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Government of India
Ministry of Environment, Forest and Climate Change
IA Division
(River Valley and Hydroelectric Projects)
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Minutes of 01st Meeting of the Re-constituted Expert Appraisal Committee (EAC) meeting River Valley and Hydroelectric Projects held from 17/10/2023 to 18/10/2023

Date: 07/11/2023

MoM ID: EC/MOM/EAC/756541/10/2023

Agenda ID: EC/AGENDA/EAC/756541/10/2023

Meeting Venue: MOEF&CC, INDIRA PARYAVARAN BHAWAN, NEW DELHI

Meeting Mode: Physical

Date & Time:

17/10/2023	10:30 AM	05:30 PM
18/10/2023	10:30 AM	05:30 PM

1. Opening remarks

The 1st meeting (hybrid mode) of the re-constituted EAC for River Valley & Hydroelectric Projects organized by the Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi, was held on 17th - 18th October, 2023, under the Chairmanship of Prof. G. J. Chakrapani. After initial introduction of all, the committee deliberated on the various issues and challenges for sustainable development of hydroelectric and river valley projects and expressed their absolute commitment, cooperation and team work for the EAC.

2. Confirmation of the minutes of previous meeting

The EAC confirmed the minutes of 51st EAC meeting held on 12th September, 2023.

3. Details of proposals considered by the committee

Day 1 -17/10/2023

3.1. Agenda Item No 1:

3.1.1. Details of the proposal

Ramial Left Bank Pumped Storage Project (1500 MW) by **RENEW SOLAR POWER PRIVATE LIMITED** located at **KENDUJHAR,ODISHA**			
Proposal For		Fresh ToR	
Proposal No	**File No**	**Submission Date**	**Activity**

			(Schedule Item)
IA/OR/RIV/438758/2023	J-12011/40/2023-IA.I (R)	01/08/2023	River Valley/Irrigation projects (1(c))

3.1.2. Project Salient Features

1.6.1 The proposal is for grant of Terms of Reference (ToR) to the project for Ramial Left Bank Close Loop Pumped Storage Project (1500 MW) in an area of 335.25 ha at Village Godikansa and Godinarda, Tehsil Telkoi, District Keonjhar, Odisha by M/s Renew Solar Power Private Limited.

1.6.2 The Project Proponent and the accredited Consultant M/s. R. S. Envirolink Technologies Pvt. Ltd., made a detailed presentation on the salient features of the project as discussed in the following:

i. The proposal earlier considered by the EAC in its 50th meeting held on 11.08.2023 wherein EAC deferred the proposal for ADS, while making observation, that *"the alternative site study is focused on power generation perspective, no environmental consideration has been taken into account. The PP should revisit the proposed alternatives in terms of loss of forest land, impact on ecosystem services and scope for restoration of natural environment."*

ii. The ADS sought by the EAC was submitted by the PP on 20/09/2023 is given under:

Four alternatives of the project layout were studied for the selection of most optimized project layout:

Alternative 1: Layout with underground Powerhouse and other components of this scheme are Upper reservoir, Intake structure, Penstock / Pressure Shaft, Tail Race Outlet and Lower reservoir for the capacity of 1500 MW.
Alternative 2: Layout with Surface Powerhouse and other components of this scheme are Upper reservoir, Intake structure, Penstock / Pressure Shaft, Tail Race Outlet, Tail Race Channel and Lower reservoir for the capacity of 1500 MW.
Alternative 3: Layout with Underground Powerhouse and other components of this scheme are Upper reservoir, Intake structure, Penstock / Pressure Shaft, Tail Race Outlet, Tail Race Channel and Lower reservoir for the capacity of 810 MW.
Alternative 4: Layout with Underground Powerhouse and other components of this scheme are Upper reservoir, Intake structure, Penstock / Pressure Shaft, Tail Race Outlet, Tail Race Channel and Lower reservoir for the capacity of 550 MW.
These four alternatives layouts are with four distinct locations of lower reservoirs and three distinct locations of upper reservoirs. The location of the upper reservoir for Alternative 1 & 2 are same. However, the location of lower reservoir for alternatives 1&2 are slightly different. In Alternative 3 and 4 Project layouts have independent project components and the locations of all the components viz-viz upper reservoir, lower reservoir and alignment of water conductor system is different.

The summary of various alternatives based on environmental and forest aspects is tabulated below.

Sl. No.	**Parameters**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**
1	Installed Capacity (MW)	1500	1500	810	550
2	Topography	The upper reservoir is proposed in a flat terrain with favourable	Same as Alt- 1	The Upper reservoir is having huge rock blocks with gapping	The Upper reservoir topogra phy is

		geology for construction of Embankment for water tightness.		joints filled with overburden	similar to Alt-3
3	Total Land Requirement (Ha)	333	320	200	164
3A	Forest Land (Ha)	133	132	142	140
3B	Non-Forest Land (Ha)	200	188	58	24
3C	Forest land (Ha)/MW	0.089	0.088	0.175	0.255
4	Muck Disposal / Dumping Yard	Non-Forest	Non-Forest	Forest	Forest
5	Protected Area / Wildlife Sanctuary (distance from Lower reservoir)	Simlipal WLS about 70 km away	Simlipal WLS about 70 km away	Simlipal WLS about 73 km away	Simlipal WLS about 75 km away
6	Accessibility (New approach roads in Forest area)-km	10	8	10.5	11
7	Length of pipeline for one-time water filling of Lower reservoir from Dandadhar reservoir (km)	7	6.5	5	12.5
8	Dense forest involvement	Upper reservoir in non-forest area, while other components lie in thin forest cover	Same as Alt- 1	All project components lie in Dense Forest cover	Same as Alt-3

iii. The salient features of the project are as under:

1. Project details:

Name of the Proposal	Ramial Left Bank Pumped Storage Project
Location (Including coordinates)	Lower Reservoir: 85°33'58.87"E; 21°15'11.74"N Upper Reservoir: 85°32'46.04”E"; 21°16'9.69"N
Inter- state issue involved	No
Seismic zone	Zone-II

2. Category details:

Category of the project	A
Provisions	
Capacity / Cultural command area (CCA)	1500 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

3. Electricity generation capacity:

Powerhouse Installed Capacity	1500 MW
Generation of Electricity Annually	3214.7 MU
No. of Units	7 nos. (5X250 MW+2X125 MW)
Additional information (if any)	Nil

4. ToR/EC Details:

Cost of project	6383.23 Cr.
Total area of Project	320.00 ha
Height of Dam from River Bed (EL)	Lower Dam – 23 m Upper Dam – 24 m
Length of Tunnel/Channel	2116 m
Details of Submergence area	176.00 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	Not Applicable, as this is Off-Stream Closed Loop Pumped Storage Project (PSP)
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by b) EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	No

5. Muck Management Details:

No. of proposed disposal area/ (type of land-Forest/Pvt. land)	82.0 ha Private Land
Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

6. Land Area Breakup:

Government land/Forest Land	132.0 ha
Submergence area/Reservoir area	176.0 ha

Land required for project components	144.0 ha
Additional information (if any)	Nil

7. Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone	Yes/No	Details of Certificate / letter/ Remarks
Reserve Forest/Protected Forest Land	--	There is no Protected Area in the vicinity of the proposed project. Simlipal WLS is about 70.0 Km from site, is the nearest protected area.

3.1.3. Deliberations by the committee in previous meetings

Date of EAC 1 :11/08/2023

Deliberations of EAC 1 :

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of terms of reference to the project for Ramial Left Bank Close Loop Pumped Storage Project (1500 MW) in an area of 335.25 ha at Village Patkelipur and Godinarda, Tehsil Telkoi, District Keonjhar, Odisha by M/s Renew Solar Power 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**.**

50.4.4 The EAC during deliberation observed that the alternative site study is focused on power generation perspective, no environmental consideration has been taken in to account. The PP should revisit the proposed alternatives in terms of loss of forest land, impact on ecosystem services and scope for restoration of natural environment.

The proposal was therefore **deferred** on the above lines.

3.1.4. Deliberations by the EAC in current meetings

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of terms of reference to the Ramial Left Bank Close Loop Pumped Storage Project (1500 MW) in an area of 335.25 ha at Village Godikansa and Godinarda, Tehsil Telkoi, District Keonjhar, Odisha by M/s Renew Solar Power 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.

3.1.5. Recommendation of EAC

Recommended

3.1.6. Details of Terms of Reference

3.1.6.1. Specific

Environmental Management and Biodiversity Conservation**	
1.	i. Conducting site specific ecological study w.r.t riverine ecology focus on fish diversity

		and aquatic biota due to construction of lower reservoir across Dandadhar reservoir and River Ramial. ii. Stage I FC for 132.0 ha of forest land involved in the project shall be submitted prior to grant of EC iii. Conduct Environmental Cost Benefit Analysis in terms of loss of Forest ecosystem due to diversion of Forest land/ loss of biodiversity and its impacts on ecosystem, water availability, water uses for generation of hydro power in study area 10 km from periphery of Project components iv. Alternative sites for various components shall be identified in terms of loss of forest area and other environmental aspects. Explore to minimize forest land. v. Action plan for survival of the rivulets located in the study area. vi. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Standard ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all three seasons. vii. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared. viii. Sampling locations be located to cover villages situated near the reservoir and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report. ix. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report. x. A detailed wildlife conservation plan for Schedule –I species, duly approved by the Chief Wild Life Warden, be submitted. xi. In case any Wildlife corridor is located within 10 km radius of the project site a detailed study shall be conducted to assess the impact of project on safe movement of wild animals. xii. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP. xiii. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Govt. institutions/ Indian Council of Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report. xiv. MoU for water uses for the project shall be signed and approved by concerned authority. xv. Environmental matrix during construction and operational phase needs to be submitted. xvi. Matrix formulated on the basis of detailed study and field survey of flora and fauna methodology used shall be mentioned in the EIA report. xvii. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State. xviii. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component. xix. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.
Muck Management/ Disaster Management		
1.	xxvii.	Details of quantity of muck generation component wise and disposal site along

	with transportation plan and its monitoring to be provided. xxviii. Details of Muck Management plan prepared along with estimated cost incorporated in EIA/ EMP report. xxix. Techno-economic viability of the project must be recommended from CEA/ CWC
Socio-economic Study	
1.	xxii. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project. xxiii. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter. xxiv. Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the CER in compliance of the Ministry's OM F. No. 22- 65/2017- IA.III dated 30th September, 2020 shall be submitted. xxv. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared. xxvi. Details of settlement in 10 km area shall be submitted.
Miscellaneous**	
1.	xxx. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted. xxxi. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose. xxxii. Both capital and recurring expenditure under EMP shall be submitted. xxxiii. The photograph should bear the date, time, latitude & longitude of the monitoring station/ sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyse the samples. xxxiv. Arial view video of project site shall be recorded and to be submitted.

3.1.6.2. Standard

1(c)	**River Valley/Irrigation projects**
Scope of EIA Study	
1.	The EIA Report should identify the relevant environmental concerns and focus on potential impacts that may change due to the construction of proposed project. Based on the baseline data collected for three (3) seasons (Pre-monsoon, Monsoon and Winter seasons), the status of the existing environment in the area and capacity to bear the impact on this should be analysed. Based on this analysis, the mitigation measures for minimizing the impact shall be suggested in the EIA/EMP study.
Details of the Project and Site	
1.	General introduction about the proposed project.
2.	Details of Project and site giving L-Sections of all U/S and D/S Projects with all relevant maps and figures. Connect such information as to establish the total length of interference of Natural River and the committed unrestricted release from the site of Dam/Barrage into the main river.
3.	A map of boundary of the project site giving details of protected areas in the vicinity of 25 km of project

	location.
4.	Location details on a map of the project area with contours indicating main project features. The project layout shall be superimposed on a contour map of ground elevation showing main project features (viz. location of dam, Head works, main canal, branch canals, quarrying etc.) shall be depicted in a scaled map.
5.	Layout details and map of the project along with contours with project components clearly marked with proper scale maps of at least 1:50,000 scale and printed at least on A3 scale for clarity.
6.	Existence of National Park, Sanctuary, Biosphere Reserve etc. in the study area, if any, should be detailed and presented on a map with distinct distances from the project components.
7.	Drainage pattern and map of the river catchment up to the proposed project site.
8.	Delineation of critically degraded areas in the directly draining catchment on the basis of Silt Yield Index as per the methodology of Soil and Land use Survey of India.
9.	Soil characteristics and map of the project area.
10.	Geological and Seismo-tectonic details and maps of the area surrounding the proposed project site showing location of dam site and canal sites.
11.	Remote Sensing studies, interpretation of satellite imagery, topographic sheets along with ground verification shall be used to develop the land use/land cover pattern of the study using overlaying mapping techniques viz. Geographic Information System (GIS), False Color Composite (FCC) generated from satellite data of project area.
12.	Land details including forests, private and other land.
13.	Demarcation of snow fed and rain fed areas for a realistic estimate of the water availability.
14.	Different riverine habitats like rapids, pools, side pools and variations in the river substratum bedrocks, rocks, boulders, sand/silt or clay etc. need to be covered under the study
Description of Environment and Baseline Data	
1.	To know the present status of environment in the area, baseline data with respect to environmental components air, water, noise, soil, land and biology & biodiversity (flora & fauna), wildlife, socioeconomic status etc. should be collected within 10 km radius of the main components of the project/site i.e. dam site and power house site. The air quality and noise are to be monitored at such locations which are environmentally & ecologically more sensitive in the study area. The baseline studies should be collected for 1 season (Preferably Monsoon season). Flora-Fauna in the catchment and command area should be documented. The study area should comprise of the following:
2.	(i) Catchment area up to the dam/barrage site.
3.	(ii) Submergence Area.
4.	(iii) Project area or the direct impact area should comprise of area within 10 km radius of the main project components like dam, canals etc.
5.	(iv) Downstream upto 10 km from the tip of the reservoir.
Details of the Methology	
1.	The methodology followed for collection of base line data along with details of number of samples and their

	locations in the map should be included. Study area should be demarcated properly on the appropriate scale map. Sampling sites should be depicted on map for each parameter with proper legends. For Forest Classification, Champion and Seth (1968) methodology should be followed.
Methodology for Collection of Biodiversity Data	
1.	The number of sampling locations should be adequate to get a reasonable idea of the diversity and other attributes of flora and fauna. The guiding principles should be the size of the study area (larger area should have larger number of sampling locations) and inherent diversity at the location, as known from secondary sources (e.g. eastern Himalayan and low altitude sites should have a larger number of sampling locations owing to higher diversity).
2.	The entire area should be divided in grids of 5kmX5km preferably on a GIS domain. There after 25% of the grids should be randomly selected for sampling of which half should be in the directly affected area (grids including project components such as reservoir, dam, powerhouse, tunnel, canal etc.) and the remaining in the rest of the area (areas of influence in 10 km radius form project components). At such chosen location, the size and number of sampling units (e.g. quadrates in case of flora/transects in case of fauna) must be decided by species area curves and the details of the same (graphs and cumulative number of species in a tabulated form) should be provided in the EIA report. Some of the grids on the edges may not be completely overlapping with the study area boundaries. However, these should be counted and considered for selecting 25% of the grids. The number of grids to be surveyed may come out as a decimal number (i.e. it has an integral and a fractional part) which should be rounded to the next whole number.
3.	The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.
4.	The R.E.T. species referred to in this point should include species listed in Schedule I and II of Wildlife (Protection) Act, 1972 and those listed in the red data books (BSI, ZSI and IUCN).
Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follows:	
1.	null
2.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.

3.	Tectonics, seismicity and history of past earthquakes in the area. A site specific study of the earthquake parameters will be done. The results of the site specific earthquake design shall be sent for approval of the NCSDP (National Committee of Seismic Design Parameters, Central water Commission, New Delhi for large dams.
4.	Landslide zone or area prone to landslide existing in the study area should be examined.
5.	Presence of important economic mineral deposit, if any.
6.	Justification for location & execution of the project in relation to structural components (dam /barrage height).
7.	Impact of project on geological environment.
8.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
9.	Ambient Air Quality with parameters viz. Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM) i.e. suspended particulate materials < 10 microns, Sulphur dioxide (SO2) and Oxides of Nitrogen (NOX) in the study area at 5-6 Locations.
10.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.
11.	Soil classification, physical parameters (viz., texture, Porosity, Bulk Density and water holding capacity) and chemical parameters (viz. pH, electrical conductivity, magnesium, calcium, total alkalinity, chlorides, sodium, potassium, organic carbon, available potassium, available phosphorus, SAR, nitrogen and salinity, etc.) at @ one sample/ha of command area.
12.	(i) Generation of thematic maps viz, slope map, drainage map, soil map, land use and land cover map, etc. Based on these, thematic maps, an erosion intensity map should be prepared.
13.	History of the ground water table fluctuation in the study area.
14.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO2, PO4, CI, SO4, Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii) Bacteriological parameter (MPN, Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).
15.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
16.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
17.	Run off, discharge, water availability for the project, sedimentation rate, etc.
18.	Basin characteristics
19.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
20.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km2 year-1.
21.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.

22.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
23.	Information on the 10-daily flow basis for the 90 per cent dependable year the flow intercepted at the dam, the flow diverted to the power house and the spill comprising the environmental flow and additional flow towards downstream of the dam for the project may be given.
24.	The minimum environmental flow shall be 20% of the flow of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months shall be in between 20-30%, depending on the site specific requirements. A site specific study shall be carried out by an expert organization.
25.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
26.	Hydrological studies/data as approved by CWC shall be utilized in the preparation of EIA/EMP report. Actual hydrological annual yield may also be given in the report. Sedimentation data available with CWC may be used to find out the loss in storage over the years.
27.	A minimum of 1 km distance from the tip of the reservoir to the tail race tunnel should be maintained between upstream and downstream projects.
28.	Besides primary studies, review of secondary data/literature published for project area on flora & fauna including RET species shall be reported in EIA/EMP report.
29.	Characterization of forest types (as per Champion and Seth method) in the study area and extent of each forest type as per the Forest Working Plan.
30.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteriodophytes, Bryophytes (all groups).
31.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
32.	Assessment of plant species with respect to dominance, density, frequency, abundance, diversity index, similarity index, importance value index (IVI) , Shannon Weiner index etc. of the species to be provided. Methodology used for calculating various diversity indices along with details of locations of quadrates, size of quadrates etc. to be reported within the study area in different ecosystems.
33.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
34.	Economically important species like medicinal plants, timber, fuel wood etc.
35.	Details of endemic species found in the project area.
36.	Flora under RET categories should be documented using International Union for the Conservation of Nature and Natural Resources (IUCN) criteria and Botanical Survey of India's Red Data list along-with economic significance. Species diversity curve for RET species should be given.
37.	Cropping pattern and Horticultural Practices in the study area.
38.	Fauna study and inventorisation should be carried out for all groups of animals in the study area. Their present status alongwith Schedule of the species.
39.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
40.	Information (authenticated) on Avi-fauna and wildlife in the study area.
41.	Status of avifauna their resident/ migratory/ passage migrants etc.

42.	Documentation of butterflies, if any, found in the area.
43.	RET species-voucher specimens should be collected along-with GPS readings to facilitate rehabilitation. RET faunal species to be classified as per IUCN Red Data list and as per different schedule of Indian Wildlife (Protection) Act, 1972.
44.	Existence of barriers and corridors, if any, for wild animals.
45.	Compensatory afforestation to compensate the green belt area that will be removed, if any, as part of the proposed project development and loss of biodiversity.
46.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
47.	For categorization of sub-catchment into various erosion classes and for the consequent CAT plan, the entire catchment (Indian Portion) is to be considered and not only the directly the draining catchment.
48.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplantktons, benthos etc.
49.	Fish and fisheries, their migration and breeding grounds.
50.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
51.	Conservation status of aquatic fauna.
52.	Sampling for aquatic ecology and fisheries and fisheries must be conducted during three seasons Pre-monsoon (summer), monsoon and winter. Sizes (length & weight) of important fish species need to be collected and breeding and feeding grounds should also be identified along the project site or in vicinity.
53.	Collection of baseline data on human settlements, health status of the community and existing infrastructure facilities for social welfare including sources of livelihood, job opportunities and safety and security of workers and surroundings population.
54.	Collection of information with respect to social awareness about the developmental activity in the area and social welfare measures existing and proposed by project proponent.
55.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
56.	The socio-economic survey/ profile within 10 km of the study area for demographic profile; Economic Structure; Developmental Profile; Agricultural Practices; Infrastructure, education facilities; health and sanitation facilities; available communication network etc.
57.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
58.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
59.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
60.	List of all the Project Affected Families with their name, age, educational qualification, family size, sex, religion, caste, sources of income, land & house holdings, other properties, occupation, source of income, house/land to be acquired for the project and house/land left with the family, any other property, possession of cattle, type of house etc.
61.	Special attention has to be given to vulnerable groups like women, aged persons etc. and to any

	ethnic/indigenous groups that are getting affected by the project.
Impact Prediction and Mitigation Measures	
1.	The adverse impact due to the proposed project should be assessed and effective mitigation steps to abate these impacts should be described.
2.	Changes in ambient and ground level concentrations due to total emissions from point, line and area sources.
3.	Effect on soil, material, vegetation and human health.
4.	Impact of emissions from DG set used for power during the construction, if any, on air environment.
5.	Pollution due to fuel combustion in equipments and vehicles
6.	Fugitive emissions from various sources
7.	Changes in surface and ground water quality
8.	Steps to develop pisci-culture and recreational facilities
9.	Changes in hydraulic regime and downstream flow.
10.	Water pollution due to disposal of sewage
11.	Water pollution from labour colonies/ camps and washing equipment.
12.	Adverse impact on land stability, catchment of soil erosion, reservoir sedimentation and spring flow (if any) (a) due to considerable road construction / widening activity (b) interference of reservoir with the inflowing stream (c) blasting for commissioning of HRT, TRT and some other structures.
13.	Changes in land use / land cover and drainage pattern
14.	Immigration of labour population
15.	Quarrying operation and muck disposal
16.	Changes in land quality including effects of waste disposal
17.	River bank and their stability
18.	Impact due to submergence.
19.	Impact on forests, flora, fauna including wildlife, migratory avi-fauna, rare and endangered species, medicinal plants etc.
20.	Pressure on existing natural resources
21.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors
22.	Compensatory afforestation-identification of suitable native tree species for compensatory afforestation and green belt.
23.	Impact on fish migration and habitat degradation due to decreased flow of water

24.	Impact on breeding and nesting grounds of animals and fish.
25.	Impact on local community including demographic profile.
26.	Impact on socio-economic status
27.	Impact on economic status.
28.	Impact on human health due to water / vector borne disease
29.	Impact on increase traffic
30.	Impact on Holy Places and Tourism
31.	Impacts of blasting activity during project construction which generally destabilize the land mass and leads to landslides, damage to properties and drying up of natural springs and cause noise population will be studies. Proper record shall be maintained of the baseline information in the post project period.
32.	Positive and negative impacts likely to be accrued due to the project are listed.
Environmental Management Plan	
1.	Biodiversity and Wildlife Conservation and Management Plan for the conservation and preservation of rare, endangered or endemic floral/faunal species or some National Park/Sanctuary/ Biosphere Reserve or other protected area is going to get affected directly or indirectly by construction of the project, then suitable conservation measures should be prepared in consultation with the State Forest Department and with the physical and financial details. Suitable conservation techniques (in-situ/ ex-situ) will be proposed under the plan and the areas where such conservation is proposed will be marked on a project layout map.
2.	Compensatory Afforestation shall be prepared by the State Forest Department in lieu of the forest land proposed to be diverted for construction of the project as per the Forest (Conservation) Act, 1980. Choice of plants for afforestation should include native and RET species, if any. This will be a part of the forest clearance proposal.
3.	Fisheries Conservation and Management Plan - a specific fisheries management measures should be prepared for river and reservoir. If the construction of fish ladder/ fish-way etc. is not feasible then measures for reservoir fisheries will be proposed. The plan will detail out the number of hatcheries, nurseries, rearing ponds etc. proposed under the plan with proper drawings. If any migratory fish species is getting affected then the migratory routes, time/season of upstream and downstream migration, spawning grounds etc will be discussed in details.
4.	Green Belt Development Plan along the periphery of the reservoir, approach roads around the colonies and other project components, local plant species must be suggested with physical and financial details. A layout map showing the proposed sites for developing the green belt should be prepared.
5.	Environmental Monitoring Programme to monitor the mitigatory measures implemented at the project site is required will be prepared. Provision for Environment Management Cell should be made. The plan will spell out the aspects required to be monitored, monitoring indicators/parameters with respect to each aspect and the agency responsible for the monitoring of that particular aspect throughout the project implementation.
6.	Catchment Area Treatment (CAT) Plan should be prepared micro-watershed wise. Identification of free draining/ directly draining catchment based upon Remote Sensing and Geographical Information System (GIS) methodology and Sediment Yield Index (SYI) method of AISLUS, Deptt. of Agriculture, Govt. of India coupled with ground survey. Areas or watersheds falling under 'very severe' and 'severe' erosion categories should be provided and required to be treated. Both biological as well as engineering measures should be proposed in consultation with State Forest Department for areas requiring treatment. Year-wise schedule of work and monetary allocation should be provided. Mitigation measures to check shifting cultivation in the catchment area with provision for alternative and better agricultural practices should be included.

7.	Study of Design Earthquake Parameters: A site specific study of earthquake parameters should be done. Results of the site specific earthquake design parameters should be approved by National Committee of Seismic Design Parameters, Central Water Commission (NCSDP), New Delhi.
8.	Dam Break Analysis and Disaster Management Plan The outputs of dam break model should be illustrated with appropriate graphs and maps clearly bringing out the impact of Dam Break scenario. To identify inundation areas, population and structures likely to be affected due to catastrophic floods in the event of dam failure. DMP will be prepared with the help of Dam Break Analysis. Maximum water level that would be attained at various points on the downstream in case of dam break will be marked on a detailed contour map of the downstream area, to show the extent of inundation. The action plan will include Emergency Action and Management plan including measures like preventive action notification, warning procedure and action plan for co-ordination with various authorities.
9.	Reservoir Rim Treatment Plan for stabilization of land slide / land slip zones, if any, around the reservoir periphery is to be prepared based on detailed survey of geology of the reservoir rim area. Suitable engineering and biological measures for treatment of identified slip zones to be suggested with physical and financial schedule. Layout map showing the landslide/landslip zones shall be prepared and appended in the chapter.
10.	Muck Disposal Plan- suitable sites for dumping of excavated material should be identified in consultation with the State Pollution Control Board and Forest Department. All Muck disposal sites should be minimum 30 m away from the HFL of river. Plan for rehabilitation of muck disposal sites should also be given. The L- section/ cross section of muck disposal sites and approach roads to be given. Financial out lay for this may be given separately. Deatailed muck transportation plan delinating the path ways, number of trucks, quantity of muck to be transportated along with monitoring mechanism using latest technology, shall be prepared.
11.	Restoration Plan for Quarry Sites and landscaping of colony areas, working areas, roads etc. Details of the coarse/fine aggregate/clay etc. required for construction of the project and the rock/clay quarries/river shoal sites identified for the project should be discussed along-with the Engineering and Biological measures proposed for their restoration with physical and financial details. Layout map showing quarry sites vis-à-vis other project components, should be prepared.
12.	Resettlement and Rehabilitation Plan needed to be prepared on the basis of findings of the socio- economic survey coupled with the outcome of public consultation held. The R&R package shall be prepared after consultation with the representatives of the project affected families and the State Government. Detailed budgetary estimates are to be provided. Resettlements site should be identified. The plan will also incorporate community development strategies.
13.	Public Health Delivery Plan including the provisions of drinking water supply for local population shall be in the EIA/EMP Report. Status of the existing medical facilities in the project area shall be discussed. Possibilities of strengthening of existing medical facilities, construction of new medical infrastructure etc. will be explored after assessing the need of the labour force and local populace.
14.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Pancahayats. Appropriate schemes shall be prepared under EMP for the Local Area Development Plan with sufficient financial provisions.
15.	Labour Management Plan for their Health and Safety.
16.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
17.	Energy Conservation Measures for the work force during construction with physical and financial details. Alternatives will be proposed for the labour force so that the exploitation of the natural resource (wood) for the domestic and commercial use is curbed.
18.	Environmental safeguards during construction activities including Road Construction.
19.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.

20.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.

3.2. Agenda Item No 2:

3.2.1. Details of the proposal

Tarali Pumping Storage Project (1500 MW) by **ADANI GREEN ENERGY LIMITED** located at **SATARA,MAHARASHTRA**			
Proposal For		Amendment in ToR	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/MH/RIV/443150/2023	J-12011/52/2023-IA.I (R)	19/09/2023	River Valley/Irrigation projects (1(c))

3.2.2. Project Salient Features

1.5.1: The proposal is for grant of amendment in Terms of Reference (ToR) to the project for Tarali Off Stream Open Loop Pumping Storage Project (1500 MW) in an area of 150.74 ha at Village Kalambe, Jalu, Nivade and Tondoshi, Sub District Patan, District Satara, Maharashtra by M/s Adani Green Energy Limited.

