DAM REHABILITATION AND IMPROVEMENT PROJECT (DRIP) Phase II

(Funded by World Bank)

MOYAR FOREBAY DAM
TN12MH0012
ENVIRONMENT AND SOCIAL DUE DILIGENCE REPORT

SEPTEMBER 2022

Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO), Tamil Nadu

CONTENTS

List of Tables

List of Figures

List of Annexures

ABBREVIATIONS AND ACRONYMS

AIDS	: Acquired Immunodeficiency Syndrome
CA	: Conservation Area
CCA	: Cultivable Command Area
COVID	: Corona virus Disease
CWC	: Central Water Commission
DRIP	: Dam Rehabilitation and Improvement Project
DSRP	: Dam Safety Review Panel
E&S	: Environment & Social
EAP	: Emergency Action Plan
ESDD	: Environmental and Social Due Diligence
ESF	: Environmental and Social Framework
ESHS	; Environmental, Social Health, and Safety Management System
ESIA	: Environmental and Social Impact Assessment
ESMF	: Environmental and Social Management Framework
ESMP	: Environmental and Social Management Plan
ESS	: Environmental and Social Standard
GBV	: Gender Based Violence
GIS	: Geographic Information System
GRM	: Grievance Redressal Mechanism
HIV	: Human Immunodeficiency Virus
IA	: Implementation Agency
IPF	: Investment Project Financing
MCM	: Million Cubic Meters
OHS	: Occupational Health & Safety
PA	: Protected Area
PDO	: Project Development Objective
PMF	: Probable Maximum Flood
PPE	: Personal Protective Equipment
PST	: Project Screening Template
RET	: Rare Endangered and Threatened
RFB	: Request for Bids
SC	: Scheduled Castes
SCADA	: Supervisory Control and Data Acquisition
SEA	: Sexual Exploitation and Abuse
SEAH	: Sexual Exploitation Abuse and Harassment
SEP	: Stakeholder Engagement Plan
SF	: Screening Format
SH	: Sexual Harassment
SPMU	: State Project Management Unit
ST	: Scheduled Tribes
TANGEDCO	: Tamil Nadu Generation and Distribution Corporation Limited
WB	: World Bank
WQ	: Water Quality

EXECUTIVE SUMMARY

The dam is located in the Nilgiris District, Tamil Nadu State at Latitude $11^0$36'16" N and Longitude $76^0$41'31" E (Topo sheet 58 A/10). This dam is a composite dam consisting of masonry, earthen and concrete sections with a total length of 731.00 m and 13.00 m height. The dam was constructed during the period 1946 - 1951 to impound water discharged from the Pykara Power House at Singara, flowing through Maravakandy Dam, as a fore bay to Moyar Power House. The dam is provided with 41.20 m long ungated spillway with a discharge capacity of 37 Cumecs. Discharges from the Pykara Power House and the Pykara Ultimate Stage Power House (150 MW) (Commissioned in 2005) are channelized through Maravakandy Reservoir and reach the Moyar Forebay for power generation in Moyar Power House, located on the southern bank of the Moyar River at the bottom of the Moyar gorge. The installed capacity of power house is 36 MW (3 x 12 MW). It has been proposed to undertake rehabilitation measures (remedial works and basic facility enhancement) under the proposed Dam Rehabilitation and Improvement Project (DRIP II) with a view to increase the safety and to strengthen dam safety management.

The Environment and Social Due Diligence has been conducted for decision-making on the sub-project with a view to identify, evaluate and manage the environment and social risks and impacts in a manner consistent with the World Bank ESF. ESDD has been carried out by studying the sub-project information and proposed interventions, assessing the magnitude of E&S risk and impacts with respect to key baseline data in immediate vicinity area. Stakeholder consultation with communities living downstream/vicinity of the dam was conducted on 28.12.2021.

Activity wise environment and social screening has been carried out to identify risks and impacts to classify the sub-project based on risk level (low, moderate or substantial and high) and recommend commensurate plans/measures to meet identified risks and impacts.

As per the ESDD exercise, risk/impacts that have been identified relate to Water Quality, Physical Environment, labour, protected area and SEAH/GBV. Environment risks of air, water, noise, land use, soil and resource use for special repairs to masonry portion of dam like u/s face treatment are Moderate. Similarly, environment and social risk of transportation of material, labour camp and disposal of debris has been identified as moderate.

Dam is located within Mudumalai Tiger Reserve biodiversity conservation will be a priority area during the execution of rehabilitation work. Due to limited amount of rehabilitation work proposed, which is within the dam area, risk on outside sensitive habitat due to rehabilitation work is not significant as all the activities will be carried out within the dam area on the land owned by TANGEDCO. Only risk identified on ecologically sensitive habitat in dam surrounding is due to transportation of material and involvement of outside labour for rehabilitation work.

Overall risks are low to moderate and localized, short term and temporary in nature which can be managed with standard ESMP and guidelines. OHS is a substantial risk activity and is being treated separately through OHS plan in accordance with WB ESHS guidelines.

Since risks and impacts are low to moderate category, a standard ESMP customized to sub-project will be prepared in accordance with the ESMF. The customized ESMP will address the following: ·

- Gender Based Violence or SEA/SH related actions (ESS1)
- Labour Management Procedure (ESS2)

- Resource Efficiency and Pollution Prevention (ESS3)
- Community Health and Safety (ESS4)
- Biodiversity Conservation Plan (ESS6)
- Stakeholders Engagement Plan (ESS10)

Overall, the proposed activities within this dam sub-project have low to moderate risks resulting in the overall sub-project to be categorized as Moderate risk category. These risks and impacts can be effectively mitigated with effective implementation of mitigation plans by SPMU/IA, Contractors and monitoring by EMC, SPMU and CWC.

Chapter 1 INTRODUCTION

1.1 PROJECT OVERVIEW

The proposed Dam Rehabilitation and Improvement Project (DRIP II) would complement the suite of ongoing and pipeline operations supporting India's dam safety program. The project development objective (PDO) is to increase the safety of selected dams in participating States and to strengthen dam safety management in India. Project Components include:

Component 1: Rehabilitation and Improvement of Dams and Associated Appurtenances (US$ 577.14 million);
Component 2: Dam Safety Institutional Strengthening (US$45.74 million);
Component 3: Incidental Revenue Generation for sustainable operation and maintenance of dams (US$26.84million);
Component 4: Project Management (US$68.13 million).
Component 5: Contingency Emergency Response Component (US$0 million).

The project is likely to be implemented for 300 dams in 18 states across the country. The primary beneficiaries of the project are the communities that live in dam breach flood inundation areas and the communities that depend on water, irrigation and electricity services provided by the dams that could be compromised by poor dam performance or failure. In addition to saving lives, improved dam safety will avoid potential flood damage to houses, farm areas, infrastructure (roads, bridges, and other public and private infrastructure) and industrial and commercial facilities. Improved dam safety will also reduce the likelihood of service interruptions due to dam failure as well as potentially improving dam service provision, overall efficiency and storage capacity, including during drought periods.

1.2 SUB-PROJECT DESCRIPTION – MOYAR FOREBAY DAM

The dam is located in the Nilgiris District, Tamil Nadu State at Latitude 11^0 36'16" N and Longitude $76^0$41'31" E (Topo sheet 58 A/10). This dam is a composite dam consisting of masonry, earthen and concrete sections with a total length of 731.00 m and 13.00 m height. The dam was constructed during the period 1946 - 1951 to impound water discharged from the Pykara Power House at Singara, flowing through Maravakandy Dam, as a fore bay to Moyar Power House. The dam is provided with 41.20 m long ungated spillway with a discharge capacity of 37 Cumecs. Discharges from the Pykara Power House and the Pykara Ultimate Stage Power House (150 MW) (Commissioned in 2005) are channelized through Maravakandy Reservoir and reach the Moyar Forebay for power generation in Moyar Power House, located on the southern bank of the Moyar River at the bottom of the Moyar gorge. The installed capacity of power house is 36 MW (3 x 12 MW).

Salient features of the project area are reported below:

1	Location of the Dam	This Dam is located at Moyar, 45 Km away from Ooty, Nilgiris District, Tamil Nadu.
2	Dam Purpose	Power Generation (3x12 MW)
2	Latitude	11̊ 36' 16" N
3	Longitude	76° 41' 31"E
4	Spillway Discharge Capacity	37 Cumecs
5	Revised Maximum Discharge as per C.W.C recommendation	44.72 Cumecs
6	Type of Dam	Composite Dam (Earthen, Masonry & Concrete)
7	Height of Dam	13.00 m
8	Construction Period	1946 – 1951
9	Reservoir Capacity	Gross Capacity : 0.28 Mcum
10	Length of Dam	731.00 m (Earthen Bund: 396.00 m, Masonry and Concrete : 335.00 m)
11	Length of the spillway	41.20 m
12	Crest level of Spillway	902.50 m
13	Maximum water level	902.80 m
14	F.R.L	902.50 m
15	Deepest Bed level	893.10 m
16	Top width of Earthen Dam	3.65 m
17	Free board	1.20 m
18	Spillway gate	Ungated
19	Top level of the Non Spillway	904.00 m
20	Length of Non Spillway	689.80 m
21	Scour vent sill level	893.53 m
22	Size of the Scour vent	1.32 m x1.45 m
23	Minimum Draw down level	897.03 m
24	Dead storage level	893.53 m

View of Dam

Proposed Interventions/ Activities and intended Outcomes

The Dam Safety Review Panel (DSRP), constituted for the purpose of inspection of the TANGEDCO to undertake repair, rehabilitation and modernization work under World Bank aided DRIP-II & III schemes, made a visit to Moyar Forebay Dam Project on 03/11/2020 for inspection purpose and recommended measure to improve the safety and performance of dam and associated appurtenances in a sustainable manner, and also to strengthen the dam safety institutional set-up.

