SAIDONGAR 1 – KARJAT 3000 MW PSP

Raigad, Maharashtra

Executive Summary - English

EXECUTIVE SUMMARY

ES 1.0 INTRODUCTION

Torrent PSH3 Private Limited is a subsidiary of Torrent Power Limited (TPL). Torrent PSH3 has entered into a Memorandum of Understanding (MoU) with the Department of Water Resources, Government of Maharashtra on 03/09/2024 to establish Saidongar 1 – Karjat PSP of 3000 MW (Saidongar 1) installed capacity located in district Raigad, Maharashtra. PSH3. Torrent PSH3 has assigned the task of preparation of the Environmental Impact Assessment and Environmental Management Plan for obtaining Environmental Clearance from Ministry of Environment Forests & Climate Change (MoEF&CC) to M/s. Aarvee Engineering Consultants Ltd., Hyderabad (former known as M/s. Aarvee Associates Architects Engineering Consultants, Ltd., Hyderabad.)

EIA Notification issued on 14th September 2006 by the MoEF&CC, GoI, including its various amendments, deals with environment clearance process for various categories of projects. Among categories listed in Schedule of EIA Notification and amendments thereof, the proposed Saidongar 1 - Karjat PSP (3000MW) is listed at item 1(c) Category -A project viz., (i) ≥ 100 MW hydroelectric power generation. Hence, an Environmental Clearance is required from MoEF&CC, New Delhi.

Accordingly, the project has obtained Fresh ToR obtained from 23rd ToR EAC Meeting held on 29.01.2025 (Vide File No: J-12011/04/2025-IA.I (R), Dated 16 January 2025). Based on the ToR issued by MoEF&CC, the EIA Study has been conducted and detailed in the report considering proposed project as an Open loop project due to change in technical parameters of Project & formation of SPV. ToR was obtained before for Closed loop project from 50th Expert

Appraisal Committee (EAC) meeting held on 11th August 2023 (Vide file no. J-12011/42/2023IA.I (R), dated 23rd September,2023).

The objective is to carry out the Environmental impact Assessment (EIA) study to identify, predict and evaluate potential environmental, socio-economic impacts which may result from proposed “Saidongar 1 - Karjat PSP in Maharashtra” and develop suitable Environmental Management Plan (EMP) to mitigate the impact. The EIA is mandatory in the environmental clearance process of such projects. Proposed project consists of common lower reservoir receiving discharge from both upper reservoir of Saidongar 1- karjat PSP & Saidongar 2 – Maval PSP.

Statutory Clearances: The proposed Saidongar 1 - Karjat Pumped Storage (3000 MW) is requires approvals from statutary authorities. These regulations and rules are helpful in impact mitigation and improvement of environment. The environmental impact assessment study has been carried out as per the requirement of the National/State guidelines.

Environmental Clearance: The proposed project is a hydroelectric project as listed at item **1 (c) of Schedule of EIA notification and is a Category -A project** viz., (i) ≥ 100 MW

hydroelectric power generation. Hence, an Environmental Clearance is required from MoEF&CC, New Delhi.

Wildlife Clearance: The proposed project does not require wildlife clearance as it is outside the notified Eco-sensitive Zone of the nearest protected area i.e. Bhimashankar WLS, which is about 15 Km away. (Refer Section 4.8.5 for map with description).

Forest Clearances: The proposed project involves the diversion of **233.00 ha** of the Forest land and requires obtaining Forest Clearance from MoEF&CC, New Delhi. Online application seeking forest diversion for 233.0 Ha has been submitted vide proposal no. FP/MH/HYD/IRRIG/515850/2024 dated 31/12/2024.

ES 2.0 PROJECT DESCRIPTION

Saidongar 1 - Karjat Pumped Storage comprising of 3000MW is proposed to be located at Pali

T. Kothal Khalathi, Saidongar, Ambot, Dhak, Bhaliwadi village, Sub district Karjat, Raigad District, Maharashtra. It will comprise of two reservoirs. Upper & lower reservoirs with a gross storage capacity of 15.87 MCM & 28.96 MCM respectively, upper reservoir will be constructed on the hilltop with maximum dam height of 27 m to create the desired storage capacity while the lower reservoir will have maximum height of 59 m and shall be constructed across River Pej. This Project envisages non-consumptive re-utilization of 14.77 MCM of water for recirculation among these two reservoirs. The Salient Features of the Saidongar-1 Karjat PSP are given in **Table ES.1.** The proposed civil components of the project are as follows: **Table ES.1: Salient Features of the Project**

S.No	Description		Details
1.	Type		Pumped Storage Project
2.	Capacity		3000 MW
3.	Daily hours of generation		6 hour
4.	Country, State, District		India, Maharashtra, Raigad
5.	Upper Reservoir		Lat. N-18°54'15"N Long. E-73° 24'32"E
6.	Lower Reservoir		Lat. N-18°54'37"N Long. E-73°25'34"E
7.	Nearest Road		Accessible from SH-55 Saidongar Village
8.	Nearest Airport		Pune & Mumbai
9.	Nearest Rail head (with facilities)	unloading	Karjat Railway Station

Material Requirements: For the construction of various project components approximately **63,74,731 ton** of coarse aggregate **13,59,223 ton** fine aggregate and **4,80,340 ton** of cement are required for the proposed project.

Land Requirement: For the development of Saidongar 1 - Karjat PSP, land would be required for construction of project components, reservoir area, muck dumping, construction camps and colony, etc. Total land required for the construction of proposed activities is approximately **377ha (233ha forest land and 144ha of non-forest land).**

Muck Generation: Substantial amount of muck would be generated when excavation of the principal components is done. The total muck to be generated from excavation of the principal components would be of the order of 110.78 Lakh cum. Presently all the quantity of excavation has been planned to be directed to the designated disposal sites. However, during construction stage the excavated material shall be tested for their suitability for use as construction material. The material found suitable shall be used for construction. Three (3) Muck disposal sites have been selected and proposed. The area of the site is assessed as 41 Ha of 65.69 Lakh cum capacity of muck dumping yard. Detailed muck disposal plan is provided in the EMP chapter.

Proposed Schedule: Construction Programme and selection of Methodology with the planning for equipment has been worked out keeping site constraints in view. The project has been planned to be commissioned in a period of approx. **42 months + 3 months of pre-construction** from the start of the project. Pre-construction activities involve development of infrastructure facilities in the project, obtaining requisite clearances, financial approvals, land acquisition, tendering and award of work, design and engineering.

Project Cost: The total project cost has been estimated at **Rs. 13,017 Cr.**

ES 3.0 DESCRIPTION OF THE ENVIRONMENT

ES 3.1 Introduction

This section presents the ambient air quality, ground and surface water quality, noise levels, land environment including soil quality, land-use pattern, forest cover, biological environment, socio-economic and health status of the population, demography and quality of life.

The proposed Saidongar 1 - Karjat PSP project is an open loop pumped storage project. MoEF&CC's OM no. F.No.IA3-22/33/2022-IA.III (E18815) dated 14th August 2023 defined specific terms of reference for conducting environmental impact assessment study for open loop pump storage projects.

