

# **EXECUTIVE SUMMARY**

**OF  
ENVIRONMENTAL IMPACT ASSESSMENT REPORT  
&  
ENVIRONMENTAL MANAGEMENT PLAN  
FOR**

**PUBLIC HEARING  
of**

## **Proposed Pane Pumped Storage Project (1500 MW)**

**At**

**Villages: Pane and Vagheri, Tehsil: Mahad, District: Raigad, and  
Village: Khanu, Tehsil: Velhe, District: Pune, Maharashtra.**

**PROJECT PROPONENT**



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**EXECUTIVE SUMMARY**

**1.0 PROJECT DESCRIPTION**

**1.1 INTRODUCTION**

M/s. JSW Energy PSP Seven Limited is proposing Pane Open Loop Pumped Storage Project (1500 MW) at Villages: Pane and Vagheri, Tehsil: Mahad, District: Raigad, and Village: Khanu, Tehsil: velhi, District: Pune, Maharashtra.

JSW Energy PSP Seven Limited's Pumped storage hydropower project is typically a configuration of two water reservoirs at different elevations that can generate power (discharge) as water moves down through a turbine; this project draws power as it pumps water (recharge) to the upper reservoir.

Proposed Pumped Storage Project (PSP) is Off-Stream open Loop pumped storage development proposed with an installed capacity of 1500 MW/9480 MWH. The Project comprises of upper & lower reservoirs with a gross storage capacity of 8.026 MCM (0.283 TMC) & 13.588 MCM (0.480 TMC) respectively

**1.2 IDENTIFICATION OF THE PROJECT**

M/s. JSW Energy PSP Seven Limited is proposing Pump Storage hydropower Project (1500 MW) at Villages: Pane and Vagheri, Tehsil: Mahad, District: Raigad, and Village: Khanu, Tehsil: velhi, District: Pune, Maharashtra. Key Parameters of the Project are given in the Table below:

**Table – 1:**

**Key Parameters of the Project**

Sl. No	Parameter	Unit	Value
1.	Storage Capacity	MWH	9480
2.	Rating	MW	1500
3.	No. of Units	Nos	7
4.	Rated Head in Turbine mode for larger unit	m	508.40
5.	Rate Head in Turbine mode for smaller unit	m	508.20
6.	Total Design Discharge for turbine mode for larger unit	Cumec	275.08
7.	Total Design Discharge for turbine mode for smaller unit	Cumec	55.04
8.	Design Discharge per unit of 250 MW	Cumec	55.02
9.	Design Discharge per unit of 125 MW	Cumec	27.52
10.	Generation Duration	Hrs	6.32
11.	Turbine Capacity – 5 Units	MW	250.00
12.	Turbine Capacity – 2 Units	MW	125.00
13.	Annual Energy Generation	MU	3287.62
14.	Rated Head in Pump mode for larger unit	m	527.40
15.	Rate Head in Pump mode for smaller unit	m	528.00
16.	Total Design Discharge for pump mode for larger unit	Cumec	244.76
17.	Total Design Discharge for pump mode for smaller unit	Cumec	55.11

18.	Pumping Discharge per unit of 275 MW	Cumec	48.95
19.	Pumping Discharge per unit of 155 MW	Cumec	27.56
20.	Pump Capacity – 5 Units	MW	275
21.	Pump Capacity – 2 Units	MW	155
22.	Pumping Duration	Hrs	6.95
23.	Annual Pumping Energy	MU	4062.16
24.	Cycle efficiency	%	80.93

## 2.0 SITE SELECTION FOR THE PROJECT

A detailed alternative study for selection of site for both upper and lower reservoir along with WCS alignment has been carried out. The search area considered for the selection of site is about 140 sq. km. Five project sites/locations have been considered for finalization of project location.

Out of five sites, based on preliminary screening three sites S-2, S-3 and S-4 have been selected for further techno-commercial study with underground powerhouse.

- Alternative-1: (Layout with underground powerhouse on Site S-2)
- Alternative-1A: (Layout with underground powerhouse on Site S-3)
- Alternative-1B: (Layout with underground powerhouse on Site S-4 and lower reservoir is same of Alternative-1)

Details about site selection has also been mentioned in chapter 5

## 3.0 BRIEF DESCRIPTION OF THE PROJECT

Brief description about the Project is given in Table - 2.

**Table - 2**  
**Brief Description of the Project**

S. NO.	PARTICULARS	DETAILS			
A.	<b>Nature of the Project</b>	Pane Open Loop Pumped Storage Project			
B.	<b>Size of the Project</b>	1500 MW			
C.	<b>Location Details</b>				
	Village	Pane, Vagheri and Khanu			
	Tehsil	Mahad and Velhe			
	District	Raigad and Pune			
	State	Maharashtra			
	Latitude & Longitude	Pillar No.	Direction	Latitude	Longitude
		5	North	18°17'31.675"N	73°29'7.564"E
		38	West	18°14'33.731"N	73°27'53.922"E
		40	South	18°14'7.266"N	73°28'20.027"E
		56	East	18°15'58.063"N	73°30'1.001"E
	Toposheet No.	E43H7, E43H8, E43H11 and E43H12			