The objectives of the project are to be achieved through investments for physical and technological improvement activities, managerial upgrading of dam operations, management and maintenance, with accompanying institutional reforms. The project will improve the safety and operational performance of dam and mitigate risks to ensure safety of downstream population and property. The following rehabilitation proposals as described in the PST have been formulated based on DSRP recommendations and these proposals form the basis for preparation of present ESDD report.

Structural Rehabilitation Works

1. Basic Facilities

- Resurfacing the existing approach BT road to Inspection Bungalow and Camp.
- GI chain link fencing around the Dam complex.
- Water supply arrangements to entire camp area.
- Renovation of old Police guard room and Gauge reader room.
- Renovation of Quarters for Dam maintenance staff.
- Renovation of Dam maintenance office room.

2. Remedial Works

- Providing RR dry stone pitching on the upstream side of the Dam @ Ch 110M from Intake structure after earth work excavation and filling with red gravel.
- Construction of PCC toe wall after filling the Earth/Red gravel in the existing damaged bund portion near intake.
- Providing PCC ramp on the upstream side of the earthen bund near check post.

- Providing balance portion of PCC lining on the upstream side of the Dam near intake area and near pump house.
- Providing a new earth bund formed along the road side from main gate pillar.

3. Special repairs to masonry portion of Dam

- Rectification of cracks on the concrete Dam structure near intake area by epoxy putty of top fix EP.
- Providing steel ladder on the downstream side of the intake left side and RCC for downstream side of spillway.
- Removal of sediment deposited nearby intake in the reservoir and flume exit point.
- Colour washing, Painting.
- Supply and erection of entrance gate.
- Providing level Gauge plate.

4. Repairs to shutters

- Overhauling and reassembling of guide rollers, pulleys, etc., for intake.
- Overhauling and reassembling of Gear box, Gear coupling and pinions for intake.
- Replacement of corroded Trash rack panels.
- Supply, fabrication and erection of walk over platform and handrails over the trash rack across flume exit Location.
- Painting with Epoxy coal tar for intake gate, trash rack and Scourvent gate.

5. Providing electrification to dams

- Lights on the top of the dam.
- Replacement of control panels, cables, limit switches.
- Replacement of entire electrical system including providing new motor.

Figures 1.1 and 1.2 provide photographs of key infrastructure proposed for rehabilitation works and also major interventions locations.

DSRP Team's Inspection of Moyar Forebay dam

Seepage observed location on the right flank side near check post

Unprotected upstream bund portion near intake

Damaged right flank bend near the Check post

Right flank earthen bund which requires fencing

Damaged bund portion on the downstream side near intake

Hairline cracks on the upstream side of concrete dam near intake.

Proposed location for approach steps to the downstreamside

Damaged pitching portion on the downstream side of the Spillway

Dislocated pictching near flume exit point

Rectification work on the both side of trash rack

Upstream Left Flank Approach Steps to be Repaired

Damaged lining portion of flume (Maravakandy Dam to Moyar Forebay Dam)

Steel wire rope and screw rod mechanism of scour vent gate

Damaged seal of intake gate

Intake gate guide rollers in jammed and rusted condition

Intake gate hoist arrangement

Floating debris in front of intake.

Damaged trash rack panels at flume exit (04.11.2020)

Damaged existing BT road leading to camp.

Dam top without sufficient lighting arrangements

Existing Guard room

Damaged water supply arrangement

Damaged 2E type and 2F type tile roofed quarters

AEE/Electrical and AEE/Mechanical office buildings

Figure 1.1: Selected Photographs of Improvement/Intervention area

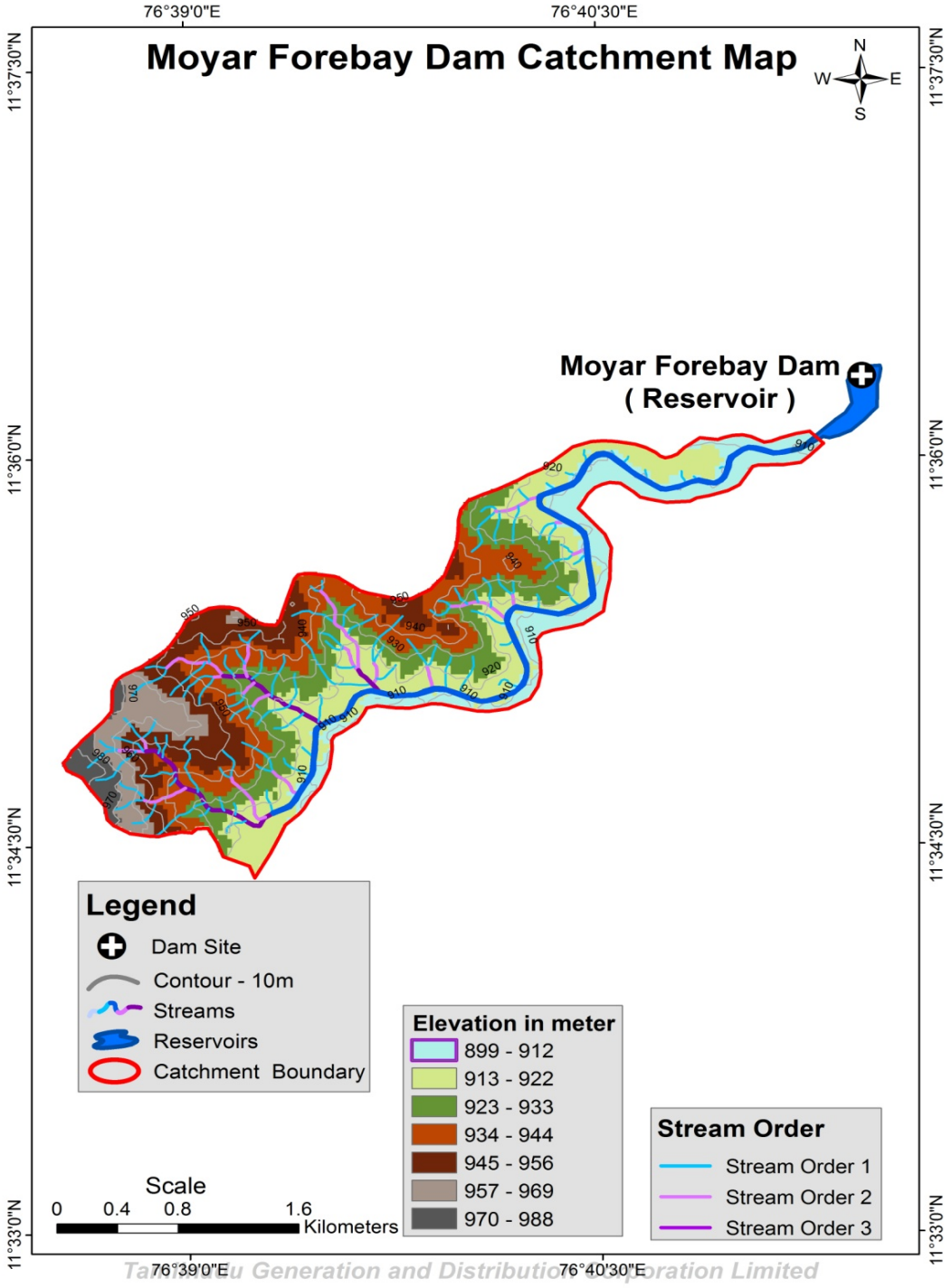


Figure 1.2: Project Area showing Major intervention locations

1.3 IMPLEMENTATION ARRANGEMENT AND SCHEDULE

As it can be seen from the list of activities proposed under dam rehabilitation project; the activities for Moyar Forebay Dam can be floated as one main package consisting of Civil, Mechanical and Electrical works. Works will be carried out by Contractor(s) as these are labour intensive activities and would be completed over a period of 18 months. IA will hire Contractor(s) based on national open competitive procurement using a Request for Bids(RFB) as specified in the World Bank's-Procurement Regulations for IPFB or rowers, July 2016, (RevisedAugust2018Procurement Regulations),and is open to all Bidders as defined in the Procurement Regulations. Following is the overall implementation and procurement schedule:

a) Overall Phasing of Project Implementation:
   Proposed Starting of implementation (MM/DD/YYYY) : 04/2023
   Proposed Ending of implementation (MM/DD/YYYY) : 09/2024
   Implementation Duration (months) (MM) : 18 months

b) Timeline phasing of implementation:

