office, Accordingly, the required information including the reports furnished by the Director of Mines, Odisha

and PCCF (WL), Odisha along wit the copy of Minutes of Meeting dated 07.02.2018 along with view of Addl. PCCF (Central is enclosed for subsequent consideration of the proposal by the Ministry, as may be deemed appropriate.

In the meeting minutes, the following observations are made by Regional Office:

(i) It was observed that the said diversion proposal is situated, in a virgin, very dense, nearly undisturbed pristine forest having immense biodiversity value and is serving as a crucial tiger corridor interlinking Similipal Tiger Reserve and Satakosia Tiger Reserve, which is very near to the proposed diversion boundary and is a prized habitat, of elephants and many species of very important wildlife, which is of grave concern and utmost importance.

(ii) It was also observed (DSS) that the said OMC mine (currently operating in 95.60 ha) is a lone mine situated on hill top and is aerially 5 KM (approx.) apart/ away from the Chromite mine cluster which are situated in the valley.

(iii) It was also observed that the mining disturbance and related biotic interference including transport route of ore are not limiting to each other.

(iv) The proposed diversion along with the existing iron ore mine is situated in a pristine very dense undisturbed forest, excepting the pre-existing mining activities of the OMC, which is also attenuated/ reduced in recent years due to unavailability of areas for further ore extraction as stated by OMC representative.

(v) Accordingly, the additional diversion is proposed for extension of mine. The subsequent evacuation/transport of ore, OMC has conveyers to bring ore to downhill, for further disposal by existing express way and railway line.

(vi) The said existing OMC mine is a very old mine started since 1966 and for its ore evacuation an express highway constructed before 1970, terminating at Paradeep Port.

(vii) The transport of ore from Chromite mine cluster, where OMC also has two mines, commences initially through different routes, out of which one route joins express highway much later at Tomka and at Duburi. Accordingly, OMC authorities were requested to submit an undertaking for transport plan/truck transport liability for evacuation of ore in future. (Action: OMC authorities)

(viii) Considering the large scale proposed cutting of 2.7 lakh trees in a pristine forest and OMC proposed additional safety zone of 112 ha, an undertaking regarding the Proposed number of trees to be saved from felling along with site maps shall also be submitted by OMC.

(ix) The Director of Mines informed that there is no other mining proposal pending with Govt. on the said hill top. **The Director of Mines shall provide a confirmation to that effect along with a list of mines operating in iron ore zone and Chromite mine clusters of that area.**

(x) As pointed out in the NTCA report, **a chunk of 112 ha out of proposed ML area of 746.3325 ha to be kept conserved by de-linking from mining activity to maintain a manageable safe distance (3 km) from ... corridor**, for which OMC was unwilling earlier, has now consented.

(xi) It was observed that there is ambiguity on the implementation of fund collected for Regional Wildlife Management Plan or in the area or elsewhere in the State. **The CWLW is requested to submit a report on utilization/ implementation of fund (for Chromite and iron ore mines) in the said area as well as elsewhere with regard to (a) Regional Wildlife Management Plan, (b) Site Specific Wildlife Conservation Plan.**

(xii) As pointed out in the NTCA report, CA area should be in the Tiger/Elephant areas. Accordingly, **PCCF/Nodal Officer shall review and report. It was also requested to report, if there is any plan in preparation or in operation for corridor improvement in the mining zones/ state.**

(xiii) Accordingly, the State Govt. shall submit/ forward a report incorporating the above observations to the Regional Office for further necessary action.

31. Now the State Government of Odisha vide their letter no. 10F(Cons)-37/2018-10150/F&E dated 01.05.2018 (**Pg No. 1260-1284/c**) submitted their response on Ministry's letter dated 24.08.2017. The point wise information as sought by this Ministry and reply there of given by the State Government are as under:

Information sought by Ministry	**State Government in consultation with Regional Office shall take a holistic view of all mines existing in that area and analyse how this mine along with other existing mines in the area will affect the corridor connectivity and biodiversity value of the area.**
Response of State Government	In the above context, it is reported by the State Govt. that a meeting was held on 7.2.2018 at the level of Addl. PCCF(Central), MoEF&CC, Eastern Regional Office with the concerned officers of State Mining/Forest Department to take a holistic view on existing mines in Daitari area of Jajpur district and its impact on corridor connectivity and bio-diversity of the area with specific reference to Daitari Iron ore Mines of OMC Ltd. The Minutes of the above mentioned meeting was communicated by the Eastern Regional Office vide its letter No. 5-ORA263/2015-BHU dt. 12.2.2018 to all concerned. With regard to points of discussion held at RO, Bhubaneswar, the State Govt. reported that the PCCF, Odisha and others were also requested by this department vide communication dt. 3.3.2018 for furnishing required compliance on the minutes of the meeting. While the point 1 to 6 of minutes are the observations made in course of discussion based on DSS analysis of the area with regard to nature forest growth available in the area, possible location of a crucial tiger corridor interlinking Similipal Tiger Reserve and Satakosia Tiger Reserve, mines if any located near the Daitari Iron ore mines, necessity of expansion of Daitari Iron ore mines, ore evacuation routes etc., The **point No. 7,8, 10** require compliance of OMC Ltd. Similarly point No. 9 and 11 of the minutes are to be replied by the Director of Mines and PCCF(WL)&CWLW, Odisha respectively. On **point 12 of the minutes**, Nodal Officer is required to furnish his report. The OMC Ltd. in its representation dt. 16.2.2018 to F&E department has furnished the required compliance on all the three points of the minute. The point 7 of the minutes requires OMC authorities to submit an undertaking for transport plan/truck transport liability for evacuation of ore in future. OMC have furnished in detail about the mode of transport adopted by them for evacuation of extracted ore from their chromite and iron ore mines in the area. They have also undertaken to maintain the truck transport liability on Daitari-Paradeep Express highway pertaining to chrome ore transport from OMC mines. Similarly, they have also undertaken to limit the transportation of iron ore from Daitari Iron ore mines up to a maximum of 1.0 MTPA even during expansion through Ghat road to Baliparbat stockyard. On **point No. 8 of the minutes**, the OMC Ltd. has undertaken to retain 33,600 no. of trees in the proposed additional safety zone. Similarly, on **point 10 of the minutes**, it has been undertaken that a chunk of 112 ha. of forest land within the Daitari ML area is to be maintained as additional safety zone. The Submission of OMC Ltd. to have additional safety zone of 112 ha. within ML area was also earlier furnished to GoI vide F&E Department letter dt. 16.10.2017 referred to above. Copy of letter dt. 16.2.2018 of OMC Ltd. appended with above undertakings and relevant maps showing additional safety zone along with KML file of the area in CD form are attached / herewith as Annexure II (**Pg.1271-1272/c**). As indicated in the **minutes at point 9**, the Director of Mines, Odisha informed in the meeting that there is no other mining proposal pending with State

	Government on the said hill top. He has also furnished his report to Eastern Regional Office in this context. Regarding **point 11 of the minutes** of the meeting, the CCF(WL) vide letter No. 2686 dt. 21.3.2018, has furnished details of expenditure made through Annual Plan of Operations of State-CAMPA from 2009-10 to 2015-16 in the State in executing the Regional Wildlife Management Plans and Site Specific Wildlife Conservation Plans with specific reference to Chromite/iron ore mines and other mining/industrial area (Annexure III: **Pg.1273-1274/c**). Besides, the RCCF, Angul based on the report of DFO, Cuttack has furnished details of allotment of fund and expenditure made in execution of Regional Wildlife Management Plan and Site Specific Wildlife Conservation Plan in Cuttack Forest Division (Annexure IV: **Pg.1276-1280/c**). As regards **point 12 of the minutes** of the meeting regarding NTCA report and proposal for corridor improvement in the area, based on the report of DFO, Cuttack, the PCCF, Odisha vide his letter No. 9269 dt. 27.4.2018 has reported that no elephant/tiger corridor is passing through or nearby this ML area of OMC Ltd. The area was inspected by the DFO, Cuttack on 8.4.2018. The only non-forest patch available in the village limit of Talapada is mostly used fo agriculture purpose by the local tribal people who are dependent upon this crop for their livelihood. Therefore, this land should not be covered under plantation. Further entire area proposed for corridor comes under Rebena RF having very high density of forest growth. The copy of letter dt. 27.4.2018 of PCCF, Odisha is appended as Annexure V **(Pg.1282-1284/c)**. It is further ascertained that the Eastern Regional Office vide its letter No. 5-ORA263/2015 dt. 25.4.2018 has furnished detailed report on the observation 2(i) of MoEF&CC dt. 24.8.2017 to the Ministry for consideration of the forest diversion proposal.
Information sought by Ministry	**It is reported that a big patch of Gramya Jungle was found without vegetative cover, which was abnormal considering the dense canopy of the adjacent forest, the area is adjacent to village Talapada. Approximately 28.67 ha. of Gramya Jungle coming within the lease area . The state government shall enquire the reason for less vegetation in the lease area under the control of the user agency and submit the report to the Ministry**
Response of State Government	In this regard, it is informed by the State Govt. that as reported while forwarding this diversion proposal, a big patch of Gramya Jungle land measuring approximately 28.67 ha. located adjacent to village Talapada within ML area was found to be without vegetative cover. This deforestation was reported to be owing to Podu/ Jhum/ Shifting cultivation. This has been re-confirmed by the report of DFO, Keonjhar(WL) Division. **Such type of cultivation activities in forest land amounts to violation Forest Conservation Act, 1980. Appropriate penal measures as per latest guidelines of MoEF&CC bearing guidelines F. No. 11-42/2017-FC dt. 29.1.2018.**

In view of the above, the facts related to the proposal may be placed before FAC in its forthcoming meeting scheduled to be held on 26.07.2018 for its examination and appropriate recommendation.

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Agenda No. 5

F. No. 8-47/2018-FC

Sub: Proposal for prospecting (Research) for 121.83 ha. Forest land under Forest (Conservation) Act-1980 for Laser Interferometer Gravitational Wave Observatory in India (LIGO) in village Dudhala, Anjanwada, Nandgaon Sawali (B), Tal-Aundha (Nagnath), District – Hingoli by taking 150 Bore Holes in 0.375 ha forest area.

The State Government of Maharashtra vide their letter no. FLD-2018/CR.204/F-10 dated 28.06.2018 submitted the above mentioned proposal seeking prior approval of the Central Government under Section-2 of the Forest (Conservation) Act, 1980.

2. Details indicated in the proposal submitted by the Government of Maharashtra are as below:-

FACT SHEET

1.	Name of the proposal	Proposal for prospecting (Research) for 121.83 ha. Forest land under Forest (Conservation) Act-1980 for Laser Interferometer Gravitational Wave Observatory in India (LIGO) in village Dudhala, Anjanwada, Nandgaon Sawali (B), Tal-Aundha (Nagnath), District – Hingoli by taking 150 Bore Holes in 0.375 ha forest area.
2.	Location:- **(i)** State **(ii)** District	 Maharashtra Hingoli
3.	Particulars of Forests:- **(i)** Name of forest Division and Forest area involved **(ii)** Legal Status / Sy. No. **(iii)** Maps	Hingoli Forest Division 121.83 ha. Reserved Forest **Pg. No. 63-68/c.**
4.	Vegetation Density	Dry deciduous and open type of forest 0.1
5.	Species-wise local/(Scientific names) and girth-wise enumeration of trees at FRL.	Species wise local or scientific names and girth wise trees required to be felled is given and may kindly be seen at **Pg. No.24/c.**
6.	Brief note on vulnerability of the forest area to erosion.	Yes, forest area proposed for LIGO India project is vulnerable to soil erosion.
7.	Approximate distance of the proposed site for diversion from boundary of forest	0.5 Km.
8.	Details of wildlife present in and around the forest land proposed for diversion.	Major wildlife found in area is Blue bull, wild boar, jackal, spotted deer and Indian hare etc.
9.	Whether forms part of National Park, Wildlife Sanctuary, Biosphere Reserve, Tiger Reserve, Elephant Corridor etc. (if so, the details of the area the comments of the Chief Wildlife Warden to be annexed)	No
10.	Whether any rare / endangered unique species of flora and fauna found in the area. If so, details thereof.	No

File No.8-43/2011-FC

Sub: Diversion of 75.304 ha of forest land for construction of 180 MW Bajoli- Holi Hydro Electric Project in favour of GMR Bajoli Holi Hydro Power Pvt. Ltd in Bharmour Forest Division in Chamba district of Himachal Pradesh.-regarding permission for felling of additional number of 12 trees and use of non-diverted degraded/blank forest land in lieu of diverted dense forest land of almost equal area.,

FACT SHEET

1.	Name of the Proposal	Diversion of 75.304 ha of forest land for construction of 180 MW Bajoli- Holi Hydro Electric Project in favour of GMR Bajoli Holi Hydro Power Pvt. Ltd in Bharmour Forest Division in Chamba district of Himachal Pradesh.
2.	**Location :** **(i)** State **(ii)** District	 Himachal Pradesh Chamba
3.	**Particulars of Forests :** **(i)** Name of Forest Division **(ii)** Forest area involved **(iii)** Legal Status/Sy. No. **(iv)** Map	 Bharmour Forest Division 75.304 ha RF and DPF Map -Topo sheet (52 D11)
4.	Topography of the area	The proposed forest area is mostly rocky and not vulnerable to erosion.
5.	**(i)** Vegetation **(ii)** No. of trees which will be affected **(iii)** Density	Kail, Deodar, Aardo, Killer, Khidak, Khair, Kainth, **4915 trees** **22 to 36%**
6.	Whether area is significant from wildlife point of view	The area is not part of National Park, Sanctuary, Biosphere Reserve, Tiger reserve, elephant corridor etc.
7.	**Details of Hydel Project :** **1.** Total catchment area **2.** Total command area **3.** Full Reservoir Level **4.** High Flood Level **5.** Minimum Drawl Level **6.** Break up of catchment area **7.** Area of submergence at HFL including water body/river bed **8.** Area of submergence at FRL including water body/river bed **9.** Area of submergence at 2 m below FRL including water body/river bed **10.** Area of submergence at Minimum Drawl Level including water body/river bed.	 902 sq. km. - EL 2018.25 m EL 1986 m EL 2012.00 m - 18.70 ha (FRL + 5m) 16.50ha - -
8.	Catchment Area Treatment Plan	-

9.	Compensatory Afforestation	Project proponent committed to provide the cost of compensatory afforestation Measures and its maintenance on the demand of department of forest.
10.	Rehabilitation of Oustees	02 families.
11.	Employment likely to be generated	1500 skilled, semi-skilled and unskilled persons during construction phase 406/c.
12.	Cost Benefit Ratio	1:11.77
13.	Reclamation of mined areas	-
14.	**Recommendation:** **(i)** DFO **(ii)** CF **(iii)** PCCF **(iv)** State Government	All have recommended the proposal.
15.	District Profile	
	(i) Total Geographical area of District	179828.00 ha
	(ii) Total forest area of District Divisional forest area	135755.77 ha
	(iii) Total area diverted since 1980	108.62 ha area has been diverted 16 cases in Bharmour Forest Division since 1980.
	(iv) Total CA stipulated since 1980 **(till now)**	219.1 ha of forest land
	(v) Total CA done since 1980 **(as on 31.12.2009)**	137.25 ha on forest land

Other Remarks:

1. The GMR Bajoli Holi Hydro Power Project (HEP) is envisaged as run of the river development on the Ravi River, in the reach between Bajol to Holi villages in Chamba district of Himachal Pradesh.

2. The project area is about 74 km from Chamba, the Dist. H.Q. on State Highway -33. Chamba is connected with Pathankot via National Highway NH -20.

3. The project envisages diversion of river water with small storage reservoir with bed level at EL 1975m and full reservoir level at 2018.25 m which passes through a 15.56 km long tunnel on left bank of river Ravi and discharges back to Surface Power House near Holi village.

4. The total land required for the project is 85.779 ha including 75.304 ha forest land &09.588 ha private land. Out of 75.304 ha forest land, about 14.986 ha is required for underground work and 60.318 ha for surface rights. Out of 60.318 ha, 20.468 is temporary land.

5. The land use of forest land is given below:

Sl no	Components of projects	Forest land	Non- Forest land	Total (ha)
1	Diversion Dam, Coffer Dam& Reservoir	21.52	-	21.52
2	Diversion Tunnel &Head Race Tunnel, Adits	14.986	-	14.986
3	Surge Shaft & Pressure Shaft	2.819	2.399	5.218
4	Power House	0.21	0.89	1.10
5	Dumping area	20.353	0.354	20.707
6	Approach Roads	4.333	0	4.333
7	Job facilities & other requirement	11.083	6.843	17.926

	Total	**75.304**	**10.486**	**85.78**

6. The State Govt. has issued a certificate of the availability of degraded forest land of 151.0 ha is available in Himachal Pradesh in Dist. Chamba for raising compensatory afforestation in lieu of 75.304 ha forest land being diverted.

7. No violation of forest (Conservation) Act, 1980 has been reported.

8. The environment clearance has already been granted on 24.01.2011.

9. The total cost of the project is Rs.1876.14Crores.

10. The User Agency has given an undertaking to bear the cost of raising and maintenance of Compensatory Afforestation.

11. The user agency has submitted an undertaking to deposit NPV for diverted forest land.

12. The user agency has submitted that no objection certificates from different Gram Sabhasat.

13. The CA has been proposed over 151 ha, i.e., double the degraded forest area, in Survey Sheet 52/D-11 in Chamba District (page 388) at the total financial outlay of Rs.2.58 Crores with 5 years maintenance.

14. There is no archaeological / heritage site / defence establishment or any other important monument located in the area.

15. The power generated at 180 MW GMR Bajoli Holi Hydro Power Project will be transmitted through State Grid and Central Grid networkfor which separate proposal will be submitted.

16. The user agency has submitted the Certificate for minimum use of Forest Land.

17. This proposal was considered in the FAC meeting held on 5th & 6th May, 2011.

18. After examining the proposal in detail, the FAC desired that a study to assess *cumulative environmental impact of various hydroelectric projects particularly on the riverine eco system, land and aquatic biodiversity* the State Government may be requested to furnish the following:

i. To assess cumulative impact of hydroelectric projects on larger landscape in general and Forest, aquatic fauna and wild life in specific.

ii. To verify the quantity of minimum discharge from the protected stipulated therein the downstream.

19. The above information were commentated to the State Govt. of Himachal Pradesh vide letter of even no. dated 11.05.2011.

20. In response to the above, the State Government has submitted the following information:

(i) The Ravi sub-basin of Indus basin is fully harnessed except for few projects in the upper reaches of the river and as per the Indus water treaty 1970 agreed between India and Pakistan, Ravi River is for full consumptive use of India. As such after completion of Thein Dam, which is the downstream most storage scheme, no water is released downstream of Madhopur Barrage as such practically a river stretch of about 80 km within

the Indian territory and about 500 km downstream in Pakistan territory is dry except during high floods. As such conducting cumulative impact studies in this basin may not be that significant. However, EIA studies for Bajoli Holi have been conducted through M/s. R S Envirolink Technologies, a reputed consultant recognized by MoEF which covers detailed assessment of Impact of Bajoli Holi HEP .These details were put to expert appraisal committee on the basis of which environmental clearance has been given to the project on January 23, 2011.

(ii) For verification of quantity of minimum discharge, the matter was referred to the Directorate of Energy, Govt. of H.P. They have replied that no gauge and discharge site is established on these streams, therefore, no long term discharge data is available. They have also written that for verification of data of these rivulets, the method of proportional catchment area method was adopted and it has been observed that the discharges method by the IPP is broad in order. As per the Himachal State Policy, all the developers are required to release 15% of average of lean 4 months discharge as downstream release continuously from the diversion structure. However, MoEF while according environment clearance has stipulated that a 20% of average lean for 4 months is required to be released downstream of the diversion structure. As such quantum of release downstream is considered to be higher than minimum required

21. Again this proposal alongwith the above information was considered in the FAC meeting dated 30th and 31st May, 2011.

22. After thorough discussion, the FAC had recommended this proposal to accord in-principle/S-I approval.

23. Accordingly, after obtaining the approval of the competent authority on the recommendation of the FAC dated 30th and 31st May, 2011, the S-I approval had been accorded by the Ministry on 08th July, 2011 and condition Modified vide Ministry's letter dated 29.08.2011.

24. The State Government of Himachal Madhya Pradesh vide their letter No.Ft.48-2232/2010 (FCA) dated 23.09.2011, had submitted a report on compliance of conditions stipulated in the Stage-I approval letter dated 08.07.2011. After examination of the Compliance report Ministry had accorded stage-II/final approval on 20.10.2012.

25. After going more than 7 years, now, the State Government of Himachal Pradesh vide their letter No.Ft.48-2232/2011 (FCA) dated 17th July, 2019 requesting for grant permission for felling of **12 number** of trees and use of **0.421 ha. of new forest land** in lieu of diverted/approved dense forest land. In this context, it has been submitted by the DFO Bharmour that in the instant case, area measuring 1.570 hectare comprised in Khasra No. 4/1, and 0.0664. 0.202 ha. and 0.704 ha in Khasra No.24 & 116/1, in Mohal Gadoh in DPF Pani Nali had been diverted for the quarrying activities proposed in the instant proposal.

26. Further, it has been informed by the SG that the user agency has not used the diverted forest land under Khasra No. 4/1 & 24. Only diverted forest land under Khasra No. 116/1 used for quarrying activities with the reason that requirement of this project will be get fulfilled from the area under Khasra No. 116/ 1. Therefore, enumeration and felling of trees were taken in Khasra No. 116/1 & the trees in other two Khasra Nos. 4/1 & 24 had not been enumerated and felled.

27. It has been informed by the SG that the user agency felt necessary to make the use of remaining allotted quarry area to meet the balance raw material requirement, because in the incessant rain and huge flood in Ravi River in the month of September, 2018 which resulted in erosion of the platform along the river and washing away of the material collected for crushing and production of sand/aggregate. The user agency has applied for felling of trees standing over Khasra No.s 4/1, 24. These are the trees, whose felling permission has not been sought from the GoI, MoEF.

28. It has been informed by the DFO, Bharmour that he has inspected Khasra No. 4/1 24 & 116/1 and observed that **127** numbers of trees of various species are standing over the Khasra No. 4/ 1, 24 & 116/ 1. Felling of these trees are unavoidable if the diverted/allotted forest land is used for the said purpose. Large number of trees area standing over Khasra No. 4/1 in Mohal Ghado in DPF Pani Nalli and to avoid huge numbers of trees felling in Khasra No. 4/1, DFO Bharmour has proposed to use small portion of non-diverted forest land to the extant 0.421 ha in Khasra No. 4. This degraded forest land lying adjacent to the project. If swapping of equivalent area from Khasra No. 4/1 to Khasra No. 4 is done, **nearly 115 trees of different can be saved from felling**.

29. The Khasra number wise breakup of the forest land required for quarrying as per new proposal against the approved diverted forest area along with number of trees required to fell is tabulated as below:-

S. No	Khasra No.	Forest area diverted for quarrying as per original proposal (in ha)	Trees standing on the diverted forest land whose felling permission is required as per user agency request	Forest area use for quarrying as per fresh proposal	Number of trees involves in fresh proposal.	Remarks
1	116/1	0.704	15	0 704	0	Diverted
2	24	0 202	22	0 049	7	Diverted land required only for construction of approach road
3	4/1	0 664	90	0 243	4	Diverted land required for quarrying
4	4	0	0	0 421	1	Non diverted forest land quarrying in lieu proposed for quarrying in lieu of diverted forest land
Total		**1.570**	**127**	**1.417**	**12**	

1. Further, it has been informed by the State Government of Himachal Pradesh that the project is almost on the verge of completion and its commissioning is absolutely necessary to meet the power requirement of the country and economic upliftment of the State. So Keeping in view of the importance of this project and consideration the environment and ecological grounds, it has been requested by the State Government of Himachal Pradesh to grant permission for felling of 12 number of trees and use of 0.421 ha of new-forest land in lieu of diverted/approved dense forest land. The following documents are enclosed herewith for kind reference and perusal please:

- **i.** Geo referenced maps clearly indicating the diverted forest land and proposed forest land for quarrying with regard to crop density and extent of area.
- **ii.** The list of trees, species wise and dia meter wise along with abstract, coming in the diverted forest land and proposed forest land for quarrying.
- **iii.** The revenue papers of the diverted forest land and proposed forest land.
- **iv.** The copy of forest clearance granted under FCA, 1980 by the Government of India, MoEF and the copy of subsequent order by Government of Himachal Pradesh.
- **v.** The NOC from the HPPWD.
- **vi.** No objection certificate of Up-Pradhan Gram Panchayat Nayagran.
- **vii.** Certificate from the DFO Bharmour regarding no trees was enumerated from the DFO Bharmour regarding no trees was enumerated or felled in the Khasra No. 4/1 and 24 of quarry area.
- **viii.** Letters of DFO Bharmour regarding the case.

30. Before examined the matter the Ministry sought the following information from the State Government of Himachal:

(i) The KML/shapefile of the already diverted forest area for which Stage-II already accorded.

(ii) Separate KML file of the Khasra No.4/1, 24, 116/1 and newly proposed forest land 0.421 (Khasra No.4) for diversion and Compensatory Afforestation lands, including maps depicting forest land to be surrendered to State Forest Department.

(iii) Details area statement with existing and proposed land use may be provided.

31. The above observations were communicated to the State Government of HP vide this Ministry's letter dated 03rd December, 2019 and the State Government of Himachal Madhya Pradesh vide their letter No.Ft.48-2232/2011 (FCA) dated 15th January, 2020 submitted the information in respect of this Ministry's letter dated 03.12.2019 the same is given as under:

(i) The revised KML file already diverted forest area has been enclosed in soft copy which is enclosed.

(ii) The Separate KML file of the Khasra No.4/1, 24, 116/1 and newly proposed forest land 0.421 (Khasra No.4) for diversion and Compensatory Afforestation lands, including maps depicting forest land to be surrendered has been enclosed in soft copy as well as hard copy, which is enclosed herewith.

(iii) The details area statement with existing and proposed land used have been enclosed herewith in hard copy as well as soft copy.

32. After examination of the information as submitted by the State Government of HP vide his letter dated 15.01.2020 it has been found that the State Government / user agency has not submit the KML/shapefile of proposed Compensatory Afforestation lands, including maps and same were communicated to the State government of Himachal Pradesh on 03.01.2020.

33. The State Government of Himachal Pradesh vide their letter No.Ft.48-2232/2011 (FCA) dated 14th February, 2020 forwarding the KML file and maps of Compensatory Afforestation (CA) land. After careful examination of KML file of CA sites by GIS-DSS cell of FC Division Observations are given below:

(i) Compensatory afforestation has been proposed in 11 patches over degraded forest land and total area of proposed CA land is found 151.05 ha.,

(ii) All the eleven patches proposed for CA is located in Chamba district of Himachal Pradesh State. All these proposed CA sites are free from encroachment.

In view of the above, it is proposed that the proposal for saving of 115 number of trees and approval for use of 0.421 ha of new forest land in lieu of diverted moderately dense forest land, to be surrendered by user agency (i.e. 0.574 ha) may be placed before the FAC, in its meeting scheduled to be held on 27.02.2020.

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Government of India
Ministry of Environment, Forest and Climate Change
(Forest Conservation Division)

Indira Paryavaran Bhawan
Aliganj, Jorbagh Road
New Delhi – 110003
Dated: 12th March, 2020

To,

The Principal Secretary (Forests),
Department of Environment & Forests,
Government of Arunachal Pradesh,
Itanagar.

Sub: Diversion of 4577.84 ha (originally proposed 5056.5 ha) of forest land in favour of M/s NHPC Limited for construction of Dibang Multipurpose Project (2880 MW originally proposed 3000 MW) on Dibang River in Lower Dibang valley District of Arunachal Pradesh.

Sir,

I am directed to refer to the Govt. of Arunachal Pradesh's letter No. FOR.10-44/Cons./2003/Vol.V/4030/36 dated 05.08.2014 on the above mentioned subject seeking prior approval of the Central Government under Section 2 of the Forest (Conservation) Act, 1980 and to say that the said proposal has been examined by the Forest Advisory Committee constituted by the Central Government under Section-3 of the aforesaid Act. After careful consideration of the proposal by the Forest Advisory Committee (FAC), ***In-principle/Stage-I*** approval was granted vide this Ministry's letter of even number dated 15.04.2015 subject to fulfilment of certain conditions. The State Government has furnished compliance report in respect of the conditions stipulated in the approval and has requested the Central Government to grant final approval.

2. In this connection, I am directed to say that on the basis of the compliance report furnished by the PCCF & Nodal Officer(FCA), Govt. of Arunachal Pradesh's letters No. FOR.10-44/Cons./2003/Vol-IV/2027-29 dated 20.09.2019 and No. FOR.10-44/Cons./2003/Vol-IV/06-08 dated 06.01.2020 and the reports of Regional Office, Shillong as received vide their letters No. 8-85/2011-FC/430 dated 13.04.2018 and No. 8-85/2011-FC/3816 dated 13.02.2020, ***Stage-II/Final approval*** of the Central Government is hereby granted under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 4577.84 ha (originally proposed 5056.5 ha) of forest land in favour of M/s NHPC Ltd for construction of Dibang Multipurpose Project (2880 MW originally proposed 3000 MW) on Dibang River in Lower Dibang valley District of Arunachal Pradesh. subject to following conditions:

i Legal status of the diverted forest land shall remain unchanged;

ii Compensatory afforestation(CA) over identified degraded forest land, twice in extent to the forest land shall be taken up as per approved plan/scheme by the Forest Department from the funds received from the user agency within a period of three years with effect from the date of issue of approval, and maintained thereafter in accordance with the approved Plan.The CA land shall be mutated and notified as as RF/PF under Indian Forest Act 1927, with in six months of Stage II approval.

iii The User Agency shall pay the additional amount of NPV, if so determined, as per the

12.03.2020

final decision of the Hon'ble Supreme Court of India;

iv The State Govt. ensure that the User Agency shall obtain the Environment Clearance as per the provisions of the Environmental (Protection) Act, 1986, if required;

v The State Govt. and the user agency shall ensure that no labour camp shall be established on the forest land and the user agency shall provide firewood preferably alternate fuel to the labourers and the staff working at the site so as to avoid any damage and pressure on the adjacent forest areas;

vi The State Govt. shall ensure that the boundary of the mining lease and safety zone shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing, distance from pillar to pillar and GPS co-ordinates;

vii The State Govt. and the user agency shall ensure that the layout plan of the mining plan/ proposal shall not be changed without the prior approval of the Central Government;

viii The State Govt. and the user agency shall ensure that the forest land shall not be used for any purpose other than that specified in the proposal;

ix The State Govt. and the user agency shall ensure that the forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department or person without prior approval of the Central Government;

x The State Govt. and the user agency shall ensure that no damage to the flora and fauna of the adjoining area shall be caused;

xi The State Govt. and the user agency shall ensure that any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department;

xii The State Govt. shall ensure that the State Forest Department will implement the approved plan/scheme to create and maintain alternate habitat/home for the avifauna, from the funds deposited by the user agency in CAMPA account;

xiii The State Govt. and the user agency shall ensure to constitute Ecological Monitoring Unit to monitor the impact of the project on flora and fauna of the area and furnish a copy of constitution order to this Ministry for record.

xiv The State Govt. and the user agency shall ensure to implement the approved plan/scheme for afforestation along the periphery of the reservoir and canals (as applicable).

xv The State Govt. shall ensure that the State Forest Department will implement the approved CAT plan, Wild Life Management Plan of Mahao Wildlife Sanctuary and Zonal Wildlife Conservation Plan from the funds deposited by the user agency in CAMPA account.

xvi The complete compliance of the FRA, 2006 shall be ensured by way of prescribed certificate from the concerned District Collector.