1.5.2: The Project Proponent and the accredited Consultant M/s. R.S. Envirolink Technologies Pvt. Ltd., made a detailed presentation on the salient features of the project as the following:

i. The Proposed Tarali Pumped Storage Project is located on Tarali River near village Dangistewadi in Patan Taluka, Satara District, Maharashtra State. The Tarali PSP will comprise of two reservoirs, of which lower reservoir is an existing Tarali reservoir which is already constructed as part of Irrigation Project by Water Resource Department (WRD), Maharashtra, whereas Upper Reservoir (UR) is proposed to be newly constructed. The proposed Tarali PSP is planned an 'Off stream open loop' scheme. The live storage capacity of the existing lower reservoir is 165.4 MCM.

ii. Project was appraised and recommended for grant of TOR in 34th meeting of EAC held on 14/09/2022. The TOR was issued by MoEF&CC vide its letter dated 09/11/2022.

iii. After TOR, during survey and investigation, it was observed that the water conductor system (WCS) of the proposed layout is passing just below an existing wind farm, located on the left bank of Tarali PSP upper reservoir. Doing underground construction work below the wind turbines foundations of the existing wind farm would be difficult. Considering this difficulty in laying out the WCS on left bank, more alternatives are explored and therefore, amendment in TOR is requested for revision on project layout. A statement of comparison of revised layout with earlier approved layout is given below:

S.No	Parameters	Unit	As Per ToR	Actual	Deviation
1	Project Capacity	MW	1500	1500	No Change
2	Unit Size	-	4x300+2x150	4x300+2x150	No Change
3	Storage Capacity	MWH	9000	9705	No Change
4	Total Land Area	ha	108.95	150.74	Change (+41.79)
4a.	Forest Area	ha	63.1	0	Change (-63.10)
4b.	Non-Forest Area	ha	45.85	150.74	Change (+104.89)

5	**Upper Reservoir-Proposed**				
i	Gross Storage	MCM	10.73	11.36	Change (+0.63)
ii	Live Storage	MCM	10.1	10.42	Change (+0.32)
iii	Dead Storage	MCM	0.63	0.94	Change (+0.31)
6	**Type of Dam**		**Concrete**	**Concrete**	**No Change**
7	**Height of Dam**	**m**	**60**	**61.5**	**Change (+1.5)**
8	**Length of Dam**	**m**	**650**	**746.7**	**Change (+96.7)**
9	**Head Race Tunnel (HRT)**				
I	Quantity	Nos	2	2	No Change
ii	Length	m	460 & 460	500 & 542.8	Change (+40 & +82.8)
iii	Diameter	m	10 & 8	9.3 & 7.6	Change (-0.7 & - 0.4)
10	**Surge Shafts**				
I	Quantity	Nos	2	2	No Change
ii	Height	m	90 & 90	82 & 83.90	Change (-8 & -6.1)
iii	Diameter	m	-	15 & 10	New
11	**Pressure Shafts**				
I	Quantity	Nos	2	2	No Change
ii	Length	m	1696 & 1710	1074.50 & 1074.80	Change (-621.5 & -635.2)
iii	Diameter	m	8.3 & 6.8	7.6 & 6.2	Change (-0.7 & - 0.6)
12	**Powerhouse**	**-**	**Underground**	**Pit**	**Change**
13	**Tail Race Tunnels**				
i	Quantity	Nos	2	5	Change (+3)
ii	Length	m	200	113.5	Change (-86.5)
iii	Diameter	m	8.7	5.4	Change (-3.3)

iv. Revised layout has been selected due to the following advantages:

- Issue of land acquisition through the existing windfarm is resolved
- It is in the same environmental setting; so no additional environmental impacts envisaged
- Need to divert 63.10 ha of forest land is eliminated
- Private land requirement increased from 45.85ha to 150.74ha; however, there is no displacement involved
- Storage capacity is increased from 9000 MWH to 9705 (MWH)

v. Project cost has come down from Rs. 6009.63crore to Rs. 5675crore

3.2.3. Deliberations by the committee in previous meetings

N/A

3.2.4. Deliberations by the EAC in current meetings

The proposal is for grant of Terms of Reference (TOR) to the project for Tarali Off Stream Open Loop Pumping Storage Project (1500 MW) in an area of 150.74 ha at Village Kalambe, Jalu, Nivade and Tondoshi, Sub District Patan, District Satara, Maharashtra by M/s Adani Green Energy 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 EAC noted that ToR was issued by MoEF&CC vide its letter dated 09/11/2022 for preparing of EIA/EMP.

3.2.5. Recommendation of EAC

Recommended

3.2.6. Details of Terms of Reference

3.2.6.1. Specific

Additional condition	
1.	All terms of reference mentioned in the letter dated 09/11/2022 will remain unchanged.

3.2.6.2. Standard

1(c)	**River Valley/Irrigation projects**
Scope of EIA Study	
1.	The EIA Report should identify the relevant environmental concerns and focus on potential impacts that may change due to the construction of proposed project. Based on the baseline data collected for three (3) seasons (Pre-monsoon, Monsoon and Winter seasons), the status of the existing environment in the area and capacity to bear the impact on this should be analysed. Based on this analysis, the mitigation measures for minimizing the impact shall be suggested in the EIA/EMP study.
Details of the Project and Site	
1.	General introduction about the proposed project.
2.	Details of Project and site giving L-Sections of all U/S and D/S Projects with all relevant maps and figures. Connect such information as to establish the total length of interference of Natural River and the committed unrestricted release from the site of Dam/Barrage into the main river.
3.	A map of boundary of the project site giving details of protected areas in the vicinity of 25 km of project location.
4.	Location details on a map of the project area with contours indicating main project features. The project layout shall be superimposed on a contour map of ground elevation showing main project features (viz. location of dam, Head works, main canal, branch canals, quarrying etc.) shall be depicted in a scaled map.
5.	Layout details and map of the project along with contours with project components clearly marked with proper scale maps of at least 1:50,000 scale and printed at least on A3 scale for clarity.
6.	Existence of National Park, Sanctuary, Biosphere Reserve etc. in the study area, if any, should be detailed and presented on a map with distinct distances from the project components.
7.	Drainage pattern and map of the river catchment up to the proposed project site.
8.	Delineation of critically degraded areas in the directly draining catchment on the basis of Silt Yield Index as per

	the methodology of Soil and Land use Survey of India.
9.	Soil characteristics and map of the project area.
10.	Geological and Seismo-tectonic details and maps of the area surrounding the proposed project site showing location of dam site and canal sites.
11.	Remote Sensing studies, interpretation of satellite imagery, topographic sheets along with ground verification shall be used to develop the land use/land cover pattern of the study using overlaying mapping techniques viz. Geographic Information System (GIS), False Color Composite (FCC) generated from satellite data of project area.
12.	Land details including forests, private and other land.
13.	Demarcation of snow fed and rain fed areas for a realistic estimate of the water availability.
14.	Different riverine habitats like rapids, pools, side pools and variations in the river substratum bedrocks, rocks, boulders, sand/silt or clay etc. need to be covered under the study
Description of Environment and Baseline Data	
1.	To know the present status of environment in the area, baseline data with respect to environmental components air, water, noise, soil, land and biology & biodiversity (flora & fauna), wildlife, socioeconomic status etc. should be collected within 10 km radius of the main components of the project/site i.e. dam site and power house site. The air quality and noise are to be monitored at such locations which are environmentally & ecologically more sensitive in the study area. The baseline studies should be collected for 1 season (Preferably Monsoon season). Flora-Fauna in the catchment and command area should be documented. The study area should comprise of the following:
2.	(i) Catchment area up to the dam/barrage site.
3.	(ii) Submergence Area.
4.	(iii) Project area or the direct impact area should comprise of area within 10 km radius of the main project components like dam, canals etc.
5.	(iv) Downstream upto 10 km from the tip of the reservoir.
Details of the Methology	
1.	The methodology followed for collection of base line data along with details of number of samples and their locations in the map should be included. Study area should be demarcated properly on the appropriate scale map. Sampling sites should be depicted on map for each parameter with proper legends. For Forest Classification, Champion and Seth (1968) methodology should be followed.
Methodology for Collection of Biodiversity Data	
1.	The number of sampling locations should be adequate to get a reasonable idea of the diversity and other attributes of flora and fauna. The guiding principles should be the size of the study area (larger area should have larger number of sampling locations) and inherent diversity at the location, as known from secondary sources (e.g. eastern Himalayan and low altitude sites should have a larger number of sampling locations owing to higher diversity).
2.	The entire area should be divided in grids of 5kmX5km preferably on a GIS domain. There after 25% of the grids should be randomly selected for sampling of which half should be in the directly affected area (grids including project components such as reservoir, dam, powerhouse, tunnel, canal etc.) and the remaining in the rest of the area (areas of influence in 10 km radius form project components). At such chosen location, the size

	and number of sampling units (e.g. quadrates in case of flora/transects in case of fauna) must be decided by species area curves and the details of the same (graphs and cumulative number of species in a tabulated form) should be provided in the EIA report. Some of the grids on the edges may not be completely overlapping with the study area boundaries. However, these should be counted and considered for selecting 25% of the grids. The number of grids to be surveyed may come out as a decimal number (i.e. it has an integral and a fractional part) which should be rounded to the next whole number.
3.	The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.
4.	The R.E.T. species referred to in this point should include species listed in Schedule I and II of Wildlife (Protection) Act, 1972 and those listed in the red data books (BSI, ZSI and IUCN).
Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follows:	
1.	null
2.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
3.	Tectonics, seismicity and history of past earthquakes in the area. A site specific study of the earthquake parameters will be done. The results of the site specific earthquake design shall be sent for approval of the NCSDP (National Committee of Seismic Design Parameters, Central water Commission, New Delhi for large dams.
4.	Landslide zone or area prone to landslide existing in the study area should be examined.
5.	Presence of important economic mineral deposit, if any.
6.	Justification for location & execution of the project in relation to structural components (dam /barrage height).
7.	Impact of project on geological environment.
8.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD

	station.
9.	Ambient Air Quality with parameters viz. Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM) i.e. suspended particulate materials < 10 microns, Sulphur dioxide (SO2) and Oxides of Nitrogen (NOX) in the study area at 5-6 Locations.
10.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.
11.	Soil classification, physical parameters (viz., texture, Porosity, Bulk Density and water holding capacity) and chemical parameters (viz. pH, electrical conductivity, magnesium, calcium, total alkalinity, chlorides, sodium, potassium, organic carbon, available potassium, available phosphorus, SAR, nitrogen and salinity, etc.) at @ one sample/ha of command area.
12.	(i) Generation of thematic maps viz, slope map, drainage map, soil map, land use and land cover map, etc. Based on these, thematic maps, an erosion intensity map should be prepared.
13.	History of the ground water table fluctuation in the study area.
14.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO2, PO4, CI, SO4, Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii) Bacteriological parameter (MPN, Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).
15.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
16.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
17.	Run off, discharge, water availability for the project, sedimentation rate, etc.
18.	Basin characteristics
19.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
20.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km2 year-1.
21.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
22.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
23.	Information on the 10-daily flow basis for the 90 per cent dependable year the flow intercepted at the dam, the flow diverted to the power house and the spill comprising the environmental flow and additional flow towards downstream of the dam for the project may be given.
24.	The minimum environmental flow shall be 20% of the flow of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months shall be in between 20-30%, depending on the site specific requirements. A site specific study shall be carried out by an expert organization.
25.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
26.	Hydrological studies/data as approved by CWC shall be utilized in the preparation of EIA/EMP report. Actual

	hydrological annual yield may also be given in the report. Sedimentation data available with CWC may be used to find out the loss in storage over the years.
27.	A minimum of 1 km distance from the tip of the reservoir to the tail race tunnel should be maintained between upstream and downstream projects.
28.	Besides primary studies, review of secondary data/literature published for project area on flora & fauna including RET species shall be reported in EIA/EMP report.
29.	Characterization of forest types (as per Champion and Seth method) in the study area and extent of each forest type as per the Forest Working Plan.
30.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteriodophytes, Bryophytes (all groups).
31.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
32.	Assessment of plant species with respect to dominance, density, frequency, abundance, diversity index, similarity index, importance value index (IVI) , Shannon Weiner index etc. of the species to be provided. Methodology used for calculating various diversity indices along with details of locations of quadrates, size of quadrates etc. to be reported within the study area in different ecosystems.
33.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
34.	Economically important species like medicinal plants, timber, fuel wood etc.
35.	Details of endemic species found in the project area.
36.	Flora under RET categories should be documented using International Union for the Conservation of Nature and Natural Resources (IUCN) criteria and Botanical Survey of India's Red Data list along-with economic significance. Species diversity curve for RET species should be given.
37.	Cropping pattern and Horticultural Practices in the study area.
38.	Fauna study and inventorisation should be carried out for all groups of animals in the study area. Their present status alongwith Schedule of the species.
39.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
40.	Information (authenticated) on Avi-fauna and wildlife in the study area.
41.	Status of avifauna their resident/ migratory/ passage migrants etc.
42.	Documentation of butterflies, if any, found in the area.
43.	RET species-voucher specimens should be collected along-with GPS readings to facilitate rehabilitation. RET faunal species to be classified as per IUCN Red Data list and as per different schedule of Indian Wildlife (Protection) Act, 1972.
44.	Existence of barriers and corridors, if any, for wild animals.
45.	Compensatory afforestation to compensate the green belt area that will be removed, if any, as part of the proposed project development and loss of biodiversity.
46.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities

	components.
47.	For categorization of sub-catchment into various erosion classes and for the consequent CAT plan, the entire catchment (Indian Portion) is to be considered and not only the directly the draining catchment.
48.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplantktons, benthos etc.
49.	Fish and fisheries, their migration and breeding grounds.
50.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
51.	Conservation status of aquatic fauna.
52.	Sampling for aquatic ecology and fisheries and fisheries must be conducted during three seasons Pre-monsoon (summer), monsoon and winter. Sizes (length & weight) of important fish species need to be collected and breeding and feeding grounds should also be identified along the project site or in vicinity.
53.	Collection of baseline data on human settlements, health status of the community and existing infrastructure facilities for social welfare including sources of livelihood, job opportunities and safety and security of workers and surroundings population.
54.	Collection of information with respect to social awareness about the developmental activity in the area and social welfare measures existing and proposed by project proponent.
55.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
56.	The socio-economic survey/ profile within 10 km of the study area for demographic profile; Economic Structure; Developmental Profile; Agricultural Practices; Infrastructure, education facilities; health and sanitation facilities; available communication network etc.
57.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
58.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
59.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
60.	List of all the Project Affected Families with their name, age, educational qualification, family size, sex, religion, caste, sources of income, land & house holdings, other properties, occupation, source of income, house/land to be acquired for the project and house/land left with the family, any other property, possession of cattle, type of house etc.
61.	Special attention has to be given to vulnerable groups like women, aged persons etc. and to any ethnic/indigenous groups that are getting affected by the project.
Impact Prediction and Mitigation Measures	
1.	The adverse impact due to the proposed project should be assessed and effective mitigation steps to abate these impacts should be described.
2.	Changes in ambient and ground level concentrations due to total emissions from point, line and area sources.
3.	Effect on soil, material, vegetation and human health.
4.	Impact of emissions from DG set used for power during the construction, if any, on air environment.

5.	Pollution due to fuel combustion in equipments and vehicles
6.	Fugitive emissions from various sources
7.	Changes in surface and ground water quality
8.	Steps to develop pisci-culture and recreational facilities
9.	Changes in hydraulic regime and downstream flow.
10.	Water pollution due to disposal of sewage
11.	Water pollution from labour colonies/ camps and washing equipment.
12.	Adverse impact on land stability, catchment of soil erosion, reservoir sedimentation and spring flow (if any) (a) due to considerable road construction / widening activity (b) interference of reservoir with the inflowing stream (c) blasting for commissioning of HRT, TRT and some other structures.
13.	Changes in land use / land cover and drainage pattern
14.	Immigration of labour population
15.	Quarrying operation and muck disposal
16.	Changes in land quality including effects of waste disposal
17.	River bank and their stability
18.	Impact due to submergence.
19.	Impact on forests, flora, fauna including wildlife, migratory avi-fauna, rare and endangered species, medicinal plants etc.
20.	Pressure on existing natural resources
21.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors
22.	Compensatory afforestation-identification of suitable native tree species for compensatory afforestation and green belt.
23.	Impact on fish migration and habitat degradation due to decreased flow of water
24.	Impact on breeding and nesting grounds of animals and fish.
25.	Impact on local community including demographic profile.
26.	Impact on socio-economic status
27.	Impact on economic status.
28.	Impact on human health due to water / vector borne disease
29.	Impact on increase traffic

30.	Impact on Holy Places and Tourism
31.	Impacts of blasting activity during project construction which generally destabilize the land mass and leads to landslides, damage to properties and drying up of natural springs and cause noise population will be studies. Proper record shall be maintained of the baseline information in the post project period.
32.	Positive and negative impacts likely to be accrued due to the project are listed.
Environmental Management Plan	
1.	Biodiversity and Wildlife Conservation and Management Plan for the conservation and preservation of rare, endangered or endemic floral/faunal species or some National Park/Sanctuary/ Biosphere Reserve or other protected area is going to get affected directly or indirectly by construction of the project, then suitable conservation measures should be prepared in consultation with the State Forest Department and with the physical and financial details. Suitable conservation techniques (in-situ/ ex-situ) will be proposed under the plan and the areas where such conservation is proposed will be marked on a project layout map.
2.	Compensatory Afforestation shall be prepared by the State Forest Department in lieu of the forest land proposed to be diverted for construction of the project as per the Forest (Conservation) Act, 1980. Choice of plants for afforestation should include native and RET species, if any. This will be a part of the forest clearance proposal.
3.	Fisheries Conservation and Management Plan - a specific fisheries management measures should be prepared for river and reservoir. If the construction of fish ladder/ fish-way etc. is not feasible then measures for reservoir fisheries will be proposed. The plan will detail out the number of hatcheries, nurseries, rearing ponds etc. proposed under the plan with proper drawings. If any migratory fish species is getting affected then the migratory routes, time/season of upstream and downstream migration, spawning grounds etc will be discussed in details.
4.	Green Belt Development Plan along the periphery of the reservoir, approach roads around the colonies and other project components, local plant species must be suggested with physical and financial details. A layout map showing the proposed sites for developing the green belt should be prepared.
5.	Environmental Monitoring Programme to monitor the mitigatory measures implemented at the project site is required will be prepared. Provision for Environment Management Cell should be made. The plan will spell out the aspects required to be monitored, monitoring indicators/parameters with respect to each aspect and the agency responsible for the monitoring of that particular aspect throughout the project implementation.
6.	Catchment Area Treatment (CAT) Plan should be prepared micro-watershed wise. Identification of free draining/ directly draining catchment based upon Remote Sensing and Geographical Information System (GIS) methodology and Sediment Yield Index (SYI) method of AISLUS, Deptt. of Agriculture, Govt. of India coupled with ground survey. Areas or watersheds falling under 'very severe' and 'severe' erosion categories should be provided and required to be treated. Both biological as well as engineering measures should be proposed in consultation with State Forest Department for areas requiring treatment. Year-wise schedule of work and monetary allocation should be provided. Mitigation measures to check shifting cultivation in the catchment area with provision for alternative and better agricultural practices should be included.
7.	Study of Design Earthquake Parameters: A site specific study of earthquake parameters should be done. Results of the site specific earthquake design parameters should be approved by National Committee of Seismic Design Parameters, Central Water Commission (NCSDP), New Delhi.
8.	Dam Break Analysis and Disaster Management Plan The outputs of dam break model should be illustrated with appropriate graphs and maps clearly bringing out the impact of Dam Break scenario. To identify inundation areas, population and structures likely to be affected due to catastrophic floods in the event of dam failure. DMP will be prepared with the help of Dam Break Analysis. Maximum water level that would be attained at various points on the downstream in case of dam break will be marked on a detailed contour map of the downstream area, to show the extent of inundation. The action plan will include Emergency Action and Management plan including measures like preventive action notification, warning procedure and action plan for co-ordination with various authorities.

9.	Reservoir Rim Treatment Plan for stabilization of land slide / land slip zones, if any, around the reservoir periphery is to be prepared based on detailed survey of geology of the reservoir rim area. Suitable engineering and biological measures for treatment of identified slip zones to be suggested with physical and financial schedule. Layout map showing the landslide/landslip zones shall be prepared and appended in the chapter.
10.	Muck Disposal Plan- suitable sites for dumping of excavated material should be identified in consultation with the State Pollution Control Board and Forest Department. All Muck disposal sites should be minimum 30 m away from the HFL of river. Plan for rehabilitation of muck disposal sites should also be given. The L- section/ cross section of muck disposal sites and approach roads to be given. Financial out lay for this may be given separately. Deatailed muck transportation plan delinating the path ways, number of trucks, quantity of muck to be transportated along with monitoring mechanism using latest technology, shall be prepared.
11.	Restoration Plan for Quarry Sites and landscaping of colony areas, working areas, roads etc. Details of the coarse/fine aggregate/clay etc. required for construction of the project and the rock/clay quarries/river shoal sites identified for the project should be discussed along-with the Engineering and Biological measures proposed for their restoration with physical and financial details. Layout map showing quarry sites vis-à-vis other project components, should be prepared.
12.	Resettlement and Rehabilitation Plan needed to be prepared on the basis of findings of the socio- economic survey coupled with the outcome of public consultation held. The R&R package shall be prepared after consultation with the representatives of the project affected families and the State Government. Detailed budgetary estimates are to be provided. Resettlements site should be identified. The plan will also incorporate community development strategies.
13.	Public Health Delivery Plan including the provisions of drinking water supply for local population shall be in the EIA/EMP Report. Status of the existing medical facilities in the project area shall be discussed. Possibilities of strengthening of existing medical facilities, construction of new medical infrastructure etc. will be explored after assessing the need of the labour force and local populace.
14.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Pancahayats. Appropriate schemes shall be prepared under EMP for the Local Area Development Plan with sufficient financial provisions.
15.	Labour Management Plan for their Health and Safety.
16.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
17.	Energy Conservation Measures for the work force during construction with physical and financial details. Alternatives will be proposed for the labour force so that the exploitation of the natural resource (wood) for the domestic and commercial use is curbed.
18.	Environmental safeguards during construction activities including Road Construction.
19.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
20.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.

3.3. Agenda Item No 3:

3.3.1. Details of the proposal

Hasdeo Bango Pumped Storage Hydro-electric Project (1200 MW) by **CHHATTISGARH STATE POWER GENERATION COMPANY LIMITED** located at **KORBA,CHHATTISGARH**	
Proposal For	Fresh ToR

Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/CG/RIV/444952/2023	J-12011/51/2023-IA.I (R)	20/09/2023	River Valley/Irrigation projects (1(c))

3.3.2. Project Salient Features

1.4.1: The proposal is for grant of Terms of References (TOR) to the Hasdeo Bango Pumped Storage Hydro-electric Project (1200 MW) in an area of 145 ha at Village Khirati, Tehsil Morga Road, Podi-Uparoda, District Korba, Chhattisgarh by M/s Chhattisgarh State Power Generation Company Limited.

1.4.2: The Project Proponent and the accredited Consultant M/s WAPCOS Limited, made a detailed presentation on the salient features of the project and informed that:

i. The proposed Hasdeo Bango Pumped Storage Project is located near Khirati village, Morga Road, Podi-Uparoda Tehsil of Korba district, Chhattisgarh, India. The project falls in the Latitude 22°42'43.12"N and Longitude 82°42'22.66"E It is located 80 KM towards North from District headquarters Korba.

ii. The scheme envisages utilization of available head between proposed upper dam and existing Hasdeo Bango reservoir as lower pond. An Underground Power House will be located in between two reservoirs are connected through water conductor system and the generator and turbines installed at the power house.

The project proposal was earlier considered by the EAC in its 48th meeting held on 26/06/2023 to 27/06/2023 and the EAC returned the proposal to the proponent due to the following reasons:

It was observed that the proposed site comes under dense forest area with abundance of Sal trees (Shorea Robusta L). The Lemaru Elephant Reserve is in close proximity. The Hasdeo river Valley hasecological significance being home to a diverse flora, fauna, forests and local Adivasi communities. Preservation of thepristine ecosystem is very essential for better sustainability of the Hasdeo river which is good source water for local population and for thermal power plants situated in the vicinity. The EAC after detailed deliberation was of the view that it is not advisable to disturb this biodiversity rich area and suggested to explore other alternative site for development of the project.

iii. Later with the current proposal PP has proposed a revised layout:

Revised Proposal:

- Layout plan of upper reservoir has been revised with an objective to reduce the acquisition of forest land.
- Land requirement has been reduced by increasing the height of bund by 3 m, which has reduced the length of upper reservoir by 19% (4850 m to 3950 m). This would also lead to reduction in muck generation as well.
- All non-project component have been realigned to non-forest land.
- Total land has been reduced by 26% (From 195 ha to 145 ha) and forest land has been reduced by 41% (195 ha to 115 ha).

HASDEO BANGO PUMPED STORAGE HYDRO ELECTRIC PROJECT (1200 MW)
COMPARISON - ORIGINAL Vs REVISED PROPOSAL

S. No.	Parameters	Original	Revised	Reduction (%)
1	**Land Requirement**	195	145	26%
2	**Forest Land**	195	115	41%

iv. Salient features of the project:

Project details:

Name of the Proposal	Hasdeo Bango Pumped Storage Hydro-Electric Project (1200 MW)
Location (Including coordinates)	Near Khirati village in Korba district of Chhattisgarh, India (22°42'43.12"N and 82°42'22.66"E)
Inter- state issue involved	No
Seismic zone	Zone -II

Category details:

Category of the project	A
Provisions	-
Capacity / Cultural command area (CCA)	1200 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	-

Electricity generation capacity:

Powerhouse Installed Capacity	4 units of 300 MW each
Generation of Electricity Annually	2335.15 GWh for 1 cycle operation and 3502.73 GWh for 1.5 cycle operation
No. of Units	4
Additional information (if any)	-

ToR/EC Details:

Cost of project	Rs. 5563.28 Crores
Total area of Project	145 ha
Height of Dam from River Bed (EL)	23 m (Upper Reservoir)
Length of Tunnel/Channel	1594 m
Details of Submergence area	75 ha
Types of Waste and quantity of generation during construction/ Operation	Sewage generated from Labour camps 400 KLD per day approx.
E-Flows for the Project	-
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. b) If not the E-Flows maintain criteria for sustaining river ecosystem.	NA

Muck Management Details:

No. of proposed disposal area/(type of land-Forest/Pvt. land)	20 hectares (approx.)
Muck Management Plan	Will be prepared during CEIA study
Monitoring mechanism for Muck Disposal	Will be prepared during CEIA study

Land Area Breakup:

Forest Land	115 Hectares
Non Forest Land	30 Hectares
Submergence area/Reservoir area	75 Hectares
Land required for project components	110 Hectares
Additional information (if any)	-

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone	Yes/No	Details of Certificate/letter/Remarks
Reserve Forest/Protected Forest Land		
National Park	-	
Wildlife Sanctuary	-	

Lemru Elephant Reserve boundary - 5.3 km (Shortest distance from the project boundary)

Court case details:

Court Case	NA
Additional information (if any)	-

Affidavit/Undertaking details:

Affidavit/Undertaking	-
Additional information (if any)	-

Previous EC compliance and necessary approvals:

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	-
Status of Stage- I FC	Yet to be applied
Additional detail (If any)	-
Is FRA (2006) done for FC-I	-

Miscellaneous

Particulars	Details
Details of consultant	WAPCOS Limited
Project Benefits	Hydro-electric power and Employment generation

Status of other statutory clearances	-
R&R details	Nil
Additional detail (If any)	-

3.3.3. Deliberations by the committee in previous meetings

N/A

3.3.4. Deliberations by the EAC in current meetings

1.4.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of Terms of References (ToR) to the project for Hasdeo Bango Pumped Storage Hydro-electric Project (1200 MW) in an area of 145 ha at Village Khirati, Tehsil Morga Road, Podi-Uparoda, District Korba, Chhattisgarh by M/s Chhattisgarh State Power Generation Company 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.

Earlier, the proposal number IA /CG/RIV/430533/2023 was earlier considered by the EAC in its 48th meeting held on 26/06/2023 to 27/06/2023 and the EAC returned the proposal in view of the environmental sensitivity of the project location.

The EAC noted that the PP has reduced the requirement of the total land by 26% (From 195 ha to 145 ha) and forest land has been reduced by 41% (195 ha to 115 ha). The EAC opined that overall requirement of forest land shall be limited to a maximum of 30% of the total land requirement.

It was also noted that Lemru Elephant Reserve boundary is 5.3 km from the project boundary. Therefore, necessary clearance needs to be obtained from the competent authority.

