

Environmental Monitoring Report

Quarterly Report
July 2016

SRI: Green Power Development and Energy Efficiency Improvement Investment Program (Tranche 1) Moragolla Hydropower Project

Prepared by Ceylon Electricity Board of the Ministry of Power and Renewable Energy for the Asian Development Bank.

This environmental monitoring report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

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Environmental Safeguard Monitoring Report

Reporting Period : April 2016 to June 2016
Date : July 01, 2016
Loan No. : 3147 / 3146 (SF) - SRI

SRI: Green Power Development and Energy Efficiency Improvement Investment Program (Tranche-01) Moragolla Hydropower Project

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ABBREVIATIONS

ADB	Asian Development Bank
APs	Affected Persons
CEB	Ceylon Electricity Board
CEA	Central Environmental Authority
GoSL	Government of Sri Lanka
GRC	Grievance Redress Committee
DS	Divisional Secretariat
DWC	Department of Wild Life Conservation
EARF	Environmental Assessment and Review Framework
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMoP	Environmental Monitoring Plan
EPL	Environmental Protection License
FSL	Full Supply Level
FD	Forest Department
IA	Implementing Agency
IUCN	International Union for Conservation of Nature
IEE	Initial Environmental Examination
LAA	Land Acquisition Act
NEA	National Environment Act
NZG	National Zoological Gardens
MASL	Mahaweli Authority of Sri Lanka
MCM	Million Cubic Meter
MFF	Multi Financing Facility
MHP	Moragolla Hydropower Project
MoPE	Ministry of Power and Renewable Energy
MV	Medium Voltage
MPC	Ministry Procurement Committee
PD	Project Director
PMO	Project Management Office
PMU	Project Management Unit
PPC	Project Procurement Committee
Rsp	Responsibility
SCAPC	Standard Cabinet Appointed Procurement Committee
SPS	Safeguard Policy Statement
TL	Transmission Line

Electrical Terminology

V	Volt	Unit of Voltage
kV	Kilovolt	1000 volts
W	Watt	Unit of active power
kW	Kilowatt	1000 watts
MW	Megawatt	1000kW
MWh	Megawatt hour	Unit of energy
VA	Volt ampere	Unit of apparent power
MVA	Million volt ampere	10 ⁶ VA

Executive Summary

Moragolla Hydropower Project (MHP) is one of several hydropower projects identified by the Government of Sri Lanka (GoSL) to reduce the role of fossil-fuel power generation, which has outstripped hydropower over the past 30 years as readily exploitable locations have been utilized. The Executing Agency of The project is the Ministry of Power and Renewable Energy (MoPE) and the Implementing Agency is the Ceylon Electricity Board (CEB). Financial assistance is given by the Asian Development Bank (ADB) under the Tranch 1 of Green Power Development and Energy Efficiency Improvement Investment Program.

The Project involves construction of a 37m high, 236 m long concrete gravity dam (crest at 550 masl), to create a 38.5ha, 1.98 MCM reservoir with a Full supply Level (FSL) at 548 masl. The concrete spillway contains 5 radial gates (13x15m) designed to pass a 10,000 year flood (6,700m³/s) with no increase in FSL, or with a 2m increase if one gate was non-operational and closed. Water will be diverted by an intake just upstream of the dam, into a 2.7km, 4.7m \varnothing underground headrace tunnel, surge tank and penstock on the left bank, to an above-ground powerhouse and 28m open-channel tailrace outfall, through which water will return to the river. A 500 m transmission line (TL) with two towers will connect the switchyard to an existing 132kV transmission line from Kiribathkumbura to Polpitiya.

The Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) are the main practical tools employed during the project implementation to provide the environmental protection measures. The purpose of the Environmental Management Plan (EMP) is to set out clearly the required mitigation measures and allocate responsibility for each, and to provide additional information to assist in planning and implementing the various activities.

The impacts and mitigation for this project fall into four distinct categories, based on the phase in which the mitigation will be provided and the parties who will take the necessary action. For this reason the EMP as well as EMoP for this project is subdivided into the equivalent four parts. These are as follows:

- a) Construction Phase EMP;
- b) Operation Phase EMP;
- c) Special Issues EMP: Aquatic Ecology;
- d) Special Issues EMP: Terrestrial Ecology.

Since at the moment project is at preconstruction stage, this report mainly addressed relevant environmental issues and their mitigation measures for preconstruction stage of the project as mentioned in the following table and forth coming chapters.

Summary of Environmental compliance during the period of April 01, 2016 to June 30, 2016.

Table No. 1.1 : Summary of Environmental Compliance Status

Environmental Mitigation Measures	Compliance Status
Preventing Poaching	To be commenced
Confirmation of Fish Distributions (Fish Survey)	To be commenced
Catch- and- Haul (Fish Translocation)	To be commenced
Animal Rescue Program	To be commenced
Afforestation/Habitat Enhancement	To be commenced

1.0 Introduction:

1.1 Brief Project Description

Green Power Development and Energy Efficiency Improvement Investment Program is intended to finance a series of investments via Multi-tranche Financing Facility (MFF) of Asian Development Bank (ADB). Tranche-01 consists of several developments projects in Generation, Transmission and Distribution sectors, including Moragolla Hydropower Project.