Sl. No.	Description	From (month/year)	To (month/year)	Status of Procurement Process
1	Main package C M E works	04/2023	09/2024	Tender floated
2	Other Packages	NIL		
3	Procurement – instrumentation, goods, inspection vehicles	NIL		

1.4 PURPOSE OF ESDD

The overall project (DRIP II) was categorized as substantial as per the internal Environment and Social Risk Classification of the Bank. The Environment and Social Due Diligence has been conducted to use it as a tool for decision-making on the sub-project with the following specific objectives:

i. To identify, evaluate and manage the environment and social risks and impacts of the sub-project in a manner consistent with the ESSs;
ii. To adopt a mitigation hierarchy approach to the project's E&S risks i.e. a) anticipate and avoid risks and impacts; b) minimize or reduce risks and impacts to acceptable levels, if not avoidable; c) once risks and impacts have been minimized or reduced, mitigate; and (d) where significant residual impacts remain, compensate for or offset them, where technically and financially feasible;
iii. To help identify differentiated impacts on the disadvantaged or vulnerable, if any, and to identify differentiated measures to mitigate such impacts, wherever applicable;
iv. To assess the relevance and applicability of environmental and social institutions, systems, laws, regulations and procedures in the assessment, development and implementation of projects, whenever appropriate; identify gaps, if any exist,

v. To assess borrower's existing capacity, gaps therein, and identify areas for enhanced capacity towards management of E&S risks.

vi. Based on the categorization of Environment and Social risks and impacts of the Dam sub-project, to determine whether ESIA is to be carried out using independent third-party agency or a generic ESMP customized to mitigate E&S risks and impacts will suffice.

1.5 APPROACH AND METHODOLOGY OF ESDD

The following approach has been adopted for ESDD:

i. Study sub-project information, proposed interventions, their magnitude and locations and carry out assessment of each proposed intervention to identify the magnitude of E&S risk and impacts;

ii. Review relevance and applicability of national and state legal requirements and Bank's ESF policy, standards and directives and preliminary assessment of applicability of legal requirement and ESS framework (2-8).

iii. Conduct site visit to understand baseline environment and social settings, proposed activities under the sub-project, their location and sensitivity, if any.

iv. present key baseline data essential for impact assessment in immediate vicinity area of proposed interventions from secondary sources, such as land-use, protected areas in vicinity, ascertain presence of indigenous (schedule tribe)/vulnerable people, etc.

v. Undertake institutional assessment to identify existing capacities & relevant gaps to manage E&S risks and impacts

vi. Conduct preliminary stakeholder consultations to help identify potential stakeholders; to provide information on the proposed interventions; to identify issues and concerns; and ascertain appropriate mechanisms for continued engagement

vii. Carry out activity wise environment and social screening and identify risks and impacts. Classify the sub-project based on risk level (low, moderate or substantial and high) and recommend commensurate plans/measures to meet identified risks and impacts.

Stakeholder consultations with communities living downstream/vicinity of the dam have been held on 28.12.2021.

Chapter 2 INSTITUTIONAL FRAMEWORK AND CAPACITY ASSESSMENT

2.1 POLICY AND LEGAL FRAMEWORK

India has well defined environmental and social regulatory framework. The regulation applicability depends on nature of work and location of work. Broadly legislation can be divided into four categories viz environmental, forests, wildlife conservation and social. The applicability analysis of regulations pertaining to all the above four categories was carried out. The applicability of World Bank ESF comprising, 10 ESSs (ESS1 to ESS10) to the proposed rehabilitation proposals and Standard specific requirements were analyzed. Further, a comparison of national environmental and social regulations versus World Bank's ESS has been carried out along with the gap analysis. Applicability of Indian regulations, World Bank's ESS along with comparison and gap analysis is discussed in ESMF.

Central Water Commission, Ministry of Jal Shakti, Government of India has prepared "Operational Procedures for Assessing and Managing Environmental Impacts in Existing Dam Projects" and is under publication as a guiding document for the dam owners to systematically address in advance the environmental safeguard requirements and have discussed in detail all applicable legal requirement. Reference has been drawn from this document as well, while carrying out applicability analysis.

Indian environmental regulation require environment clearance for new dam projects specifically for the purpose of hydropower generation and/or irrigation projects and vary with generation capacity for hydropower projects and cultivable command area served by irrigation projects. Forest related clearances become applicable if, new or any modification in any existing project require diversion of forest land for non-forestry purposes. Wildlife Clearance process gets triggered if the project is in proximity to protected area or activities are proposed within protected or conservation areas (CA).

Therefore, for the proposed dam rehabilitation activities at Moyar Forebay Dam, regulatory clearances will not be applicable as per Indian regulations. Other applicable regulatory requirement is discussed in ESMF.

2.2 DESCRIPTION OF INSTITUTIONAL FRAMEWORK

The sub-project will be implemented by Tamil Nadu Generation and Distribution Corporation, Government of Tamil Nadu. TANGEDCO being responsible for power generation, transmission and distribution; have a well-established customer complaint system for power consumer; where they can register their complaints 24x7 on dedicated line (94987 94987). It also has a 24x7 Chairman's complaint cell with phone number and whatsapp numbers. In addition, it has established a Consumer Grievance Redressal Forum, where consumers can register complaints online/manually, directly or through a

representative to be resolved within a period of 60 days; with a provision of filing appeal in next 30 days if the complainant is not satisfied with the redressal.

Tamil Nadu Generation and Distribution Corporation Limited do not have in-house expertise to address E&S issues. As per the suggestions of CPMU/CWC, it is proposed to outsource consultancy services of Environmental and Social experts to assist TANGEDCO in resolving E& S issues.

SPMU will designate Nodal Officer(s) to coordinate and supervise E&S activities at the level of Executive Engineers to provide commensurate time to comply with E&S related activities. Brief TORs for E&S officers is included in ESMF. Since, in case in-house expertise is not available, SPMU may hire the qualified staffs on need basis to support management of E&S risks including Environmental and Social Experts for ensuring compliance with the Bank's ESF and ESSs and ensuring that these activities shall be implemented as per the procedures.

Presently, Grievance Redressal Mechanism has been established with two nodal officers, one at SPMU level and another at Field level. Sexual Harassment complaints can be made to either at dam level or SPMU level. As committed in ESCP, a Grievance Redress Mechanism (GRM) will be established and operated by the contracted agencies to address Project worker's workplace concerns. SPMU will have oversight responsibility on the functioning of the GRM.

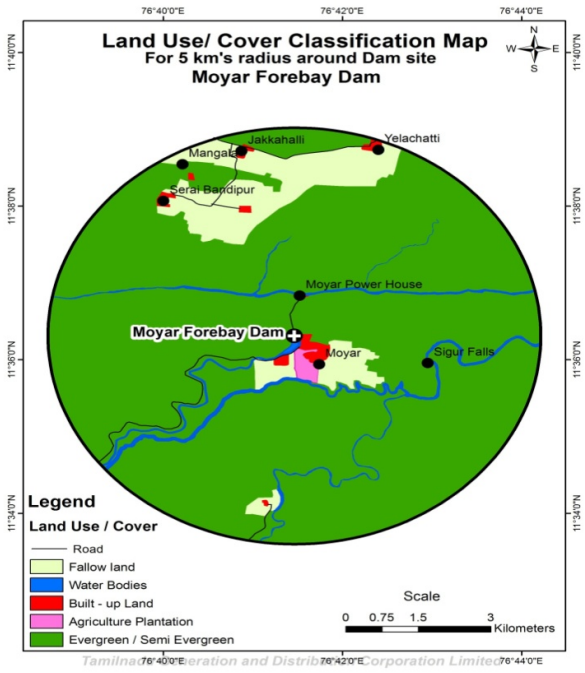
Chapter 3 ASSESSMENT OF ENVIRONMENTAL AND SOCIAL CONDITIONS

Assessment of physical, ecological and socio-economic conditions at dam site and immediate surrounding has been carried out based on secondary information and site observations; as discussed below.

3.1 PHYSICAL ENVIRONMENT

Land Use/ Land Cover

The project surrounding area land use and environmental sensitivity was analysed using GIS techniques. Land use/ Land cover map within 5 km radius of dam is presented at **Figure** 3.1. As can be seen from the map, evergreen/semi-evergreen forest, deciduous forest, and agriculture/fallow land dominates the land Use in project surrounding area. In addition, there are small patches of scrub forest and crop land; small and scattered settlement and water body (reservoir). However, the project activities will be confined to dam body only and no structural interventions are proposed beyond existing dam boundaries. Two major villages are identified in dam surrounding (within 5 km) viz. Moyar Camp and Undi Moyar.



[(Source: Digital data on land use/land cover maps using bhuvan prepared by National Remote Sensing Centre (NRSC) with Institute of Remote Sensing College of Engineering Anna University along with further refinement using Google Earth]

Figure 3.1: Land Use and Land Cover Map of 5 km radius around Dam site

Natural Hazards

Potential of natural hazards such as earthquake have been assessed.

