

Updated Environmental Management Plan

August 2017
Project Number: 47381-001

SRI: Mahaweli Water Security Investment Program Tranche 1 and 2

Upper Elahera Canal Project (UEC-ICB-1, UEC-ICB-2A and UEC-ICB-2B)

Prepared by Ministry of Mahaweli Development and Environment with the assistance of Program Management, Design and Supervision Consultant (Joint Venture Lahmeyer International GmbH – GeoConsult ZT GmbH) for Democratic Socialist Republic of Sri Lanka and the Asian Development Bank.

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Mahaweli Water Security Investment Program

SUPPLEMENTARY INFORMATION RELATED TO INFRASTRUCTURE DESIGN CHANGES FOR THE UPPER ELAHERA CANAL PROJECT

VOLUME 2: UPDATED EMPs FOR UEC-ICB-1, UEC-ICB-2A AND UEC-ICB-2B

August 2017



Program Management, Design and Supervision Consultant

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VOLUME 2 : UPDATED EMPs FOR UEC-ICB-1, UEC-ICB-2A AND UEC-ICB-2B

Prepared for:

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 Mahaweli Water Security Investment Program
 Program Management Unit
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VOLUME 2 : UPDATED EMPs

- A) Updated EMP – Revised Incorporating Canal Deviation (2+820 Km to 3+860 Km)
UEC Stage 1 of UEC-ICB-1 (0+100 Km to 3+860 Km)

- B) Updated EMP of UEC-ICB-2A
Upper Elahera Canal from 27+509 Km to 55+600 Km including 27.7 Km Long Tunnels

- C) Updated EMP of UEC-ICB-2B
Kaluganga – Moragahakanda Transfer Canal 0+000 Km to 8+830 Km under Tranche 2



Mahaweli Water Security Investment Program

**UPDATED ENVIRONMENTAL MANAGEMENT PLAN
(EMP) - REVISED INCORPORATING CANAL DEVIATION
(2+820 KM TO 3+860 KM)
UPPER ELAHERA CANAL (UEC) STAGE 1 (0+100 TO
3+860 KM) – UEC-ICB-1**

August 2017



Program Management, Design and Supervision Consultant

UPDATED ENVIRONMENTAL MANAGEMENT PLAN (EMP) - REVISED INCORPORATING CANAL DEVIATION (2+820 KM TO 3+860 KM) UPPER ELAHERA CANAL (UEC) STAGE 1 (0+100 TO 3+860 KM) – UEC-ICB-1

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ABBREVIATIONS

ADB	Asian Development Bank
BoQ	Bill of Quantities
CAPC	Cabinet Appointed Procurement Committee
CEA	Central Environmental Authority
CEB	Ceylon Electricity Board
CI	Cropping Intensity
DDesR	Detailed Design Report
DPC	Department Procurement Committee
DDR	Due Diligence Report
d/s	downstream
EIA	Environmental Impact Assessment
EA	Executive Agency
EOI	Expression of Interest
FAM	Facility Administration Manual
GBL	Geotechnical Baseline Report
GOSL	Government of Sri Lanka
H&S	Health and Safety
IA	Implementing Agency
ICTAD	Institute for Construction Training and Development
ID	Irrigation Department
ISEWP	Improving system efficiencies and water productivity
km	Kilometre
KMTC	Kalu Ganga - Moragahakanda Transfer Canal
LB	Left Bank
m ³ /s	Cubic metres per second
masl	Metres above mean sea level
MASL	Mahaweli Authority of Sri Lanka
MCB	Mahaweli Consultancy Bureau
MCM	Million m ³
MDP	Mahaweli Development Program
MIWRM	Ministry of Irrigation and Water Resources Management
MLBCR	Minipe Left Bank Canal Rehabilitation
MFF	Multitranchise Financing Facility
MFP	Ministry of Finance and Planning
M-K Project	Moragahakanda-Kalu Ganga Project
MMDE	Ministry of Mahaweli Development and Environment
MPC	Ministry Procurement Committee
MPP	Master Procurement Plan
MRB	Mahaweli River Basin
NCPCP	North Central Province Canal Project
NPA	National Procurement Agency
NWPC	North Western Province Canal
PD-MWSIP	Program Director Mahaweli Water Security Investment Program
PD-UEC	Project Director –Upper Elahera Canal
PMDSC	Program Management, Design and Supervision Consultant
PPTA	Project Preparatory Technical Assistance
PSC	Program Steering Committee
RB	Right Bank
RF	Resettlement Framework
RIP	Resettlement Implementation Plan
RKTC	Randenigala - Kalu Ganga Transfer Canal

RPC	Regional Procurement Committee
SBD	Standard Bid Documents
SEA	Strategic Environmental Assessment
SIWRM	Strengthening Integrated Water Resources Management
t	(metric) ton
ToR	Terms of Reference
UEC	Upper Elahera Canal
u/s	upstream

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1 INTRODUCTION

1. The Mahaweli Water Security Investment Program (MWSIP), under the Ministry of Mahaweli Development and Environment of the Government of Sri Lanka (GoSL), is a project funded by the Asian Development Bank (ADB) [Loan No. 47381-002-SRI (SF)] and GoSL, which assists the goal to maximize the productivity of the Mahaweli River Basin (MRB) water resources, by transferring available water to the north and north western dry zone areas for irrigation, drinking and commercial purposes.

2. The investment program will implement Phase I of the North Central Province Canal Project (NCPCCP), using the Asian Development Bank's (ADB's) Multi Tranche Financing Facility (MFF) modality, loaned to the government in three tranches. The updated Mahaweli Development Program (MDP) comprises three main individual investment projects:

- (i) Upper Elahera Canal Project (UECP)
- (ii) North Western Province Canal Project (NWPCP)
- (iii) Minipe Left Bank Canal Rehabilitation Project (MLBCRP)

3. The objective of Upper Elahera Canal (UEC), having a total length of 101 km, is to transfer Mahaweli water from Moragahakanda reservoir to Huruluwewa reservoir in Yan Oya basin, North Central Province Canal, and Mananakattiya – Eruwewa – Mahakandarawa cascade system in Malwathu Oya basin and reroute the present supply of water from Huruluwewa Feeder Canal (HFC) to Huruluwewa, Nachchaduwa and Nuwara Wewa via UEC.

4. UEC is to be implemented in 3 Tranches:

- (i) Tranche 1 is to construct the UEC from 0+100 km to 3+860 km (UEC-ICB-1)
- (ii) Tranche 2 will include construction of UEC Tunnel 3 and Tunnel 4 from 27+509 km to 55+600 km (UEC-ICB-2A), and the Kaluganga – Moragahakanda Transfer Canal (KMTC) from 0+000 km to 8+830 km (UEC-ICB-2B)
- (iii) Tranche 3 will include construction of UEC from 6+226 km to 17+700 km (UEC-ICB-3), UEC from 17+700 km to 27+509 km (UEC-ICB-4), 55+600 to 65+500 km (UEC-ICB-5) and transfer canal from end of UEC to Mahakanadarawa reservoir is to be constructed under UEC-ICB-6

5. An updated Environmental Management Plan (EMP) was prepared in December 2016, based on the project interventions anticipated under the UEC-ICB-1 package, which mainly includes water conveyance system from 0+100 km to 3+860 km, constructed as cut and cover rectangular conduits, associated structures and inlet and outlet transitions to Kongetiya Level crossing. The improvements to the existing Kongetiya Level Crossing of length 2343.6 m is excluded from this contract. In addition to the above, the Naula - Elahera New Road Deviation is included under the contract package, where design and construction will be undertaken by the Road Development Authority (RDA), Sri Lanka. This deviation will be of 350 m length of 2-lane public road with one 1.5 x 1.5 m culvert at a specified location. The map of the project area is shown in **Figure 1-1**, showing the main contractor's facilities.