12.03.2020

xvii The State Govt. ensure that the State Forest Department shall implement approved plan for muck disposal and dumping area for muck disposal. In addition, the State Govt. and the user agency shall ensure to stabilize and reclaim by planting suitable species at the project cost under the supervision of State Forest Department. Stabilization and reclamation of such dumping sites shall be completed before handing over the same to the State Forest Department in a time bound manner as per Plan;

xviii The State Govt. shall ensure that the User agency shall construct road/path, if any, in consultation with organization(s) having experience in construction of roads in hilly areas to avoid frequent road blockade due to landslides etc. and shall provide breast walls and retaining walls wherever necessary;

xix The State Government and the user agency shall ensure that the trees available between full reservoir level (FRL) and FRL—4 meters are not felled;

xx The user agency shall provide free water for the forestry related projects;

xxi The State Govt. and the user agency shall ensure that the annual self - compliance report in respect of the above conditions shall be submitted to the State Government, concerned Regional Office and to this Ministry by the end of March every year;

xxii The State Govt. and the user agency shall ensure that any other condition that the concerned Regional Office of this Ministry may stipulate with the approval of competent authority in the interest of conservation, protection and development of forests & wildlife; and

xxiii The State Govt. and the user agency shall comply all the provisions of the all Acts, Rules, Regulations, Guidelines, Hon'ble Court Order (s) and National Green Tribunal Order(s) pertaining to this project, if any, for the time being in force, as applicable to the project.

Yours faithfully,

12.03.2020.

(Sandeep Sharma)

Assistant Inspector General of Forests

Copy to:

1. The PCCF(HoFF), Government of Arunachal Pradesh, Itanagar.
2. The Nodal Officer(FCA), O/o the PCCF(HoFF), Govt. of Arunachal Pradesh, Itanagar.
3. The Dy. Director General (Central), Regional Office, Shillong.
4. User Agency
5. Monitoring Cell of FC division, MoEF&CC, New Delhi.
6. Guard file.

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS
NORTH EASTERN REGIONAL OFFICE
Law-U-Sib, Lumbatngen
Near MTC Workshop, Shillong 793 021
टेली/Tel: (0364) – 253-7606/7345/7195/7278
GRAM: PARYAVARAN, SHILLONG
ईमेल/Email – mofner-meg@nic.in & moefner@dataone.in

भारत सरकार
पर्यावरण एवं वन मंत्रालय
पूर्वोत्तर क्षेत्रीय कार्यालय
लाउसीब, लुम्बट्गेन
एम.टी.सी वर्कसप के पास, शिलांग 793021
फैक्स/Fax: (0364) – 2536041
तार : पर्यावरण, शिलांग

No. 3-AN C 107/2011-SHI/1793-97

7th September, 2012

To,

The Principal Chief Conservator of Forests-
-Cum Principal Secretary
Deptt. of Forests, Environment & Wildlife
Govt. of Arunachal Pradesh
Itanagar.

Sub : Proposal for diversion of 39.26 Ha forest land for construction of Gongri HEP (144 MW) in West Kameng District of Arunachal Pradesh by M/s Dirang Energy Pvt. Ltd.

Sir,

This has got reference to the State Government's letter No. FOR. 260/CONS/2009/379-82 dt. 30.09.2011 on the subject mentioned above, seeking prior approval of the Central Government in accordance with Section 2 of the FCA, 1980. After careful consideration of the proposal by the State Advisory Group Committee, In-principle approval was granted vide this office letter of even number dated 11.06.2012 subject to fulfillment of certain conditions. The State Government has furnished compliance report in respect of the conditions stipulated in the in-principle approval and has requested the Central Government to grant final aproval.

In this connection and on the basis of the compliance report furnished by the State Government vide letter No. FOR. 260/Cons/2009/2300-03 dt. 03.08.2012 & 04.09.2012, final approval of the Central Government is hereby granted under Section-2 of the Forest (Conservation) Act, 1980 for diversion 39.26 Ha forest land for construction of Gongri HEP (144 MW) in West Kameng District of Arunachal Pradesh by M/s Dirang Energy Pvt. Ltd, subject to the following conditions:

(1) The legal status of the forest land shall remain unchanged.
(2) Compensatory afforestation (CA) shall be carried out over 65 ha. of degraded Community Forest land at Rurang Village under Nafra Range in a single patch as per the fund deposited by the User Agency & scheme furnished by the State Govt.
(3) As per guidelines of MoEF (No. 8-84/2002-FC dt. 03.02.2004) the degraded Community Forest Land which has already been mutated in favour of State Forest Department shall be declared RF / PF under Section 4 or Section 29 of the Indian Forest Act, 1927. The Nodal Officer shall report compliance within a period of 6 months along with a copy of the original notification declaring such degraded Community Land as RF / PF.
(4) Additional amount of the Net present Value (NPV) of the diverted forest land any becoming due after finalization/revision of the same by the Hon'ble Supreme Court of India shall be charged by the State Govt from the User Agency.
(5) The user agency shall carry out muck disposal at pre-designated sites in a manner so as to avoid its rolling down into valley / river / water channels etc.

(6) The dumping area for muck shall be stabilized and plantation of suitable species shall be carried out over stabilized dumps on the cost of the user agency under the supervision of State Forest Department. Retaining walls and terracing shall also be carried out to hold the dumping material in place. Stabilization and reclamation of such dumping sites shall be completed before handing over the same to the State Forest Department as per schedule & plans.

(7) Catchment Area Treatment Plan shall be implemented at the project cost under the supervision of State Government.

(8) Planting of native species shall be undertaken on vacant land along the banks of reservoir.

(9) No tree felling in the area between FRL and and FRL-4 m. levels shall be carried out.

(10) User Agency shall provide fuelwood, preferably alternate fuel to the labourers and the staff working at the site so as to avoid any damage and pressure on adjacent forest areas.

(11) No labour camp shall be set up or any habitation shall be allowed to come up either over diverted or non-diverted forest land in the vicinity.

(12) There shall be no damage done to the surrounding forests, environment, wildlife, natural resources and other properties; the same shall be compensated along with the reclamation measures in case a damage is found.

(13) All the components of the Environment Management Plan (EMP) shall be implemented by the User Agency in co-ordination with the different agencies of the State Government.

(14) The forest land shall not be used for any purpose other than that specified in the proposal.

(15) Any other conditions as may be found appropriate in future for the betterment of environment & wildlife, may be imposed by APCCF (C), North Eastern Regional Office.

Yours faithfully,

(B. N. JHA)
Addl. Principal Chief Conservator of Forests (C)

Copy to :-

1. The Addl. Principal Chief Conservator of Forests & Nodal Officer (FCA), O/o PCCF, Department of Env. & Forests, Itanagar.

7-9-12

Addl. Principal Chief Conservator of Forests (C)

F. No. 8-5/2002-FC
Government of India
Ministry of Environment & Forests
(FC Division)

Paryavaran Bhawan
CGO Complex, Lodhi Road
New Delhi-110 510
Dated: 28th July 2008

The Principal Secretary (Forests),
Government of Himachal Pradesh,
Shimla.

Sir,

Subject: Diversion of 1.6348 ha of additional forest land (over and above already approved 172.3834 ha) for construction of approach road to concrete batching and mixing plant of 1000 MW Karchham Wangtoo Hydro Electric Project in district Kinnaur, Himachal Pradesh.

I am directed to refer to State Government's letter no. FFE-B-F(2)-206/2006 dated 1.01.2007 on the subject cited above seeking prior approval of the Central Government under the Forest (Conservation) Act, 1980. After careful consideration of the proposal by the Forest Advisory Committee constituted under Section-3 of the said Act, in-principle approval for the 75.0600 ha forest land was granted vide this Ministry's letter of even number dated 27.12.2007 subject to fulfilment of certain conditions. The State Government has furnished compliance report in respect of the conditions stipulated in the in-principle approval and has requested the Government to grant final approval.

2. In this connection, I am directed to say that on the basis of the compliance report furnished by the Nodal Officer (FCA) of State Government vide letter dated 26.05.2008, approval of the Central Government is hereby granted under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 1.6348 ha of additional forest land for construction of approach road to concrete batching and mixing plant of 1000 MW Karchham Wangtoo Hydro Electric Project in district Kinnaur, Himachal Pradesh subject to fulfillment of the following conditions:

i) Legal status of the diverted forest land shall remain unchanged.

ii) Compensatory Afforestation will be raised and maintained by the State Forest Department at the project cost.

iii) Additional amount of the Net Present value (NPV) of the diverted forest land, if any, becoming due after finalisation of the same by the Hon'ble Supreme Court of India on receipt of the report from the Expert Committee, shall be charged by the State Government from the User Agency. The User Agency shall furnish an undertaking to this effect.

4. The User Agency shall implement all the conditions of the Muck Rehabilitation Plan under supervision of the State Forest Department at the project cost.

5. In addition to condition 4 above, following activities shall be undertaken by the User Agency under supervision of the State Forest Department at the project cost:

(i) The User Agency should ensure that muck does not roll down the slopes. All such areas where muck has rolled down the slopes shall be rehabilitated at the cost of User Agency and under the supervision of State Forest Department.

(ii) The dumping area should be stabilized and reclaimed and plantation of suitable species be carried out over dumping areas at the cost of the User Agency under the supervision of State Forest Department.

(iii) Construction of check dams, retention / toe walls to arrest sliding down of the excavated material along the contour.

6. The total area diverted, so far, for the project in favour of Karchham Wangtoo HEP in Kinnaur, Himachal Pradesh will become 174.0182 ha (167.4246 ha + 4.7053 ha +0.2535 ha + 1.6348 ha).

7. All the relevant conditions which have been stipulated in the approval granted by this Ministry vide letter of even no dated 17.11.2005 for diversion 167.4246 ha (136.2833 ha for surface works and 31.1413 ha for underground work) and 06.07.2006 for diversion of 4.7053 ha of additional forest land and 0.2535 ha of private land for construction of 1000 MW Karchham Wangtoo Hydro Electric Project in Kinnaur in Himachal Pradesh shall remain applicable.

8. Any other condition that the Conservator of Forests (Central), Regional Office, Chandigarh, may impose from time to time for protection and improvement of flora and fauna in the forest area, shall also be applicable.

9. The forest land thus diverted shall be non-transferable. Whenever the forest land is not required, it shall be surrendered to the State Forest Department under intimation to this Ministry.

Yours faithfully,

(C.D. Singh)
Sr. Assistant Inspector General of Forests

Rampur Forest Circle — Dy. No. 2879 Dt. 13/8/08

Copy to:-

1. The Principal Chief Conservation of Forests, Government of Himachal Pradesh, Shimla.
2. The Nodal Officer, O/o the PCCF, Government of Himachal Pradesh, Shimla.
3. The Conservator of Forests (Central), Regional Office, Chandigarh.
4. User Agency.
5. Monitoring Cell of FC Section.

(C.D. Singh)
Sr. Assistant Inspector General of Forests

11 AUG 200

Endst. No. Ft 48-1373/2006 (FCA) Dated ... Copy in continuation to this office endst. of even number dated 26-5-2008 is forwarded to C.F. Rampur for further action as above. It may also be ensured that no violation of Forest (Conservation) Act, 1980 takes place.

Nodal Officer-cum-CCF (FCA) o/o PCCF (F) HP Shimla

CCF (FCA)

6/8/08

13/8/08

JOINT INSPECTION REPORT AND CERTIFICATE

We the undersigned have jointly inspected on 11-08-2006 following forest land required for the implementation of Karchham - Wangtoo Hydroelectric Project (1000MW) for **Approach road to Concerete Batching and Mixing Plant.**

Sl. No.	Name of item	Location of land		Forest land		Remarks
		Tehsil	Mohal/ Up mohal	Khasra No.	Area in ha.	
1	Approach road to Concrete, Batching & Mixing Plant	Sangla	Kanai	498/1	0.0204	
				564/1	0.0028	
				554	0.0196	
				575/1	0.0037	
				493	0.0528	
				562	0.0018	
				501/1	0.0022	
				502	0.0869	
				504	0.0939	
				495	0.0761	
				577/1	0.1252	
				539/1	0.0080	
				503/3	1.1414	
			Total		**1.6348**	

Divisional Forest Officer
Kinnaur Forest Division,
at Reckongpeo Distt. Kinnaur
Himachal Pradesh
R/Peo

Sub. Divisional Officer (C)
Kalpa at Reckongpeo
Distt. Kinnaur
Himachal Pradesh

(G.S.Rathor)
Authorised Signatory
M/s Jaypee Karcham Hydro Corpn. Limited
Karcham Wangtoo H.E.Project (1000MW)
Sholtu Colony Distt. Kinnaur
Himachal Pradesh

F. No. 8-5/2002-FC (Vol.-III)
Government of India
Ministry of Environment & Forests
(FC Division)
***

Paryavaran Bhawan, CGO Complex,
Lodhi Road, New Delhi - 110510
Dated: 23August, 2013

To

The Principal Secretary (Forests),
Government of Himachal Pradesh,
Shimla.

Sub: Diversion of 6.7190 ha of additional forest land (3.6502 ha surface rights and 3.0688 ha underground area) for construction of road to surge shaft, flushing tunnel and underground access to Baspa HEP Power House from Karcham Bridge in favour of M/s Jaypee Karcham Hydro Corporation Limited in Kinnaur & Sarahan (WL) Forest Divisions in Kinnaur district of Himachal Pradesh.

Sir,

I am directed to refer to State Government's letter no. FFE-B-F/(2)/111/2009 dated 30.11.2009 on the above subject seeking prior approval of the Central Government under Section -2 of the Forest (Conservation) Act, 1980. After careful consideration of the proposal by the Forest Advisory Committee constituted under Section-3 of the said Act, 'in-principle' approval was granted vide this Ministry's letter of even number dated 24.05.2010 subject to fulfillment of certain conditions prescribed therein. The State Government has furnished compliance report in respect of the conditions stipulated in the 'in-principle' approval and has requested the Central Government to grant final approval.

In this connection, I am directed to say that on the basis of the compliance report furnished by the State Government vide letter no. Ft.48-1929/2009/ FCA dated 07.10.2010, 22.03.2011 and 13.06.2013, final approval of the Central Government is hereby granted under Section-2 of the Forest (Conservation) Act, 1980 for diversion of 6.7190 ha of additional forest land (3.6502 ha surface rights and 3.0688 ha underground area) for construction of road to surge shaft, flushing tunnel and underground access to Baspa HEP Power House from Karcham Bridge in favour of M/s. Jaypee Karcham Hydro Corporation Limited in Kinnaur & Sarahan (WL) Forest Divisions in Kinnaur district of Himachal Pradesh subject to fulfilment of the following conditions:

1. Legal status of the diverted forest land shall remain unchanged;
2. Compensatory Afforestation over degraded forest land, twice in extent to the forest land to be diverted, shall be raised and maintained by the State Forest Department from the funds already deposited by the user agency;
3. The User Agency shall pay the additional NPV, if so determined, as per the final decision of Hon'ble Supreme Court of India;
4. The User Agency shall implement all the conditions of the Muck Rehabilitation Plan under supervision of the State Forest Department at the project cost;
5. The following activities shall be undertaken by the User Agency under supervision of the State Forest Department at the project cost:

(i) The User Agency should ensure that muck does not roll down the slopes. All such areas where muck has rolled down the slopes shall be rehabilitated at the cost of User Agency and under the supervision of State Forest Department;

(ii) The dumping area should be stabilized and reclaimed and plantation of suitable species be carried out over dumping areas at the cost of the User Agency under the supervision of State Forest Department;

(iii) Construction of check dams, retention / toe walls to arrest sliding down of the excavated material along the contour.

7. The total area diverted, so far, for the project in favour of Karchham Wangtoo HEP in Kinnaur, Himachal Pradesh will become 180.7372 ha (167.4246 ha + 4.7053 ha +0.2535 ha + 1.6348 ha **+6.7190 ha**);

8. All the relevant conditions which have been stipulated in the approval granted by this Ministry vide letter of even no dated 17.11.2005 for diversion 167.4246 ha (136.2833 ha for surface works and 31.1413 ha for underground work) and subsequent additional diversions for construction of 1000 MW Karchham Wangtoo Hydro Electric Project in Kinnaur in Himachal Pradesh shall remain applicable;

9. Any other condition that the concerned Regional Office of this Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife;

10. The User agency shall submit the annual self compliance report in respect of the above conditions to the State Government and to the concerned Regional Office of the Ministry regularly; and

11. The User Agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations and Guidelines, for the time being in force, as applicable to the project.

Yours faithfully,

(T. C. Nautiyal)
Assistant Inspector General of Forests

Copy to:
1. The Principal Chief Conservation of Forests, Government of Himachal Pradesh, Shimla.
2. The Addl. PCCF (Central), Regional Office, Chandigarh.
3. The Nodal Officer, O/o the PCCF, Government of Himachal Pradesh, Shimla.
4. The User Agency (M/s Jaypee Karcham Hydro Corporation Limited, Karcham-Wangtoo H.E. Project, Sholtu Colony, PO Tapri – 172 104 District Kinnaur, Himachal Pradesh).
5. Monitoring Cell, FC Division, MoEF, New Delhi.
6. Guard file.

(T. C. Nautiyal)
Assistant Inspector General of Forests

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Annexure-III

JOINT INSPECTION REPORT AND CERTIFICATE

We the undersigned have jointly inspected on **24-09- 2009** following forest land required for the implementation of Karchham - Wangtoo Hydroelectric Project (1000MW) for **Road to surge shaft.**

Sl. No.	Name of item	Location of land		Forest land		Remarks
		Tehsil	Mohal/ Up mohal	Khasra No.	Area in ha.	
1	Road to Surge Shaft	Nichar	Dharyasang	10/10	1.8700	
				10/11	1.5400	
2	Surge Shaft		Kutano	595/2	0.2402	
3	Outfall Structure of flushing tunnel				2.6158	
4	Underground land for flushing tunnel		Kutano		0.4530	
5	Underground Area for Alternative approach tunnel to Baspa -II Power House	Sangla	Dharwadang			
			Total		**6.7190**	

24/09/09
Divisional Forest Officer
Wild life Forest Division
Sarahan, Distt. Shimla
Himachal Pradesh

Range Forest Officer
K-lpa Forest Range
Distt. Kinnaur (H. P.)

24/9
Divisional Forest Officer
Kinnaur Forest Division
at Reckongpeo Distt. Kinnaur
Himachal Pradesh

Sub. Divisional Officer (C)
Nichar at Bhabanager
Distt. Kinnaur
Himachal Pradesh

(G S.Ratnor)
Authorised Signatory
M/s Jaypee Karcham Hydro Corpn. Limited
Karcham Wangtoo H.E.Project (1000MW)
Shoitu Colony Distt. Kinnaur
Himachal Pradesh

Sub Divisional Officer (C)
Kalpa at Reckong Peo
Distt Kinnaur
Himachal Pradesh

F. No. 8-5/2002-FC
Government of India
Ministry of Environment & Forests
(FC Division)

Paryavaran Bhawan
CGO Complex, Lodhi Road
New Delhi-110 003

Dated : 6th July 2006

To

The Principal Secretary (Forests),
Government of Himachal Pradesh,
Shimla.

Sub: **Diversion of 4.7053 ha of additional forest land and 0.2535 ha of private (forest) land, for construction of 1,000 MW Karchham Wangtoo Hydro Electric Project (HEP) in District Kinnaur, Himachal Pradesh.**

Sir,

I am directed to refer to your letters No. FFE-B-F(2)143/2005 dated 16.11.2005 and letter No. FFE-B-F(2)151/2005 dated 16.11.2005 on the above mentioned subject whereunder the above proposal was submitted seeking prior approval of the Central Government in accordance with Section-2 of the Forest (Conservation) Act, 1980, and to say that the proposal has been examined by Forest Advisory Committee constituted under Section-3 of the Act.

2. After careful consideration of the proposal of the State Government, and on the basis of the recommendations of the above mentioned Advisory Committee, the Central Government granted in-principle approval vide letter of even no. dated 12.01.2006 subject to certain conditions. The compliance of these conditions was submitted vide Nodal Officer letter No. Ft.48-464/2003(FCA) dated 06.06.2006. After consideration of the proposal, and compliance of various conditions by the State Government, the Central Government hereby conveys its approval under Section-2 of the Forest (Conservation) Act, 1980 for **diversion of 4.7053 ha of additional forest land and 0.2535 ha of private (forest) land**, for construction of 1,000 MW Karchham Wangtoo Hydro-Electric Project (HEP) in District Kinnaur, Himachal Pradesh, subject to the fulfilment of following conditions :-

(i) Legal Status of the forest land shall remain unchanged.
(ii) Compensatory Afforestation will be raised and maintained over degraded forest land twice in extent to the forest land approved for diversion, at the cost of user agency.
(iii) The entire reservoir area shall be declared as a Reserved Forest under Indian Forest Act, 1927 with regulated fishing rights.
(iv) Felling of trees shall be done only when necessary and that too with the prior permission of the State Forest Department.
(v) The State Government shall deposit all the above-mentioned funds with the Ad-hoc Body of Compensatory Afforestation Fund Management and Planning

Authority (CAMPA) in Account No CA 1595 of Corporation Bank (A Government of India Enterprises), Block-11, Ground Floor, CGO Complex, Phase-1, Lodhi Road, New Delhi-110003, as per the instructions communicated vide letter No. 5-2/2006-FC dated 20.05.2006.

(vi) Demarcation of the area shall be done on the ground at the project cost by erecting 4 feet high RCC pillars showing forward and backward bearings.

(vii) Green belt of adequate width shall be raised on the vacant area, at the cost of the project.

(viii) All efforts shall be made for protection of the environment at the cost of project.

(ix) No labour camps shall be set up in the forest area, nor any habitation shall be allowed to come up in the forest area.

(x) All efforts shall be made by the user agency to avoid any damage to the wildlife found in the area.

(xi) Steps may be taken to minimize biotic pressure over adjoining/nearby forests.

(xii) The forest land shall not be used for any purpose other than that specified in the proposal.

(xiii) The total diverted forest land of the project now becomes 172.3834 ha (167.4246 ha + 4.7053 ha + 0.2535 ha). The conditions stipulated while granting approval for 167.4246 ha vide this Ministry's letter of even no. dated 17.11.2005 shall also be strictly complied with by the State Government/User Agency.

(xiv) The forest land thus diverted shall be non-transferable. Whenever and whatever extent of forest land is not required by the user agency, it shall be surrendered to the State Forest Department after proper rehabilitation under intimation to this Ministry.

The State Government shall ensure compliance of all the above conditions.

Yours faithfully,

(Pankaj Asthana)
Assistant Inspector General of Forests

Copy to :-

1. The Principal Chief Conservator of Forests, Government of Himachal Pradesh, Shimla.
2. The Nodal Officer, O/o PCCF, Government of Himachal Pradesh, Shimla.
3. The Conservator of Forests (Central), Regional Office, Chandigarh.
4. User Agency.
5. Guard File.
6. Monitoring Cell of FC Section.

(Pankaj Asthana)
Assistant Inspector General of Forests

JOINT INSPECTION REPORT AND CERTIFICATE

We the undersigned have jointly inspected on 3 - 05 - 2005 following forest land required for the implementation of Karchham - Wangtoo Hydroelectric Project (1000MW) for Main Access Tunnel (M.A.T.), Switch yard and Tail Race Outfall.

Sl. No.	Name of item	Location of land		Forest land		Remarks
		Tehsil	Mohal/ Up mohal	Khasra No.	Area in ha.	
1	M.A.T. and Switchyard	Nichar	Dharyashang	10/9	2.8560	
			Dharyashang	23/4	0.7725	
			Total		**3.6285**	
2	Tail Race Outfall		Rarang	20/3	1.0768	
			Total (Sl. No. 1+2)	**Kita 3**	**4.7053**	

1 It is certified that the present proposed site is barest minimum forest land and unavoidable for the construction of Mat and Switch yard at wangtoo.

2 No violation of the Act has been carried out.

3 There is no protected archeological/ heritage site/defence establishment or any other Important monument is located on the area.

4 The land being diverted is devoid of any tree.

5 There will be no adverse impact on wild life Sanctuary since the land in question is situated / Located along the Satluj river bed.

Divisional Forest Officer
Kinnaur Forest Division
at Reckongpeo Distt. Kinnaur
Himachal Pradesh

Divisional Forest Officer
Sarahan Forest Division
Distt Shimla
Himachal Pradesh

Sub Divisional Officer (C)
Nichar at Bhabananger
Distt. Kinnaur
Himachal Pradesh

(G.S.Rathor)
Authorised Signatory
M/s Jaiprakash Industries Limited
Karcham Wangtoo H E Project
Sholtu Distt Kinnaur
Himachal Pradesh

Sh. G.S. Rathore Ji

ITEMWISE BREAKUP OF THE FOREST LAND REQUIRED FOR THE PROJECT/ SCHEME FOR DIFFERENT PURPOSE IN KINNAUR FOREST DIVISION

JOINT INSPECTION CERTIFICATE

We the undersigned have jointly inspected on 23-05-04 the following Private vani land required for the implementation of Karchham-Wangtoo Hydroelectric Project (1000 MW). The diversion of said private vani land for non forest use is inescapable as there is no alternative suitable Government/ Private land this purpose.

Sl. No.	Name of item	Location of land		Vani land		Remarks
		Tehsil	Mohal/Up mohal	Khasra No.	Area in ha.	
1	Submergence Area	Sangla	Shanandain	3/1	0.1006	
2	Road			3/2	0.1529	
			Total	Kita 2	0.2535	

Sub Divisional Officer (c)
Kalpa at Reckongpeo
Distt. Kinnaur
Himachal Pradesh

Divisional Forest Officer
Kinnaur Forest Division
At Reckongpeo Distt. Kinnaur
Himachal Pradesh

G.S. Rathore

IFICATE

(G.S. Rathore)
Authorised Signatory
M/s Jaiprakash Industries Limited
Karchamm Wangtoo H.E. Project
Sholtu Distt. Kinnaur
Himachal Pradesh

JAIPRAKASH POWER VENTURES LIMITED

KARCHAM WANGTOO HYDROELECTRIC PLANT (1000 MW)

31.03.2015

Sr. No.	Description	Surface Area in ha.	Underground Area in ha.	Total Area in ha.	Remarks
1	Govt. land area diverted by Govt. of India, vide letter no. F.No. 8-5/2002-FC dated 17-11-2005	136.2833	31.1414	167.4247	
2	Govt. land area diverted by Govt. of India, vide letter no. F.No. 8-5/2002-FC dated 06-07-2006	4.7053	-	4.7053	
3	Govt. land area diverted by Govt. of India, vide letter no. F.No. 8-5/2002-FC dated 28-07-2008	1.6348	-	1.6348	
4	Govt. land area diverted by Govt. of India, vide letter no. F.No. 8-5/2002-FC (Vol.-III) dated 23-08-2013	3.6502	3.0688	6.7190	
5	Proposal for diversion of forest land under forest (Conservation) Act 1980	0.7609	-	0.7609	
Grand Total		**147.0345**	**34.2102**	**181.2447**	

F. No. 8-5/2002-FC
Government of India
Ministry of Environment & Forests
(FC Division)

Paryavaran Bhawan
CGO Complex, Lodhi Road
New Delhi-110 003

Dated : 17th November 2005

To

The Principal Secretary (Forests),
Government of Himachal Pradesh,
Shimla.

Sub: Diversion of 167.4247 ha of forest land including 136.2833 ha of surface rights for construction of 1000 MW Karchham-Wangtoo Hydro Electric Project in District Kinnaur, Himachal Pradesh.

Sir,

I am directed to refer to your letter No. FFE-B-F(2)-68/2001 dated 29.12.2001 and subsequent letter of Nodal Officer No. Ft.48-464/99(M)FCA dated 26.10.2005 on the above mentioned subject whereunder the above proposal and compliance of various conditions was submitted seeking prior approval of the Central Government in accordance with Section-2 of the Forest (Conservation) Act, 1980.

2. After careful consideration of the proposal of the State Government, the Central Government hereby conveys its approval for diversion of 167.4247 ha of forest land including 136.2833 ha of surface rights for construction of 1000 MW Karchham-Wangtoo Hydro Electric Project in District Kinnaur, Himachal Pradesh, subject to fulfilment of following conditions :-

(i) Legal Status of the forest land shall remain unchanged.

(ii) Compensatory Afforestation will be raised and maintained over degraded forest land twice in extent to the surface forest land, proposed to be diverted, i.e., over 273.00 ha, at the cost of user agency.

(iii) Felling of trees shall be done only when necessary and that too with the prior permission of and in consultation with the State Forest Department.

(iv) The entire reservoir area shall be declared as a Reserved Forest under Indian Forest Act, 1927 with regulated fishing rights.

(v) The State Government shall deposit NPV and all other funds with Compensatory Afforestation Fund Management and Planning Authority (CAMPA), which has already been constituted and notified by the Central Government on 23.04.2004. Till such time the CAMPA intimates the Head of Account for deposition of funds, the funds shall be maintained in the form of fixed deposits in the name of Nodal Officer or concerned Divisional Forest Officer of the State Government. The funds realized towards the NPV shall not be utilized by the State Government.

(vi) Demarcation of the area shall be done on the ground at the project cost by fixing 4 feet high RCC pillars showing forward and backward bearings.

(vii) Green belt of adequate width shall be raised around the reservoir at the cost of the project authorities.

(viii) Reclamation of quarry sites shall be carried out by the project authorities in consultation with the State Forest Department. The concerned local Divisional Forest Officer shall monitor the progress of reclamation works. Reclamation of quarry sites shall be completed as soon as the quarrying operations are over, and, before the project is closed

(ix) The dumping area for muck disposal shall be stabilized and reclaimed and plantation of suitable species shall be carried out over dumping areas at the cost of the user agency under the supervision of State Forest Department. Retaining walls and terracing shall be carried out to hold the dumping material in place. Stabilization and reclamation of such dumping sites shall be completed as soon as the excavation work is over, and well before the project is closed.

(x) The user agency shall ensure that muck does not roll down the slopes. All such areas where muck has rolled down the slopes shall be rehabilitated at the cost of user agency and under the supervision of State Forest Department.

(xi) The user agency will take all measures to contain the subsidence over 31.1414 ha of forest land required for underground works. In the event of subsidence beyond permissible limits, the user agency will be responsible for the damage and provide equivalent non-forest land alongwith funds for Compensatory Afforestation for the same to the State Forest Department within 6 months of its occurrence.

(xii) Project affected and displaced persons shall not be rehabilitated on forest land.

(xiii) The Catchment Area Treatment (CAT) Plan shall be implemented at the project cost.

(xiv) All the areas required for temporary use shall be handed over back to the Forest Department after proper rehabilitation at the project cost and under the supervision of State Forest Department.

(xv) All efforts should be made for protection of the environment at the cost of user agency.

(xvi) No labour camps shall be setup in the forest area nor any habitation should be allowed to come up in the forest area.

(xvii) All efforts should be made by the user agency to avoid any damage to the wildlife found in the area.

(xviii) Steps may be taken to minimize biotic pressure over adjoining/nearby forests.

(xix) The forest land shall not be used for any purpose other than the specified in the proposal.

(xx) The forest land thus diverted shall be non-transferable. Whenever the forest land is not required, it shall be surrendered to the State Forest Department under intimation to this Ministry.

The State Government shall ensure compliance of all the above conditions.

Yours faithfully,

(Pankaj Asthana)
Assistant Inspector General of Forests

Copy to :-

1. The PCCF, Government of Himachal Pradesh, Shimla.
2. The Nodal Officer, O/o PCCF, Shimla.
3. The Conservator of Forests (Central), Regional Office, Chandigarh.
4. The User Agency.
5. Guard File.
6. Monitoring Cell of FC Section

(Pankaj Asthana)
Assistant Inspector General of Forests

ITEMWISE BREAKUP OF THE FOREST LAND REQUIRED FOR THE PROJECT/SCHEME FOR DIFFERENT PURPOSES IN KINNAUR FOREST DIVISION

JOINT INSPECTION CERTIFICATE

We the undersigned have jointly inspected the following forest land required for the implementation of Karchham-Wangtoo Hydroelectric Project (1000 MW). The diversion of the said forest land for non-forest use is inescapable as there is no alternative suitable goverment/ private land for this purpose.