In terms of Indian Standard IS 11223-1985 criteria, Moyar Forebay Dam is classified as a 'Medium Dam' and, accordingly, qualifies for PMF (Probable Maximum Flood) as the design flood. The total inflow expected into the reservoir is 44.72 Cumecs. The original spillway capacity of 44.72 Cumecs. Hence, the designed spillway capacity of 44.72 Cumecs may be accepted as the design flood for Moyar Forebay dam under DRIP.

Project falls in earthquake zone II and same was considered at the time of design and there is no need for seismic design review. The Bureau of Indian Standards [IS 1893 (Part I):2002], has grouped the country into four seismic zones viz. Zone II, III, IV and V. Zone II is the least active and Zone V is the most active.

3.2 PROTECTED AREA

Protected areas Maravakandy Dam have been reviewed to assess the applicability of ESS 6. (Mudumalai Tiger Reserve.). Tiger Reserve has 321.00 square kilometres as Core or Critical Tiger Habitat and 367.586 square kilometres as Buffer area and is part of Nilgiris Biosphere Reserve. In addition, lately an Eco-sensitive Zone (ESZ) has also been notified for the protection of tiger reserve. No rehabilitation work is proposed beyond the dam boundary, which can directly or indirectly impact the protected area, there ESS 6 will not be triggered.

Mudumalai Tiger Reserve the first Sanctuary to be set up in India and forms part of the Jawharlal Nehru National Park. It is located 36 kms from Ooty from Kalhatty and 67 kms via Gudalur. From Mysore it is 91 kms away. This Sanctuary extends over an area of 321 sq.kms in the junction of the three states of Tamil Nadu, Karnataka and Kerala. It is at an elevation of 1,140 mtrs. A variety of habitat ranging from tropical evergreen forest, moist deciduous forest, moist teak forest, dry teak forest, secondary grasslands and swamps are found here.

It is rich in wildlife, like Elephants, Gaur, Tiger, Panther, Spotted Deer, Barking Deer, Wild Boar, Porcupine etc., birds like-minivets, hornbill, fairy Blue Birds, Jungle Fowls etc., and reptiles like python, Monitor Lizards Flying Lizards etc., You can take a ride into the jungle on elephant back or take a vehicle ride along designated visitor's route inside the jungle. The elephant rides have to be booked at Ooty. The Moyar river and the life around it is an experience by itself. The Theppakadu elephant camp is popular tourist attraction.

Location of the dam with respect to Mudumalai Tiger reserve is given at Figure 3.2

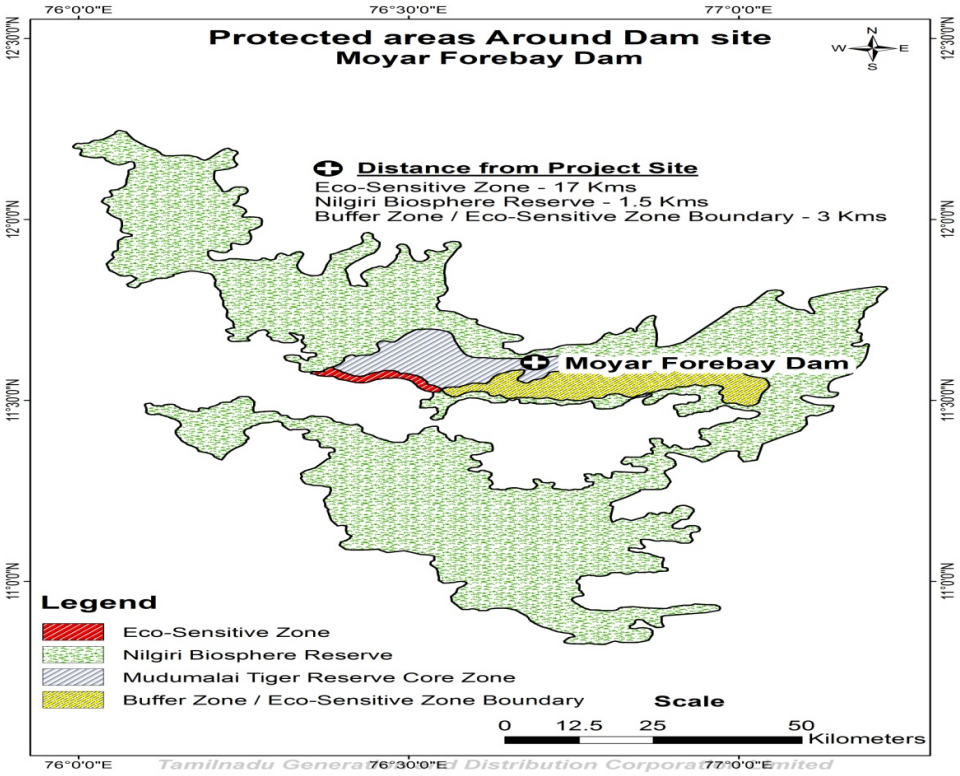


Figure 3.2: Protected Areas around Dam Site

3.3 SOCIAL ENVIRONMENT

The Moyar Forebay dam is located across the Moyar river in the Nilgiris district in the state of Tamil Nadu. The proximity villages' areas i.e. villages which fall within 5 km distance from the dam are Moyar Camp and Undimoyar. There are no Schedule V[1]areas in state of Tamil Nadu. The district is divided into two revenue Divisions namely Coonoor and Gudalur. The district has six tehsils (talukas) namely Coonoor, Kotagiri, Udhagamandalam, Kundah, Gudalur and Panthalur along with 4 Panchayat Unions (Community Development Blocks); Gudalur, Udhagamandalam, Kotagiri and Coonoor.

The economy of the district is basically dependent on non-agricultural activities & resources. The brief demographic characteristic of the district is given in the table below:

No. of Households	**1,97,653**	**Household Size**	**04**
Total Population	**7,35,394**	**Population (0-6 age)**	**6 6,799**
Male	3,60,143	Boys (0-6 age)	3 3,648
Female	3,75,251	Girls (0-6 age)	3 3,151
Sex Ratio	1042	Sex Ratio (0-6)	985
Population (SC)	**2,35,878 (32.08 %)**	**Population (ST)**	**32,813 (4.46%)**
Male	1,15,917	Male	16,091
Female	1,19,961	Female	16,722
Literates	**5,69,647**	**Literacy Rate (in %)**	**85.20**
Male	2,99,447	Male	91.72
Female	2,70,200	Female	78.98
No. of Workers	**3,49,974**	**Cultivators**	15,645 (4.47%)
Male	2,12,172	**Agricultural Labours**	79,100 (22.60%)
Female	1,37,802	**Household Industrial Workers**	3,895 (1.11%)

No. of Main Workers	**3,18,924**	**Other Workers**	2,51,334 (71.82%)
No. of Marginal Workers	**31,050**		
			Source: *Census of India, 2011 (District Handbook)*

With 7,35,394 population, the district ranks at 16th place in population size of and has sex ratio of 1042 which is 5.78 % higher than the state sex ratio of 985. The population density is 429 persons per sq km in the district which is moderately populated district in the state. The district has literacy rate of 85.20% which is higher than that of the State average of 80.09%. The gender gap in the literacy rate is .12.74 % in the district.

In the District, the Scheduled Caste and Scheduled Tribe population is 32.08 % and 4.46 % respectively with respect to the total population.. There are no Scheduled Tribe households in the project area and there are no physical interventions planned in the downstream areas. These areas will be taken into account during the preparation and implementation of Emergency Action Plan for Maravakandy Dam.

The agricultural labourers 22.60 %., House hold industrial workers 1.11% and other workers 71.82 %

3.4 CULTURAL ENVIRONMENT

List of National Monuments in Tamil Nadu and list of State Protected monuments in Tamil Nadu have been reviewed. There are protected monuments identified by Archaeological Survey of India. However, none of them are in the vicinity of the project.

Chapter 4 ACTIVITY WISE ENVIRONMENT & SOCIAL SCREENING, RISK AND IMPACTS IDENTIFICATION

4.1 SUB-PROJECT SCREENING

The subproject screening is undertaken following a three step screening methodology as described in ESMF. Process of risk /impacts identification is done using screening process considering the proposed interventions at each dam as provided in the Project Screening Template using first screening format (SF-1). Applicable interventions are further classified based on their location i.e. within dam area or outside the dam area. Each activity is reviewed for the applicability under-sub project, location of applicable activity and likely risks and impacts. The SF-1 format is used to ascertain the types of E&S risks for each of the proposed rehabilitation activity e.g. Risk/Impact on Water Quality, Fisheries, Conservation Area, Protected Area, Ecology, Physical Environment, Cultural Environment, Tribal Presence, Private Land/Assets/Encroachers/Squatters, Labor, Migrant Labor and GBV risks – each of these corresponding to the ESS 2-8.