Moragolla Hydropower Project (MHP) is one of several hydropower projects identified by the Government of Sri Lanka (GoSL) to reduce the role of fossil-fuelled power generation, which has outstripped hydropower over the past 30 years as readily exploitable locations have been utilized. Returning hydropower to greater prominence would promote sustainable development and reduce greenhouse gas emissions in line with the National Climate Change Policy, and limit exposure to fluctuating international fuel prices. The Executing Agency is the Ministry of Power and Renewable Energy (MoPE) and the Implementing Agency is the Ceylon Electricity Board (CEB).

The project will be located in the upper reaches of the Mahaweli Ganga in the Central Highlands of Sri Lanka, approximately 22 km south of Kandy City and 130 km north-east of Colombo.

The project involves construction of a 37 m high, 236 m long concrete gravity dam (crest at 550 masl), to create a 38.5 ha, 1.98 MCM reservoir with a Full Supply Level (FSL) at 548 masl. The concrete spillway contains 5 radial gates (13 x 15 m) designed to pass a 10,000 year flood (6,700 m³/s) with no increase in FSL, or with a 2 m increase if one gate was non-operational and closed. Water will be diverted by an intake just upstream of the dam, into a 2.7 km , 4.7 m Ø underground headrace tunnel, surge tank and penstock on the left bank, to an above-ground powerhouse and 28 m open-channel tailrace outfall, through which water will return to the river. A 500 m transmission line (TL) with two towers will connect the switchyard to the existing 132kV transmission line from Kiribathkumbura to Polpitiya.

MHP is designed as a run-of-river scheme, with an installed capacity of 30.2 MW (2 x 15.1 MW); and it will operate as a “peaking” station, generating power in the daily peak demand period (5-9 pm), and at other times if there is sufficient water (mainly in the monsoon season). The dam includes a pipe to discharge a constant “Environmental Flow” (E-flow) of 1.5 m³/s, which will pass through a micro-hydro plant on the right bank, generating an additional 360 kW.

1.2 Project Progress Status and Implementation Schedule:

A. Progress Status

The updated status of Moragolla Hydropower project from April 2016 to June 2016 is given below in Table 2.1 and Table 2.2 respectively.

Table -2.1: Status of the Main Activities of the Project funded by ADB

Se. No	Work Description	Status
1.0	<p>Lot 1 - Civil Works</p> <p>Part A – Preparatory Works consists of construction of Base camp for the Employer and Engineer, upgrading and construction of irrigation facilities, and construction and improvement of permanent access roads.</p> <p>Part B – Main work consists of construction of a dam, intake, headrace tunnel, surge tank, penstock shaft, power house, tailrace, and switchyard and all related works.</p>	<p>SCAPC approval was granted for Bidding. Bidding delayed due to non-appointment of Consultant, who should review before calling for bids.</p>
2.0	<p>Lot 2 – Mechanical and Electrical Facilities</p> <p>Part A – Hydro Mechanical Facilities consists of dam gates, stop logs, trash racks, steel lining of penstock and all hydro mechanical facilities.</p> <p>Part B – Electro Mechanical Facilities consist of turbine, generators, switchyard equipment, control and protection systems, connection to the existing transmission line, micro hydro power plant and all other electro mechanical facilities.</p>	<p>Bidding document was sent to ADB for review. ADB comments was received. Reply to ADB comments was sent back and ADB comments for IFB was received.</p>
3.0	<p>Lot 3- Consultancy Service</p> <p>Consultancy Supervision Services for the project.</p>	<p>CACPC and ADB approval was received for contract negotiations with the highest ranked firm Ms. Nippon Koei Co. Ltd & Fitchner GmbH & Co. KG. Negotiations were completed. CEB Consultancy staff for Lot 2 work to be appointed. The Contract agreement and the revised TOR being finalized.</p>