Pane Open Loop Pumped Storage Project of capacity 1500 MW At Villages: Pane and Vagheri, Tehsil: Mahad, District: Raigad, and Village: Khanu, Tehsil: Velhe, District: Pune, Maharashtra.		
Executive Summary of Draft EIA / EMP Report		
S. NO.	PARTICULARS	DETAILS
<b>D.</b>	<b>Area Details</b>	
	Project area	293.50 ha
	Greenbelt / Plantation area	7.19 ha
<b>E.</b>	<b>Environmental Setting Details (with approximate aerial distance and direction from the project site)</b>	
1.	Nearest Village	Pane (~300 m in SW direction)
2.	Nearest Town/City	➤ Pune (45 km from project site)
3.	National/State Highway	➤ SH- 101 ~2.5 km in SSW direction (Accessible from Pane village road) ➤ NH- 66 at ~19.5 km in South West direction
4.	Nearest Railway Station	➤ Veer Railway Station (~40 Kms)
5.	Nearest Airport	➤ Mumbai Airport (~170 Kms)
6.	Inter district Boundary	Raigad and Pune Inter district Boundary passing through the project site.
7.	National Park, Wild Life Sanctuaries, Biosphere Reserves, Tiger Reserves, Wildlife Corridors, Reserved/ Protected Forests within 10 km radius study area	None
8.	Reserve/Protected Forest within 10 km radius study area	➤ Reserved Forest within the project area ➤ Reserved Forest (~1 km in West direction) ➤ Reserved Forest (~2 km in SSW direction) ➤ Reserved Forest (~7 km in East direction) ➤ Reserved Forest (~8 km in NW direction) ➤ Reserved Forest (~8 km in SW direction) ➤ Reserved Forest (~8.5 km in SSE direction) ➤ Reserved Forest (~9 km in NNW direction) ➤ Forest (~9.5 km in WSW direction)
9.	Water bodies within 10 km radius study area	➤ Kal River (~2.0 km in SSW direction) ➤ Panshet dam (~6.93 km from project site to tailwater end in NNE Direction)
10.	Archaeologically Important Site	➤ Lingana fort (~3.0 km from Project Site) ➤ Konkan Diva Fort & Caves (~7.00 km from project site)
	Seismic Zone	The project area falls under Zone IV i.e., High Risk Zone as per IS-1893 (Part 1) 2002, Seismic Zoning Map of India
<b>F.</b>	<b>Cost details</b>	
1.	Total Cost of the Project	Rs. 7419.06 Crores
2.	Cost for Environmental Protection Measures	▪ Capital Cost -Rs. 67.75 Crores ▪ Recurring Cost – Rs 1.73 Crores / annum