S.NO.	Name of Item	LOCATION OF LAND		FOREST LAND AREA REQUIRED (HA)		REMARKS
		TEHSIL	MOHAL/ UP MOHAL	KHASRA NO.	FOREST LAND	
1	DAM / SUBMERGENCE AREA	Sangla	Shanandain	628/24	0.1477	
				625/14	0.0081	
				22	0.0045	
				23	0.0110	
				26/1	0.5407	
				13	1.2092	
				1/1	0.2596	
				3/1	0.0112	
				5	0.0105	
				10	0.3775	
				11	0.2779	
				12	0.0117	
				28/1	0.2819	
				632/41/2	0.0955	
			Total		3.2470	
			Dharwadhang	4/1	0.0626	
				6	0.8322	
				8	1.5298	
				11	1.0292	
				14	0.0133	
				15	0.0054	
				53	0.0116	
				54	0.0200	
				18/2	0.1344	
				18/3	1.0524	
				24/1	0.1586	
				24/2	0.0782	
				28	4.9741	
				55/1	0.0636	
				55/2	0.0869	
				62/1	0.2274	
				3	0.0081	
				9	0.0150	
				7	0.8048	
				10	1.3290	
				31/1	0.0006	
			Total		12.4372	
			Kanaee	605/578/1	2.0625	
				607/580/1	0.4745	
				586	1.2997	
				589	0.3875	
				591	0.0220	
				594	0.1156	
				595	0.2254	
				596	0.3709	
				605/578/2	0.0551	
				605/578/3	0.1965	
			Total		5.2097	
		Kalpa	Dhakal	347/1/2	0.2250	
				10	0.7758	
				14/1	3.6515	
				23	0.0230	
				29/1	1.4129	
				31/1	0.0973	
				34/2	0.5949	
			Total		6.7804	
			Grand Total		27.6743	

S.NO.	Name of Item	LOCATION OF LAND		FOREST LAND AREA REQUIRED (HA)		REMARKS
		TEHSIL	MOHAL/ UP MOHAL	KHASRA NO.	FOREST LAND	
				B/F	27.6743	
1	DAM / SUBME-RGENCE AREA	Kalpa	Rall	12/1	4.0632	A-13
				1/1	0.2217	
				329/9/2	0.1436	
				17/1	0.0326	
				23/1	0.0374	
				24	12.3338	
			Total		16.8323	
2	Job Facility	Sangla	Jaryo	443/127/2	1.8898	
				129/2	0.1386	A-8
			Total		2.0284	
			Kuppa	442	0.7131	
				595/3	0.6599	A-6
			Total		1.3730	
3	ROAD	Kalpa	Dhakal	347/1/1	1.1269	A-12
				350/2/1	0.8111	
				350/2/2	0.006	
				350/2/3	0.0341	
				8/1	0.3549	
			Total		2.3330	
		Sangla	Kanaee	605/578/4	0.5009	A-10
		Sangla	Shanandain	1/2	0.4601	
				1/3	0.1107	A-9
				632/41/1	0.3307	
			Total		0.9015	
		Sangla	Dharwadhang	55/4	0.0428	
				31/2	0.0158	
				55/5	0.3062	
				55/3	0.0543	A7
				18/4	0.7318	
				24/3	0.4188	
			Total		1.5695	
4	DUMPING AREA	Sangla	Kanaee	807/580/2	0.9405	
				2/1	0.1988	A-10
			Total		1.1393	
		Sangla	Kilba Khas	1380/1343/4	0.2995	
				1380/1343/2	1.2762	A-10
			Total		1.5757	
		Sangla	Dharwadhang	62/3	0.3188	
				62/4	0.3316	A7
			Total		0.6504	

S.NO.	Name of Item	LOCATION OF LAND		FOREST LAND AREA REQUIRED (HA)		REMARKS
		TEHSIL	MOHAL/ UP MOHAL	KHASRA NO.	FOREST LAND	
				B/F	56.5783	
4	DUMPING AREA	Kalpa	Rali	305/1	0.3240	
		Kalpa	Yusaring	3/1	1.0388	
				6/1/1	1.1997	
				4/1	0.2688	
			Total		2.5073	
GRAND TOTAL					59.4096	

Sub Divisional Officer (c)
Kalpa at Reckongpeo
Distt. Kinnaur
Himachal Pradesh

(Ajit Thakur)
Divisional Forest Officer
Kinnaur Forest Division
at Nichar Distt. Kinnaur
Himachal Pradesh

(G.S. Rathore)
Authorised Signatory
M/s Jaiprakash Industries Limited
Karchham Wangtoo H.E. Project
P.O. Tapri Distt. Kinnaur

ITEMWISE BREAKUP OF THE FOREST LAND REQUIRED FOR THE PROJECT/SCHEME FOR DIFFERENT PURPOSES IN KINNAUR FOREST DIVISION

JOINT INSPECTION CERTIFICATE

X

X

W/e the undersigned have jointly inspected the following forest land required for the implementation of Karchham-Wangtoo Hydroelectric Project (1000 MW). The diversion of the said forest land for non-forest use is inescapable as there is no alternative suitable goverment/ private land for this purpose.

S.NO.	Name of Item	LOCATION OF LAND		FOREST LAND		REMARKS
		TEHSIL	MOHAL/ UP MOHAL	KHASRA NO.	FOREST LAND	
1	QUARRY SITE	Moorang	Khokpa	1/1	2.3647	
				1/4	1.2547	
				Total	3.6194	
			Jangi	1028/1	2.6688	
				1028/3	2.1600	
				1026/3	1.3514	
				1030	2.4596	
			Total		8.6398	
2	JOB FACILITY	Moorang	Jangi	1026/1	0.8065	
				Grand Total	13.0657	→ Shamsher

Tehsildar Moorang

Tehsildar Moorang
Distt. Kinnaur
Himachal Pradesh

(R.L. Negi)
Athorised Signatory
M/s Jaiprakash Industries Limited
Karchham Wangtoo H.E. Project
P.O. Tapri Distt. Kinnaur
Himachal Pradesh

Addl. District Magistrate
Pooh, District Kinnaur
(HP)

Divisional Forest Officer
Kinnaur Forest Division
at Nichar Distt. Kinnaur
Himachal Pradesh

ITEMWISE BREAKUP OF THE FOREST LAND REQUIRED FOR THE PROJECT/SCHEME FOR DIFFERENT PURPOSES IN WILD LIFE DIVISION SARAHAN

JOINT INSPECTION CERTIFICATE

We the undersigned have jointly inspected the following forest land required for the implementation of Karchham-Wangtoo Hydroelectric Project (1000 MW). The diversion of the said forest land for non-forest use is inescapable as there is no alternative suitable goverment / private land for this purpose.

S.NO.	Name of Item	LOCATION OF LAND		FOREST LAND AREA REQUIRED (HA)		REMARKS
		TEHSIL	MOHAL/ UP MOHAL	KHASRA NO.	FOREST LAND	
1	ROAD	Nichar	Dharyasang	10/1	4.5150	A-B
			Rarang	17/1	1.5336	
				17/2	1.0352	
				12	0.0064	
				13	0.0110	
				14	0.0120	A-B
				15	0.0064	
			Total		2.6046	
2	ADIT & JOB FACILITY	Nichar	Dharyasang	10/2	1.0000	
				10/3	0.5300	
				23/1	0.1350	
			Total		1.6650	B-B
			Rarang	20/1	2.0616	
				20/2	0.0660	
				21	1.8720	
				23	0.0112	A-3
				24	0.0192	
			Total		4.0300	
3	DUMPING AREA	Nichar	Rarang	4/1	3.7200	
				4/2	0.9664	A-3
			Total		4.6864	
Grand Total					17.5010	

Sub-Divisional Officer (C),
Nichar Distt. Kinnaur (H.P.)
Sub Divisional Officer (c)
Nichar at Bhabanagar
Distt. Kinnaur
Himachal Pradesh

(R.L. Negi)
Authorised Signatory
M/s Jaiprakash Industries Limited
Karchamm Wangtoo H.E. Project
P.O. Tapri Distt. Kinnaur
Himachal Pradesh

Divisional Forest Officer
Wild Life Forest Division
Sarahan Distt. Shimla
Himachal Pradesh

Tehsildar
Nichar Tehsil
Nichar At Bhabanagar
Distt. Kinnaur
(HP)

ITEMWISE BREAKUP OF THE FOREST LAND REQUIRED FOR THE PROJECT/SCHEME FOR DIFFERENT PURPOSES IN KINNAUR FOREST DIVISION

JOINT INSPECTION CERTIFICATE

We the undersigned have jointly inspected the following forest land required for the implementation of Karchham-Wangtoo Hydroelectric Project (1000 MW). The diversion of the said forest land for non-forest use is inescapable as there is no alternative suitable goverment/ private land for this purpose.

S.NO.	Name of Item	LOCATION OF LAND		FOREST LAND AREA REQUIRED (HA)		REMARKS
		TEHSIL	MOHAL/ UP MOHAL	KHASRA NO.	FOREST LAND	
1	DAM / SUBME-RGENCE AREA	Nichar	Runang	345	0.8406	
				339/2	1.1071	
				343/1	0.8040	A-5
			Total		2.7517	
2	ROAD	Nichar	Runang	339/3	0.9497	
				343/3	1.2436	A-5
			Total		2.1933	
		Nichar	Choling	213/1	0.2495	A-2
3.	ADITS & JOB FACILITY	Nichar	Runang (Nichla)	336/3	0.7912	
				339/1	0.4560	
				332/2	0.0303	
				336/1	0.5046	A-5
				332/1	0.4354	
			Total		2.2176	
			Choling	241/1	0.2760	
				214/1	0.0600	
			Total		0.3360	B-2
			Kutano	568/1	0.3451	B-9
			Tapri	954/1	0.4240	B-12
			Dharyasing	10/6	1.4975	
				10/5	0.3300	
				10/7	0.0700	
				23/3	0.0450	
				11/1	1.3200	B-8
			Total		3.6625	
			Burcha	340/2	0.0280	B-7
			Punang	154	0.0128	
				884/155	0.0247	
				885/155	0.0133	
				156	0.0133	
				159	0.0238	
				181	0.0106	
				249	0.0401	

S.NO.	Name of Item	LOCATION OF LAND		FOREST LAND AREA REQUIRED (HA)		REMARKS
		TEHSIL	MOHAL/ UP MOHAL	KHASRA NO.	FOREST LAND	
3	ADITS & JOB FACILITY	Nichar	Punang	261	0.4475	
				66	0.2407	
				193	0.0350	
				154/1	0.0128	
				120	0.0105	
				158	0.1520	
				58/1	0.2522	
				206	0.1692	
				153	0.0197	
				162	0 0240	
				196	0.0272	
				251	0.0290	
				252	0.0183	
				255	0.0084	
				254	0.0788	
				173/3	0.1045	
				164	0.0150	
				165	0.0185	
				182	0.0405	
				169	0.0055	
				180	0.0016	
				256	0.0480	
				897/820/1	0.3186	A-1 → 0.0660 + 0.2526 = 0.3186
				884/873/ 816/2	0.1034	
			Total		2.3928	
4	DUMPING AREA	Nichar	Runang	335/2	0.2788	A-5
			Choling	235	0.1700	
				236	0.2526	
			Revision by Collector	212/2	0.2223	B-2
			TOTAL		0.6449	
			Kutano	594	0.1518	
				595/1	1.7817	B-9
				Total	1.9335	
			Tapri	956/1	0.6076	
				954/2	0 4651	
				961/1	0.6784	
				769/1	0.0900	
				1064/1	0.3175	
				572	0.7190	
				570	0.3191	B-12
			Total		3.1967	
			Dharyasang	29/14/5	1.1700	
				29/14/4	1.6200	
				29/14/3	0.8100	
				29/14/2	0.4400	
				10/4	0.8037	B-8
				10/8	1.1925	
				29/14/1	0.5400	
				21/3	0.2225	
			Correction of entry	12	0.5400	
				15	0 1000	
				16	0.1000	
				17	0.1000	
				18	0.1534	
			Total		6.9671	

S.NO.	Name of Item	LOCATION OF LAND		FOREST LAND AREA REQUIRED (HA)		REMARKS
		TEHSIL	MOHAL/ UP MOHAL	KHASRA NO.	FOREST LAND	
4	Dumping Area	Nichar	Panvi	452/1	0.1724	
				489/1	0.5504	
				1352/515/1	0.0724	
				496/1	0.0735	
				479	0.0952	
				514/1	0.3336	
				472	0.0750	
				468/1	1.0234	
				511	0.4505	
				454/1	1.4380	
				456/1	0.3005	
				457	0.7708	
				514/1	0.6434	
				491	0.0056	
				486	0.0300	
				510	0.0736	
				509	0.0081	
				484	0.0317	
				502	0.1433	
				498	0.0040	
				497	0.0150	
				499	0.0604	
				500	0.0575	
				506	0.0029	
				503	0.0078	
				505	0.0290	
				504	0.0129	
				483	0.0045	
				482	0.0192	
				480	0.0078	
				481	0.0080	
			Total		6.5209	
			Panvi	474	0.0387	
				470	0.0091	
				471	0.1066	
				467	0.0078	
				466	0.0156	
				464	0.1835	
				463	0.0048	
				462	0.0450	
				461	0.0967	
				459	0.0133	
				458	0.0162	
				450	0.0094	
				451	0.0565	
			Total		0.5552	
		Nichar	Jhungtaring	148/1	0.6128	
				155	0.0415	
			Total		0.6543	
		Nichar	Burcha	403/323/1	0.3415	
			Total		0.3415	
		Nichar	Parlingkhor	2/1/1	2.2934	
			Grand Total		37.9758	

S.NO	Name of Item	LOCATION OF LAND		FOREST LAND AREA REQUIRED (HA)		REMARKS
		TEHSIL	MOHAL/ UP MOHAL	KHASRA NO.	FOREST LAND	
				B/F	37.9766	
	Dumping Area	Nichar	Dhar Yasang	23/2	1.5300	
				25/1	0.7300	B-8
			Total		2.2600	
6	Quarry Site		Pallvi	453/1	0.3390	B-13
			Choling	212/1	5.7314	B-2
	Total				16.3070	

Nichar at Bhabanagar
Distt. Kinnaur
Himachal Pradesh

(R. L. Negi)
Authorised Signatory
M/s Jaiprakash Industries Limited
Karchham Wangtoo H.E. Project
P.O. Tapri Distt. Kinnaur

Sub-Divisional Officer (C)
Nichar Distt. Kinnaur (H.P.)

Divisional Forest Officer
Kinnaur Forest Division
at Nichar Distt. Kinnaur
Himachal Pradesh

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS
NORTH EASTERN REGIONAL OFFICE
Law-U-Sib, Lumbatngen
Near MTC Workshop, Shillong 793 021
टेली/Tel: (0364) – 253-7609/7340/7395/7278
GRAM: PARYAVARAN, SHILLONG
ईमेल/Email – mofner-meg@nic.in & moefner@dataone.in

भारत सरकार
पर्यावरण एवं वन मंत्रालय
पूर्वोत्तर क्षेत्रीय कार्यालय
लाउसीब, लुम्बट्गेन
एम.टी.सी वर्कसप के पास, शिल्लांग 793021
फैक्स/Fax: (0364) – 2536041
तार : पर्यावरण, शिलांग

No. 3-AN C 107/2011-SHI/1793-94

7th September, 2012

To,

The Principal Chief Conservator of Forests-
-Cum Principal Secretary
Deptt. of Forests, Environment & Wildlife
Govt. of Arunachal Pradesh
Itanagar.

Sub : Proposal for diversion of 39.26 Ha forest land for construction of Gongri HEP (144 MW) in West Kameng District of Arunachal Pradesh by M/s Dirang Energy Pvt. Ltd.

Sir,

This has got reference to the State Government's letter No. FOR. 260/CONS/2009/379-82 dt. 30.09.2011 on the subject mentioned above, seeking prior approval of the Central Government in accordance with Section 2 of the FCA, 1980. After careful consideration of the proposal by the State Advisory Group Committee, In-principle approval was granted vide this office letter of even number dated 11.06.2012 subject to fulfillment of certain conditions. The State Government has furnished compliance report in respect of the conditions stipulated in the In-principle approval and has requested the Central Govermment to grant final aproval.

In this connection and on the basis of the compliance report furnished by the State Government vide letter No. FOR. 260/Cons/2009/2300-03 dt. 03.08.2012 & 04.09.2012, final approval of the Central Government is hereby granted under Section-2 of the Forest (Conservation) Act, 1980 for diversion 39.26 Ha forest land for construction of Gongri HEP (144 MW) in West Kameng District of Arunachal Pradesh by M/s Dirang Energy Pvt. Ltd, subject to the following conditions:

(1) The legal status of the forest land shall remain unchanged.
(2) Compensatory afforestation (CA) shall be carried out over 65 ha. of degraded Community Forest land at Rurang Village under Nafra Range in a single patch as per the fund deposited by the User Agency & scheme furnished by the State Govt.
(3) As per guidelines of MoEF (No. 8-84/2002-FC dt. 03.02.2004) the degraded Community Forest Land which has already been mutated in favour of State Forest Department shall be declared RF / PF under Section 4 or Section 29 of the Indian Forest Act, 1972. The Nodal Officer shall report compliance within a period of 6 months along with a copy of the original notification declaring such degraded Community Land as RF / PF.
(4) Additional amount of the Net present Value (NPV) of the diverted forest land any becoming due after finalization/revision of the same by the Hon'ble Supreme Court of India shall be charged by the State Govt from the User Agency.
(5) The user agency shall carry out muck disposal at pre-designated sites in a manner so as to avoid its rolling down into valley / river / water channels etc.

(6) The dumping area for muck shall be stabilized and plantation of suitable species shall be carried out over stabilized dumps on the cost of the user agency under the supervision of State Forest Department. Retaining walls and terracing shall also be carried out to hold the dumping material in place. Stabilization and reclamation of such dumping sites shall be completed before handing over the same to the State Forest Department as per schedule & plans.

(7) Catchment Area Treatment Plan shall be implemented at the project cost under the supervision of State Government.

(8) Planting of native species shall be undertaken on vacant land along the banks of reservoir.

(9) No tree felling in the area between FRL and and FRL-4 m. levels shall be carried out.

(10) User Agency shall provide fuelwood, preferably alternate fuel to the labourers and the staff working at the site so as to avoid any damage and pressure on adjacent forest areas.

(11) No labour camp shall be set up or any habitation shall be allowed to come up either over diverted or non-diverted forest land in the vicinity.

(12) There shall be no damage done to the surrounding forests, environment, wildlife, natural resources and other properties; the same shall be compensated along with the reclamation measures in case a damage is found.

(13) All the components of the Environment Management Plan (EMP) shall be implemented by the User Agency in co-ordination with the different agencies of the State Government.

(14) The forest land shall not be used for any purpose other than that specified in the proposal.

(15) Any other conditions as may be found appropriate in future for the betterment of environment & wildlife, may be imposed by APCCF (C), North Eastern Regional Office.

Yours faithfully,

(B. N. JHA)
Addl. Principal Chief Conservator of Forests (C)

Copy to :

1. The Addl. Principal Chief Conservator of Forests & Nodal Officer (FCA), O/o PCCF, Department of Env. & Forests, Itanagar.

7-9-12

Addl. Principal Chief Conservator of Forests (C)

Annexure - 23

ANNEXURE 2
(SITE VISIT REPORT)

सत्यमेव जयते

Government of India
Ministry of Environment, Forest and Climate Change
IA Division
(River Valley and Hydroelectric Projects)
***

Minutes of 22ND MEETING OF THE EXPERT APPRAISAL COMMITTEE meeting River Valley and Hydroelectric Projects held from 10/01/2025 to 10/01/2025 Date: 22/01/2025

MoM ID: EC/MOM/EAC/580839/1/2025

Agenda ID: EC/AGENDA/EAC/580839/1/2025

Meeting Venue: INDIRA PARYAVARAN BHAWAN, NEW DELHI

Meeting Mode: Physical

Date & Time:

10/01/2025	10:30 AM	05:30 PM

1. Opening remarks

The 22nd meeting of the EAC for River Valley & Hydro-electric Projects organized by the Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi, was held on Physical Mode, under the Chairmanship of Prof. G. J. Chakrapani.

2. Confirmation of the minutes of previous meeting

The Minutes of the Meeting held on 21st EAC meeting on 31st December, 2024 were confirmed.

3. Details of proposals considered by the committee

Day 1 -10/01/2025

3.1. Agenda Item No 1:

3.1.1. Details of the proposal

Proposed Expansion of Tembhu Lift Irrigation Project Taluka Karad, District Satara, Maharashtra by Department of Irrigation located at **SATARA,MAHARASHTRA**			
Proposal For		Fresh EC	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/MH/RIV/482689/2024	J-12011/48/2023-IA.I (R)	06/01/2025	River Valley/Irrigation projects (1(c))

The Member Secretary, EAC informed that the Terms of Reference (TOR) was granted by the MoEF&CC, vide letter no. J-12011/08/2022-IA.I(R), 27.06.2022 and accordingly, Public hearing were conducted on 10.01.2024 for Nashik District and on 13.02.2024 for Thane District (Maharashtra). Final EIA report was submitted to MoEF&CC on18.06.2024 and an EDS was generated on 03.07.2024, in which clarification w.r.t. change in project area from ToR was asked. Reply of the same has been submitted on 23.07.2024 with proper justification for change in the project area. Thereafter, proposal was considered by Expert Appraisal Committee (EAC) in the 14" meeting conducted on dated 30 08 2024. In meeting, it was recommended that the Sub-committee of EAC shall conduct a site visit prior to reconsideration for EC.

The Sub-committee comprising of Ajay Kumar Lal, Member EAC (Hydro & River Valley project) and Dr P. R. Sakhare, Scientist E Representative from MoEF&CC undertook site visit to the proposed Bhavali Pumped Storage Project" on 02.01.2025 and 03.01.2025. The sub-committee visited the upper dam, upper reservoir, lower dam, lower reservoir, muck disposal areas of Bhavali PSP.

The Sub-committee after detailed deliberation observations and recommendations are as follows:

i. The selected location is topologically stable and non prone to landslides as such. It is not therefore so fragile or sensitive The proposed project is not likely to cause considerable negative impacts on the geological conditions; rights and interests of people related to water resources of downstream locations if the conditions and safeguards imposed vide the TOR granted are complied with fully and comprehensibly. Further, the Project Proponent is also to ensure strict compliance of the assurances given during public hearing.

ii. The relocation of muck disposal site may not be insisted on while considering the proposal for clearance since the muck disposal site was found to have been selected properly. Further, ecologically better sites were not appeared available in nearby areas. Any relocation at this stage might lead to much changes and may lead to more adverse consequences. However, safety measures as contained in EMP and in other documents should be adhered to in toto.

iii. Water for operation of project will be sourced from self-yield from catchment area. There will be no dependency on the nearby streams and already established dams/reservoirs as confirmed and assured by the proponent. As stated above, since there are not much agricultural or drinking requirements in or nearby areas, the dam intervention should not be a matter of concern. Nevertheless, project proponent, as assured, will ensure maintenance of e-flow and minimum threshold water availability all year around.

Annexure I

Site visit Report on Proposed Bhavali Pumped Storage Project" (1500MW) at Village Jamunde, Tehsil Igatpuri, District Nashik and villages Kalbhonde and Kothale, Tehsil Shahpur Thane (Maharashtra)

In compliance to the MoEF&CC office order no. J-12011/08/2022-IA I(R) (E-185170) dated 30.12.2024 the Sub-committee comprising of Ajay Kumar Lal, Member EAC (Hydro & River Valley projects) and Dr. P. R. Sakhare, Scientist E Representative from MoEF&CC undertook site visit to the proposed Bhavali Pumped Storage Project" on 02.01.2025 and 03.01.2025. The sub-committee visited the upper dam, upper reservoir, lower dam, lower reservoir, muck disposal areas of Bhavali PSP. The attendees of the site visit included project proponent authorised representatives, their consultants, local staff and a few locals.

Background

The proposed Bhavali Pumped Storage Project (5X250MW+2X125MW) is a self-identified green field project by the JSW Energy PSP Two Ltd, a subsidiary of JSW Energy Limited. The need for Bhavali PSP in Nashik and Thane district, Maharashtra, has been considered in context of the focus of State Government to stabilize the grid by installation of Pumped Storage project which leads to increase the share of renewable energy which is available in plenty within the state in general and in the country as whole. The project is an off-stream project, where water will be recycled between the proposed upper and lower reservoir in one daily cycle of peaking (7.78 hour) and one daily pumping cycle (8.79 hour). The total land requirement for the project has been assessed as 278.92 ha of which private land is 35.18 ha and forest land is 243.74 ha. Forest land diversion case has been submitted vide FP/MH/HYD/153240/2022, dated 06.03.2022 on Parivesh Portal.

In this background, Terms of Reference (TOR) was granted by the MoEF&CC, vide letter no. J-12011/08/2022-IA I(R), 27.06.2022 and accordingly, Public hearing was conducted on 10.01.2024 for Nashik District and on 13.02.2024 for Thane District (Maharashtra). Final EIA report was submitted to MoEF&CC on 18.06.2024 and an EDS was generated on 02.07.2024, in which clarification w.r.t. change in project area from ToR was asked. Reply of the same has been submitted on 23.07.2024 with proper justification for change in the project area. Thereafter, proposal was considered by Expert Appraisal Committee (EAC) in the 14th meeting conducted on dated 30.08.2024. In meeting, it was recommended that the Sub-committee of EAC shall conduct a site visit prior to reconsideration for EC. The sub-committee undertook site visit on 2nd and 3rd January, 2025 to assess ground conditions and likely environmental impacts due to project intervention.

Specific Observations and Recommendations

1. The selected location is topologically stable and non prone to landslides as such it is not therefore so fragile or sensitive The proposed project is not likely to cause considerable negative impacts on the geological conditions, rights and interests of people related to water resources of downstream locations if the conditions and safeguards imposed vide the TOR granted are complied with fully and comprehensibly Further, the Project Proponent is also to ensure strict compliance of the assurances given during public hearing.

2. The relocation of muck disposal site may not be insisted on while considering the proposal for clearance since the muck disposal site was found to have been selected properly Further, ecologically better sites were not appeared available in nearby areas. Any relocation at this stage might lead to such changes and may lead to more adverse consequences. However, safety measures as contained in EMP and in other documents should be adhered to in toto.

3. Water for operation of project will be sourced from self yield from catchment area. There will be no dependency on the nearby streams and already established dams/reservoirs as confirmed and assured by the proponent. As stated above, since there are not much agricultural or drinking requirements in or nearby areas, the dam interception should not be a matter of concern. Nevertheless, project proponent as assured will ensure maintenance of e-flow and minimum threshold water availability all year round.

4. Nalla passing through the lower reservoir is a non-perennial and was containing very thin layer of water at the time of visit. However, as per the discussion held with the PP, natural flow of nallas/streams will not be restricted/diverted. Provision of ungated slipways has been considered to maintain natural flow of non-perennial nallah/streams.

5. Out of total forest area of 343.74 ha, 160.21 ha is reserved forest, 73.85 ha is deemed forest and 9.68 ha is protected forest. The forest density in the proposed forest land involved in the project site is approx. 150 trees/ha. A total of around 35000 trees and saplings are likely to be sacrificed. Therefore, it is important to initiate submitting the case under FCA and receive stage-I clearance at the earliest by the Project Proponent.

6. PP has started the CER/CSR activities in the affected villages which includes the construction of public toilets, classrooms in the Govt. School, Mid-day Meal kitchens, and distribution of study materials, Shoes etc. to the students, blankets to the villagers.

Lower Reservoir (5th Jan 2024):

09.01.25 (A K Lal)

Signature of member

09/01/2025

Signature of MoEFCC Representative

Approval of the Chairman

Re: [WARNING: ATTACHMENT(S) MAY CONTAIN MALWARE]Fwd: Draft MOM of the 22nd EAC meeting held on 10.1.2025-reg.

CG Chakrapani GovindaJoseph <govind.chakrapani@es.iitr.ac.in>
Wed, 22 Jan 2025 10:20:19 AM +0530

To "Yogendra Pal Singh" <yogendra78@nic.in>

Cc "chakrapani govind" <chakrapani.govind@gmail.com>

Approved.
Chakrapani

From: "Yogendra Pal Singh" <yogendra78@nic.in>
To: "Chakrapani GovindaJoseph" <govind.chakrapani@es.iitr.ac.in>; "chakrapani govind" <chakrapani.govind@gmail.com>
Sent: Wednesday, January 22, 2025 10:07:13 AM
Subject: [WARNING: ATTACHMENT(S) MAY CONTAIN MALWARE]Fwd: Draft MOM of the 22nd EAC meeting held on 10.1.2025-reg.

Dear Sir,

The draft MOM of the 22nd EAC meeting was circulated to all members of the EAC. No comments received so far. Accordingly, the draft MOM of 22nd EAC meeting held on 10.01.2025 is attached herewith for approval please.

With Regards,

Yogendra Pal Singh
Scientist 'F'
Government of India
M/o Environment, Forest and Climate Change
Room No. 236, 2nd Floor, Vayu Wing
Indira Paryavaran Bhawan
Jor Bagh, New Delhi-110003
Tele-fax: 011-20819354

Annexure-2.4

Justification of Muck Dumping in the Forest Areas

Executive Summary

Bhavali Pumped Storage Project (PSP) involves large-scale surface and underground excavations associated with construction of dams, water conductor system, tunnels, powerhouse caverns, intake structures and ancillary infrastructure. These excavation activities generate substantial quantities of muck, the management and disposal of which constitute a critical environmental consideration, particularly in forested and hilly terrain.

This annexure has been prepared as a part of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) documentation to evaluate the environmental implications of muck disposal alternatives, with specific emphasis on **Carbon dioxide (CO_2) emissions arising from transportation of excavated material**. The assessment examines two alternative muck disposal options, namely **Site–1 (dumping site located near the project area)** and **Site–2 (dumping site located outside the project area)**.

The analysis is based on detailed excavation planning, haulage logistics, equipment deployment and fuel consumption calculations derived from approved project documents and supporting calculations. Results indicate that disposal of muck at a distant location (Site–2) would result in **very high diesel consumption and CO_2 emissions**, whereas disposal at Site–1, being in close proximity to excavation fronts, would significantly reduce vehicular movement, fuel usage and associated emissions.

The assessment establishes that CO_2 emissions associated with Site–2 are approximately **14 times higher** than those for Site–1. From an environmental sustainability and impact minimization perspective, near-site muck disposal is therefore clearly preferable. Retention of muck disposal sites near the project area minimizes carbon footprint, confines impacts spatially, and is consistent with the principles of sustainable construction and mitigation hierarchy adopted in EIA practice.

1. Introduction

Bhavali Pumped Storage Project (PSP) is a major hydroelectric infrastructure project involving construction of upper and lower reservoirs, dams, intake structures, underground waterways, powerhouse and transformer caverns, surge arrangements, access tunnels and project roads. Execution of these components requires extensive rock excavation, resulting in generation of large volumes of muck.

Muck management is a key component of environmental planning for hydropower and pumped storage projects, particularly in ecologically sensitive and forested regions. Improper location of muck disposal sites or excessive transportation distances can lead to increased air pollution, greenhouse gas emissions, traffic congestion, noise, slope instability and secondary environmental impacts.

Transportation of excavated material using diesel-powered dumpers is one of the principal contributors to construction-phase CO_2 emissions. Accordingly, this annexure has been prepared to assess the implications of alternative muck disposal locations on carbon emissions and to support environmentally sound decision-making under the Environmental Clearance (EC) and Forest Clearance (FC) appraisal process.

2. Objective of the report

The objectives of this assessment are to:

- Support environmentally sound selection of muck disposal sites;
- Provide technical justification for retaining muck disposal sites near the project area.

3. Muck Generation and Management

3.1 Quantity of Muck Generated

Based on detailed excavation estimates incorporated in the approved project documents, the total quantity of muck generated from all components is approximately **64.06 lakh cubic meter.** Out of which, about **36.08 lakh cubic meter** is proposed to be reused within the project works for construction activities such as embankment filling, road formation & structural backfilling. The balance **28.43 lakh cubic meter**, corresponding to approximately **40.37 lakh cubic metres** considering 42% swell, is required to be disposed of at identified dumping sites.