Table -2.2: Status of the Preliminary Activities of the Project funded by CEB

Se. No	Work Description	Status
1	Land Acquisition	<p>Udapaltha DS Division - possession of 40 Nos. lots (Out of 45 lots) have been taken over by CEB from DS division. Section 38 – Direction was issued for all lots and balance lots to be taken over. Taking over is delayed due to a land issue with one landowner. Section 5 Direction was received for the all lands.</p> <p>Ganga Ihala Korale DS division – possession of 54 Nos. (Out of 59 lots) have been taken over by CEB from DS division. For balance 05 lots possession to be taken over. Section 5 Direction was received for some sections of lands.</p>
2	Resettlement Land	Possession of the new resettlement land was taken over. Section 5 Direction was received. Survey order was given to the Survey Dept. to prepare preliminary plans.
3	Construction of Resettlement Village	Contract was awarded to Ms. Sierra Construction Co. Ltd. on 21-03-2016. Preliminary design work is on going.
4	Environmental activities	<p>Contract was awarded to Ms. Access Energy (Pvt) Ltd. to obtain the river flow measurement along the Mahaweli river. Flow measurements work were commenced and ongoing.</p> <p>Contract was awarded to Ms. National Aquatic Resources Research & Development Agency to commence fish survey and translocation of Labeo Fisheri along Mahaweli River. A Technical Committee was appointed to oversee the implementation of fish survey and translocation process. First meeting was held, and the second meeting was held with Department of Wild Life on April 2016. Awaiting for approval to commence work.</p>

B. Implementation Schedule for Environmental Activities of Moragolla Hydropower Project

B.1 Aquatic Ecology

Table No. 3.1: Preventing Poaching

Activities	2014	2015	2016	2017	2018	2019	2020	2021
	Pre-construction			Construction			Operation	
Worker dissemination sessions.			X ¹	x	x			
Monitoring (spot checks) of worksites adjacent to the river.				x	x	x	x	x

Table No. 3.2: Confirmation of Fish Distributions (Fish Survey)

Activities	2014	2015	2016	2017	2018	2019	2020	2021
	Pre-construction			Construction			Operation	
Logistics preparation for survey (equipment procurement; maps, boat).		x						
Fish survey.			X ²					
Linkage to fish translocation program.			x					
Fish Survey / Monitoring				x	x	x	x	x

Table No. 3.3: Catch- and- Haul (Fish Translocation)

Activities	2014	2015	2016	2017	2018	2019	2020	2021
	Pre-construction			Construction			Operation	
Review of fish survey data.			x					
Survey and selection of translocation sites.				x				
Undertake catch-and-haul.				x				
Public awareness-raising at target sites to support fish conservation.				x	x			

Note 1: Pre construction activities are delayed due to delay in appointing the Consultancy Service to commence work.

Note 2: Fish survey work is delayed due to delay in some local approvals and approval for Supplementary EIA.

B.2 Terrestrial Ecology

Table No. 3.4: Animal Rescue Program

Activities	2014	2015	2016	2017	2018	2019	2020	2021
	Pre-construction			Construction			Operation	
Animal rescue program.			X ³	x	x			

Table No. 3.5: Afforestation/Habitat Enhancement

Activities	2014	2015	2016	2017	2018	2019	2020	2021
	Pre-construction			Construction			Operation	
Final selection of afforestation sites.			X ³					
Survey and demarcation of planting sites.			X ³					
Final site-specific selection of species.			X ³					
Preparation of detailed afforestation plan.			x					
Preparation of detailed planting maps.			x					
Establishment and maintenance of nurseries.				x	x			
Land preparation for planting.					x			
Supply of planting material.					x			
Afforestation planting.					x			
Post-planting maintenance and management.						x	x	x
Weeding.						x	x	
Fire protection.						x	x	x
Application of fertilizer.					x	x		
Cutting of climbers and creepers.						x	x	x
Pest and diseases control.					x	x	x	x
Vacancy planting.						x		
Monitoring.						x	x	x

Note 3: Pre construction activities are delayed due to delay in some local approvals and approval for Supplementary EIA.

2.0 Compliance to National Regulations:

The relevant applicable Acts and Legislations to the project are given in the Table No. 4.1.

Table No. 4.1: Applicable Acts and Legislations to the project

Act /Rule/Notification	Year	Objectives	Compliance Status
National Environment Act (NEA) No 47 of 1980 as amended by act No 56 of 1988 and act No 53 of 2000	1980 1988 2000	Sri Lanka national basic charter for protection and management of environment.	Being Complied
EIA regulations gazetted under NEA (Government Gazette Extraordinary No.772/72 dated 24 June 1993 and in several subsequent amendments)	1993	Schedule of State agencies as the project approving agencies under NEA.	Being Complied
Environmental Protection License (EPL) regulations gazetted under NEA (Government Gazette Extraordinary No. 1533/16 dated 25 January 2008)	2008	Schedule of activities for which a EPL is required under NEA	Being Complied
Wastewater Discharge Standards-Gazette Notification No. 1534/18 dated 01/02/2008	2008	General standards and criteria for the discharge of industrial effluents into inland surface waters	Being Complied
National Environmental (Noise Control) Regulations 1996 - Gazette Notification no. 924/12 dated 23.05.1996	1996	To regulate and control noise generating sources with the objective of maintaining the standards (Under NEA)	Being Complied
Sri Lanka Electricity Act, No. 20 of 2009	2009	The Act does not explicitly deal with environmental implications of activities related to power generation, transmission and distribution. However, CEB Integrates environment protection as a part of its project activities.	Being Complied
Mines and Minerals Act No. 33 of 1992	1992	Provide for the establishment of the Geological survey and mines Bureau to regulate the exploration for mining,	Being Complied