6. This revised version of the updated EMP has been prepared due to a deviation in the canal alignment between 2+820 Km and 3+860 Km after the contract award. UEC-ICB-1 was one of PMDSC's "advance packages". For this package it was not possible to consider a precise canal strip survey and it had to be solely based on the 1:10,000 scale topographic maps, which is known to be imprecise in the vertical direction.

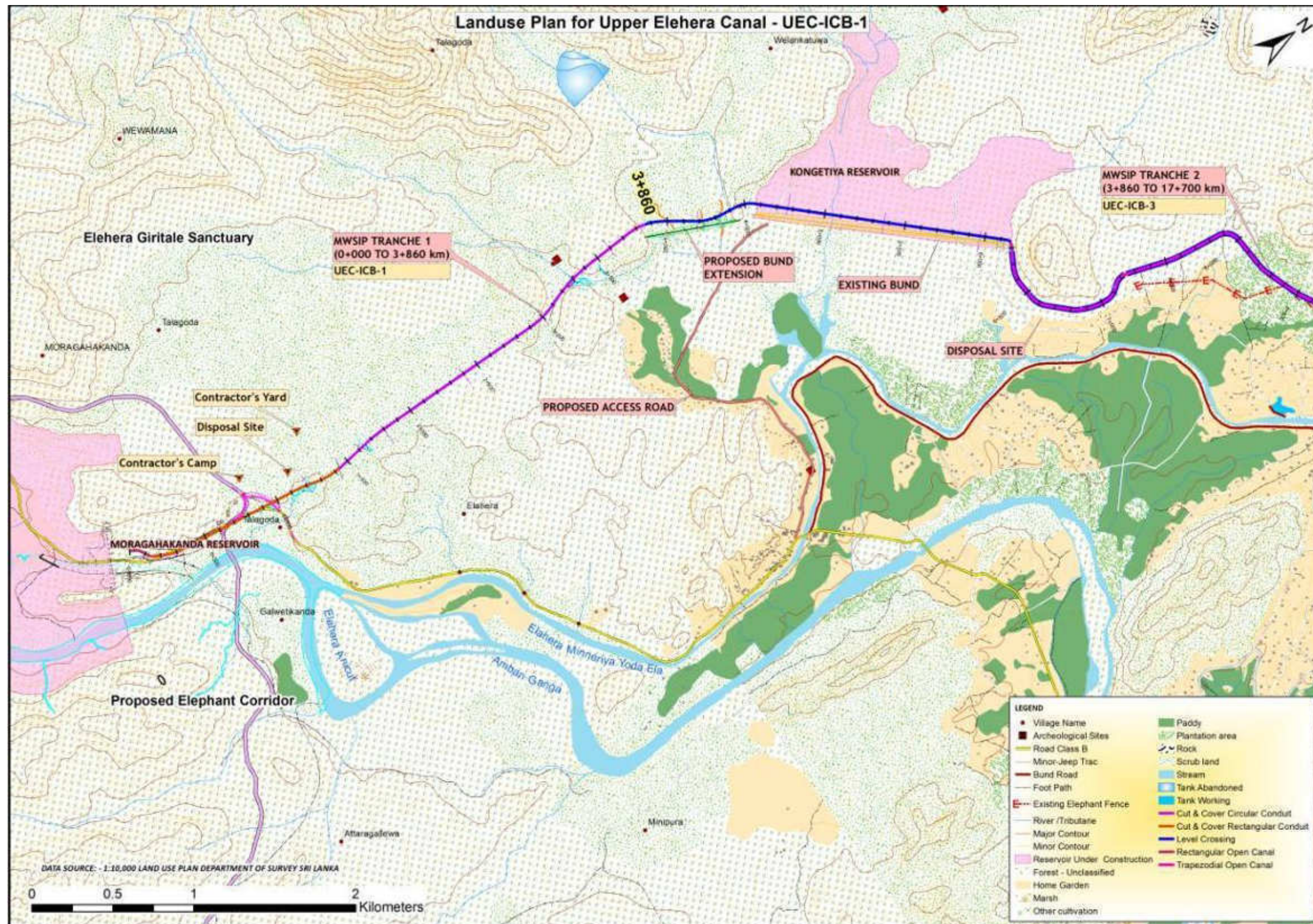


Figure 1-1: Project Area map showing administrative boundaries and protected areas indicating Contractor's camp, disposal areas and Contractor's yard (0+100 km to 3+860 Km)

7. The cut-and-cover canal was originally designed to have a maximum overburden of 10m to 15 m. With the receipt of the site survey, this amount increased locally to 25 m to 30 m, which would have led to a very substantial increase of excavation, backfill, concrete and reinforcement quantities. Moreover, maintaining the previous design would have substantially increased the area of temporary land use for the canal trench, and it would have consequently required a far higher number of trees to be felled than with the new, deviated canal alignment. In addition, the previous alignment would have resulted in a significant cost increase, which would almost certainly not have been covered by the contract price nor would it have been justifiable.

8. The deviated trace falls mainly within an area of Forest Department (FD) reserved land, and hence separate approval has already been obtained from the FD. Further, IUCN has studied the deviated trace for its ecological significance including translocation carried out on 15 May 2017 as part of the preparation of a Wildlife Management Plan (WMP) to comply with CEA EIA approval conditions. The land use is noted as scrub forest and planted Teak forest including some stream crossings and the Welankatuwa anicut (**Figure 1-2**).



Figure 1-2 : Land use of the deviated section

9. This deviation needs to be notified through the Program Director of PMU to the Central Environmental Authority (CEA), so as to adhere to clause 1.4 of the General Conditions provided by the original CEA approval. It should be noted that the deviation is still within the EIA study area of 500 m from the centre line of the canal trace as shown in **Figure 1-3** and hence there is no requirement to undertake a separate environmental assessment. The construction work in this area is on temporary hold until the CEA approval for the deviation is obtained.



10. This EMP comprises the following sections, incorporating mitigatory measures and a monitoring plan:

- (i) Introduction
- (ii) Summary of Potential Impacts
- (iii) Description of Planned Mitigatory Measures
- (iv) Procedures for Dealing with Chance Finds
- (v) Description of Planned Environmental Monitoring
- (vi) Procedures for Site Rehabilitation
- (vii) Reporting & Review
- (viii) Contractor's Cost

1.1 Purpose of this Document

11. This Environmental Management Plan (EMP) is based on the Environmental Impact Assessment (EIA) prepared in June 2015 and the requirements of the letter of conditional approval of the CEA (REF. 08/EIA/WATER/04/2012 DATED AS 31.03.2016) (Annex 1) including the Conditional approval granted by the Department of Wildlife Conservation (DWLC) by the letter dated as 16.03.2016 (Ref. No. 08/6/1/1/252-ii). The Facility Administration Manual (MWSIP RRP Sri 47381-001 of 2015) and Environmental Assessment Review Framework (2014) of the Asian Development Bank (ADB), were also taken into account in preparing this EMP.