The component-wise breakup of muck generation and disposal quantities is provided in **in table below:**

S.N.	Project Component	Quantity of rock excavation (Cum)	Quantity of overburden (Cum)	Total Quantity (Cum)	Quantity of Muck to be used (Cum)	Quantity of Disposable Muck with 42% swell (Cum)	Dumping site
1	Upper Dam	2,733,413	83,669	2,817,082	1,539,427	1,814,269	D-1
2	Lower Dam	129,974	14,442	144,416	73,200	101,127	D-1
3	Upper Intake & Approach Channel	225,740	0.00	225,740	127,134	140,020	D-1
4	Lower Intake & Tail Race Channel	2,413,526	0.00	2,413,526	1,359,271	1,497,043	D-2, D-1
5	HRT	19,532	0.00	19,532	11,000	12,115	D-1
6	PH & Transformer Cavern	368,552	0.00	368,552	207,564	228,602	D-1
7	Pressure Shaft	171,192	0.00	171,192	96,413	106,186	D-1
8	MAT	101,907	0.00	101,907	57,393	63,210	D-1
9	CAT	12,634	0.00	12,634	7,115	7,837	D-1
10	ADITS	16,544	0.00	16,544	9,317	10,262	D-1
11	TRT	167,236	0.00	167,236	94,185	103,732	D-2
12	Valve Chamber	24,643	0.00	24,643	13,879	15,285	D-1
13	Roads	20,785	24,434	45,219	11,706	47,589	D-1
Total		**6,405,678**	**45,219**	**6,450,897**	**3,607,606**	**4,037,474**	

3.3 Muck Management Plan

The muck management strategy for the project has been developed based on the following principles:

- Maximization of reuse of excavated material within the project area;
- Selection of muck disposal sites in close proximity to excavation fronts to minimize haulage distance;
- Reduction of fuel consumption, vehicular movement and associated emissions;
- Adoption of engineered stabilization measures and biological reclamation for long-term slope stability and ecological restoration;
- Minimization of secondary environmental impacts such as dust, noise and traffic.

3.4 Muck Disposal Sites

Two permanent muck disposal sites have been proposed, comprising **Muck Disposal Site–1 (18.335 ha)** and **Muck Disposal Site–2 (22.575 ha)** have been identified keeping in view the land availability, lead consideration, the quantity of the muck, landscape, cost effectiveness, nearness to source of generation absence of ground and surface water, relief and scope for afforestation works.

3.4.1 Muck Disposal Site (D-1)

The muck disposal site: D-1 is located on right of powerhouse and WCS. It shall be approachable through proposed haul road from Lower dam. The said muck dumping site lies in forest land and is about 1003 m long with storage capacity of 28.684 lakh cum of muck against which 28.00 lakh cum shall be dumped from the proposed project.

3.4.2 Muck Disposal (D-2)

The muck disposal site: D-2 is located on left of powerhouse and WCS. It shall be approachable through proposed haul road from lower dam. The said muck site lies in forest land and is about 1003 m long with storage capacity of 12.885 lakh cum of muck against which 12.37 lakh cum shall be dumped from the proposed project.

4. Justification of Dumping Site in Forest Area

4.1 Site–1: Dumping Site in Forest Area (Near Project)

Site–1 is located in close proximity to the main excavation areas, as detailed in section 3.4 of this study, including tunnel portals, dam sites and underground works. The site has been selected to enable direct and short-haul transportation of muck, resulting in lower cycle time, reduced number of dumpers, and minimal diesel consumption. The location of Site–1 allows efficient muck disposal while confining construction-related impacts to a limited area.

Additionally, The Expert Appraisal Committee (River Valley & Hydroelectric Projects) of MoEF&CC, New Delhi visited the Project site on 2nd & 3rd Jan., 2025. The findings of the site visit were discussed amongst the Hon'ble EAC members at Additional Agenda Item 22.4 in the 22nd EAC Meeting held on 10th Jan., 2025. The recommendations of the EAC Sub-Committee is given below:

"the relocation of muck disposal site may not be insisted on while considering the proposal for clearance since the muck disposal site was found to have been selected properly. Further, ecologically better sites were not appeared available in nearby areas. Any relocation at this stage might lead to much changes and may lead to more adverse consequences. However, safety measures as contained in EMP and in other documents should be adhered into".

4.2 Site–2: Dumping Site in Non-Forest Area (Outside Project Area)

The lower reservoir is located in the forest area, and the nearest available non-forest land for dumping is at approximately 22 km. This location, Site–2, is located at a considerable distance from the project components and would require long-distance transportation of muck using a large fleet of dumpers over extended haul roads. Disposal at this site would involve substantially longer travel time, higher fuel consumption, increased vehicular movement and associated emissions over a wider geographical area.

5. Impact on Forest for Dumping Site-2

5.1 Hazardous Fuel Emissions from Dumper Movement

Diesel-powered dumpers used for muck transportation emits hazardous air pollutants including **carbon monoxide (CO), nitrogen oxides (NO_x), sulphur dioxide (SO_2), particulate matter (PM_{10} and $PM_{2.5}$)** and hydrocarbons. The magnitude of these emissions is directly proportional to **diesel consumption and engine operating hours**, both of which increase significantly with haulage distance.

Standard emission factors for heavy diesel vehicles used in construction projects (as per CPCB / USEPA-AP42 and commonly adopted EIA practice) indicate:

- **NO_x emissions**: ~30–40 g per litre of diesel
- **PM emissions**: ~1.0–1.5 g per litre of diesel

Based on project-specific fuel consumption estimates, as per **Appendix-1**:

- **Site–1 (Near Project)**
    - Diesel consumption: ~3,39,534 liters
    - NO_x emissions: ~10.2–13.6 tonnes
    - PM emissions: ~0.34–0.51 tonnes
- **Site–2 (Outside Project Area)**
    - Diesel consumption: ~ 47,44,352 liters
    - NO_x emissions: ~142–190 tonnes
    - PM emissions: ~4.7–7.1 tonnes

This quantitative assessment clearly demonstrates that **long-distance muck transportation to Site–2 results in several orders of magnitude higher NO_x and PM emissions**, despite the dumping site being located outside forest land.

5.2 Assessment of CO_2 Emissions

The assessment considers only the transportation stage of muck disposal, as the excavation, loading and unloading operations remain identical for both scenarios. Fuel consumption data has been derived from detailed construction planning calculations, including dumper capacity, cycle time, number of trips, duration of excavation activities and haulage distance.

CO_2 emissions have been estimated using an emission factor of **2.63 kg CO_2 per litre of diesel**, as per IPCC (2006) Guidelines and standard EIA practice. The detailed CO_2 emissions calculation is appended as Appendix-1 of this report.

Parameters	Site-1	Site-2
Fuel Used (litres)	3,39,534	47,44,352
Total CO_2 (kg)	8,92,973	1,24,77,646
Total CO_2 (tons)	~893	~12478

The results indicate that CO_2 emissions associated with Site-2 are approximately **14 times higher** than those for Site-1. This substantial difference arises solely due to the **longer haulage distance and increased travel time** required for Site-2.

5.3 Impact of Dust Emissions on Vegetation and Forest Cover

Transportation of muck using diesel-powered dumpers is a major source of **fugitive dust emissions**, particularly along haul roads, dumping areas and unloading points. When muck is transported over long distances, repeated movement of heavy vehicles leads to continuous resuspension of fine particulate matter (PM_{10} and $PM_{2.5}$), which can adversely affect surrounding vegetation and forest ecosystems.

Deposition of dust on leaf surfaces reduces **photosynthetic efficiency** by obstructing stomatal openings, thereby impairing gaseous exchange and transpiration processes. Prolonged dust deposition can lead to chlorosis, premature leaf senescence and reduced plant vigor. In forested areas, dust accumulation on foliage also interferes with natural physiological processes and may reduce growth rates of sensitive species. The adverse impact on forest cover is as follows:

- **20-40% reduction in photosynthetic efficiency** due to blockage of stomatal openings,
- **25-50% reduction in leaf chlorophyll content**,
- **20-45% reduction in annual biomass increment**, particularly in understory vegetation and saplings.

Quantitative impact on Flora Diversity, particularly in **broadleaf and moist-deciduous species** common to Western Maharashtra forest type is as detailed hereunder:

Parameter	Impact Range
Seedling survival (roadside zone)	↓ 40-60%
Understorey plant density	↓ 45-65%
Regeneration success (tree saplings)	↓ 30-50%

Near-site muck disposal (Site–1) significantly restricts the length of haul roads and confines dust-generating activities to a limited area. In contrast, transportation to distant dumping locations (Site–2) would result in dust dispersion over a much larger spatial extent, affecting a wider stretch of forest land and vegetative cover along haulage routes. The increased area of influence would proportionately raise the risk of degradation of roadside vegetation and forest understory.

5.4 Impact on Fauna and Wildlife

Increased vehicular movement over extended haul routes can significantly disturb wildlife through **noise, vibration, light disturbance and physical barriers**. Forest fauna are particularly sensitive to repetitive disturbances caused by heavy vehicles, which may disrupt natural movement patterns, feeding behavior and breeding activities.

Continuous vehicle activity associated with emissions of this magnitude typically results in the following:

Indicator	Quantitative Change
Effective habitat usability	↓ 30-45%
Wildlife corridor functionality	↓ 35-55%
Nocturnal activity window	↓ 3–6 hours/night

The following changes on ecosystem will have compound stress on native flora and disrupt trophic stability

Parameter	Quantitative Change
Local temperature rise (corridor zones)	+0.5 to +0.9 °C

Parameter	Quantitative Change
Soil moisture reduction	12–25%
Litter decomposition rate	↑ 25–35%
Invasive species establishment	↑ 35–50% likelihood

Transportation of muck to distant sites would require a larger fleet of dumpers operating continuously over long stretches, increasing the likelihood of wildlife disturbance and road mortality. Such disturbances can fragment habitats and create avoidance behavior among sensitive species.

Near-site muck disposal confines vehicular movement to areas already influenced by construction activity, thereby reducing incremental disturbance to wildlife habitats beyond the immediate project footprint.

5.5 Impact of Noise Emissions

Noise generated from dumpers, excavators and auxiliary construction equipment constitutes a significant environmental concern. Prolonged exposure to elevated noise levels can adversely affect both fauna and nearby human settlements.

Long-distance hauling to Site–2 would extend noise impacts over a larger geographical area and for longer durations, potentially affecting forest fauna that rely on acoustic signals for communication and predator avoidance. Chronic noise exposure can lead to stress responses in wildlife, including altered behavior and displacement from preferred habitats.

Limiting muck transportation to near-project areas (Site–1) restricts noise generation spatially and temporally, thereby reducing its ecological footprint.

5.6 Impact on Air Quality

Air quality impacts during construction are primarily associated with emissions of particulate matter (PM), NOx, CO, and hydrocarbons from diesel vehicles. Increased fuel consumption directly correlates with higher emission loads.

The substantially higher diesel usage associated with Site–2 would result in elevated pollutant concentrations along haul roads, adversely affecting ambient air quality over a wider area. This could have secondary impacts on vegetation, wildlife and nearby habitations.

Near-site disposal reduces the total vehicle-kilometres travelled, thereby significantly lowering overall air pollutant emissions and helping maintain air quality within permissible limits.

5.7 Cumulative Environmental Impact

Cumulative environmental impacts arise from the combined effects of dust, gaseous emissions, noise and habitat disturbance over time. While individual impacts may appear manageable, their cumulative effect can be substantial when spread over large areas and prolonged durations.

Relocating muck disposal to distant non-forest locations would expand the spatial and temporal footprint of construction-related impacts, leading to higher cumulative stress on forest ecosystems, wildlife and ambient air quality. Conversely, near-site muck disposal localizes impacts, facilitates effective mitigation and aligns with the principle of minimization of secondary impacts under the EIA framework.

Overall, the assessment demonstrates that near-project muck disposal represents the environmentally preferable option by substantially reducing cumulative impacts on flora, fauna, vegetative cover, air quality and acoustic environment.

6. Mitigation Plan

The proposed measures for Muck Management is discussed in Annexure A of this study report. The same has been duly approved by the MoEFCC, New Delhi in its 32nd EAC meeting held on 29.05.2024.

7. Conclusion

The assessment clearly establishes that disposal of muck at a site located near the project area (Site–1) results in **minimal fuel consumption and CO_2 emissions**, whereas disposal at a distant location (Site–2) would lead to **very high emissions**, approximately **14 times greater**.

From an environmental, operational and sustainability perspective, near-site muck disposal is preferable and consistent with the principles of EIA and EMP. Shifting muck disposal to distant non-forest areas would significantly increase carbon emissions, vehicular movement and overall environmental impact. Accordingly, retention of muck disposal sites near the project area is justified on technical and environmental grounds.

8. References

1. IPCC (2006). *Guidelines for National Greenhouse Gas Inventories*.
2. MoEF&CC. *EIA Guidance Manual for River Valley and Hydroelectric Projects*.
3. CPCB. *Emission Factors for Diesel Consumption*.
4. Approved EIA/EMP report-Bhavali Pumped Storage Project

Appendices

- **Appendix-1:** CO_2 Emission Calculations for Site-1 and Site-2 (Fuel Consumption Sheets)

Muck Management Plan for Bhavali PSP

General

The excavation shall result in large quantity of excavated material i.e. muck which shall have to be evacuated, disposed at designated sites and roller compacted or laid on mild slopes pari-passu with the excavation work. In the present case, the total quantity of muck / debris, to be generated (Table 10.27) due to the project, shall be 6450897 cum, out of which 3607606 cum shall be consumed on the project leaving 2843291cum, which with 42% swell factor shall amount to 4037474 cum, to be disposed-off away from sites to make available the clear site for construction activities. The muck, which is suitable for use as, rockfill material, coarse aggregate, backfill and for construction/widening of the road shall be properly stacked.

Component Wise Details of the Muck Generation and Management.

S.N.	Project Component	Quantity of rock excavation (Cum)	Quantity of overburden (Cum)	Total Quantity (cum)	Quantity of Muck to be used(cum)	Quantity of Disposable Muck with 42% swell (cum)	Dumping site.
1	Upper Dam	2733413	83669	2817082	1539427	1814269	D-1
2	Lower Dam	129974	14442	144416	73200	101127	D-1
3	Upper Intake & Approach Channel	225740	0.00	225740	127134	140020	D-1
4	Lower Intake & Tail Race Channel	2413526	0.00	2413526	1359271	1497043	D-2,D-1
5	HRT	19532	0.00	19532	11000	12115	D-1
6	PH & Transformer Cavern	368552	0.00	368552	207564	228602	D-1
7	Pressure Shaft	171192	0.00	171192	96413	106186	D-1
8	MAT	101907	0.00	101907	57393	63210	D-1
9	CAT	12634	0.00	12634	7115	7837	D-1
10	ADITS	16544	0.00	16544	9317	10262	D-1
11	TRT	167236	0.00	167236	94185	103732	D-2
12	Valve Chamber	24643	0.00	24643	13879	15285	D-1
13	Roads	20785	24434	45219	11706	47589	D-1
	Total	**6405678**	**45219**	**6450897**	**3607606**	**4037474**	

Muck Disposal Sites

Two permanent muck disposal sites with total land requirement of 44.09 ha to be in forest land have been identified keeping in view the land availability, lead consideration, the quantity of the muck, landscape, cost effectiveness, nearness to source of generation absence of ground and surface water, relief and scope for afforestation works. The location of muck disposal sites is displayed in Figure 10.29 and details in Table10.28.

Muck Disposal Site Details

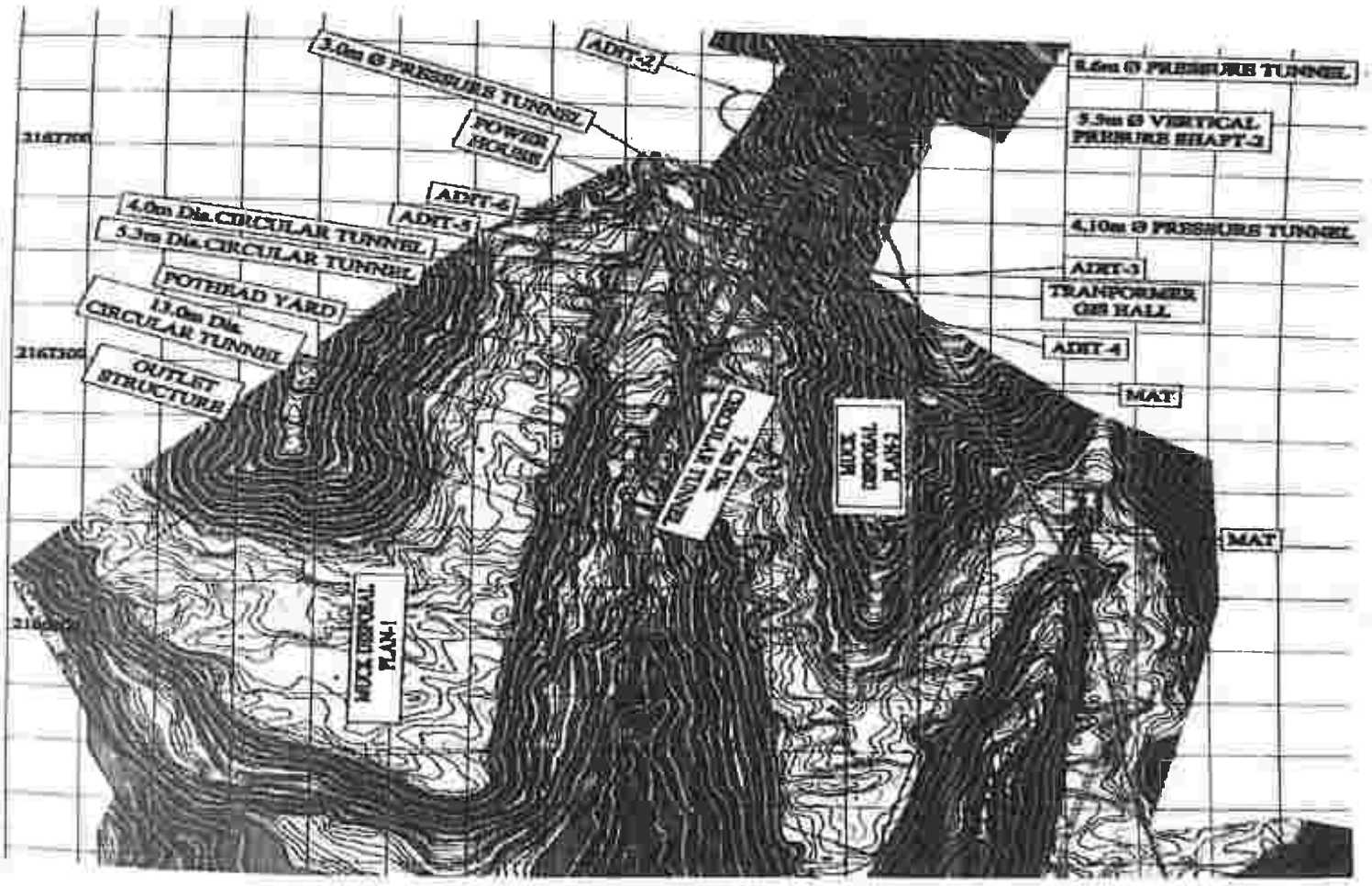
S.N.	Dumping Site	Area (ha)				Capacity (lakh cum)	Quantity to be dumped (lakh cum)
		Private	Govt.	Forest	Total		
1	D-1	-	-	22.3	22.3	28.684	28.00
2	D-2	-	-	22.6	22.6	12.885	12.37
Total		-	-	**44.9**	**44.9**	**41.569**	**40.37**

Muck Disposal Site-1

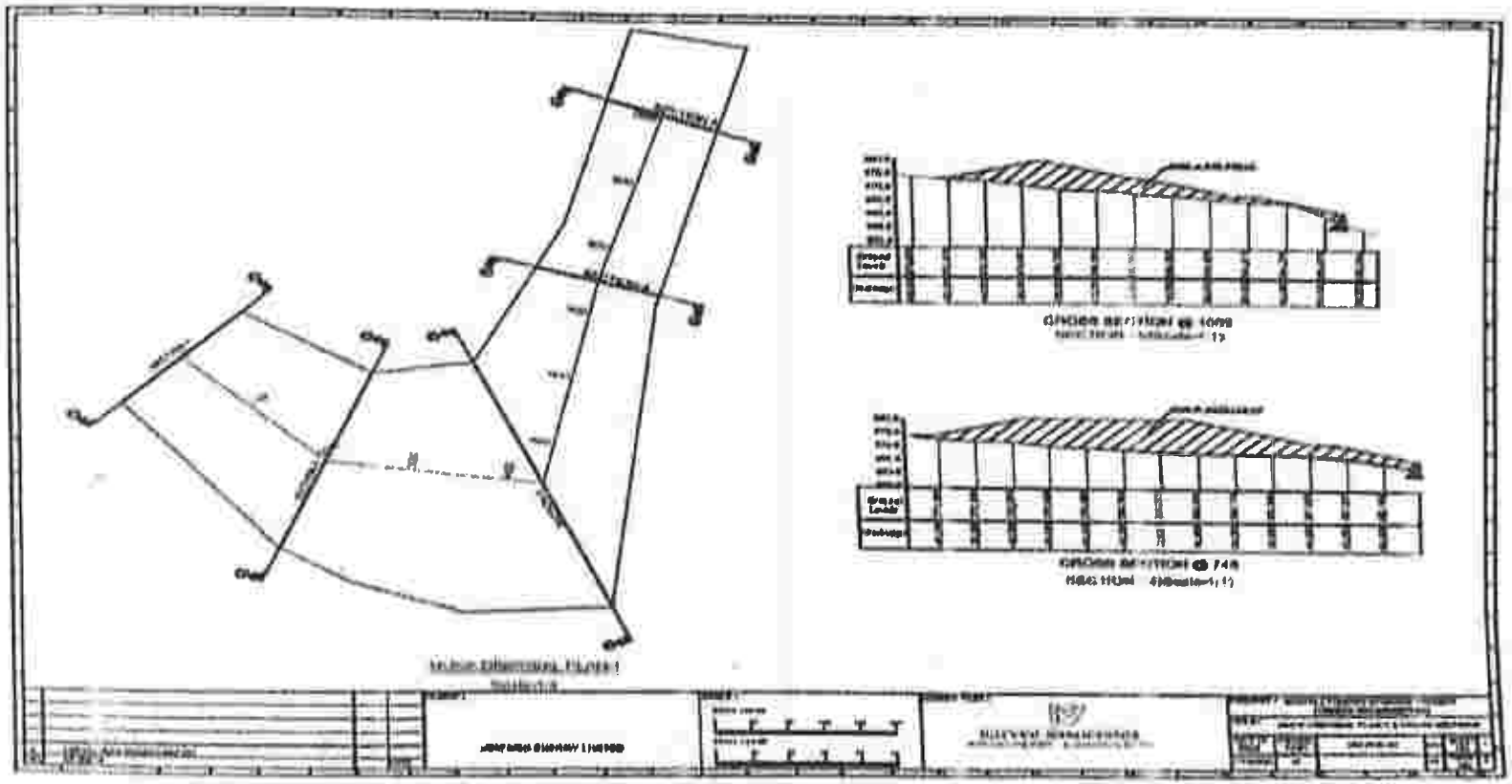
The muck disposal sites D-1 is located on right of powerhouse and WCS. It shall be approachable through proposed haul road from Upper dam. The muck site lies in forest land. The muck site is about 1003 m long and has capacity to store 28.684 lakh cum of muck against which 28.00 lakh cum shall be dumped. The plan and plot of typical x-section with supporting structure at the toe is shown in the given figures.

Muck Disposal Site-2

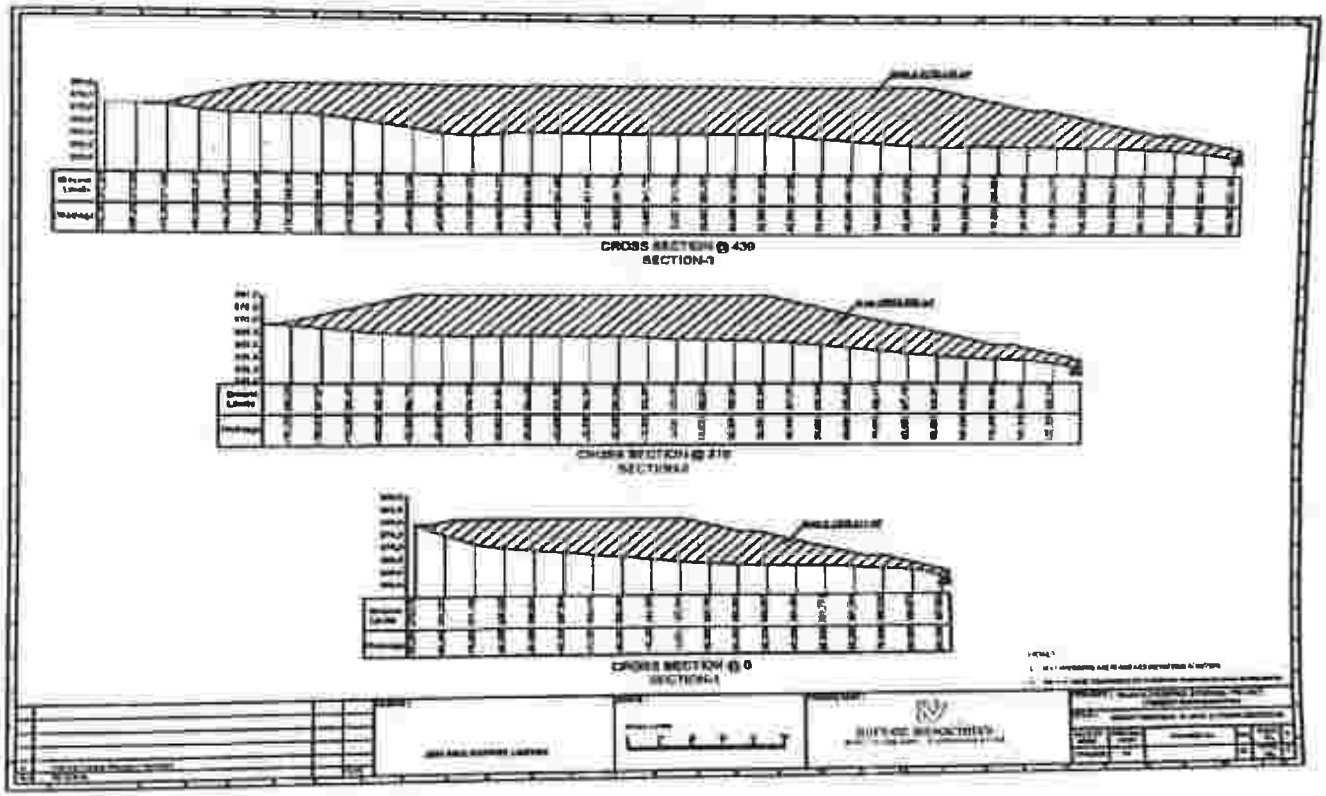
The muck disposal sites D-2 is located on left of powerhouse and WCS. It shall be approachable through proposed haul road from lower dam. The muck site lies in forest land. The muck site is about 1003 m long and has capacity to store 12.885 lakh cum of muck against which 12.37 lakh cum shall be dumped. The plan and plot of typical x-section with supporting structure at the toe is shown in the given figures.