Act /Rule/Notification	Year	Objectives	Compliance Status
		transportation, processing, trading in or export of minerals.	
Mahaweli Authority of Sri Lanka Act No. 23 of 1979	1979	To plan and implement the Mahaweli Ganga Development Scheme including the construction and operation of reservoirs, irrigation distribution system and installations for the generation and supply of electrical energy.	Being Complied
Soil Conservation Act No. 25 of 1951 and No. 29 of 1953 and amended by Act No. 24 of 1996	1951 1953 1996	To make provision for the enhancement and substance of productive capacity of the Soil; to restore degraded land for the prevention and mitigation of soil erosion; for the Conservation of soil resources and protection of land against damage by floods, salinity, alkalinity water clogging, and to provide for matters connected therewith or incidental thereto.	Being Complied
Irrigation Ordinance No. 32 of 1946, Act No.1 of 1951 and No. 48 of 1968, Law No. 37 of 1973	1946 1951 1968 1973	Construction and Maintenance of Irrigation Works , Protection of Irrigation Works and Conservation of Water	Being Complied
Fauna and Flora Protection Ordinance as amended by Act No. 49 of 1993 and subsequent amends.	1993	To provide for the protection, conservation and preservation of the fauna and flora of Sri Lanka	Being Complied
The Antiquities Ordinance, No.9 of 1940 (now Act) and the subsequent amendments, particularly the Antiquities (Amendment) Act No. 24 of 1998 is the primary Act.	1940 1998	This Ordinance provides for the preservation of the antiquities of Sri Lanka	Being Complied

Act /Rule/Notification	Year	Objectives	Compliance Status
The Urban Development Authority Act No. 41 of 1978	1948	Minister in-charge of the subject of Urban Development declares the areas suitable for development.	Being Complied

3.0 Compliance to Environmental Covenants from the ADB Loan Agreement:

The Table 5.1 shows the applicable Environmental Covenants from the ADB Loan Agreement.

TableNo.5.1: Environmental Covenants

Product	Schedule	Para No.	Description	Remarks
Loan 3146-SRI	5	5	The Borrower and CEB shall ensure that the preparation, design, construction, implementation, operation and decommissioning of the project and all project facilities comply with (a) all applicable laws and regulations of the Borrower relating to environment, health, and safety; (b) the Environmental safeguards; (c) the EARF; and (d) all measures and requirements set forth in a respective IEE or EIA and EMP, and any corrective or preventive actions set forth in a Safeguards Monitoring Report.	<p>It is being compiled as per ADB Safeguard Policy Statement (SPS) (2009) as set out in the EARF.</p> <p>EMP is being implemented in accordance with applicable laws and regulations of GOSL and ADB guide lines.</p> <p>Further an Environmental Management Office of the MHP will carry out the regular environmental monitoring as set out in the EMP.</p> <p>The Environmental Monitoring actions has been planned and will be carried out in all three phases of preconstruction, during construction, and post construction phase.</p>
Loan 3146-SRI	5	6	By 2015, CEB shall undertake, to the satisfaction of ADB, (a) dry and wet season fisheries surveys for the endangered Green Labeo fish on the stretch of Mahaweli River from around the site of the Moragolla Hydropower plant tailrace and the confluence with the Atabage Oya to appropriate point downstream on the Mahaweli river and (b) collect hourly, daily and monthly flow data on the Mahaweli river downstream of the Moragolla Hydropower Plant tailrace and the confluence with the Atabage Oya over the period of January 2015 to December to identify the minimum required downstream environmental river flows during the dry and wet seasons to satisfy the critical habitat requirements of the safeguard Policy Statement. CEB shall ensure that such minimum required downstream environmental river flows are maintained following completion of the Moragolla Hydropower plant to avoid	<p>Being complied.</p> <p>Contract was awarded to Ms. National Aquatic Resources Research & Development Agency to commence fish survey and translocation of Labeo Fisheri along Mahaweli River. A Technical Committee was appointed to oversee the implementation of fish survey and translocation process. First meeting was held, and the second meeting was held with Department of Wild Life on April 2016. Awaiting for approval to commence work.</p> <p>Contract was awarded to Ms. Access Energy (Pvt) Ltd to obtain river flow measurements along Mahaweli River. Mahaweli Authority approval was received for a location to carry out the flow measurements. Flow measurements were commenced and ongoing.</p>