12. The EMP is developed for the final designs of the civil works and other work contracts of the corresponding contract packages. The Works to be executed under each construction Contract are clearly defined in the various sections of the Bidding Document for the UEC-ICB-1 contract package.

13. The purpose of the EMP is to provide a framework for minimizing the adverse environmental impacts of the Project in all its phases. It defines the roles of key stakeholders, and reporting and feedback mechanisms. The EMP also provides a basis for the systematic collection of data to determine the actual environmental effects of the Project, compliance with regulatory standards, and measurement of the success of the environmental protection activities identified during the EIA process.

14. This draft EMP prepared by the Project Management Design & Supervision Consultant (PMDSC) in October 2016, and revised in November 2016 and June 2017, is submitted to the MMDE's Program Management Unit (PMU) for onward transmission to the Central Environmental Authority (CEA) and ADB. The EMP approved by the CEA will be considered as the Final EMP to be used in the contract document, which will be the baseline document in preparing the Contractor's Environmental Management Plan (CEMP). The CEMP, which will be prepared by the Contractor after mobilization, based on this final EMP, will be submitted to the Environmental Monitoring Committee (EMC) appointed by the CEA. A detailed and specific CEMP for each of the Contract packages (which are described in Section 3, paragraph 29) will be prepared based on this EMP and submitted to the Environmental Monitoring Committee after mobilization of the Contractor.

15. The monitoring program, including the monitoring scope, institutional responsibilities and the implementation schedule, are also included in the EMP. In consideration of recommendations given as mitigation measures for potential environmental impacts indicated in the EIA report, as well as the conditions mentioned in the CEA approval letter, the parameters to be monitored continuously during the project implementation with participation from Project Implementation Unit (PIU) project staff of the Mahaweli Authority of Sri Lanka (MASL) are incorporated in the EMP. The CEA approval letter, including the conditional approval granted by the DWLC is attached in **Annex 1**.

1.2 Management Structure

16. The Ministry of Mahaweli Development and Environment (MMDE) is the Executing Agency (EA) of the entire Investment Program and the Mahaweli Authority of Sri Lanka (MASL) is the Project Implementing Agency (PIA) for implementing the Upper Elahera Canal (UEC) project. The management structure for the MWSIP PMU Organization and Environmental Management is described in **Figures 1.4** and **1.5** respectively.

17. The Program Director (PD) is the head of the Investment Program implementation, and the PMU operates under his management. There are three Project Directors responsible for the implementation of the three main projects (MLBCRP, UECP and NWPCP) assigned for each Project Implementation Unit (PIU) based in the respective field offices.

18. A safeguards cell is established in the PMU, which is responsible for overseeing the overall monitoring and verification of the environment and resettlement activities of the investment program with the assistance of the PIU and the PMDSC. The two counterpart personnel of Environmental Specialist and Social Safeguard Specialist with relevant experience are assigned to the safeguards cell, and will have responsibility for ensuring compliance of the safeguards requirements including (i) environment, and (ii) resettlement, including gender issues. The Executive Agency (EA) will be responsible for overall coordination, planning, and financing of the Resettlement Implementation Program (RIP) and the implementation of RIPs is the responsibility of PMU.

19. The Resident Engineer (RE) appointed under the PMDSC assumes primary responsibility for ensuring the implementation by the Contractors of the CEMP. The relevant activities will be guided by the Environmental Specialist of PMDSC and supported by the Site Engineering Supervisors. An Environmental Officer is assigned to the Project Team under the Project Director of PIU, and with the guidance of the Environmental Specialist and Social and Resettlement Specialist of PMU will hold environmental monitoring responsibilities. PMDSC will assist during the monitoring activities as resources allow (allowance may need to be made for dedicated environmental staff to be added to the PMDSC team). The duties of the Environmental Officer will include: (i) oversight of construction contractors for monitoring and implementing mitigation measures; (ii) preparing and implementing environment policy guidelines and environmental good practices; (iii) liaising with the environmental agencies and seeking their help to solve the environment-related issues of project implementation; (iv) providing awareness training on environmental and social issues related to the program; and (v) preparation of environmental monitoring reports once a year for the EIA as required by ADB.

20. The Environmental Specialist engaged by the PMDSC will: (i) update the environmental assessments including EMP based on detailed designs; (ii) ensure EMPs are included in bidding documents and civil works contracts; (iii) provide guidance to the contractors to properly carry out the implementation of the CEMPs; (iv) review and evaluate the effectiveness with which the CEMPs are implemented, and recommend corrective actions to be taken as necessary; (v) maintain documents for preparing periodic environmental monitoring reports to ADB/CEA with the coordination of PMU Environmental Specialist; and (vi) provide training and capacity building of the PMU and PIU Environmental staff. The PMU Environmental Specialist of PMU will (i) provide oversight on environmental management aspects of the project and ensure that the relevant requirements of the EMPs that are included in the CEMPs are being implemented by the contractors; (ii) facilitate and ensure that contractors comply with all government rules and regulations regarding permits as well as any other relevant approvals required for works for which they are responsible; (iii) conduct ongoing consultation with the community during implementation of the project; and (iv) establish a grievance redress mechanism and ensure it is operated satisfactorily.

21. For the purpose of implementing the Environmental Management Plan, an EMC has been set up under the CEA. The EMC comprises representatives from the Mahaweli Authority of Sri Lanka (MASL),

Program Management Unit (PMU), representatives of Divisional Secretaries, and representatives from other stakeholder agencies. The PMU and PMDSC will monitor the implementation of the EMP and will report through periodical progress reports to the EMC of CEA as well as to the ADB. The overall environmental monitoring shall be undertaken by the EMC appointed by the CEA.

22. The key responsibilities of the PMU/PIU and PMDSC staff engaged in environmental safeguard compliance is summarized in the **Table 1-1**.

Table 1-1 : Key responsibilities of the PMU/PIU and PMDSC staff relating to safeguard Compliance

PMDSC	<ul style="list-style-type: none"> • Environmental Specialists • Social Safeguard Specialists 	<ul style="list-style-type: none"> • Update the environmental assessments including EMP based on detailed designs • Ensure EMPs are included in bidding documents and civil works contracts • Preparation of Environmental Monitoring formats • Provide guidance to the contractors to properly carry out the implementation of the EMPs • Guidance on routine environmental monitoring activities, carried out as a joint effort by PIU Environmental Officer, and staff recruited under the Resident Engineer as per the resources allowed and periodical site inspections • Review and evaluate the effectiveness with which the EMPs are implemented, and recommend corrective actions to be taken as necessary • Maintain documents for preparing periodic environmental monitoring reports to ADB/CEA with the coordination of PMU Environmental Specialist • Preparing due diligence reports on safeguard • Undertaking any necessary additional surveys and investigations to support designs and implementation • Preparing Strategic Environmental Assessment (SEA)
PMU	<ul style="list-style-type: none"> • Environmental Specialist • Social and Resettlement Specialist 	<ul style="list-style-type: none"> • Provide oversight on environmental management aspects of the project and ensure that the relevant requirements of the EMPs which are included in the CEMPs are being implemented by the contractors • Facilitate and ensure contractors comply with all government rules and regulations regarding permits as well as any other relevant approvals required for works for which they are responsible • Conduct ongoing consultation with the community during implementation of the project; and • Establish a grievance redress mechanism and ensure it is operated satisfactorily. • Implementing resettlement implementation and land acquisition plans where necessary
PIU	<ul style="list-style-type: none"> • Environmental Officer • Social and Resettlement Officer 	<ul style="list-style-type: none"> • EMP Monitoring and implementing mitigation measures with the assistance of the Engineering Assistants of PMDSC as resources allow • Preparing and implementing environment policy guidelines and environmental good practices • Liaising with the environmental agencies and seeking their help to solve the environment-related issues of project implementation • Providing awareness training on environmental and social issues related to the program • Preparation of environmental monitoring reports as required by ADB