Source: Pre-feasibility Report

4.0 LOCATION MAP AND PROJECT LAYOUT

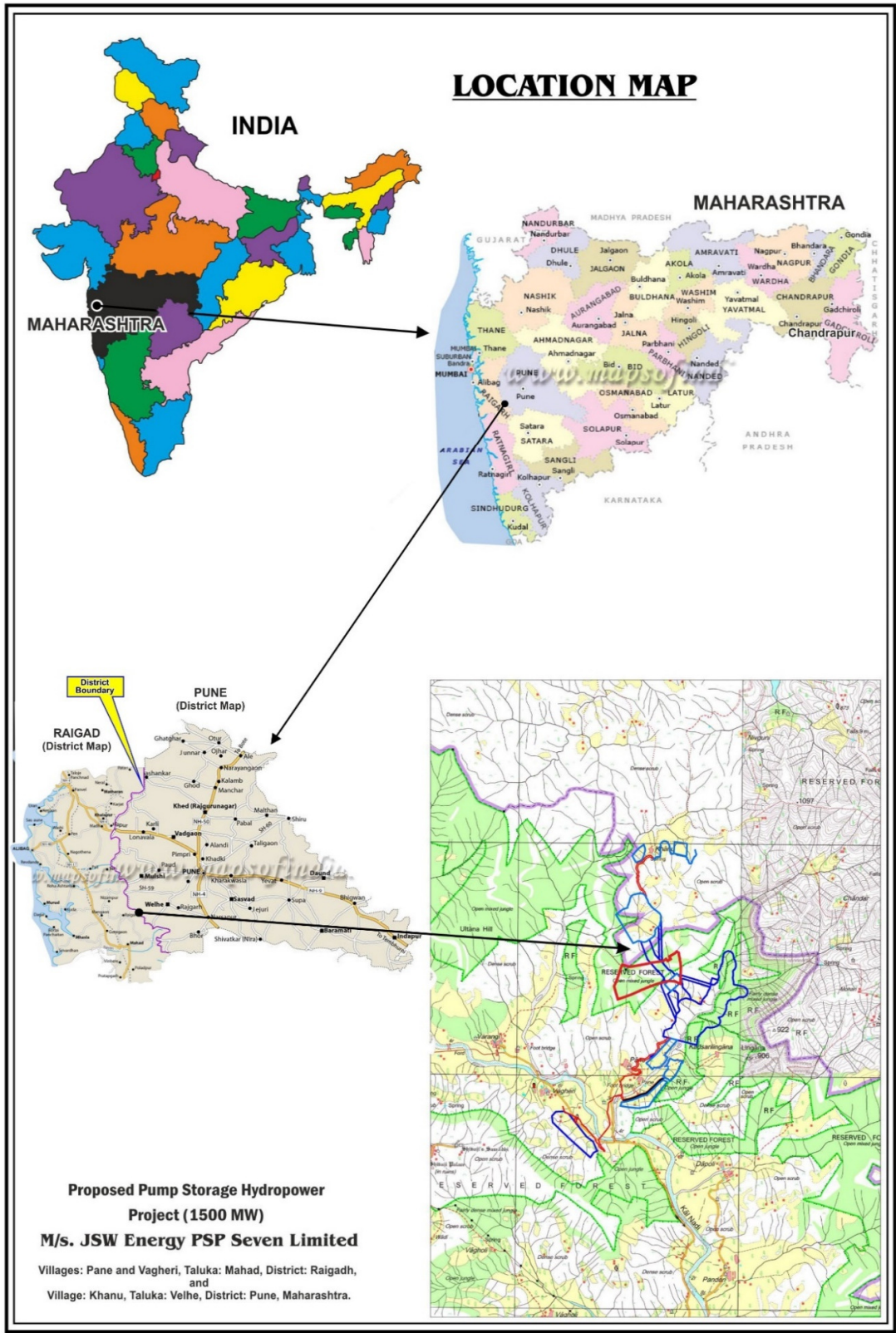


Figure-1: Location map of the project site

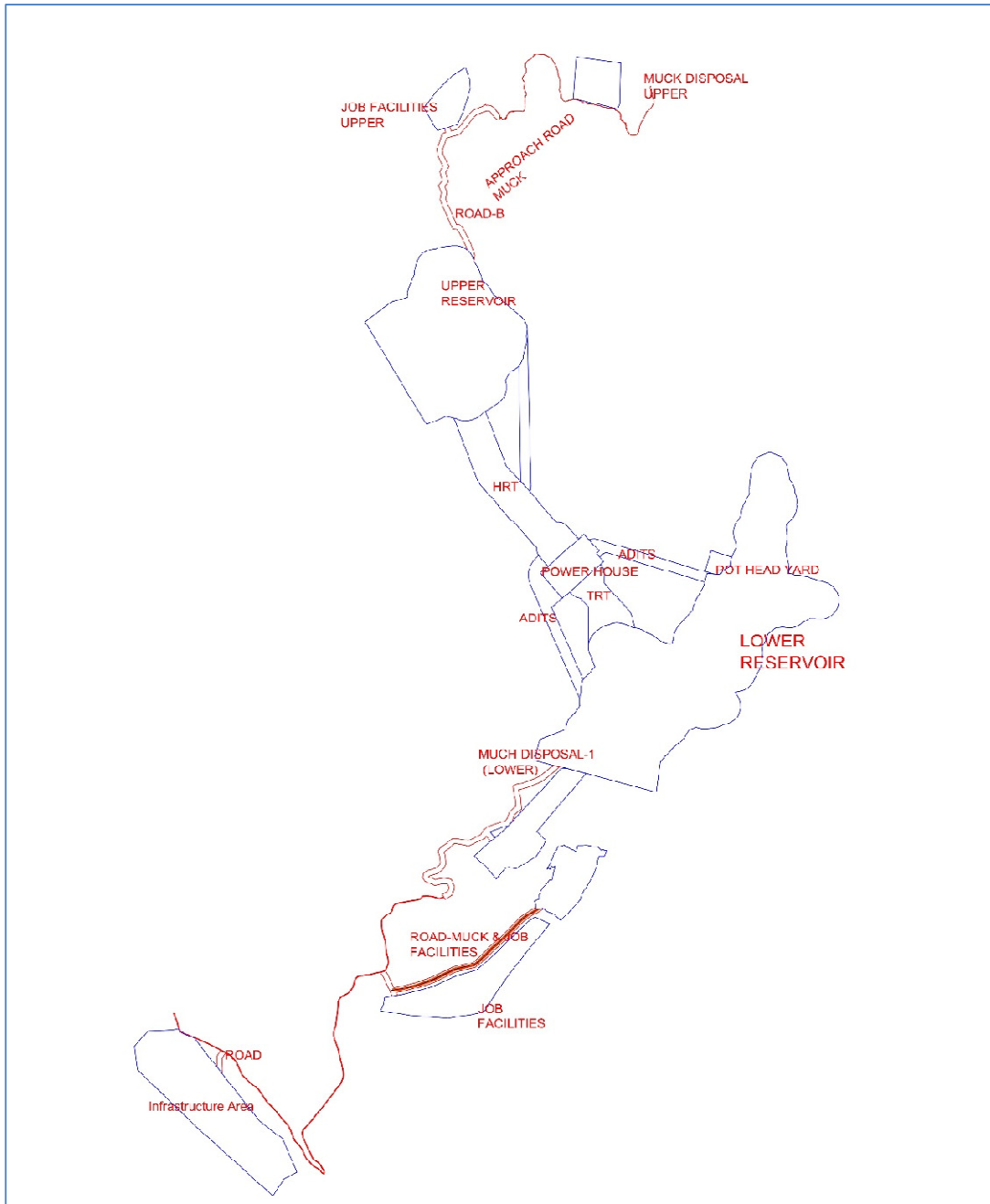


Figure 2.2 (a): PLANT LAYOUT SHOWING INFRASTRUCTURE

## 5.0 MAJOR REQUIREMENTS FOR THE PROJECT

### 5.1 RAW MATERIAL REQUIREMENT

Construction Materials will be required for the project during the construction phase which will be transported by means of road ways or railways. Details are given as below:

**Table - 3**

**Raw Material Requirement, Source and Transportation**

Construction material	Quantity in MT	Source	Mode of transport	Distance from source in Km
Aggregates	3359435	Nearby Market	Road	50 kms
Sand	1714681	Nearby Market	Road	50 kms
Cement	648163	Nearby market	Road	50 kms
Steel	6240	Nearby Steel Yards	Road and Railways	50 kms

Source: Pre-feasibility Report

**5.2 WATER REQUIREMENT**

Water requirement for the proposed project is given in Table 4:

**Table - 4**

**Water Requirement for the Proposed Project**

S. No.	Particulars	Requirement	Source
1.	During Construction phase	1000 KLD	Kal River and Groundwater (Prior permission will be obtained)
2.	One Time Filling for Reservoir	14.184 MCM	Kal River (Approval has been received from Water Resource Department; Government of Maharashtra vide letter No WFR/Savitri/932 dated 16.10.2023)
3.	During Operational phase*	1.01 MCM/A (to recoup the evaporation losses 35 KLD (domestic requirement)	Kal River to recoup evaporation losses from UR&LR during flood season (Approval has been received from Water Resource Department; Government of Maharashtra vide letter No WFR/Savitri/932 dated 16.10.2023) Ground Water for domestic purposes (Prior permission will be obtained)

Source: Pre-feasibility Report

**5.3 POWER REQUIREMENT**

The power will be required during pumping mode to pump the water back from lower reservoir to the upper reservoir. Annual energy consumption by Pane PSP in Pump mode is 4060.16 MU which will be sourced from Power grid 765/400 kV Pune III substation would be around 60 km. For backup power, 2 DG set of 750 KVA each (1 for Upper and 1 for Lower Reservoir) will be available.



#### 5.4 MAN POWER REQUIREMENT

Total man power requirement during the construction phase 2170 persons and 320 during the operational phase for this project. Unskilled /semi-skilled manpower will be hired from the local area as per requirement. Preference will be given to the locals as per their eligibility.

#### 6.0 PROCESS DESCRIPTION

Pumped Hydroelectric Energy Storage (PHES) is a type of hydroelectric energy storage that is used for load balancing in electric power systems. This method stores energy as gravitational potential energy of water pumped from a lower elevation reservoir to a higher elevation reservoir. Pumps are typically powered by low-cost surplus off-peak electricity. When there is a high demand for electricity, the stored water is released through turbines to generate hydroelectric power. Although the plant is a net consumer of energy due to pumping losses, the system increases revenue by selling more electricity during peak demand periods when electricity prices are highest.

##### Hydrology

The Upper reservoir does not have any natural stream. But the lower reservoir has a small stream which will be diverted using toe drain. The Proposed PSP upper reservoir has a gross storage capacity of 8.026 MCM (0.283TMC). The live storage of PSP Upper reservoir is 7.430 MCM (0.262 TMC). The operational pattern of PSP has been kept in such a way that 7.430 MCM (0.262 TMC) of water will be utilized for the proposed PSP. The project is a pumped storage scheme and hence, no consumptive utilization of water is required for its operation. Being a Off-stream open loop project, one time filling of the PSP reservoir which will be carried out from the self-catchment inflows of the Lower Reservoir.

##### **Installed Capacity**

The PSP is proposed with a Storage Capacity of 9480 MWH with Rating of 1500 MW. This Project is comprising of 5 units of 250 MW each and 2 units of 125 MW each. The installed capacity of a pumped storage scheme is influenced by the requirements of daily peaking power requirements, flexibility in efficient operation of units, storage available in the reservoirs and the area capacity characteristics. The scheme envisages utilization of 508.40 m and 508.20 m rated head and design discharge of 275.079 Cumec and 55.04 cumec for larger and smaller unit respectively for generation of 1500 MW (5 units of 250 MW each and 2 units of 125 MW each). For Pumping, the scheme envisages utilization of 527.40 m and 528.00 m rated head and pumping discharge of 244.76 Cumec and 55.11 cumec for larger and smaller unit Pump respectively for pumping power of 1685MW (5 units of 275 MW each and 2 units of 155 MW each). The Pane PSP will utilize 1685 MW to pump 7.430 MCM (0.262 TMC) of water to the upper reservoir in 6.95 hours

#### 7.0 DESCRIPTION OF ENVIRONMENT

##### 7.1 PRESENTATION OF RESULTS (AIR, NOISE, WATER & SOIL)

The Baseline data for the environmental studies has been collected during Post Monsoon Season (October 2022 to December 2022) and Pre-Monsoon Season (March to May, 2023) in accordance

with the Office Memorandum Issued by MoEFCC by F. No IA3-22/33/2022-IA.III (E-188159) dated 14<sup>th</sup> August., 2023.

#### **Ambient Air Quality Monitoring**

Ambient Air Quality Monitoring results reveals that the concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> for all the 8 AAQM stations were found between 51.8 to 67.3 µg/m<sup>3</sup> and 20.8 to 30.2 µg/m<sup>3</sup> respectively for Post Monsoon Season and between 49.7 to 55.9 µg/m<sup>3</sup> and 21.3 to 29.4 µg/m<sup>3</sup> respectively during Pre-Monsoon Season.