3.3.5. Recommendation of EAC

Recommended

3.3.6. Details of Terms of Reference

3.3.6.1. Specific

Environmental Management and Biodiversity Conservation**	
1.	i. Cumulative Impact of project on carrying capacity and sustainability of Reservoir/ nalahs of catchment area, irrigation facilities due to tapping of water for filling reservoir. ii. Alternative sites for various components shall be identified in terms of loss of forest area. The requirement of forest land shall be limit to 30% of the total land area requirement of the project. All Muck disposal sites should be outside the forest area. iii. A time bound action plan for extensive Sal tree plantation on identified sites/locations in consultation with Forest Department be prepared and submitted along with EIA/EMP report. iv. Impact zone decided prior to base line data generation and accordingly, sampling location

	shall be finalized. Baseline data as mentioned in Standard ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all three seasons. v. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared. vi. Sampling locations be located to cover villages situated near the reservoir and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report. vii. Identify the sand mining/ quarrying sites in submergence area and downstream of reservoir. viii. Source of construction material and its distance from the project site along with detailed transportation plan for construction material. ix. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report. x. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP. xi. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Govt. institutions/ Indian Council of Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report. xii. MoU for water uses for the project signed and approved by concerned authority shall be submitted. xiii. Environmental matrix during construction and operational phase needs to be submitted. xiv. Matrix formulated on the basis of detailed study and field survey of flora and Fauna methodology used shall be mentioned in the EIA report. xv. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State. xvi. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component. xvii. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied. xviii. Stage-I Forest Clearance shall be obtained.
Socio-economic Study	
1.	i. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project. ii. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter. iii. Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the CER in compliance of the Ministry's OM F. No. 22-65/2017-IA.III dated 30th September, 2020 shall be submitted. iv. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared. v. Details of settlement in 10 km area shall be submitted.
Miscellaneous**	
1.	i. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by

	CWC/CEA shall be submitted. ii. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose. iii. Both capital and recurring expenditure under EMP shall be submitted. iv. The photograph should bear the date, time, latitude & longitude of the monitoring station/ sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyse the samples. v. Arial view video of project site shall be recorded and to be submitted. vi. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project. vii. A Site visit of the project area by a sub - committee members shall be done prior to grant of EC in view of the sensitivity of the area.
Muck Management/Disaster Management..	
1.	i. Details of quantity of muck generation component wise and disposal site along with transportation plan and its monitoring to be provided. ii. Details of Muck Management plan prepared along with estimated cost incorporated in EIA/ EMP report. iii. Techno-economic viability of the project must be recommended from CEA/ CWC

3.3.6.2. Standard

1(c)	**River Valley/Irrigation projects**
Scope of EIA Study	
1.	The EIA Report should identify the relevant environmental concerns and focus on potential impacts that may change due to the construction of proposed project. Based on the baseline data collected for three (3) seasons (Pre-monsoon, Monsoon and Winter seasons), the status of the existing environment in the area and capacity to bear the impact on this should be analysed. Based on this analysis, the mitigation measures for minimizing the impact shall be suggested in the EIA/EMP study.
Details of the Project and Site	
1.	General introduction about the proposed project.
2.	Details of Project and site giving L-Sections of all U/S and D/S Projects with all relevant maps and figures. Connect such information as to establish the total length of interference of Natural River and the committed unrestricted release from the site of Dam/Barrage into the main river.
3.	A map of boundary of the project site giving details of protected areas in the vicinity of 25 km of project location.
4.	Location details on a map of the project area with contours indicating main project features. The project layout shall be superimposed on a contour map of ground elevation showing main project features (viz. location of dam, Head works, main canal, branch canals, quarrying etc.) shall be depicted in a scaled map.
5.	Layout details and map of the project along with contours with project components clearly marked with proper scale maps of at least 1:50,000 scale and printed at least on A3 scale for clarity.
6.	Existence of National Park, Sanctuary, Biosphere Reserve etc. in the study area, if any, should be detailed and presented on a map with distinct distances from the project components.

7.	Drainage pattern and map of the river catchment up to the proposed project site.
8.	Delineation of critically degraded areas in the directly draining catchment on the basis of Silt Yield Index as per the methodology of Soil and Land use Survey of India.
9.	Soil characteristics and map of the project area.
10.	Geological and Seismo-tectonic details and maps of the area surrounding the proposed project site showing location of dam site and canal sites.
11.	Remote Sensing studies, interpretation of satellite imagery, topographic sheets along with ground verification shall be used to develop the land use/land cover pattern of the study using overlaying mapping techniques viz. Geographic Information System (GIS), False Color Composite (FCC) generated from satellite data of project area.
12.	Land details including forests, private and other land.
13.	Demarcation of snow fed and rain fed areas for a realistic estimate of the water availability.
14.	Different riverine habitats like rapids, pools, side pools and variations in the river substratum bedrocks, rocks, boulders, sand/silt or clay etc. need to be covered under the study
Description of Environment and Baseline Data	
1.	To know the present status of environment in the area, baseline data with respect to environmental components air, water, noise, soil, land and biology & biodiversity (flora & fauna), wildlife, socioeconomic status etc. should be collected within 10 km radius of the main components of the project/site i.e. dam site and power house site. The air quality and noise are to be monitored at such locations which are environmentally & ecologically more sensitive in the study area. The baseline studies should be collected for 1 season (Preferably Monsoon season). Flora-Fauna in the catchment and command area should be documented. The study area should comprise of the following:
2.	(i) Catchment area up to the dam/barrage site.
3.	(ii) Submergence Area.
4.	(iii) Project area or the direct impact area should comprise of area within 10 km radius of the main project components like dam, canals etc.
5.	(iv) Downstream upto 10 km from the tip of the reservoir.
Details of the Methology	
1.	The methodology followed for collection of base line data along with details of number of samples and their locations in the map should be included. Study area should be demarcated properly on the appropriate scale map. Sampling sites should be depicted on map for each parameter with proper legends. For Forest Classification, Champion and Seth (1968) methodology should be followed.
Methodology for Collection of Biodiversity Data	
1.	The number of sampling locations should be adequate to get a reasonable idea of the diversity and other attributes of flora and fauna. The guiding principles should be the size of the study area (larger area should have larger number of sampling locations) and inherent diversity at the location, as known from secondary sources (e.g. eastern Himalayan and low altitude sites should have a larger number of sampling locations owing to higher diversity).

2.	The entire area should be divided in grids of 5kmX5km preferably on a GIS domain. There after 25% of the grids should be randomly selected for sampling of which half should be in the directly affected area (grids including project components such as reservoir, dam, powerhouse, tunnel, canal etc.) and the remaining in the rest of the area (areas of influence in 10 km radius form project components). At such chosen location, the size and number of sampling units (e.g. quadrates in case of flora/transects in case of fauna) must be decided by species area curves and the details of the same (graphs and cumulative number of species in a tabulated form) should be provided in the EIA report. Some of the grids on the edges may not be completely overlapping with the study area boundaries. However, these should be counted and considered for selecting 25% of the grids. The number of grids to be surveyed may come out as a decimal number (i.e. it has an integral and a fractional part) which should be rounded to the next whole number.
3.	The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.
4.	The R.E.T. species referred to in this point should include species listed in Schedule I and II of Wildlife (Protection) Act, 1972 and those listed in the red data books (BSI, ZSI and IUCN).
Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follows:	
1.	null
2.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
3.	Tectonics, seismicity and history of past earthquakes in the area. A site specific study of the earthquake parameters will be done. The results of the site specific earthquake design shall be sent for approval of the NCSDP (National Committee of Seismic Design Parameters, Central water Commission, New Delhi for large dams.
4.	Landslide zone or area prone to landslide existing in the study area should be examined.
5.	Presence of important economic mineral deposit, if any.
6.	Justification for location & execution of the project in relation to structural components (dam /barrage height).

7.	Impact of project on geological environment.
8.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
9.	Ambient Air Quality with parameters viz. Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM) i.e. suspended particulate materials < 10 microns, Sulphur dioxide (SO2) and Oxides of Nitrogen (NOX) in the study area at 5-6 Locations.
10.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.
11.	Soil classification, physical parameters (viz., texture, Porosity, Bulk Density and water holding capacity) and chemical parameters (viz. pH, electrical conductivity, magnesium, calcium, total alkalinity, chlorides, sodium, potassium, organic carbon, available potassium, available phosphorus, SAR, nitrogen and salinity, etc.) at @ one sample/ha of command area.
12.	(i) Generation of thematic maps viz, slope map, drainage map, soil map, land use and land cover map, etc. Based on these, thematic maps, an erosion intensity map should be prepared.
13.	History of the ground water table fluctuation in the study area.
14.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO2, PO4, CI, SO4, Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii) Bacteriological parameter (MPN, Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).
15.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
16.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
17.	Run off, discharge, water availability for the project, sedimentation rate, etc.
18.	Basin characteristics
19.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
20.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km2 year-1.
21.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
22.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
23.	Information on the 10-daily flow basis for the 90 per cent dependable year the flow intercepted at the dam, the flow diverted to the power house and the spill comprising the environmental flow and additional flow towards downstream of the dam for the project may be given.
24.	The minimum environmental flow shall be 20% of the flow of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months shall be in between 20-30%, depending on the site specific requirements. A site specific study shall be carried out by an expert organization.

25.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
26.	Hydrological studies/data as approved by CWC shall be utilized in the preparation of EIA/EMP report. Actual hydrological annual yield may also be given in the report. Sedimentation data available with CWC may be used to find out the loss in storage over the years.
27.	A minimum of 1 km distance from the tip of the reservoir to the tail race tunnel should be maintained between upstream and downstream projects.
28.	Besides primary studies, review of secondary data/literature published for project area on flora & fauna including RET species shall be reported in EIA/EMP report.
29.	Characterization of forest types (as per Champion and Seth method) in the study area and extent of each forest type as per the Forest Working Plan.
30.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteriodophytes, Bryophytes (all groups).
31.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
32.	Assessment of plant species with respect to dominance, density, frequency, abundance, diversity index, similarity index, importance value index (IVI) , Shannon Weiner index etc. of the species to be provided. Methodology used for calculating various diversity indices along with details of locations of quadrates, size of quadrates etc. to be reported within the study area in different ecosystems.
33.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
34.	Economically important species like medicinal plants, timber, fuel wood etc.
35.	Details of endemic species found in the project area.
36.	Flora under RET categories should be documented using International Union for the Conservation of Nature and Natural Resources (IUCN) criteria and Botanical Survey of India's Red Data list along-with economic significance. Species diversity curve for RET species should be given.
37.	Cropping pattern and Horticultural Practices in the study area.
38.	Fauna study and inventorisation should be carried out for all groups of animals in the study area. Their present status alongwith Schedule of the species.
39.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
40.	Information (authenticated) on Avi-fauna and wildlife in the study area.
41.	Status of avifauna their resident/ migratory/ passage migrants etc.
42.	Documentation of butterflies, if any, found in the area.
43.	RET species-voucher specimens should be collected along-with GPS readings to facilitate rehabilitation. RET faunal species to be classified as per IUCN Red Data list and as per different schedule of Indian Wildlife (Protection) Act, 1972.
44.	Existence of barriers and corridors, if any, for wild animals.
45.	Compensatory afforestation to compensate the green belt area that will be removed, if any, as part of the

	proposed project development and loss of biodiversity.
46.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
47.	For categorization of sub-catchment into various erosion classes and for the consequent CAT plan, the entire catchment (Indian Portion) is to be considered and not only the directly the draining catchment.
48.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplantktons, benthos etc.
49.	Fish and fisheries, their migration and breeding grounds.
50.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
51.	Conservation status of aquatic fauna.
52.	Sampling for aquatic ecology and fisheries and fisheries must be conducted during three seasons Pre-monsoon (summer), monsoon and winter. Sizes (length & weight) of important fish species need to be collected and breeding and feeding grounds should also be identified along the project site or in vicinity.
53.	Collection of baseline data on human settlements, health status of the community and existing infrastructure facilities for social welfare including sources of livelihood, job opportunities and safety and security of workers and surroundings population.
54.	Collection of information with respect to social awareness about the developmental activity in the area and social welfare measures existing and proposed by project proponent.
55.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
56.	The socio-economic survey/ profile within 10 km of the study area for demographic profile; Economic Structure; Developmental Profile; Agricultural Practices; Infrastructure, education facilities; health and sanitation facilities; available communication network etc.
57.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
58.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
59.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
60.	List of all the Project Affected Families with their name, age, educational qualification, family size, sex, religion, caste, sources of income, land & house holdings, other properties, occupation, source of income, house/land to be acquired for the project and house/land left with the family, any other property, possession of cattle, type of house etc.
61.	Special attention has to be given to vulnerable groups like women, aged persons etc. and to any ethnic/indigenous groups that are getting affected by the project.
Impact Prediction and Mitigation Measures	
1.	The adverse impact due to the proposed project should be assessed and effective mitigation steps to abate these impacts should be described.
2.	Changes in ambient and ground level concentrations due to total emissions from point, line and area sources.

3.	Effect on soil, material, vegetation and human health.
4.	Impact of emissions from DG set used for power during the construction, if any, on air environment.
5.	Pollution due to fuel combustion in equipments and vehicles
6.	Fugitive emissions from various sources
7.	Changes in surface and ground water quality
8.	Steps to develop pisci-culture and recreational facilities
9.	Changes in hydraulic regime and downstream flow.
10.	Water pollution due to disposal of sewage
11.	Water pollution from labour colonies/ camps and washing equipment.
12.	Adverse impact on land stability, catchment of soil erosion, reservoir sedimentation and spring flow (if any) (a) due to considerable road construction / widening activity (b) interference of reservoir with the inflowing stream (c) blasting for commissioning of HRT, TRT and some other structures.
13.	Changes in land use / land cover and drainage pattern
14.	Immigration of labour population
15.	Quarrying operation and muck disposal
16.	Changes in land quality including effects of waste disposal
17.	River bank and their stability
18.	Impact due to submergence.
19.	Impact on forests, flora, fauna including wildlife, migratory avi-fauna, rare and endangered species, medicinal plants etc.
20.	Pressure on existing natural resources
21.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors
22.	Compensatory afforestation-identification of suitable native tree species for compensatory afforestation and green belt.
23.	Impact on fish migration and habitat degradation due to decreased flow of water
24.	Impact on breeding and nesting grounds of animals and fish.
25.	Impact on local community including demographic profile.
26.	Impact on socio-economic status
27.	Impact on economic status.

28.	Impact on human health due to water / vector borne disease
29.	Impact on increase traffic
30.	Impact on Holy Places and Tourism
31.	Impacts of blasting activity during project construction which generally destabilize the land mass and leads to landslides, damage to properties and drying up of natural springs and cause noise population will be studies. Proper record shall be maintained of the baseline information in the post project period.
32.	Positive and negative impacts likely to be accrued due to the project are listed.
Environmental Management Plan	
1.	Biodiversity and Wildlife Conservation and Management Plan for the conservation and preservation of rare, endangered or endemic floral/faunal species or some National Park/Sanctuary/ Biosphere Reserve or other protected area is going to get affected directly or indirectly by construction of the project, then suitable conservation measures should be prepared in consultation with the State Forest Department and with the physical and financial details. Suitable conservation techniques (in-situ/ ex-situ) will be proposed under the plan and the areas where such conservation is proposed will be marked on a project layout map.
2.	Compensatory Afforestation shall be prepared by the State Forest Department in lieu of the forest land proposed to be diverted for construction of the project as per the Forest (Conservation) Act, 1980. Choice of plants for afforestation should include native and RET species, if any. This will be a part of the forest clearance proposal.
3.	Fisheries Conservation and Management Plan - a specific fisheries management measures should be prepared for river and reservoir. If the construction of fish ladder/ fish-way etc. is not feasible then measures for reservoir fisheries will be proposed. The plan will detail out the number of hatcheries, nurseries, rearing ponds etc. proposed under the plan with proper drawings. If any migratory fish species is getting affected then the migratory routes, time/season of upstream and downstream migration, spawning grounds etc will be discussed in details.
4.	Green Belt Development Plan along the periphery of the reservoir, approach roads around the colonies and other project components, local plant species must be suggested with physical and financial details. A layout map showing the proposed sites for developing the green belt should be prepared.
5.	Environmental Monitoring Programme to monitor the mitigatory measures implemented at the project site is required will be prepared. Provision for Environment Management Cell should be made. The plan will spell out the aspects required to be monitored, monitoring indicators/parameters with respect to each aspect and the agency responsible for the monitoring of that particular aspect throughout the project implementation.
6.	Catchment Area Treatment (CAT) Plan should be prepared micro-watershed wise. Identification of free draining/ directly draining catchment based upon Remote Sensing and Geographical Information System (GIS) methodology and Sediment Yield Index (SYI) method of AISLUS, Deptt. of Agriculture, Govt. of India coupled with ground survey. Areas or watersheds falling under 'very severe' and 'severe' erosion categories should be provided and required to be treated. Both biological as well as engineering measures should be proposed in consultation with State Forest Department for areas requiring treatment. Year-wise schedule of work and monetary allocation should be provided. Mitigation measures to check shifting cultivation in the catchment area with provision for alternative and better agricultural practices should be included.
7.	Study of Design Earthquake Parameters: A site specific study of earthquake parameters should be done. Results of the site specific earthquake design parameters should be approved by National Committee of Seismic Design Parameters, Central Water Commission (NCSDP), New Delhi.
8.	Dam Break Analysis and Disaster Management Plan The outputs of dam break model should be illustrated with appropriate graphs and maps clearly bringing out the impact of Dam Break scenario. To identify inundation areas, population and structures likely to be affected due to catastrophic floods in the event of dam failure. DMP will be prepared with the help of Dam Break Analysis. Maximum water level that would be attained at various

	points on the downstream in case of dam break will be marked on a detailed contour map of the downstream area, to show the extent of inundation. The action plan will include Emergency Action and Management plan including measures like preventive action notification, warning procedure and action plan for co-ordination with various authorities.
9.	Reservoir Rim Treatment Plan for stabilization of land slide / land slip zones, if any, around the reservoir periphery is to be prepared based on detailed survey of geology of the reservoir rim area. Suitable engineering and biological measures for treatment of identified slip zones to be suggested with physical and financial schedule. Layout map showing the landslide/landslip zones shall be prepared and appended in the chapter.
10.	Muck Disposal Plan- suitable sites for dumping of excavated material should be identified in consultation with the State Pollution Control Board and Forest Department. All Muck disposal sites should be minimum 30 m away from the HFL of river. Plan for rehabilitation of muck disposal sites should also be given. The L- section/ cross section of muck disposal sites and approach roads to be given. Financial out lay for this may be given separately. Deatailed muck transportation plan delinating the path ways, number of trucks, quantity of muck to be transportated along with monitoring mechanism using latest technology, shall be prepared.
11.	Restoration Plan for Quarry Sites and landscaping of colony areas, working areas, roads etc. Details of the coarse/fine aggregate/clay etc. required for construction of the project and the rock/clay quarries/river shoal sites identified for the project should be discussed along-with the Engineering and Biological measures proposed for their restoration with physical and financial details. Layout map showing quarry sites vis-à-vis other project components, should be prepared.
12.	Resettlement and Rehabilitation Plan needed to be prepared on the basis of findings of the socio- economic survey coupled with the outcome of public consultation held. The R&R package shall be prepared after consultation with the representatives of the project affected families and the State Government. Detailed budgetary estimates are to be provided. Resettlements site should be identified. The plan will also incorporate community development strategies.
13.	Public Health Delivery Plan including the provisions of drinking water supply for local population shall be in the EIA/EMP Report. Status of the existing medical facilities in the project area shall be discussed. Possibilities of strengthening of existing medical facilities, construction of new medical infrastructure etc. will be explored after assessing the need of the labour force and local populace.
14.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Pancahayats. Appropriate schemes shall be prepared under EMP for the Local Area Development Plan with sufficient financial provisions.
15.	Labour Management Plan for their Health and Safety.
16.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
17.	Energy Conservation Measures for the work force during construction with physical and financial details. Alternatives will be proposed for the labour force so that the exploitation of the natural resource (wood) for the domestic and commercial use is curbed.
18.	Environmental safeguards during construction activities including Road Construction.
19.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
20.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.

3.4. Agenda Item No 4:

3.4.1. Details of the proposal

Brahmani Pumped Storage Project (600 MW) by **ACME CLEANTECH SOLUTIONS PRIVATE LIMITED** located at **CHITTORGARH,RAJASTHAN**			
Proposal For		Fresh ToR	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/RJ/RIV/445044/2023	J-12011/50/2023-IA.I (R)	21/09/2023	River Valley/Irrigation projects (1(c))

3.4.2. Project Salient Features

1.3.1: The proposal is for grant of Terms of References (ToR) to the project for Brahmani Pumped Storage Project (600 MW) in an area of 284.95 ha at Village Rayata, Sub District Begun, District Chittaurgarh, Rajasthan by M/s Acme Cleantech Solutions Private Limited.

1.3.2: The Project Proponent and the accredited Consultant M/s R. S. Envirolinks Technologies Pvt. Ltd, made a detailed presentation on the salient features of the project and informed that:

i. The proposed Brahmani PSP is located near villages Deoriya and Dharla approximately 15km away from the nearest town Begun, Chittorgarh district in the state of Rajasthan. The project components of proposed Brahmani PSP are covered under Survey of India (SoI) toposheet No. 45O/4 available at 1:50000 scale. The geographical coordinates of the upper reservoir are 25°02'43.83"N, 75°07'04.69"E and that of lower reservoir is 25°01'54.97"N, 75°07'25.35"E.

ii. The Brahmani PSP is envisaged as an off stream Closed Loop PSP which will utilize a rated net head of 134 m and design discharge of 507.15 cumecs for generation 600 MW (2 units of 200 MW & 2 units of 100 MW) in Chittorgarh district of Rajasthan.

iii. Brahmani Pumped Storage Project envisaged construction of two artificial reservoirs; Upper reservoir near village Dharla and lower reservoir near Deoriya in Chittorgarh district of Rajasthan. The project is proposed to generate energy during peak hours by utilizing water from the upper reservoir to lower reservoir and pump back the water into upper reservoir using surplus power available during off peak hours.

iv. The formation of upper & lower reservoir will involve construction of CFRD for creation of 12.31 MCM & 15.02 MCM gross capacities respectively. Water will be pumped one time from the Brahmani River by laying a 1.4 m diameter, 6.8 km long pipeline to fill up the lower reservoir. Based upon the differential head available between two proposed reservoirs, it is proposed to operate the scheme between EL 585.0 m and EL 430.0 m.

v. The estimated project cost is Rs 2730.45 crore. Total capital cost earmarked towards environmental pollution control measures will be worked out during EIA study as well as the Recurring cost (operation and maintenance).

vi. There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site. River/ water body, Brahmani river is flowing at the aerial distance of 5000 m in west to east direction.

vii. **Alternative Studies**

Based on the desk studies on the topographic map and further inputs from the site visit, five alternative layouts were proposed and studied for finding the environmentally sustainable and

techno economical alternative.

The upper reservoir location has been kept the same for Alternatives 1, 2, 3 & 5 except which the shape of the reservoir was modified in alternative 1 & 3 accordingly to make it more economical. Underground Powerhouse cavern has been proposed in Alternatives 1 & 2 and a deep pit type surface powerhouse is provided in case of the Alternatives 3, 4 & 5. Lower reservoirs for Alternatives 1, 2 & 4 are proposed by construction of dam on one side and naturally abutting hill on the other side. Lower reservoir for Alternatives 3 & 5 is proposed by constructing dam across the natural depression with mountain flanking on three sides. After perusal of the five alternatives from environmental, techno-economical and geological aspects, it was observed that Alternative 3 has major advantages compared to other alternatives.

viii. The salient features of the project:

1. Project details:

Name of the Proposal	Brahmani Pumped Storage Project
Location (Including coordinates)	Lower Reservoir: 75°07'25.35"E; 25°01'54.97"N Upper Reservoir: 75°07'04.69”E; 25°02'43.83"N
Inter- state issue involved	No
Seismic zone	Zone-II

2. Category details:

Category of the project	A
Provisions	
Capacity / Cultural command area (CCA)	600 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

3. Electricity generation capacity:

Powerhouse Installed Capacity	600 MW
Generation of Electricity Annually	1287.19 MU/ 1910.88 MU (1 cycle/ 2 cycle)
No. of Units	4 nos. (2X200 MW+2X100 MW)
Additional information (if any)	Nil

4. ToR/EC Details:

Cost of project	2730.45 Cr.
Total area of Project	284.95 ha
Height of Dam from River Bed (EL)	Lower Dam – 30.0 m Upper Dam – 27.0 m
Length of Tunnel/Channel	3090 m
Details of Submergence area	205.08 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste

E-Flows for the Project	Not Applicable, as this is Off-Stream Closed Loop Pumped Storage Project (PSP)
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by b) EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	No

5. Muck Management Details:

No. of proposed disposal area/ (type of land- Forest/Pvt. land)	50 ha Non-Forest Land
Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

6. Land Area Breakup:

Government land/Forest Land	136.62 ha
Submergence area/Reservoir area	205.08 ha
Land required for project components	79.87 ha
Additional information (if any)	Nil

7. Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone	**Yes/No**	**Details of Certificate / letter/ Remarks**
Reserve Forest/Protected Forest Land	--	There is no protected area in the vicinity of the proposed project. Bassi WLS is about 16.0 Km from site, is the nearest protected area.
National Park ---	--	
Wildlife Sanctuary ---	--	

3.4.3. Deliberations by the committee in previous meetings

N/A

3.4.4. Deliberations by the EAC in current meetings

1.3.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of Terms of References (ToR) to the project for Brahmani Pumped Storage Project (600 MW) in an area of 284.95 ha at Village Rayata, Sub District Begun, District Chittaurgarh, Rajasthan by M/s Acme Cleantech Solutions 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.

3.4.5. Recommendation of EAC

Recommended

3.4.6. Details of Terms of Reference

3.4.6.1. Specific

Environmental Management and Biodiversity Conservation**	
1.	i. Conducting site specific ecological study w.r.t riverine ecology, such as on fish diversity and aquatic biota due to construction of lower reservoir across Brahmani River. ii. Stage I FC for 136.62 ha of forest land involved in the project shall be submitted prior to grant of EC iii. Conduct Environmental Cost Benefit Analysis in terms of loss of Forest ecosystem due to diversion of Forest land/ loss of biodiversity and its impacts on ecosystem, water availability, water uses for generation of hydro power in study area 10 km from periphery of Project components iv. Alternative sites for various components shall be identified in terms of loss of forest area and other environmental aspects. Explore to minimize forest land. v. Action plan for survival of the rivulets located in the study area. vi. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Standard ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all three seasons. vii. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared. viii. Sampling locations be located to cover villages situated near the reservoir and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report. ix. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report. x. A detailed wildlife conservation plan for Schedule –I species, duly approved by the Chief Wild Life Warden, be submitted. xi. In case any Wildlife corridor is located within 10 km radius of the project site a detailed study shall be conducted to assess the impact of project on safe movement of wild animals. xii. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP. xiii. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Govt. institutions/ Indian Council of Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report. xiv. MoU for water uses for the project shall be signed and approved by concerned authority. xv. Environmental matrix during construction and operational phase needs to be submitted. xvi. Matrix formulated on the basis of detailed study and field survey of flora and fauna methodology used shall be mentioned in the EIA report.

	xvii. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State. xviii. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component. xix. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied. xx. Are there any sand dunes in the study location and if yes, to study the affect of proposed project on the landscape. Establish with proof that Brahmani River is a perennial river.
Miscellaneous**	
1.	i. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted. ii. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose. iii. Both capital and recurring expenditure under EMP shall be submitted. iv. The photograph should bear the date, time, latitude & longitude of the monitoring station/ sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyse the samples. v. Arial view video of project site shall be recorded and to be submitted. vi. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project. vii. Specific Terms of Reference (ToRs) issued by the Ministry vide Office Memorandum No. F. No. IA3-22/33/2022-IA.III dated 14.08.2023 for Pump storage projects shall be used for preparation of EIA/ EMP reports.
Muck Management/Disaster Management..	
1.	1. Details of quantity of muck generation component wise and disposal site along with transportation plan and its monitoring to be provided. 2. Details of Muck Management plan prepared along with estimated cost incorporated in EIA/ EMP report. 3. Techno-economic viability of the project must be recommended from CEA/ CWC
Socio-economic study	
1.	xxii. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project. xxiii. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter. xxiv. Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the CER in compliance of the Ministry's OM F. No. 22- 65/2017- IA.III dated 30th September, 2020 shall be submitted. xxv. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared. xxxvi. Details of settlement in 10 km area shall be submitted.