1.3 Contractors' EMP and Compliance Monitoring

23. Each Contractor is required under his construction contract to develop a CEMP based on the EMP presented here, and the guideline for CEMP is given below, as well as the environmental compliance mechanism that in place to ensure that the EMP is implemented properly. The Environmental Monitoring Plan (EMoP) (**Table 3-2**) has been developed, including key monitoring aspects and responsible parties, to ensure environmental best practices during the construction and operation phases of this project.

24. Contractor's EMP will be reviewed by PMDSC to ensure that it addresses requirements mentioned in the CEA approvals and ADB loan covenants, and this CEMP will be submitted to the EMC for approval in compliance with CEA approval condition No.14 (ref. 08/EIA/WATER/04/2012 dated as 31 March 2016).

25. The Contract will refer to the approved EIA Report and the CEA Environmental Approval (ref. 08/EIA/WATER/04/2012 dated as 31 March 2016) for the applicable Laws and Regulations related to environmental management (Section 1.6 of the EIA report) and to the clearances and permits to be obtained prior to commencing the work, including those for which it will be his responsibility to obtain confirmation.

26. The CEMP will be based on the detailed implementation plan and the Contractor's actual construction methodologies, the work schedule, and the types of work and the details given in the Specifications. The CEMP shall be consistent with the project EMP and prepared based on the Contractor's activities at the corresponding locations.

27. The CEMP shall address all environmental and social matters relevant to the Works, which shall include as a minimum, but not be limited to, the following areas:

- (i) **Definition of project boundaries** (footprint of the construction activities, other contractors' facility locations, disposal areas, borrow areas (if any), worker camp areas, machinery yards, access roads, transportation routes of borrow, disposal material etc.)
 - (ii) **Identification of environmental values and sensitive receptors** of the site and its surrounds (once the site boundaries are defined, the sensitive receptors and the environmental values of the area need to be confirmed. The EIA/IEE document and the updated EMP will often provide the necessary information. Such information can be presented as an overlay of the engineering drawings or maps)
 - (iii) **Construction activities** - based on the construction plan/schedule prepared, it is important to mention what the various phases of work are for each site, as different phases include different activities and thus different environmental management requirements (e.g., site survey, vegetation clearance, soil stripping and earth movement, excavation, electric elephant fencing, concrete work, blasting etc.)
 - (iv) **Risk Assessment Matrix:** Risk assessment and environmental management measures based on the construction activities
28. (Risk is assessed as the likelihood that the activity will have an effect on the environment as well as the consequence of the effect occurring. Hence, it is often described as "**Risk = Likelihood x Consequence**")
- (v) **Site plans** - completed risk matrix provides a detailed assessment of the environmental management requirements for a construction site. The identified environmental management requirements need to be included in a site plan. The site plans range from simple line drawings to marked-up engineering drawings, to detailed overlays on aerial photographs. A site plan must cover the extent of the construction activity and should contain;

- (a) Indication of North, and scale;
 - (b) Existing and planned supporting infrastructure (e.g., access roads, water ways, electricity supply etc.);
 - (c) Location of planned work;
 - (d) Drainage system;
 - (e) Location of sensitive receptors (e.g. animal crossings etc.)
29. The environmental management measures are then overlaid onto the site plan. This can be done by hand or by using computer graphics / symbols depending on what is available. **ADB will not consider a CEMP to be complete unless a site plan accompanies the risk assessment matrix.**
- (vi) **Environmental Work Plans** - the completed CEMP shall provide the details of all the environmental management requirements for all stages of the construction process. If the work is undertaken as individual work teams, the environmental work plans need to be prepared separately targeting each work team for respective work activities (e.g. clearing, excavation, concrete work, back filling).
 - (vii) the Contractor's organisational structure showing the implementation, supervision and reporting and responsibilities of key personnel;
 - (viii) the construction programme and work activities;
 - (ix) requirement of environmental license and approvals
 - (x) the Contractor's plans for specific environmental measures, including:
 - (a) relocation of utilities if required (minimize/avoid disruption of services such as power, water supply etc.)
 - (b) Contractor's Facilities Management Plan for management of impacts due to establishment and operation (includes detailed designs, methodologies and installation locations of all construction related facilities, such as access roads, workers' camps, storage areas, equipment maintenance areas etc., pollution control facilities, such as drainage channels, settling tank/ponds and septic tanks, temporary noise barriers etc.)
 - (c) liaison with local authorities and residents
 - (d) air pollution (dust and gaseous emissions) control
 - (e) noise and vibration control
 - (f) waste management (solid, liquid, hazardous)
 - (g) wastewater collection, treatment and disposal
 - (h) prevention of contamination of natural water courses and groundwater
 - (i) water extraction, treatment and supply
 - (j) protection of wildlife and fish
 - (k) establishment, operation and reinstatement of spoil disposal areas
 - (l) protection and replanting of flora
 - (m) drainage and storm water management
 - (n) erosion and sedimentation control
 - (o) traffic management
 - (p) minimising disturbance in public areas (including from construction traffic)

- (q) damage to and maintenance of existing roads, bridges, culverts etc.
 - (r) chemicals and hazardous substances/materials management, spillage prevention
 - (s) workers and public safety
 - (t) emergency response
 - (u) dealing with geological, paleontological and archaeological remains, graves etc.
 - (v) reinstatement of Site areas used for facilities, access and temporary construction roads;
 - (xi) the approach and schedule for implementing the mitigation measures specified in the Project EMP;
 - (xii) plan for self-monitoring and reporting to ensure compliance with the EMP/CEMP provisions
30. The preparation of the CEMP and implementation of required environmental mitigation actions will be the responsibility of the Contractor through an experienced Environmental Officer dedicated for the entire construction period having a sound knowledge and professionally qualified in environmental science/ management and ecology, since the project area is associated with wildlife protected areas (Elahera Girithale sanctuary).
31. Further it is required to submit the Environmental Method Statement (EMS) for the project interventions or the construction activities, such site clearing, identification and establishment of contractor's facilities (camp sites, office and laboratory, disposal areas, batching plants, crusher plant, waste management, site restoration etc.) that have a significant environmental impact.
32. Other key documents that need to be maintained by the contractor during the construction stage are, (i) Contractor's schedule on Environmental Management (attached with Construction schedule of daily/weekly basis), (ii) Environmental Issue log, (iii) Grievance log, and (iv) monthly monitoring report followed by routing self-monitoring carried out based on the "monitoring forms".
33. Environmental compliance monitoring is essential for successfully implementing the project-specific environmental management program developed through the Environmental Assessment carried out for the project and the EMP prepared, taking into account project-specific environmental impacts that may arise and mitigation measures required to make the project both environmentally and economically viable.
34. Environmental compliance monitoring involves a systematic collection and analysis of environmental mitigation/compliance-related information as the project progresses. It aims to improve the efficiency and effectiveness of the project. Monitoring will help determine whether the project is meeting the environmental standards and whether the environmental mitigation component results in the expected outputs. It is important that the environmental officers assigned to each PIU, and the supervision staff of the Engineer under the construction contracts, understand the importance of monitoring as a tool for analysing and understanding the status of the project.
35. During the construction phase the Contractor is responsible for implementation of all the requirements of the EMP, which are identified in the CEMP, while the Resident Engineer will supervise the compliance. Monitoring will ensure that the contractor complies with the terms and conditions of the CEMP for which he is responsible. The Project Director of the PIU is responsible for the assignment of Environmental Officers to carry out the monitoring together with the Engineer and supervision staff of the respective construction contract. The PMU Environmental Specialist, apart from supervising the work of the PIU Environmental Officers, will prepare monitoring protocols and will arrange for any necessary training for the PIU Environmental Officers and, if appropriate, specifically assigned staff from the Engineer's supervision team. The national and international Environmental Specialists of the PMDSC will also provide technical support for the environmental monitoring work.