As far as the gaseous pollutants SO<sub>2</sub> and NO<sub>x</sub> are concerned, the prescribed CPCB limit of 80 µg/m<sup>3</sup> has never surpassed at any station. The concentrations of SO<sub>2</sub> and NO<sub>2</sub> were found to be in range from 5.9 to 12.2 µg/m<sup>3</sup> and 19.9 to 25.6 µg/m<sup>3</sup> respectively for Post Monsoon Season and between 5.2 to 12.3 µg/m<sup>3</sup> and 12.7 to 22.5 µg/m<sup>3</sup> respectively during Pre-Monsoon Season. CO concentration was found to be in range of BDL to 0.59 mg/m<sup>3</sup> during Post Monsoon Season and BDL to 0.72 mg/m<sup>3</sup> during Pre-Monsson Season.

#### **Ambient Noise Level Monitoring**

Ambient noise levels were measured at 8 locations in and around the project site. Noise levels varied from 51.6 to 54.0 Leq dB (A) during day time and from 41.9 to 44.0 Leq dB (A) during night time for Post Monsoon Season and from 52.2 to 53.6 Leq dB (A) during day time and from 39.7 to 43.3 Leq dB (A) during night time for Pre-Monsoon Season.

#### **Water Quality Monitoring**

**Surface Water: Surface water sampling was done at 4 locations during Post and pre monsoon.**

**Post Monsoon Season (Oct., to Dec., 2022):** The pH of collected water sample is from 7.42 to 8.26 indicating that water is slightly alkaline. Odour was found agreeable at all the locations.

Total hardness (120 to 270 mg/l), Total dissolved solids (57 to 270 mg/l), Chloride (4 to 63 mg/l), Alkalinity (35 to 154 mg/l) and conductivity (109.8 to 421.8 µs/cm) were found to be within standards in water samples. BOD was found (3.0 to 3.9 mg/l) & COD was found (26.4 to 31.2 mg/l).

The nutrients were also found viz. Sulphate (9.52 to 40 mg/l), Nitrate (1.30 to 27.82 mg/l), Calcium (8.82 to 36.8 mg/l), Magnesium (4.37 to 18.7 mg/l) indicate that the water bodies are rich in Calcium, silica, potassium, magnesium and bicarbonates.

**Pre-Monsoon Season (Mar., to May, 2023):** The pH of collected water sample is from 7.35 to 8.31 indicating that water is slightly alkaline. Odour was found agreeable at all the locations.

Total hardness (132 to 289 mg/l), Total dissolved solids (52 to 277 mg/l), Chloride (7 to 60 mg/l), Alkalinity (41 to 159 mg/l) and conductivity (115.4 to 320.8 µs/cm) were found to be within standards in water samples. BOD was found (3.1 to 3.5 mg/l) & COD was found (25.4 to 30.1 mg/l).

**Ground Water: Ground water sampling was done at 10 locations during Post and pre monsoon.**

**Post Monsoon Season (Oct., to Dec., 2022):**

- The pH of collected water samples varied from 6.87 to 7.80
- Total hardness varies from 90 to 208 mg/l
- Total dissolved solids varied from 180 to 450 mg/l

- The water samples contain, chloride from 37 to 96 mg/l, SO<sub>4</sub> varies from 32 to 116 mg/l, Ca from 20 to 72.9 mg/l, Mg varies from 3.84 to 40.8 mg/l.

**Pre-Monsoon Season (Mar., to May, 2023)**

- The pH of collected water samples varied from 7.10 to 7.88
- Total hardness varies from 112.62 to 166.21 mg/l
- Total dissolved solids varied from 180.12 to 300.21 mg/l
- The water samples contain, chloride from 38.56 to 63.98 mg/l, SO<sub>4</sub> varies from 1.56 to 25.67 mg/l, Ca from 22.98 to 41.23 mg/l, Mg varies from 12.51 to 22.12 mg/l.

**Soil Sampling:** Soil sampling was done at 4 locations during Post and pre monsoon.

**Post Monsoon Season (October 2022 to December 2022):** The organic matter (1.20 % to 1.46 %) and organic carbon (0.56 % to 0.82%) present in the soil observed to be appropriate for the plant growth. The texture of the soil samples was Sandy Clay Loam. All soil samples are having pH ranging from 6.68 to 7.08 which is an optimal range for most the plant to thrive and grow. All the essential nutrients were Nitrogen (220.57 to 351.37 kg/ha), Phosphorous (27.89 to 47.56 kg/ha), Potassium (211.30 to 388.12 kg/ha), Magnesium (329.66 to 411.12 mg/kg), Calcium (1675.5 to 2314.6 mg/kg). These results indicate that the soil quality within the study area is of a good quality and contains sufficient macronutrients which is vital for healthy plant life.

**Pre-Monsoon Season (Mar., to May, 2023):** The organic matter (1.20 % to 1.48 %) and organic carbon (0.55 % to 0.82%) present in the soil observed to be appropriate for the plant growth. The texture of the soil samples was Sandy Clay Loam. All soil samples are having pH ranging from 6.50 to 7.05 which is an optimal range for most the plant to thrive and grow. All the essential nutrients were Nitrogen (215.33 to 315.37 kg/ha), Phosphorous (27.89 to 47.56 kg/ha), Potassium (211.30 to 388.12 kg/ha), Magnesium (329.66 to 411.12 mg/kg), Calcium (1675.5 to 2313.7 mg/kg). These results indicate that the soil quality within the study area is of a good quality and contains sufficient macronutrients which is vital for healthy plant life.