3.4.6.2. Standard

1(c)	**River Valley/Irrigation projects**
Scope of EIA Study	
1.	The EIA Report should identify the relevant environmental concerns and focus on potential impacts that may change due to the construction of proposed project. Based on the baseline data collected for three (3) seasons (Pre-monsoon, Monsoon and Winter seasons), the status of the existing environment in the area and capacity to bear the impact on this should be analysed. Based on this analysis, the mitigation measures for minimizing the impact shall be suggested in the EIA/EMP study.
Details of the Project and Site	
1.	General introduction about the proposed project.
2.	Details of Project and site giving L-Sections of all U/S and D/S Projects with all relevant maps and figures. Connect such information as to establish the total length of interference of Natural River and the committed unrestricted release from the site of Dam/Barrage into the main river.
3.	A map of boundary of the project site giving details of protected areas in the vicinity of 25 km of project location.
4.	Location details on a map of the project area with contours indicating main project features. The project layout shall be superimposed on a contour map of ground elevation showing main project features (viz. location of dam, Head works, main canal, branch canals, quarrying etc.) shall be depicted in a scaled map.
5.	Layout details and map of the project along with contours with project components clearly marked with proper scale maps of at least 1:50,000 scale and printed at least on A3 scale for clarity.
6.	Existence of National Park, Sanctuary, Biosphere Reserve etc. in the study area, if any, should be detailed and presented on a map with distinct distances from the project components.
7.	Drainage pattern and map of the river catchment up to the proposed project site.
8.	Delineation of critically degraded areas in the directly draining catchment on the basis of Silt Yield Index as per the methodology of Soil and Land use Survey of India.
9.	Soil characteristics and map of the project area.
10.	Geological and Seismo-tectonic details and maps of the area surrounding the proposed project site showing location of dam site and canal sites.
11.	Remote Sensing studies, interpretation of satellite imagery, topographic sheets along with ground verification shall be used to develop the land use/land cover pattern of the study using overlaying mapping techniques viz. Geographic Information System (GIS), False Color Composite (FCC) generated from satellite data of project area.
12.	Land details including forests, private and other land.
13.	Demarcation of snow fed and rain fed areas for a realistic estimate of the water availability.
14.	Different riverine habitats like rapids, pools, side pools and variations in the river substratum bedrocks, rocks, boulders, sand/silt or clay etc. need to be covered under the study
Description of Environment and Baseline Data	

1.	To know the present status of environment in the area, baseline data with respect to environmental components air, water, noise, soil, land and biology & biodiversity (flora & fauna), wildlife, socioeconomic status etc. should be collected within 10 km radius of the main components of the project/site i.e. dam site and power house site. The air quality and noise are to be monitored at such locations which are environmentally & ecologically more sensitive in the study area. The baseline studies should be collected for 1 season (Preferably Monsoon season). Flora-Fauna in the catchment and command area should be documented. The study area should comprise of the following:
2.	(i) Catchment area up to the dam/barrage site.
3.	(ii) Submergence Area.
4.	(iii) Project area or the direct impact area should comprise of area within 10 km radius of the main project components like dam, canals etc.
5.	(iv) Downstream upto 10 km from the tip of the reservoir.
Details of the Methology	
1.	The methodology followed for collection of base line data along with details of number of samples and their locations in the map should be included. Study area should be demarcated properly on the appropriate scale map. Sampling sites should be depicted on map for each parameter with proper legends. For Forest Classification, Champion and Seth (1968) methodology should be followed.
Methodology for Collection of Biodiversity Data	
1.	The number of sampling locations should be adequate to get a reasonable idea of the diversity and other attributes of flora and fauna. The guiding principles should be the size of the study area (larger area should have larger number of sampling locations) and inherent diversity at the location, as known from secondary sources (e.g. eastern Himalayan and low altitude sites should have a larger number of sampling locations owing to higher diversity).
2.	The entire area should be divided in grids of 5kmX5km preferably on a GIS domain. There after 25% of the grids should be randomly selected for sampling of which half should be in the directly affected area (grids including project components such as reservoir, dam, powerhouse, tunnel, canal etc.) and the remaining in the rest of the area (areas of influence in 10 km radius form project components). At such chosen location, the size and number of sampling units (e.g. quadrates in case of flora/transects in case of fauna) must be decided by species area curves and the details of the same (graphs and cumulative number of species in a tabulated form) should be provided in the EIA report. Some of the grids on the edges may not be completely overlapping with the study area boundaries. However, these should be counted and considered for selecting 25% of the grids. The number of grids to be surveyed may come out as a decimal number (i.e. it has an integral and a fractional part) which should be rounded to the next whole number.
3.	The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area

	based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.
4.	The R.E.T. species referred to in this point should include species listed in Schedule I and II of Wildlife (Protection) Act, 1972 and those listed in the red data books (BSI, ZSI and IUCN).
Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follows:	
1.	null
2.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
3.	Tectonics, seismicity and history of past earthquakes in the area. A site specific study of the earthquake parameters will be done. The results of the site specific earthquake design shall be sent for approval of the NCSDP (National Committee of Seismic Design Parameters, Central water Commission, New Delhi for large dams.
4.	Landslide zone or area prone to landslide existing in the study area should be examined.
5.	Presence of important economic mineral deposit, if any.
6.	Justification for location & execution of the project in relation to structural components (dam /barrage height).
7.	Impact of project on geological environment.
8.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
9.	Ambient Air Quality with parameters viz. Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM) i.e. suspended particulate materials < 10 microns, Sulphur dioxide (SO2) and Oxides of Nitrogen (NOX) in the study area at 5-6 Locations.
10.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.
11.	Soil classification, physical parameters (viz., texture, Porosity, Bulk Density and water holding capacity) and chemical parameters (viz. pH, electrical conductivity, magnesium, calcium, total alkalinity, chlorides, sodium, potassium, organic carbon, available potassium, available phosphorus, SAR, nitrogen and salinity, etc.) at @ one sample/ha of command area.
12.	(i) Generation of thematic maps viz, slope map, drainage map, soil map, land use and land cover map, etc. Based on these, thematic maps, an erosion intensity map should be prepared.
13.	History of the ground water table fluctuation in the study area.
14.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO2, PO4, CI, SO4, Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii) Bacteriological parameter

	(MPN, Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).
15.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
16.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
17.	Run off, discharge, water availability for the project, sedimentation rate, etc.
18.	Basin characteristics
19.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
20.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km2 year-1.
21.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
22.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
23.	Information on the 10-daily flow basis for the 90 per cent dependable year the flow intercepted at the dam, the flow diverted to the power house and the spill comprising the environmental flow and additional flow towards downstream of the dam for the project may be given.
24.	The minimum environmental flow shall be 20% of the flow of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months shall be in between 20-30%, depending on the site specific requirements. A site specific study shall be carried out by an expert organization.
25.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
26.	Hydrological studies/data as approved by CWC shall be utilized in the preparation of EIA/EMP report. Actual hydrological annual yield may also be given in the report. Sedimentation data available with CWC may be used to find out the loss in storage over the years.
27.	A minimum of 1 km distance from the tip of the reservoir to the tail race tunnel should be maintained between upstream and downstream projects.
28.	Besides primary studies, review of secondary data/literature published for project area on flora & fauna including RET species shall be reported in EIA/EMP report.
29.	Characterization of forest types (as per Champion and Seth method) in the study area and extent of each forest type as per the Forest Working Plan.
30.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteriodophytes, Bryophytes (all groups).
31.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
32.	Assessment of plant species with respect to dominance, density, frequency, abundance, diversity index, similarity index, importance value index (IVI) , Shannon Weiner index etc. of the species to be provided. Methodology used for calculating various diversity indices along with details of locations of quadrates, size of quadrates etc. to be reported within the study area in different ecosystems.

33.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
34.	Economically important species like medicinal plants, timber, fuel wood etc.
35.	Details of endemic species found in the project area.
36.	Flora under RET categories should be documented using International Union for the Conservation of Nature and Natural Resources (IUCN) criteria and Botanical Survey of India's Red Data list along-with economic significance. Species diversity curve for RET species should be given.
37.	Cropping pattern and Horticultural Practices in the study area.
38.	Fauna study and inventorisation should be carried out for all groups of animals in the study area. Their present status alongwith Schedule of the species.
39.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
40.	Information (authenticated) on Avi-fauna and wildlife in the study area.
41.	Status of avifauna their resident/ migratory/ passage migrants etc.
42.	Documentation of butterflies, if any, found in the area.
43.	RET species-voucher specimens should be collected along-with GPS readings to facilitate rehabilitation. RET faunal species to be classified as per IUCN Red Data list and as per different schedule of Indian Wildlife (Protection) Act, 1972.
44.	Existence of barriers and corridors, if any, for wild animals.
45.	Compensatory afforestation to compensate the green belt area that will be removed, if any, as part of the proposed project development and loss of biodiversity.
46.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
47.	For categorization of sub-catchment into various erosion classes and for the consequent CAT plan, the entire catchment (Indian Portion) is to be considered and not only the directly the draining catchment.
48.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplantktons, benthos etc.
49.	Fish and fisheries, their migration and breeding grounds.
50.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
51.	Conservation status of aquatic fauna.
52.	Sampling for aquatic ecology and fisheries and fisheries must be conducted during three seasons Pre-monsoon (summer), monsoon and winter. Sizes (length & weight) of important fish species need to be collected and breeding and feeding grounds should also be identified along the project site or in vicinity.
53.	Collection of baseline data on human settlements, health status of the community and existing infrastructure facilities for social welfare including sources of livelihood, job opportunities and safety and security of workers and surroundings population.

54.	Collection of information with respect to social awareness about the developmental activity in the area and social welfare measures existing and proposed by project proponent.
55.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
56.	The socio-economic survey/ profile within 10 km of the study area for demographic profile; Economic Structure; Developmental Profile; Agricultural Practices; Infrastructure, education facilities; health and sanitation facilities; available communication network etc.
57.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
58.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
59.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
60.	List of all the Project Affected Families with their name, age, educational qualification, family size, sex, religion, caste, sources of income, land & house holdings, other properties, occupation, source of income, house/land to be acquired for the project and house/land left with the family, any other property, possession of cattle, type of house etc.
61.	Special attention has to be given to vulnerable groups like women, aged persons etc. and to any ethnic/indigenous groups that are getting affected by the project.
Impact Prediction and Mitigation Measures	
1.	The adverse impact due to the proposed project should be assessed and effective mitigation steps to abate these impacts should be described.
2.	Changes in ambient and ground level concentrations due to total emissions from point, line and area sources.
3.	Effect on soil, material, vegetation and human health.
4.	Impact of emissions from DG set used for power during the construction, if any, on air environment.
5.	Pollution due to fuel combustion in equipments and vehicles
6.	Fugitive emissions from various sources
7.	Changes in surface and ground water quality
8.	Steps to develop pisci-culture and recreational facilities
9.	Changes in hydraulic regime and downstream flow.
10.	Water pollution due to disposal of sewage
11.	Water pollution from labour colonies/ camps and washing equipment.
12.	Adverse impact on land stability, catchment of soil erosion, reservoir sedimentation and spring flow (if any) (a) due to considerable road construction / widening activity (b) interference of reservoir with the inflowing stream (c) blasting for commissioning of HRT, TRT and some other structures.
13.	Changes in land use / land cover and drainage pattern

14.	Immigration of labour population
15.	Quarrying operation and muck disposal
16.	Changes in land quality including effects of waste disposal
17.	River bank and their stability
18.	Impact due to submergence.
19.	Impact on forests, flora, fauna including wildlife, migratory avi-fauna, rare and endangered species, medicinal plants etc.
20.	Pressure on existing natural resources
21.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors
22.	Compensatory afforestation-identification of suitable native tree species for compensatory afforestation and green belt.
23.	Impact on fish migration and habitat degradation due to decreased flow of water
24.	Impact on breeding and nesting grounds of animals and fish.
25.	Impact on local community including demographic profile.
26.	Impact on socio-economic status
27.	Impact on economic status.
28.	Impact on human health due to water / vector borne disease
29.	Impact on increase traffic
30.	Impact on Holy Places and Tourism
31.	Impacts of blasting activity during project construction which generally destabilize the land mass and leads to landslides, damage to properties and drying up of natural springs and cause noise population will be studies. Proper record shall be maintained of the baseline information in the post project period.
32.	Positive and negative impacts likely to be accrued due to the project are listed.
Environmental Management Plan	
1.	Biodiversity and Wildlife Conservation and Management Plan for the conservation and preservation of rare, endangered or endemic floral/faunal species or some National Park/Sanctuary/ Biosphere Reserve or other protected area is going to get affected directly or indirectly by construction of the project, then suitable conservation measures should be prepared in consultation with the State Forest Department and with the physical and financial details. Suitable conservation techniques (in-situ/ ex-situ) will be proposed under the plan and the areas where such conservation is proposed will be marked on a project layout map.
2.	Compensatory Afforestation shall be prepared by the State Forest Department in lieu of the forest land proposed to be diverted for construction of the project as per the Forest (Conservation) Act, 1980. Choice of plants for afforestation should include native and RET species, if any. This will be a part of the forest clearance proposal.

3.	Fisheries Conservation and Management Plan - a specific fisheries management measures should be prepared for river and reservoir. If the construction of fish ladder/ fish-way etc. is not feasible then measures for reservoir fisheries will be proposed. The plan will detail out the number of hatcheries, nurseries, rearing ponds etc. proposed under the plan with proper drawings. If any migratory fish species is getting affected then the migratory routes, time/season of upstream and downstream migration, spawning grounds etc will be discussed in details.
4.	Green Belt Development Plan along the periphery of the reservoir, approach roads around the colonies and other project components, local plant species must be suggested with physical and financial details. A layout map showing the proposed sites for developing the green belt should be prepared.
5.	Environmental Monitoring Programme to monitor the mitigatory measures implemented at the project site is required will be prepared. Provision for Environment Management Cell should be made. The plan will spell out the aspects required to be monitored, monitoring indicators/parameters with respect to each aspect and the agency responsible for the monitoring of that particular aspect throughout the project implementation.
6.	Catchment Area Treatment (CAT) Plan should be prepared micro-watershed wise. Identification of free draining/ directly draining catchment based upon Remote Sensing and Geographical Information System (GIS) methodology and Sediment Yield Index (SYI) method of AISLUS, Deptt. of Agriculture, Govt. of India coupled with ground survey. Areas or watersheds falling under 'very severe' and 'severe' erosion categories should be provided and required to be treated. Both biological as well as engineering measures should be proposed in consultation with State Forest Department for areas requiring treatment. Year-wise schedule of work and monetary allocation should be provided. Mitigation measures to check shifting cultivation in the catchment area with provision for alternative and better agricultural practices should be included.
7.	Study of Design Earthquake Parameters: A site specific study of earthquake parameters should be done. Results of the site specific earthquake design parameters should be approved by National Committee of Seismic Design Parameters, Central Water Commission (NCSDP), New Delhi.
8.	Dam Break Analysis and Disaster Management Plan The outputs of dam break model should be illustrated with appropriate graphs and maps clearly bringing out the impact of Dam Break scenario. To identify inundation areas, population and structures likely to be affected due to catastrophic floods in the event of dam failure. DMP will be prepared with the help of Dam Break Analysis. Maximum water level that would be attained at various points on the downstream in case of dam break will be marked on a detailed contour map of the downstream area, to show the extent of inundation. The action plan will include Emergency Action and Management plan including measures like preventive action notification, warning procedure and action plan for co-ordination with various authorities.
9.	Reservoir Rim Treatment Plan for stabilization of land slide / land slip zones, if any, around the reservoir periphery is to be prepared based on detailed survey of geology of the reservoir rim area. Suitable engineering and biological measures for treatment of identified slip zones to be suggested with physical and financial schedule. Layout map showing the landslide/landslip zones shall be prepared and appended in the chapter.
10.	Muck Disposal Plan- suitable sites for dumping of excavated material should be identified in consultation with the State Pollution Control Board and Forest Department. All Muck disposal sites should be minimum 30 m away from the HFL of river. Plan for rehabilitation of muck disposal sites should also be given. The L- section/ cross section of muck disposal sites and approach roads to be given. Financial out lay for this may be given separately. Deatailed muck transportation plan delinating the path ways, number of trucks, quantity of muck to be transportated along with monitoring mechanism using latest technology, shall be prepared.
11.	Restoration Plan for Quarry Sites and landscaping of colony areas, working areas, roads etc. Details of the coarse/fine aggregate/clay etc. required for construction of the project and the rock/clay quarries/river shoal sites identified for the project should be discussed along-with the Engineering and Biological measures proposed for their restoration with physical and financial details. Layout map showing quarry sites vis-à-vis other project components, should be prepared.
12.	Resettlement and Rehabilitation Plan needed to be prepared on the basis of findings of the socio- economic survey coupled with the outcome of public consultation held. The R&R package shall be prepared after consultation with the representatives of the project affected families and the State Government. Detailed

	budgetary estimates are to be provided. Resettlements site should be identified. The plan will also incorporate community development strategies.
13.	Public Health Delivery Plan including the provisions of drinking water supply for local population shall be in the EIA/EMP Report. Status of the existing medical facilities in the project area shall be discussed. Possibilities of strengthening of existing medical facilities, construction of new medical infrastructure etc. will be explored after assessing the need of the labour force and local populace.
14.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Pancahayats. Appropriate schemes shall be prepared under EMP for the Local Area Development Plan with sufficient financial provisions.
15.	Labour Management Plan for their Health and Safety.
16.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
17.	Energy Conservation Measures for the work force during construction with physical and financial details. Alternatives will be proposed for the labour force so that the exploitation of the natural resource (wood) for the domestic and commercial use is curbed.
18.	Environmental safeguards during construction activities including Road Construction.
19.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
20.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.

3.5. Agenda Item No 5:

3.5.1. Details of the proposal

Vijayanagar Pump Storage Project by **JSW ENERGY PSP TWO LIMITED** located at **BALLARI,KARNATAKA**			
Proposal For		Fresh EC	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/KA/RIV/444768/2023	J-12011/05/2022-IA.I (R)	19/09/2023	River Valley/Irrigation projects (1(c))

3.5.2. Project Salient Features

1.2.1: The proposal is for grant of Environmental Clearance (EC) to the project for Vijayanagar Pump Storage Project (130 MW) in an area of 127.54 ha at Village Kurekuppa, Sub District Sandur, District Ballari, Karnataka by M/s JSW Energy PSP Two Limited.

1.2.2: The Project Proponent and the accredited Consultant M/s EQMS Global Pvt. Ltd., made a detailed presentation on the salient features of the project and informed that:

i. The proposed Vijayanagar Pumped Storage Project is a self-identified, green field project by the JSW Renewable Energy (Vijayanagar) Ltd., a subsidiary of JSW Energy Limited, for captive use in JSW Steel Plant.

ii. The project has been conceived as an off-stream closed loop pumped storage project of installed

capacity 130 MW/845 MWH pumped storage component with twin cycle consisting of hydropower generation during morning and evening peaks by pumping twice during 24-hour period. The project shall be located in Vidya Nagar area of JSW Steel Plant, Taluka Sandur, District Bellary, Karnataka.

iii. The project with an installed capacity of 130 MW by utilizing a design discharge of 108.01 cumecs with rated net head of 136.32 m for two daily cycles of peaking (4.0 hours in the morning and 6.50 hours in evening/night)

iv. The MoEF&CC had accorded Terms of Reference vide letter No. J-12011/05/2022-IA. I(R), dated 3rd June 2022 to the proposed project.

v. The project envisages construction of upper reservoir by constructing 1543m long concrete gravity dam with height of the NOF blocks varying from 27 m to 37 m along the dam periphery. Two intake structures are proposed within the upper reservoir (gross storage :2.93MCM; live storage 2.81 MCM) by locally excavating to provide sufficient submergence below the MDDL.

vi. **Land Requirement:** The total land requirement for project is 127.54 ha of which 23.39 ha shall be forest land; 30.96ha shall be Government land (KIADB), 33.37 ha shall be land owned by JSW Steel and 39.82 ha shall be private land for transmission line (ROW) to be taken on lease through mutual agreement. No R&R issues are involved.

Sl No	Components	Forest Area (ha)	Non-Forest Area (ha)		
			Govt. Area (ha)	Private Area	
				Owned by JSW (ha)	To be acquired/ purchased (ha)
1	Upper Reservoir	9.10	10.43	-	-
2	Penstock, Powerhouse Area & Tailrace Canal Area	-	2.48	17.16	-
3	Dumping Site 1	-	-	7.16	-
4	Dumping Site 2	-	4.37	3.49	-
5	Dumping Site 3	-	-	1.72	-
6	Approach Road	-	1.31	0.18	-
7	Facilitation Area	-	-	2.99	-
8	400 KV transmission Line	14.29	12.37	0.67	39.82
Total Area		23.39	30.96	33.37	39.82
			104.15		
		127.54 ha			

vii. **Hydrology/Water Availability:**

- The project is a closed loop pumped storage project where the reservoirs are not connected to any natural water sources. The project would require one time filling and later would require replenishing the water, lost due to evaporation to generate the stipulated energy.
- For reservoir operation the proposed closed loop PSP contemplates non-consumptive re-utilization of 2.78 MCM of water for recirculation among the two reservoirs. One time filling of the upper reservoir shall be done from the existing Lower Reservoir -1 which has a total capacity of about 4.77 MCM.
- The existing raw water Reservoir R-1 at Vidyanagar, is being filled from water allotted to JSW for Integrated Steel Plant Complex and its auxiliary units like power plant, oxygen plant and cement plant etc. At present, the raw water allotted for JSW Steel Plant by Government of Karnataka is 80.8MGD, of which approximately 30.8MGD is from Tungabhadra dam and 50.0MGD from Almaty dam.

viii. Salient features of the project:

Location (Including Coordinates)	Vidyanagar Township area of JSW Steel Plant, Taluka Sandur, District Bellary, Karnataka. Upper Reservoir: $15^0$09’ 32.4” N ,76^0 38’ 0.83” E; Lower Reservoir: $15^0$09’ 1.54” N,76^0 39’3.78’’ E
Company’s Name	JSW Renewable Energy (Vijayanagar) Ltd.
CIN no. of Company/user agency	U40105MH2020PLC335989
Accredited Consultant and certificate no.	EQMS India Pvt. Ltd., Karkardooma, Delhi-110092 QCI/NABET/ENV/ACO/2225/0303, Valid up to 23.11.2025.
Project location (Coordinates /River/Reservoir)	Upper Reservoir: $15^0$09’ 32.4” N ,76^0 38’ 0.83” E; Lower Reservoir: $15^0$09’ 1.54” N,76^0 39’3.78’’ E
Inter- state issue involved	No
Proposed on River/ Reservoir	Off-stream, Close loop PSP. Lower reservoir is existing in Vidyanagar Area, JSW Steel Plant and upper reservoir is proposed in Taluka Sandur, District Bellary, Karnataka.
Type of Hydro-electric project	Standalone Pump Storage Project.
Seismic zone	Zone III (Moderate Damage Risk Zone)

2.Category Details

Category of the project	A
Capacity / Cultural command area (CCA)	130MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	-

3.ToR/EC Details

ToR Proposal No.	IA/KA/RIV/264454/2022
EAC meeting date	26th meeting held on 8.4.2022.
ToR Letter No.	J-12011/05/2022-IA. I(R)
ToR grant Date	3rd June 2022.
Cost of project	Rs. 985.13 Crores
Total area of Project	127.54 ha including transmission line (ROW)
Height of Dam from River Bed (EL)	Upper Reservoir dam: Varying from 27 m to 37m along the dam
Details of submergence area	19.53 ha
District to provide irrigation facility (if applicable)	Not applicable
Details of tunnels on upper level & lower level and length of canal (if applicable)	Penstock/pressure shaft (2Nos,3.7m dia, 299 m long) Main TRT (8.0 m diameter and 1327 m long) Unit TRT (2Nos, 4.2 m diameter and 36 m long)

No. of affected village(s)	5
No. of affected families	Displaced Families: Nil, PAF :105
Project Benefits	Project benefits *inter alia* shall include benefits such as, (i) Average annual generation of 460.90 MU of energy with 95% plant availability; (ii) Increased vegetal cover due to implementing of CAT Plan and Green Belt Development Plans (iii) Employment Potential during construction (650 labour); (iv) Overall development of area by implementing CSR initiatives and Watershed Development Plans
R&R details	Total Private land to be taken on lease:39.82 ha of which 1.2 ha shall be for transmission tower base and 38.62 ha for transmission line corridor. Displaced families: Nil Land lease cost: Rs. 534 lakh R&R Grants: Nil Infra-Structure Development in R&R site: Nil Total: Rs. 534 lakh
Catchment area/ Command area	Catchment Area -9.59 sq.km; CCA Nil
Types of Waste and quantity of generation during construction/Operation	MSW-13.32 Ton/annum during construction and 5.04 Ton/annum during operation
Material used for blasting and its composition as per DGMS standards	Ammonium Nitrate Fuel Oil (ANFO), a mixture of ammonium nitrate and fuel oil.
E-Flows for the Project	Since it is an off-stream project and is not a direct intervention on any river, the question of releasing of e-flow in the river does not arise.
Is the project located in Projects studied earlier for Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for the River? If yes then, c) E-flow with TOR/Recommendation by EAC as per CIA&CC study of River Basin. d) If not the E-Flows maintain criteria for sustaining river ecosystem.	No Not applicable Not applicable
Details on provision of fish pass	In the light of fact that fish movement shall not be inhibited as no natural stream is to be harnessed for the project, there is absolutely no requirement of any fish pass.
Project benefit including employment details. (no of employee)	Benefits from project already stated at S.N.4 Temporary employment during construction: 390000 man-days Permanent employment during operation:25
Area of Compensatory Afforestation (CA) with tentative no of plantation.	23.3876 ha (24000 saplings)
Previous EC details	None, as EC is yet to be granted
EC Compliance Report by R.O,	Not applicable

MOEF&CC	

4.Electricity Generation Capacity

Powerhouse Installed Capacity	130MW
Generation of Electricity Annually	460.90 MU
No. of Units	2 X 65MW

5.Muck Management Details:

No. of proposed disposal area/ (type of land-Forest/Pvt land)	3 Type of Land: Govt and Private owned by JSW
Cross section of proposed muck area, height of muck with slope.	D-1: Area=7.16ha, Height average=5.0m D-2: Area=7.86ha, Height average=5.9m D-3: Area=1.72 ha, Height average=12m Slope of muck shall be lesser than 28^0
Distance of muck disposal area(location), from muck generation sources (project area)/River, HFL of proposed muck disposal area.	0.5-1.5 km No river at muck disposal site.
Total Muck Disposal Area	16.74 ha (Govt:4.37ha; Private:12.37ha)
Estimate Muck to be generated	Muck to be generated: 27.76 lakh cum Consumed on work: 19.85 lakh cum To be disposed:7.91 lakh cum
Transportation	By road
Monitoring mechanism for Muck Disposal	The project authorities shall erect a barrier to regulate to and fro movement of traffic from the excavation site. Entry of all vehicles passing through the barrier and the information regarding quantities of earth material being transported shall be properly arrayed in a register in a transparent manner and shall be liable to be made public by the project authorities as and when required. Proper e-challan shall be issued.

6. Land Area Breakup:

Private land	73.19ha (33.37ha already owned by JSW &39.82 to be taken on lease)
Forest Land	23.39 ha
Government land	30.96 ha
Submergence area/Reservoir area	19.53
Land required for project components	40.86 ha +67.15 ha for Transmission line (ROW)

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

Forest Land/ Protected Area/ Environmental Sensitivity Zone	**Yes/No**	**Details of Certificate/ letter/Remarks**
Reserve Forest/Protected Forest Land.	Yes	Torangullu Reserve Forest Donimalai Reserve Forest

		Daroji Reserve Forest
National Park	No	
Wildlife Sanctuary	Yes	Daroji Sloth Bear Sanctuary. The nearest project boundary is about 8.0 km from the boundary of sanctuary and 6.5 kms from ESZ boundary. Same has been certified vide letter No. DCF/VDH/JSWEL/2023-24 dated 30thJune 2023 and 3rd Oct. 2023 by DCF, Vijayanagar Division, Hospet, Karnataka
Archaeological sites monuments/historical temples etc	No	-
Additional information (if any)	No	-

8. Availability of Schedule-I species in study area

Mammalian Species: Striped Hyena, Jackal, Indian Fox, Jangle cat, Porcupine, Sloth bear,

Bird Species: Common peafowl, Grey Jungle fowl and Lugar Falcon, Snake: Russell's Viper, Rat snake and Python,

9. Public Hearing (PH) Details:

Advertisement for PH with date	"Vijayakarnataka" (Kannada) and the "The New Indian Express" (English) on 10.2.2023 and in the local newspaper namely "E Namma Knnada Naadu" on 14.2.2023.
Date of PH	13.3.2023
Venue	Village Bannihatti, near to Inspire Institute of Sports Complex, Sandur Taluka, Bellary District.
Chaired by	Sh. P.S. Manjunatha, ADC/ADM, Bellary.
Main issues raised during PH	i. Job opportunities for the youth and unemployed people ii. Assistance to the villagers in education, health and employment sector iii. Livelihood opportunities for the people of the area iv. Control of dust emission in the area v. CSR grant for developing local villages
No. of people attended	92

10. Brief of base line Environment:

Period of baseline data collection/Sampling period.	1.4.2022 to 29.11.2022
Air, noise, water, land	**Ambient Air** The maximum concentration of PM_{10}, $PM_{2.5}$, NO_X and SO_2 monitored at six locations was 75.0µg/m^3, 41µg/m^3, 22.2µg/m^3 and 12.3µg/m^3 respectively which shows that concentration of pollutants was within the limits of NAAQS, prescribed by CPCB (2009). **Noise Levels** The highest noise levels recorded during daytime at Toranagallu (NQ-4) is 62.5 dB (A) and during nighttime is

50.0 dB (A) and both are within the CPCB limits of 65 dB (A) and 55 dB (A) for commercial zone. The community noise pollution level is highest in Toranagallu and least at Banihatti.

Soil Quality

The soils are neutral to slightly alkaline at all the locations with pH range of 7.21 to 8.15. The texture of the soil is sandy clay loam. Available nitrogen content in the surface soils ranges between 142.1 to 261.5 kg/ha, indicating that soils are low in available nitrogen content. Available phosphorus content ranges between 10.5 to 26.5 kg/ha which indicate that the available phosphorus content is medium to high. Available potassium content in these soils' ranges between 74.8 to 298.6 kg/ha, indicating low to high potassium content. The organic carbon varies from 0.35 % to 0.91% which indicate that the soils are low in organic carbon.