The proposed Saidongar-1 Karjat PSP is required to establish the existing environmental conditions-based baseline data collection for 3 seasons viz Pre-monsoon, post monsoon & winter season. Hence, the environmental baseline data is generated for three seasons viz., Pre monsoon Season (March 2025 to May 2025), Post Monsoon season (October 2024 to December 2024) & winter season (December 2023 to February 2024) of all the environmental attributes including biological environment as mentioned in the Standard ToR.

ES 3.2 Regional Topography, Physiography and Geology

The Project falls in Raigad district and is located on the border of Raigad and Pune District in the state of Maharashtra. The Sahyadri mountain range encompasses the majority of the district's mountainous areas. The eastern part of the Raigad district is of hilly zone highly uneven in altitude and covered with forest. This hill range is characterized by ruggedness and uneven topography, with crestline of peaks and saddles forming the eastern horizon. The climate of the district is typical of west coast and characterized with plentiful and regular seasonal rainfall, oppressive weather in summer and high humidity throughout the year. The analysis of longterm

rainfall data (Year 2002 to 2012) indicates that normal annual rainfall over the Karjat taluka ranges from 2335 mm to more than 4800 mm, with an average value of 3670 mm. The Pune district is bounded by Ahmednagar district and the landscape of Pune district is distributed triangularly in western Maharashtra at the foothills of the Sahyadri Mountains. Pune district forms a part of the tropical monsoon land and therefore, shows a significant seasonal variation in temperature as well as rainfall conditions. Climate of the western region of Pune is cool whereas the eastern part is hot and dry. Owing to the geographical conditions within the district, the rainfall is unevenly distributed. The western part of the district adjacent to the west coast is hilly area having forest cover, due to which the rainfall intensity is more in this area as compared to the eastern parts.

ES 3.3 Hydrogeology

The proposed project comprises of upper and lower reservoirs. The upper reservoir on high plateau terrains has no significant catchment area, while the lower reservoir will be on seasonal nala with a small catchment area of about 23.4 Sq. km. Thus, the Saidongar 1 Karjat Pumped Storage Project will comprise of two reservoirs. Upper & lower reservoirs with a gross storage capacity of 15.87 MCM & 28.96 MCM respectively, out of which upper reservoir is to be constructed on the hilltop with maximum dam height of 27 m to create the desired storage capacity.

ES.3.4 Natural Hazard

- **Seismicity of the Project Area**: The project area is located in the border districts of Raigad and Pune of Maharashtra state. The Raigad area falls under seismic zone-III & The Pune district area falls under seismic zone-III.
- **Flood Prone**: The project is not prone to frequent flooding areas of Maharashtra State.

ES 3.5 Micro-Meteorology of Project site

Meteorological data station has been established at Pali T. Kothal Kalathi (18°55'21.0"N 73°25'07.6"E) and collected the data for the study period Pre monsoon Season (Mar 2025 to

May 2025), Post monsoon season (October 2024 to December 2024) & winter season (Dec 2023 to Feb 2024).

- Temperature varied between 1.7°C to 42.8°C
- Relative Humidity varied between 57% to 87%.

ES 3.6 Air Environment analysis

(A) Pre monsoon Season

The baseline data generated during March 2025 to May 2025 covers Pre monsoon season. Six (06) monitoring stations were selected. The criteria adopted for selecting the monitoring stations, sampling and analysis was carried out as recommended by IS: 5182 and CPCB

- All the locations where Ambient Air Quality Monitoring was carried out falls under residential category. The recorded concentrations are compared with the latest National Ambient Air Quality Standards (NAAQS)-2009 as notified by CPCB.
- The maximum value for PM10 observed at Vaijanath (AAQ-6) is 93 µg/m3 and minimum value for PM10 at Pali T. Kothal Kalathi (AAQ-1) is 60.2 µg/m3. Generally, the most consistent sources for PM10 concentrations are from dirt, soil and road dust and vehicular movements in the area. The values are well within the 24-hour average limit of 100 µg/m3 standards by NAAQS.
- The maximum and minimum value for PM2.5 observed at Vadap (AAQ-4) is 48.6 µg/m3 and 26.2 µg/m3. The concentrations are medium in range which may be due to the reason that there is no major economic activity except for some agriculturally based activities. PM2.5 values observed at all the locations were below the 24 hours average suggested by NAAQS for residential areas which is 60 µg/m3.
- The maximum and minimum value for SO2 was observed at Vaijanath (AAQ-6) which is 18.9 µg/m3 and 8.4 µg/m3 respectively. The SO2 values observed at all the locations are below the 24 hours average standards suggested by NAAQS for residential and industrial areas which is 80 µg/m3. It can also be seen that the values are well within the annual limits too.
- The maximum value for NO2 observed at Vaijanath (AAQ-6) is 33.7 µg/m3 and minimum value for NO2 at Pali T. Kothal Kalathi (AAQ-1) is 16.4 µg/m3. The NO2 values observed at all the locations are below the 24 hours average stipulated for residential category by NAAQS which is 80 µg/m3. It can also be seen that the values are well within the annual limits too.
- The maximum value for CO observed at Vaijanath (AAQ-6) is 0.57 mg/m3 and minimum value for CO at Tiwane (AAQ-3) is 0.32 mg/m3.The CO values observed at all the locations are below the one hour average standard stipulated for residential category by NAAQS which is 4.0 mg/m3.

(B) Post-Monsoon Season

The baseline data generated during October 2024 to December 2024 covers post-monsoon for the second season.

- All the locations where Ambient Air Quality Monitoring was carried out falls under residential category. The recorded concentrations are compared with the latest National Ambient Air Quality Standards (NAAQS) as notified by CPCB.
- The maximum value for PM10 observed at Kusur (AAQ-2) is 96.3 µg/m3 and minimum value for PM10 at Vadap (AAQ-4) is 57.4 µg/m3.
- The maximum value for PM2.5 observed at Vadap (AAQ-4) is 52.6 µg/m3 and minimum value for PM2.5 at Bhaliwadi (AAQ-5) is 25.4 µg/m3. The concentrations are low, which may be

due to the reason that there is no major economic activity except for some agriculturally based activities. PM2.5 values observed at all the locations were below the 24 hours average suggested by NAAQS for residential areas which is 60 µg/m3.

- The maximum value for SO2 observed at Kusur & Vadap (AAQ-2 & AAQ-4) is 9.6 µg/m3 and minimum value for SO2 at Kusur, Tiwani & Vadap (AAQ-2, 3 & 4) is 7.0 µg/m3.
- The maximum value for NO2 observed at Baliwadi (AAQ-5) is 27.6 µg/m3 and minimum value for NO2 at Pali T. Kothal & Kusur (AAQ-1&2) is 14.6 µg/m3.
- The maximum value for CO observed at Pali T Kothal kalathi & Kusur (AAQ-1&2) is 0.57 mg/m3 and minimum value for CO at Tiwane (AAQ-3) is 0.3 mg/m3. The CO values observed at all the locations are below the one hour average standard stipulated for residential category by NAAQS which is 4.0 mg/m3.