The second format (SF-2) is used to assess the extent of risk/impact intensity for each of the identified E&S risk and is used to categorize the risk level as Low/Moderate/Substantial/High. Finally, using a third E&S risk summary format (SF-3), the risk categories for all different types of E&S risk and impacts is summarized and the highest of the risk categories is assigned as overall risk category for the given Dam sub-project. Based on the above findings, the ESDD report recommends Risk category of the Dam sub-project – whether it is Low/Moderate/Substantial/High and types of instruments that need to be prepared as part of the ESMP along with the responsibilities and timelines.

Outcome of three stage screening exercise is discussed below:

Step I Screening (using Form SF-1): Sub-Project Component, Construction Support Preparatory Intervention related vs Nature of risk/impact

Screening indicated that all project components related activities are limited to within the dam area/premises. Due to nature of these activities, likely impacts will be on physical environment in terms of air pollution, noise pollution and waste generation. None of the proposed structural interventions involve acquisition of private land and/or private assets. These activities in no way cause restriction on access to land or use of resources by local communities and there is no economic displacement envisaged due to the sub-project. Activities interfacing with water bodies – river/reservoir may have risk of spillage of chemicals, construction material, and debris leading to water pollution and impacts on fishes.

As the dam is located within Mudumalai tiger reserve, biodiversity conservation is a priority area during the execution of rehabilitation work. Due to limited amount of rehabilitation work proposed, which is within the dam area, risk on outside sensitive habitat due to

rehabilitation work is not significant. Proposed rehabilitation work includes repair to earthen dam and masonry portion of dam, all gates, electrification/lighting, repairs to approach road repair to guard room and residential quarters. These activities will be carried out within the dam area on the land owned by TANGEDCO. Only risk identified on ecologically sensitive habitat in dam surrounding is due to transportation of material and involvement of outside labour for rehabilitation work.

Pre-construction and construction stage, major auxiliary or preparatory intervention are within dam area. Deployment and haulage of heavy machinery, setting up of workshop, operation of concrete mixture and heavy pumps will be within dam area. Other activities such as labour camp and debris disposal will also be within the dam area due to protected habitat in dam surrounding. Activities involving machinery and equipment will have impacts on physical environment. Transportation of material, debris disposal and labour camp are likely to generate pollution and impact on physical environment. They also pose risk to protected habitat in dam surrounding.

Project will involve project managers and supervisors, contracted workers – these would also include migrant workers as all the required labour will not be fully supplied locally for a number of reasons, such as worker unavailability and lack of technical skills and capacity. Construction contractors are expected to stay at/near dam, set up construction equipment and machinery near work location at pre-determined/approved sites. Influx of skilled migrant labour, albeit few in numbers, for construction works is likely. The labour will stay outside the dam premises, hence risk of SEA/SH is unlikely.

Non-structural interventions such Emergency Action Plan has not been proposed, however, EAP shall be prepared and implemented. Moyar Forebay dam drains into downstream Bhavanisagar dam and there is no significant habitation in the downstream stretch up to Bhavanisagar dam.

Output of this screenings enclosed as Annexure I.

Step II Screening (using Form SF-2): All applicable activities identified as having potential risks/impacts that were identified through Step I screening, are further screened for associated sub-activity and evaluated for the extent of risk. Sub-activity's Risk/Impact intensity is further categorised as Low (L), Moderate (M), Substantial (S) or High (H) based on following criteria:

Low	:	Localized, temporary and negligible
Moderate	:	Temporary, or short term and reversible under control
Substantial	:	Medium term, covering larger impact zone, partially reversible
High	:	Significant, non- reversible, long term and can only be contained/compensated

Occupational Health and safety is treated as Moderate by default as its risk effect can be managed by adopting defined guidelines.

Analysis of extent of risk/impact for sub-activities resulted in identification of following activities as having Moderate Risks/impacts.

- Special repairs to earthen dam and masonry portion of dam
- Hydro-Mechanical works
- Labour Camps involved
- Debris Disposal
- Transportation of material
- Repair and maintenance works to quarters
- Painting

All other activities are categorized as low risk activities. E&S risks of none of the sub-activities for this sub-project is categorized as either Substantial or High risk. **The outcome of Screening is enclosed as Annexure II.** In case of GBV/SEAH, this site was assessed as Low risk. Based on consideration of all the above, summary of Risk/Impact (as per outcome of SF-2) is summarised for major sub-project activities under **Table 4.1 below.**

Table 4.1: Summary of Identified Risks/Impacts inForm SF 3

Project Activity	Environment Risks						Social Risks					
	Air, water, noise, land use, Soil, Resource use	Pollution downstream and upstream	General Ecology	Protected Area (Wild Life Sanctuaries, National Park and other natural habitat even if not protected)	Other RET species (flora and fauna) outside protected areas	Fish and Aquatic life within dam water body	Land	Tribal	Labour	Cultural heritage	GBV/ SEAH	OH and Safety to Labour/ Community
Civil (within Dam Boundary)	M	M	L	None	None	L	L	L	M	L	L	M
Hydro Mechanical/Electrical	L	L	L	None	None	L	L	L	L	L	L	M
Instrumental SCADA, surveillance	None	None	None	None	None	None	None	None	None	None	None	None
Road work	M	L	L	None	None	L	L	L	M	L	L	L
Major debris disposal	L	L	L	None	None	L	L	L	L	L	L	L
Labour camp	L	L	L	None	None	L	L	L	L	L	L	L

Criteria for Risk Evaluation:
Low: Localized, temporary and Negligible
Moderate: temporary, or short term and reversible under control
Substantial: medium term, covering larger impact zone, partially reversible
High: significant, non- reversible, long term and can only be contained/compensated
Occupational Health and safety: it will be treated as Moderate by default as OHS effect can be kept controlled and with negligible effect with adoption of defined guidelines,

4.2 STAKEHOLDERS CONSULTATION

Stakeholder consultation was conducted on 28.12.2021. It was also attended by permanent staff of the borrower (TANGEDCO) working at dam, public of nearby village.

Stakeholder consultation was conducted as part of environmental and social impact assessments, with a purpose to:

a. Provide initial information to the communities on the proposed project interventions and particularly the non-structural interventions.
b. Help identify potential stakeholders who are involved at this stage and will be involved a later stage.
c. Ascertain if, there are any legacy issues relating to displacement, resettlement, etc.
d. Elicit their responses in relation to key non-structural interventions such as early warning systems, emergency action plans, etc.
e. Identify mechanisms that would be deployed to engage with different stakeholders and particularly communities living downstream.

Following is the outcome of the stakeholder consultation exercise. List of participants is enclosed as **Annexure III**.

A. Interaction with Dam Engineers/Staff

Questions	Responses provided / Observations
1. Please confirm whether all proposed structural rehabilitation activities for this dam are limited to dam compound only or any activities are proposed beyond dam complex like catchment area treatment plan, stabilization of reservoir rim area, slope stabilization, de-silting etc.? Please specify if any possibility of local community interference exist during the implementation of rehabilitation measures; including stakeholder's consultation meetings planned for dissemination of emergency action plans which is a non-structural measure.	The proposed structural Rehabilitation activities are within the dam compound only, on upstream Right flank slope protection work only involved. Removal of deposited silt at a minimum quantity involved in this dam. This dam is located in the (Mudumalai Tiger reserved) forest area and there is no possibility of community interference during the implementation of Rehabilitation work including stack holders consultant meeting.
2. Is there any unsettled issues (legacy) related to displacement or resettlement, pending since time of dam construction? If yes, please give a brief detail.	The dam is located in the (Mudumalai Tiger Reserved) forest area, there were no displacement and resettlement issues during construction.
3. Any unauthorized encroachers or squatters living within the dam premise? If yes, are these not a threat for dam security and dam premise, any official action taken in the past, does the state government have legalized these squatters and these have full right in the property of dam authorities.	No encroachers (or) squatters within the dam premises so far.
4. What is the proposed institutional arrangement to deal the Environment and Social activities within the scheme i.e. in-house team of experts/hired agency or individual experts?	TANGEDCO do not have in-house expertise to address E&S issues. Presently, Project Director at SPMU and Executive Engineer at dam level look after these aspects. Hiring of Experts will be processed.
5. Who will be in charge of E&S related activities at dam site and at SPMU level?	Dam site: Executive Engineer/Civil/DRIP of respective dams SPMU : Executive Engineer/Civil/Dam Safety/Chennai
6. How do communities contact dam officials? Is there any existing mechanism known to communities to contact dam officials (through telephone/mobile/e-mail/official website?	Through in person, mobile, Telephone, E-Mail & Office website.
7. What is existing mechanism to communicate with downstream communities/public on unregulated releases of water during high flood time siren/written communication to district authorities/ telephone/mobile/text messages or any other mode of communication?	1. Written Communication to the District Collector. 2. Advance intimation to the public/ downstream communities through mobile.