Surface Water Quality

The pH values of all analyzed samples ranged between 6.7 – 7.8 and are within the acceptable limit (6.5-8.5). The TDS levels ranged from 152 to 239 mg/l and were less than the desirable limit of 500 mg/l. Total hardness levels ranged from 97 to 142 mg/l and were well below the acceptable limit of 200 mg/l. The dissolved oxygen values ranged between 5.1-7.2 mg/l and were more than 4 mg/l, i.e., the limit under CPCB Water Quality Criteria for designated best use (C).

The chloride level in surface water samples ranged from 45.4 -79 mg/l and were below the acceptable limit of 250 mg/l. The sulfates level ranged from 22.5 to 39.6 mg/l and were below the acceptable limit of 200 mg/l. The nitrate ranged between 1.1 to 6.1 mg/l and were below the acceptable limit of 45 mg/l. The BOD values ranged between 4.3 to 12.1 mg/l and exceeded the CPCB criteria of 3mg/l or less for Class C water. The Total Coliform level ranged between 230-1950 MPN/100ml and were less than 5000 MPN/100ml, the limits specified for Class C water under CPCB Water Quality Criteria for designated best use**.**

Ground Water Quality

The pH of ground water ranged between 7.2 to 8.1, which are well within the specified standard of 6.5 to 8.5 limit. Total hardness was recorded to range from 191 to 288 mg/l, which is within the permissible limit 600 mg/l at all locations. The EC concentration recorded ranged between 489-681 µS/cm. Chloride at all the locations were within the desirable limits (250 mg/l) as it ranged between 52.8 – 86.1 mg/l. Sulfates at all the locations were within the desirable limits (200 mg/l) as it ranged between 14.1 – 32.6 mg/l. Nitrates at all the locations were within the desirable limits (45 mg/l) as it ranged between 30.6 – 39.1 mg/l. Iron at all the locations were within the desirable limits (1.0 mg/l) as it ranged between 0.07 – 0.42 mg/l. Bacteriological studies reveal that no coliform bacterial are present in the samples. The heavy metal contents were observed to be below

	detectable limits. All physical and general parameters were observed within the desirable limit as per IS10500:2012 (Second Revision). The WQI for ground water at all sampling locations is between 50-100 and therefore, water quality is good.
Flora and Fauna of the project area,	**Flora** During primary and secondary study carried out under present project, 57 tree species, 29 shrub species, 118 herbs and grass species and 30 species of climbers were recorded from the study area. About 5 economically important plant species were recorded from the study area. About 50 important medicinal/ethnobotanical importance plant species were recorded. **Fauna** 15 mammalian species were recorded /reported during the survey of which six (Striped Hyena, Jackal, Indian Fox, Jangle cat, Porcupine, Sloth bear) belong to Schedule-1. 63 bird species were observed /reported during the survey of which three (Common peafowl, Grey Jungle fowl and Lugar Falcon) belong to Schedule-1 of WPA, 1972. 2 species of amphibians, 6 species of snakes and 4 species of lizards recorded/confirmed in the study area of which Russell's Viper, Rat snake and Python belong to Schedule-I of WPA,1972, as amended in December,2022.
Aquatic ecology, etc.	The phytoplankton community in the study area comprised of four (3) major classes namely Bacillariophyceae, Chlorophyceae and Cyanophyceae. A total of 15 species were identified which include four species of Bacillariophyceae seven species of Chlorophyceae, four species of Cyanophyceae. Thirteen species of Zooplankton were recorded from the study area of which 6 species belonged to Rotifera, 4 species belonged to Protozoa, three species to Crustacea of zooplankton group In all 19 fresh water fish species were collected/recorded/ identified from Daroji Lake which belongs to 10 families. Among fish population Cyprinidae comprised 8 species (Common carp, Grass carp, silver carp, Catla, Rohu, L. fimbriae, Mrigaal and Flying barb) followed by Channidae (Murrels, Snakehead fish and Spotted snakehead). Whereas Cichlidae, Poeciliidae, Gobiidae, Notopteridae, Clariidae, Siluridae, Bagridae and Heteropneustidae comprised single representative species each.
Brief description on hydrology and water assessment as per the approved pre-DPR	The project is a closed loop pumped storage project where the reservoirs are not connected to any natural water sources. The project would require one time filling and later would require replenishing the water, lost due to evaporation. Thus, the hydrological studies are confined to evaporation losses, sedimentation and flood estimation.
Additional detail (If any)	None

11. Court case details: No court case/litigation is pending.

Court Case	None
Additional information (if any)	None

12. Status of other statutory clearances:

Particulars	**Letter no. and date**
Status of Stage- I FC	Not, yet. The forest land diversion case submitted vide FP/KA/HYD/152438/2022, dated 12.9.2022, is under examination at Nodal Office, Bengaluru.
Approval of Central Water Commission	Not applicable as shall be apprised at State level by the Department of Energy, GoK, Bengaluru.
Approval of Central Electricity Authority	Not applicable as shall be apprised at State level l by the Department of Energy, GoK, Bengaluru.
Additional detail (If any)	The DPR has been submitted to the Energy Department, GoK, Bengaluru, vide No, JSW/PSP-Vijayanagar/ 1.1/23-173, Dated 21.7.2023 for concurrence.
Is FRA (2006) done for FC-I	Yes, final letter awaited

13. Details of the EMP:

S. N.	**Plans**	**Cost (Rs. Lakh)**	**Capital cost (Rs lakh)**	**Annual recurring cost (Rs lakh)**
1.	Catchment Area Treatment Plan	150.00	120.00	15.00
2.	Compensatory Afforestation Scheme	653.00	653.00	0.00
3.	Wildlife and Bio-diversity Management plan	170.00	150.00	10.00
4.	Resettlement & Rehabilitation Plan	534.00	534.00	0.00
5.	Green Belt Development Plan	25.00	2.00	11.50
6.	Reservoir Rim Treatment Plan	0.00	0.00	0.00
7.	Fisheries Management Plan	0.00	0.00	0.00
8.	Muck Management Plan	906.00	886	10.00
9	Restoration Plan for Quarry Sites &landscaping of colony & work area	40.00	30.00	5.00
10.	Disaster Management Plan	15.00	14.0	0.50
11.	Water, Air and Noise Management Plan	35.00	8.60	13.20
12.	Public Health Delivery Plan	15.00	4.00	5.50
13.	Labor Management Plan	15.00	8.00	3.50
14.	Sanitation & Solid Waste Management Plan	63.00	47.00	8.00
15.	Local Area Development Plan	238.00	238.00	0.00
16.	Environmental Safeguards During Const.	40.00	00.00	20.00
17.	Energy Conservation Measures	34.00	5.50	14.25
18.	Environmental Monitoring Plan	56.00	14.00	21.00
19	Watershed Management	450.00	450.00	0.00

Grand Total	**3439.00**	**3164.10**	**137.45**

3.5.3. Deliberations by the committee in previous meetings

N/A

3.5.4. Deliberations by the EAC in current meetings

1.2.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted and as presented in the meeting and observed that the proposal is for grant of Environmental Clearance (EC) to the project for Vijayanagar Pump Storage Project (130 MW) in an area of 127.54 ha at Village Kurekuppa, Sub District Sandur, District Ballari, Karnataka by M/s JSW Energy PSP Two Limited, for which ToR was issued earlier.

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 EAC noted that MoEF&CC has accorded Terms of Reference vide letter No. J-12011/05/2022-IA. I(R), dated 3rd June 2022 to the proposed project. Sampling/monitoring for baseline environmental attributes, as elaborated in ToR, were carried out for three seasons (Pre-monsoon 2022, Monsoon2022 and Post-monsoon2022).

The Public Hearing was conducted by Karnataka State Pollution Control Board (KSPCB) on 13.3.2023, in village Bannihatti, near to Inspire Institute of Sports Complex, Sandur Taluka, Bellary District. The meeting was presided by Sh. P.S. Manjunatha, ADC/ADM, Bellary. The notice for conducting Public Hearing was published in the state level newspaper namely "Vijayakarnataka" (Kannada) and the "The New Indian Express" (English) on 10.2.2023 and in the local newspaper namely "E Namma Knnada Naadu" on 14.2.2023. The public hearing was attended by 92 stakeholders.

The EAC noted that lower reservoir is existing one and only one i.e., upper reservoir needs to be constructed for PSP. Further, the total land requirement for project is 127.54 ha of which 23.39 ha shall be forest land; 30.96ha shall be Government land (KIADB), 33.37 ha shall be land owned by JSW Steel and 39.82 ha shall be private land for transmission line (ROW) to be taken on lease through mutual agreement.

3.5.5. Recommendation of EAC

Recommended

3.5.6. Details of Environment Conditions

3.5.6.1. Specific

Disaster Management:	
1.	i. Disposal of the excavated muck and its filling on the low-lying area with proper measures for the stabilization and greenery to minimize the impacts of the generated construction muck shall be taken up pari passu with construction work. The muck disposal site should not create any surface water stagnation and leachate movement to the groundwater be monitored

	periodically. ii. Stabilization of muck disposal sites using biological and engineering measures shall be taken up immediately to ensure that muck does not roll down the slopes and does not pollute the natural streams and water bodies in surrounding area. The plantation on muck disposal site with local species for restoration of ecology and environment of the project site area. iii. Necessary control measures such as water sprinkling arrangements, and construction of paved roads leading to muck disposal sites etc. shall be taken up on priority to arrest fugitive dust at all the construction sites. iv. Solid waste generated, especially plastic waste, etc. should not be disposed of as landfill material. It should be treated with scientific approach and recycled. Use of single-use plastics may be discouraged.
Environmental management and Biodiversity conservation:	
1.	i. The water of rainfall yield of self-catchment of the reservoir shall be released to downstream through body of dam/ barrage/ embankment etc. ii. The water for filling of reservoir/ recoupment of evaporation and recirculation losses shall be met from a source other than the rainfall yield of catchment of non-perennial stream/nallah. iii. The Environmental Management Plan (EMP) shall be strictly adhered to as submitted in the EIA/EMP reports. The budgetary provisions for implementation of EMP, shall be fully utilized and not to be diverted to any other purpose. In case of revision of the project cost or due to price level change, the cost of EMP shall also be updated proportionately. iv. The contract clause limiting the number of vehicles used during excavation and transportation shall followed scrupulously and the same shall informed to the ministry. v. Ambient Air Quality Monitoring Stations for real time data to be installed at project site, shall be displayed at project site and its report to be submitted to IRO, MoEF&CC. vi. No vehicle purchase shall be allowed from funds earmarked for implementation of Wildlife Conservation plan. Measures for minimizing the human–animal conflict specially for black bear and leopard be suitably incorporated in the wildlife conservation plan in consultation with State Forest Department. vii. Thick 3 rows plantation shall be carried out around the muck disposal area and the survival of plants shall be submitted with the 6 monthly compliance report. viii. Watershed development plan shall be implemented as presented before the EAC in consultation with ICAR/expert Govt. institute within 10 km radius of the projects. The time bound action plan for implementation shall be prepared and submitted before the RO, MoEF&CC within 3 months from date of grant of EC. Implementation status be submitted in the 6 monthly compliance report. ix. Environmental risk assessment studies shall be carried out every year and be intimated to the Ministry. x. All efforts shall be made towards aesthetics and to protect existing flora and fauna and its diversification. xi. The project proponent must take care of the rules and regulations related to forests, reserve forests and sanctuaries from time to time.
Miscellaneous:	
1.	i. After 5 years of the commissioning of the project, a study shall be undertaken regarding impact of the project on the environment. The study shall be undertaken by an independent agency and report to be submitted to the IRO. ii. Bio-Gas plant (Deen Bandhu Model of Bio-Gas) shall be installed in the Project affected area for utilizing cattle waste (cow dung) into renewable source of fuel. iii. RO plant shall be installed in the nearby 5 villages and the maintenance shall be done by the project Authorities. iv. Solar panel be provided to the families living in rural areas within 10 km radius of project.

	v. The compliance of above conditions shall be monitored by IRO, MoEF&CC and regular site visit to be undertaken twice in a year. The compliance report of IRO shall be regularly submitted to MoEF&CC. vi. PP shall procure construction material only from those Organizations having all valid legal/statutory clearances/permissions or necessary permission to be obtained for quarrying construction materials for the project as per the EIA Notification, 2006 and as amended thereof. vii. An institutional mechanism to be developed to ensure the preference of jobs to PAFs and also a policy for preferential treatment for award of sundry works to the PAFs and their dependents.
Socio-economic:	
1.	i. Land acquired for the project shall be suitably compensated in accordance with the prevailing guidelines of the state government and provisions under Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013. ii. The commitments made by the PP during Public hearing shall be implemented in time bound manner. A time bound implementation plan shall be prepared and submitted before IRO. Implementation status shall be provided to the RO, MoEF&CC in 6 monthly compliance report.

3.5.6.2. Standard

1(c)	**River Valley/Irrigation projects**
Statutory compliance	
1.	The project proponent shall obtain forest clearance under the provisions of Forest (Conservation) Act, 1986, in case of the diversion of forest land for non-forest purpose involved in the project.
2.	The project proponent shall obtain clearance from the National Board for Wildlife, if applicable.
3.	The project proponent shall prepare a Site-Specific Conservation Plan & Wildlife Management Plan and approved by the Chief Wildlife Warden. The recommendations of the approved Site-Specific Conservation Plan / Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report. (in case of the presence of Schedule-I species in the study area).
4.	The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board/ Committee.
5.	NOC shall be obtained from National Commission of Seismic Design Parameters (NCSDS) of CWC.
6.	Necessary approval of CEA shall be obtained for those projects having the project cost more than Rs. 1,000 crores.
Air quality monitoring and preservation	
1.	Regular monitoring of various environmental parameters viz., Water Quality, Ambient Air Quality and Noise levels as per the CPCB guidelines at designated locations shall be carried out on monthly basis and a detailed database of the same shall be prepared and recorded. This shall be used as a baseline data for post construction EIA / Monitoring purposes.
2.	Appropriate Air Pollution Control (APC) system shall be provided for all the dust generating points including

	fugitive dust from all vulnerable sources, so as to comply prescribed standards.
3.	Necessary control measures such as water sprinkling arrangements, etc. bet taken up to arrest fugitive dust at all the construction sites.
4.	Conjunctive use of surface water to be planned in the project to check water logging as well as to increase crops productivity. The field drains shall be connected with natural drainage system (if applicable).
5.	Remodelling of existing natural drains (link drains) and connecting them with irrigated land through constructed field drains, collector drains, etc. are to be ensured on priority basis (if applicable).
6.	Before impounding of the water, Cofferdams for both at the upstream and downstream are to be decommissioned as per EIA/EMP report so that once the project is commissioned; cofferdam should not create any adverse impact on water environment including the rock mass and muck used for the Cofferdam.
7.	As the reservoir will be acting as balancing reservoir and there would be fluctuation of water level during peaking period, efforts be made to reduce impact on aquatic life including impacts during spawning period both at the upstream and downstream of the project.
8.	Water depth sensors shall be installed at suitable locations to monitor e-flow. Hourly data to be collected and converted to discharge data. The Gauge and Discharge data in the form of Excel Sheet be submitted to the Regional Office, MoEF & CC and to the CWC on weekly basis.
9.	Mixed irrigation shall be practised and necessary awareness be given to all the farmers and trained in the use of such systems. Proper crops selection shall be carried out for making irrigation facility more effective (if applicable).
10.	On Farm Development (OFD) works like landscaping, land levelling, drainage facilities, field irrigation channels and farm roads, etc. should be taken up in phased manner prior to the start of irrigation in the entire command area. The Command Area Development Plan should be strictly implemented as proposed in the EIA/EMP report (if applicable).
Noise monitoring and prevention	
1.	All the equipment likely to generate high noise shall be appropriately enclosed or inbuilt noise enclosures be provided so as to meet the ambient noise standards as notified under the Noise Pollution (Regulation and Control) Rules, 2000, as amended in 2010 under the Environment Protection Act (EPA), 1986.
2.	The ambient noise levels should conform to the standards prescribed under E(P)A Rules, 1986 viz. 75 dB(A) during day time and 70 dB(A) during night time.
Catchment Area Treatment Plan	
1.	Catchment Area Treatment (CAT) Plan as proposed in the EIA/EMP report shall be implemented in consultation with the State Forest Department and shall be implemented in synchronization with the construction of the project.
Waste management	
1.	Muck disposal be carried out only in the approved and earmarked sites. The dumping sites shall be located sufficiently away from the HFL of the river. Efforts be made to reuse the muck for construction and other filling purposes and balanced be disposed of at the designated disposal sites. Once the muck disposal sites are inactive, proper treatment measures like both engineering and biological measures be carried out so that sites are stabilized quickly.
2.	Solid waste management should be planned in details. Land filling of plastic waste shall be avoided and instead be used for various purposes as envisaged in the EIA/EMP reports. Efforts be made to avoid one time use of

	plastics.
Green Belt and Wildlife Management	
1.	Based on the recommendation of Cummulative Impact Assessment and Carrying capacity study of river basin or as per the ToR conditions or minimum 15% of the average flow of four consecutive leanest months, whichever value is higher, shall be released as environmental flow.
2.	Detailed information on species composition particular to fish species from previous study/literature be inventoried and proper management plan shall be prepared for insitu conservation in the streams, tributaries of river and the main river itself for which adequate budget provision be made and followed strictly.
3.	Wildlife Conservation Plan approved by the Chief Wildlife Warden shall be implemented in consultation with the local State Forest Department.
4.	To enrich the habitat of the project site, plantation shall be raised as envisaged in the EIA/EMP report. Plantation to be developed along the periphery of the reservoir in multi-layers with local indigenous species in consultation with the local State Forest Department.
5.	Compensatory afforestation programme shall be implemented as per the plan approved.
6.	Fish ladder/pass as envisaged in the EIA/EMP report shall be provided for migration of fishes. Regular monitoring of this facility be carried out to ensure it effectiveness.
Public hearing and Human health issues	
1.	Resettlement & Rehabilitation plan be implemented in consultation with the State Govt. as approved by the State Govt.
2.	Budget provisions made for the community and social development plan including community welfare schemes shall be implemented in toto.
3.	Preventive measures viz. fuming and spraying of mosquito control shall be done in and around the labour colonies, affected villages, stagnated pools, etc. Provisions be made to not to create any stagnated pools to avoid creation of breeding grounds of the vector borne diseases.
4.	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.
5.	Labour force to be engaged for construction works shall be examined thoroughly and adequately treated before issuing them work permit. Medical facilities shall be provided at the construction sites.
Risk Mitigation and Disaster Management	
1.	Early Warning Telemetric system shall be installed in the upper catchment area of the project for advance intimation of flood forecast.
2.	Drilling and blasting shall be done only either by licensed explosive agent or by the proponent after obtaining required approvals from Competent Authorities.
3.	Emergency preparedness plan be made for any eventuality of the dam failure and shall be implemented as per the Disaster Management Plan.
4.	Stabilization of muck disposal sites using biological and engineering measures shall be taken up to ensure that

	muck does not roll down the slopes and shall be disposed safely and that it does not pollute the natural streams and water bodies in surrounding area. The engineering measures for the muck disposal arrangements be evolved after carrying out required slope stability analysis.
5.	Catchment area treatment plan shall be prepared and sufficient fund shall be provided for afforestation, rim plantation, pasture development, nursery development.
Corporate Environment Responsibility	
1.	The project proponent shall comply with the provisions contained in this Ministry's OM vide F.No. 22-65/2017-IA.III dated 30th September, 2020, as applicable, regarding Corporate Environment Responsibility.
2.	Skill mapping be undertaken for the youths of the affected project area and based on the skill mapping, necessary trainings to the youths be provided for their long time livelihood generation
3.	The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental / forest / wildlife norms/ conditions. The company shall have defined system of reporting infringements / deviation/violation of the environmental / forest / wildlife norms/conditions and / or shareholders/ stake holders. The copy of the board resolution in this regard shall be submitted to the MoEF&CC as a part of six-monthly report.
4.	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization.
5.	Action plan for implementing EMP and environmental conditions along with responsibility matrix of the company shall be prepared and shall be duly approved by competent authority. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Year wise progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six Monthly Compliance Report.
6.	Post EIA and SIA be prepared for the project through a third party and evaluation report be submitted to the Ministry after five years of commissioning of the project.
7.	Multi Disciplinary Committee (MDC) be constituted with experts from Ecology. Forestry, Wildlife, Sociology. Soil Conservation, Fisheries, NGO, etc. to oversee implementation of various environmental safeguards proposed in EIA/EMP report during construction of the project. The monitoring report the Committee shall be uploaded in the website of the Company.
8.	Formation of Water User Association/Co-operative be made involment of the whole community be ensured for discipline use of available water for irrigation purposes
Miscellaneous	
1.	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponent's website permanently.
2.	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.
3.	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.
4.	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated

	environmental conditions on the website of the ministry of Environment, Forest and Climate Change at environment clearance portal.
5.	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.
6.	The project proponent shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities, commencing the land development work and start of production operation by the project.
7.	The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.
8.	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.
9.	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).
10.	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.
11.	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.
12.	The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.
13.	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information/monitoring reports.
14.	The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India / High Courts and any other Court of Law relating to the subject matter.
15.	Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

4. Any Other Item(s)

N/A

5. List of Attendees

Sr. No.	Name	Designation	Email ID	Remarks
1	Prof. G. J. Chakrapani	Chairman	chakrapani.govind@gmail.com	
2	Dr Uday Kumar R Y	Member (EAC)	udaykumarry@yahoo.com	
3	Dr Mukesh Sharma	Member (EAC)	mukesh@iitk.ac.in	

4	Shri Janardan Choudhary	Member (EAC)	janardan.choudhary@gmail.com	
5	Dr. J V Tyagi	Member (EAC)	jv_tyagi@yahoo.com	
6	Shri Kartik Sapre	Member (EAC)	kartiksapre@gmail.com	
7	Shri Ajay Kumar Lal	Member (EAC)	aklal87@gmail.com	
8	Yogendra Pal Singh	Scientist E	yogendra78@nic.in	

MINUTES OF THE 1st MEETING OF THE EXPERT APPRAISAL COMMITTEE FOR RIVER VALLEY AND HYDROELECTRIC PROJECTS HELD ON 17TH - 18th OCTOBER, 2023 FROM 10:30 AM – 05:30 PM BY HYBRID MODE (PHYSICAL- INDUS HALL, MoEF&CC AND ONLINE).

The 1st meeting (hybrid mode) of the re-constituted EAC for River Valley & Hydroelectric Projects organized by the Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi, was held on 17th - 18th October, 2023, under the Chairmanship of Prof. G. J. Chakrapani. After initial introduction of all, the committee deliberated on the various issues and challenges for sustainable development of hydroelectric and river valley projects and expressed their absolute commitment, cooperation and team work for the EAC. The list of Members present in the meeting is shown in the **Annexure**.

Agenda Item No. 1.1: Confirmation of Minutes of 51st EAC meeting

The EAC confirmed the minutes of 51st EAC meeting held on 12th September, 2023.

Agenda Item No. 1.2

Vijayanagar Pump Storage Project (130 MW) in an area of 127.54 ha at Village Kurekuppa, Sub District Sandur, District Ballari, Karnataka by M/s JSW Energy PSP Two Limited – Environmental Clearance (EC) – reg.

[Proposal No. IA/KA/RIV/444768/2023; F. No. J-12011/05/2022-IA.I (R)]

1.2.1: The proposal is for grant of Environmental Clearance (EC) to the project for Vijayanagar Pump Storage Project (130 MW) in an area of 127.54 ha at Village Kurekuppa, Sub District Sandur, District Ballari, Karnataka by M/s JSW Energy PSP Two Limited.

1.2.2: The Project Proponent and the accredited Consultant M/s EQMS Global Pvt. Ltd., made a detailed presentation on the salient features of the project and informed that:

i. The proposed Vijayanagar Pumped Storage Project is a self-identified, green field project by the JSW Renewable Energy (Vijayanagar) Ltd., a subsidiary of JSW Energy Limited, for captive use in JSW Steel Plant.

ii. The project has been conceived as an off-stream closed loop pumped storage project of installed capacity 130 MW/845 MWH pumped storage component with twin cycle consisting of hydropower generation during morning and evening peaks by pumping twice during 24-hour period. The project shall be located in Vidya Nagar area of JSW Steel Plant, Taluka Sandur, District Bellary, Karnataka.

iii. The project with an installed capacity of 130 MW by utilizing a design discharge of 108.01 cumecs with rated net head of 136.32 m for two daily cycles of peaking (4.0 hours in the morning and 6.50 hours in evening/night)

iv. The MoEF&CC had accorded Terms of Reference vide letter No. J-12011/05/2022-IA. I(R), dated 3rd June 2022 to the proposed project.

v. The project envisages construction of upper reservoir by constructing 1543m long concrete gravity dam with height of the NOF blocks varying from 27 m to 37 m along the dam periphery. Two intake structures are proposed within the upper reservoir (gross storage :2.93MCM; live storage 2.81 MCM) by locally excavating to provide sufficient submergence below the MDDL.

vi. **Land Requirement:** The total land requirement for project is 127.54 ha of which 23.39 ha shall be forest land; 30.96ha shall be Government land (KIADB), 33.37 ha shall be land owned by JSW Steel and 39.82 ha shall be private land for transmission line (ROW) to be taken on lease through mutual agreement. No R&R issues are involved.

Sl No	Components	Forest Area (ha)	Non-Forest Area (ha)		
			Govt. Area (ha)	Private Area	
				Owned by JSW (ha)	To be acquired/ purchased (ha)
1	Upper Reservoir	9.10	10.43	-	-
2	Penstock, Powerhouse Area & Tailrace Canal Area	-	2.48	17.16	-
3	Dumping Site 1	-	-	7.16	-
4	Dumping Site 2	-	4.37	3.49	-
5	Dumping Site 3	-	-	1.72	-
6	Approach Road	-	1.31	0.18	-
7	Facilitation Area	-	-	2.99	-
8	400 KV transmission Line	14.29	12.37	0.67	39.82
Total Area		23.39	30.96	33.37	39.82
			104.15		
		127.54 ha			

vii. **Hydrology/Water Availability:**

- The project is a closed loop pumped storage project where the reservoirs are not connected to any natural water sources. The project would require one time filling and later would require replenishing the water, lost due to evaporation to generate the stipulated energy.
- For reservoir operation the proposed closed loop PSP contemplates non-consumptive re-utilization of 2.78 MCM of water for recirculation among the two reservoirs. One time filling of the upper reservoir shall be done from the existing Lower Reservoir -1 which has a total capacity of about 4.77 MCM.

- The existing raw water Reservoir R-1 at Vidyanagar, is being filled from water allotted to JSW for Integrated Steel Plant Complex and its auxiliary units like power plant, oxygen plant and cement plant etc. At present, the raw water allotted for JSW Steel Plant by Government of Karnataka is 80.8MGD, of which approximately 30.8MGD is from Tungabhadra dam and 50.0MGD from Almaty dam.

viii. Salient features of the project:

1. Project Details

Location (Including Coordinates)	Vidyanagar Township area of JSW Steel Plant, Taluka Sandur, District Bellary, Karnataka. Upper Reservoir: $15^0$09' 32.4" N ,76^0 38' 0.83" E; Lower Reservoir: $15^0$09' 1.54" N,76^0 39'3.78'' E
Company's Name	JSW Renewable Energy (Vijayanagar) Ltd.
CIN no. of Company/user agency	U40105MH2020PLC335989
Accredited Consultant and certificate no.	EQMS India Pvt. Ltd., Karkardooma, Delhi-110092 QCI/NABET/ENV/ACO/2225/0303, Valid up to 23.11.2025.
Project location (Coordinates /River/Reservoir)	Upper Reservoir: $15^0$09' 32.4" N ,76^0 38' 0.83" E; Lower Reservoir: $15^0$09' 1.54" N,76^0 39'3.78'' E
Inter- state issue involved	No
Proposed on River/ Reservoir	Off-stream, Close loop PSP. Lower reservoir is existing in Vidyanagar Area, JSW Steel Plant and upper reservoir is proposed in Taluka Sandur, District Bellary, Karnataka.
Type of Hydro-electric project	Standalone Pump Storage Project.
Seismic zone	Zone III (Moderate Damage Risk Zone)

2.Category Details

Category of the project	A
Capacity / Cultural command area (CCA)	130MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	-

3.ToR/EC Details

ToR Proposal No.	IA/KA/RIV/264454/2022
EAC meeting date	26th meeting held on 8.4.2022.
ToR Letter No.	J-12011/05/2022-IA. I(R)

ToR grant Date	3rd June 2022.
Cost of project	Rs. 985.13 Crores
Total area of Project	127.54 ha including transmission line (ROW)
Height of Dam from River Bed (EL)	Upper Reservoir dam: Varying from 27 m to 37m along the dam
Details of submergence area	19.53 ha
District to provide irrigation facility (if applicable)	Not applicable
Details of tunnels on upper level & lower level and length of canal (if applicable)	Penstock/pressure shaft (2Nos,3.7m dia, 299 m long) Main TRT (8.0 m diameter and 1327 m long) Unit TRT (2Nos, 4.2 m diameter and 36 m long)
No. of affected village(s)	5
No. of affected families	Displaced Families: Nil, PAF :105
Project Benefits	Project benefits *inter alia* shall include benefits such as, (i) Average annual generation of 460.90 MU of energy with 95% plant availability; (ii) Increased vegetal cover due to implementing of CAT Plan and Green Belt Development Plans (iii) Employment Potential during construction (650 labour); (iv) Overall development of area by implementing CSR initiatives and Watershed Development Plans
R&R details	Total Private land to be taken on lease:39.82 ha of which 1.2 ha shall be for transmission tower base and 38.62 ha for transmission line corridor. Displaced families: Nil Land lease cost: Rs. 534 lakh R&R Grants: Nil Infra-Structure Development in R&R site: Nil Total: Rs. 534 lakh
Catchment area/ Command area	Catchment Area -9.59 sq.km; CCA Nil
Types of Waste and quantity of generation during construction/Operation	MSW-13.32 Ton/annum during construction and 5.04 Ton/annum during operation
Material used for blasting and its composition as per DGMS standards	Ammonium Nitrate Fuel Oil (ANFO), a mixture of ammonium nitrate and fuel oil.
E-Flows for the Project	Since it is an off-stream project and is not a direct intervention on any river, the question of releasing of e-flow in the river does not arise.