## 7.2 BIOLOGICAL ENVIRONMENT

**Flora:** Most common species found in the area are *Ficus religiosa* (Peepal), *Acacia nilotica* (Babul), *Annona squamosa* (Seetaphal, sareefa), *Azadirachta Indica* (Neem), *Gmelima arborea* (Khamer / Gamari), *Mangifera indica* (Aam / Mango), *Chamaedorea elegans* (Bamboo palm), *Datura metal* (Datura), etc.

**Fauna:** Commonly found species in the study area are *Cuon alpinus* (Wild dog), *Felis chaus* (Jungle cat), *Lepus nigricollis* (Common Indian Hare), *Oryctolagus cuniculus algirus* (Rabbit), *Sus scrofa* (Wild pig), *Calotes versicolor* (Garden lizard), *Danaischrysiptus* (Plain tiger), etc

As per The Wildlife (Protection) Amendment Act (W(P)AA), 2022, there are 22 schedule -I species i.e., *Herpestes edwardsii* (Common grey mongoose), *Hystrix indica* (Indian porcupine), *Viverricula indica* (Small Indian civet), *Macaca radiata* (Bonnet macaque), *Cuon alpinus* (Wild dog), *Panthera pardus* (Common leopard), *Prionailurus bengalensis* (Leopard cat), *Loris lydekkerianus* (Slender loris), *Tetracerus quadricornis* (Four-horned antelope), *Bos gaurus* (Gaur), *Manis crassicaudata* (Indian pangolin), *Melursus ursinus* (Sloth bear), *Ptyas mucosa* (Indian rat snake), *Naja naja* (Cobra),

*Ophiophagus hannah* (King cobra), *Daboia russelii* (Russell's viper), *Varanus bengalensis* (Common Indian monitor lizard), *Python molurus* (Indian rock python), *Crocodylus palustris* (Marsh crocodile), *Lissemys punctata* (Indian flapshell turtle), *Bubo bubo* (Great horned owl), *Dendrocopos mahrattensis* (Yellow-crowned woodpecker), *Gallus sonneratii* (Grey jungle fowl) and *Pavo cristatus* (Peafowl) present in the study area

### 7.3 SOCIO-ECONOMIC ENVIRONMENT

The population as per 2011 Census records is 22,439 (for 10 km radius buffer zone). Total no. of household is 529, 1945 and 3135 respectively, in primary, secondary and outer zone. Sex ratio is 1078, 1070 and 1068 (females per 1000 males) observed in primary, secondary and outer zone respectively. SC population distribution is 11, 536 and 1079 respectively in primary, secondary and outer zone. ST population distribution is 513, 946 and 1773 respectively in primary, secondary and outer zone respectively.

### 8.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Anticipated environmental impacts due to operation of the proposed project along with mitigation measures are given below:

#### 8.1 ANTICIPATED IMPACT ON AMBIENT AIR QUALITY AND MITIGATION MEASURES

##### **ANTICIPATED IMPACTS**

- Gaseous pollutants (SO<sub>2</sub> and NO<sub>x</sub>) are anticipated from blasting operation and movement of heavy machineries & other vehicles
- The main sources of dust emission are the movement of equipment at site, Blasting, Drilling, earthwork and foundation works.
- Exhaust emissions from vehicles and equipment to be deployed during the construction phase is also likely to result in marginal increase in the levels of SO<sub>2</sub>, NO<sub>2</sub>, PM, CO and un-burnt hydrocarbons.
- Loading and unloading activities will also contribute in deterioration of air quality.
- The impact due to construction activities is mainly the health effects such as respiratory diseases, however, the impact will be for short duration. This will be confined within the plant boundary and is expected to be negligible outside the plant boundary. The impact will, however, be reversible, marginal and temporary in nature.
- Dust and fugitive emissions generated by crusher and other construction plants during the construction phase can affect both the plant area and its surroundings, depending on the wind direction.
- Greenhouse gases (CO<sub>2</sub> and pollutant, change in land use and vegetation cover associated with the clearing site affect the carbon sequestration in terrestrial ecosystem)

##### **MITIGATION MEASURES**

- Sprinkling of water on construction site and on unpaved roads.
- Proper ventilation facilities will be provided inside the tunnel, powerhouse and at labour camps.

- Construction equipment/ vehicle having valid PUC certificate will be deployed during the activity to restrict exhaust emission.
- Proper upkeep and maintenance of vehicles and construction equipment will help in controlling the emissions.
- Vehicles having construction materials will be covered with tarpaulin.
- Dust will also be generated from stockpiles of construction material (aggregates and sand). To prevent this, stockpiles will be aligned properly with slopes stabilized and appropriate height will be maintained and a separate storage area will be demarcated for construction material to confine the dust dispersion.
- Crushers must be equipped with air pollution control devices, following the regulations set by the pollution control board. This ensures the reduction of particulate matter (PM) released into the atmosphere.
- The chimneys of Diesel Generator Sets (DG sets) should be positioned at an appropriate height, in accordance with CPCB guidelines. Additionally, DG sets must undergo regular maintenance and hold valid certificates for both Type Approval and Conformity of Production.
- Green belt will be developed along the periphery of the roads, Muck Disposal Area Lower Reservoir, Muck Disposal Area upper Reservoir and Quarry.