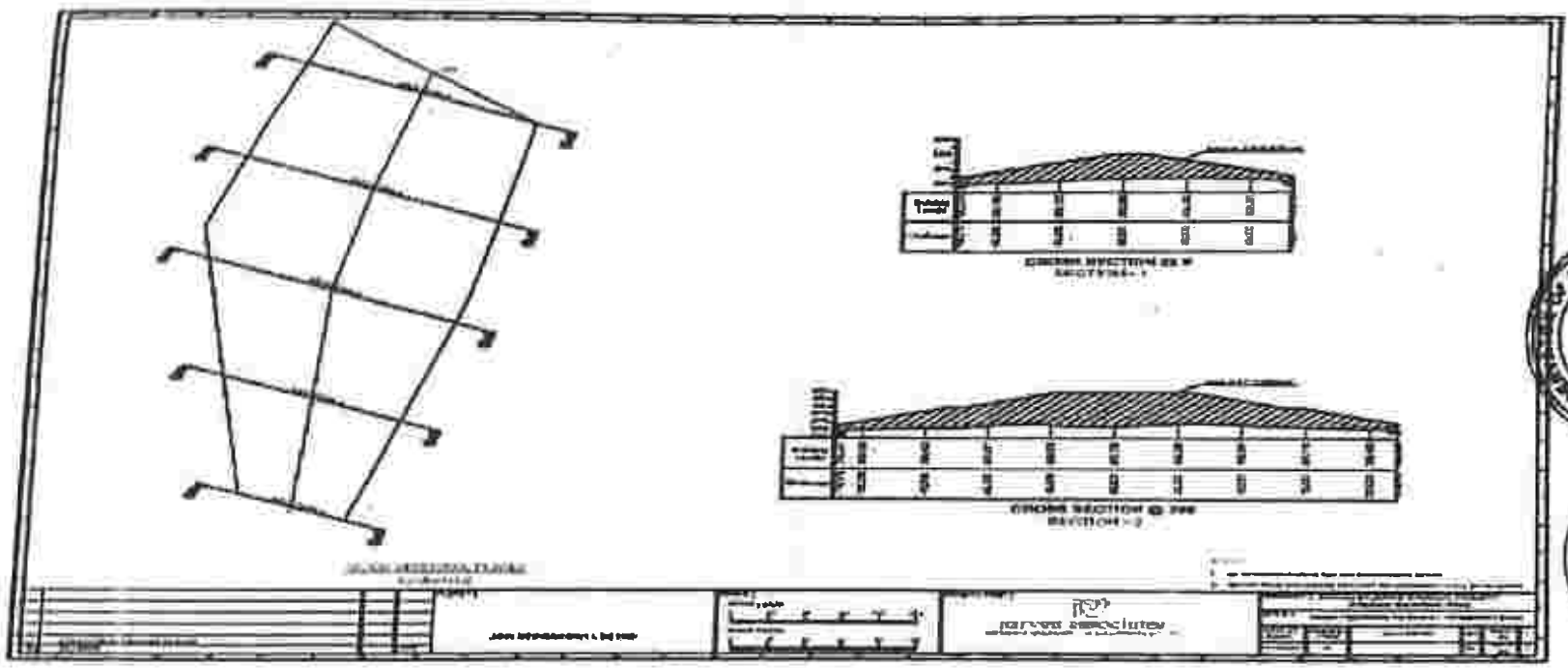
Location of Muck Disposal Site



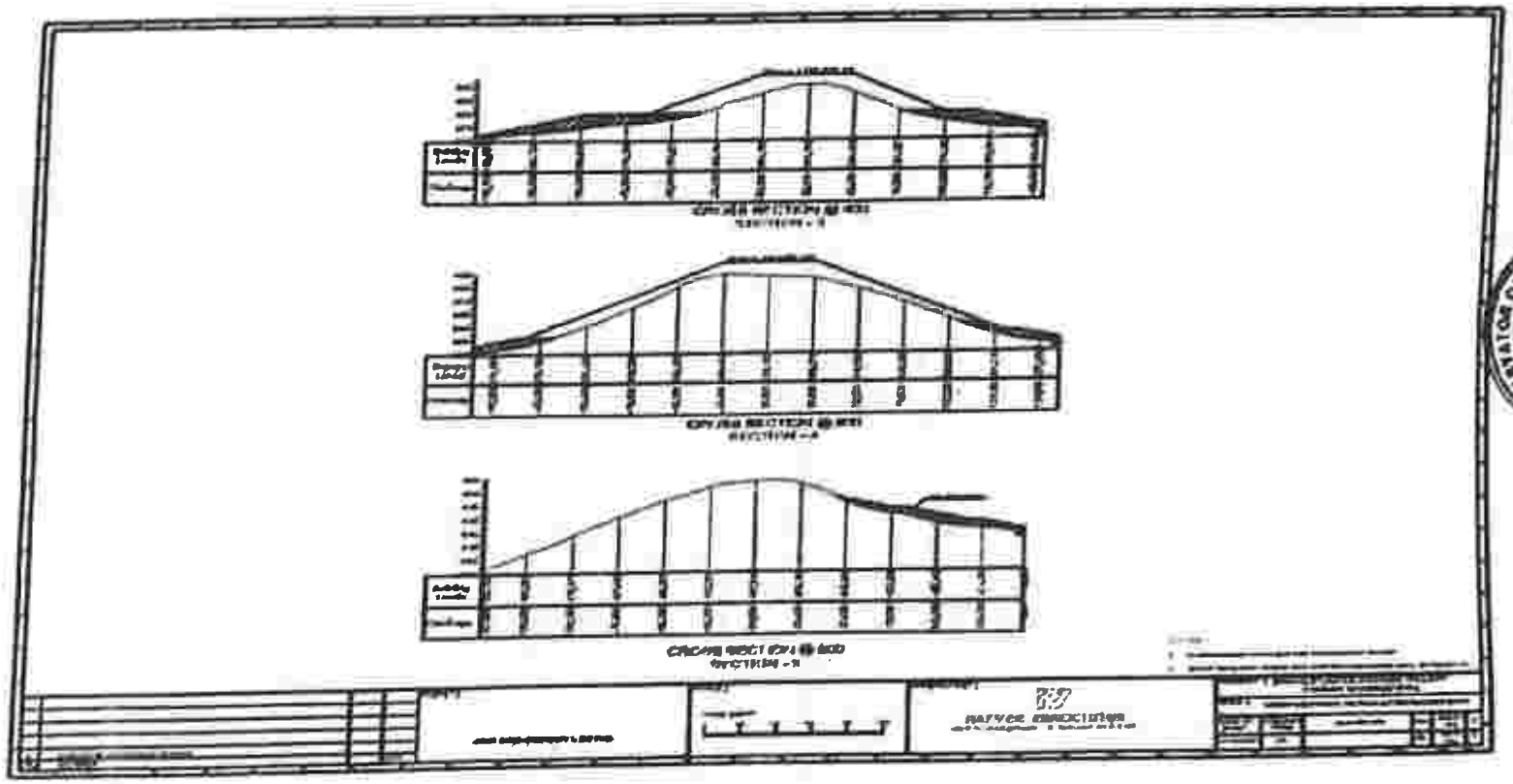
Typical Cross-section of Muck Disposal Site D-1



Typical Cross-section of Muck Disposal Site D-1



Typical Cross-section of Muck Disposal Site D-2



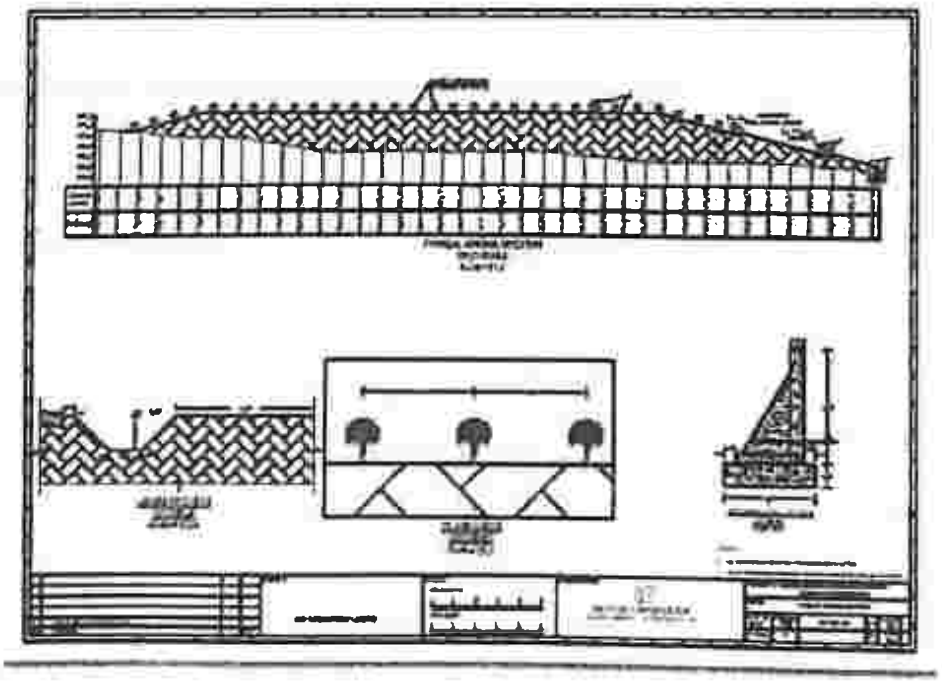
Typical Cross-section of Muck Disposal Site D-2

Implementation of Engineering & Biological Measures

As already explained engineering measures like providing of GI wire crates and retaining walls and compaction of muck will provide stability to the profile of muck piles.

Engineering Measures

It has been observed that after excavation the disposal of muck creates problem as it is susceptible to scattering unless the muck disposal yards are supported with engineering measures such as retaining structures, crate walls and gabions. All the dumping sites need proper handling to avoid spilling of muck either on the adjoining and or into the river water while dumping and in the post dumping stages. The muck disposal sites shall be developed from below the ground level by providing RCC Retaining wall 6m high. All muck disposal sites are away from waterbody. After construction of retaining wall, the muck brought in dumpers shall be dumped and manually spread behind the wall. The muck shall be laid with vertical angle not exceeding 280 in such a manner that rock mass is properly stacked behind the wall with minimum of voids. The muck pile shall be later covered with geo-Geo-coir textile properly held to the ground by steel wire U-nails and rehabilitated by afforestation of herbs and shrubs. Geo-coir textile should also be provided on surface of muck piles where top surface is to be vegetated.



Typical Section of Retaining Wall and Plantation on Muck Pile

Biological Measures

Biological measures, however, require special efforts as the muck disposed in disposal yards will in general be devoid of nutrients and soil contents to support vegetation. The selection of soil for spreading over such an area would require nutrient profiling of soil for different base elements. Suitable admixture of nutrients would be done before placing the soil on the top surface of muck disposal areas to have administered growth of forest canopy.

Plantation Technique

In view of the peculiar site conditions particularly the soil conditions, the planting technique for all the categories of the plants must be very site specific and suited to the stress conditions as anticipated and discussed above. The planting substrates would need to be considerably improved to support the plants in their initial stages of establishment. The moisture retention capability, availability of nutrients and soil aeration, permeability and porosity would require intervention and assistance.

Multistoried and multipurpose plantations are proposed to be raised on the muck dumping sites as also in roadside strips using grasses, shrubs and bushes in the under story and trees in the upper story. Nursery raised grass slips, seedlings of shrubs & bushes and tree species would be planted in the area combined with grass sowing in patches. In addition, cuttings of bushes and shrubs can also be planted to supplement the nursery raised stock, but this would substitute requirement of raising the nursery of these species. Intimate mixture of species would be avoided right at the planning stage and would be strictly followed during planting. Each patch should contain maximum of two species. Grasses would be mixed by groups in rows, shrubs and bushes by group again in rows.

Grass slip planting and grass seed sowing would be done in strips at 0.10 m x 0.10 m spacing in the prepared staggered patches of 1 m x 0.5 m with a depth of 0.30 m. Soil mixture would be used while filling the patches. Balance dug up soil/muck will be stacked along the patch on the downhill side for rainwater tapping and enhanced percolation in the patch. Number of such patches in each hectare is proposed at 500.

Shrubs and bushes would be planted in elongated strips of 1.5 m x 0.5 m with a depth of 0.45m. Soil mixture would be used while filling the patches. Balance dug up soil/muck will be stacked along the patch on the downhill side for water tapping and better percolation in the patch. These would be staggered throughout the area numbering 500 per hectare. Each patch would have two rows of planting with staggered spacing between plants in a row as 15 cm and distance between rows as 15 cm.

Planting of trees would be done in contour staggered pits of 0.60 m x 0.60 m x 0.60 m size numbering 800 per hectare. Out of these 800 plants, about 200 plants per hectare are meant for planting along the periphery of the area. If the periphery gets filled up with lesser numbers, the remainder would be planted in the core/main area. Soil mixture would be used while filling the pits. Balance dug up soil/muck will be stacked on downhill side of the pit for trapping the rainwater and allowing it to percolate in the pit.

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It is proposed to use soil mixture in the pits & patches consisting of soil imported from nearby areas mixed with compost or humus or vermin-compost or all of these. The ratio for the mix would be 5 parts: Compost/manure 2 parts: Sand 2 parts and humus or vermin-compost 1 part. This will make nutrients available for the plants in the preliminary stages and help increase soil aeration, porosity & permeability and improved moisture available for the plants.

The stabilization sites from the time of execution of biological measures would be protected with barbed wire fencing on 2m high RCC posts and provided with inspection paths. Since the muck dumping sites are being provided with either RCC walls or the wire crate (gabion) wall on the valley side (towards river) which is not negotiable by animals and human beings, fencing would not be required along the entire perimeter. Hence, it would be done on the vulnerable sections i.e., towards the hillside only.

The proposed costs include nursery costs for initial planting and for mortality replacement.

The biological measures shall be taken up towards the end of construction. The plantations would be maintained for a period of 5 years by irrigating the plantation during dry seasons, mortality replacement and repair of fencing & inspection paths within the area. The task of irrigation would be performed by the watch & ward (chowkidar) provided in the cost estimate.

Species for Plantation

Afforestation with suitable plant species of high ecological and economic value and adaptable to local conditions will be undertaken at the rate of 800 plants per hectare in accordance with canopy cover requirement. The major plant species which can be used in the area shall belong to indigenous species.

Cost Model for Plantation

The cost model for plantation on muck dumping sites is given in table:

Cost Model for Plantation on Muck Dumping Sites (For 1 hectare)

S. No.	Particular	Qty.	Unit	Rate (Rs.)	Amount (Rs.)
A.	PALANTATION:				
(1)	GRASS SLIP PLANTING AND GRASS SEED SOWING:				
1	Preparation of soil mixture (soil, sand, humus & compost) including digging, purchase, carriage to the site of work and mixing at site.	75.00	Cum.	850.00	63750
2	Digging of staggered patches 1 m x 0.50 m x 0.30 m @ 500 patches/ha.	75.00	Cum.	50.00	3750
3	Filling of staggered patches with imported soil mixture.	75.00	Cum.	15.00	1125

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4	Extraction of grass slips from nursery beds @ 30 slips per patch.	25000	Per Slip	0.12	3000
5	Carriage of grass slips from nursery to work site.	25000	Per Slip	0.25	6250
6	Planting of the extracted grass slips in above patches @ 30 slips per patch.	25000	Per Slip	0.18	4500
7	Cost of grass slips (in nursery).	25000	Per Slip	0.5	12500
8	Purchase of grass seeds @ 5 gm. Per patch.	2.5	Kg	115.00	288
9	Sowing of grass seeds in furrows in each patch.	500	Patch	2.50	1250
TOTAL					83813
(II)	SHRUBS AND BUSHES PLANTATION:				
1	Preparation of soil mixture (soil, sand, humus & compost) including digging, purchase, carriage to the site of work and mixing at site.	168.75	Cum.	850.00	143438
2	Digging of elongated patches 1.5 x 0.50 m x 0.45 m @ 500 patches/ha.	168.75	Cum.	50.00	8438
3	Filling of elongated patches with imported soil mixture.	168.75	Cum.	15.00	2531
4	Extraction of shrubs & bushes from nursery beds @ 50 per patch.	25000	Per plant	0.15	3750
5	Carriage of shrubs & bushes from nursery to work site.	25000	Per plant	0.15	3750
6	Planting of the extracted shrubs & bushes un above patches @ 50 per patch.	25000	Per plant	0.20	5000
7	Cost of shrubs & bushes (in nursery).	25000	Per plant	1.00	25000
	TOATL				191906
(III)	FOUR LINE STRIP PLANTATION (TREE SPECIES):				
1	Preparation of soil mixture (soil, sand, humus & compost) including digging, purchase, carriage to the site of work and mixing at site.	18.225	Cum.	850.00	15491
2	Digging of pits (45cm x 45cm x 45cm) in periphery of area.	200	No.	4.45	890
3	Filling of pits (45cm x 45cm x 45 cm) with imported soil mixture.	200	No.	1.27	254
4	Extracted of plants from nursery beds.	200	No.	0.25	50
5	Carriage of plants from nursery to the work site over average distance of 10 km uphill carriage.	200	Nos. per Km.	0.17	340

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DEPUTY CONSERVATOR OF FORESTS * SHAHAPUR *

6	Planting of extracted plants in above pits including ramming.	200	No.	0.86	172
7	Mulching of plants with grass.	200	No.	0.28	56
8	Cost of plants (in nursery).	200	No.	1.00	200
TOTAL					17453
(IV)	PLANTATION OF TREE SPECIES IN BLANK AREA:				
1	Preparation of soil mixture (soil, sand, humus & compost) including digging, purchase, carriage to the site of work and mixing at site	54.675	Cum.	850.00	46474
2	Digging of pits (45cm x 45cm x 45cm) for B/L plantation.	600	No.	4.45	2670
3	Filling of pits (45cm x 45cm x 45cm) for B/L plantation with imported soil mixture.	600	No.	1.27	762
4	Extraction of plants from nursery beds.	600	No.	0.25	150
5	Carriage of plants from nursery to the work site over an average distance of 10 Km uphill carriage.	600	No. per Km.	0.17	1020
6	Planting of B/L plants in pits including ramming.	600	No.	0.86	516
7	Mulching of B/L plants with grass.	600	No.	0.28	168
8	Cost of plants (in nursery).	600	No.	4.00	2400
TOTAL					54160
(V)	MAINTENANCE:				
1	1st year maintenance.	1	Ha.	4000	4000
2	2nd year maintenance.	1	Ha.	3600	3600
3	3rd year maintenance.	1	Ha.	3200	3200
4	4th year maintenance.	1	Ha.	2800	2800
5	5th year maintenance.	1	Ha.	2000	2000
TOTAL					14600
TOTAL (I) through (V)					372032
Say					3.72,000

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DEPUTY CONSERVATOR OF FORESTS SHAHAPUR

Cost Estimate for Muck Management Plan

The cost estimate for muck management plan indicating engineering, biological, bio-technological measures and maintenance is provided in the given Table.

Summary of Cost Estimate for Muck Management Plan

A. Engineering Measures					
1	RCC retaining wall 6m high with 30cm thick counterfort at 3m c/c for dump yard 1 and 2 in about 1003m and 1400m respectively.				
(a)	Concrete M20, A20				
	Stem: 0.6x3.6x2043=4413 cum	4413	cum	9221	406.92
	Stem: ½ (0.3+0.6) x5.4x2043=4965 cum				
	Counterfort: ½ (5.4x1.8) x0.3=991 cum	5956	cum	18084	1077.08
(b)	Steel Reinforcement =10369x .08=830MT	830	MT	79178	657.18
Sub-total (A)					2141.18
B. Biological Measures					
1.	Plantation of muck disposal sites	21.04	ha	372000	78.27
2.	Barbed wire fencing on 2m high RCC posts	21.04	ha	100000	21.04
3.	Providing and laying Geo-coir textile	10.8	ha	1000000	108.00
4.	Cost of portable pump with accessories	4	No.	300000	20.00
5.	Cost of sprinkler system of irrigation	21.04	ha	50000	10.52
6.	Watch& ward 2 Chowkidars. for 3 years	72	month	15000	10.80
Subtotal (B)					248.63
Grand Total (A) + (B)					2389.81
Say Rs.					**23.9 Cr**

JSW Energy PSP Two Limited

Dy. Conservator of Forests
Shahapur Forest Division,
Shahapur.

Annexure-3.1 A.5.)

Central Electricity Authority

Guidelines for Formulation of Detailed Project Reports for Pumped Storage Schemes

New Delhi
July, 2024
(Version 3.0)

This process of preparation of Detailed Project Report (DPR) shall be completed by the Developer indicatively in a period of:

(i) 690 days from the date of allotment/ signing of MoA/MoU of the project, extendable by 180 days for reasons beyond the control of Developer for following PSPs:
   a) PSPs located in non-Himalayan region comprising of surface power house.
   b) PSPs located in non-Himalayan region comprising of underground power house in an area with good geology.

(ii) 840 days from the date of allotment/ signing of MoA/MoU of the project, extendable by 180 days for reasons beyond the control of Developer for following PSPs:
   a) PSPs located in Himalayan region.
   b) PSPs located in non-Himalayan region comprising of underground power house in an area with poor geology.

For further delay on part of Developer, State Government may make a provision for resorting to levy of a financial penalty against the developer and/ or cancellation of project allotment.

The Data collected by Developer for preparation of DPR shall be property of concerned State Government and its copy shall be made available to CEA/ CWC.

Typical bar chart showing different activities to be carried out by the project authorities for preparation of DPR and by CEA/ CWC/ GSI & CSMRS for approval of above chapters is given at **Plate-1(a), (b) & (c)**. Typical flow chart showing different activities to be carried out by project authorities before submission of DPR and pre-DPR clearances by CEA, CWC, GSI & CSMRS is given at **Plate-2 (a), (b) & (c)**.

The DPR prepared by the Generating Company/ Project Developer shall be structured in the format as described in the succeeding paragraphs.

2.6 Structure of the Detailed Project Report

The structure of DPR/ details to be included in the respective chapters of the DPR is given below. The sections of *"Guidelines for preparation of Detailed Project Report of Irrigation and Multipurpose Projects" issued by CWC* to be referred are indicated inbracket against the respective components of work.

2.6.1 DPR should include the following chapters:

Chapter -I	Introduction
Chapter –II	Justification of project from power supply angle
Chapter -III*	Basin Development
Chapter –IV*	Inter-State Aspects (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter -V	Surveys & Investigations (Section 3.4) (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter –VI	Hydrology (Section 3.5) (As per already approved chapter/ aspect

	as referred under para 2.3 above)
Chapter –VII	Reservoir (Section 3.7) (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter –VIII	Power Potential Studies & Installed Capacity (Refer Appendix-2 of these Guidelines) (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter –IX	Design of Civil Structures (Section 3.6)
Chapter –X	Electrical and Mechanical Designs
Chapter –XI	Transmission of Power and Communication facilities
Chapter –XII	Clearances / Inputs

Examination of Cost Estimates of Pumped Storage Projects is exempted from Concurrence Process. However, following additional chapters shall be submitted by project developer to the Authority within 60 days from date of uploading the DPR on CEA portal so as to ascertain the project cost in accordance with the limit specified by the Central government from time to time. It will not be vetted by CEA/CWC.

If any project developer desires to get the cost estimates examined by CEA, the same will be examined by CEA in consultation with CWC in parallel to concurrence process.

Chapter –XIII	Construction Programme & Plant Planning (Section 3.13)
Chapter –XIV	Project Organization
Chapter –XV	Infrastructural Facilities
Chapter –XVI	Environmental & Ecological Aspects
Chapter –XVII	Cost Estimates
Chapter –XVIII	Allocation of Cost
Chapter –XIX	Economic Evaluation
Chapter –XX	Future Utilization of Buildings (Section 3.20)
Chapter –XXI	Recommendations

*Note: Chapters on Basin Development and Inter-state Aspects are not required for **Off-stream closed loop type PSPs**.

Additionally, the Cost of Enabling Infrastructure/ Flood Moderation etc. (wherever applicable), which can be availed as Grant from GoI , must be vetted from the respective appraising group (CEA/ CWC).The Project developer needs to get this cost vetted before the commencement of construction of the project.

Chapter-wise detailed information to be included in the Detailed Project Report hasbeen

7.16 Other facilities, if any

7.17 Need and recommendations for soil conservation measures in the catchment.

Chapter –VIII POWER POTENTIAL & INSTALLED CAPACITY
(Refer Appendix-2 of these guidelines)
(As per already approved chapter/ aspect as referred under para 2.3 above)

8.1 Type of scheme – daily or weekly regulated

8.2 Studies carried out for optimization of storage capacity, FRL, MDDL etc. of upper and lower reservoirs.

8.3 Studies carried out for optimization of installed capacity and number of units.

8.4 Operating criteria of the project in generating and pumping mode, availability of pumping energy for pumping operations over the years

8.5 Cycle efficiency of the scheme

8.6 Pumping Power Arrangement (Capacity, source etc.)

8.7 Reservoir filling mechanism (onetime filling and annual recoupment of losses)

Chapter –IX DESIGN OF CIVIL STRUCTURES (Section 3.6)

9.1 Structures & layout (As per already approved chapter/ aspect as referred under para 2.3 above)

9.2 General

(i) Head works - site and vicinity

(ii) Reasons for choice of the layout of the project adopted.

(iii) Type of structure – dam (Concrete gravity Dam/Roller compacted Dam/GFRD/CFRD etc. etc.)/ embankment etc.

(iv) Layout of dam and spillway / barrage / weir / appurtenants / auxiliary works and power house, reasons for choice of site.

9.3 Geology, seismicity and foundations (As per already approved chapter/ aspect as referred under para 2.3 above)

9.4 Alternative studies carried out for selection of site and type of structures / dam/ embankment/ barrage / weir, regulators, water conductor system, power house etc.

9.5 Choice of final layout of all the major components of the project and reasons – with details

9.6 Design flood and sedimentation studies

9.7 Free board

9.8 River diversion arrangements – choice of design flood with hydro-graphs

9.9 Construction materials (As per already approved chapter/ aspect as referred under para 2.3 above)

9.10 Details of Model of studies

9.11 Design of dam / barrage / weir/embankment

9.12 Design of intake, desilting arrangement, power channel/tunnel, balancing reservoir / fore-bay, surge shaft, penstocks, power house, switchyard

9.13 Details of instrumentation for various structures

The chapter shall include structural and hydraulic design calculations for dam, spillway gates and energy dissipation arrangements, outlets – regulators, river sluices, intake structures, surge shafts, power house etc. Essential structural calculations shall be furnished. For stability analysis, loading diagrams considering various conditions of water level, earthquake and other forces/stresses considered shall be included.

Chapter –X ELECTRICAL AND MECHANICAL DESIGNS

10.1 Type of Machine
(Reversible Pump turbine with Fixed Speed Generator Motor/ Reversible Pump turbine with Variable Speed Generator Motor/ Ternary Set with Separate Pump and Turbine and fixed speed generator Motor)

10.2 Pump/ Turbine

(i) Type

(ii) Operating heads & outputs

(iii) Specific speed and synchronous speed

(iv) Setting of pump turbine

(v) Speed & pressure rises

(vi) Efficiencies

10.3 Generator/ Motor

(i) Type of generator/motor

(ii) Outputs, power factor, generation voltage

(iii) Class of insulation

(iv) Type of cooling

(v) Generator inertia

(vi) Starting method

(vii) Type of Converter (VSI/ Full Converter/Static Excitation)

(viii) Efficiencies

10.4 Generator – transformer connections

10.5 Main Inlet Valve

10.6 Surge Protection & Neutral Earthing System

10.7 Supervisory Control and Data Acquisition System

10.8 Penstock Valves, if any

Suggestive Measures to Reduce to tariff of the project at DPR stage are attached at ***Appendix-3***

Chapter –XX FUTURE UTILISATION OF BUILDINGS (Section 3.20)

20.1 Details of buildings to be constructed to meet peak requirements of the project

20.2 Departmental requirement of buildings after completion of the project

20.3 Requirement of the buildings by other agencies

20.4 Utilization of surplus buildings

Chapter –XXI RECOMMENDATIONS

20.1 Economic justification of the project

20.2 Socio-economic and other benefits

2.7 Aspects to be appraised

i. **Hydrology:** An accurate assessment of the hydrology at the project site is required in on-stream and off-stream open loop pumped storage scheme to determine designed flood and diversion flood estimation for designing spillways, diversiontunnels etc.. Appraisal of the project hydrology includes water availability studies, design flood estimation, diversion flood estimation and sedimentation studies for estimating the life of the project.

ii. **Hydro Power Planning:** Power potential studies shall be carried out to determine the installed capacity, number and size of units, generating energy, pumping energy and cycle efficiency.General layout of the Scheme whether it fits into the overall basin development plan or not is also examined.

iii. **Dam/ Embankment/ Barrage/ Weir etc. and Head Works**: Design and safety of the dam/ embankment/ barrage/ weir etc. and appurtenant works are examined.

iv. **Hydraulic Structures/ Hydel Civil Design:** Techno- economic evaluation of water conductor system and power house comprising of intake, de-silting arrangement, head race tunnel, surge shaft, pressure shaft/ penstock, tailrace tunnel/ channel and the type/ layout and dimensions of the power house is made to ensure that the surveys and investigations carried to finalize the layout & designs are adequate, layout is optimum & is evolved after evaluation of various alternatives; project components are safe, planning & design has been carried out utilizing state of the art technology and relevant standards.

v. **Geology:** Geology of the project components is appraised to ensure that detailed geological mapping & geophysical surveys have been done, drilling/ drifting carried out and structural features viz. thrusts, folds/faults have been studied in detail to delineate problems during construction.

vi. **Electro-Mechanical Design:** Design & layout of turbine-generator sets, main step-up transformer, auxiliary equipment in the power house and switchyard / gas insulated switchgear room etc. are appraised.

Annexure.-3.2

Government of India
Central Water Commission
Hydrology (South) Directorate
7th floor (S), Sewa Bhawan
R.K.Puram, New Delhi-110066
Phone/Fax:011-29583507
Email: hydsouth@nic.in

Sub– JSW Energy PSP Two Limited- Submission of Feasibility Study Report for Bhavali PSP (1500MW), Maharashtra -Techno Economic Clearance (TEC) from CEA.

Reference– 1) Lr No.-JSWNEL/BHAVALI/2021-22/014 dated 07.03.2022

2) Lr. No. 7/Maha-210/2021-Hyd(S)/83 dated: 09/05/2022

3) JSWNEL/BHAVALI/2022-23/024 dated 26.05.2022

Please refer to the letter cited in Ref 1 wherein Feasibility Study Report (FSR) in respect of proposed Bhavali PSP in the state of Maharashtra has been sent to this office and vide the letter cited in Ref 2 the comments/observations pertaining to Hydrology were issued by the Hydrology(S) directorate. In compliance to this, the project developer has sent the revised hydrology report of the proposed PSP vide Ref. 3 and requested the comments/observations of this office. The revised hydrology report has been examined by this office and comments/observation are given as below-

A. PROJECT PROPOSAL

The proposed Bhavali Pumped Storage Project (PSP) is located bordering Thane and Nashik districts of Maharashtra. The project with 1500MW of pumped storage capacity is proposed for development near Jamunde and Kalbhonde village. Bhavali PSP will comprise of two reservoirs i.e. Upper Reservoir & lower reservoir; both the reservoirs are to be constructed newly. The geographical coordinates of the proposed upper reservoir are at $19^0$36'31.69"N & $73^0$35'45.06"E and that of lower reservoir are at $19^0$34'32.56.38"N and $73^0$35'10"E. The proposed Upper & lower reservoir for the Pumped storage scheme have Full Reservoir Levels of 737.0m and 300.0m, Minimum draw down level of 711.0 m and 270.0 m respectively.

The proposed upper reservoir is on a small stream of Dharna river, which is a part of Godavari Upper sub basin and lower reservoir is located on a stream which is a tributary of Ulhas River which is a part of western flowing river system. The proposed storage project is being planned on the allocated water for utilization from surplus flows of Bhatsa dam. One time filling of the PSP reservoir will be carried out from the yield into the lower reservoir, part of Bhatsa dam catchment whereas water into the Upper reservoir is not obstructed for filling the Upper Reservoir, either during the construction or operation of the PSP scheme as the upper dam is constructed on a small stream which joins the existing Bhavali dam.

Since the proposed scheme is a pumped storage scheme and envisages utilizing the water from newly proposed reservoirs, no consumptive use of water is envisaged. As mentioned in the report submitted by the Project Authorities, the water requirements for one time filling of the reservoir is **14.50 MCM**. Moreover, only recycling of water stored in the reservoirs is utilized for PSP operation and the Losses will be fulfilled by annual yield from the catchment area of the Bhavali PSP.

B. WATER AVAILABILITY STUDIES

The Project Authorities have used rainfall data of Kothale rain gauge station, located at 19.580 Latitude & 73.565 Longitude and this data was collected from Irrigation Division Bhatsa dam for the year 1973 to 2019. Dependability analysis of rainfall data as done by Project Authorities is given as below-

S. No.	Dependability	Rainfall (mm)
1	90%	967.0
2	75%	2328.0
3	50%	2894.2

Project Authorities have calculated water yield of proposed PSP by two methods-

Method-1

Project Authorities have used a runoff factor of 0.6 to convert above mentioned dependable rainfall into runoff, and the estimated yields at lower dam site are given as below-

S. No.	Dependability	Yield at Lower Dam(MCM)
1	90%	4.21
2.	75%	10.224
3.	50%	12.71

Method-2

Project Authorities have used a rainfall-runoff correlation formula developed at Bhatsa site in the integrated state water plan of Maharashtra as given below-

R=0.7890*P-128.0288

Where, R= Runoff in mm

P= Rainfall in mm

Using the above formula project authorities have converted the dependable rainfall into corresponding dependable Runoff as shown below-

S. No.	Dependability	Yield at Lower Dam(MCM)
1	90%	4.65
2	75%	12.508
3	50%	15.778

Out of the above two methods Project authorities have used the yield calculated by Method 1, as it is on the conservative side, and the 90% dependable yield at proposed lower reservoir is 4.21MCM. Hence it may take four monsoon seasons for one time filling of 14.50 MCM water in lower and upper reservoir, and the 75% dependable yield at proposed lower reservoir is 10.224 MCM. Hence it may take two monsoon seasons for one time filling of 14.50 MCM water in lower and upper reservoir.

Impact on Bhatsa Dam:

As mentioned in the report by the project authorities, Bhatsa dam has a catchment area of 388.50sqkm and that of proposed lower reservoir is 7.32 km^2. So the contribution of catchment interrupted by the proposed lower reservoir of Bhavali PSP is minimal during first filling. Subsequently during the operation of PSP, all the flows including non-monsoon flows will be let downstream, as the PSP reservoir will not have the capacity to fill over and above the proposed gross storage capacity. Moreover, during monsoon in most of the years, water spills through Bhatsa dam as the reservoir level reaches FRL. This aspect is also confirmed with WRD Department, wherein the spillage from Bhatsa dam in a 75% dependable year is 64.970 MCM of water.

B.1 Observations & findings

1. It is observed in the study that the rainfall data of Kothale rain gauge station as provided by the project authorities is found inconsistent for the year 1976 and from the year 2013 to 2019. Hence this office has used IMD gridded rainfall data for the nearest grid to the project site from the year 1970 to 2020 to estimate the annual yield for the project, and the corresponding dependability analysis is shown in the table below, which can be used for the planning purpose of the proposed Bhavali PSP.

S. No.	Dependability	Yield at Lower Dam(MCM)
1	90%	12.96
2	75%	15.83
3	50%	19.14

C. DESIGN FLOOD STUDIES

The Bhavali PSP, upper & lower reservoir can be classified as "Large dam" by hydraulic head criterion being more than 30m, hence the upper and lower dam should be design for Probable maximum flood as its design flood. Project authorities have used rational approach to estimate the Probable Maximum Flood for proposed Upper and Lower Dam and the estimated values are presented in the table given below:

Dam	Probable Maximum Flood (m^3/sec)
Upper Dam	256
Lower Dam	431

C.1 Observations & findings

1. The estimated Probable Maximum Flood for upper and lower dam by the project authorities **appears to be generally in order.**
2. Hence the Probable Maximum Flood of **256m^3/sec** and **431m^3/sec** may be used for the design purpose of upper and lower dam respectively.

D. DIVERSION FLOOD STUDIES

According to IS 14815:2000, Project authorities have used 25 year return period rainfall from the atlas of state wise generalized Isopluvial maps prepared by IMD for computing the diversion flood. Accordingly estimated diversion flood by the project authorities for upper and lower dam are **63m^3/sec** and **104m^3/sec** respectively.