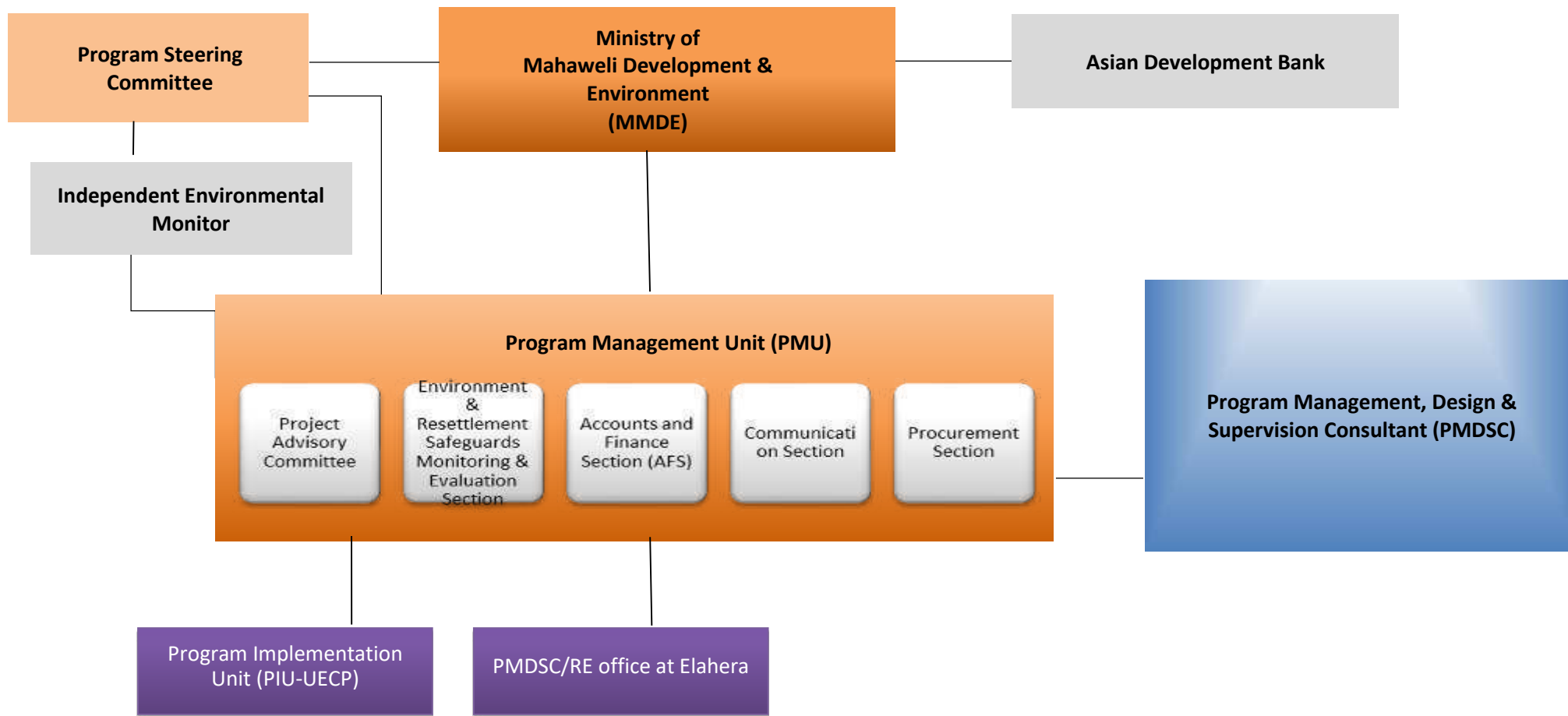


Figure 1-4 : MWSIP Organization Chart

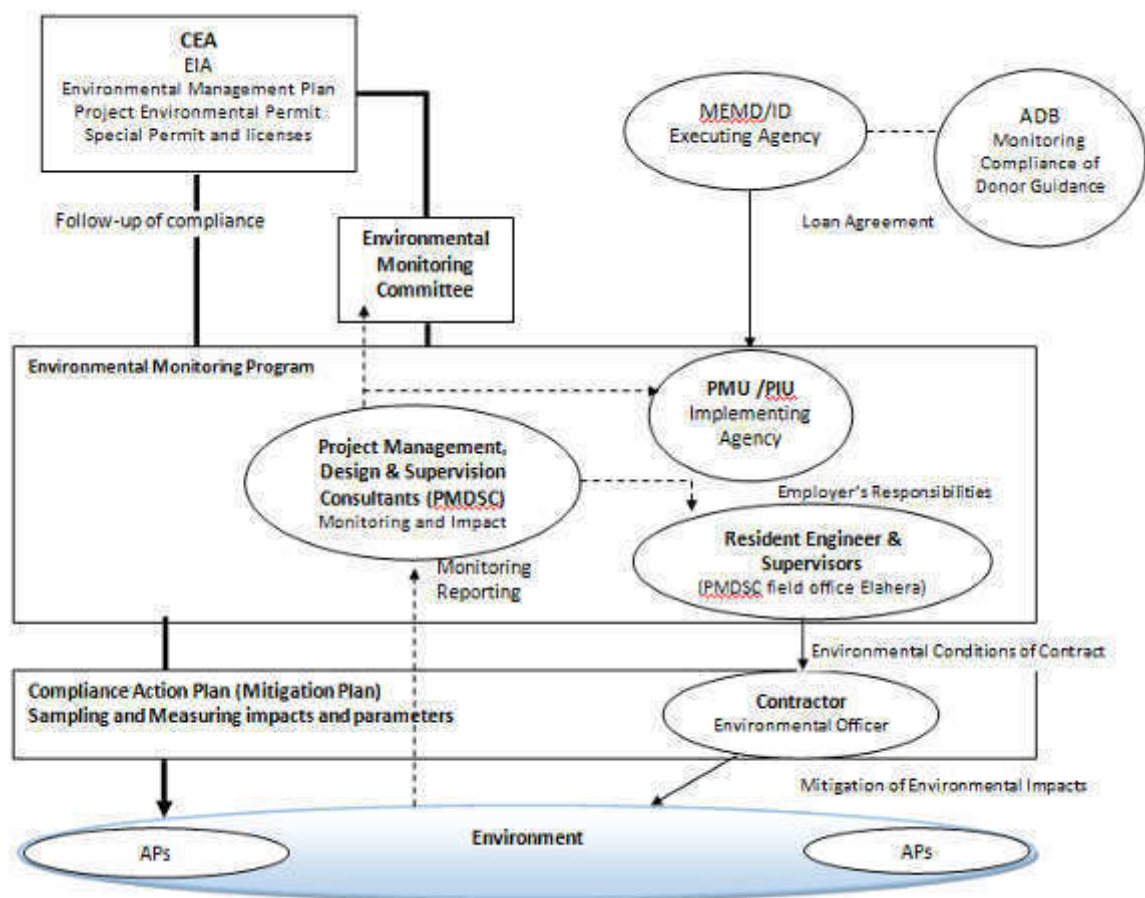


Figure 1-5: Environmental Management Organization Chart

36. The Contractor is responsible for implementation of the CEMP while the PMU is responsible for compliance monitoring and reporting to the EMC appointed by the CEA. Monitoring will ensure that the contractor complies with the terms and conditions of the CEMP. The Resident Engineer with his supervisory staff will carry out monitoring related to the CEMP, and the periodical environmental monitoring activities as per the updated EMP will be carried out by the PIU Environmental Officer with the involvement of engineering supervisory staff of PMDSC as allowed by the resources availability. Environmental Specialists assigned to PD-PMU and PMDSC will provide technical inputs as and when required. In addition, the Environmental Specialist of the PMU is responsible for preparing environmental monitoring protocols and training the environmental officer as well as supervising the work done by environment officer-PIU. In addition, s/he will oversee and attend to resolution of critical issues on the environmental management, grievance redress mechanism, compliance with regulatory and ADB safeguard requirements, reviewing environmental documentation submitted to ADB and CEA and presenting the Project environmental progress as and when required by PMU. The national and international environmental specialists of the PMDSC are to provide technical support for the environmental monitoring work through (i) updating the EIAs and IEE, and the respective EMPs based on final detailed designs; (ii) training and building capacity of PMU and PIU staff on environmental management, supervision, reporting, and monitoring of implementation of EMPs; (iii) orienting contractors on implementation of the EMPs; (iv) reviewing the environmental method statements provided by contractors and guide them on any revisions required; (v) monitoring implementation of the EMP and recommending any corrective actions on any unforeseen environmental impacts; and (vi) taking the lead in preparing environmental monitoring reports for PMU to be submitted to ADB and CEA.

37. It is the responsibility of the PMDSC staff working under the Resident Engineer to undertake monitoring of CEMP as part of construction supervision, with technical inputs from the PIU

environmental officer. The monitoring formats for monitoring EMP implementation at the construction site, and other indirect impact areas, such as quarries, borrow and waste disposal and dumping areas, is prepared by the Environmental Specialist of the PMDSC and introduced at the orientation program (Annex 3A-C). All forms of monitoring should be accompanied by regular monitoring reports including, where appropriate, dated photographs, interview results, and any test reports produced by independent firms or accredited laboratories (such as water, air and sediment quality). All the reports produced should be kept with the Project Director of the PIU, and a copy should also be kept on site by the Engineer to be made readily available to any interested party.

38. Apart from the routine monitoring conducted by the PIU Environmental Officers and the Engineer's staff, the PMU Environmental Specialist will also carry out periodic reviews (at quarterly intervals) to ensure that all the mitigation measures proposed have been carried out as specified in the EMP. The PIU Environmental Officers will report directly to the respective PIU Project Director, and the PIU Project Directors as well as the PMU Environmental Specialist then report to the Program Director. **Table 1-2** summarizes the site environmental monitoring and recording/ reporting events.

Table 1-2 : Summary of site environmental monitoring and recording/reporting events