Product	Schedule	Para No.	Description	Remarks
			any measurable adverse impacts on the habitat of the endangered Green Labeo fish.	
Loan 3146-SRI	5	7	CEB shall enter into an agreement with Mahaweli Authority, acceptable to ADB, which shall, <i>inter alia</i> , set out(a) to the extent possible, the minimum hourly, daily and monthly environmental river flows downstream of the Moragolla Hydropower Plant tailrace during the dry and wet seasons; and (b) a regulatory mechanism for the coordinated operation of the Moragolla Hydropower Plant following its construction and the existing Kotmale hydropower plant to ensure that, at all times, adequate downstream flows are released to avoid any measureable adverse impacts on the Labeo fishery and maintain the population of the endangered Green Labeo fish inhabiting the Mahaweli River downstream of the tail race of the proposed Moragolla Hydropower Plant and the confluence of the Atabage Oya with the Mahaweli River.	To be carried out A project modification report was submitted to the project approving authority for approvals due to some changes in EIA. A Supplementary Environmental Impact Assessment report is prepared and submitted for approvals. Once this is approved the agreement between CEB and Mahaweli Authority is expected to be reached.
Loan 3146-SRI	5	8	Within 180 days of the effective date CEB shall established an Environment Management office, acceptable to ADB, which shall be responsible for (a) the environmental monitoring of construction activities of the Moragolla Hydropower plant; and (b) implementation of the relevant EMP for the Moragolla Hydropower plant including monitoring of the Green Labeo fishery and downstream minimum environmental river flows during operations of the Moragolla Hydropower plant.	Complied. Environment Management Office was established in June 2015 with one Engineer and Supervisor to take care the Resettlement, Environmental and Social issues. Environmental Officer is also recruited to oversee the environmental issues. Other necessary staff is to be recruited with the approval of CEB management.

4.0 Compliance to Environmental Management Plan:

The Environmental impacts and mitigation for this project fall into four distinct categories, based on the phase in which the mitigation will be provided and the parties who will take the necessary action. For this reason the EMP for this project has subdivided into the equivalent four parts. These are as follows:

1. Construction Phase EMP
2. Operation Phase EMP
3. Special Issues EMP: Aquatic Ecology
4. Special Issues EMP: Terrestrial Ecology

Since this project is in pre-construction stage, special issues of EMP; Aquatic Ecology and Terrestrial Ecology and relevant environmental issues and their mitigation measures for pre-construction stage of the Project are being carried out and addressed in this report.

Based on the Environmental Management Plan the Compliance Status on Environmental Issues in Moragolla Hydropower Project for pre-construction stage is presented in Table No.6.1. It is to be noted that since no physical pre-construction work has yet being commenced, some activities related to Environmental issues has commenced and some are yet to be implemented.

Table No.6.1: Compliance Status on Pre-Construction Environmental Issues of Moragolla Hydropower Project

Project Activity	Environmental Issues	Management/ Mitigation Measures	Responsibility					Compliance Status/Remarks
			Planning	Implementation	Monitoring	Supervision	Review Agency	
Fish Poaching by Project workers	Adverse impacts on <i>local fish</i> population	Preventing fish Poaching Dissemination session for all project workers and Monitoring (spot checks) of work sites adjacent to the river	CEB	CEB	CEB	CEB	CEB	To be implemented as per the EMP
Blasting and Excavation	Adverse impacts on <i>Labeo fisheri</i> distribution in the Mahaweli Ganga Section near project	Confirmation of Fish Distributions (Fish Survey) Fish survey of all the pools above and below the dam site	CEB	CEB/Consultant	CEB	CEB	CEB	Being implemented as per the EMP
	Adverse impacts on <i>local fish</i> population	Catch-and- Haul (Fish Translocation)	CEB	CEB/Consultant	CEB/FD/D WC/NZG/	CEB/FD/DW C/NZG/	CEB/FD/ DWC/NZ G	To be implemented as per the EMP
Site Clearance and Inundation	Adverse impacts on animals at project site	Animal Rescue Program Vulnerable animals will be captured and moved to adjacent habitat, if possible or allowed to move away from the land clearing work sites.	CEB	CEB/Consultant	CEB/ Consultant	CEB/IUCN/C EA	CEB/IUC N/CEA	To be implemented as per the EMP
	Losing habitats of wildlife due to land clearing and inundation	Afforestation/Habitat Enhancement Enhancing habitat for wild life to compensate lost habitats by afforestation of 100m buffer strip around the reservoir	CEB	CEB/Consultant	CEB/ Consultant	FD	CEB/FD	To be implemented as per the EMP

5.0 Safeguards Monitoring Results and Unanticipated Impacts:

Environmental Monitoring Schedule

The individual environmental monitoring measures are identified in the EIA/Main Report and in the EMP and relate primarily to those activities in which there are measurable environmental emissions (eg air quality, water quality, noise, etc). These activities are drawn together in the Environmental Monitoring Plan (EMoP), which describes in detail the purpose of each monitoring activity and the methodology to be employed (including the approach, parameters to be measured, survey locations, frequency, and other information). It also recommends thresholds that will signal the need for corrective actions.