D.1 Observations & findings

1. The estimated diversion flood appears to be generally in order; hence the diversion flood of $63m^3/sec$ and $104m^3/sec$ may be used for the planning purpose of diversion structure of upper dam and lower dam respectively.

E. EVAPORATION STUDIES

The project authorities have estimated the evaporation losses from upper and lower reservoir as 0.2904 MCM and 0.3049 MCM respectively.

E.1 Observations & findings

1. The evaporation losses as submitted by the project authorities **appears to be generally in order** hence the total annual loss of **0.2904MCM** and **0.3049MCM** may be used for the planning purpose of the upper and lower reservoir respectively.

F. RESERVOIR SEDIMENTATION STUDIES

In the upper dam site, the lowest river bed R.L. is at 690.0 m and MDDL is at RL of 711.0m. The project authorities have taken average siltation rate of 2270 m^3/km^2/year for 70 years of sedimentation based on average sediment rate in the reservoir located in the East flowing rivers upto Godavari (excluding Ganga) as given in "Compendium on Sediment of Reservoir in India (2020)" published by CWC. And the new zero elevation (NZE) as calculated by the project authorities at the end of 70 year will be at R.L. of 699.00 m.

For the lower dam site the lowest river bed R.L. is at 237.00 m and MDDL is at RL of 270.0m. The project authorities have taken average siltation rate of $3070m^3/km^2$/year for 70 years of sedimentation based on average sediment rate in the reservoir located for the West flowing rivers beyond Tapi and south Indian rivers as given in "Compendium on Sediment of Reservoir in India (2020)" published by CWC. And the new zero elevation (NZE) as calculated by the project authorities at the end of 70 year will be at R.L. of 262.00 m.

F.1 Observations & findings

1. New zero elevation (NZE) as estimated by the project authorities **appears to be generally in order**, hence the new zero elevation (NZE) at RL of 699.0m and 262.0m may be used for the planning purpose of upper and lower dam respectively.

This is for information and taking further necessary action at the earliest.

Nitya Nand Rai
(Director)

Director, HPPI, CEA, New Delhi
CWC U.O.: 7/Maha-210/2021-Hyd(S)/107 Date: 28/06/2022

Annexure- 3.3

मुख्य अभियंता,
जलविज्ञान व धरण सुरक्षितता
सोडोओ बिल्डींगच्या मागे,
दिंडोरी रोड , नाशिक - ४२२००४
दूरध्वनी :०२५३-२५३०२२७

महाराष्ट्र शासन
जलसंपदा विभाग

Chief Engineer,
Hydrology & Dam Safety
Behind C.D.O. Building,
Dindori Road,
Nashik – ४२२००४
Ph.No. : ०२५३-२५३०२२७

Web: www.mahahp.gov.in Email: cehpswnasik@gmail.com / cehp nashikwrd@maharashtra.gov.in

फक्त ई-मेलद्वारे

जा.क्र.मुअ/जवधसु/तांशा-६/(१४/२०२२)/२३६७/सन २०२२ दिनांक:- २१/११/२०२२

प्रति,

मुख्य अभियंता,
जलसंपदा विभाग, कोंकण प्रदेश,
मुंबई-४००००१.

विषय :- Request for allocation of water to Proposed Bhavali Pumped Storage Project (1500 MW) of JSW Energy limited.

संदर्भ :-१) शासन पत्र संकिर्ण-२००८/१६०४/(४६४/२००८)/जसंअ, दि. २७/०५/२००९.
२) शासन पत्र क्रं. जविप्र २०२१/ (प्र.क्र.७४/२१)/जवि, दिनांक - ०४/१०/२०२१.
३) मुख्य अभियंता, जलसंपदा विभाग, कोकण प्रदेश, मुंबई या कार्यालयाचे पत्र जा.क्र.मुअ/ जसंविकोप्र/पाऊप्र/तां-५/२७०१, दिनांक - ०६/०७/२०२२.
४) या कार्यालयाचे मा. सचिव (जसंव्य व लाक्षेवि), जलसंपदा विभाग मंत्रालय यांना उद्देशून पत्र जा.क्र.मुअ/जवधसु/तांशा-६/(१४/२०२२)/१८५०/सन २०२२, दि. २३/०८/२०२२.
५) शासन पत्र संकिर्ण-२००८/(४६४/२००८)/जसंअ, दि. १४/१०/२०२२.
६) शासन पत्र जा.क्र. जविप्र २०२१/(प्र.क्र. ७४/२१) जवि, दि. २१.१०.२०२२.

उपरोक्त संदर्भ पत्र क्र. २ अन्वये आपले कार्यालयाने विषयांकित प्रकल्पास पाणी उपलब्धता प्रमाणपत्र मिळणेबाबतचा प्रस्ताव शिफारशी सह सादर केलेला आहे.

संदर्भिय शासन पत्र क्र. १ नुसार खाजगी संस्थांना पाणी उपलब्धतेचे निष्कर्ष निर्गमित करण्यापुर्वी त्या अभ्यासांना शासनाची मान्यता घेण्यात यावी असे निर्देश होते. या अनुषंगाने विषयांकित प्रकल्पाची संकल्पन टिप्पणी शासन मान्यतेसाठी या कार्यालयाचे संदर्भिय पत्र क्र. ४ अन्वये सादर करण्यात आलेली होती. तथापि दि. १४.१०.२०२२ रोजीच्या संदर्भिय शासन पत्र क्र. ५ अन्वये मुद्दा क्र. ३ मध्ये "अनुज्ञेय शिल्लक पाण्यापैकी किती पाणी/प्रस्तावित पाणी प्रत्यक्षात प्रस्तावित प्रकल्पाच्या ठिकाणी उपलब्ध आहे किंवा कसे याबाबत पाणी उपलब्धता प्रमाणपत्र मुख्य अभियंता, जलविज्ञान व धरण सुरक्षितता, नाशिक यांनी जलशास्त्रीय अभ्यास करुन त्याआधारे देणे अपेक्षित आहे. मुख्य अभियंता, जलविज्ञान व धरण सुरक्षितता, नाशिक हे जलशास्त्रीय अभ्यासासाठी सक्षम कार्यालय असून व त्यासाठी शासनाने प्राधिकृत केलेले असल्याने परत या अभ्यासास शासनाची मान्यता घेण्याची आवश्यकता नाही" असे नमूद आहे.

त्यानुसार संदर्भिय शासन पत्र क्र. ६ अन्वये शासनाने खाजगी संस्थांकडून पाणी उपलब्धता मागणी प्रस्तावाबाबत करावयाच्या कार्यावाही संदर्भात जलसंपदा विभाग, जसंअ कार्यासनाने दिनांक १४/१०/२०२२

रोजीच्या पत्रान्वये (संदर्भ पत्र क्र. ५) अभिप्राय दिले असून,सदर अभिप्रायास अनुसरुन पुढिल उचित कार्यवाही आपल्या स्तरावर त्वरीत करण्यात यावी असे कळविले आहे.

या अनुषंगाने या कार्यालयाने पाणी उपलब्धता प्रमाणपत्र क्र. WFR/Ulhas/894,Dated- 21/11/2022 अन्वये विषयांकित प्रकल्पास ०.९९१ द.ल.घ.मी. चे प्रमाणपत्र जा. क्र. CE/H&DS/TS-6/(14/2022)/2350 /2022, दि. 21/11/2022 प्रदान केलेले आहे. सोबत सदर प्रमाणपत्र व संकल्पन टिपणी जोडण्यात आलेली आहे.

प्रस्तावित प्रकल्पाचा समावेश राज्य एकात्मिक जल आराखड्यात (ISWP) करण्याची जबाबदारी क्षेत्रिय मुख्य अभियंता यांची राहील.

हे आपले माहिती व आवश्यक कार्यवाहीसाठी सस्नेह अग्रेषीत.

सोबत –वरीलप्रमाणे

स्थळ प्रत मा. मु.अ. यांनी मान्य केली आहे.

(अ. अ. पंडित)
सहायक मुख्य अभियंता
जलविज्ञान व धरण सुरक्षितता
नाशिक.

प्रत:-मा. सचिव (जसंव्य व लाक्षेवि), जलसंपदा विभाग, मंत्रालय, मुंबई यांना माहितीस्तव सविनय सादर.
(लक्षवेध- न.गो. बसेर, उपसचिव (जवि), जलसंपदा विभाग, मंत्रालय, मुंबई)
प्रत:-मा. कार्यकारी संचालक, कोंकण पाटबंधारे विकास महामंडळ, ठाणे यांना माहितीस्तव सादर.
प्रत:-अधीक्षक अभियंता, आधार सामग्री पृथ:करण मंडळ, नाशिक यांना माहितीसाठी.
सोबत: वरीलप्रमाणे.
प्रत:- JSW Neo Energy Ltd, JSW Centre, Bandra Kurla Complex, Mumbai-४०००५१.
D.A.-Design Note.

Annexure-4

JSW Energy PSP Two Limited
Regd. Office : JSW Centre,
Bandra Kurla Complex,
Bandra (East), Mumbai - 400 051

CIN. U40106MH2021PLC367136
Phone . +91 22 4286 1000
Fax : +91 22 4286 3000
Website www.jsw.in

Undertaking

(Regarding Plantation over degraded forest land)

With reference to Point No. 4 of the MoEF&CC EDS letter dated 15.12.2025, it is stated that, as per the recommendations of the Regional Office, MoEF&CC, Nagpur, Maharashtra, 20 ha of Non-Forest Land (NFL) proposed for Compensatory Afforestation (CA) is unsuitable for plantation.

In this regard, we hereby undertake that we are ready to bear the cost of carrying out plantation over degraded forest land identified and provided by the Forest Department at double the extent of the unsuitable CA area, in accordance with the prevailing guidelines, norms, and directions of the Forest Department.

We affirm that this undertaking is submitted in good faith and in compliance with the conditions prescribed for the project.

Yours faithfully,
For JSW Energy PSP Two Limited

[Lalit Parab]
Authorized Signatory

JSW Energy PSP Two Limited

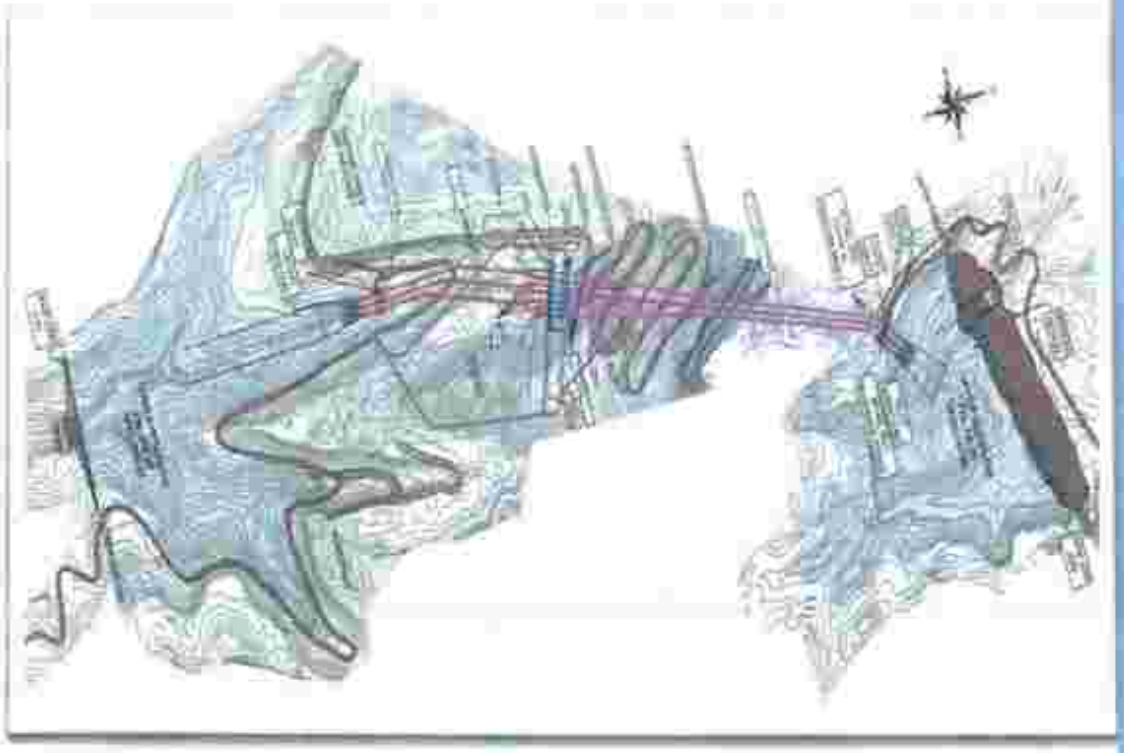
Place: Igatpuri

Date: 06.01.2026

Annexure - 5.1 A-5.2

Report on

Study on assessment and mitigation of impact of blasting operations on flora and fauna, nearby man-made structures and the environment during construction of JSW Bhavali Pumped Power Storage Project, Nashik



Submitted to

JSW ENERGY PSP TWO LIMITED

BKC Mumbai

By

CSIR-Central Institute of Mining and Fuel Research
Council of Scientific and Industrial Research, Ministry of Sct & Tech. GOI
CSIR-CIMFR Regional Research Centre Bilaspur
Ph +91-7752271581-88, Fax: +91-7752-271450, www.cimfr.res.in

SEPT 2025

Report on

Study on Assessment and Mitigation of Impact of Blasting Operations on Flora and Fauna, Nearby Man-Made Structures and the Environment during Construction of JSW Bhavali Pumped Power Storage Project, Nashik

Sponsored Research Project Report

Disclaimer

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CIMFR reserves the right to publish the results of the research for the benefit of the industry in general.

24.09.2025

(Dr. Harsh Kumar Verma)
Sr. Pr. Scientist and Head of Section

अनुभागाध्यक्ष / Head of the Section
सीएसआईआर–केन्द्रीय खनन एवं ईंधन अनुसंधान संस्थान
क्षेत्रीय केन्द्र, बिलासपुर

Executive Summary

M/s JSW Energy PSP Two Ltd. is developing Bhavali Pumped Storage Project (BPSP) with an installed capacity of 1500MW/11670 MWH. The project is located in Igatpuri taluka of Nashik district of Maharashtra state. The project comprises of development of upper & lower reservoirs with a gross storage capacity of 0.436 TMC & 0.468 TMC respectively, out of which upper reservoir to be constructed on the hilltop with maximum dam height of 49.57 m to create the desired storage capacity while the lower reservoir will have maximum dam height of 48.15 m constructed in a natural depression downhill. As per a rough estimate approximately 30.0 lakh cum of hard rock excavation will be carried out using controlled blasting technique during construction of the Bhavali PSP.

JSW Energy PSP Two Limited requested to CSIR-Central Institute of Mining and Fuel Research for technical support and guidance for carrying out control blast design operation during construction of Bhavali PSP with special emphasis to prevent any adverse impact of blasting operation to flora and fauna of Kalsubai Harishchandragad Wildlife Sanctuary. Team of Scientists and staff members conducted a preliminary field investigation to assess the possible impact of blasting operation and evaluate the required mitigation measures.

Construction planning details of Bhavali PSP revealed that the actual operating distance of the quarry boundary from ESZ is 253 m, although, the minimum distance of FRL boundary of upper reservoir is 12.5 m from ESZ at Saddle dam point (fig. 6 of the report). Similarly housing structures of Jamunde village is also approx.. 250 m from the nearest blasting points. As per prevailing standard, the safe permissible limit of 5 mm/s peak particle velocity for all the structure may be considered as safe permissible limit.

CSIR-CIMFR Team made field investigations, reviewed the available safe limit of blast induced ground vibration, air overpressure, Noise, Dusts generation etc. Optimised controlled blast design pattern have been evolved considering the propagation characteristics of vibration and air overpressure in the prevailing rock mass condition. A comprehensive plan to implement various measures for controlling adverse impact of the blasting operation have been suggested.

Recommended measures include, use of advanced explosive and initiating system such as shock tube initiation system, emulsion explosive, varying blast hole dia., and blast design parameters considering the proximity of the ESZ, dust and flyrock control measures, use of blasting mats to suppress noise etc.

TABLE OF CONTENTS

Report on

STUDY ON ASSESSMENT AND MITIGATION OF IMPACT OF BLASTING OPERATIONS ON FLORA AND FAUNA, NEARBY MAN-MADE STRUCTURES AND THE ENVIRONMENT DURING CONSTRUCTION OF JSW BHAVALI PUMPED POWER STORAGE PROJECT, NASHIK

1.0 INTRODUCTION

Pumped Storage Projects (PSPs) are crucial in India's energy ecosystem for balancing supply and demand, ensuring grid stability, and integrating renewable energy sources. They function as a reliable energy storage technology, storing power during periods of low demand and releasing it when needed, particularly during peak hours. PSPs also help smooth out fluctuations in renewable energy generation from sources like wind and solar, preventing grid instability. The Pump storage offers multiple benefits to a power system. In addition to providing energy storage, pumped storage can provide power immediately and can be rapidly adjusted to respond to changes in energy demands. Multiple PSP project are under construction in the country.

M/s JSW Energy PSP Two Ltd is developing Bhavali Pumped Storage Project (BPSP) with an installed capacity of 1500MW/11670 MWH. The importance for Bhavali PSP, indicative installed capacity 1500 MW, in Nashik and Thane district, Maharashtra, has therefore been considered in context of the focus of State Government to increase the share of renewable energy which is available in plenty within the state in general and in the country as whole.

The Project comprises of development of upper & lower reservoirs with a gross storage capacity of 0.436 TMC & 0.468 TMC respectively, out of which upper reservoir to be constructed on the hilltop with maximum dam height of 49.57 m to create the desired storage capacity while the lower reservoir will have maximum height of 48.15 m

constructed in a natural depression downhill. Other project components are Geomembrane Faced Rockfill Dam, & Concrete Spillway, Upper Intake, Penstock, Powerhouse and GIS, Tailrace Tunnel TRT Intake/Lower Intake etc.

As per a rough estimate approximately 64.0 lakh cum of hard rock excavation will be carried out using controlled blasting technique during construction of the Bhavali PSP.

Uncontrolled blasting operation gives rise to problem of ground vibration, noise, flyrock and air over pressure and dust related problem leading to damage to the surrounding environment and structures. All these adverse impact can be reduced to safe tolerance limit by optimising the controlled blast design parameters, use of suitable advance technology and modern scientific methodologies.

Considering the availability of expertise in development and application of various controlled blasting techniques in various similar infrastructure projects with the institute, M/s JSW vide P.O. Letter No. CORP-PSP2/2025-26/1483000148 dated 16.05.2025, requested CSIR-Central Institute of Mining and Fuel Research for carrying out a scientific study initially to assess impact of blasting on surrounding environment and propose mitigation techniques of adverse impact, if any. JSW also requested CSIR-CIMFR to provide technical support in supervision controlled blasting operation during construction of project by deputing scientist and technical staff at site on continuous basis.

This report is an interim report incorporating details of preliminary assessment of impact of blasting operations on nearby environment and structures. It also contains suggestions on techniques and mitigation measures to minimise the impact of blasting operation. During course of the study, emphasis is given to the possible adverse impact to flora and fauna of Kalsubai Harischandragarh Wildlife Sanctuary.

2.0 PROJECT DETAILS

The Geographical co-ordinates of the proposed Pumped Storage Project component of upper reservoir located near to Jamunde Village in Igatpuri Taluk of Nashik district with latitude 19°36'31.69"N, and Longitude 73°35'45.06"N and that of lower reservoir at Kalbhonde village in Shahpur Taluk of Thane district with latitude 19°34'56.38"N and longitude 73°35'10.00"E.

Lay out of the project in plan and L-Section is presented in Fig 1 and Fig. 2 respectively. The project envisages creation of an upper reservoir (gross storage: 12.35 MCM & live storage:11.08 MCM) by constructing 962.47 m long dam comprising of 822.47 m long Geomembrane faced rockfill dam (GRFD) with maximum height of 48.64 m from foundation, 60 m long and 61 m height ungated spillway with 4 bays of 12.5 m each; 4 blocks of 20 m length each non-overflow section of maximum height of 49.57 m from foundation, two each on either side of spillway. 80 m long saddle dam (maximum height 10 m from foundation) to reduce backwater to enter ESZ area. The lower reservoir (gross storage:13.26 MCM; live storage: 11.71 MCM) shall be created by constructing concrete gravity dam 365.5 m long at top with maximum height of 48.15 m from foundation and 104 m long, 74 m high (from foundation) ungated spillway with 8 bays of 10.5 m each. Diffuser type Intake structure with 3 intakes (25.5 m x 10.5 m) of 42.44 m length shall be provided.

The water conductor system shall comprise of 67.96 m long three intake tunnels of 7 m diameter each with design discharge of 131.74 cumec each. 5.2 m diameter, followed steel lined pressure shaft 3 nos. of independent, 5.2 m diameter with length varying from 1568.09 m to 1594.89 m, six 3.8 m diameter branch pressure shaft after first bifurcation of design discharge 65.96 cumec each; two 2.9 m diameter 46.83 m long steel lined branch pressure shaft after second bifurcation of design discharge 32.98 cumec each.

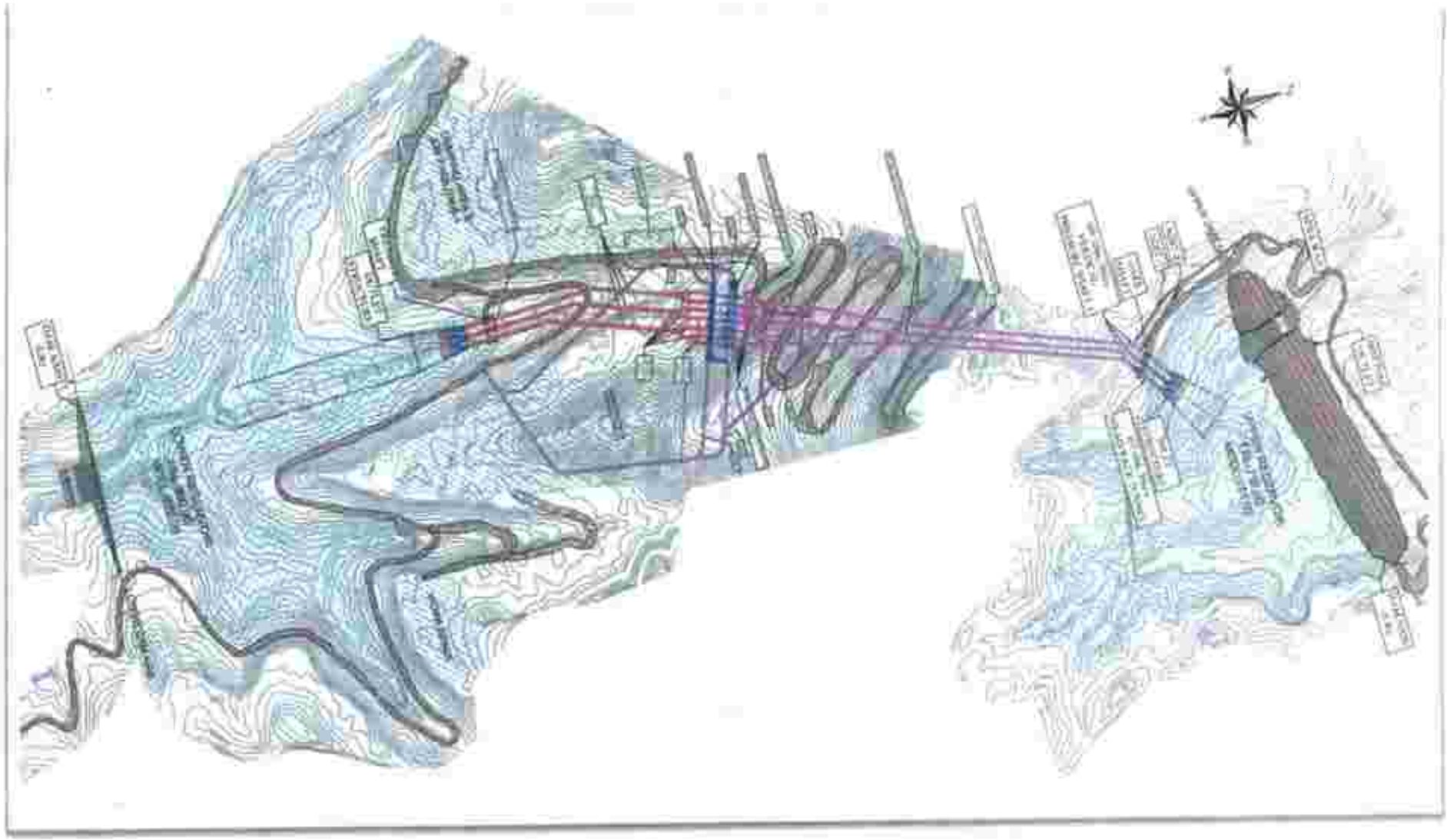

Fig. 1: Lay of Bhavali PSP Project, Igatpuri

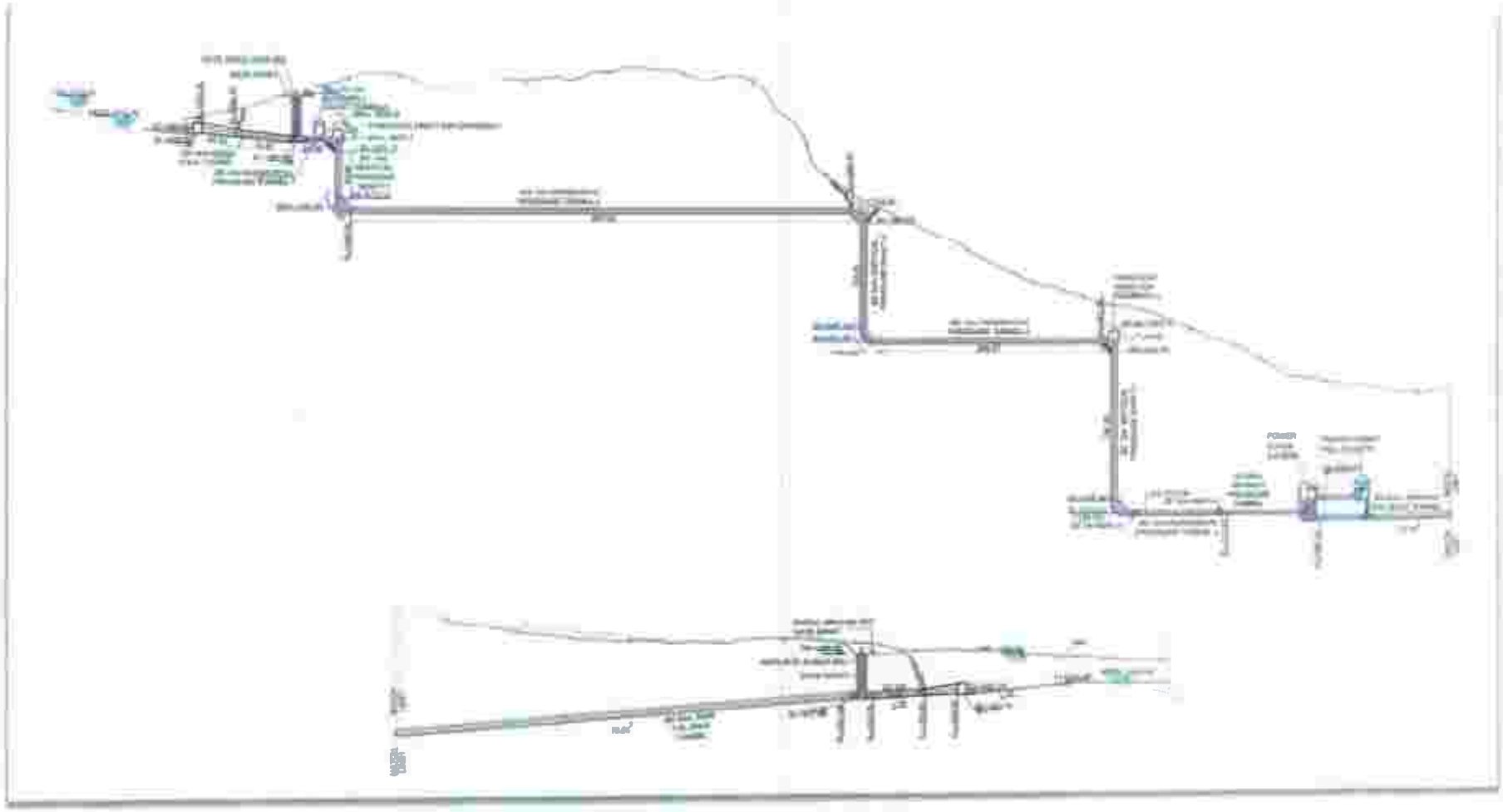

Fig. 2: L- Section Layout of Bhavali PSP Project, Igatpuri

Figure 3: Photograph showing Bhavali PSP Project site location in a google map

Underground powerhouse (167 m x 22 m x 52.9 m) housed with 7 No's. Francis vertical shaft reversible pump-turbine (5 X 250 MW & 2 X 125 MW) discharging into circular draft tube 5.20 m and 4.0 m diameter for large and small unit; two four meter diameter concrete lined branch tail race tunnel for 32.98 cumec discharge after 3rd bifurcation; six 5.2 meter diameter concrete lined branch tail race tunnel for 65.78 cumec discharge after 4th bifurcation; followed by three 7 m diameter main tail race tunnel with length varying from 621.17 m to 646.57 m, each discharging 131.74 cumec, 105 m long trapezoidal tail race pool followed by 560 m long trapezoidal tail race channel.

The project will generate 1500 MW by utilizing a design discharge of 394.84 cumecs that includes, 65.78 cumec with rated head of 425.23 m (for larger unit of 250 MW) and 32.98 cumec with rated head of 424.03 m (for smaller unit of 125 MW) for 7.78 hr. The PSP will utilize approx.. 1600 MW to pump 0.391 TMC of water to the upper reservoir in 8.79 hours. Annual energy generation by Bhavali PSP in turbine mode is 4044.06 MU whereas annual energy consumed in pump mode is 5120.53 MU.

3.0 GEOLOGICAL SET-UP OF THE PROJECT

Geological set-up of the project site play important role in controlled blasting operations and it governs propagation characteristics of the blast induced ground vibration and air overpressure. Therefore investigation of geological set-up and review of the geotechnical data of the project site was also carried out.

Figure 4: Photographs of field visit of CSIR-CIMFR team to Bhavali Project site

The proposed PSP site is located on the western margin of Western Ghats of Indian Peninsula, which are occupied by thick pile of Thoilitic Basalt flows, which are stratigraphically termed as 'Deccan Traps'. The Deccan Traps cover a large area of 52000 sq.km covering a major part of Maharashtra, parts of Gujarat, Madhya Pradesh and small parts of coastal Andhra Pradesh. The basalt rock prevailing in the project area make it as hard rock terrain. It is strong rock covering all the component locations such as upper and lower reservoir areas, water conductor system, powerhouse complex and entire length of Tailrace tunnel/channel area.

As per the regional geological setup at and around the project area, the area is occupied by strong basalt rocks/Deccan trap. The rock types, as per this map, mainly belong to the Lower Ratangarh formation which prevails in the upper reservoir/dam, part of the WCS, and powerhouse complex area. In the case of the TRT, the Lower dam/reservoir area, the basalt rocks belong to the Salher formation. Both formations come under the Sahyadri group within the Deccan Trap Super group, belonging to the Cretaceous to Paleocene age. The basalt rock exposed in the project area has been observed to show thick flows and is massive and strong in nature. Amygdaloidal basalt is also observed in the Upper dam area. Weak lithological strata like red bole/green bole beds, which are observed at places in Deccan basalt rocks, are not found in the project area. No such weak layers are encountered in any of the drill holes completed in the project area, right from the upper reservoir, water conductor system, powerhouse complex, TRT/TRC, and lower dam site.

The general trend of the flow direction of basaltic rock in the area, mainly in the upper reservoir area, is observed to be in SE, SW, and NW directions, dipping at 8^0 to 38^0 degree at places. Besides flow joints, there are 3-4 sets of joints spaced and are moderately to widely spaced. Rocks are generally strong to very strong, fresh at depth, with slight to moderate weathering effect near the ground surface.