Is the project located in Projects studied earlier for Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for the River? If yes then, c) E-flow with TOR/Recommendation by EAC as per CIA&CC study of River Basin. d) If not the E-Flows maintain criteria for sustaining river ecosystem.	No Not applicable Not applicable
Details on provision of fish pass	In the light of fact that fish movement shall not be inhibited as no natural stream is to be harnessed for the project, there is absolutely no requirement of any fish pass.
Project benefit including employment details. (no of employee)	Benefits from project already stated at S.N.4 Temporary employment during construction: 390000 man-days Permanent employment during operation:25
Area of Compensatory Afforestation (CA) with tentative no of plantation.	23.3876 ha (24000 saplings)
Previous EC details	None, as EC is yet to be granted
EC Compliance Report by R.O, MOEF&CC	Not applicable

4.Electricity Generation Capacity

Powerhouse Installed Capacity	130MW
Generation of Electricity Annually	460.90 MU
No. of Units	2 X 65MW

5.Muck Management Details:

No. of proposed disposal area/ (type of land-Forest/Pvt land)	3 Type of Land: Govt and Private owned by JSW
Cross section of proposed muck area, height of muck with slope.	D-1: Area=7.16ha, Height average=5.0m D-2: Area=7.86ha, Height average=5.9m D-3: Area=1.72 ha, Height average=12m Slope of muck shall be lesser than 28^0
Distance of muck disposal area(location), from muck generation sources (project area)/River, HFL of proposed muck disposal area.	0.5-1.5 km No river at muck disposal site.
Total Muck Disposal Area	16.74 ha (Govt:4.37ha; Private:12.37ha)
Estimate Muck to be generated	Muck to be generated: 27.76 lakh cum Consumed on work: 19.85 lakh cum To be disposed:7.91 lakh cum

Transportation	By road
Monitoring mechanism for Muck Disposal	The project authorities shall erect a barrier to regulate to and fro movement of traffic from the excavation site. Entry of all vehicles passing through the barrier and the information regarding quantities of earth material being transported shall be properly arrayed in a register in a transparent manner and shall be liable to be made public by the project authorities as and when required. Proper e-challan shall be issued.

6. Land Area Breakup:

Private land	73.19ha (33.37ha already owned by JSW &39.82 to be taken on lease)
Forest Land	23.39 ha
Government land	30.96 ha
Submergence area/Reservoir area	19.53
Land required for project components	40.86 ha +67.15 ha for Transmission line (ROW)

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

Forest Land/ Protected Area/ Environmental Sensitivity Zone	**Yes/No**	**Details of Certificate/ letter/Remarks**
Reserve Forest/Protected Forest Land.	Yes	Torangullu Reserve Forest Donimalai Reserve Forest Daroji Reserve Forest
National Park	No	
Wildlife Sanctuary	Yes	Daroji Sloth Bear Sanctuary. The nearest project boundary is about 8.0 km from the boundary of sanctuary and 6.5 kms from ESZ boundary. Same has been certified vide letter No. DCF/VDH/JSWEL/2023-24 dated 30thJune 2023 and 3rd Oct. 2023 by DCF, Vijayanagar Division, Hospet, Karnataka
Archaeological sites monuments/historical temples etc	No	-
Additional information (if any)	No	-

8. Availability of Schedule-I species in study area

Mammalian Species: Striped Hyena, Jackal, Indian Fox, Jangle cat, Porcupine, Sloth bear,

Bird Species: Common peafowl, Grey Jungle fowl and Lugar Falcon, Snake: Russell's Viper, Rat snake and Python,

9. Public Hearing (PH) Details:

Advertisement for PH with date	"Vijayakarnataka" (Kannada) and the "The New Indian Express" (English) on 10.2.2023 and in the local newspaper namely "E Namma Knnada Naadu" on 14.2.2023.
Date of PH	13.3.2023
Venue	Village Bannihatti, near to Inspire Institute of Sports Complex, Sandur Taluka, Bellary District.
Chaired by	Sh. P.S. Manjunatha, ADC/ADM, Bellary.
Main issues raised during PH	i. Job opportunities for the youth and unemployed people ii. Assistance to the villagers in education, health and employment sector iii. Livelihood opportunities for the people of the area iv. Control of dust emission in the area v. CSR grant for developing local villages
No. of people attended	92

10. Brief of base line Environment:

Period of baseline data collection/Sampling period.	1.4.2022 to 29.11.2022
Air, noise, water, land	**Ambient Air** The maximum concentration of PM_{10}, $PM_{2.5}$, NO_X and SO_2 monitored at six locations was 75.0µg/m^3, 41µg/m^3, 22.2µg/m^3 and 12.3µg/m^3 respectively which shows that concentration of pollutants was within the limits of NAAQS, prescribed by CPCB (2009). **Noise Levels** The highest noise levels recorded during daytime at Toranagallu (NQ-4) is 62.5 dB (A) and during nighttime is 50.0 dB (A) and both are within the CPCB limits of 65 dB (A) and 55 dB (A) for commercial zone. The community noise pollution level is highest in Toranagallu and least at Banihatti. **Soil Quality** The soils are neutral to slightly alkaline at all the locations with pH range of 7.21 to 8.15. The texture of the soil is

	sandy clay loam. Available nitrogen content in the surface soils ranges between 142.1 to 261.5 kg/ha, indicating that soils are low in available nitrogen content. Available phosphorus content ranges between 10.5 to 26.5 kg/ha which indicate that the available phosphorus content is medium to high. Available potassium content in these soils' ranges between 74.8 to 298.6 kg/ha, indicating low to high potassium content. The organic carbon varies from 0.35 % to 0.91% which indicate that the soils are low in organic carbon. **Surface Water Quality** The pH values of all analyzed samples ranged between 6.7 – 7.8 and are within the acceptable limit (6.5-8.5). The TDS levels ranged from 152 to 239 mg/l and were less than the desirable limit of 500 mg/l. Total hardness levels ranged from 97 to 142 mg/l and were well below the acceptable limit of 200 mg/l. The dissolved oxygen values ranged between 5.1-7.2 mg/l and were more than 4 mg/l, i.e., the limit under CPCB Water Quality Criteria for designated best use (C). The chloride level in surface water samples ranged from 45.4 -79 mg/l and were below the acceptable limit of 250 mg/l. The sulfates level ranged from 22.5 to 39.6 mg/l and were below the acceptable limit of 200 mg/l. The nitrate ranged between 1.1 to 6.1 mg/l and were below the acceptable limit of 45 mg/l. The BOD values ranged between 4.3 to 12.1 mg/l and exceeded the CPCB criteria of 3mg/l or less for Class C water. The Total Coliform level ranged between 230-1950 MPN/100ml and were less than 5000 MPN/100ml, the limits specified for Class C water under CPCB Water Quality Criteria for designated best use**.** **Ground Water Quality** The pH of ground water ranged between 7.2 to 8.1, which are well within the specified standard of 6.5 to 8.5 limit. Total hardness was recorded to range from 191 to 288 mg/l, which is within the permissible limit 600 mg/l at all locations. The EC concentration recorded ranged between 489-681 µS/cm. Chloride at all the locations were within the desirable limits (250 mg/l) as it ranged between 52.8 – 86.1 mg/l. Sulfates at all the locations were within the desirable limits (200 mg/l) as it ranged between 14.1 – 32.6 mg/l. Nitrates at all the locations were within the desirable limits (45 mg/l) as it ranged between 30.6 – 39.1 mg/l. Iron at all the locations were within the desirable limits (1.0 mg/l) as it ranged between

	0.07 – 0.42 mg/l. Bacteriological studies reveal that no coliform bacterial are present in the samples. The heavy metal contents were observed to be below detectable limits. All physical and general parameters were observed within the desirable limit as per IS10500:2012 (Second Revision). The WQI for ground water at all sampling locations is between 50-100 and therefore, water quality is good.
Flora and Fauna of the project area,	**Flora** During primary and secondary study carried out under present project, 57 tree species, 29 shrub species, 118 herbs and grass species and 30 species of climbers were recorded from the study area. About 5 economically important plant species were recorded from the study area. About 50 important medicinal/ethnobotanical importance plant species were recorded. **Fauna** 15 mammalian species were recorded /reported during the survey of which six (Striped Hyena, Jackal, Indian Fox, Jangle cat, Porcupine, Sloth bear) belong to Schedule-1. 63 bird species were observed /reported during the survey of which three (Common peafowl, Grey Jungle fowl and Lugar Falcon) belong to Schedule-1 of WPA, 1972. 2 species of amphibians, 6 species of snakes and 4 species of lizards recorded/confirmed in the study area of which Russell's Viper, Rat snake and Python belong to Schedule-I of WPA,1972, as amended in December,2022.
Aquatic ecology, etc.	The phytoplankton community in the study area comprised of four (3) major classes namely Bacillariophyceae, Chlorophyceae and Cyanophyceae. A total of 15 species were identified which include four species of Bacillariophyceae seven species of Chlorophyceae, four species of Cyanophyceae. Thirteen species of Zooplankton were recorded from the study area of which 6 species belonged to Rotifera, 4 species belonged to Protozoa, three species to Crustacea of zooplankton group In all 19 fresh water fish species were collected/recorded/ identified from Daroji Lake which belongs to 10 families. Among fish population Cyprinidae comprised 8 species (Common carp, Grass carp, silver carp, Catla, Rohu, L. fimbriae, Mrigaal and Flying barb) followed by Channidae (Murrels, Snakehead fish and Spotted

	snakehead). Whereas Cichlidae, Poeciliidae, Gobiidae, Notopteridae, Clariidae, Siluridae, Bagridae and Heteropneustidae comprised single representative species each.
Brief description on hydrology and water assessment as per the approved pre-DPR	The project is a closed loop pumped storage project where the reservoirs are not connected to any natural water sources. The project would require one time filling and later would require replenishing the water, lost due to evaporation. Thus, the hydrological studies are confined to evaporation losses, sedimentation and flood estimation.
Additional detail (If any)	None

11. Court case details: No court case/litigation is pending.

Court Case	None
Additional information (if any)	None

12. Status of other statutory clearances:

Particulars	**Letter no. and date**
Status of Stage- I FC	Not, yet. The forest land diversion case submitted vide FP/KA/HYD/152438/2022, dated 12.9.2022, is under examination at Nodal Office, Bengaluru.
Approval of Central Water Commission	Not applicable as shall be apprised at State level by the Department of Energy, GoK, Bengaluru.
Approval of Central Electricity Authority	Not applicable as shall be apprised at State level l by the Department of Energy, GoK, Bengaluru.
Additional detail (If any)	The DPR has been submitted to the Energy Department, GoK, Bengaluru, vide No, JSW/PSP-Vijayanagar/ 1.1/23-173, Dated 21.7.2023 for concurrence.
Is FRA (2006) done for FC-I	Yes, final letter awaited

13. Details of the EMP:

S. N.	**Plans**	**Cost (Rs. Lakh)**	**Capital cost (Rs lakh)**	**Annual recurring cost (Rs lakh)**
1.	Catchment Area Treatment Plan	150.00	120.00	15.00
2.	Compensatory Afforestation Scheme	653.00	653.00	0.00
3.	Wildlife and Bio-diversity Management plan	170.00	150.00	10.00

4.	Resettlement & Rehabilitation Plan	534.00	534.00	0.00
5.	Green Belt Development Plan	25.00	2.00	11.50
6.	Reservoir Rim Treatment Plan	0.00	0.00	0.00
7.	Fisheries Management Plan	0.00	0.00	0.00
8.	Muck Management Plan	906.00	886	10.00
9	Restoration Plan for Quarry Sites &landscaping of colony & work area	40.00	30.00	5.00
10.	Disaster Management Plan	15.00	14.0	0.50
11.	Water, Air and Noise Management Plan	35.00	8.60	13.20
12.	Public Health Delivery Plan	15.00	4.00	5.50
13.	Labor Management Plan	15.00	8.00	3.50
14.	Sanitation & Solid Waste Management Plan	63.00	47.00	8.00
15.	Local Area Development Plan	238.00	238.00	0.00
16.	Environmental Safeguards During Const.	40.00	00.00	20.00
17.	Energy Conservation Measures	34.00	5.50	14.25
18.	Environmental Monitoring Plan	56.00	14.00	21.00
19	Watershed Management	450.00	450.00	0.00
Grand Total		**3439.00**	**3164.10**	**137.45**

1.2.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted and as presented in the meeting and observed that the proposal is for grant of Environmental Clearance (EC) to the project for Vijayanagar Pump Storage Project (130 MW) in an area of 127.54 ha at Village Kurekuppa, Sub District Sandur, District Ballari, Karnataka by M/s JSW Energy PSP Two Limited, for which ToR was issued earlier.

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 EAC noted that MoEF&CC has accorded Terms of Reference vide letter No. J-12011/05/2022-IA. I(R), dated 3rd June 2022 to the proposed project. Sampling/monitoring for baseline environmental attributes, as elaborated in ToR, were carried out for three seasons (Pre-monsoon 2022, Monsoon2022 and Post-monsoon2022).

The Public Hearing was conducted by Karnataka State Pollution Control Board (KSPCB) on 13.3.2023, in village Bannihatti, near to Inspire Institute of Sports Complex, Sandur Taluka, Bellary District. The meeting was presided by Sh. P.S. Manjunatha, ADC/ADM, Bellary. The notice for conducting Public Hearing was published in the state level newspaper namely

"Vijayakarnataka" (Kannada) and the "The New Indian Express" (English) on 10.2.2023 and in the local newspaper namely "E Namma Knnada Naadu" on 14.2.2023. The public hearing was attended by 92 stakeholders.

The EAC noted that lower reservoir is existing one and only one i.e., upper reservoir needs to be constructed for PSP. Further, the total land requirement for project is 127.54 ha of which 23.39 ha shall be forest land; 30.96ha shall be Government land (KIADB), 33.37 ha shall be land owned by JSW Steel and 39.82 ha shall be private land for transmission line (ROW) to be taken on lease through mutual agreement.

1.2.4: The EAC after examining the information submitted and detailed deliberations **recommended** the proposal for grant of Environmental Clearance by the Ministry to Vijayanagar Pump Storage Project (130 MW) in an area of 127.54 ha at Village Kurekuppa, Sub District Sandur, District Ballari, Karnataka by M/s JSW Energy PSP Two Limited, under the provisions of EIA Notification, 2006 and as amended with subject to compliance of applicable Standard EC conditions with the following additional conditions:

[A] Environmental management and Biodiversity conservation:

i. The water of rainfall yield of self-catchment of the reservoir shall be released to downstream through body of dam/ barrage/ embankment etc.
ii. The water for filling of reservoir/ recoupment of evaporation and recirculation losses shall be met from a source other than the rainfall yield of catchment of non-perennial stream/nallah.
iii. The Environmental Management Plan (EMP) shall be strictly adhered to as submitted in the EIA/EMP reports. The budgetary provisions for implementation of EMP, shall be fully utilized and not to be diverted to any other purpose. In case of revision of the project cost or due to price level change, the cost of EMP shall also be updated proportionately.
iv. The contract clause limiting the number of vehicles used during excavation and transportation shall followed scrupulously and the same shall informed to the ministry.
v. Ambient Air Quality Monitoring Stations for real time data to be installed at project site, shall be displayed at project site and its report to be submitted to IRO, MoEF&CC.
vi. No vehicle purchase shall be allowed from funds earmarked for implementation of Wildlife Conservation plan. Measures for minimizing the human–animal conflict specially for black bear and leopard be suitably incorporated in the wildlife conservation plan in consultation with State Forest Department.
vii. Thick 3 rows plantation shall be carried out around the muck disposal area and the survival of plants shall be submitted with the 6 monthly compliance report.
viii. Watershed development plan shall be implemented as presented before the EAC in consultation with ICAR/expert Govt. institute within 10 km radius of the projects. The time bound action plan for implementation shall be prepared and submitted before the RO, MoEF&CC within 3 months from date of grant of EC. Implementation status be submitted in the 6 monthly compliance report.
ix. Environmental risk assessment studies shall be carried out every year and be intimated to the Ministry.

x. All efforts shall be made towards aesthetics and to protect existing flora and fauna and its diversification.
xi. The project proponent must take care of the rules and regulations related to forests, reserve forests and sanctuaries from time to time.

[B] Disaster Management:

i. Disposal of the excavated muck and its filling on the low-lying area with proper measures for the stabilization and greenery to minimize the impacts of the generated construction muck shall be taken up pari passu with construction work. The muck disposal site should not create any surface water stagnation and leachate movement to the groundwater be monitored periodically.
ii. Stabilization of muck disposal sites using biological and engineering measures shall be taken up immediately to ensure that muck does not roll down the slopes and does not pollute the natural streams and water bodies in surrounding area. The plantation on muck disposal site with local species for restoration of ecology and environment of the project site area.
iii. Necessary control measures such as water sprinkling arrangements, and construction of paved roads leading to muck disposal sites etc. shall be taken up on priority to arrest fugitive dust at all the construction sites.
iv. Solid waste generated, especially plastic waste, etc. should not be disposed of as landfill material. It should be treated with scientific approach and recycled. Use of single-use plastics may be discouraged.

[C] Socio-economic:

i. Land acquired for the project shall be suitably compensated in accordance with the prevailing guidelines of the state government and provisions under Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.
ii. The commitments made by the PP during Public hearing shall be implemented in time bound manner. A time bound implementation plan shall be prepared and submitted before IRO. Implementation status shall be provided to the RO, MoEF&CC in 6 monthly compliance report.

[D] Miscellaneous:

i. After 5 years of the commissioning of the project, a study shall be undertaken regarding impact of the project on the environment. The study shall be undertaken by an independent agency and report to be submitted to the IRO.
ii. Bio-Gas plant (Deen Bandhu Model of Bio-Gas) shall be installed in the Project affected area for utilizing cattle waste (cow dung) into renewable source of fuel.
iii. RO plant shall be installed in the nearby 5 villages and the maintenance shall be done by the project Authorities.
iv. Solar panel be provided to the families living in rural areas within 10 km radius of project.

v. The compliance of above conditions shall be monitored by IRO, MoEF&CC and regular site visit to be undertaken twice in a year. The compliance report of IRO shall be regularly submitted to MoEF&CC.
vi. PP shall procure construction material only from those Organizations having all valid legal/statutory clearances/permissions or necessary permission to be obtained for quarrying construction materials for the project as per the EIA Notification, 2006 and as amended thereof.
vii. An institutional mechanism to be developed to ensure the preference of jobs to PAFs and also a policy for preferential treatment for award of sundry works to the PAFs and their dependents.

Agenda Item No. 1.3:

Brahmani Pumped Storage Project (600 MW) in an area of 284.95 ha at Village Rayata, Sub District Begun, District Chittaurgarh, Rajasthan by M/s Acme Cleantech Solutions Private Limited – Terms of References (TOR) – reg.

[Proposal No. IA/RJ/RIV/445044/2023; F. No. J-12011/50/2023-IA.I (R)]

1.3.1: The proposal is for grant of Terms of References (ToR) to the project for Brahmani Pumped Storage Project (600 MW) in an area of 284.95 ha at Village Rayata, Sub District Begun, District Chittaurgarh, Rajasthan by M/s Acme Cleantech Solutions Private Limited.

1.3.2: The Project Proponent and the accredited Consultant M/s R. S. Envirolinks Technologies Pvt. Ltd, made a detailed presentation on the salient features of the project and informed that:

i. The proposed Brahmani PSP is located near villages Deoriya and Dharla approximately 15km away from the nearest town Begun, Chittorgarh district in the state of Rajasthan. The project components of proposed Brahmani PSP are covered under Survey of India (SoI) toposheet No. 45O/4 available at 1:50000 scale. The geographical coordinates of the upper reservoir are 25°02'43.83"N, 75°07'04.69"E and that of lower reservoir is 25°01'54.97"N, 75°07'25.35"E.

ii. The Brahmani PSP is envisaged as an off stream Closed Loop PSP which will utilize a rated net head of 134 m and design discharge of 507.15 cumecs for generation 600 MW (2 units of 200 MW & 2 units of 100 MW) in Chittorgarh district of Rajasthan.

iii. Brahmani Pumped Storage Project envisaged construction of two artificial reservoirs; Upper reservoir near village Dharla and lower reservoir near Deoriya in Chittorgarh district of Rajasthan. The project is proposed to generate energy during peak hours by utilizing water from the upper reservoir to lower reservoir and pump back the water into upper reservoir using surplus power available during off peak hours.

iv. The formation of upper & lower reservoir will involve construction of CFRD for creation of 12.31 MCM & 15.02 MCM gross capacities respectively. Water will be pumped one time from the Brahmani River by laying a 1.4 m diameter, 6.8 km long pipeline to fill up the

lower reservoir. Based upon the differential head available between two proposed reservoirs, it is proposed to operate the scheme between EL 585.0 m and EL 430.0 m.

v. The estimated project cost is Rs 2730.45 crore. Total capital cost earmarked towards environmental pollution control measures will be worked out during EIA study as well as the Recurring cost (operation and maintenance).

vi. There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site. River/ water body, Brahmani river is flowing at the aerial distance of 5000 m in west to east direction.

vii. **Alternative Studies**

Based on the desk studies on the topographic map and further inputs from the site visit, five alternative layouts were proposed and studied for finding the environmentally sustainable and techno economical alternative.

The upper reservoir location has been kept the same for Alternatives 1, 2, 3 & 5 except which the shape of the reservoir was modified in alternative 1 & 3 accordingly to make it more economical. Underground Powerhouse cavern has been proposed in Alternatives 1 & 2 and a deep pit type surface powerhouse is provided in case of the Alternatives 3, 4 & 5. Lower reservoirs for Alternatives 1, 2 & 4 are proposed by construction of dam on one side and naturally abutting hill on the other side. Lower reservoir for Alternatives 3 & 5 is proposed by constructing dam across the natural depression with mountain flanking on three sides. After perusal of the five alternatives from environmental, techno-economical and geological aspects, it was observed that Alternative 3 has major advantages compared to other alternatives.

viii. The salient features of the project:

1. Project details:

Name of the Proposal	Brahmani Pumped Storage Project
Location (Including coordinates)	Lower Reservoir: 75°07'25.35"E; 25°01'54.97"N Upper Reservoir: 75°07'04.69”E; 25°02'43.83"N
Inter- state issue involved	No
Seismic zone	Zone-II

2. Category details:

Category of the project	A
Provisions	

Capacity / Cultural command area (CCA)	600 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

3. Electricity generation capacity:

Powerhouse Installed Capacity	600 MW
Generation of Electricity Annually	1287.19 MU/ 1910.88 MU (1 cycle/ 2 cycle)
No. of Units	4 nos. (2X200 MW+2X100 MW)
Additional information (if any)	Nil

4. ToR/EC Details:

Cost of project	2730.45 Cr.
Total area of Project	284.95 ha
Height of Dam from River Bed (EL)	Lower Dam – 30.0 m Upper Dam – 27.0 m
Length of Tunnel/Channel	3090 m
Details of Submergence area	205.08 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	Not Applicable, as this is Off-Stream Closed Loop Pumped Storage Project (PSP)
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by b) EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	No

5. Muck Management Details:

No. of proposed disposal area/ (type of land-Forest/Pvt. land)	50 ha Non-Forest Land
Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

6. Land Area Breakup:

Government land/Forest Land	136.62 ha
Submergence area/Reservoir area	205.08 ha
Land required for project components	79.87 ha
Additional information (if any)	Nil

7. Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone		**Details of Certificate / letter/ Remarks**
Reserve Forest/Protected Forest Land	--	There is no protected area in the vicinity of the proposed project. Bassi WLS is about 16.0 Km from site, is the nearest protected area.
National Park	--	
Wildlife Sanctuary	--	

1.3.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of Terms of References (ToR) to the project for Brahmani Pumped Storage Project (600 MW) in an area of 284.95 ha at Village Rayata, Sub District Begun, District Chittaurgarh, Rajasthan by M/s Acme Cleantech Solutions 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.

1.3.4 The EAC after detailed deliberation on the information submitted and as presented during the meeting **recommended** for grant of Standard ToR for preparation of EIA/EMP to Brahmani Pumped Storage Project (600 MW) in an area of 284.95 ha at Village Rayata, Sub District Begun, District Chittaurgarh, Rajasthan by M/s Acme Cleantech Solutions Private Limited under the provisions of EIA Notification, 2006, as amended along with the following additional/specific ToR:

[A] Environmental Management and Biodiversity Conservation:

i. Conducting site specific ecological study w.r.t riverine ecology, such as on fish diversity and aquatic biota due to construction of lower reservoir across Brahmani River.
ii. Stage I FC for 136.62 ha of forest land involved in the project shall be submitted prior to grant of EC
iii. Conduct Environmental Cost Benefit Analysis in terms of loss of Forest ecosystem due to diversion of Forest land/ loss of biodiversity and its impacts on ecosystem, water

availability, water uses for generation of hydro power in study area 10 km from periphery of Project components

iv. Alternative sites for various components shall be identified in terms of loss of forest area and other environmental aspects. Explore to minimize forest land.

v. Action plan for survival of the rivulets located in the study area.

vi. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Standard ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all three seasons.

vii. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.

viii. Sampling locations be located to cover villages situated near the reservoir and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report.

ix. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report.

x. A detailed wildlife conservation plan for Schedule –I species, duly approved by the Chief Wild Life Warden, be submitted.

xi. In case any Wildlife corridor is located within 10 km radius of the project site a detailed study shall be conducted to assess the impact of project on safe movement of wild animals.

xii. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.

xiii. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Govt. institutions/ Indian Council of Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report.

xiv. MoU for water uses for the project shall be signed and approved by concerned authority.

xv. Environmental matrix during construction and operational phase needs to be submitted.

xvi. Matrix formulated on the basis of detailed study and field survey of flora and fauna methodology used shall be mentioned in the EIA report.

xvii. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.

xviii. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component.

xix. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.

xx. Are there any sand dunes in the study location and if yes, to study the affect of proposed project on the landscape.

xxi. Establish with proof that Brahmani River is a perennial river.

[B] Socio-economic Study

xxii. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.

xxiii. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.

xxiv. Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the CER in compliance of the Ministry's OM F. No. 22- 65/2017-IA.III dated 30th September, 2020 shall be submitted.

xxv. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared.

xxvi. Details of settlement in 10 km area shall be submitted.

[C] Muck Management/ Disaster Management

xxvii. Details of quantity of muck generation component wise and disposal site along with transportation plan and its monitoring to be provided.

xxviii. Details of Muck Management plan prepared along with estimated cost incorporated in EIA/ EMP report.

xxix. Techno-economic viability of the project must be recommended from CEA/ CWC

[D] Miscellaneous.

xxx. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted.

xxxi. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.

xxxii. Both capital and recurring expenditure under EMP shall be submitted.

xxxiii. The photograph should bear the date, time, latitude & longitude of the monitoring station/ sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyse the samples.

xxxiv. Arial view video of project site shall be recorded and to be submitted.

xxxv. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.

xxxvi. Specific Terms of Reference (ToRs) issued by the Ministry vide Office Memorandum No. F. No. IA3-22/33/2022-IA.III dated 14.08.2023 for Pump storage projects shall be used for preparation of EIA/ EMP reports.

Agenda Item No. 1.4:

Hasdeo Bango Pumped Storage Hydro-electric Project (1200 MW) in an area of 145 ha at Village Khirati, Tehsil Morga Road, Podi-Uparoda, District Korba, Chhattisgarh by M/s Chhattisgarh State Power Generation Company Limited – Terms of References (ToR) – Reg.

[Proposal No. IA/CG/RIV/444952/2023; F. No. J-12011/51/2023-IA.I (R)]

1.4.1: The proposal is for grant of Terms of References (TOR) to the Hasdeo Bango Pumped Storage Hydro-electric Project (1200 MW) in an area of 145 ha at Village Khirati, Tehsil Morga Road, Podi-Uparoda, District Korba, Chhattisgarh by M/s Chhattisgarh State Power Generation Company Limited.