(c) Winter Season

The baseline data generated during Dec 2023 to Feb 2024 covers Pre monsoon season. Five (05) monitoring stations were selected. The criteria adopted for selecting the monitoring stations, sampling and analysis was carried out as recommended by IS: 5182 and CPCB

- The maximum value for PM10 observed at Pali T. Kothal Kalathi (AAQ-1) is 45.40 µg/m3 and minimum value for PM10 at Kusur (AAQ-2) 35.48 µg/m3. The PM10 recorded were well within the 24-hour average limit of 100 µg/m3 suggested by NAAQS.
- The maximum value for PM2.5 observed at at S Pali T. Kothal Kalathi (AAQ-1) is 24.19 µg/m^3 and minimum value for PM2.5 at Bhaliwadi (AAQ-5) is 17.35 µg/m^3. The $PM_{2.5}$ recorded were well within the 24-hour average limit of 60 µg/m3 suggested by NAAQS.
- The maximum value for SO2 observed at Kusur (AAQ-2) is 12.62 µg/m^3 and minimum value for SO2 at Tiwane (AAQ-3) is 7.08 µg/m^3. The recorded were well within the 24 hours average standards suggested by NAAQS for residential and industrial areas which is 80 µg/m^3.

The maximum value for NO_2 observed at Kusur (AAQ-2) is 15.12 µg/m^3 and minimum value for NO_2 at Tiwane (AAQ-3) is 9.58 µg/m^3. The NO2 recorded were well within the 24 hours average stipulated for residential category by NAAQS which is 80 µg/m3.

ES 3.7 Water Environment

Surface Water Quality

(A) Pre monsoon Season

During the study period Fourteen (14) Nos. of samples were collected from Thokarwadi Dam, Vaijanath, Bhilawadi and other lakes and streams. The Samples are taken at Fourteen (14) locations. The study area is drained by Pej river in lower reservoir, and its tributaries/streams. The rivers and all the streams are carrying swift flow during monsoon only i.e. they are ephemeral and torrential in nature

- The surface water samples collected from the various sources showed pH value ranging in between 7.03 to 7.83 which are within the IS 2296 Class C limits of 6.5 to 8.5.
- Hardness values are in the range of 12.8 to 259.4 mg/l which are within the IS 2296 Class C limits of 600 mg/l.
- At all the sampling locations DO levels are more than the IS 2296 Class C limits of 4.0 mg/l.
- TDS values are in the range of 174 to 986 mg/l which are within IS 2296 Class C limits of 1500 mg/l.
- The concentration of soluble salts in irrigation water is vital for type of crops to be grown, crop growth and health. These soluble salts concentrations can be expressed in terms of Electrical Conductivity (EC). The EC values are varying in the range 115.9 µS/cm to 661 µS/cm. The water with salinity in this range can be safely used for irrigation purpose.
- The concentrations of Chlorides and Sulphates in all the samples were below the IS 2296 Class C limits of 600 mg/l and 400 mg/l respectively.
- Heavy metals such as Iron, Zinc, Lead, Chromium, Cadmium etc., are well within the limits.

Overall, the surface water quality of the study area covering Saidongar-1 PSP, and their upstream and downstream locations are found to well within the stipulated IS 2296 Class-C Water quality values standards.

(B) Post-Monsoon Season

During the study period Fourteen (14) Nos. of samples were collected from Thokarwadi Dam, Vaijanath, Bhilawadi and other lakes and streams. The Samples are taken at Fourteen (14) locations. The study area is drained by Pej river in lower reservoir, and its tributaries/streams.

- The surface water samples collected from the various sources of water bodies collected for the Post Monsoon in the study area. The analysed results shown that the pH value ranging in between 6.96 (SW8- Bhaliwad) – 8.20 (SW5- Kusur)) during the post-monsoon period which is within the prescribed limit 6.5 to 8.5 of IS: 2296 Class C Limits.
- The alkalinity values are ranging from 48 (SW13- Khandpe) to 160 (SW3- Potal Vai Janath) which were found to be below acceptable limit of IS-10500.
- The Fe levels are in the range of Below Desirable Limits (BDL).
- The Magnesium levels are in the range 5.56 (SW13- Khandpe) to 17.23 (SW4- Vaijanath).
- The Calcium levels are in the range 14.04 (SW1- Palit Kothal Khalathi) to 43.24 mg/L at (SW7- Thokarwadi dam 1).
- The EC values are varying in the range 134 µS/cm (SW13- Khandpe) to 442 µS/cm at (SW3- Potal Vaijanath).

Overall, the surface water quality in post-monsoon season is observed to be satisfactory and found to be mostly matching with the IS:2296 Class C Standards.

(c) Winter Season

During the study period Fourteen (14) Nos. of samples were collected from Thokarwadi Dam, Vaijanath, Bhilawadi and other lakes and streams. The Samples are taken at Fourteen (14) locations. The study area is drained by Pej river in lower reservoir, and its tributaries/streams. The rivers and all the streams are carrying swift flow during monsoon only i.e. they are ephemeral and torrential in nature

- The analysis results show that the hardness values are in the range of 95 to 200 mg/l.
- The Fluoride values are observed to be less than the prescribed limit of 1.5 mg/l and are in the range of 0.501 to 0.545 mg/l which is also below the minimum requirement.
- The Dissolved Oxygen values are in the range of 6.2 to 7.6 mg/l. The Dissolved oxygen levels were found to be above the requirement of 4 mg/l. The Dissolved Oxygen and Biochemical Oxygen Demand values are well with the standards of IS: 2296 Class C limits. These DO values are suitable for the growth of aquatic life
- High BOD values of 2.80 mg/L were observed at SW – 13. Lowest BOD value of 1.60 mg/L was observed at SW – 3 & 6.
- The concentration of soluble salts in irrigation water is vital for type of crops to be grown, crop growth and health. These soluble salts concentrations can be expressed in terms of Electrical Conductivity (EC). The EC values are varying in the range 441.2 µS/cm to 955.4 µS/cm. The water with salinity in this range can be safely used for irrigation purpose.

Overall, the surface water quality of the study area covering Saidongar-1 PSP, and their upstream and downstream locations are found to well within the stipulated IS 2296 Class-C Water quality values standards.

ES 3.8 Ground Water Quality

(A) Pre monsoon Season

For assessing the ground water quality in the study area, twelve (12) samples were collected from the identified bore wells/dug wells.

- The Ground water samples collected from the various sources showed pH value ranging in between 7.62 to 9.06 showing alkaline in nature.
- Hardness values are in the range of 42 to 134 mg/l.
- The Chloride concentration in the samples collected varied between 56-177 mg/L which is well below the desirable limit a per Is 10500: 2012.
- The concentration of soluble salts in irrigation water is vital for type of crops to be grown, crop growth and health. These soluble salts concentrations can be expressed in terms of

Electrical Conductivity (EC). The EC values are varying in the range 206 µs/cm to 681 µs/cm which is in low range.

- The Sulphate concentrations in the analysed samples are in the range 20.0 to 78.0 mg/l which are well within the limits.

In general, the ground water quality within the study area i.e., along with the proposed project area is satisfactory.

(B) Post Monsoon Season

Ground water is one of the main sources in the project area for Irrigation and domestic use, hence the rate of extraction of ground water is high. For assessing the ground water quality in the study area, twelve (12) locations were selected and analysed during the Post Monsoon Season.