Review of the investigation reports reveals that all the sites of major components of the project are geologically mapped and explored by geophysical survey and number of drill holes. The exploration results confirm the availability of strong basalt rock at both the dam foundations and also along the underground media of tunnels, shafts, caverns etc.

The typical soil type of the area is the medium black cotton variety. There are, however, variations in the type of soil and several different varieties of soils, i.e., greyish black, brownish black, and reddish black soils are also observed. The major geomorphic landforms demarcated are scarp slopes, hills and ridges, dyke ridges, and pedimented plains, The eastern boundaries of both Bhatsa and Kalu basins are marked by steep scarps, while the central and western parts of both basins are marked by gently undulating topography interspersed with hills and ridges.

Geophysical survey using Seismic refraction method and MASW (Multi channel Analysis of Surface wave) have been carried out covering all the major components of Bhavali PSP. The broad findings are given as under. Generally, the S-waves are found to be in the range of 91-110 m/s near ground surface for unconsolidated deposits to 750m/s for the weathered/fragmented rock. Below this zone, increased Swave velocity greater than 2000m/s represents sound quality basement rock which are seen in all the profiles.

Comprehensive investigation through 23 boreholes have been carried out covering entire project components. Investigation report of bore hole survey show a good correlation with the Geophysical survey findings. In general, it is noted that the drill hole data corroborate these geophysical survey findings. The unconsolidated soil or overburden deposits, as described in the preceding paragraphs, also range from less than a meter to a couple of meters. Even the fracture zones or moderately weathered zones, with RQD values less than 50%, are generally confined to depths of 5-7 meters

or a maximum of up to 10 meters from the ground level. Beyond this depth, generally, fresh, strong, and massive basalt rocks are recovered even in deeper holes.

4.0 STANDARDS ON SAFE LIMIT OF GROUND VIBRATION AND AIR OVERPRESSURE/NOISE

4.1 Ground Vibration

Ground vibration is an important and integral aspect of any blasting process. Damage to the surface or underground structures has been widely correlated with peak particle velocity (PPV) of ground vibrations induced by blasting. In the present study, review of blast vibration monitoring data from different tunnel construction sites with similar geological set-up have been carried out and attenuation characteristics of vibrations in tunnels have been evolved to compute near field vibration level.

When an explosive is detonated inside a blast hole explosive energy is rapidly released in the form of chemical energy in short span of time generating tremendous pressure and temperature. High temperature and pressure environment causes surrounding rock material melt, flow, crush and fracture. After certain distance away from the bore hole, these inelastic process stops and the elastic processes begin to occur. Decay of the energy is very rapid and only apportion of the explosive/ chemical energy is transformed into elastic form. The elastic disturbance propagates away in the form of seismic waves which is also termed as vibration generation zone.

Attenuation of the shock wave energy is very fast due to utilization of this energy in crushing and fracturing. Beyond fracture zone, the energy propagates as seismic wave elastically which is termed as ground vibration. Intensity of the ground vibration is governed by the blasting parameters and characteristics of the propagating medium. Generation of blast induced ground vibrations is shown in Fig 2.28 in the form of flow-chart. It may be noted that the explosive energy

inside a holes instantaneously converts in to shock and gas energy forms. The shock component causes cracks in the rock mass through high intensity of the strain pulse and stress. The cracks formed by the shock energy are further widened by the gas component of the explosive energy. After fragmentation, the energy is utilized in displacement of the rock. Unutilised explosive energy travels in the surrounding rock mass in the form of seismic waves which are termed as blast induced ground vibrations.

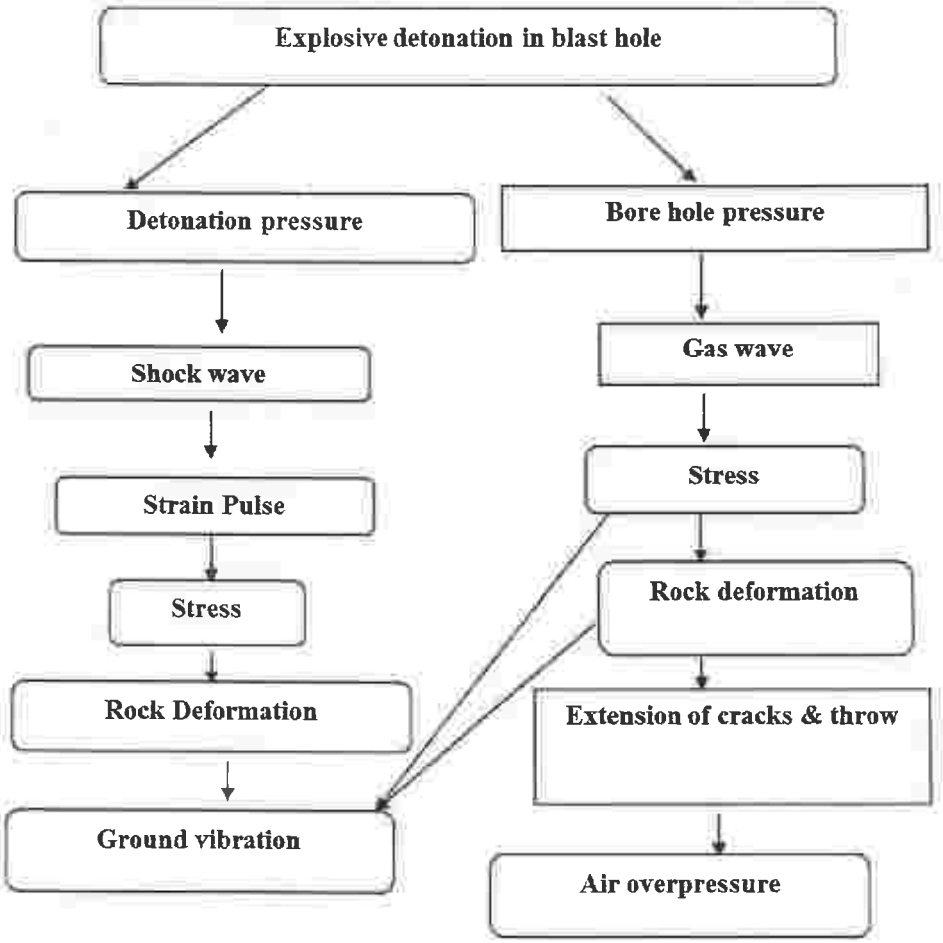

Fig. 5: Generation of Ground Vibrations due to Blasting

Most of the researchers, while formulating prediction model for blast vibration, correlated the amplitude of vibration with quantity of explosive used in a blast round and distance of monitoring location (Blair and Duvall, 1954; Duvall and Petkof, 1959). They concluded that any linear dimension of charge should be

scaled to the cube-root scaled distance due to spherical symmetry. However, in case of long cylindrical explosive charges, the linear dimension will be scaled with square-root of maximum charge per delay.

Review of different prediction models reveal that most of the empirical models provide relations among blast induced ground vibrations (peak particle velocity, V_{ppv}, in mm/s), distance of monitoring point to source (R, m) and maximum explosive charge per delay (W). United States Bureau of Mines (USBM) conducted extensive study on prediction of blast induced vibrations and structural damage. Daemen, (1983) and researchers of USBM (Duvall and Fogelson,1962; Duvall et al., 1963; Siskind et al.,1980) concluded that any linear dimension should be scaled to square root of the explosive charge as shown in Eq. 1.

$$V_{ppv} = K\left(\frac{R}{\sqrt{W}}\right)^{-\beta} \qquad \text{(Eq. 1)}$$

Over the years, numerous vibration criteria and standards have been suggested by researchers, organizations, and governmental agencies. Much of this work originated from the mining industry, where vibration from blasting is a critical issue. Different countries have set their own standard on the basis of experimental investigation in the mining industry. As per the present Indian Standards, as mentioned in DGMS (Tech) (S&T) Circular No. 7 dated 29th August, 1997 depending on the type of structures and dominant excitation, the Peak Particle Velocity (PPV) on the ground adjacent to the structure shall not exceed the values given below in the Table 1.

As given in Table 1, DGMS criterion being followed in whole of the country is frequency based damage criterion. The standard specifies that damage potential of the PPV will primarily depend on the frequency of vibration. As the frequency increases, the damage potential of the vibration reduces and hence the safe permissible PPV also goes on increasing. The frequency of the vibration depends on local geological conditions. A

hard massive rock will have higher frequency and a soft jointed rock will have lower frequency. Higher the geological disturbances, less will be the frequency of vibration and therefore safe permissible PPV will also be lesser. Table 7 also reveals that the type of housing structures will decide the maximum safe PPV it can sustain. A domestic house of Kachha brick and cement/ mud-clay can sustain less value of PPV whereas an industrial building with RCC frame will sustain higher level of PPV without incurring any damages

Table 1: Permissible Peak Particle Velocity (PPV) in mm/sec as per DGMS (India) Standard

Type of Structures	Dominant Frequency, Hz		
	<8 Hz	8-25 Hz	>25 Hz
(A) Buildings/structures not belonging to the owner			
i. Domestic houses /structure (Kuchha brick and cement)	5	10	15
i. Industrial buildings (RCC and framed structures)	10	20	25
ii. Objects of historical importance and sensitive structures	2	5	10
(B) Building belonging to owner with limited span of life			
i. Domestic houses /structures (Kuchhabrick and cement)	10	15	25
ii. Industrial buildings (RCC and framed structures)	10	25	50

In DGMS standard as mentioned above in Table 1, special provision has been given to the owner of the structure close to the blasting activities. Limit of safe vibration for residential houses not owned by the project authorities are more restrictive than the one owned by the project authorities on account of temporariness of the structures. However, irrespective of ownership and type of construction material, historical objects have been given special emphasis and the safe limit of PPV has been most restricted.

4.2 Air overpressure

When a blast is fired, it is frequently accompanied by a loud noise called air blast. Air blast is an atmospheric pressure wave consisting of high-frequency sound that is audible and low frequency sound that is sub-audible and cannot be heard. Either one or both of the sound waves can cause damage if the sound pressure is high enough. Air blast, generally is an annoyance problem, does not cause damage but may result in confrontation between the operator and those effected (Konya and Walter, 1990). Air blast is measured in decibels (dB) or in pounds per square inch (psi). Because of the wide range of over pressure, the decibel is usually used. The decibel is defined in terms of the overpressure, by the equation

$$\mathbf{AOP\ (dB) = 20\ LOG\ (P/P_o)} \qquad \text{(Eq. 2)}$$

Where,

dB = sound level in decibels,

P = overpressure in psi,

P_o = overpressure of the lowest sound that can be heard, and

P_o = $3 * 10^{-9}$ psi

Review of various standards reveals that at sound pressure levels below 130dB there will be audible rattle, mainly from windows and doors and from objects standing on shelves. With increasing amplitude, window panes begin to break at about 152dB. Most windows in an area would break at amplitude of 172dB, and structure damage would occur at 182dB or over (Siskind et a1. 1980b., Anon, 1998., Konya et a1. 1990).

For construction and quarry blasting specification, there has been long history of using 140 dB as an overpressure limitation. Recently it has become more common to make use of more restrictive limitation that were developed for surface mining operation and to apply them to all forms of blasting. For large scale surface mining operations, air overpressure can be characterized by lower frequency. For such large scale operation,

a common overpressure limit of 134 dB is recommended by United States Bureau of Mines (USBM) RI8485 (Siskind et al, 1980) as given below in Table 2.

Table 2: Typical Air overpressure criterion

Air Overpressure limits	Damage potential
180 dB	Some structural Damage
171 dB	General window breakages
140 dB	Occasional Window breakage
134 dB	US Bureau of mines recommendations for large scale surface mine blasting.

DGMS Circular suggests 90dB as the threshold for continuous occupational exposure upto 8 hours duration. However, there is no Circular from DGMS or Indian Bureau of Mines (IBM) regarding permissible safe level for air overpressure produced due to blasting. The permissible levels of air overpressure recommended by Siskind et. al, 1980(b) (Table 3) is most comprehensively used and hence same is adopted in this case also.

Table 3: Permissible level of Air overpressure (Siskind et. al, 1980(b))

Type of instruments	Permissible level (dB)
0.1 Hz high pass time	134
2.0 Hz high pass time	133
6.0 Hz high pass time	129
C-slow weighing scale (Event less than 2 sec duration	105

The following suggestions are made to control air over pressure:

1. A deeper charge or a better-confined charge produces a low pressure pulse.
2. Detonating cord used to interconnect down line for initiating detonation in the explosive in drill holes produces more sound pressure. The sharp air shock wave

from the detonating cord is a major cause of disturbance and is annoying to the neighbors. Hence, detonating cord is to be avoided except in remote locations.

3. As each detonating hole will produce its own fingerprint in the air pressure, it is recommended to connect holes in row and holes are to be fired sequentially in such a way that the initiation sequence is moving away from the sensitive object, thereby minimizing the risk for building up more severe blast waves propagating in a direction toward the sensitive object.

4. Avoid heavy charges too close to the ground surface where they may blowout, or "crater". Such charges may also generate flyrock. Having charges too close to the ground surface is a condition comparable to having charges, which are too far apart for the depth of stemming. The closest relief is upward.

5. Avoid heavy charges too close to an open face where they may also blowout, as above. These charges may also generate flyrock. The action is similar to the above, but may take place horizontally to an open face rather than vertically to the ground surface.

6. It is helpful to avoid placing charges in open seams, clay filled seams, highly fractured zones or other weaknesses, where they may allow explosive gases to be vented.

7. Use a depth of stemming which is sufficient to prevent flyrock and blowout.

8. Less stemming will be required if interlocking in the material is of good quality. If possible, avoid the use of fine stemming or light weight stemming which can't be compacted.

9. Higher pressures may be generated by large quantities of exposed detonating materials, such as detonating cord, surface delays and portions of down lines. If the air blast overpressures is too high, it may be necessary to cover these products with sand or similar material.

10. Although it is not directly related to increased overpressures, another factor of

interest is the time related to the occupancy of the area and residential activities. Certain times may be unfavorable for the residents of a given area, such as night, evening, early morning, or times when most of the people in the area are home and conditions are relatively quiet.

4.3 FLYROCK

The rock fragments ejected from the blast called "flyrock" is a serious hazard of blasting operations, particularly when the blast is conducted in the vicinity of village and structures of ecologically sensitive zone(ESZ). The factors which influence the flyrock distance include:

- Height of stemming column in the blast holes and type/quality of stemming material
- Irregular shape of free face/top of the bench
- Excessive large burden or blasting without free face
- Muffling of the blast area and the muffling material type.
- Scattering and overlapping of delay timings of the delay detonators/relays.
- Presence of water in blastholes

The first four parameters can be controlled by properly designing the blasting pattern whereas the last two parameters are not easily controllable. The risk from flyrock can be minimised to a great extent by proper design and execution of the design. FLyrock can be further eliminated using muffle blasting and same is recommended for the blasting operation near ESZ at Bhavali PSP site.

4.4 Noise

Blasting operations in ecologically sensitive zones can cause significant noise pollution, leading to various negative impacts on wildlife, vegetation, and human health. The resulting noise can disrupt habitats, affect communication and reproductive behavior of animals, and potentially damage structures and ecosystems. As per prevailing regulation as specified in

guidelines of ministry of Environment & forests, The Noise Pollution (Regulation and Control) Rules, 2000; (As amended till 10/08/2017 vide S.O. 2555(E)), the safe permissible limit for different types zones are as given below.

Table 4: Safe limit of Noise for various zones as per The Noise Pollution (Regulation and Control) Rules, 2000

Area Code	Category of Area/Zone	Limits in dB(A)	
		Day Time (6.00 am to 10 pm)	Night Time (10.00pm-6.00am)
A	Industrial area	75	70
B	Commercial area	65	55
C	Residential area	55	45
D	Silence Zone	50	40

During optimisation of controlled blasting techniques, efforts will be made to optimise blast design parameters in a as way that the noise produced at source is minimum. Further, the explosive and initiating devices used will be of highest quality which produces less sound such as NONEL and Shock tube initiation system. Further, all blasting operation will be taken as muffle blasting so that noise is further reduced and it remains well within the specified limit.

Other measures to be implemented during blasting operation includes measures such as using quieter explosives, optimizing blast designs, and using noise barriers. Limiting blasting activities to specific times of day or year to minimize disruption to wildlife and sensitive ecosystems is also effective way to reduce adverse impact of noise. Similarly establishing buffer zones around sensitive areas to reduce the impact of blasting on ecologically sensitive zones.

Monitoring noise levels during blasting operations will be carried out by CSIR-CIMFR Team to ensure compliance with regulations and to assess the impact on the surrounding environment

4.5 Dust Generated from the Blasting Operations

Drilling and blasting are processes of detaching rock material from the parent rock. Dust causes environmental, health, safety and operational problems affecting workers and surrounding environment. The distance from the drill and blast site determines the dust concentration produced. Different types of dust particle size are produced from drilling and blasting. These include >PM10, PM10, PM2.5, Total Suspended Particles and deposited dust.

Wet blasting technique is recommended for the dust control. This technique involves mixing water with the abrasive material in the blasting nozzle. This creates a slurry that captures dust particles at their source and prevents them from becoming airborne.

Installing ventilation systems can help to remove dust particles from the air and prevent them from accumulating in the workspace. Creating barriers or enclosing the blasting area can help to contain dust and prevent it from spreading to other areas. Implementing restricted zones around blasting operations can help to protect nearby workers and prevent dust from contaminating other areas. Providing workers with proper respiratory equipment, such as respirators, can help protect them from inhaling dust particles.

5.0 IMPACT ASSESSMENT OF BLASTING OPERATION ON WILD LIFE, MAN MADE STRUCTURES AND ENVIRONMENT

Blasting shall have adverse impact on fauna using the area contiguous with the surrounding habitation area as habitat. Construction and operation activities generate noise and artificial light, which can disturb wildlife. Nocturnal animals may be particularly affected by light pollution, altering their behavior and disrupting natural processes. The noise generation has an adverse impact on terrestrial fauna and avifauna.

Intervention in the project area will impact butterflies and birds which are quite sensitive to noise and human presence. The traffic noise has detrimental effect on the

survival rates and breeding success of such fauna which reside in the small habitats along roadside communicating using acoustic signals. Sometime as a result of habitat loss and physical disturbance, the fauna shall move from the habitat along roadside. Based on the field observations and interaction with local people and forest officials, it was noted that the Project area does not constitute part of any wildlife migratory routes and construction activities won't affect animal movement. All precautions shall be taken as envisaged under the relevant acts in respect of handling of explosive material and blasting which shall invariably be carried out by a qualified blaster.

CSIR- CIMFR team visited the site to physically evaluate the proximity of various sensitive structure around the project site. Exploratory trekking was done along the main component of the project, particularly the upper reservoir area where the Kalsubai Harischandragarh Wildlife Sanctuary is in close proximity of the rock excavation works. A detailed investigation on proximity of the ESZ area with the possible blasting operation was made by the visiting team. A detailed discussion on the construction methodologies and sequence of the rock excavation was done with the JSW team to evaluate the blasting impact on the flora and fauna.

5.1 Kalsubai Harischandragarh Wildlife Sanctuary

Kalsubai Harishchandragad Wildlife Sanctuary (KHWF) located on the Sahyadri mountain ranges which is part of the Western Ghats of Maharashtra and is situated between Latitude 19°25'57" to 19°34'04" North and Longitude 73°37'51" to 73°46'25" East covering an area of 225 sq. km (15 km × 15 km dimension). The elevation of the area varies from 148 m to 1508 m above MSL while most of the area is situated near the crest line of Western Ghats. Geologically this area is part of the Deccan Trap. The Kalsubai Harishchandragad Wildlife Sanctuary is replete with abundant kinds of flora and fauna. This region receives excessive rainfall of about 600 cm. The green landscape is stocked with beautiful vegetation and shrubs like Beheda, Avali, Gulchavi, Kharvel, Siras, Aashind, Parjambhual, Hirda, and Lokhandi under the bracket of trees. The

different animals in the study area, like the leopard, jackal, hyena, barking deer, Palm civet, Indian giant squirrel, mongoose, jungle cat, and also many species of mammals and birds. The Pravara River originates on the eastern slope of Sahyadri in between Kulang and Ratangad forts.

Figure 6 is a layout of the ecologically sensitive zone (ESZ) showing the distance of the quarry of the Bhavali PSP Project. In this figure, various distances are marked from the closest blasting site. Although the minimum distance of FRL boundary of upper reservoir is 12.5 m from ESZ at Saddle dam point, the actual operating distance of the quarry boundary from ESZ is 253 m. Therefore, for all blasting operation from ESZ will be minimum 253 m.

Various researcher have performed experimental blast vibration monitoring in basalt rock formation, similar to prevailing rock mass in Bhavali Project site, near pune and Mumbai. They found that the vibration attenuation. The observed vibration data in basalt rock formation were analysed to obtain the vibration attenuation characteristics. The plot of observed vibration data in terms of peak particle velocity and square root scaled distance is presented in Fig 7. The attenuation characteristics of vibration in basalt rock formation is presented in Eq. 2 and 3 at 50% and 95% confidence intervals.

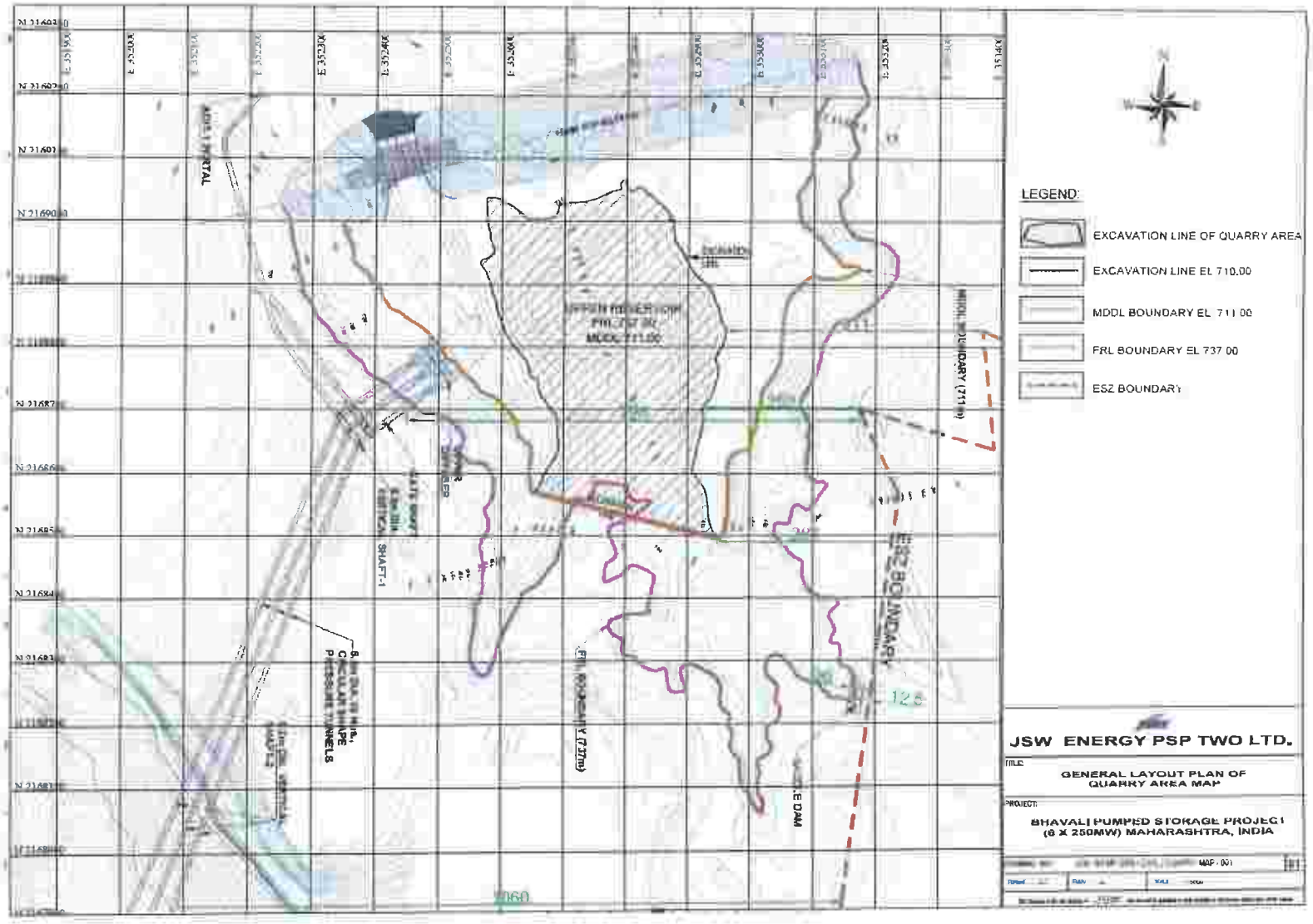

Figure 6: Layout of quarry area indicating proximity of the blasting site from ESZ.

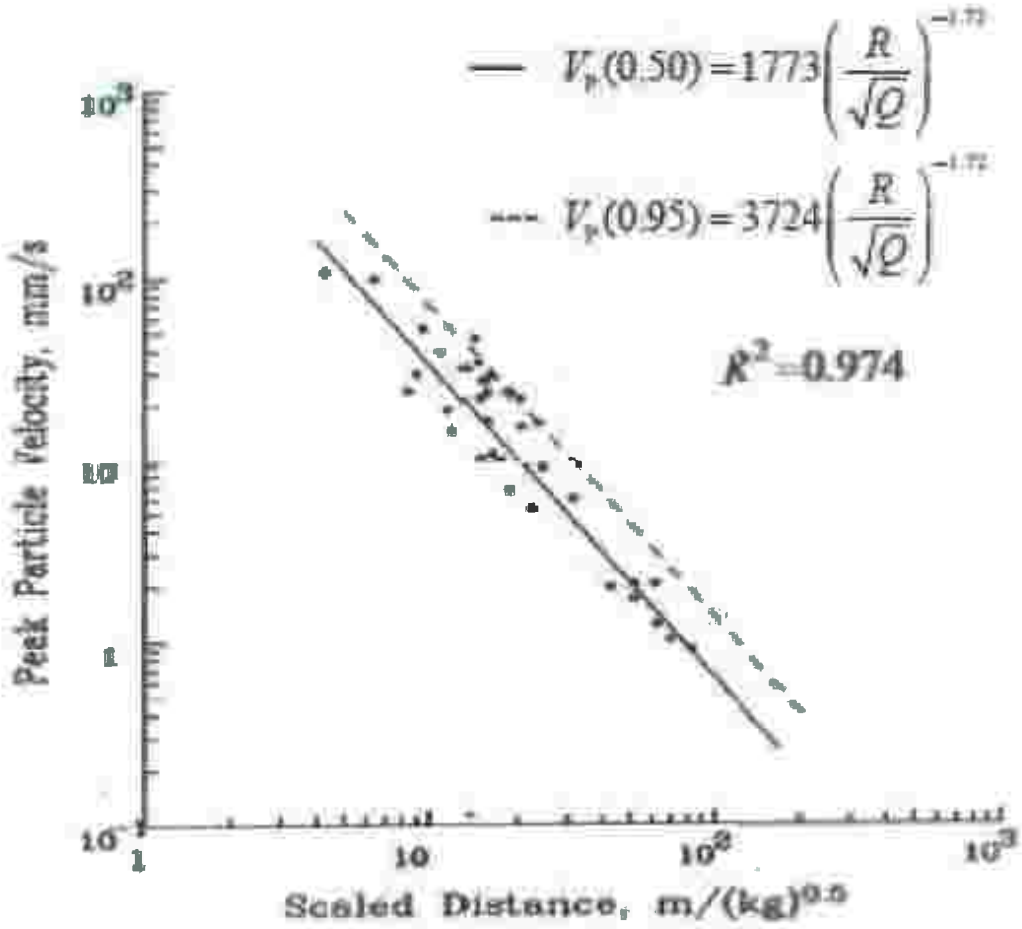

Figure 7: Plot showing attenuation characteristics of blast vibration in Basaltic rock mass formation

$$V_{ppv} = 1773\left(\frac{R}{\sqrt{W}}\right)^{-1.72} \quad (3)$$

$$V_{ppv} = 3724\left(\frac{R}{\sqrt{W}}\right)^{-1.72} \quad (4)$$

Where *R* is the distance (m) between the observation and blast and W is the quantity of explosive charge used per delay;

In Bhavali project site, the attenuation characteristics of the vibration will follow Eq. 3 and Eq. 4 at 50 % and 95% confidence intervals respectively. Equation 4 may be used for computation of safe charges and other Controlled blast design parameters considering Eq. 4. The minimum distance of 253 m is the value of R in Eq 4. The Eq. 4 will be further refined using filed data obtained by actual measurement of vibration during construction phase.

In addition to the surface excavation, underground excavation will also be done using controlled blast design parameters for rock excavation of tunnel, power house tail race tunnel etc. In all this blasting operations also, blast induced ground vibration will be controlled using optimised blast design parameters and the charge weight per delay. In underground blasting operation, problem of air overpressure, flyrock, dust and noise will not be there.

All efforts will be made to ensure that the vibration remains well with the 5.0 mm/s of peak particle velocity in all ESZ with the help of use of advanced explosive and initiating devices such as shock tube initiation systems, electronic detonators, etc. Such low vibration and AOP level will not create any problem to flora and fauna of Kalsubai Harishchandragad Wildlife Sanctuary.

5.2 IMPACT ASSESSMENT OF BLASTING OPERATIONS MAN-MADE STRUCTURES

During the course of filed investigation of the CSIR-CIMFR to Bhavali PSP site, efforts were made to locate and identify the man-made structure in and around the project site. The project site is scarcely populated and there are very few houses. It was informed that affected house within the project site have been suitably compensated and relocated. It was observed that the nearest village is Jamunde village which is close to Upper reservoir. The houses in the village are mostly mud house. This village is approx. 250 m from the site of blasting operations (Fig 8). Few more houses made of brick-mortar also observed. However, theses house are far off (>600 m) from the project site and the impact of controlled blasting operations will be insignificant on these houses (Fig 9).

Figure 8: Housing structures of Jamunde village (<250 m)

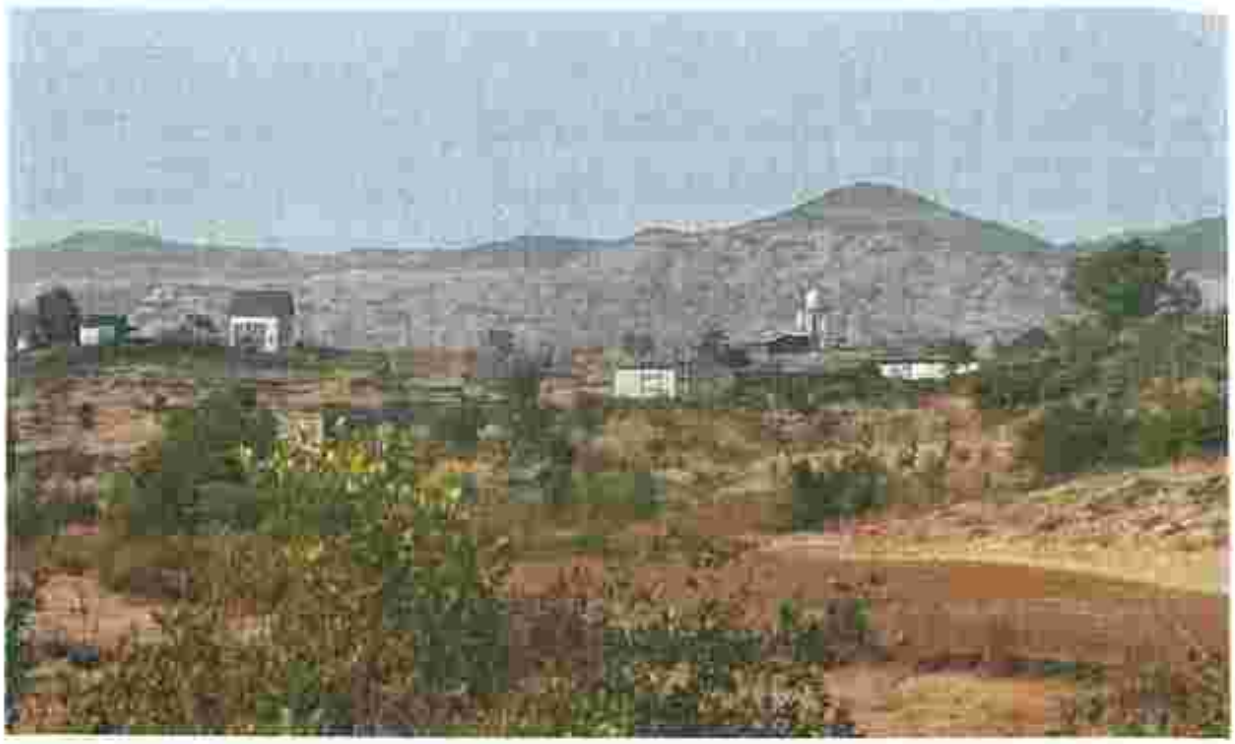

Figure 9: Housing structures in project site (> 600 m)

As per present Indian standard the safe vibration limit of vibration in terms of Peak Particle velocity is 5.0 mm/s. Base on this assessment, controlled blast design parameters will be recommended to ensure that the vibration remains less than the safe recommended PPV value of 5.0 mm/s and accordingly other parameters such as AOP, NOISE and Dust control measures will be implemented during the blasting operations.