EMoP for this project is divided into four parts, equivalent to the different parts of the EMP such as construction phase, Operation Phase, Special Issues; Aquatic Ecology and Special Issues; Terrestrial ecology. Construction phase shows that some quite extensive monitoring is required in relation to the three main fields in which there is the most risk of impacts from the construction work (water quality, air quality and noise and vibration). This involves monitoring at and around all of the main construction sites and several of the ancillary sites (quarry, disposal sites and main transportation route), and before construction begins (baseline) and regularly throughout the construction period. This monitoring is assigned to the contractor to raise awareness of the environmental risks and impacts associated with the construction work and the way they need to be mitigated.

The remainder of this EMoP involves: small-scale monitoring to confirm the requisite E-flow is provided during reservoir impoundment; regular monitoring of water levels in domestic wells during tunnel construction; and checking the structural condition of buildings that may be at risk of structural damage throughout the construction period. These activities are assigned to CEB because they involve contact with the public regarding some quite sensitive issues, and because provision of a continuous E-flow is one of the main conditions of the Environmental Approval for the project, granted by MASL. CEB will probably appoint specialized consultants and contractors to conduct this work, but it is important that the responsibility for the monitoring and any resulting remedial action remains with CEB as the Project Proponent.

The operation stage of the project is not expected to have major environmental impacts during this stage, so there is no need for extensive environmental monitoring. Monitoring in relation to the hydrological changes downstream of the tailrace only requires simple checks, because if CEB mitigates these impacts by operating the Moragolla and Kotmale stations out-of-phase in the dry season it is very unlikely that there will be noticeable changes in flow when one station begins to operate.

EMoP for the Special Issues on Aquatic ecology and Terrestrial Ecology is shown in Table No. 7.1. Since the project is at pre-construction stage, relevant activities in this table are planned to be carried out.

Table No. 7.1: Environmental Monitoring Plan for the Moragolla Hydropower Project: Special Issues

Impact	Mitigation	Monitoring	Parameters	Method	Rsp	Frequency	Location
<p>1. Aquatic Ecology: The project area supports 8 nationally threatened fish species, including <i>Labeo fisheri</i>, which is of high conservation priority. These species may be affected by disturbance, poaching, turbidity, blasting, etc</p>	<p>Special measures to protect the rare fish include catch and haul (translocation) to the nearby Kelani River; and cutting channels in the river bed downstream of the dam to improve connections between pools in dry season</p>	<p>Catch and haul requires a prior survey to determine the presence and distribution of <i>L. fisheri</i> and other large species; and this should then be repeated during MHPP operation to assess changes in the populations</p>	<p><u>Monitor:</u> Locations of river bed pools above and below the dam site; fish species present, their distributions and approximate numbers in pools in the river bed; locations of pools</p>	<p>Use an inflatable raft and portable electronic fish finder to determine depth of riverbed, numbers and depth of fish, & locations (GPS coordinates). Use small mesh nets to catch fish samples for species identification; release the captured specimens upstream or downstream</p>	CEB	<p>Two surveys: one pre-construction and one after one year of MHPP operation</p>	<p>In all major pools in the river bed, at the sites of the reservoir and dam, down to Atabage Oya.</p>
		<p>The translocation area in Kelani River should then be surveyed annually for the first four years after translocation to monitor survival and population expansion</p>	<p><u>Monitor:</u> Fish species present and their distributions. Estimate population densities and record other features, such as breeding status</p>	<p>Use similar netting techniques to capture samples of fish in the translocation area</p>		<p>Five surveys: one baseline before translocation and then annually post-translocation</p>	<p>Kelani River, over around 5 km upstream and downstream</p>
<p>2. Terrestrial Ecology: The project will remove >900 trees, none of which are endangered. Terrestrial fauna includes 41 endemic or endangered species of which 5 are high priority. These are not at risk from the project but their habitat will be enhanced</p>	<p>CEB will reforest a 100 m buffer around the reservoir to reduce soil erosion and planting will incorporate measures to provide habitat for the 5 priority faunal species</p>	<p>The planted area will need to be regularly monitored so that dead seedlings can be replaced and other remedial action (weed removal, disease treatment, etc) planned and implemented as necessary</p>	<p><u>Monitor:</u> seedling deaths, indications and presence of pests and disease, invasive species, human encroachment, farming and other unauthorized activities</p>	<p>Conduct walkover surveys of features that can be recognised visually (seedling survival, encroachment) and smaller scale investigations of other aspects (pests, disease). Record locations on maps to plan remediation</p>	CEB	<p>Surveys every 3 months for the first year, then every six months for the next four years</p>	<p>Cover the whole planted buffer zone</p>
	<p>When the MHPP is operating the main mitigation will be to protect the reservoir catchment from human impacts by implementing a Watershed Management Plan to improve vegetative cover, stabilise soil and enhance faunal habitat</p>	<p>Once the WMP is underway there will need to be regular monitoring of the key expected improvements in order to record progress and plan refocusing if needed</p>	<p><u>Monitor:</u> the key parameters in which improvements are needed: soil conservation, vegetation cover and the presence of the key faunal species (reservoir and river water quality will also be monitored as described above)</p>	<p>Monitoring methodologies will be developed in detail during the planning stage for the WMP</p>		<p>Surveys every six months, plus shorter-term records of aspects like faunal sightings when appropriate</p>	<p>The overall WMP area, and in particular those locations targeted for specific activities</p>