- The Ground water samples collected for the Second Season from the various sources showed pH value ranging in between 7.56 (GW2-Kusur) to 8.66 (GW3- Kusur) which shows the levels at (GW3-Kusur) slightly crossing permissible limit 8.5
- The Concentrations of Magnesium and Calcium are in the range of 5.1 (GW2-Kusur) to 32.66 mg/l at (GW8- Tambas), and 12.27 (GW1-Pali T. Kothal Khalathi) to 77.02 mg/l at (GW8).
- The Total Hardness lies in the range of 54 mg/l (GW2) to 278 mg/l (GW8) which are in the permissible limit of 600 mg/l.
- Electrical conductivity (EC) values are in the range of 115 (GW2-Kusur) to 1027 uS/cm

  (GW1- Pali T. Kothal Khalathi)
- The Alkalinity values are in the range 8 mg/L (GW1- Pali T. Kothal Khalathi) to 256 mg/L (GW8-Tambas) which are well within the limits of Alkalinity i.e, 600 mg/L.
- The Fe levels in the samples are in the Below Desirable Limits (BDL).
- The other physico-chemical values were well within the prescribed limits as per IS 10500: 2012 (drinking water quality) standards.

In general, the ground water quality within the study area i.e., along with the proposed project area is satisfactory

(C) Winter Season

For assessing the ground water quality in the study area, twelve (12) samples were collected from the identified bore wells/dug wells.

- The Ground water samples collected from the various sources showed pH value ranging in between 6.64 to 7.96 showing neutral in nature.
- Water quality analysis also shows the hardness values are in the range of 180 to 250 mg/l.

- The Fluoride values are in the range of 0.745-1.267mg/l and are within the permissible limits of 1.5mg/l.
- The Chloride concentration in the samples collected varied between 120-194 mg/L which is well below the desirable limit a per Is 10500: 2012. The concentration of soluble salts in irrigation water is vital for type of crops to be grown, crop growth and health. These soluble salts concentrations can be expressed in terms of Electrical Conductivity (EC).
- The EC values are varying in the range 1014µs/cm to 1295µs/cm which is in low range.
- The Total Dissolved Solids concentrations are in the range of 658-842mg/L which are exceeding the stipulated Permissible limits in some of the locations.
- The Sodium concentrations in the analysed samples are in the range 126.9 to 186.9mg/l.
- The Alkalinity levels are in the range of 170 to 270mg/l which are exceeding the permissible limits of Ground water quality in some of the locations. No coliform organism was recorded in the collected samples. The other physico-chemical values were well within the prescribed limits as per IS 10500: 2012 (drinking water quality) standards.

In general, the ground water quality within the study area i.e., along with the proposed project area is satisfactory.

ES 3.9 Noise Environment

(A) Pre monsoon Season

The noise levels were monitored at Twelve (12) locations. According to CPCB the standards for Leq day and night noise levels are 55 & 45 dB(A) respectively. The Day time Leq values are in the range 50.4 dB(A) to 61.7 dB(A) and Night time Leq values are in the range 43.5 dB(A) to 47.3 dB(A). The Noise level standards for residential areas are in the range 45 dB(A)-Night times to 55 dB(A)- day times. The day time noise levels at vadap and Pali T Kothal Khalathi exceeded the standards.

(B) Post-Monsoon Season

The noise levels were monitored at Twelve (12) locations. According to CPCB the standards for Leq day and night noise levels are 55 & 45 dB(A) respectively.

From the Noise Quality monitoring was carried out at 12 selected locations. Lutron SL 4010 model was used for Noise quality monitoring. From the results, it has been observed that Day time Leq values are in the range 51.1 dB(A) to 62.5 dB(A) and Night time Leq values are in the range 41.2 dB(A) to 46.3 dB(A). The Noise level standards for residential areas are in the range 55 dB(A)-Night times to 65 dB(A)- day times.

(C) Winter Season

The noise levels were monitored at Twelve (12) locations. According to CPCB the standards for Leq day and night noise levels are 55 & 45 dB(A) respectively. The Day time Leq values are in the range 50.1 dB(A) to 54.9 dB(A) and Night time Leq values are in the range 39.5 dB(A) to

44.9 dB(A). The Noise level standards for residential areas are in the range 45 dB(A)-Night times to 55 dB(A)- day times.

ES.3.10 Land Environment

(A) Pre monsoon Season

The soil texture for the study area surrounding the project site was observed to be Clay loam, sandy loam and silty loam in nature. After careful consideration of land use and land pattern of the existing region, twelve (12) sampling locations are being identified and analysed.

- The quality of soil affects both crop growth and production. pH of the soils in the study area ranged from 6.46 to 7.89 showing slightly acidic to slightly alkaline in nature.
- The EC of all the soil samples is found to be in the range 56 to 298 µS/cm.
- The soil nutrients such as Nitrogen, Phosphorous and Potassium (NPK) are the index of the soil fertility. The NPK values are in the range of 596 to 827 mg/Kg, 3.2 to 30.0 mg/Kg and 28.5 to 790 mg/Kg respectively.
- The Organic Carbon assessed in the soil is ranging between 0.3% to 3.7% and SAR found to be 0.15 to 0.41 respectively. As the SAR values are found to be < 3, which shows the no sodium problems in the soils.
- Calcium (Ca) values are observed in ranging from 804 to 3444 mg/kg is found to be very high which is reflecting on the pH values of the soils.

(B) Post-Monsoon Season

The soil quality of the study area is dominated by silty clay, sandy clay and clay. Sandy textured soils are prone to erosion and low moisture retention capacity. After careful consideration of land use and land pattern of the existing region, twelve (12) sampling locations are being identified and analysed.

- pH of the soils in the study area ranged from 6.46 to 7.86 showing slightly acidic to slightly alkaline in nature.
- The type of Soil in the Project location is found to be Clay loam to Sandy loam in nature.
- The salt levels of soil affect both crop growth and production.
- The Electrical conductivity (EC) of all the soil samples is found to be in the range 53 to 297 µS/cm.
- The NPK values are in the range of 571 to 2528 mg/Kg, 3.4 to 31.0 mg/Kg and 52.0 to 770.5mg/Kg respectively.
- The Organic Carbon assessed in the soil is ranging between 0.28% to 3.4% and SAR found to be 0.13 to 0.34 respectively.
- Calcium (Ca) values are observed in ranging from 791 to 3644 mg/kg is found to be very high which is reflecting on the pH values of the soils.

(c) Winter season

The soil texture for the study area surrounding the project site was observed to be Silty in nature. After careful consideration of land use and land pattern of the existing region, twelve (12) sampling locations are being identified and analysed.

- The quality of soil affects both crop growth and production. pH of the soils in the study area ranged from 6.46 to 7.86 showing slightly acidic to slightly alkaline in nature.
- The EC of all the soil samples is found to be in the range 53 to 297 µS/cm.
- The soil nutrients such as Nitrogen, Phosphorous and Potassium (NPK) are the index of the soil fertility. The NPK values are in the range of 571 to 2528 mg/kg, 3.4 to 31.0 mg/kg and 52.0 to 770.5mg/kg respectively.
- The Organic Carbon assessed in the soil is ranging between 0.28% to 3.4% and SAR found to be 0.13 to 0.34 respectively. As the SAR values are found to be < 3, which shows the no sodium problems in the soils.
- Calcium (Ca) values are observed in ranging from 791 to 3644 mg/kg is found to be very high which is reflecting on the pH values of the soils.