6.0 RECOMMENDED MITIGATION MEASURES AND METHDOLOGIES

CSIR-CIMFR Team conducted a field investigation to identify and assess sensitivity of various wild life and man-made structures around the proposed Bhavali PSP Project, Igatpuri with due consideration to the proximity of the ESZ of Kalsubai Harishchandragad Wildlife Sanctuary. Following remedial measures are suggested to for mitigating adverse impact of blasting operation to ensure minimum disturbance to the nearby flora and fauna of Kalsubai Harishchandragad Wildlife Sanctuary and also the man-made structure in the close proximity of the rock excavation works.

6.0 Optimisation of controlled blast design parameters

The controlled blasting operation will only be implemented with optimised blast design parameters. The maximum charge weight of explosive in blast round will be decided using Eq. 4, which is attenuation characteristics of the blast induced ground vibration in predominant rock mass. This will ensure peak particle velocity of the vibration well within the recommended safe permissible limit as per India standard.

6.1 Controlled Blast Design Pattern

6.1.1 Formation of Benches

Any excavation that needs to be started has to be done under constricted blasting condition till a free face is created and benches are developed systematically. Initially shallow benches are formed and merged to achieve the desired bench height. Depending on the topography, hole are drilled and the desired bench height is achieved by conducting development blasts. In Bhavali PSP site, development will on a sloping area as it forms a part of the of hill. Bench preparation will be carried out by drilling shallow holes (2.5 to 3.0m) with a burden and spacing of 2.0 m x 2.5 m with a hole diameter of 45 mm. In some areas the hole depths as low as 1.5m will be required depending on the field conditions. In area more than 500 m from ESZ, higher dia hole and greater depth may also be used with controlled blasting operations.

6.1.2 Bench Height

Bench height is normally decided depending on the local geology, production size, type of loading machine and slope stability. For a blasting engineer the bench height is a fixed parameter. In this project site the benches are of height ranging from 3.0 m to 5.0 m to be developed in a systematic manner to form stable benches. The bench height shall match to the rock excavator for easy mucking and maneuver.

6.1.3 Blasthole Diameter

The suitability of the hole diameter is evaluated based on the compatibility to the bench height. The hole diameter is also decided on the minimum length of the charge in a blasthole, blast vibration constraints, rock structure and

minimum cost of production. The minimum length of bottom charge in a blast hole should be at least 20 times the charge diameter to yield good results. Depending on the site conditions and the need for controlling flyrock, ground vibrations etc., the hole diameter up to 45 mm can in area close to ESZ and upto 105 mm in sites at least 500 m away be used. However, the permissible maximum charge per delay needs to be complied with and control the vibrations/air overpressure and flyrock within safe limits.

6.1.4 Burden and Spacing

Burden (B) is defined as the distance from the blast hole to the nearest free face at the time of detonation. It is conventionally measured in the direction parallel to the free face. Burden with regard to delay pattern is called effective burden or true burden. Spacing (S) is defined as the distance between adjacent holes measured perpendicular to burden. The burden is the most important parameter and its assessment is made in the light of available literature.

Various burden formulae are available in the literature and all are of empirical nature. Rustan (1990) has shown that the formula developed by Langefors and Kihlstom (1963) is only valid for hole diameters in the range of 30-89 mm. Pearson formula (Gregory, 1984) is not easy to use as the input data such as maximum tensile strength of rock and maximum detonation pressure are not readily available. Burden can be calculated taking into account the hole diameter, the bench height, density of explosive, density of rock, bucket capacity of the loading machine and mean joint spacing.

Burden generally varies from 0.25 to 0.5 times bench height. Burden also varies from 20 to 35 times the hole diameter. For the hole diameter of 45 mm proposed near ESZ, the burden value range is 2.0 – 2.5 m. For higher diameter of hole up to 105 mm, burden of 2.5 to 3.2 m may also be used.

Spacing is calculated as a function of the burden. In most of the blasting operations, spacing to burden ratio has been found to vary between one and two.

Spacing is initially calculated as 1.2 times the burden. For any other spacing to burden ratio, burden and spacing can be adjusted provided the area (B x S) remains constant. A pattern of 3x5m is equivalent to a pattern 3.4x4.4m. Greater spacing to burden ratio is preferred for row by row initiation system. For diagonal or V pattern, S/B ratio will be between 1.0 and 1.4.

6.1.5 Charge Factor

Charge factor is the mathematical relationship between the weight of explosives and a given quantity of rock. It is normally expressed in kilograms per cubic meter. Since explosives vary in their energy content and the energy released on detonation, the charge factor is not a constant figure even for the same rock. Further, Konya and Walter (1990) have shown that the same amount of explosives can break different volumes of rock depending upon the orientation of holes with respect to the free face.

The charge factor is used basically to estimate the quantity of explosives in the hole or to plan for the explosive requirements. If soft rock is some what undercharged, it will still be muckable and if it is somewhat overcharged, excessive throw rarely occurs. On the other hand, undercharging of hard rock frequently results in a tight and blocky muckpile. Overcharging of hard rock may cause flyrock and airblast. The design of blasts in hard rock requires tighter control than in soft rock (Olofsson, 1991).

6.1.6 Blasthole Pattern and Initiation Sequence

Blast hole pattern could be square, rectangle or staggered. Each pattern has got its own place of application and needs to be initiated in a defined sequence depending on the end results. Row by row initiation with staggered pattern gives good results in blast casting and this is rarely used for conventional production blasting. Drilling errors are more in case of staggered patterns as compared to others. For a set of blast holes, several initiation sequences are possible. The initiation sequence significantly affects the blast results in respect of direction of throw, fragmentation and damage to the rock mass. Hagan (1983) suggests

that the initiation sequence for multi-row blasts should be such that (a) each charge shoots to a free face (b) effective spacing to burden ratio is as per the design (c) blasthole are effectively staggered. In order to satisfy these requirements he recommends staggered V pattern (Figure 10). To avoid blowouts in the back rows, one delay period is generally skipped.

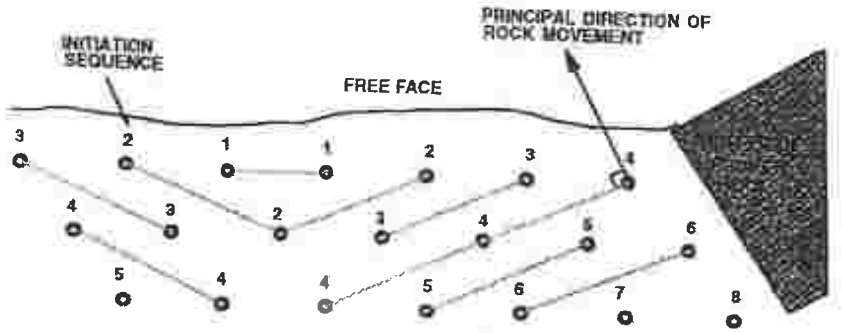

Figure 10: Staggered V pattern when blasting along side a buffered end

Figure 11 shows a diagonal sequence for a staggered pattern. Figure 12 shows the traditional V cut, but instead of blasting a rectangular block, a trapezoidal area is prepared in order to eliminate the problem of heavy confinement on the longest delay. If this pattern is employed, a comer cut as shown in the Figure 13 can be followed to further develop the bench. The last row of holes in this sequence breaks at obtuse angle in the comer, thereby causing less wall damage and a lower probability of blowout. Figures 14 and 15 show rectangular pattern initiated with a V cut or diagonal pattern depending on the block orientation and the general face conditions

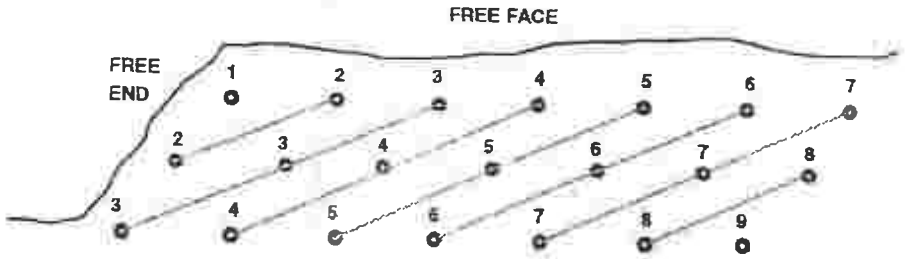

Figure 11: Staggered diagonal pattern shooting to a free face

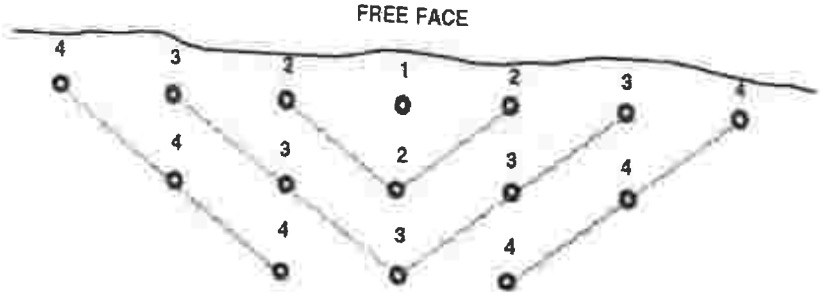

Figure 12 V cut (angle corner) progressive delay

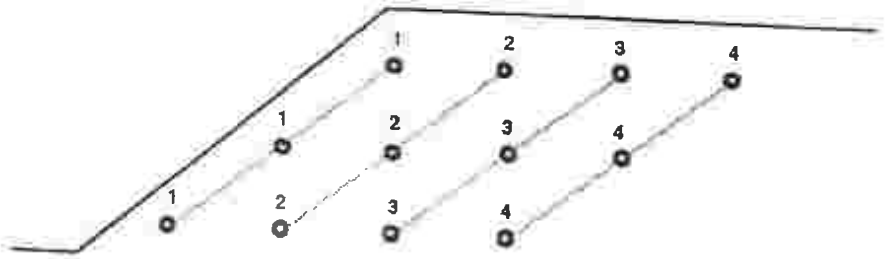

Figure 13: Angled corner cut fired on echelon pattern

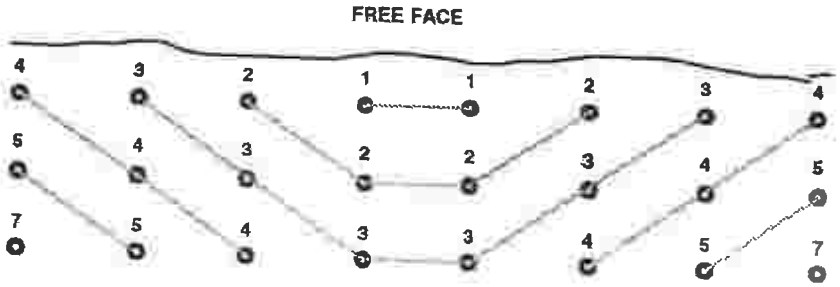

Figure 6: V cut for a rectangular pattern

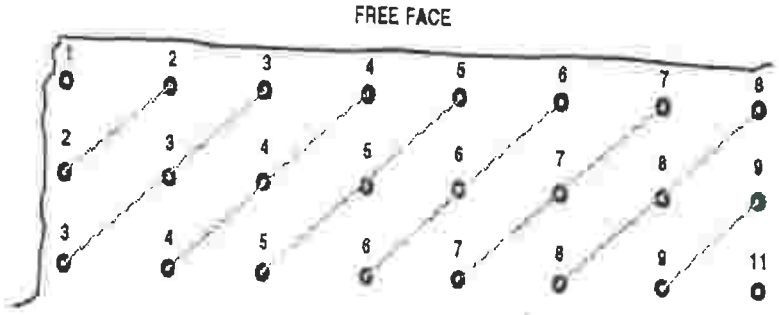

Figure 14: Diagonal sequence for a rectangular pattern

6.1.7 Delay Timing

For multi-row blasting, the rock must be allowed to move 1/3rd of the burden distance before the next row detonates. The delay intervals between the rows may vary from 10ms/m of the burden for hard rock to 30ms/m of burden for soft rock (Olofsson, 1991). An optimum inter-row delay gives good fragmentation and displacement without cut-off. Improper delay gives rise to problem of flyrock, vibration, toe and back break. For large diameter blast holes, the optimum inter-row delay usually varies from about 5ms/m of effective burden for strong massive rocks to about 10ms/m for weak/highly fissured strata (Hagan, 1983). In addition to burden and rock type Konya and Walter (1990) have suggested delay timing depending on the desired end results based on their priority. The best possible fragmentation can be achieved with delay timing of 10 - 20ms/m of burden.

6.1.8 Stemming

Stemming is an inert material filled on top of the explosive charge in a blast hole. It is essential to enhance the explosive efficiency and reduce the environmental problems related to blasting. If the stemming is inadequate, the explosive gases will vent prematurely reducing blast hole pressure and resulting in poor displacement and tight muckpile. It is also accompanied by flyrock torn from the collar region plus air blast. Often there is a further perceptible waste of energy in the form of flame indicating that the explosive reaction is incomplete at the time of venting. Stemming length varies from 0.7 to 1.5 times burden depending on the rock being blasted and the concern for fragmentation and flyrock problems (Table 5).

Table 5: Suggested stemming length for surface blasting

Case	Rock being blasted	Flyrock problem	Stemming length, m
1	Hard	Yes	1.0 – 1.3 times
2	Hard	No	0.7 – 1.0 time burden
3	Soft	Yes	1.0 – 1.3 time burden
4	Soft	No	0.7 – 1.0 time burden

There are several kinds of material that have been used for stemming. Water, mud, soil, wet clay and drilling dust are easily ejected. On the other hand, dry angular material under the effect of impulse gas pressure tends to form a compaction arch, which locks into the wall of a blasthole, thus increasing its resistance to ejection. Stemming materials can be ranked in this order from the least efficient to most efficient; air, water, wet drill cuttings, wet sand, paper cartridge of rock dust, clay dummies, wet crushed stone, dry drill cuttings, dry sand, dry crusher run stone, dry screened stone (Lippincott, 1992).

In water filled holes, gravel and crushed rock quickly settle to form a plug of stemming, not as effective as that in a dry hole but still effective. The behavior of drill cuttings can be quite different. The drill cuttings are converted to a sludge, which has little to offer, other than its own mass, in opposing explosion gas pressure.

In general, drill cuttings are preferred, as they are readily available and conveniently located at the collar of the hole, whereas other material is to be brought to the site. The optimum size of stemming material is about 5 - 25mm depending on the blast hole diameter. For a diameter of 102/115mm, 5 - 10mm crushed stone is recommended (Konya and Walter., 1990, Anon., 1993).

6.2 Noise and Air overpressure Control Measures

Noise and air overpressure control measure such as use of explosive and initiating system such as Shock Tube Initiating system (NONEL), Twin-Det/ Dual Det system for making circuitry arrangement in a blast rounds will only be used.

No conventional initiating devices such as detonating fuse will be used. Shock tube initiating systems produces significant less air overpressure/Noise as compared to conventional Detonating fuse. AOP and Noise level will be maintained as per recommended safe permissible limit of CPCB/DGMS etc.

6.3 Restricted Timing of Blasting Operation

Blasting operation shall be conducted only in day time, preferably in afternoon so that due to phenomenon of temperature inversion, all the air overpressure wave/Noise wave are refracted to open sky rather than reflected back to the ground surface level and travelling to longer distance. In morning and evening hours, due to higher density of air near ground surface level, more amount of the air overpressure wave tend to travel longer distance and hence may be given rise to higher level of air overpressure and noise level. No surface blasting operation shall be conducted beyond sunset and sunrise. Air overpressure/ Noise due to Air pressure pulse and rock pressure pulse will be controlled using the blast design parameters such as No. of Holes, Hole Depth, bench height etc.

6.4 Dust Control Measures

During drilling operation only wet drilling shall be carried out so that no dust is produced. In blasting operation and breakage of the rock mass, dust is invariably produced. However, with muffle blasting i.e. covering the blast round with blasting mats reduced the dust generation to more than 90%. Blasting mats are used in blasting operations to contain the blast, prevent flyrock (rock fragments ejected during blasting), and reduce noise and vibrations. They help protect nearby structures, people, and the environment from potential damage and harm.

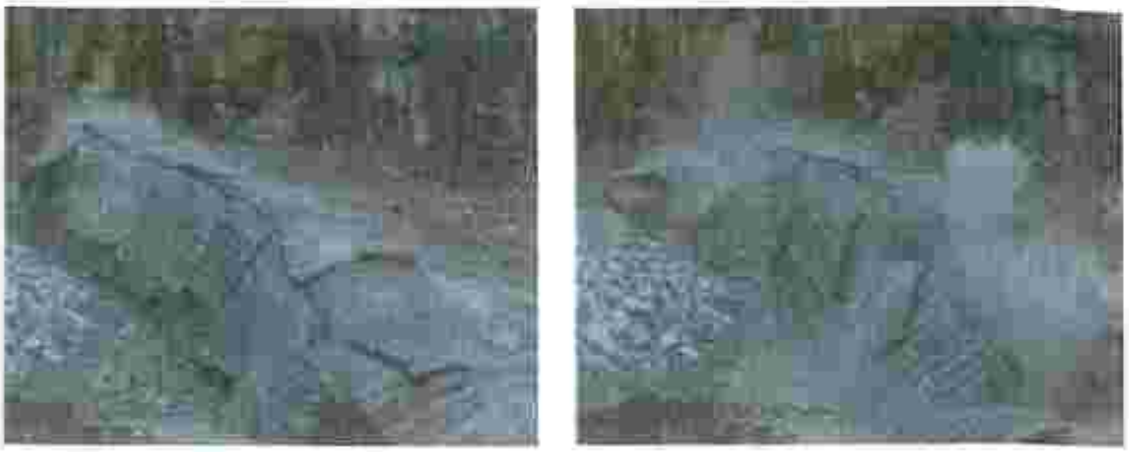

Figure 15: Photographs of blasting operation with blasting operation with blast mats

6.5 Flyrock Control Measures

As discussed in preceding section of this report a comprehensive flyrock control measure will be adopted while carrying out the blasting operation which included, designing the controlled blast design parameters as per the prevailing rock mass, use of blasting mats, charging holes after identifying the weak zone in the strata , adequate stemming length and stemming materials. In area close to ESZ, a provision of the barricade is also recommended. It will not only prevent any flyrcok crossing the construction but will also be helpful in reducing noise/ air overpressure level.

6.6 CSIR-CIMFR Supervision of the Blasting Operation

JSW Energy PSP two Limited have requested CSIR-Central Institute of Mining and Fuel Research for technical support and guidance during construction of Bhavali PSP project considering not only its proximity with ESZ of Kalsubai Harishchandragad Wildlife Sanctuary but also to prevent rock mass damage to the surrounding structures during construction of various components of the project. CSIR-CIMFR Team have accepted the same and agreed to supervise and guide the team for all day to day to blasting operation by deputing the technical staff with necessary equipment at site.

6.7 Continuous monitoring of vibration and air overpressure/ noise level

All day to day controlled blasting operation will be carried out under supervision of expert team of CSIR-CIMFR who will be stationed at site. The team will guide execution team and follow the optimised blast design pattern. During blasting operations, blast induced ground vibration and AOP/Noise level will be monitored in all sensitive location such as closest ESZ points using advance tri-axial seismographs. Multiple seismographs will be used to monitor the parameters at different locations simultaneously.

6.8 Documentation of Blasting parameters

CSIR-CIMFR team will develop a system of documentation for each round of the blasting operations. Records of the blast induced ground vibration and air overpressure/ Noise will be also maintained meticulously and same may be submitted to the regulatory agencies, if required.

7.0 CONCLUSION AND RECOMMENDATIONS

JSW Enegry PSP 2 Limited requested to CSIR-Central Institute of Mining and Fuel Research for technical support and guidance for carrying out control blast design operation during construction of Bhavali PSP with special emphasis to prevent any adverse impact of blasting operation to flora and fauna of Kalsubai Harishchandragad Wildlife Sanctuary. Team of Scientists and staff members of CSIR-CIMFR Team conducted preliminary field investigation to assess the possible impact of blasting operations and evaluated the required mitigation measures.

CSIR-CIMFR team suggested a series of mitigation measures to prevent the adverse impact on flora and fauna of Kalsubai Harishchandragad Wildlife Sanctuary, man-made structures and surrounding environment.

Based on the input on rock mass obtained from the geotechnical investigation report, Controlled blast design parameters are suggested to ensure that ground

vibration level remains well within the safe permitted limit as per prevailing Indian Standard. These parameters will be further calibrated and optimised during construction of the project as per data obtained through real time measurement using advance seismographs. Mitigation measure for control of Air overpressure/ Noise/ Dust and flyrock is given in this preliminary report.

CSIR-CIMFR Team also agreed to provide continuous technical support during construction phase of Bhavali PSP by deputing project staff with necessary equipment such as blast induced ground vibration and AOP/Noise monitoring system. Entire blasting operation will be supervised by the CSIR-CIMFR team. A system of documentation will be developed and meticulous record of each blasting round together with the vibration and AOP observed from each blast rounds will be kept for future review also

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NOTE

Annexure- 5.2

Central Electricity Authority

सत्यमेव जयते

Guidelines for Formulation of Detailed Project Reports for Pumped Storage Schemes

New Delhi
July, 2024
(Version 3.0)

This process of preparation of Detailed Project Report (DPR) shall be completed by the Developer indicatively in a period of:

(i) 690 days from the date of allotment/ signing of MoA/MoU of the project, extendable by 180 days for reasons beyond the control of Developer for following PSPs:
   a) PSPs located in non-Himalayan region comprising of surface power house.
   b) PSPs located in non-Himalayan region comprising of underground power house in an area with good geology.

(ii) 840 days from the date of allotment/ signing of MoA/MoU of the project, extendable by 180 days for reasons beyond the control of Developer for following PSPs:
   a) PSPs located in Himalayan region.
   b) PSPs located in non-Himalayan region comprising of underground power house in an area with poor geology.

For further delay on part of Developer, State Government may make a provision for resorting to levy of a financial penalty against the developer and/ or cancellation of project allotment.

The Data collected by Developer for preparation of DPR shall be property of concerned State Government and its copy shall be made available to CEA/ CWC.

Typical bar chart showing different activities to be carried out by the project authorities for preparation of DPR and by CEA/ CWC/ GSI & CSMRS for approval ofabove chapters is given at **Plate-1(a), (b) & (c)**. Typical flow chart showing different activities to be carried out by project authorities before submission of DPR and pre-DPR clearances by CEA, CWC, GSI & CSMRS is given at **Plate-2 (a), (b) & (c)**.

The DPR prepared by the Generating Company/ Project Developer shall be structured in the format as described in the succeeding paragraphs.

2.6 Structure of the Detailed Project Report

The structure of DPR/ details to be included in the respective chapters of the DPR is given below. The sections of *"Guidelines for preparation of Detailed Project Report of Irrigation and Multipurpose Projects" issued by CWC* to be referred are indicated inbracket against the respective components of work.

2.6.1 DPR should include the following chapters:

Chapter -I	Introduction
Chapter –II	Justification of project from power supply angle
Chapter -III*	Basin Development
Chapter –IV*	Inter-State Aspects (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter -V	Surveys & Investigations (Section 3.4) (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter –VI	Hydrology (Section 3.5) (As per already approved chapter/ aspect

as referred under para 2.3 above)

Chapter –VII	Reservoir (Section 3.7) (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter –VIII	Power Potential Studies & Installed Capacity (Refer Appendix-2 of these Guidelines) (As per already approved chapter/ aspect as referred under para 2.3 above)
Chapter –IX	Design of Civil Structures (Section 3.6)
Chapter –X	Electrical and Mechanical Designs
Chapter –XI	Transmission of Power and Communication facilities
Chapter –XII	Clearances / Inputs

Examination of Cost Estimates of Pumped Storage Projects is exempted from Concurrence Process. However, following additional chapters shall be submitted by project developer to the Authority within 60 days from date of uploading the DPR on CEA portal so as to ascertain the project cost in accordance with the limit specified by the Central government from time to time. It will not be vetted by CEA/CWC.

If any project developer desires to get the cost estimates examined by CEA, the same will be examined by CEA in consultation with CWC in parallel to concurrence process.

Chapter –XIII	Construction Programme & Plant Planning (Section 3.13)
Chapter –XIV	Project Organization
Chapter –XV	Infrastructural Facilities
Chapter –XVI	Environmental & Ecological Aspects
Chapter –XVII	Cost Estimates
Chapter –XVIII	Allocation of Cost
Chapter –XIX	Economic Evaluation
Chapter –XX	Future Utilization of Buildings (Section 3.20)
Chapter –XXI	Recommendations

*Note: Chapters on Basin Development and Inter-state Aspects are not required for **Off-stream closed loop type PSPs**.

Additionally, the Cost of Enabling Infrastructure/ Flood Moderation etc. (wherever applicable), which can be availed as Grant from GoI , must be vetted from the respective appraising group (CEA/ CWC).The Project developer needs to get this cost vetted before the commencement of construction of the project.

Chapter-wise detailed information to be included in the Detailed Project Report hasbeen

5.7 Seismicity (As per already approved chapter/ aspect as referred under para 2.3 above)

5.8 Foundation investigations of different structures/components of the project indicating boreholes details, soil/rock strata etc. (As per already approved chapter/ aspect as referred under para 2.3 above)

5.9 Construction materials investigations (As per already approved chapter/ aspect as referred under para 2.3 above)

5.10 Hydrological and meteorological investigations.

Chapter -VI HYDROLOGY (Section 3.5)

(As per already approved chapter/ aspect as referred under para 2.3 above)

6.1 Hydrological inputs for the project planning

6.2 Effect of project development on hydrologic regime.

6.3 Hydrological studies for water availability, design flood, design flood levels, diversion flood, sedimentation etc.

Chapter –VII RESERVOIR (Section 3.7)

(As per already approved chapter/ aspect as referred under para 2.3 above)

7.1 Catchment area, annual run-off, submergence, suitability of soil/rock, dead storage level

7.2 Sedimentation data and studies

7.3 Fixation of storage and reservoir levels, {maximum water level (MWL), full reservoir level (FRL), minimum draw down level (MDDL)}, flo od cushion etc.

7.4 Life of reservoir in years with basis

7.5 Capacities at MWL, FRL, MDDL, Dead Storage level etc. at project planning stage and after 25, 50, 75 and 100 years or more of operation

7.6 Water tightness of the reservoir

7.7 Annual losses (month-wise) (evaporation, seepage etc.)

7.8 Flood absorption on regular/flash flood

7.9 Effect on subsoil water tables in the adjoining areas upstream and downstream of the dam

7.10 Seismic characteristics and effects due to construction of dam

7.11 Reservoir rim stability

7.12 Length of Reservoir and Area of submergence

7.13 Land acquisition

7.14 Recreation facilities

7.15 Pisci-culture

Suggestive Measures to Reduce to tariff of the project at DPR stage are attached at ***Appendix-3***

Chapter –XX FUTURE UTILISATION OF BUILDINGS (Section 3.20)

20.1 Details of buildings to be constructed to meet peak requirements of the project

20.2 Departmental requirement of buildings after completion of the project

20.3 Requirement of the buildings by other agencies

20.4 Utilization of surplus buildings

Chapter –XXI RECOMMENDATIONS

20.1 Economic justification of the project

20.2 Socio-economic and other benefits

2.7 Aspects to be appraised

i. **Hydrology:** An accurate assessment of the hydrology at the project site is required in on-stream and off-stream open loop pumped storage scheme to determine designed flood and diversion flood estimation for designing spillways, diversiontunnels etc.. Appraisal of the project hydrology includes water availability studies, design flood estimation, diversion flood estimation and sedimentation studies for estimating the life of the project.

ii. **Hydro Power Planning:** Power potential studies shall be carried out to determine the installed capacity, number and size of units, generating energy, pumping energy and cycle efficiency.General layout of the Scheme whether it fits into the overall basin development plan or not is also examined.

iii. **Dam/ Embankment/ Barrage/ Weir etc. and Head Works**: Design and safety of the dam/ embankment/ barrage/ weir etc. and appurtenant works are examined.

iv. **Hydraulic Structures/ Hydel Civil Design:** Techno- economic evaluation of water conductor system and power house comprising of intake, de-silting arrangement, head race tunnel, surge shaft, pressure shaft/ penstock, tailrace tunnel/ channel and the type/ layout and dimensions of the power house is made to ensure that the surveys and investigations carried to finalize the layout & designs are adequate, layout is optimum & is evolved after evaluation of various alternatives; project components are safe, planning & design has been carried out utilizing state of the art technology and relevant standards.

v. **Geology:** Geology of the project components is appraised to ensure that detailed geological mapping & geophysical surveys have been done, drilling/ drifting carried out and structural features viz. thrusts, folds/faults have been studied in detail to delineate problems during construction.

vi. **Electro-Mechanical Design:** Design & layout of turbine-generator sets, main step-up transformer, auxiliary equipment in the power house and switchyard / gas insulated switchgear room etc. are appraised.

Annexure-6

Energy PSP Two Limited
Regd. Office: JSW Centre
Bandra Kurla Complex
Bandra (East), Mumbai - 400 051
CIN U40106MH2021PLC367736
Phone: 022-4286 1000
Fax: 022-4286 3000

UNDERTAKING

The JSW Energy PSP Two Limited, JSW Centre, Bandra Kurla Complex, Bandra East, Mumbai- 400 051 is intending to construct Pumped Storage Project (1500 MW) in Thane & Nasik Districts of Maharashtra State.

1. The Government of Maharashtra has signed a Memorandum of Understanding with the JSW Energy PSP Two Limited, on 14th day of September, 2021, for facilitating setting up of a Hydro Energy Project in Thane & Nasik districts of Maharashtra State as per existing policy framework.

2. The land proposed for the project involves Reserved Forests and Private Forests (Deemed Reserved Forest) Land to the extent of 243.74 Ha.

3. A total of 243.74 hectares of forest land includes a proposed area of 62.29 hectares located in the village of Jamunde, within the Igatpuri Range of Nashik. This specific land is designated as part of forest land Survey no. 42.

4. There are five Survey nos. 37, 38, 39, 40, and 41 located within the Survey no. 42 that are also belongs to the Forest Department; however, they do not need to be diverted for the project.

5. We, JSW Energy PSP Two Limited, hereby confirm that Survey nos. 37, 38, 39, 40, and 41 are not necessary for diversion for the project.

Date: 26/09/2025

Place: Mumbai

Office Seal:

JSW Energy PSP Two Limited

(Lalit Parab)

Authorized Signatory,
JSW Energy PSP Two Limited
JSW Centre, Bandra Kurla Complex,
Bandra East, Mumbai- 400 051

Part of O.P. Jindal Group