8. How do you ensure that downstream community is fully aware of the above existing mechanism?	Does not arise.
9. Are there women employees at the dam site?	-Nil-
10. Is there any existing Grievance Redressal Mechanism (GRM) within the department to address any kind of grievance/complaints by general public?	Yes. Executive Engineer/Civil/Dam Safety-I/Chennai @ HQrs. Executive Engineer/Civil/DRIP/Madurai @ Field.
11. Details of any grievances received lately related to this new Scheme?	-Nil-
12. Is dam premise a restricted area or has open access to general public?	Access to Dam area – Fully restricted.
13. Are there tribal's living in the surrounding area of dam complex? Which tribes are these? Please give brief detail.	No Tribal's living in the surrounding dam area.
14. Does the dam have any tourism/water recreation facilities? If yes, how many approximate tourist visits annually, annual revenue generated, whether any portion of this generated revenue is diverted to regular O&M of this dam.	No
15. Do you engage any local labours for routine dam maintenance work? If yes, what is the process of engaging these locals for work at dam, whether through Government approved contractor or hired individually?	Routine Dam maintenance works are being done by department staff and through Government approved contractor.

B. Interaction with Local Community

Questions	Responses provided / Observations
1. How many villages are in immediate downstream vicinity?	The Dam is in Mudumalai Tiger Reserve area. There is no Tribal village is in immediate downstream vicinity.
2. Are they dependent on dam in any way for their livelihood?	No. they are not dependent on the dam. All the basic amenities required are fulfilled by the respective Panchayat.

3. Does any of these villages were displaced and rehabilitated during the construction of Moyar Forebay Dam. Is there any pending compensation issues?	Dam area is fully covered in Mudumalai Tiger Reserve area. Displacement and Rehabilitation does not arise.
4. Is there any R&R affected person known to you who is currently working with the dam authorities? If so, in what capacity (employee/direct worker/contractor)	-NO-
5. Are you aware of any fishing communities living immediately downstream of dam whose livelihood are directly linked with the fishing activities of this dam?	-NO-
6. Are you aware of fishing working seasons, revenue earning, any access to general public for fishing, any suggestion etc.	-NO-
7. Are you aware of local women affected in any way by dam operations?	-NO-
8. Are you aware of any early flood warning system for this dam, or any other system wherein downstream communities getting regular update during flood season for any uncontrolled release of water?	No. The Dam is having ungated spillway.
9. Are you aware of any dam related incident happened in the past wherein some loss of life encountered? If yes, brief summary may be given	-NO-
10. If you have to contact the dam authorities; how will you contact, through telephone/mobile/e mail/personally?	By Telephone, Mobile and in Person.
11. In the past, on any occasion, did you contact dam authorities for any specific reason affecting public in general? If so, how did you contact and how was the response of dam authority?	Such situation did not arise.
12. Give your views about Moyar Forebay Dam, how this dam is helping Country, State, district or local communities in meeting its objectives, any specific concern can also be given?	This dam picks up water diverted from Maravakandy Reservoir through a flume and utilized for Power generation in Moyar Power House.The Maravakandy dam is located at 45 km from Ooty and is reachable via Thalaikundah. Discharges from the Pykara Power House and the Pykara Ultimate Stage Power House (150 MW) are channelized through Maravakandy Reservoir and reach the Moyar Forebay and are utilized for power

	generation in Moyar Power House, located on the southern bank of the Moyar River at the bottom of the Moyar gorge. The installed capacity of power house is 36 MW (3 x 12 MW).
13. (a) Are you aware of any document named Emergency Action Plan (EAP) of the dam? (b) If yes, do dam authorities conduct any annual mock drill or consultation meeting on dam site and invite all stakeholders to inform about various protocols in place and consequences in case dam fails? (c) In future, during stakeholder's consultation meeting, would you like to be a part of these consultation and mock drill activities to be conducted by dam authorities? (d) If yes, how to contact you, please give the corresponding address alongwith all details to receive the official communication.	-NO- Consultation meeting to be conducted. YES
14. Are you a regular follower of official website of dam authorities as a general public, in case you are a contractor, do you follow various tenders notices being invited for various maintenance of this dam?	-NO-
15. Any suggestion to improve overall system by dam authorities in any way, please give in brief?	Proposed Dam Rehabilitation and Improvement works, as per DSRP recommendations, shall be carried out as a safety measure.

Following is the summary outcome of the stakeholder consultation:

Technical Aspects:

1. The surplus water from Moyar Forebay Dam merges with Moyar River near Moyar Power House in Mudumalai Tiger Reserved forest area and finally goes to Bhavani sagar dam.
2. The main source of water in the Moyar Forebay Dam reservoir from Maravakandy dam through open flume at a distance of 6.8Km with trash rack arrangements at flume exit point.
3. Moyar Forebay Dam is one of the main Power Generation of Moyar Power House for the Generation capacity of 3 units of 12MW.
4. Moyar Power House has operated between the level 2958.5 ft to 2961.00 ft and MDDL is 2944.00 ft. Power could not be operated between MDDL 2944 ft and 2958.5 ft. It seems to

be silt / muddy water enter into the penstock when utilize the water below the 2958.5 ft for Power generations. Hence it is proposed the estimate for Desilting in the Moyar reservoir after depletion of the water by closing the existing open flume at Maravakandy Dam.

4.3 DESCRIPTIVE SUMMARY OF RISKS AND IMPACTS BASED ON SCREENING

Based on the above screening analysis, potential impacts and risks from the sub-project are summarised below:

Environmental Impacts and Risks

1. Dam is located within the protected area, although no activity is proposed outside the dam area which is owned by TANGEDCO, moderate risk is identified on protected habitat due to labour movement and movement of material through protected area.

2. Environment risks and impacts, as assessed above, for various project activities under this sub-project are categorized as Low and Moderate due to localized nature of proposed activities i.e. activities remain limited to dam area except for labour camp and muck/debris disposal.

3. Execution of civil and hydro-mechanical work within dam body will generate localized impacts on physical environment and resource use; pose risk of exposure of workers requiring personal protective equipment (PPE) use.

4. Civil work interfaced with water body pose risk of water pollution and impact on fish fauna.

5. Construction waste and muck from repairs to masonry portion of dam like u/s face treatment, approach road, etc require careful disposal at pre-identified and approved site to minimise the risk of pollution on this count.

6. Rehabilitation work would require labour to work on various sections of dam involving working at height, working in confined spaces, working on reservoir side, etc; Further, workers will also be exposed to dust and noise and will have to handle chemicals/gases for some of the works; these will lead to occupational health and safety risks.

Social Risk and impacts

1. As the interventions are within the dam premises and on the dam structure, there shall be no adverse impacts on land and assets due to any sub-component or sub-activities
2. The dam is not located in the Schedule V area. Though are Scheduled Tribes households in the vicinity, these are mainstreamed into the overall society and do not meet the characteristics outlined in ESS 7. There will be no physical interventions.
3. Influx of migrant labour will be low as these works require only few but very skilled labour Also these workers will mostly operate from labour camps within the dam premises/proximity and hence there would be minimal interface with communities and therefore significantly lower SEAH/GBV risks.
4. Waste generation from labour colony can pollute drinking water sources of community; risk is low and can be mitigated by providing adequate sanitation facilities.
5. No impacts are envisaged on cultural heritage as works shall not be undertaken in their vicinity or result in any impact.

6. Labour related risk would include:
   - Safety issues while at work like injuries/accidents/ fatalities leading to even death, while at work; Occupational health and safety risks due to exposure of workers to unsafe conditions while working at heights, working using lifts, handling of equipment and machinery, exposure to air and noise pollution etc. will be addressed through OHS guidelines.
   - Short terms effects due to exposure to dust and noise levels, while at work
   - Long term effects on life due to exposure to chemical /hazardous wastes
   - Inadequate accommodation facilities at work force camp, including inadequate sanitation and health facilities
   - Sexual harassment at work
   - Absence or inadequate or inaccessible emergency response system for rescue of labour/workforce in situations of natural calamities.
   - Health risks of labour relating to HIV/AIDS and other sexually transmitted diseases
   - Non-payment of wages
   - Discrimination in Employment (e.g. abrupt termination of the employment, working conditions, wages or benefits etc.)
   - Unclear terms and conditions of employment
   - Discrimination and denial of equal opportunity in hiring and promotions/incentives/training opportunities
   - Denial for workers' rights to form worker's organizations, etc.
   - Absence of a grievance mechanism for labour to seek redressal of their grievances/issues.

Chapter 5 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

5.1.1 Risk Classification

As per the ESDD exercise, risk/impacts that have been identified relate to Water Quality, Physical Environment, labour, protected area and SEAH/GBV. The summarised environmental and social risks of identified activities with level of risk is presented in previous chapter. Environment risks of air, water, noise, land use, soil and resource use for special repairs to masonry portion of dam like u/s face treatment are Moderate. Similarly, environment and social risk of transportation of material, labour camp and disposal of debris has been identified as moderate due to location of dam within the protected area. Risk of all other activities has been identified as Low. These risks are low to moderate and localised, short term and temporary in nature which can be managed with generic ESMP and guidelines.

Hence the overall risk of this sub-project Dam is categorized as Moderate. OHS is a substantial risk activity and is being treated separately through OHS plan in accordance with WB ESHS guidelines.