ES 3.11 Biological Environment

The proposed project has been carefully designed to escape the ecologically sensitive areas but falls in Western Ghats ESA. It involves **233ha** forest land where only shrub and grass dominated community is dominating. A mix of thorny, succulent and xerophytic bushes are common such as *Chromolaena odorata, Urena lobata* and *Hygrophila serpyllum* whereas in trees very sparse individuals of small size trees such as *Butea monosperma, Cassia fistula, Azadirachta indica etc* are found. The slopes at the sides of the stream (i.e. lower reservoir) shows good presence of greenery with tree species like *Careya arborea*, *Terminalia alata*, *Terminalia arjuna*, *Terminalia bellerica, Euphorbia nivvulia Madhuca longifolia* var. *latifolia*, and *Diospyros melanoxylon* and *Ficus hispida etc*.

The proposed project area reported with several Schedule-I of the Wildlife Protection Act (WPA) 1972, 2022, **14 mammals** including Indian Jackal, Indian Fox, Indian Wolf, Jungle Cat, Leopard, Indian Porcupine, Sloth Bear, Bonnet Macaque, Gray Langur, Asian Palm Civet, Small Indian Civet, Four-horned Antelope, and Sambar Deer, along with Indian Pangolin, have been reported from the study area. Additionally, **6 birds** - Indian Peafowl, Brahmini Kite, Osprey, Black Eagle, White-eyed Buzzard and Shikra, and **6 reptiles** - Asian Chameleon, Russell's Viper, Indian Cobra, Rat Snake, Indian Python, and Bengal Monitor, listed under have also been recorded.

The lower reservoir will be constructed on the river Pej in which water flows only during the monsoon season or rainy days otherwise remains almost dry, therefore, **this stream does not support a significant aquatic life**.

This project will divert a **233-ha forest land** hence, **Green Belt Development Plan, and Compensatory Afforestation Plan** as well as an approved **Biodiversity Management and Wildlife Conservation Plan for Sch-1 Species**, have been prepared and provided in EIA report with Budget estimation added in the EMP Cost. Compensatory Afforestation Plan shall be prepared on equivalent non-forest land. The equivalent non-forest land suitability certificate is provided by DCF of respective forest division. As significant fish population is not supported by this reiver and no migratory fish aspects is observed, therefore, no especial mitigation measures or Plan for fisheries is required.

ES 4.0 ALTERNATIVE ANALYSIS

A detailed alternative study has been carried out to find the best optimized location for lower reservoir. Detailed topographical survey was carried out for all the four (4) options and analysed for optimum storage capacity of reservoirs.

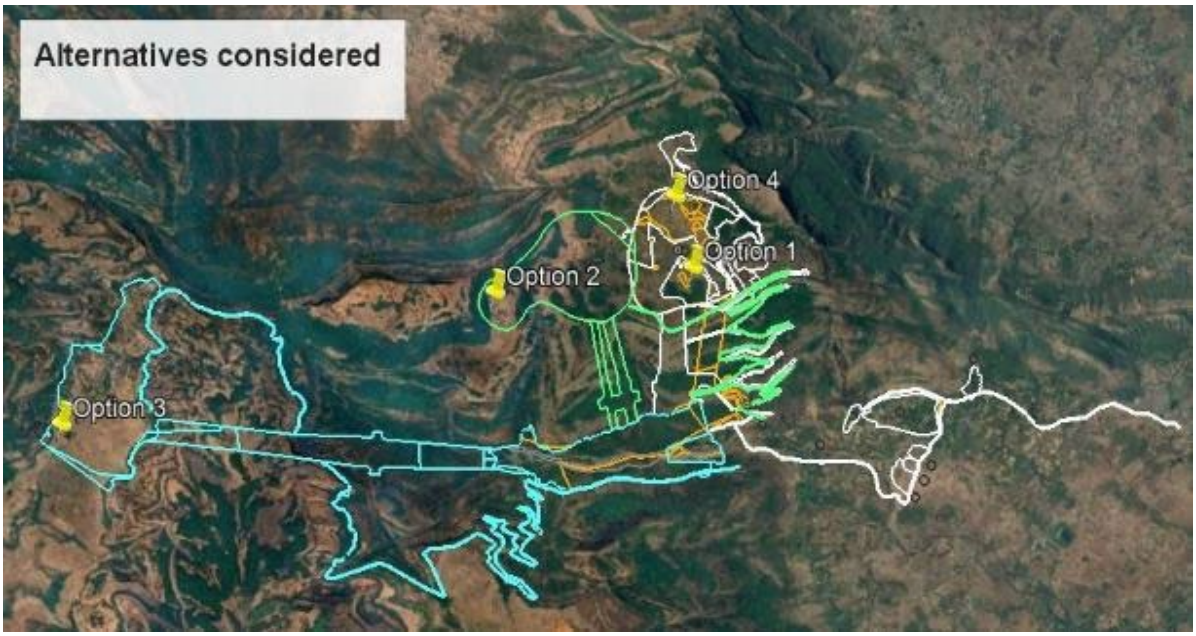

Figure ES.1: Proposed alternatives for Upper reservoir with lower reservoir

The analysis of the alternatives for alignment is evaluated using Environmental Impact Assessment Decision Support System (EIADSS). The Impact scoring criteria are mainly categorized into five groups *(viz. Natural Resource Environment, Physical Environment, Biological Environment, Social Environment, & Engineering Environment).*

For option-1, 2, 3 & 4, the cumulative weighted percentage is worked out to be 44%, 46%, 47% and 39% respectively. The minimum weighted percentage indicates the best alternative, and the maximum weighted percentage indicates the poor for the project. So, it is concluded that the minimum weighted percentage obtained to option-4 and is recommended for this project which will have social & environmental acceptability, technically viability and economic & financial feasibility.

ES 5.0. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This section summarizes the pollution potential of the proposed Saidongar 1 - Karjat Pumped Storage Project and its possible impact on the surrounding environment during construction and operational phases.

ES 5.1 Impact on Air Quality

The FDE during the construction phase are mainly due to the disposal of muck generated in the project. The total quantity of muck generated of rock is around 110.78 Lakh Cum and out of which 58.64 Lakh cum shall be reused in the project. Considering the swelling factor & Compaction factor, the total quantity of muck to be generated from the project shall be around 65.69 Lakh cum. The FDE is predicted for key activities such as (i) Excavation; (ii) Loading and Unloading of Muck (iii) Haulage roads and (iv) Truck.

Mitigation Measures: During construction phase all above impacts discussed above can be avoid or minimized by applying/adopting following mitigation measures.

- Access roads will be developed/paved which avoid local people's moving route.
- Regular watering/sprinkling (two – three times a day) on the access roads and construction site for suppression of dust, especially in the dry season, and using cover sheets on trucks for the transportation of soil, and wind barriers will be applied to reduce dust generation.
- Speed limits will be applied for vehicles.
- For mitigation of pollutant emissions, periodic maintenance and management of all the construction machinery and vehicles will be conducted to reduce exhaust gas discharged from construction machinery and vehicles.