6.0 Implementation of Grievance Redress Mechanism and Complaints Received from Stakeholders

Construction activities of hydropower projects, especially where Involuntary Resettlement is involved, might give rise to grievances among Affected Persons (APs), however much the potential sources of conflict have been addressed in Environmental Management Plans and Resettlement Plans and Policies. Grievances may be related to social issues such as eligibility criteria and entitlements, location of resettlement sites, quality of services at those sites, allocation of houses, livelihoods and social and cultural issues, etc. Grievances may also be related to environmental issues such as dust generated due to clearing and grubbing works, vibration and damages to structures, noise, traffic congestion, decrease in water level and water pollution in private and public wells due to blasting and tunneling, damage to tea plantations and agricultural lands, etc.

Social grievances occur mostly at the time of implementation of the Resettlement Action Plan; and complaints on environmental issues and public nuisances generally occur during the construction period. Both types of grievances are different in nature. However, it is imperative to have a mechanism in place to examine each and find solutions in a transparent manner, to demonstrate to the people that their grievances are examined carefully.

The Moragolla Hydropower Project, in keeping with the ADB and national safeguard policies, has set up a Grievance Redress Committee (GRC), which will function as an independent body to find solutions to grievances and disputes among the affected and concerned parties.

The tentative nominations for the GRC was received by the PMO and formal setting up of the committee was done. Formation of the GRC was notified to the general public by publication of a notice in national newspapers in three languages ie., Sinhala, Tamil and English. The local community was also informed about the grievance handling procedures of the project through Grama Niladharis¹ of the area and displaying notices at important public places within the Divisional Secretariat Divisions of Udapalatha and Ganga Ihala Korale.

With the resignation of the Chairman to the committee a new Chairman was appointed. Hence the following members to the GRC was appointed. Mr. J C Ranepura - Additional District Secretary (Lands) of the Kandy District will function as the Chairperson of the GRC. Ven. Bowala Wimaladhamma and P G Wijethunga from Udapalatha DS Division and Ven. Mawathure Chandima and K M A Illangakoon from Ganga Ihala Korale DS Division will represent the Members from the Affected Persons (AP). Mr. H M C D Herath - Civil Engineer of the PMO, nominated by the Project Director of the MHPP will serve as the Secretary to the GRC. An honorarium will be paid to the members of the GRC; the required funds for operation of the GRC will be borne by CEB.

The first meeting of the GRC was held on January 04, 2016. Next meeting is scheduled to held on early July, with the appointment of new Chairman to discuss the scope and the Terms of Reference of the GRC, in detail and it was proposed to call for a stakeholder meeting with the PAP's to aware among themselves and to discuss their issues.

¹ Grama Niladhari (Village leader) is a Sri Lankan public official appointed by the central government to carryout administrative duties in a Grama Niladhari division, which is a sub unit of a Divisional Secretariat. The duties of a Grama Niladhari include the reporting of issuing of permits, gathering statistics, maintaining the voter registry and keeping the peace by settlement of personal disputes. They are responsible for keeping track of any criminal activity in their area and issuing character certificates on behalf of residents when requested.

During this reporting period, only effective social activity in progress is the land acquisition process, and some requests and grievances have been received to PMU. Some issues were sorted and others need some further actions for a formal solution. Detail list of grievances/complaints referred during the reporting period is given below.

Table No. 8.1: List of grievances/complaints received for Moragolla Hydropower Project

Person who raised the grievance	Address	Date of complaint / grievance	Brief description of the grievance/complaint	Brief description of solution given	Remarks
S Kariyawasum	889/1, Samanala, Bangalawa Road, Athgala, Gampola	2015 – 09 - 01	Fear of scarcity of water due to impact to the water table by drilling the tunnel	During the EIA study the rock condition is assessed along the tunnel trace. A proposal was received from the Water Board for possible solutions if any adverse effect occur, and it's being reviewed	
T C Fernando	95/10, Mahalwarawa, Pannipitiya	2016 – 06 – 17	Proposed acquired land has a natural water source. Object to release the land area having the natural water source, in order to use for future agricultural purposes.	Being investigated for possibility to release the land with natural water source.	
Dickson J Perera	261/15, Gal Vihara Road, Dehiwela	2016 – 03 – 29	Object to release the land for Project purposes since this is the only land he has for living.		Described in detail at Social Safeguard Monitoring report
P M Samson Fernando	Kekulanda watta, Yatipiyangala, Galatha	2016 – 03 – 15	Error in boundary points of his land when doing the surveying of adjacent land.		Described in detail at Social Safeguard Monitoring report
S Kariyawasum	889/1, Samanala, Bangalawa Road, Athgala, Gampola	2016 – 03 – 09	Requested to arrange an awareness program of the project and grievance committee for the affected people.	Arranged with the next GRC meeting.	