1.4.2: The Project Proponent and the accredited Consultant M/s WAPCOS Limited, made a detailed presentation on the salient features of the project and informed that:

i. The proposed Hasdeo Bango Pumped Storage Project is located near Khirati village, Morga Road, Podi-Uparoda Tehsil of Korba district, Chhattisgarh, India. The project falls in the Latitude 22°42'43.12"N and Longitude 82°42'22.66"E It is located 80 KM towards North from District headquarters Korba.

ii. The scheme envisages utilization of available head between proposed upper dam and existing Hasdeo Bango reservoir as lower pond. An Underground Power House will be located in between two reservoirs are connected through water conductor system and the generator and turbines installed at the power house.

The project proposal was earlier considered by the EAC in its 48th meeting held on 26/06/2023 to 27/06/2023 and the EAC returned the proposal to the proponent due to the following reasons:

It was observed that the proposed site comes under dense forest area with abundance of Sal trees (Shorea Robusta L). The Lemaru Elephant Reserve is in close proximity. The Hasdeo river Valley hasecological significance being home to a diverse flora, fauna, forests and local Adivasi communities. Preservation of thepristine ecosystem is very essential for better sustainability of the Hasdeo river which is good source water for local population and for thermal power plants situated in the vicinity. The EAC after detailed deliberation was of the view that it is not advisable to disturb this biodiversity rich area and suggested to explore other alternative site for development of the project.

iii. Later with the current proposal PP has proposed a revised layout:

Revised Proposal:

- Layout plan of upper reservoir has been revised with an objective to reduce the acquisition of forest land.

- Land requirement has been reduced by increasing the height of bund by 3 m, which has reduced the length of upper reservoir by 19% (4850 m to 3950 m). This would also lead to reduction in muck generation as well.
- All non-project component have been realigned to non-forest land.
- Total land has been reduced by 26% (From 195 ha to 145 ha) and forest land has been reduced by 41% (195 ha to 115 ha).

HASDEO BANGO PUMPED STORAGE HYDRO ELECTRIC PROJECT (1200 MW)				
COMPARISON - ORIGINAL Vs REVISED PROPOSAL				
S. No.	**Parameters**	**Original**	**Revised**	**Reduction (%)**
1	**Land Requirement**	195	145	26%
2	**Forest Land**	195	115	41%

iv. Salient features of the project:

Project details:

Name of the Proposal	Hasdeo Bango Pumped Storage Hydro-Electric Project (1200 MW)
Location (Including coordinates)	Near Khirati village in Korba district of Chhattisgarh, India (22°42'43.12"N and 82°42'22.66"E)
Inter- state issue involved	No
Seismic zone	Zone -II

Category details:

Category of the project	A
Provisions	-
Capacity / Cultural command area (CCA)	1200 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	-

Electricity generation capacity:

Powerhouse Installed Capacity	4 units of 300 MW each
Generation of Electricity Annually	2335.15 GWh for 1 cycle operation and 3502.73 GWh for 1.5 cycle operation
No. of Units	4
Additional information (if any)	-

ToR/EC Details:

Cost of project	Rs. 5563.28 Crores
Total area of Project	145 ha
Height of Dam from River Bed (EL)	23 m (Upper Reservoir)
Length of Tunnel/Channel	1594 m
Details of Submergence area	75 ha
Types of Waste and quantity of generation during construction/ Operation	Sewage generated from Labour camps 400 KLD per day approx.
E-Flows for the Project	-
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. b) If not the E-Flows maintain criteria for sustaining river ecosystem.	NA

Muck Management Details:

No. of proposed disposal area/(type of land-Forest/Pvt. land)	20 hectares (approx.)
Muck Management Plan	Will be prepared during CEIA study
Monitoring mechanism for Muck Disposal	Will be prepared during CEIA study

Land Area Breakup:

Forest Land	115 Hectares
Non Forest Land	30 Hectares
Submergence area/Reservoir area	75 Hectares
Land required for project components	110 Hectares
Additional information (if any)	-

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone	Yes/No	Details of Certificate/letter/Remarks
Reserve Forest/Protected Forest Land		
National Park	-	
Wildlife Sanctuary	-	

Lemru Elephant Reserve boundary - 5.3 km (Shortest distance from the project boundary)

Court case details:

Court Case	NA
Additional information (if any)	-

Affidavit/Undertaking details:

Affidavit/Undertaking	-
Additional information (if any)	-

Previous EC compliance and necessary approvals:

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	-
Status of Stage- I FC	Yet to be applied
Additional detail (If any)	-
Is FRA (2006) done for FC-I	-

Miscellaneous

Particulars	Details
Details of consultant	WAPCOS Limited
Project Benefits	Hydro-electric power and Employment generation
Status of other statutory clearances	-
R&R details	Nil
Additional detail (If any)	-

1.4.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of Terms of References (ToR) to the project for Hasdeo Bango Pumped Storage Hydro-electric Project (1200 MW) in an area of 145 ha at Village Khirati, Tehsil Morga Road, Podi-Uparoda, District Korba, Chhattisgarh by M/s Chhattisgarh State Power Generation Company 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.

Earlier, the proposal number IA /CG/RIV/430533/2023 was earlier considered by the EAC in its 48th meeting held on 26/06/2023 to 27/06/2023 and the EAC returned the proposal in view of the environmental sensitivity of the project location.

The EAC noted that the PP has reduced the requirement of the total land by 26% (From 195 ha to 145 ha) and forest land has been reduced by 41% (195 ha to 115 ha). The EAC opined that overall requirement of forest land shall be limited to a maximum of 30% of the total land requirement.

It was also noted that Lemru Elephant Reserve boundary is 5.3 km from the project boundary. Therefore, necessary clearance needs to be obtained from the competent authority.

1.4.4 The EAC after detailed deliberation on the information submitted and as presented during the meeting ***recommended*** for grant of Standard ToR for conducting EIA study for Hasdeo Bango Pumped Storage Hydro-electric Project (1200 MW) in an area of 145 ha at Village Khirati, Tehsil Morga Road, Podi-Uparoda, District Korba, by M/s Chhattisgarh State Power Generation Company Limited, with forest land requirement be limited to a maximum of 30%, excluding notional land for underground works wherein tree cutting is not required under the provisions of EIA Notification, 2006, as amended along with the following additional/specific ToR:

[A] Environmental Management and Biodiversity Conservation:

i. Cumulative Impact of project on carrying capacity and sustainability of Reservoir/ nalahs of catchment area, irrigation facilities due to tapping of water for filling reservoir.
ii. Alternative sites for various components shall be identified in terms of loss of forest area. The requirement of forest land shall be limit to 30% of the total land area requirement of the project. All Muck disposal sites should be outside the forest area.
iii. A time bound action plan for extensive Sal tree plantation on identified sites/locations in consultation with Forest Department be prepared and submitted along with EIA/EMP report.
iv. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Standard ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all three seasons.
v. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.
vi. Sampling locations be located to cover villages situated near the reservoir and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report.
vii. Identify the sand mining/ quarrying sites in submergence area and downstream of reservoir.
viii. Source of construction material and its distance from the project site along with detailed transportation plan for construction material.
ix. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report.

x. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
xi. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Govt. institutions/ Indian Council of Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report.
xii. MoU for water uses for the project signed and approved by concerned authority shall be submitted.
xiii. Environmental matrix during construction and operational phase needs to be submitted.
xiv. Matrix formulated on the basis of detailed study and field survey of flora and Fauna methodology used shall be mentioned in the EIA report.
xv. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.
xvi. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component.
xvii. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.
xviii. Stage-I Forest Clearance shall be obtained.

[B] Socio-economic Study

i. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.
ii. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.
iii. Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the CER in compliance of the Ministry's OM F. No. 22-65/2017-IA.III dated 30th September, 2020 shall be submitted.
iv. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared.
v. Details of settlement in 10 km area shall be submitted.

[C] Muck Management/ Disaster Management

i. Details of quantity of muck generation component wise and disposal site along with transportation plan and its monitoring to be provided.
ii. Details of Muck Management plan prepared along with estimated cost incorporated in EIA/ EMP report.
iii. Techno-economic viability of the project must be recommended from CEA/ CWC

[D] Miscellaneous.

i. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted.
ii. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.
iii. Both capital and recurring expenditure under EMP shall be submitted.
iv. The photograph should bear the date, time, latitude & longitude of the monitoring station/ sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyse the samples.
v. Arial view video of project site shall be recorded and to be submitted.
vi. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.
vii. A Site visit of the project area by a sub - committee members shall be done prior to grant of EC in view of the sensitivity of the area.

Agenda Item No. 1.5:

Tarali Off Stream Open Loop Pumping Storage Project (1500 MW) in an area of 150.74 ha at Village Kalambe, Jalu, Nivade and Tondoshi, Sub District Patan, District Satara, Maharashtra by M/s Adani Green Energy Limited – Amendment in Terms of References (TOR) – Reg.

[Proposal No. IA/MH/RIV/443150/2023; F. No. J-12011/52/2023-IA.I (R)]

1.5.1: The proposal is for grant of amendment in Terms of Reference (ToR) to the project for Tarali Off Stream Open Loop Pumping Storage Project (1500 MW) in an area of 150.74 ha at Village Kalambe, Jalu, Nivade and Tondoshi, Sub District Patan, District Satara, Maharashtra by M/s Adani Green Energy Limited.

1.5.2: The Project Proponent and the accredited Consultant M/s. R.S. Envirolink Technologies Pvt. Ltd., made a detailed presentation on the salient features of the project as the following:

i. The Proposed Tarali Pumped Storage Project is located on Tarali River near village Dangistewadi in Patan Taluka, Satara District, Maharashtra State. The Tarali PSP will comprise of two reservoirs, of which lower reservoir is an existing Tarali reservoir which is already constructed as part of Irrigation Project by Water Resource Department (WRD), Maharashtra, whereas Upper Reservoir (UR) is proposed to be newly constructed. The proposed Tarali PSP is planned an 'Off stream open loop' scheme. The live storage capacity of the existing lower reservoir is 165.4 MCM.

ii. Project was appraised and recommended for grant of TOR in 34th meeting of EAC held on 14/09/2022. The TOR was issued by MoEF&CC vide its letter dated 09/11/2022.

iii. After TOR, during survey and investigation, it was observed that the water conductor system (WCS) of the proposed layout is passing just below an existing wind farm, located on the left

bank of Tarali PSP upper reservoir. Doing underground construction work below the wind turbines foundations of the existing wind farm would be difficult. Considering this difficulty in laying out the WCS on left bank, more alternatives are explored and therefore, amendment in TOR is requested for revision on project layout. A statement of comparison of revised layout with earlier approved layout is given below:

S.No	Parameters	Unit	As Per ToR	Actual	Deviation
1	Project Capacity	MW	1500	1500	No Change
2	Unit Size	-	4x300+2x150	4x300+2x150	No Change
3	Storage Capacity	MWH	9000	9705	No Change
4	Total Land Area	ha	108.95	150.74	Change (+41.79)
4a.	Forest Area	ha	63.1	0	Change (-63.10)
4b.	Non-Forest Area	ha	45.85	150.74	Change (+104.89)
5	**Upper Reservoir-Proposed**				
i	Gross Storage	MCM	10.73	11.36	Change (+0.63)
ii	Live Storage	MCM	10.1	10.42	Change (+0.32)
iii	Dead Storage	MCM	0.63	0.94	Change (+0.31)
6	**Type of Dam**		**Concrete**	**Concrete**	**No Change**
7	**Height of Dam**	**m**	**60**	**61.5**	**Change (+1.5)**
8	**Length of Dam**	**m**	**650**	**746.7**	**Change (+96.7)**
9	**Head Race Tunnel (HRT)**				
I	Quantity	Nos	2	2	No Change
ii	Length	m	460 & 460	500 & 542.8	Change (+40 & +82.8)
iii	Diameter	m	10 & 8	9.3 & 7.6	Change (-0.7 & - 0.4)
10	**Surge Shafts**				
I	Quantity	Nos	2	2	No Change
ii	Height	m	90 & 90	82 & 83.90	Change (-8 & -6.1)
iii	Diameter	m	-	15 & 10	New
11	**Pressure Shafts**				
I	Quantity	Nos	2	2	No Change
ii	Length	m	1696 & 1710	1074.50 & 1074.80	Change (-621.5 & -635.2)
iii	Diameter	m	8.3 & 6.8	7.6 & 6.2	ange (-0.7 & - 0.6)
12	**Powerhouse**	**-**	**Underground**	**Pit**	**Change**
13	**Tail Race Tunnels**				
i	Quantity	Nos	2	5	Change (+3)
ii	Length	m	200	113.5	Change (-86.5)
iii	Diameter	m	8.7	5.4	Change (-3.3)

iv. Revised layout has been selected due to the following advantages:

- Issue of land acquisition through the existing windfarm is resolved
- It is in the same environmental setting; so no additional environmental impacts envisaged
- Need to divert 63.10 ha of forest land is eliminated
- Private land requirement increased from 45.85ha to 150.74ha; however, there is no displacement involved
- Storage capacity is increased from 9000 MWH to 9705 (MWH)
- Project cost has come down from Rs. 6009.63crore to Rs. 5675crore

1.5.3 The EAC during deliberations noted the following:

The proposal is for grant of Terms of Reference (TOR) to the project for Tarali Off Stream Open Loop Pumping Storage Project (1500 MW) in an area of 150.74 ha at Village Kalambe, Jalu, Nivade and Tondoshi, Sub District Patan, District Satara, Maharashtra by M/s Adani Green Energy 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 EAC noted that ToR was issued by MoEF&CC vide its letter dated 09/11/2022 for preparing of EIA/EMP.

1.5.4 : The EAC after detailed deliberation on the information submitted and as presented during the meeting recommended for grant of amendment in Terms of Reference as proposed by the PP to Tarali Off Stream Open Loop Pumping Storage Project (1500 MW) in an area of 150.74 ha at Village Kalambe, Jalu, Nivade and Tondoshi, Sub District Patan, District Satara, Maharashtra by M/s Adani Green Energy Limited NTPC under the provisions of EIA Notification, 2006 and as amended along with the following additional ToR:

i. All terms of reference mentioned in the letter dated 09/11/2022 will remain unchanged.

<u>Agenda Item No. 1.6:</u>

Ramial Left Bank Close Loop Pumped Storage Project (1500 MW) in an area of 335.25 ha at Village Godikansa and Godinarda, Tehsil Telkoi, District Keonjhar, Odisha by M/s Renew Solar Power Private Limited– Reconsideration for Terms of References (TOR) – Reg.

[Proposal No. IA/OR/RIV/438758/2023; F. No. J-12011/40/2023-IA.I (R)]

1.6.1 The proposal is for grant of Terms of Reference (ToR) to the project for Ramial Left Bank Close Loop Pumped Storage Project (1500 MW) in an area of 335.25 ha at Village Godikansa and Godinarda, Tehsil Telkoi, District Keonjhar, Odisha by M/s Renew Solar Power Private Limited.

1.6.2 The Project Proponent and the accredited Consultant M/s. R. S. Envirolink Technologies Pvt. Ltd., made a detailed presentation on the salient features of the project as discussed in the following:

i. The proposal earlier considered by the EAC in its 50th meeting held on 11.08.2023 wherein EAC deferred the proposal for ADS, while making observation, that "*the alternative site study is focused on power generation perspective, no environmental consideration has been taken into account. The PP should revisit the proposed alternatives in terms of loss of forest land, impact on ecosystem services and scope for restoration of natural environment."*

ii. The ADS sought by the EAC was submitted by the PP on 20/09/2023 is given under:

Four alternatives of the project layout were studied for the selection of most optimized project layout:

Alternative 1: Layout with underground Powerhouse and other components of this scheme are Upper reservoir, Intake structure, Penstock / Pressure Shaft, Tail Race Outlet and Lower reservoir for the capacity of 1500 MW.
Alternative 2: Layout with Surface Powerhouse and other components of this scheme are Upper reservoir, Intake structure, Penstock / Pressure Shaft, Tail Race Outlet, Tail Race Channel and Lower reservoir for the capacity of 1500 MW.
Alternative 3: Layout with Underground Powerhouse and other components of this scheme are Upper reservoir, Intake structure, Penstock / Pressure Shaft, Tail Race Outlet, Tail Race Channel and Lower reservoir for the capacity of 810 MW.
Alternative 4: Layout with Underground Powerhouse and other components of this scheme are Upper reservoir, Intake structure, Penstock / Pressure Shaft, Tail Race Outlet, Tail Race Channel and Lower reservoir for the capacity of 550 MW.
These four alternatives layouts are with four distinct locations of lower reservoirs and three distinct locations of upper reservoirs. The location of the upper reservoir for Alternative 1 & 2 are same. However, the location of lower reservoir for alternatives 1&2 are slightly different. In Alternative 3 and 4 Project layouts have independent project components and the locations of all the components viz-viz upper reservoir, lower reservoir and alignment of water conductor system is different.

The summary of various alternatives based on environmental and forest aspects is tabulated below.

Sl. No.	**Parameters**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**
1	Installed Capacity (MW)	1500	1500	810	550

2	Topography	The upper reservoir is proposed in a flat terrain with favourable geology for construction of Embankment for water tightness.	Same as Alt- 1	The Upper reservoir is having huge rock blocks with gapping joints filled with overburden	The Upper reservoir topography is similar to Alt-3
3	Total Land Requirement (Ha)	333	320	200	164
3A	Forest Land (Ha)	133	132	142	140
3B	Non-Forest Land (Ha)	200	188	58	24
3C	Forest land (Ha)/MW	0.089	0.088	0.175	0.255
4	Muck Disposal / Dumping Yard	Non-Forest	Non-Forest	Forest	Forest
5	Protected Area / Wildlife Sanctuary (distance from Lower reservoir)	Simlipal WLS about 70 km away	Simlipal WLS about 70 km away	Simlipal WLS about 73 km away	Simlipal WLS about 75 km away
6	Accessibility (New approach roads in Forest area)-km	10	8	10.5	11
7	Length of pipeline for one-time water filling of Lower reservoir from Dandadhar reservoir (km)	7	6.5	5	12.5
8	Dense forest involvement	Upper reservoir in non-forest area, while other components lie in thin forest cover	Same as Alt-1	All project components lie in Dense Forest cover	Same as Alt-3

iii. The salient features of the project are as under:

1. Project details:

Name of the Proposal	Ramial Left Bank Pumped Storage Project
Location (Including coordinates)	Lower Reservoir: 85°33'58.87"E; 21°15'11.74"N Upper Reservoir: 85°32'46.04"E"; 21°16'9.69"N
Inter- state issue involved	No
Seismic zone	Zone-II

2. Category details:

Category of the project	A
Provisions	
Capacity / Cultural command area (CCA)	1500 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

3. Electricity generation capacity:

Powerhouse Installed Capacity	1500 MW
Generation of Electricity Annually	3214.7 MU
No. of Units	7 nos. (5X250 MW+2X125 MW)
Additional information (if any)	Nil

4. ToR/EC Details:

Cost of project	6383.23 Cr.
Total area of Project	320.00 ha
Height of Dam from River Bed (EL)	Lower Dam – 23 m Upper Dam – 24 m
Length of Tunnel/Channel	2116 m
Details of Submergence area	176.00 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	Not Applicable, as this is Off-Stream Closed Loop Pumped Storage Project (PSP)
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies	No

(CIA&CC) for River in which project located. If yes, then E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	

5. Muck Management Details:

No. of proposed disposal area/ (type of land- Forest/Pvt. land)	82.0 ha Private Land
Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

6. Land Area Breakup:

Government land/Forest Land	132.0 ha
Submergence area/Reservoir area	176.0 ha
Land required for project components	144.0 ha
Additional information (if any)	Nil

7. Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone		**Details of Certificate / letter/ Remarks**
Reserve Forest/Protected Forest Land	--	There is no Protected Area in the vicinity of the proposed project. Simlipal WLS is about 70.0 Km from site, is the nearest protected area.
National Park	--	
Wildlife Sanctuary	--	

1.6.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of terms of reference to the Ramial Left Bank Close Loop Pumped Storage Project (1500 MW) in an area of 335.25 ha at Village Godikansa and Godinarda, Tehsil Telkoi, District Keonjhar, Odisha by M/s Renew Solar Power 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.

1.6.4: The EAC after detailed deliberation on the information submitted and as presented during the meeting recommended for grant of Specific ToR for preparation of EIA/EMP to Ramial Left Bank Close Loop Pumped Storage Project (1500 MW) in an area of 335.25 ha at Village Godikansa and Godinarda, Tehsil Telkoi, District Keonjhar, Odisha by M/s Renew Solar Power Private Limited under the provisions of EIA Notification, 2006, as amended along with the following additional/specific ToR:

[A] Environmental Management and Biodiversity Conservation:

i. Conducting site specific ecological study w.r.t riverine ecology focus on fish diversity and aquatic biota due to construction of lower reservoir across Dandadhar reservoir and River Ramial.
ii. Stage I FC for 132.0 ha of forest land involved in the project shall be submitted prior to grant of EC
iii. Conduct Environmental Cost Benefit Analysis in terms of loss of Forest ecosystem due to diversion of Forest land/ loss of biodiversity and its impacts on ecosystem, water availability, water uses for generation of hydro power in study area 10 km from periphery of Project components
iv. Alternative sites for various components shall be identified in terms of loss of forest area and other environmental aspects. Explore to minimize forest land.
v. Action plan for survival of the rivulets located in the study area.
vi. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Standard ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all three seasons.
vii. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.
viii. Sampling locations be located to cover villages situated near the reservoir and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report.
ix. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report.
x. A detailed wildlife conservation plan for Schedule –I species, duly approved by the Chief Wild Life Warden, be submitted.
xi. In case any Wildlife corridor is located within 10 km radius of the project site a detailed study shall be conducted to assess the impact of project on safe movement of wild animals.
xii. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.

xiii. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Govt. institutions/ Indian Council of Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report.

xiv. MoU for water uses for the project shall be signed and approved by concerned authority.

xv. Environmental matrix during construction and operational phase needs to be submitted.

xvi. Matrix formulated on the basis of detailed study and field survey of flora and fauna methodology used shall be mentioned in the EIA report.

xvii. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.

xviii. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component.

xxvii. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.

[B] Socio-economic Study

xxviii. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.

xxix. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.

xxx. Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the CER in compliance of the Ministry's OM F. No. 22- 65/2017-IA.III dated 30th September, 2020 shall be submitted.

xxxi. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared.

xxxii. Details of settlement in 10 km area shall be submitted.

[C] Muck Management/ Disaster Management

xxx. Details of quantity of muck generation component wise and disposal site along with transportation plan and its monitoring to be provided.

xxxi. Details of Muck Management plan prepared along with estimated cost incorporated in EIA/ EMP report.

xxxii. Techno-economic viability of the project must be recommended from CEA/ CWC

[D] Miscellaneous

xxxvii. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted.

xxxviii. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.

xxxix. Both capital and recurring expenditure under EMP shall be submitted.

xl. The photograph should bear the date, time, latitude & longitude of the monitoring station/ sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyse the samples.

xli. Arial view video of project site shall be recorded and to be submitted.

xlii. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.

xliii. Specific Terms of Reference (ToRs) issued by the Ministry vide Office Memorandum No. F. No. IA3-22/33/2022-IA.III dated 14.08.2023 for Pump storage projects shall be used for preparation of EIA/ EMP reports.

Agenda Item No. 1.7:

Jakhol Sankri Hydro Electric Project (44 MW) in an area of 39.99Ha in Village & Tehsil Mori District Uttarkashi, Uttarakhand by M/s SJVN Ltd. – Reconsideration of Environmental Clearance (EC) – Reg.

[Proposal No. IA/UK/RIV/41642/2016; F. No. J-12011/07/2016-IA.I (R)]

1.7.1 The proposal is for grant of Environmental Clearance (EC) to the project for Jakhol Sankri Hydro Electric Project (44 MW) in an area of 39.99Ha in Village & Tehsil Mori District Uttarkashi, Uttarakhand by M/s SJVN Ltd.

1.7.2 The details of the project submitted by project proponent and ascertained from the document submitted are mentioned below:

i. The Jakhol Sankri Hydro Electric Project (44 MW) is proposed on river Supin (a tributary of River Tons), near village Jakhol in District Uttarkashi of Uttarakhand. The project envisages construction of a 7.2 m high (from average river bed level) barrage, which will divert water through a 6.6 km long, 3.0 m diameter HRT to an underground powerhouse. Two units of 22 MW each shall be installed for generation of 166.19 MU of electricity per annum. This is a run-of-the-river scheme. The catchment area of the project is 268.20 km2. At present Jakhol Sankri Hydro Electric Project (JSHEP) is the only hydropower project proposed under development on river Supin.

ii. PP informed EAC that MoEF & CC accorded ToR for IC of 51 MW on 11.01.2011. Accordingly, EIA/EMP report was prepared. However, because of the floods on June, 2013 in Uttarakhand, Hon'ble Supreme Court in its judgment dated 13.08.2013 directed MoEF & CC not to take up any new project for both EC & FC in Uttarakhand till further orders. Further, Hon'ble Supreme Court vide its order dated 24.11.2015, clarified that its judgment dated 13.08.2013 is not applicable to three projects of SJVN limited in Uttarakhand including JSHEP. Taking into account the same, the project capacity was revised to 44 MW. However, the location of barrage site and powerhouse site remain unchanged.

iii. Accordingly, EAC in its 92nd meeting held during 28-29 March, 2016 recommended the ToR for 44 MW project. Revised ToR was issued vide letter dated 07.06.2016. Uttarakhand Environment

Protection and Pollution Control Board organized the public Hearing for JSHEP on 01.03.2019 at Khand Vikas Adhikari Office, Mori, Uttarkashi and Chaired by the Additional District Magistrate, Uttarkashi. The Regional Officer and Assistant Scientist represented UEPPCB. The National Board has recommended the proposed project for Wildlife clearance on 21.09.2016. GoUK issued the TEC Clearance on 03.06.2019. PP submitted the EIA/EMP report to the MoEF&CC on 27.06.2019.

iv. The Public Hearing was held on 01.03.2019 at Vikas Khand Karvalaye Parisar, district Uttarkashi. EAC took the cognizance of the complaint received from the Matu Jan Sanghtan in the Ministry on the issue of Public Hearing. The proposed project is near to GPV Wildlife Sanctuary/ National Park and project was recommended in the 39th meeting of Standing Committee of National Board of Wildlife (SC-NBWL).

v. Earlier proposal was considered by the EAC in the 25th meeting held on the 19.07.2019, 28th meeting held on 31.10.2019 and 29th meeting held on 5.12.2019. The EAC in its meeting held on 05.12.2019 recommended the proposal for grant of Environmental clearance subject to submission of Stage I Forest Clearance.

vi. Accordingly, PP submitted the Stage –I FC issued by MoEF&CC, regional office, Dehradun on 27.07.2023 on Parivesh Portal on 13.09.23. i.e. after 3 years from recommendation of the EAC.

1.7.3 The EAC during deliberation noted the following:

The proposal is for grant of Environmental Clearance (EC) to the project for Jakhol Sankri Hydro Electric Project (44 MW) in an area of 39.99Ha in Village & Tehsil Mori District Uttarkashi, Uttarakhand by M/s SJVN Ltd.

Earlier, EAC in its meeting held on 05.12.2019 recommended the proposal for grant of Environmental clearance subject to submission of Stage I Forest Clearance. The PP has submitted the Stage-I FC accorded on 27.07.2023 on PARIVESH on 13.09.2023. Accordingly, the proposal is again referred to EAC in terms of the provisions of the O.M. dated 19.06.2014.

The EAC after detailed examination on the proposal and details submitted by the PP observed that there is delay in submission of the Stage –I FC; consequently, baseline data submitted in EIA/EMP report become more than 3 years old. Therefore, EAC decided to deferred the proposal for want of following additional information:

i. Submit one season baseline data of the 10km radius of region.

ii. Comparative chart of previous baseline data and fresh baseline data shall be submitted.

iii. To submit pictures of present day site to ascertain that no construction activity has been initiated in the mean time.

The proposal was therefore **deferred** on the above lines.

2ND Day (18.10.2023)

Item No.- 1.8:

Cumulative Impact Assessment and Carrying Capacity Study (CIA & CCS) of Yamuna River Basin in Uttarakhand by Indian Council of Forestry Research and Education (ICFRE), Dehradun – Status of study report-reg.

The Indian Council of Forestry Research and Education (ICFRE), Dehradun along with its partner institutions made a presentation before the EAC (River Valley and Hydroelectric Projects) on the status of study report of Cumulative Impact Assessment and Carrying Capacity Study (CIA & CCS) of Yamuna River Basin in Uttarakhand state.