ES 5.2 Impact on Noise Quality

Impacts on ambient noise levels are expected only during the project construction phase, due to earth moving machinery, etc. Likewise, noise due to quarrying, blasting, vehicular movement will have some adverse impacts on the ambient noise levels in the area.

Noise level due to construction activities is expected to be of 73.4 dB (A) at a distance of 100m. Since, the nearest settlement is about 1.8 km away; the incremental noise due to blasting is expected to be 40-50 dB (A). As the blasting is likely to last for 4 to 5 seconds depending on the charge, noise levels over this time would be instantaneous and short in duration.

The noise assessment has been carried out with the help of Roadway Construction Noise Model (RCNM) is the Federal Highway Administration's (FHWA) national model (refer Chapter 6).

Mitigation Measures: Noise generated during blasting and excavation activities is a significant concern for both the surrounding communities and the workforce involved in the construction of the Saidongar 1 - Karjat Pumped Storage Project. To address this, a comprehensive noise mitigation plan will be implemented to minimize the impact of noise pollution. The following

measures will be adopted to ensure compliance with regulatory standards and to safeguard the health and well-being of nearby residents, wildlife, and workers:

- **Barricading the Construction Site:** The construction site will be barricaded to minimize noise levels outside the site boundary. Construction equipment will be located at least **250 meters away from inhabited areas** to reduce noise exposure for nearby communities.
- **Timing of Construction Activities:** Project activities will be scheduled to coincide with periods when people are least likely to be affected. Construction activities, including blasting, will be **strictly prohibited between 10 PM and 6 AM** in residential areas to avoid disturbance during nighttime hours. Additionally, blasting activities will be conducted during **noon hours** to minimize impact on wildlife.
- **Noise Masking for Workers:** Adequate noise masks or hearing protection will be provided to all workers, including the **1,200 workers during peak construction activity** and **800 workers during non-peak activity**, to protect them from high noise levels.
- **Acoustic Enclosures for Stationary Noise Sources:** Stationary noise sources such as generator sets will be equipped with **acoustic enclosures** to reduce noise emissions and prevent sound from spreading beyond the construction site.
- **Restriction on Honking:** Honking will be strictly restricted at the project site to minimize unnecessary noise pollution and maintain a quieter environment for both workers and nearby residents.
- **Hearing Tests for Workers:** Workers will undergo **hearing tests prior to deployment** at the site, especially for those working in high-noise areas. Periodic hearing tests will be conducted **every six months** to monitor and address any hearing loss or damage.
- **Job Rotation System:** A **job rotation system** will be implemented for workers assigned to high-noise areas. This will reduce their continuous exposure to high noise levels and lower the risk of long-term hearing damage.

ES 5.3 Impact on Soil quality:

For some distance downstream of major construction sites, such as upper and lower dam, powerhouse, etc. there is a possibility of increased sediment levels.

Mitigation measures:

- The total quantity of muck generated from the project shall be around 110.78 Lakh cum. Muck disposal has to be done in line with the **Muck Disposal Plan** given in EMP to avoid any negative impact.
- **Sanitation and Solid Waste management plan** is provided in the EMP chapter. Accordingly, the solid waste to be generated from construction camp site as well as staff colonies during operation phase requires management plan as per the Solid Wastes Management Rules (SWM) 2016. For that, an efficient waste management system will be required to put in place to keep the environment of the region clean and healthy.

Management of Solid Waste

- The solid waste generated from the camp site shall be collected, transported and disposed of in the nearby municipal land fill sites. Any solid waste generated in the project complex/ project colony/ labour colony, shall be managed and handled appropriately.
- The construction activity will also generate hazardous waste like waste oils, used batteries, empty cans etc. These wastes should be collected, handled and disposed as per the Hazardous and Other Wastes (Management & Trans-boundary Movement) Rules, 2016.

ES 5.4 Impact on Biological Environment

The direct impact of construction activity of any project is majorly due to the tree cutting to clear the site for the construction of the project components. The proposed Pump Storage development involves the formation of a reservoir at the top of the hillock adjacent to the reservoir. This project will require 233ha Forest land and cutting of about 48,000 trees along with the shrubs and other vegetation on the identified land. This will impact to the wildlife by disturbing their habitat.

The other major impact on the flora in and around the project area would be due to increased level of human interferences. The workers may also indulge in tree cutting to meet their timber requirement for temporary houses, fuel wood and space heating, however, this will be controlled by implementing energy conservation measures as proposed in EMP. Also, during construction of various components of the project, e.g., submergence area in Upper Reservoirs, road, muck disposal, etc., trees will have to be cleared.

Due to vehicular movement and blasting dust is expected to be generated during blasting, vehicle movement for transportation of construction material or construction waste. The dust particles shall settle on the foliage of trees and plants, thereby reduction in amount of sunlight falling on tree foliage. This will reduce the photosynthetic activity. Such impacts are expected upto 500m from the source.

Mitigation Measures

- The loss of trees and ecosystem shall have to be compensated through the green belt development with native species and proper care of the saplings will be taken to ensure their survival.
- Labour camps shall be setup only after obtaining proper permissions from the project Engineer and Environmental Engineer (Contractor) and alternate fuel shall be provided to the labourers in the labour camps to ensure that no firewood will be used for cooking etc.
- The camps shall have proper toilets with sanitary disposal of wastes.
- Smoking, hunting & fishing in the wild are prohibited.
- The contractor shall conduct regular awareness trainings related to non-use of firewood, prohibition on smoking in natural areas, bush fires accidents, safe handling of animals (if encountered), prohibition of fishing etc.

- **Green Belt Development Plan, and Compensatory Afforestation Plan** as well as an approved **Biodiversity Management and Wildlife Conservation Plan for Sch-1 Species**, have been prepared and provided in EIA report with Budget estimation added in the EMP Cost. As significant fish population is not supported by this river and no migratory fish aspects is observed, therefore, no especial mitigation measures or Plan for fisheries is required.

ES 6.0 Environmental Monitoring Program

Monitoring shall be performed during all stages of the project (namely: construction and operation) to ensure that the impacts are no greater than predicted, and to verify the impact predictions. The monitoring program will indicate where changes to procedures or operations are required, in order to reduce impacts on the environment or local population. A Budgetory provision of **55.29** lakhs is allotted for the environmental monitoring and programs envisaged under EMP chapter.

ES 7.0 ADDITIONAL STUDIES

Risk and Disaster management plays an important role in the prompt management of disaster events, also ensuring that normally returns to the area within the shortest possible time. The plausible natural hazards such as Earthquakes, Floods, Cyclone & Drought *etc* and man-made disaster were discussed and mitigation measures and notification chart for emergency events are proposed in the Chapter.

Watershed Development Plan: The study for development of watershed development in 10 Km radius of the project site has been carried out by Watershed Development, ICAR, Vasad of Gujarat. The study is being carried out and their recommendations shall be updated in the final report.

ENVIRONMENTAL PUBLIC HEARING: As per the Specific Conditions of ToR issued by MoEF&CC, and General condition, Public Hearing will be conducted in the project area as per the provision of EIA notification, 2006 and as amended time to time.