## 8.2 ANTICIPATED IMPACT OF NOISE / VIBRATIONS AND MITIGATION MEASURES

### **Noise Due to Drilling**

The drilling is contemplated to be carried out by Jack hammer rock drills with air compressor which entail a noise level of 88.0 dB (A) and will be a worst-case scenario. Nonetheless, the noise generated but to drilling is within the standards prescribed by Occupational Safety and Health Administration (OSHA) for 8-hour exposure i.e., 90 dB (A). It is worth mentioning here that mining shall be carried in a shift of 8 hours and the equivalent noise level exposure during the shift shall be less than the safety limit of 90 dB(A),

### **Noise due to Blasting**

Blasting generates instantaneous and impulsive noise and is site specific dependent on many factors like the dimension of the holes, type and quantity of explosive i.e., charge/delay and degree of stemming in the hole. At the blast site with the given diameter of holes and their pattern, the noise levels are expected to be in the range of 120-130 dB (A) and tend to decrease with increase in distance of receptor. As the blasting is envisaged over a fixed time period in a day the blasting is considered to last for 2-3 minutes for one blasting operation depending on the charge. The noise levels over this time would be instantaneous and short in duration thus implying that impact on noise levels from blasting are not of concern.

### **Noise due to crushing, Screening and Loading Plant**

The average noise levels generated due to proposed crushing activities will be about 100 dB(A) which is within the exposure limit of 90 dB(A). The crusher within the project area shall be housed in a shed to contain noise. Screening activities shall generate average noise level of about 96.5 dB (A). Workers in the noise generating zone will be provided with earmuffs/earplugs besides dust mask

### **Noise due to excavation and transportation**

In order to predict ambient noise levels due to the construction activities from various sources at different location within the dam complex the noise dispersion modeling has been done on the assumption that all noise sources are acting as a single source generating approximately 90 dB(A).

### **MITIGATION MEASURES**

- Blast holes shall be initiated by NONEL down-the-hole (DTH) delay detonators.
- Care shall be taken to ensure that effective burden is not excessive and the face shall be kept sufficiently long.
- Optimum charge per delay shall be kept as low as possible.
- Adoption of two row blasting and V pattern of firing
- The firing of maximum possible no. of blast holes towards free face.
- Use of milli-second delay detonators between the holes and rows of blasting.
- Greenbelt development for attenuation of noise propagation and periodical noise monitoring will be carried out.

## **8.3**

### **ANTICIPATED IMPACT ON WATER QUALITY AND MITIGATION MEASURES**

The major impacts of water pollution are given as under:

- The civil and hydro-mechanical work at site will lead to stockpiling and excavation activity on site, thereby exposing the base soil to erosion. The runoff from this site and also from muck disposal sites may contain high quantity of Suspended Solids which shall add to the inorganic load of water bodies and drainages in the area. However, the impact of runoff may not be very significant except during rainy season.
- During construction phase, wastewater, sewage etc. shall be generated from the labour camp and workshops. If disposed untreated, this would substantially deteriorate the surface and ground water quality in the area.
- The oil and grease released from the project related activities may also change the physico-chemical characteristics of water.

### **Impact during Construction Phase**

The major sources of water pollution during project construction phase are as follows:

- Sewage from Construction work camps/colonies
- Effluent from Construction Plants and Workshops
- Disposal of muck

### **Sewage from Construction work camps/colonies**

Domestic waste water (35 KLD) will be generated from Office toilets and labour camp which will be treated in STP (35 KLD) and treated waste water (30 KLD) will be used for development of greenbelt and plantation

### **Effluent from Construction Plants and Workshops**

Construction plants viz. aggregate processing and concrete mixing and workshops will be established. Water is used in these construction plants and wastewater generated with high suspended solids. Similarly, from workshops, major pollutant will be oil and grease. Discharge of

untreated wastewater will adversely affect the surface and ground water quality. To minimize the impact, such effluent needs to be treated in-situ before discharge to any water body or for land application.

**Disposal of Muck**

The major impact on the water quality arises when the muck is disposed along the water bodies and natural drainage system. The unsorted waste going into the channels/ water bodies will greatly contribute to the turbidity of water continuously for long time periods. The high turbidity is known to reduce the photosynthetic efficiency of primary producers in the water bodies and as a result, the biological productivity will be greatly reduced. Therefore, the prolonged turbid conditions would have negative impact on the water quality. Therefore, muck disposal has to be done in line with the Muck Disposal Plan, as given in Environment Management Plan (Chapter 10) to avoid any negative impact.

**Impact during Operation Phase**

The project will create artificial upper and lower reservoirs and water will remain in circulation from Upper Reservoir to Lower reservoir during power generation and pumped up during non-generation hours on daily basis. One time filling of the reservoir will be done by sourcing water from Kal River (14.184 MCM- gross storage (13.588 MCM) of Lower Reservoir and the dead storage (0.596 MCM) of upper Reservoir); thereafter water will remain in-circulation and only evaporation losses will be compensated by the self-catchment inflows. Therefore, no direct impact on natural water bodies during operation is envisaged. During the operation phase, due to absence of any large-scale construction activity, the cause and source of water pollution will be much different. Since only a small number of O&M staff will reside in the area in a well-designed colony with sewage treatment plant and other infrastructural facilities, the problems of water pollution due to disposal of sewage are not anticipated. The treated sewage will be reused for gardening and green belt around the colony. Therefore, no direct impact on natural water bodies during operation is envisaged.