No.	Mode	Frequency	Purpose/ Action	Agency Responsible
1.	Ambient Environmental quality monitoring (Air Quality, Noise, Vibration, Water and Sediment quality)	Quarterly intervals for the routing monitoring during the construction phase	Ensure compliance particularly for the key parameters having critical impacts	Independent accredited laboratory contracted through the PMDSC
2.		As and when required	Correcting any environmental issue (i.e. oil spill, sedimentation, high noise & vibration, upon any complain of non-compliance etc.)	Contractor's Environmental Officer under the guidance and supervision of counterpart staffs of PIU/PMU and Site Engineer
3.	Monitoring Contractor's EMP items particularly related with constructional impacts on physical environment (hydrology, soil, ambient air quality, noise & vibration, traffic, vehicle speed etc)	As per the implementation schedule given in the CEMP	<ul style="list-style-type: none"> Site Environmental monitoring walk around the construction area and other direct /indirect impact areas (borrow sites, disposal, stockpiling and Contractor's facilities) Completing the Monitoring formats 	Construction Supervision Engineers and PIU Environmental Officer, under the guidance of Environmental Specialist of PMU/PMDSC

No.	Mode	Frequency	Purpose/ Action	Agency Responsible
4.	Monitoring impacts and implementation of mitigatory measures as per the updated EMP (particularly impacts related to the ecological and socio-economic aspects) and conditions given by CEA Environmental approval	As per the implementation schedule given in the updated EMP	<ul style="list-style-type: none"> Feeding monitoring data into the Data base (Information Management System -IMS) Accidental Environmental issues to be informed to the Environmental Officer / PIU and Environmental Officer PMU/PMDSC and take immediate remedial actions 	PIU Environmental Officer with the assistance of the supervision engineers as per the availability of the resources , under the guidance of Environmental Specialist of PMU/PMDSC
5.	Reporting and reviewing	Monthly	Monthly compliance monitoring reports	Environmental Officer (EO) of PIU with Resident Engineer
			<ul style="list-style-type: none"> Daily Review mitigations Daily updating Environmental Issue log, Environmental safety log, Grievance log Concise summary of environment management during past month; 2 weeks in advance of Monthly Progress meeting 	Environmental officer of the Contractor Review by the RE / PIU
6.	Site audit	Weekly-regular	Site environment monitoring walk round by EO-PIU with RE's and Contractor's relevant staffs	EO-PIU with Engineer and Contractor
7.	Site audit	Monthly-regular	Site environment inspection by RE and PD with participation of ES-PMU, EO-PIU & other relevant staffs	EO-PIU with counterpart staffs of Engineer and Contractor
8.	Surprise site audit	Once in 2 months (minimum)	Un noticed site inspection/ document review by ES-PMU and ES-PMDSC	ES-PMU
9.	Monthly Project Progress Meeting (MPPM)	Monthly-regular	Key environment events/ concerns will be taken up at PD and RE level	PD-PIU, RE-PMDSC and ES-PMU & EO-PIU
10.	Monthly Environment Meeting	Monthly-regular	As a follow-up meeting to sort out matters arising at MPPM and in the Monthly Environmental Monitoring Reports (EMR) or any new developments	EO-PIU with counterpart staffs of Engineer and Contractor. ES-PMU as required
	Environment Monitoring Committee	Quarterly or as advice by CEA	Site monitoring, review of reports and mitigations adopted as decide by the EMC	EO-PIU to coordinate
11.	Periodical EMR	Semi-annually to ADB and quarterly to EMC (CEA)	A summary of Project environment management over the last 6 months, including self-monitoring findings, issues with mitigations and independent ambient environment monitoring results, progress in grievance redress and forecast for next 6 months etc.	Produce by PMDSC Review & Submit to ADB & CEA by PMU