ES 8.0 PROJECT BENEFITS

The benefits of the proposed project are given below:

1. **Contribution to the Growth of National Economy:** The net increase in productivity and direct growth of the National economy for Rs. 1,09,431.78 Crores throughout the life span of the project.
2. **Creation of Direct and Indirect Employment**: The Saidongar-1 PSP is envisaged to create direct and indirect employment of 2000 persons during construction phase of the project.
3. **Reduction of Carbon Emissions:** Benefit the environment by reducing the total amount of carbon dioxide by **4.55 million tCO_2** per year. The estimated total carbon credit revenue from the proposed project for **Rs.11,667 Crores.** Due to which the Benefit-Cost Ratio of the project is worked out to be **9.3**.

Table ES.2: Reduction of Carbon Emission

S.No	Baseline Emission, Million tCO_2e (a)	Project Emission Million tCO_2e (b)	Total carbon sequestration through Afforestation Million tCO_2e I	Emission Reduction Million tCO_2e (d=a-b+c)	USD/ tCO_2e	Carbon Credit Revenue Million USD
1.	182.25	10.81	0.0025	171.44	7.23*	1239.511

4. Subsidiary industrial opportunities: The project will generate 6241 MU per Year of energy.

This will play a significant role in National and State power planning.

ES 9. ENVIRONMENTAL COST BENEFIT ANALYSIS

Environmental Cost Benefit Analysis (CBA) is an approach to make a decision in regard to any infrastructure development. The benefit-cost ratio is the primary method to evaluate the benefits and challenges imposed by the upcoming activity in commercial terms with respective to the impact on the environmental scenario.

The estimation of Benefit – Cost ratio of Saidongar 1 – Karjat PSP is assessed by means of cumulative direct benefits viz., increase in productivity attribute to the project, employment etc. and Indirect benefits viz., Emission reduction due to the project. The cost of the project including O&M and Interest on the capital cost will give the Total construction cost of the project. The Benefit-Cost Ratio of the of Saidongar 1 – Karjat PSP of 3000 MW is estimated to be **9.3**.

ES 10. ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides the best management practices which are to be adopted to mitigate environmental impacts. This plan also specifies the organizational requirements and institutional strengthening necessary for sound environmental management of the project. The major management plans provided are as below:

1. **Compensatory Afforestation:** Compensating for the loss of 233ha of class I forests category in Maharashtra requires plantation for forest density of 0.7 coverage. The estimated budget for this compensatory plantation will be Rs. 34.83 Cr (considering CA land with NPV cost) including the preparation, saplings, labour, irrigation, and five years of crucial maintenance. However, the actual Net Present Value for the proposed forest area to be diverted shall be calculated by the Forest Advisory Committee constituted by the Ministry of Environment, Forest and Climate Change (MoEF&CC). This NPV shall be fixed during the forest clearance under VSSA 1980.
2. **Biodiversity Management and Wildlife** Conservation Plan: The proposed project has been carefully designed to escape the ecologically sensitive areas to avoid disturbance to the prominent wildlife. However, this project requires 233ha Forest land and cutting of about 48,000 trees along with the shrubs and other vegetation on the identified land. This will impact the wildlife by disturbing their habitat. Hence, a specific Biodiversity Management and Wildlife

Conservation Plan has been prepared for the project with a budget of Rs.300.00 Lakhs in the EMP. The cost provision is made in the form of capital and recurring cost for 10 Years.

3. **Fisheries Conservation and Management Plan:** The project is drained with a seasonal river Pej with very small catchment of 23.5 km^2. Hence, significant fish population is not supported by River Pej and no migratory fish aspects is observed, therefore, no mitigation measures or plan for fisheries is required.

4. **Muck Disposal Plan:** About **110.78 Lakh cum** of muck waste is expected to be generated from the excavation and other construction activities. The entire excavated material is proposed to be dumped in the identified in three (3) muck disposal site having an area of **41 ha**. The proposed biological and engineering mitigation measures for the muck disposal site are provided in the Muck Disposal Plan. The estimated cost for the management of muck waste will be **Rs. 3,173 lakhs.**

   Engineering Measures such as Retaining Wall, Compaction and Fencing are recommended in the study.

   Biological Measures *i.e.,* Vegetation cover controls the hydrological and mechanical effects on soils and slopes. Therefore, biological measures to stabilize the loose slope are recommended in the study. The details of budget allocated for management of Muck disposal is provided in the below Table ES 3.

Table ES.3: Financial requirements for implementation of Muck Disposal Plan

S. No.	Item	Amount (Rs. in lakhs)
1.	Engineering measures	3,173
2.	Biological measures	100.0
Total		**3,273**

5. **Landscaping and restoration of construction sites** are essential for mitigating impact, enhancing aesthetic appeal, and promoting long-term ecological health. These processes go beyond simply covering up the remnants of construction, they involve a systematic approach

   to revitalizing the land. An amount of Rs. 200.0 lakhs budgetary provision is made under this section.

6. **Sanitation and Solid Waste Management Plan:** The solid waste to be generated from construction camp site as well as staff colonies during construction phase requires management plan as per the Solid Wastes Management Rules (SWM) 2016. For that, an efficient waste management system will be required to put in place to keep the environment of the region clean and healthy. These camp and temporary settlements will also require an adequate water supply for drinking and cleaning. An amount of Rs. 330.0 lakhs budgetary provision is made under this section.

7. **Public Health Delivery System:** The objective of the Public Health Delivery System is to provide good health care facilities at construction sites and to improve efficiency in the allocation and use of health resources in the project area, to improve the health status of the people in the project area. The possible threats to public health are discussed along with the management measures. A budget of Rs. 160 lakhs have been included in the EMP budget.

8. **Energy conservation measure:** Energy conservation on a project site is paramount for both environmental sustainability and cost-effectiveness. Implementing a comprehensive strategy that addresses various aspects of energy consumption is crucial. An amount of Rs. 225 lakhs budgetary provision is made under this section.

9. **Labour management plan:** A Labour Management Plan (LMP) is a comprehensive document that outlines the strategies and procedures for managing the workforce on a project, ensuring their well-being, safety, and fair treatment. An amount of of Rs. 120.0 lakhs budgetary provision is made under this section.

10. **Green belt development plan:** The proposed project requires 377 ha of land involving clearing of 48,000 nos. of trees. (Trees proposed for plantation on Muck disposal area also along the sides of proposed road 14 km in length and around the office campus area.) An amount of Rs. 150.00 Lakhs (Muck disposal area: Rs. 100.0 Lakhs + Along the road: Rs. 50 lakhs) have been included in the EMP budget including 5 years maintenance.

11. Proposed Project Saidongar 1 – Karjat Pump Storage Project involves excavation of muck and hualage of muck which leads to emission of Particulate matter (PM), further to suppress PM, water sprinkling is advised for a cost of 101.3 Lakh.

12. Proposed Project Saidongar 1 – Karjat Pump Storage Project involves construction phase of 42 months and 3 months of pre-construction activities & considering 2 years of recurring operation phase which requires environment monitoring of attributes with cost of 55.3 Lakh.