7.0 Special Environmental Programs

World's Environmental day (WED) is celebrated every year on 5th of June to raise global awareness to take positive environmental action to protect nature and the planet earth. This year's theme is 'Fight against the illegal trade in wildlife'.

Moragolla Hydropower Project conducted an Art Competition and a replanting program at 'Ulapane Maha Vidyalaya' which has been identified as an upper catchment area school to mark the World Environment Day.

The title of the art competition was 'ENVIRONMENTALLY FRIENDLY SUSTAINABLE DEVELOPMENT'.

The competition was organized among two age groups; junior level (grade-5 to grade 8) and senior level (grade 9 to grade 12). The art competition was held in July 04, 2016 at the school premises under the guidance of the school art teacher.



Fig 01: Children participating in the art competition

Each student draw their paintings at school from 11.30am to 1.30pm and finally all these paintings were collected by the school art teacher. There were 230 paintings drawn by the school children.

The winners were selected on June 06, 2016 by a distinguish selection panel, which includes three Art Instructors at Zonal Education office and two CEB members at Moragolla Hydropower Project.



Fig 02: Art selection panel selecting the winners

The winning paintings were of high standards and the awards giving ceremony was held on June 08, 2016 at the school premises with the participation of Project officials and other distinguish invitees.



Fig 03: Awards giving ceremony



Fig 04: First and second place winning drawings in the junior level age group



Fig 05: First and second place winning drawings in the senior level age group

To mark this ceremony a tree planting campaign was conducted at the school premises and 1000 tree plants were distributed among school children. The progress of the tree planting activity will be monitored by the Environmental Unit of the PMU.



Fig 06: Tree planting activity conducted at the school premises



Fig 07: Distribution of tree plants among school children

8.0 Conclusion and Recommendations

EMP provides the framework for implementing the environmental mitigation, enhancement and compensation. It is in four parts, comprising EMPs for construction and operation phases, and EMPs for the two special issues (aquatic and terrestrial ecology) where mitigation is more complex and requires action in all phases. Each part deals with specific environmental issues, in turn, summarizes the potential impacts and mitigation to be applied, and assigns responsibility for each action.

At present, the Project is in pre-construction stage due to some unavoidable reasons. In this stage, special consideration has to be given for the conservation of *Labeo fisheri* in which fish surveys for identifying their baseline and establishing control points for monitoring before resuming construction and thereafter surveys for annual monitoring should be conducted. A contract was awarded to carry out fish survey and translocation process and the survey work will commence soon. In addition another contract was awarded to obtain river flow data along the Mahaweli River at the location recommended in Loan Agreement.

Mitigation in the construction phase is mainly the responsibility of the contractors and action in the operational phase is mainly allocated to CEB; but some action is required of both parties, and the design consultant, in all phases. Construction contracts will require contractors to provide all mitigation and conduct all monitoring work assigned to them in the EMP and EMoP.

The EMoP provides the mechanism to ensure that: a) all of the actions to provide the mitigation are taken as set out in the EMP; b) the actions mitigate impacts and protect the environment as intended; and c) residual impacts of the project are recorded, so that additional mitigation can be provided if any unexpected impacts occur. The EMoP is in the same four parts as in the EMP and includes: physical and chemical monitoring of emissions; biological surveys of fish, planted vegetation and other features; and social surveys of river users. In each case the approach to the monitoring is described, including the method, parameters, location, frequency, and responsibility; plus guidance on threshold levels that would trigger corrective action. Emissions monitoring is mainly the responsibility of the contractor, to raise awareness of the impacts of construction activities and the mitigation needed. The remainder of the monitoring is assigned to CEB as the Project Proponent, although this may be outsourced to specialist consultants and contractors if necessary.

CEB has established a Grievance Redress Mechanism (GRM), to ensure that any concerns, complaints and grievances about the project's environmental performance are received and resolved. This will have two levels: a) initial complaints received by the contractor or client on site will be resolved in situ where possible by discussion with the complainant and subsequent agreed action; b) any issues that cannot be resolved locally will be referred to a Grievance Redress Committee (GRC), comprising senior representatives of local government and the project agencies (client, contractor, supervision consultant), the local community and Affected Persons. A complaints register will be maintained in the client's site office and by the GRC. CEB will inform complainants in writing of decisions made, action to be taken and the program. Decisions by the GRC will be deemed final, although complainants may take further action through a court of law if they wish.

Implementing EMP for the project has got delayed by few months. However since commencement of the construction phase had been shifted, these lapses can be recovered with the immediate startup of relevant activities of EMP in this phase.