No.	Mode	Frequency	Purpose/ Action	Agency Responsible
12.	Progress Meeting of the Program	Monthly	Brief the key achievements, drawbacks and issues on environment management	PD-PIU, ES-PMU & PMDSC
13.	Steering Committee Meeting of the Program	Monthly	Brief the key achievements, drawbacks and issues with inputs from monthly progress meeting; on environment management	PD-PMU, PD-PIU (and ES-PMU & PMDSC as required)

39. The PIU Project Director should convene the CEA Monitoring Committee once every four months at the site of each construction contract, where the responsible PIU Environmental Officer, supported by the PMU Environmental Specialist, will present a report on the environmental monitoring activities and progress related to mitigation measures. The CEA Monitoring Committee meeting should then be followed by a site visit to clarify any specific issues pertaining to monitoring.

40. The PMDSC Environmental Specialists will prepare the Semi Annual Monitoring Report (SAMR) and shall be submitting to the ADB through the Environmental Specialist of PMU incorporating subsequent amendment, which will be displayed on the ADB website.

2 ENVIRONMENTAL SIGNIFICANCE AND SUMMARY OF POTENTIAL IMPACTS

2.1 Environmental Significance of the UEC-ICB-1 area

41. The alignment of the work in package UEC-ICB-1 traverses an ecologically sensitive area that comes under the jurisdiction of Fauna and Flora Protection Ordinance (FFPO) controlled by DWLC. The canal starting from Moragahakanda reservoir up to the Kongetiya reservoir falls within the Elahera Girithale sanctuary.

42. The tree survey was completed by the PMDSC through an experienced Ecologist (Flora) and the tree species having diameter at breast height (DBH) over 30 cm were listed out along the canal trace from 0+100 Km to 3+860 Km within a corridor of 40 m. The list is submitted to the DWLC through PMU requesting their approval, and the tree felling will be done by the Timber Cooperation under the supervision of the DWLC officers. The list of trees identified for felling is given in the **Annex 4** (excluding the deviated section 2+820 Km to 3+860 Km). The deviated section is falls under the jurisdiction of Forest Department (FD) and hence the tree enumeration and tree marking shall be carried out by FD, once the consent is granted and inform State Timber Cooperation (STC) for tree felling.

43. The canal trace coming under UEC-ICB-1 contract package falls within an area of different habitat types, such as forest, scrub, rock out crop, grass land and a seasonal stream network. It was found during the tree survey, that the area is rich with faunal species, especially a good habitat for elephants.

44. *Garcinia terpnophylla* is one of the Endangered and Endemic tree species as per National Red List 2012, belongs to family Clusiaceae, recorded during the tree survey in between 1+150 Km and 1+200 Km of the canal trace closer the stream (**Figure 2-1**).



Figure 2-1 : Endangered and Endemic tree species *Garcinia terpnophylla*

45. A land snail species (*Cyclophorus involvulus*), which is indigenous and endangered according to national Red List 2012, was recorded during the tree survey.

46. The significance of the environmental impact along the deviated section (2+820 km to 3+860 km) is comparatively low. The significant reduction of blasting activities due to the deviation of the canal trace would be an environmentally positive impact in the wildlife protected area. The possible environmental impacts anticipated due the entire UEC-ICB-1 package is common to the entire area, as the alignment is located within an ecologically sensitive area associated with stream network of Welankatuwa stream.

47. Since some rock outcrops are found along the UEC-ICB-1 canal trace, blasting activities would be required during canal excavation work, which needs to be done with prior approvals from relevant authorities (i.e DWL, GSMB) and close supervision of the DWLC as the area is within the wildlife sanctuary.

48. In addition, the stream crossing points are sensitive habitats and may require diverting the watercourse during the construction period so as not to disturb the stream flow and the aquatic fauna and other wildlife using the area. However, these are seasonal streams and Contractors need to be aware to construct such sections during the dry period.

49. Minimizing the damage and disturbances to the wildlife movements, the cut and cover sections need to be completed section-wise.

50. The following section summarizes the most important potential environmental and social impacts related to the construction of UEC canal (0+100 to 3+860 m) and construction of new sluice and canal (0 to 0+600 m) as per the Scope of Work and the List of Works specified in Section 6 (Employer's Requirements) of the Bidding Documents for the relevant contract packages.

51. **Tables 2-1** provides summaries for the anticipated impacts during pre-construction and construction phases and the details of mitigation measures are given in Section 3 of this document.

Table 2-1 : Anticipated Impacts during pre-construction & Construction

Impact Components	Vegetation clearance	Cut and Cover sections	Control blasting	Inlet and outlet structures to the level crossing	Road deviation	Structures	Worker Facilities	Construction Yards, vehicle	Operation of machineries	Disposal Sites
Ecological Resources										
Habitat loss, fragmentation, and degradation	H	H	M	H	H	L	L	L	M	L
Terrestrial fauna and flora	H	H	H	H	H	L	M	M	M	M
Aquatic fauna and flora	M	M	-	M	-	M	M	M	-	M
Critical habitats	M	M	M	M	M	-	M	M	-	M
Rare/Endemic species	M	M	M	M	M	-	M	M	-	M
Threatened species	M	M	M	M	M	-	M	M	-	M
Direct impacts on protected areas	H	H	H	H	H	-	M	M	H	M
Migratory routes of animals	H	H	H	H	H	-	M	M	M	M
Biodiversity loss/ecosystem function	H	H	M	H	H	M	-	-	L	-
Human-elephant conflict	M	M	M	M	L	L	M	M	M	M

Impact Components	Vegetation clearance	Cut and Cover sections	Control blasting	Inlet and outlet structures to the level crossing	Road deviation	Structures	Worker Facilities	Construction Yards., vehicle	Operation of machineries	Disposal Sites
Threats by Alien Invasive species	M	M	-	M	M	L	M	M	M	M
Increased access to protected areas	M	M	-	M	M	L	M	M	M	L
Physical Resources										
Soil erosion	M	H	-	-	M	-	-	L	M	L
Surface Water pollution	M	L	L	L	M	L	M	M	M	L
Air pollution	L	M	M	-	M	-	L	M	M	M
Mineral resources	-	L	M	-	L	-	L	-	-	-
Slope failure	-	M	L	L	-	L	-	-	-	-
Drainage patterns	-	M	-	M	L	-	L	-	L	L
Ground water table	-	M	-	-	-	-	-	-	L	-
Ground Water Pollution	L	M	L	-	-	-	L	L	M	L
Environmental flows	-	-	-	M	-	-	-	-	-	-
Noise and vibration	L	H	H	M	M	L	M	M	H	M
Socio-cultural aspects										
Health and safety of communities	L	-	M	L	L	L	L	L	-	L
Disruption of social cohesion of communities	-	-	-	L	L	L	-	-	-	L
Interruption of water users (Irrigation/domestic)	-	-	-	L	-	L	-	-	-	-
Worker health and Safety aspects										
Occupational health and safety	-	M	M	L	L	L	L	L	M	L
Archaeological and Cultural Resources										
Direct impacts	-	L	L	-	-	-	-	-	L	-
Theft and vandalism of artefacts and sites	-	L	-	-	-	-	-	-	L	-
Unanticipated events										
Health related issues	-	L	M	L	L	L	L	L	L	L
Climate related issues	L	-	-	L	-	L	-	L	-	-
Construction related issues	-	M	M	L	L	L	-	-	M	-
Issues with the resource allocation in line agencies(i.e. Wildlife dept/Timber cooperation/ID)	H	M	H	M	L	M	L	-	M	-

Abbreviations: H- Highly significant, M-Moderately significant, L-Low significance

52. The operational impacts will be positive if the construction activities are completed in a proper manner and site reinstatement and reforestation activities are fulfilled to bring the ecosystem functions within the wildlife sanctuary area up to a satisfactory level.