5.1.2 National Legislation and WB ESS Applicability Screening

The applicability analysis of GOI legal and regulatory framework indicates that while, there are various legislation which will have to be followed by the contractor for the protection of environment, occupational health and safety of workers and protection of workers and employment terms. None of Indian legislation is applicable warranting obtaining clearance prior to start of construction/improvement work.

In addition to overarching ESS1, four ESS standards are found relevant to this sub-project as per reasons given in **Table 5.1** below:

Table 5.1: WB ESF Standards applicable to the sub-project

Relevant ESS	Reasons for Applicability of the standard
ESS1: Assessment and Management of Environmental and Social Risks and Impact.	Due to engagement of Direct worker, Contracted workers and Community workers (likely for EAP and other non-structural interventions) for rehabilitation work.
ESS2: Labour and Working Conditions	Due to engagement of Direct worker, Contracted workers and Community workers (likely for EAP and other non-structural interventions) for rehabilitation work
ESS3: Resource Efficiency, Pollution	Civil and hydro-mechanical work including

Prevention and Management	resource consumption; requiring protection of physical environment and conservation of resources
ESS 4: Community Health and Safety	Rehabilitation work, although limited to dam complex, can increase community exposure to risk and impacts; directly or indirectly.
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural resources	Dam is located within the Muthumalai Tiger Reserve. As no interventions are planned outside the dam, no direct impacts have been identified on natural resources.
Relevant ESS	**Reasons for Applicability of the standard**
	To eliminate risks of indirect impacts due to outside labour and transportation of man and material, Biodiversity Plan will be prepared.
ESS 10: Stakeholder Engagement Plan	For engagement of stakeholders in all structural and non-structural measures e.g. implementation of Early flood Warning system, siren systems, broadcasting facilities, Emergency Action Plan, etc.

5.2 RECOMMENDATIONS

5.2.1 Mitigation and Management of Risks and Impacts

Since risks and impacts are low to moderate category, a ESMP customised to sub-project will be prepared in accordance with the ESMF. It shall cover the following aspects:

a. SPMU shall customise the standard Environmental and Social Management plan (ESMP) that has been provided in the Environmental and Social Management Framework (ESMF) and make it part of bid document for effective adherence by contractors.

b. ESMP will provide due measures for labour management and protection of environment quality and resource conservation (during handling of resources) in line with ESF standard ESS2 and ESS3 respectively. Likewise, due attention will be given to Occupational Health and Safety of workers and community in line with the requirements of ESS4. SPMU/IA will customize the standard ESMP in line with outline provided in the ESMF and ensure its adherence by contractor. The customised ESMP will address the following:

- Labour Management Procedure (ESS2)
- Resource Efficiency and Pollution Prevention (ESS3)
- Community Health and Safety (ESS4)
- Bio-diversity Conservation Plan (ESS6)
- Stakeholders Engagement Plan (ESS10)

c. Contractor shall submit BOQ as per ESMP of the sub project.

Mitigation plans to meet requirements for relevant Standards with responsibility and stages are given in Table 5.2 below:

Table 5.2: List of Mitigation Plans with responsibility and timelines

WB-ESS Triggered	Mitigation Instrument	Responsibility	Timelines
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	Gender Based Violence or SEA/SH related actions	SPMU/IA	Before mobilization of contractor
ESS2: Labour and Working Conditions	Labour Management Procedure (LMP) including OHS management plan.	SPMU/IA	Before mobilization of contractor
WB-ESS Triggered	**Mitigation Instrument**	**Responsibility**	**Timelines**
ESS3: Resource Efficiency, Pollution Prevention and Management	Pollution Prevention and Environment Quality Management Plan (PPEQMP)	SPMU/IA	Before mobilization of contractor
ESS 4: Community Health and Safety	Community Health and Safety Management Plan (CHSMP)	SPMU/IA	Before mobilization of contractor
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural resources	Biodiversity Conservation Plan	SPMU/IA	Before mobilization of contractor
ESS 10: Stakeholder Engagement Plan	Stakeholder Engagement Plan	SPMU/IA	By negotiation

ESDD and ESMP will be placed on the www.damsafety.in website as well as other accessible locations such as the office of Engineer in Charge at Dam site as well at SPMU for reference and record. These documents would be disclosed/disseminated through other appropriate means like project meetings, workshops etc. Each IA will translate these documents in their local language, if required, and will upload in their respective websites and also make available at other accessible locations.

5.2.2 Institutional Management, Monitoring and Reporting

ESMP will be customized for the sub project by SPMU/IA from standard ESMP included in ESMF and shall be shared with CWC by SPMU for their review/endorsement and approval before including in the bid document.

SPMU/IA will designate Nodal Officer(s) to coordinate and supervise E&S activities. They shall be at the level of Executive Engineers and shall provide commensurate time to comply with E&S related

activities. Brief TORs for these Nodal E&S officers is included in ESMF. Since, in-house expertise not available SPMU may hire the qualified staffs on need basis to support management of E&S risks including Environmental and Social Experts for ensuring compliance with the Bank's ESF and ESS's and ensuring that these activities shall be implemented as per the procedures.

SPMU/IA shall advise contractors about applicable legislative requirements and ensure that contractors prepare its own ESMP (C-ESMP) as outlined in ESMP for this sub-project and submit compliance reports to SPMU/IA on quarterly basis. SPMUs will share regular implementation status of ESMPs to CWC and The World Bank in line with ESMF on quarterly basis.

SPMU/IA shall establish and operationalize a grievance mechanism to receive and facilitate resolution of complaints and grievances, from the communities and other stakeholders including implementation partners. GRM works within existing legal and cultural frameworks and shall comprise project level and respective State level redressal mechanisms. Most Project related grievances could be minor and site-specific.

EMC (Engineering and Management Consultant) for the project will have sufficient staff with skills on Environment and Social aspects. Awareness raising and capacity building on the new Environmental and Social Framework (ESF) need to be carried out for the environment and social staff engaged and this will be an area of continued focus, with a view to generate awareness at to dam level. EMC will develop formats for regular supervision and monitoring on E&S issues and undertake site visits/ inspections of the dam sites to monitor for compliance; collate and review QPRs and set up a monitoring and reporting system on E&S issues.

Overall, the proposed activities within this dam sub-project have low to moderate risks resulting in the overall sub-project to be categorized as Moderate risk category. These risks and impacts can be effectively mitigated with effective implementation of mitigation plans by SPMU/IA, Contractors and monitoring by EMC, SPMU and CWC.

Annexure - I: Form SF1

Sl. No	Project Component	Applicable (A), Not Applicable (NA)	Environment and Social Risk Associated with in dam area (DI), Beyond Dam Area (DE)	Likely Nature of Risk/Impact Water Quality (WQ), Fisheries(F), Conservation area(CA), Protected Area (PA), Ecological (E), Occupational Health (OH), Physical Environment (PE), Cultural (C), Tribal presence (T), impact on private land/assets/encroachers/squatters (LA), Labour (L), GBV risks (G), (Write whichever is applicable)
1	**2**	**3**	**4**	**5**
A	**Nature of Project Component Related**			
1	Reservoir De silting	**A**	**DI**	**WQ, F, OH, PE, L, G**
2	Major structural changes – Spillway construction (Improving ability to withstand higher floods including additional flood handling facilities as needed.)	**NA**		
3	Structural strengthening of dams to withstand higher earthquake loads	**NA**		
4	Structural Improvement/Repair work-upstream of Dam site (interfacing dam reservoir) (like Repairs to revetment/rip-rap in u/s face)	**A**	**DI**	**WQ, F, OH, PE, L, G**
5	Structural Improvement/Repair work -Downstream of Dam site (with no interfacing with dam reservoir) (like energy dissipating arrangement etc.)	**NA**		
6	Remodelling earth dams to safe, stable cross sections	**A**	**DI**	**WQ, F, OH, PE, L, G**
7	Hydro-mechanical/electrical activities with interface with dam reservoir	**A**	**DI**	**OH, WQ, L, G**
8	Hydro-mechanical/ electrical activities Downstream of Dam site (with no interfacing with dam reservoir)	**NA**		
9	Instrumentation, General lighting and SCADA systems	**A**	**DI**	**OH, L**
10	Basic Facilities (like access road improvement, renovation of office, etc)	**A**	**DI**	**OH, PE, L, G**
11	Utility installation like standby generator, or setting up solar power systems	**NA**		
12	Painting Work	**A**	**DI**	**WQ, OH, L**
13	Water recreation activities	**NA**		
14	Tourism Development	**NA**		
15	Solar power/floating solar	**NA**		
16	List any other component not listed above			
i	Jungle clearance	**A**	**DI**	**E, L, G**