**MITIGATION MEASURES**

**Construction Phase**

- During the construction phase, STP of 30 KLD will be provided for the labor camp so that it can function properly
- Mobile toilets shall be provided for labours.

**Operation Phase**

Particulars	Details
Quantity of waste water	Domestic waste water: 35 KLD
Collection of waste water	Domestic waste water generated will be collected through underground sewerage system (pipe drain) for treatment in STP.
Treatment of waste water	Domestic waste water will be treated in STP (30 KLD Capacity) based on activated sludge process.
Reuse/recycle and Disposal	➤ Treated waste water (30 KLD) will be used for development of

of treated water	greenbelt and plantation. ➤ No waste will be discharged outside the plant premises.
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#### 9.0 ENVIRONMENTAL MONITORING PROGRAMME

Details of the environmental monitoring schedule / frequency, which will be undertaken for various environmental components, as per conditions of EC / CFE / CFO are given in Table - 5.

**Table - 5**  
**Post Project Monitoring**

Sl. No.	Aspect	Parameters to be monitored	Frequency		Location	Implementing and Pursuing Agency
			During Construction	During Operation		
1	Air Quality monitoring	As per EC and CTO	Quarterly for 2 years	Quarterly for 1 years	4 locations as specified	MSPCB or any approved agency of MOEF
2	Noise Quality Monitoring	As per EC and CTO	Quarterly for 2 years	Quarterly for 1 years	4 locations as specified	MSPCB or any approved agency of MOEF
3	Water quality Monitoring	As per EC and CTO	Monthly for 2 years	Quarterly for 1 year	4 locations as specified	MSPCB or any approved agency of MOEF
5.	Soil Monitoring	Physical and chemical properties	Half yearly for 2 years	Half yearly for 1 years	4 locations as specified	MSPCB or any approved agency of MOEF
6.	Ecosystem monitoring:	Wild life census, field surveys	Once	Once	Catchment area of the project	Forest dept. or WII

#### 10.0 ADDITIONAL STUDIES

Additional Studies conducted as per ToR Letter no. issued by MoEF&CC vide letter No J-12011/63/2023-IA.I (R) dated 30.01.2024; following are the additional studies done for the project

- Catchment Area Treatment Plan
- Water shed development Plan
- Biodiversity and Wildlife Conservation Plan
- Compensatory Afforestation Plan
- Greenbelt Development Plan
- Reservoir Rim Treatment Plan
- Muck Management Plan
- Energy Conservation



- Greenbelt Development & Plantation Programme
- Occupational Health & Safety Measures.

#### 11.0 PROJECT BENEFITS

Power sector is a critical infrastructure element required for the smooth functioning of the economy of the Nation. An efficient, resilient and financially healthy power sector is essential for growth and poverty reduction. The availability of reliable, quality and affordable power helps in the rapid agriculture, industrial and overall economic development of the state. Today, Wind & Solar, are the lowest cost source of new energy, however their inherent infirm nature & non-schedulable presents a huge challenge for integrating large RE capacities, while maintaining grid stability. Wind-Solar-Storage Hybrid Projects present a viable solution to the problem at hand and for future wherein large RE capacities are being planned to be added to National grid. While battery storage solutions are still evolving, integrating Wind & Solar with time tested and proven Pumped Storage solutions presents an optimal, economically viable & scalable solution to supply Schedulable Power On-Demand (SPOD) with both base load and peak load capabilities.

#### 12.0 OCCUPATIONAL HEALTH HAZARD

To control and minimize the risks at workplace, M/s. JSW Energy PSP Seven Limited. will implement with the following objectives:

- ☞ To prevent hazards.
- ☞ To provide safe and healthy environment to all the employees.

The company, therefore, has adopted the policy for the purpose of creating and maintaining safe and healthy environment.

In cement plant, the occupational health surveillance of the employee will be done on a regular basis and records of the same will be maintained as per the Factories Act. The occupational health surveillance programme will include lung function; sputum analysis and audiometric analysis on regular basis to observe any contraction due to exposure to dust and noise and corrective measures will be taken accordingly.

Vocational training programmes will be conducted. Under vocational training the workers will be given training related to all safety and health aspects pertaining to their vocation and thereafter every quarter special training courses/ Awareness programme for Malaria eradication, HIV and health effects on exposure to dust, heat, noise, chemicals will be organized for employed person.

Periodical medical camps with specialized doctors of various disciplines will be organized for employed person.

Periodical medical camps with specialized doctors of various disciplines will be organized to provide the specialized medical assistance to employees as well as neighboring communities

#### 13.0 CONCLUSION

The proposed project will be beneficial to the local people as more infrastructure development, improvement in education and health facilities, roads, etc. in near-by villages will be done. There will be increase in revenue generation to the Government by way of excise and government taxes etc.

There will be no significant impact on the area, as adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Regular monitoring of all the components of environment will be done. Increased social welfare measures taken by the company will lead to development in the nearby villages.

Greenbelt development will also be developed around the project area; this will help to mitigate the pollutants released from the premises of company.