The ICFRE, Dehradun informed in EAC meeting that:

i. ICFRE in association with study partner institutions (viz. DHRE, IITR; ICAR-DCFR, Bhimtal; WII-SACON, Coimbatore) conducted and submitted draft study report to UJVNL, GoUK on 18.11.2015 and the same was presented before SEIAA & SEAC on 28.07.2016.
ii. In addition, a Study Report was presented before 22nd EAC meeting (27.02.2019) for River Valley & Hydroelectric Projects (RV&HEP) of MoEF&CC, GoI, New Delhi.
iii. The EAC during its aforesaid meeting inter-alia observed the following:

a. No river cross sections have been used for quantification of E-flow. E-flow study should be carried out by using data of river cross sections d/s of projects or other suitable locations and after carrying out simulation analysis. Further, depth requirement for umbrella fish species should be taken for lean, non-monsoon non lean & monsoon seasons separately. 25 cm is too less depth of water for E-flow estimation considering umbrella fish species viz., Trout and Mahaseer. The recommended Environmental Flow Rate (EFR) is required to be relooked based on the actual river cross sections, water depth requirement specific to the umbrella fish species and other downstream uses. In addition, the lower stretch of the Yamuna River is having high fish abundance, catch and the river being flat compared to middle and upper stretch of Yamuna River, would require different EFR for hydroelectric projects falling in these stretches. EFR recommendations should be based on analysis of actual data.
b. Plankton/Benthic diversity should be grouped based on zonal, Periphyton group must be included in the site of trout zones. Depth & velocity requirement for ToR sp. must be revised seasonally**.** Report on Phyto-diversity (algae, Lichens, bryophytes Pteridophytes, gymnosperms & angiosperms) endemism, RET species, species from CITES list based on primary and secondary data needs to be provided. Criteria for estimation of riparian distance to be maintained between projects in cascade shall be relooked by considering all relevant parameters in addition to water quality.
c. The recommendations should be specific in nature and linked with presented data and the impacts assessed. Recommendations regarding hydroelectric projects proposed to be considered/ dropped should be firmly supported with scientific data like extent of threat to habitat, migration routes, breeding sites, and other parameters etc. as per the provisions of

prevailing regulations in the country. The HEPs proposed to be considered/ dropped based on their proximity to Protected Areas and ESZ should also be relooked as per above criteria.

d. Proper linking be made between data, observations vis-a-vis recommendations. The Environmental Action Plan should be specific and aimed at mitigation of the adverse impacts due to hydroelectric projects.
e. EAC noted that the river basin study should not be limited to a particular state, it has to consider the complete basin or sub-basin. Thus, the hydroelectric projects located in the state of Himachal Pradesh in the Yamuna river basin should be included in the CIA & CC study. Hence, all the hydroelectric projects in Yamuna river basin up to Paonta Sahib in Sirmour district of Himachal Pradesh should be included in the study.
f. To that end, a proposal detailing revised scope of work, Terms of Reference, time frame, cost estimates, deliverables is required to be invited for completing the study in Yamuna river basin as above.
g. The total number of hydroelectric projects (operational, under construction and proposed) to be considered in the RBS shall be finalized and frozen in consultation with both the state governments. No other HEPs shall be considered once the RBS has been finalized.

iv. ICFRE, Dehradun presented the compliance status of 22nd EAC meeting (27.02.2019) observation in the 1st EAC meeting (18.10.2023) which are as under:

SL No.	**Suggestions/comments of 22nd EAC for River Valley and Hydroelectric Projects held on 27.02.2019 w.r.t. CEIA study of hydroelectric projects in Yamuna River basin in Uttarakhand.**	**Progress status**
a	No river cross sections have been used for quantification of E-flow. E-flow study should be carried out by using data of river cross sections d/s of projects or other suitable locations and after carrying out simulation analysis. Further, depth requirement for umbrella fish species should be taken for lean, non-monsoon non lean & monsoon seasons separately. 25 cm is too less depth of water for E-flow estimation considering umbrella fish species viz., Trout and Mahseer. The recommended Environmental Flow Rate (EFR) is required to be relooked based on the actual river cross sections, water depth requirement specific to the umbrella fish species and other downstream uses. In addition, the lower stretch of the Yamuna River is having high fish abundance, catch and the river being flat compared to middle and upper stretch of Yamuna River, would require different EFR for hydroelectric projects falling in these stretches. EFR recommendations should be based on analysis of actual data.	-River cross section data requested from UJVNL Govt. of Uttarakhand vide email dated 04.07.2019 and letter dated 03.08.2020, 21.06.2022, 01.08.2023. -River X-section data for Tiuni Plasu, Vyasi, Kishau Multipurpose project, and Lakhwar HEPs out of 46 HEPs have been made available by UJVNL so far. To be compiled in proposed YRB study including H.P. part subject to availability of river X sections.

Address: IA Division, Ministry of Environment, Forest and Climate Change,
Indira Paryavaran Bhawan, Jor Bagh New Delhi - 110003

b	Plankton/Benthic diversity should be grouped based on zonal, Periphyton group must be included in the site of trout zones. Depth & velocity requirement for ToR sp. must be revised seasonally**.** -Report on phytodiversity (algae, Lichens, bryophytes Pteridophytes, gymnosperms & angiosperms) endemism, RET species, species from CITES list based on primary and secondary data needs to be provided. -Criteria for estimation of riparian distance to be maintained between projects in cascade shall be relooked by considering all relevant parameters in addition to water quality	To be compiled in proposed complete (Uttarakhand and Himachal Pradesh) YRB study report.
c	The recommendations should be specific in nature and linked with presented data and the impacts assessed. Recommendations regarding hydroelectric projects proposed to be considered/ dropped should be firmly supported with scientific data like extent of threat to habitat, migration routes, breeding sites, and other parameters etc. as per the provisions of prevailing regulations in the country. The HEPs proposed to be considered/ dropped based on their proximity to Protected Areas and ESZ should also be relooked as per above criteria.	To be compiled in proposed complete (Uttarakhand and Himachal Pradesh) YRB study report.
d	Proper linking be made between data, observations vis-a-vis recommendations. The Environmental Action Plan should be specific and aimed at mitigation of the adverse impacts due to hydroelectric projects.	To be compiled in proposed complete (Uttarakhand and Himachal Pradesh) YRB study report.
e	EAC noted that the river basin study should not be limited to a particular state, it has to consider the complete basin or sub-basin. Thus, the hydroelectric projects located in the state of Himachal Pradesh in the Yamuna river basin should be included in the CIA & CC study. Hence, all the hydroelectric projects in Yamuna river basin up to Paonta Sahib in Sirmour district of Himachal Pradesh should be included in the study.	Proposal for Cumulative Environmental Impact Assessment (CEIA) Study of Hydroelectric Projects in Yamuna River Basin including Himachal Pradesh part (i.e. up to Paonta Sahib in Sirmour district) submitted to the Ministry vide letter dated 10.12.2020
f	To that end, a proposal detailing revised scope of work, Terms of Reference, time frame, cost estimates, deliverables is required to be invited for	To be complied.

	completing the study in Yamuna river basin as above.	
g	The total number of hydroelectric projects (operational, under construction and proposed) to be considered in the RBS shall be finalized and frozen in consultation with both the state governments. No other HEPs shall be considered once the RBS has been finalized	A list of 94 HEPs in Himachal Pradesh Part of YRB was received from DoE, GoHP and 46 HEPs in Uttarakhand part of YRB as considered earlier in the above said proposal.

The EAC during the present meeting deliberated on the status report of Cumulative Impact Assessment and Carrying Capacity Study (CIA & CCS) of Yamuna River Basin in Uttarakhand by Indian Council of Forestry Research and Education (ICFRE), Dehradun. The ICFRE, has presented the compliance status of 22nd EAC meeting (27.02.2019) observations in the present meeting. As presented by the ICFRE that draft study report submitted to UJVNL, GoUK on 18.11.2015 and same was presented before SEIAA & SEAC on 28.07.2016 and final report after incorporating SEIAA and SEAC suggestions/comments to UJVNL on 29.05.2017. The final CIA&CSS was presented before EAC (RV&HEP) MoEF&CC on 22.02.2019 therefore base line data now become approx. 8-9 years old.

The EAC after detailed deliberations was of the view that after spending more than 4 years of 22nd EAC meeting, ICFRE could not get River X (cross) section data from UJVNL. ICFRE informed that River X-section data for Tiuni Plasu, Vyasi, Kishau Multipurpose project, and Lakhwar HEPs out of 46 HEPs have been made available by UJVNL till date.

EAC members expressed disappointment on the lack of a concrete study inspite of involvement of several institutions of repute such as ICFRE, IIT, NIH etc, and desired that a comprehensive report be submitted based on scientific, technological, biological, agro-forestry, ecological and socio-impact assessment and implications be submitted. The same report may pave way for other river basin studies and for future and planning of river basin management and sustainable development. The committee also suggested to expedite the collection of River X- section data from concerned authority and finalize the draft report on Cumulative Impact Assessment and Carrying Capacity Study (CIA & CCS) of Yamuna River Basin in Uttarakhand at earliest. EAC members also suggested for one season base line data to be collected to finalized the draft report on Cumulative Impact Assessment and Carrying Capacity Study (CIA & CCS) of Yamuna River Basin in Uttarakhand.

Item No.- 1.9:

Cumulative Impact Assessment and Carrying Capacity Study (CIA & CCS) of Yamuna River Basin in Himachal Pradesh by Indian Council of Forestry Research and Education (ICFRE), Dehradun - Modifications of Terms of Reference (TOR) - Reg.

The Indian Council of Forestry Research and Education (ICFRE), Dehradun along with its partner institutions made a presentation before the EAC (River Valley and Hydroelectric Projects) on the

Modifications of Terms of Reference (TOR) recommended by the EAC for conductingCumulative Impact Assessment and Carrying Capacity Study (CIA & CCS) of Yamuna River Basin in Himachal Pradesh.

The ICFRE, Dehradun informed in EAC meeting regarding above study are as under:

i. EAC(RV&HEP) in its 22nd meeting held on 22.02.2019 besides giving comments and observations on the final CIA&CSS report of Yamuna River Basin in Uttarakhand mentioned that "….*the river basin study should not be limited to a particular state, it has to be considered the complete basin or sub-basin. Thus, the hydroelectric projects located in the State of Himachal Pradesh in the Yamuna river basin should be included in the CIA & CC Study. Hence, all the hydro-electric projects in Yamuna river basin up to Paonta Sahib (Sirmour district of H.P) should be included in the study. To that end, a proposal detailing revised scope of work, Terms of References, time frame, cost estimates, deliverables is required to be invited for completing the study in Yamuna river basin as above….."*
ii. Accordingly, the consolidated proposal has been prepared by CIFRE, Dehradun and submitted to MOEF&CC. The proposal was presented and deliberated in 41st EAC (RV&HEP) held on 15.02.2023. The Expert Appraisal Committee(EAC) after examining the ICFRE proposal, finalised TOR proposal for conducting CIA&CC study along with additional TOR.
iii. In this context, MOEF&CC was requested by the ICFRE, Dehradun vide letter dated 23.05.2023 for modification of some additional TOR points finalised during 41st EAC meeting (15.02.2023).
iv. The ICFRE, Dehradun requested for modification of some additional TOR in 1st EAC meeting (18.10.2023) which are as under:

Point No.	**Additional ToR**	**Reason/Comments/Remarks for perusal and reconsideration by EAC of MoEF&CC**
2.	Implementation of set of measures for amelioration of adverse impacts.	This point may be amended as-"measures for amelioration of adverse impacts"
7.	Undertake environmental flow release assessment for the entire year i.e., covering lean, non-lean non- monsoon and monsoon periods, based on methodology such as BBM (Building Block Methodology) and make recommendations for each stretch.	1-Shall be done using the hydraulic habitat simulation in place of Building Block Methodology. 2-Building block method is an expensive and time-consuming method and requires a lot of details which may not be collected easily as most of the stakeholders including government agency have limitation to share the desired data / details.
8.	Hydro Dynamic Study for assessment of Environmental flow	The data on presence /absence of fish, its diversity, occurrence, spawning grounds, migration will be collected in different season

	release should be linked with the fauna, habitat requirement for assessment of environmental flow releases for entire year.	at various stretches of the river. Estimated depth & velocity will be provided to partner institution. Based on the above data, environmental flow recommendations will be suggested using any suitable model.
11	Impact of sand mining, boulder mining, etc need to be included in the study	There are no fixed locations/sites for sand and boulder mining and as such it will not be practical to include in the study.
16	Disaster mitigation plans.	This is a very different kind of activity and need to be excluded from the scope of work. Out of scope of CIA studies.
23	E-flow assessment on the basis of Velocity/Depth & cross section, Drone Based aerial survey.	-Drone based survey of river cross-sections may not be carried out as it involves various security, permissions and coordination issues. Drone based assessment would cover the entire river habitat picture for easy development of management practices. Agreed security reason for certain stretches but the stretches are not sensitive Drone based should be included. -If drone-based survey is required, this part may be carried out and provided to study team by the state govt. agencies like UJVN and HP energy dept. MoEF&CC may like to direct the agencies for needful in the matter. -Further MoEF&CC may like to direct the state agencies to provide the surveyed river cross sections to the study team. -Further, if river cross sections are available from the project developers, the drone based aerial surveys become infructuous and unnecessary.
24	Habitat Simulation or Micro-Habitat Modeling Methodologies for biological sustainability of aquatic ecosystem.	-In earlier study of Yamuna and Tons in Uttarakhand, VEC method was used for the assessment of level of impact on riverine ecology. This method includes indicators on physical environment (substrates /depth/velocity/temp/DO etc.), food availability (nutrient/ primary productivity/ plankton), fish migration (barriers), fish faunal status (diversity) for determining the habitat suitability for biological sustainability of aquatic ecosystem.

25	Expert required for study of impact on ecology, including fisheries, biodiversity of riverine ecosystem.	ICAR-DCFR a premier organization working in area of cold-water fisheries and ecology, resource assessment and aquaculture. Institute has completed number of impact assessment studies on HEPs including CIA & CC study of Sutlej basin and has enough expertise for study of impact on ecology, including fisheries, biodiversity of riverine ecosystem. As Fish migration through different tags electronic/sensors is critical behaviour in determining the spawning ground, ICAR-CIFRI expertise may be consulted in this regard.
28	Impacts on fisheries due to fluctuations in Water Level, HEP components (hydraulic turbines, Spillways, penstock etc).	General recommendations on impacts on fisheries will be given based on the available data on the fluctuations in water level.

The EAC during the present meeting deliberated on the modifications of modification of some additional TOR for conducting Cumulative Impact Assessment and Carrying Capacity Study (CIA & CCS) of Yamuna River Basin in Himachal Pradesh by Indian Council of Forestry Research and Education (ICFRE), finalised during 41st EAC meeting held on 15.02.2023.

The EAC after detailed deliberations was of the view that the all additional points finalized by the earlier EAC is justified and well deliberated and essential for comprehensive assessment of carrying capacity and cumulative impacts of the anthropogenic proposed/ ongoing activities in the river basin. EAC member emphasised on Habitat Simulation or Micro-Habitat Modeling Methodologies for biological sustainability of aquatic ecosystem study and E-flow assessment on the basis of Velocity/Depth & cross section, Drone Based aerial survey in the CIA&CC of River basin. ICFRE needs to expand their resources to carry out said study in appropriate manner. The Committee members also desired to expedite the collection of Primary and Secondary base line data and regular perusing with concerned department. The EAC also suggested the Committee constituted by the Ministry to examine the other aspect of the study like increased expenditure on study through drone survey, fresh collection of baseline data for Uttarakhand etc. in consultation with ICFRE for timely completion of the study.

Item No.- 1.10:

Cumulative Impact Assessment and Carrying Capacity Study (CIA & CCS) of Sutlej River Basin Study in Himachal Pradesh by Indian Council of Forestry Research and Education (ICFRE), Dehradun - Reconsideration of Study Report - reg.

The Indian Council of Forestry Research and Education (ICFRE), Dehradun along with its partner institutions viz. Alternate Hydro Energy Center (AHEC/HRED), Indian Institute of Technology

(IIT), Roorkee; ICAR Directorate of Coldwater Fisheries (DCFR), Bhimtal and Salim Ali Centre for Ornithology and Natural History (SACON), Coimbatore, made a presentation before the EAC (River Valley and Hydroelectric Projects) on the draft report on "Cumulative Environmental Impact Assessment (CEIA) & Carrying Capacity Study (CCS) of hydroelectric projects in Sutlej river basin in Himachal Pradesh".

The ICFRE, Dehradun informed that:

i. The CIA&CCS report for Sutlej River Basin for 38 HEPs (>10 MW), Himachal Pradesh part presented before EAC (RV&HEP) of MoEF&CC during its 91st meeting held on 08.02.2016.
ii. During 91st EAC meeting it was suggested to include all HEPs including less than 10MW in CIA&CCS study; including Luhri project (775 MW) to be studied as Luhri stage I (210MW), stage II (170MW) & stage III (355MW).
iii. Study Report including <10 MW HEPs submitted to MoEF&CC in November. 2018 & presented before EAC (RV&HEP) of MoEF&CC, New Delhi during its 21st meeting held on 28.01.2019.
iv. The suggestions made by the EAC during its 21st meeting on the study report were compiled and incorporated in the corrected study report which was presented before EAC (RVHEP) during its 29th meeting held on 05.12.2019.
v. The recommendations of the study report were further corrected during the 30th EAC meeting held on 27.01.2020. Accordingly, the ICFRE, Dehradun has incorporated the corrections/ modifications in the final draft report on Cumulative Environmental Impact Assessment (CEIA) & Carrying Capacity Study (CCS) of Hydroelectric projects in Sutlej River Basin in Himachal Pradesh and submitted vide letter dated 10.06.2020 to MOEF&CC.
vi. During examination of the report in the Ministry certain factual errors were observed and the same was communicated to ICFRE vide letter dated 26.10.2021.
vii. The corrected final draft report on Cumulative Environmental Impact Assessment (CEIA) & Carrying Capacity Study (CCS) & Carrying Capacity Study (CCS) of Hydroelectric projects in Sutlej River Basin in Himachal Pradesh was submitted by the ICFRE vide letter dated 16.11.2021 to the MOEF&CC.
viii. The corrected final draft report on Cumulative Environmental Impact Assessment (CEIA) & Carrying Capacity Study (CCS) of Hydroelectric projects in Sutlej River Basin in Himachal Pradesh was deliberated in 41st EAC meeting (15.02.2023). The EAC after detailed deliberations was of the view that the issues of Govt. of Himachal Pradesh related to report on Cumulative Environment Impact Assessment (CIA&CCS) Sutlej River Basin in Himachal Pradesh needs to be discussed by Government of Himachal Pradesh expeditiously with ICFRE, Dehradun on priority basis so that the same can be addressed before finalisation of the study report. The ICFRE may modified the report accordingly and submit for further deliberations by the EAC.
ix. Accordingly, meeting of officials from DoE, GoHP, Shimla, SJVNL, NTPC, HPPCL held on 02.08.2023 at DHRE, IIT, Roorkee to discuss w.r.t recommendations of CIA & CCS of Sutlej River in Himachal Pradesh made in the 41st EAC meeting held on15.02.2023 . During discussion with officials from Govt of Himachal Pradesh most of the issues were settled.

The EAC during the present meeting deliberated on recommendations of CIA & CCS of Sutlej River in Himachal Pradesh made in the minutes of the 41st EAC meeting (15.02.2023). During the meeting Govt of Himachal Pradesh officials were also present.

The EAC after detailed deliberation found that the corrected final draft report on "Cumulative Environmental Impact Assessment (CEIA) & Carrying Capacity Study (CCS) of Sutlej River Basin in Himachal Pradesh is in order and as per the TOR given by the Ministry. Accordingly, the EAC recommended the study report for acceptance by the Ministry.

Item No.- 1.11: Cumulative Impact Assessment and Carrying Capacity Study (CIA & CCS) of Tirap Basin. Inclusion of Chinglum Hydroelectric Project in Subansiri Basin – Conducting study – Reg.

The officials from Government of Arunachal Pradesh did not attend the meeting; hence EAC decided to defer the proposal.

Item No.- 1.12
Proposal for conducting Cumulative Impact Assessment (CIA) & Carrying Capacity Study (CCS) of Ravi River Basin in Himachal Pradesh –Consideration of proposal – Reg.

The Member Secretary, EAC (RV&HEP), MoEF&CC informed that:

i. MOEF&CC vide letter dated 05.02.2015 written to Chief Secretary, Govt of Himachal Pradesh to hand over all records related to Carrying Capacity and CIA studies of River Basins in Himachal Pradesh.
ii. Centre for Inter-disciplinary Studies of Mountain & Hill Environment (CISMHE), University of Delhi and WAPCOS were requested by MOEF&CC vide letter dated 03.02.2016 for preparing draft ToRs and submit to this Ministry.
iii. The CISMHE, University of Delhi submitted draft TOR for conducting CIA&CCS study of Ravi River Basin in Himachal Pradesh.
iv. The Centre for Interdisciplinary Studies of Mountain & Hill Environment (CISMHE) University of Delhi, made a presentation before the 1st EAC (River Valley and Hydroelectric Projects) on the TOR proposal for conducting CIA&CC study of Ravi River Basin in Himachal Pradesh.
v. The CISMHE, Delhi University during discussion informed that they have prepared draft TOR covering following aspects:

    a) Characteristics of Ravi Basin
    b) Scope of Work
    c) Approach and Methodology
    d) Outcome of the Study
    e) Organizational Set up and Staffing
    f) Scheduled Work Plan

The EAC during the present meeting deliberated on the TOR proposal for conducting CIA&CCS study of Ravi River Basin in Himachal Pradesh presented by CISMHE, Delhi University.

The EAC after detailed deliberations on the TOR proposal was of the view that the TOR for Cumulative Impact Assessment (CIA&CCS) of Ravi River Basin needs to be prepared for complete stretch of Ravi River in Himachal Pradesh and Jammu & Kashmir. The updated list of HEPs proposed in the Ravi River and its tributaries in both states needs to be provided by the Himachal Pradesh Government. Accordingly, the revised Terms of Reference for conducting CIA & CC study of Ravi River may be submitted. After completion of draft TOR proposal for conducting CIA&CC study of Ravi River basin for Himachal Pradesh and J&K the same may be submitted to MoEF&CC for further deliberations by the EAC meeting.

Item No.- 1.13

Discussion on requirement of CIA/CSS for small hydro power projects – reg.

The Member Secretary, EAC informed that Ministry has received proposals for grant of Forest Clearance (FC) under Forest (Conservation) Act, 1980 for diversion of forest land involved for construction of small hydro-power projects i.e. the Hydropower projects having power generation capacity less then 25 MW.

It was further informed that vide Office Memorandum dated 28.05.2013 of the Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India, the Cumulative Impact Assessment & Carrying Capacity (CC& CIA) study of the river basins has been made mandatory before grant of Environment Clearance and Forest Clearance. The said office memorandum inter-alia states as under:

*"…….(i) **Environmental Flow**: As EAC has got requisite expertise, this aspect may be considered by EAC alone and outcome be shared with FAC.*

***(ii) Bio-diversity Component:** Examination of bio-diversity issues is a highly specialized task and the consultants involved in preparation of EIA/EMP report may not be equipped to do full justice to this subject. Some institutes in the country are well equipped with expertise and resources with regard to examination of bio-diversity issues. Therefore, their knowledge and expertise may be harnessed on Bio-diversity aspect for ensuring a sound assessment of this cardinal component in EIA Studies and preparing an effective EMP. It has been decided that WII and ICFRE, Dehradun will provide a State-wise list of such institutes and based on their inputs, MoEF would finalize a list of institutes which would be displayed on MoEF's website. The developers would then choose from amongst such institute to conduct such a study. The standard ToRs for a bio-diversity study for a hydro power project may be prepared by EAC and shared with FAC for modifications, if any. The same template be then used by EAC/FAC (taking into account which Committee considers the project first) with suitable project specific modifications, if required. Once the bio-diversity study report is ready, the same could them be shared between EAC and FAC.*

***(iii) Cumulative Impact Study:** Cumulative Impact study of a basin would reflect the cumulative impact -of commissioned/up-coming hydro-power projects in the basin on environmental flow, bio-diversity, muck disposal sites, traffic flow hi the region R&R issues etc. While the first project in a basin could come up without insisting on cumulative study. for all subsequent hydro-power projects in the basin. it should be incumbent on the developer' of the second/other project(s) to incorporate*

all possible and potential impact of other project(s) in the basin to get a cumulative impact assessment done. This condition shall be stipulated. at the ToRs stage itself during the EC process. Once such a cumulative impact- study has been done. the same could be shared by EAC with FAC. The Cumulative impact study in respect of bio-diversity component may be separately got done by one of the specialized institutes as stated at (ii) above. While making recommendation on EC/FC for such projects. the EAC/FAC will take into account the results of such cumulative studies.

(iv) ***Carrying Capacity Study****: The carrying capacity study of a river basin is important to plan optimal number of power projects in a basin. All State Governments will be required to get such studies done for river basins in their State. The process may be initiated in the next three months and completed within a period of two years, after which the carrying capacity study report would be made a pre-requisite for considering EC/FC cases of projects of any basin. All State Governments will send the details of river basins where such studies are to be done and confirm initiation of studies to MoEF within 3 months of issuance of this OM. -The institutes for such studies may be settled by the State Government in consultation with the EAC…."*

Till date total **13 River basin CIA&CC** studies have been completed. Out of 13 River basin study reports of 11 River basin studies have been accepted by Ministry and communicated to the concerned States for implementation of recommendations given in the Study reports.

It was further informed that the Ministry consider the projects for grant of prior Environmental Clearance (EC) under the provisions of the Environment Impact Assessment (EIA) Notification,2006, as amended. The Hydro-electric projects with electricity generation capacity ≥ 25 MW attract the provisions of Environmental Impact Assessment (EIA) Notification,2006, as amended and liable to take prior EC under the provisions of the said notification.

1. For diversion of forest land for construction of small /mini HEP forest clearance required in which FAC require CIA&CC study of River Basin

There are many river basins in the country for which CIA &CCS are yet to be conducted. Many small HEPs are not included in the list of HEPs where CIA &CCS study report of River basin already completed. Since, the aforesaid Office Memorandum mandates that after development of one hydro-electric project in any river basin other projects shall have to conduct individual CIA &CCS study for complete river basin, if the CIA &CC study has not been done for that particular river basin.

The Ministry has decided to assess the requirement of CIA&CCS study for small hydro-power projects (mini, micro and small HEPs) which do not require Environmental Clearance under the provisions of the EIA Notification, 2006, as amended, as many such projects are kept on hold due to absence of CIA&CCS study for complete river basin.

Given the above information the EAC deliberated on the matter and observed that for ensuring the sustainability of any ecosystem it is essential to have baseline information about it's carrying capacity and extent of anthropogenic pressure/activities that the ecosystem will be able to accept without any considerable impact on biological processes. CIA&CCS of river basin provide comprehensive data about capacity of river system to continue biological processes and

metabolism. River basins also influence positively on the nearby ground water aquifer systems by water level fluctuations and recharge/discharge. The proposed activities may also enhance increased moisture which helps in better crops, agro-forestry and food security in a changing climate change scenario. Socio-economic, anthropologic, aesthetics, aqua sports and river tourism also are based on the carrying capacity of river systems. In addition, marginal marine environments such as estuaries, mangrove and deltaic ecosystems are home to the large biodiversity which are sensitive to the river cultural impacts. CIA&CCS is an important informative and scientific tool to analyse the range of environmental impacts associated with the developmental activities including development of hydropower projects and provide a road map for preparation of effective environmental management plan. The EAC decided that deliberation on the matter to be continued in the next meeting of the EAC so as to take a balanced view on the matter.

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Annexure

ATTENDANCE

1st MEETING OF RE-CONSTITUTED EXPERT APPRAISAL COMMITTEE (EAC)
RIVER VALLEY AND HYDROELECTRIC PROJECTS

DATE : 17-18th October 2023
TIME : 11.00 AM onwards
VENUE : Indus Hall, Jal Block, Indira Paryavaran Bhawan, New Delhi.

Sl.No.	Name of Member	Role	Signature (17.10.2023)	Signature (18.10.2023)
1.	**Prof. G. J. Chakrapani**	**Chairman**	G.J.Chakrapani	G.J.Chakrapani
2.	**Dr. Udaykumar R. Y.**	Member		
3.	**Dr. Mukesh Sharma**	Member	Joined through VC	Joined through VC
4.	**Shri Janardan Choudhary**	Member	Joined through VC	-Ab-
5.	**Dr. J V Tyagi**	Member		
6.	**Shri Kartik Sapre**	Member		
7.	**Shri Ajay Kumar Lal**	Member		
8.	**Shri Sharvan Kumar,** (Chief Engineer, HPA), Representative of Central Electricity Authority (CEA)	Member		-Ab-
9.	**Shri Alok Paul Kalsi, Director (EM)** Representative of Central Water Commission (CWC)	Member	Joined through VC	Joined through VC
10.	**Dr. J.A. Johnson, Scientist - F** Representative of Wildlife Institute of India (WII)	Member	Joined through VC	-Ab-
11.	**Dr B.K. Das, Director / Dr. A.K. Sahoo, Senior Scientist** Representative of Central Inland Fisheries Research Institute (CIFRI)	Member	Joined through VC	Joined through VC
12.	**Shri Yogendra Pal Singh**	Scientist – E and Member Secretary (River Valley and Hydroelectric Projects), MoEF&CC	Joined through VC	

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APPROVAL OF THE CHAIRMAN

From: "govind chakrapani" <govind.chakrapani@es.iitr.ac.in>
To: "Yogendra Pal Singh" <yogendra78@nic.in>
Sent: Monday, November 6, 2023 3:57:23 PM
Subject: Re: Draft MoM of 1st EAC meeting held on 16-17.10.2023 for approval - reg

The Minutes of the Meeting held on 16-17 October 2023 prepared by due procedure by the Member Secretary and circulated to all and after incoroprating the neccesary feedback and consent received from all is approved.
G.J. Chakrapani