Sl. No	Project Component	Applicable (A), Not Applicable (NA)	Environment and Social Risk Associated with in dam area (DI), Beyond Dam Area (DE)	Likely Nature of Risk/Impact Water Quality (WQ), Fisheries(F), Conservation area(CA), Protected Area (PA), Ecological (E), Occupational Health (OH), Physical Environment (PE), Cultural (C), Tribal presence (T), impact on private land/assets/encroachers/squatters (LA), Labour (L), GBV risks (G), (Write whichever is applicable)
1	2	3	4	5
B	**Pre-construction and construction stage major auxiliary or preparatory intervention**			
1	Acquisition of forest land involved	**NA**		
2	Taking of private land (including physical or economic displacement, impact on livelihood; temporary loss of business)	**NA**		
3	Major Borrow materials requirement involved	**NA**		
4	Major Quarry materials requirement involved	**NA**		
5	Blasting involved	**NA**		
6	Resettlement and Rehabilitation	**NA**		
7	Types of project workers (Direct, Contracted, Community Workers (or Volunteers i.e. for EAP implementation)	**A**	**DE**	**L, G**
8	Labour Camp involved (location within dam premises or outside)	**A**	**DE**	**WQ, PE, L, G**
9	Migrant labour likely to be involved	**A**	**DE**	**L, G**
10	Heavy machinery to be deployed and related maintenance workshop set up involved	**A**	**DI**	**OH, PE, L, G**
11	Hot mix plant Requirement	**NA**		
12	Concrete mixture and heavy pumps to be deployed	**A**	**DI**	**OH, PE, L, G**
13	Temporary land acquisition involved	**NA**		
14	Temporary disruption to access, livelihoods	**NA**		
15	Tree felling/ vegetation clearance involved	**NA**		
16	Haulage of machinery involved	**A**	**DI**	**OH, PE, L, G**
17	Major Debris Disposal involved	**A**	**DE**	**PE, L, G**
18	Major Transport of materials involved	**A**	**DE**	**PE, L, G**
19	Utility shifting involved	**NA**		
20	Discharge of reservoir water (lowering of reservoir water involved)	**A**	**DI**	**WQ, F, OH, PE, L, G**
21	**List any other not listed above**			

Annexure – II: Form SF2

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity (s per SC-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment /social	Risk/Impact intensity for each type of risk/impact Low (L), Moderate (M), Substantial (S), High (H)
1	**2**	**3**	**4**	**5**
A	**Project Component Related**			
1.	**Structural Strengthening/Improvement/Repair work - upstream of Dam site**			
a	Repairs to revetment/rip-rap in u/s face	**WQ, F, OH, PE, L, G**	Air pollution, noise pollution, risk of reservoir water contamination and impact on fishes, generation of construction debris, Occupational health and safety risk due to working on upstream face of dam, labour and GBV risk	**L**
b	Special repairs to masonry portion of dam • To rectify the existing crack on the concrete Dam near intake both sides.	**WQ, OH, PE, L, G**	Air pollution, noise pollution, water pollution, Occupational health and safety risk, labour and GBV risk	**L**
	Jungle clearance	**E, L, G**	Impact on ecology, labour and GBV risk	**L**
2.	**Structural Improvement/Repair work -Downstream of Dam site (with no interfacing with dam reservoir) (like repair of parapet walls, damage spillway crest, downstream training walls, etc.)**			
a	Energy dissipation arrangement	-	-	-
b	Colour washing & Painting	**WQ, PE, L, G**	water pollution, hazardous waste, Labour and GBV risk	**L**
c	Special repairs to • Approach road to dam, Camp	**OH, PE, L, G**	Air pollution, noise pollution, construction	**S**

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity (s per SC-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment /social	Risk/Impact intensity for each type of risk/impact Low (L), Moderate (M), Substantial (S), High (H)
1	2	3	4	5
			debris, Occupational health and safety risk	
d	Special repairs/constructions/improvements to buildings including electrification and fencing • Renovation of existing damaged Quarters, Police guard room and Dam maintenance office.	**OH, PE, L, G**	Air pollution, noise pollution, construction debris, Occupational health and safety risk	**L**
e	Painting gates	**OH, PE, L, G**	water pollution, hazardous waste, Labour and GBV risk	**L**
3.	**Hydro-mechanical/Electrical activities Downstream of Dam site (with no interfacing with dam reservoir)**			
a	Supply and erection of entrance gate and Gauge plate	**PE, L, G**	waste generation from removed parts, Labour& GBV risk	**L**
	Repairs to shutters • Repairs/replacement of shutters with seals • Repair/renewal of hoisting arrangements	**PE, L, G**	waste generation from removed parts, Labour & GBV risk	**L**
4.	**Instrumentation, General lighting and SCADA systems**			
a	Providing electrification to dams • lights on the top of the dam, gallery, approach road • Dam Electrification	**OH, PE, L, G**	Occupational health and safety risk due to electrical work, waste generation from removed parts and packing material, labour and GBV risk	**S**
B.	**Pre-construction and construction stage major auxiliary or preparatory intervention**			
1	Types of project workers (Direct, Contracted, Community Workers (or Volunteers i.e. for EAP implementation)	**L, G**	GBV risk due to involvement of workers and local population	**L**
2	Labour Camp involved (location within dam premises or outside)	**WQ, PE, L, G**	Wastewater generation from domestic activities, waste	**L**

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity (s per SC-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment /social	Risk/Impact intensity for each type of risk/impact Low (L), Moderate (M), Substantial (S), High (H)
1	2	3	4	5
			generation, GBV risk within labour and involving community.	
3	Migrant labour likely to be involved	**L, G**	Migrant labour having low degree of interface with community	**L**
4	Likely interface of Workers with communities	**L, G**	Risk of GBV due to labour interaction with community	**L**
5	Heavy machinery to be deployed and related maintenance workshop set up involved	**OH, PE, L, G**	Heavy machinery will be deployed for structural measures - OH risk due to machine handling, waste, wastewater and air emissions from machines operations, Labour & GBV risk	**L**
6	Concrete mixture and heavy pumps to be deployed	**OH, PE, L, G**	Concrete mixture and pumps will be deployed for road repair and other civil works and de-watering - OH risk due to machine handling, waste generation, wastewater and air emissions from operations, Labour &GBV risk	**L**
7	Haulage of machinery involved	**OH, PE, L, G**	Machines will be hauled from different location and brought to site; OHS risk during loading/unloading and air and noise pollution during transportation,	**L**

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity (s per SC-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment /social	Risk/Impact intensity for each type of risk/impact Low (L), Moderate (M), Substantial (S), High (H)
1	2	3	4	5
			labour and GBV risk	
8	Debris/Silt Disposal involved	**OH, PE, L, G**	Debris will be generated from various activities - OH risk during debris handling, air and noise emissions from debris handling and transportation, water pollution risk due to debris finding its way to water body, and GBV risk due to labour involvement	**L**
9	Major Transport of materials involved	**OH, PE, L, G**	Material will be transported from various vendors and suppliers to site for civil, hydro-mechanical work and instrumentation - OH risk during material handling, loading and unloading; ,air and noise emissions from transportation, Labour and GBV risk	**L**

Criteria for Risk Evaluation :
Low : Localized, temporary and Negligible
Moderate : temporary, or short term and reversible under control
Substantial : medium term , covering larger impact zone, partially reversible
High : significant , non- reversible, long term and can only be contained/compensated
Occupational Health and safety: it will be treated as Moderate by default as OHS effect can be kept controlled and with negligible effect with adoption of defined guidelines,

Annexure III: Stakeholder's consultation: List of Participants

Sl. No.	Name	Relation with Dam – Staff, contractor, worker, full time/part time, local, NGO….	Mobile Number	Address (at least village name)
1.	P. Vadivelu	Assistant Executive Engineer/ Civil/DRIP/Glenmorgan(A/c).	9445360733	Kundah Upper Camp
2.	S. GopalaKrishnan	Assistant Executive Engineer/ Mechanical, Moyar Power House, Moyar Post, The Nilgiris – 643 222	9445857068.	Moyar Camp
3.	S. Kathirvel,	Senior Time Keeper, Civil Section, D/No.3/2 Moyar Camp, Moyar Post, The Nilgiris – 643 222.	9486456924.	Moyar Camp
4.	D. Santhi	Mason, Civil Section, D/No.3/48 Moyar Camp, Moyar Post, The Nilgiris – 643 222.	9443610799.	Moyar Camp
5.	K. Rajathi	D/No.5/98, Moyar Camp, Moyar Post, The Nilgiris – 643 222.	7598680169.	Moyar Camp
6.	R. Subramani	D/No.2/175 UndiMoyar, Moyar Post, The Nilgiris – 643 222.	9786485983	UndiMoyar
7.	G. Udyakumar	D/No.2/70 UndiMoyar, Moyar Post, The Nilgiris – 643 222.	6382895038	UndiMoyar
8.	G. Nagaraj	UndiMoyar, Moyar Post, The Nilgiris – 643 222.	8940156281	UndiMoyar
5.	J. Nandha Kumar	D/No.3/72, Moyar Camp, Moyar Post, The Nilgiris – 643 222.	7824947784	Moyar Camp
10.	R. Venkadesh,	D/No.3/12A, Selvapa Colony, Moyar Post, The Nilgiris – 643 222.	9751725998	Selvapa Colony
11.	S. Palani Swamy	D/No.3/47, Selvapa Colony, Moyar Post, The Nilgiris – 643 222.	9442790814	Selvapa Colony