13. **Reservoir Rim Treatment Plan:** The reservoir rim treatment plan is a critical component of the Karjat (Saidongar-1) Pumped Storage Project (PSP) to ensure the stability and longevity of the reservoir embankments. The plan involves the implementation of measures to prevent erosion, landslides, and other potential hazards along the reservoir rim. This includes the construction of retaining walls, slope stabilization, and vegetation cover to reduce soil erosion. The rim treatment plan will be designed in compliance with environmental regulations and best practices to ensure the safety and sustainability of the reservoir and will be incorporated in the design of the project itself. The cost of 4.5 cr is considered in EMP.

14. **Disaster Management Plan:** Project involves construction of Upper & Lower reservoir with installed capacity of 3000 MW, also project lies in hilly ranges where chances of disaster might occur, to mitigate the impact of disaster measure are provided along with a budgetary estimate of 280 Lakh.

15. **Watershed development plan:** A watershed development plan focuses on managing land, water, and natural resources within a watershed to reduce soil erosion, improve water quality, and enhance agricultural productivity. It involves activities such as afforestation, water harvesting, and soil conservation. The plan aims to ensure sustainable resource use and ecosystem health in the watershed area. The cost for watershed development plan is included in EMP for 247 lakhs.

16. **Catchment Area Treatment Plan:** Catchment Area Treatment is an approach or plan designed to manage and protect the land and water resources within a specific catchment area. A catchment area is essentially the land area that drains water into a specific water body like a river, lake, or reservoir. The cost for Catchment Area Treatment plan is included in EMP for 340.95 lakh

17. **Large scale Plantation in 10km radius of the Project:** Apart from the above, the provision for plantation in 10km radius of the selected degraded forest patches have been already covered under watershed Development plan proposed by ICAR, which consist of degraded area of forest patches of about 30Ha. The total cost for large scale plantation & Monitoring for Rs. 23.5Lakhs. Under biological conservation measures, the cost towards development of grass lands is for Rs. 23.0 Lakhs and nursery establishment cost provision made for Rs.30.0Lakhs. Total cost accounting for Rs. 76.5 Lakhs.

18. **Local Area Development Plan:** Torrent PSH3 Private Limited as part of its overall business operations is committed to addressing aspects of local sustainable development like community development and environment protection in and around the proposed Project. The affected villages near to the project area are Bhaliwadi, Ambot, Potal, Pali, Saidongar, Dhak, villages which comes under Karjat Taluka of Raigadh District. Based on the local consultations in project affected villages, the focus areas covering many important components of the sustainable development such as social, economic, livelihoods and environment are identified in the project. An amount of **Rs.5.0 cr** budgetary provision is made under project cost.

19. **Office administration with vehicle cost**: Regarding Environment, Health & safety issue on site requires establishment of office and logistics to cover entire project area, regarding which a budgetary estimate is provided of 92.25 Lakhs.

20. **Resettlement & Rehabilitation Plan:** As per the Government of Maharashtra Gazette notification (Maharashtra Gazette notification No. LQN. 12/2013/C.R. 190/A-2 dated 27th August 2014) the provisions of Rehabilitation and Resettlement under RFCTLARR 2013 will apply only in case of private company purchases land through private negotiations to an extent equivalent or more than 1000 hectares and the project area is less than 1000 Ha.

    No R&R Plan is required as the proposed PSP project is less than 1000 Ha. However, the private land and Government barren land of 144 ha will be procured based on the market rate. The cost will be included under project cost.

ES 10.1 EMP Budget

The total budget for implementation of EMP works out to be is **Rs. 105.64 Cr** with the environmental management plan (EMP) budget. The EMP capital cost is **Rs.74.46 Cr.**

The EMP recurring cost, spread over six years, amounts to **Rs. 31.21 Cr,** including annual expenditures for activities like muck management, sanitation, and labor management. The total budget for implementation of EMP is given in Table ES.4 and Table ES.5.

Table ES.4: EMP Cost Projection Summary

S. No.	Environmental Plans	Cost (Rs. Lakh)
1.	Compensatory Afforestation including land cost	3483.50
2.	Biodiversity Conservation & Wildlife Conservation Plan	296.00
3.	Fisheries Development Plan	60.00
4.	Muck Dumping and Management Plan	3,173.00
5.	Landscaping, Restoration of Construction Sites	200.00
6.	Sanitation and Solid Waste Management Plan	330.00
7.	Public Health Delivery System	160.00
8.	Energy Conservation Measures	225.00
9.	Labour Management Plan	120.00
10.	Green Belt Development Plan	150.00
11.	Pollution Mitigation Measures	101.30
12.	Environmental Monitoring Program (Environmental Safegaurd Measures)	55.23
13.	Reservoir Rim Treatment Plan	450.00
14.	Disaster Management Plan	280.00
15.	Watershed Development Plan	247.00
16.	Catchment Area Treatment plan	340.95
17.	Large scale Plantation	300.00
18.	Local Area Development Plan	500.00
19.	Resettlement & Rehabilitation (The cost will be included in the Project Cost)	-
20.	Office administration with vehicle cost	92.25
S. No.	**Environmental Plans**	**Cost (Rs. Lakh)**
	Total in Lakhs	**10564.20**
	Total in Crore	**105.64**

**EMP Budget does not include NPV cost in Compensatory Afforestation*

Table ES.5: Cost for EMP consisting of Capital & Recurring cost

S. No.	Environmental Plans	Capital cost in INR Lakh	Recurring cost in INR Lakh						Cost in INR Lakh
			1	2	3	4	5	6	
1.	Compensatory Afforestation with land cost	3483.50	0	0	0	0	0	0	3483.50
2.	Biodiversity Conservation & Wildlife Conservation Plan	296	0	0	0	0	0	0	296.00
3.	Fisheries Development Plan	60	0	0	0	0	0	0	60.00
4.	Muck Dumping and Management Plan	1269.2	318	318	318	318	635	0	3,173.00
5.	Landscaping, Restoration of Construction Sites	80	20	20	20	20	20	20	200.00
6.	Sanitation and Solid Waste Management Plan	150	30	30	30	30	30	30	330.00
7.	Public Health Delivery System	100	10	10	10	10	10	10	160.00
8.	Energy Conservation Measures	150	10	10	10	10	10	25	225.00
9.	Labour Management Plan	60	10	10	10	10	10	10	120.00
10.	Green Belt Development Plan	100	30	20	0	0	0	0	150.00
11.	Pollution Mitigation Measures	101.3	0	0	0	0	0	0	101.30
12.	Environmental Monitoring Program	28.23	6	6	6	3	3	3	55.23
13.	Reservoir Rim Treatment Plan	450	0	0	0	0	0	0	450.00
14.	Disaster Management Plan	100	40	40	40	20	20	20	280.00
15.	Watershed Development Plan	247	0	0	0	0	0	0	247.00
16.	Catchment Area Treatment plan	340.95	0	0	0	0	0	0	340.95
17.	Large scale Plantation	200	20	20	20	20	20	0	300.00
18.	Local Area Development Plan	200	50	50	50	50	50	50	500.00
19.	Office administration with vehicle cost	30	20	10	10	10	10	2.25	92.25
Total EMP cost		**7446.18**	**564**	**544**	**524**	**501**	**818**	**170.25**	**10564.20**