53. It should be assured the water issue from the tanks, which are to be developed under UEC-ICB-1 and UEC-ICB-3, located closer to the sanctuary boundary (Kongetiya, Heerati Oya, Madettewa tanks), are only for the authorized paddy fields which are currently cultivated using the water of the above

tanks. No water issue is allowed for the unauthorized cultivations within the sanctuary area and it is recommended to involve an officer from the DWC during the water management of the mentioned tanks above.

54. On request of PMU in compliance with CEA and DWC conditions, IUCN has undertaken a biodiversity survey along the canal trace and submitted the recommendations on priority areas identified for commencement of constructions in the UECP (Annex 5) as a part of the Wild Life Management Plan preparation. PMU shall implement the recommendations of the study, on acceptance by the CEA and DWC before construction commences.

3 DESCRIPTION OF PLANNED MITIGATORY MEASURES

55. A site specific Environmental Management Plan (EMP) has been provided containing (i) project activity; (ii) potential environmental impacts; (iii) planned mitigation measures; (iv) monitoring scope; (v) institutional responsibility; and (vi) proposed timing for implementing mitigation measures related to construction of the UEC canal from Moragahakanda reservoir to the Kongetiya tank (0+100 Km to 3+860 Km) including inlet structure and outlet structure to the Kongetiya tank, under the UEC-ICB-1 construction package, depending on the availability of construction related information, and this would be converted to a Contractor's Environment Management Plan (CEMP) once the construction method and program and methodology is finalized by the Contractor.

56. The **Table 3-1** summarizes the anticipated impacts and the proposed mitigation measures based on the project interventions related to UEC-ICB-1. It is divided into two sections for ease of reference – of specific relevance to the Contractor's responsibilities on site are the activities under Section A (Construction) as per the conditions of the Contractor:

(A) Construction

- (i) Activities related to initial mobilisation and establishment of the site:
 - (a) achieving initial access into the site through vegetation clearance and construction of temporary access roads
 - (b) preparation of site establishment areas for the various temporary site facilities
 - (c) construction of Contractor's camps, including facilities for offices, storage, accommodation, equipment, aggregate production/storage, concrete production etc., as well as facilities for the Employer and the Engineer, and establishment of associated utilities and systems (See **Figure 1-1** for the identified locations for the labour camps, construction facilities and vehicle yard)
 - (d) establishment of borrow areas, ready to commence operations
 - (e) establishment of quarries, ready to commence operations
- (ii) Environmental impact management issues related to construction activities:
 - (a) Health and safety related to all construction activities
 - (b) Transport and storage of construction materials and machinery operation
 - (c) Clearing of site, removal and disposal of construction debris and excavated materials
 - (d) Activities related to significant noise and vibration
 - (e) Activities related to the emission of dust
 - (f) Activities related to the hindrance of surface runoff and soil erosion
 - (g) Construction / removal of water diversions and cofferdams
 - (h) Provision of information disclosure among stakeholders
- (iii) Special environmental impact management issues related to construction activities:

57. Since the project area is entirely comes within Elahera Girithale wildlife sanctuary area, the conditions laid down in the letter no. 08/ 6/1/252-11, dated 16 March 2016 issued by the Director General of DWC should be strictly adhered to, to avoid impacts on wildlife in the project area. Special mitigatory measures required to control the significant impacts related to the list of works identified in Section 6 (Employer's Requirements) of the Bidding Document are summarized in the following sections.

Ecological Aspects

- (i) Setting up of a temporary electric fence to separate active construction zone from wild life as appropriate under the guidance of the DWC, without disturbing the elephant migratory paths

- (ii) The deep cut sections during the construction stage should have a mechanism to cover daily to avoid injuries/ deaths to the wildlife due to falling into such deep trenches, as the project area is highly vulnerable, being located in the wildlife sanctuary area
- (iii) The sluices of the tanks located within the wildlife reserves (Kongetiya, Heerati Oya, Madeththa Wewa tanks) need to be constructed ensuring retention of 50% of the water out of the total tank capacity for the use of wildlife
- (iv) Wildlife/elephant movements should not be disturbed. In order to comply with that to reduce habitat fragmentation, the vegetation clearance within construction area (40 m width belt along the centreline) located in the protected areas (Elahera Girithale sanctuary area) should be planned in section wise based on the approved construction schedule with the DWC, so that a less than 600 m section at a stretch is opened for cut and cover. No site clearance to be done along the entire trace, which could result opening the sanctuary for the public access, enhance disturbance for wildlife movements and habitat fragmentation¹
- (v) Night time work/staying overnight or movements at night within the wildlife area are strictly prohibited
- (vi) It is required to obtain special permission from DWC and work is to be carried out under the close supervision of the DWC during the blasting and other activities that cause substantial noise and vibration
- (vii) No new access roads are to be developed into the sanctuary area, and only the existing paths are to be used
- (viii) Suitable mitigatory measures should be taken to reduce construction impacts on existing natural systems, such as forest areas, streams and tanks and wild animals within the project area
- (ix) Any tree felling other than the identified trees is to be avoided and if any additional trees are to be felled, they should be enumerated and removed with the consultation of respective Divisional Secretary and Forest Department through the State Timber Cooperation
- (x) Minimum number of trees should be cut during construction
- (xi) Abandoned quarry sites and borrow pits should be rehabilitated and suitable tree planting programs must be implemented to the ratio 1:3
- (xii) Proposed selection of suitable construction materials, borrow, disposal, and stock piling areas must avoid the protected areas under the Fauna and Flora Protection Ordinance (FFPO) or Forest Ordinance (FO) of GoSL
- (xiii) The area disturbed by the cut and cover sections need to be reinstated properly facilitating the wildlife movements and enriching the disturbed habitats by replanting the same tree species found within the disturbed area

Noise & Vibration (Referring to section 11 of conditional approval Ref. 08/EIA/Water/04/2012 dated as 31.03.2016)

- (i) All constructional activities shall be carried out in such a way, so as not to cause nuisance to the wild life. The noise level during construction shall not exceed 75 dB (A) from 06.00 hrs to 21.00 hrs and 5- dB 9A) from 21.00 hrs to 06.00 hrs to be measured at the boundary of the site

¹ Special attention need to be given during the site clearance under the close monitoring of PIU and RE staff, to limit the tree felling and vegetation clearance as instructed in EMP compatible with the approved construction schedule.

- (ii) Appropriate mitigatory measures should be adopted in order to maintain the vibration levels generated by construction activities, operation machineries and equipment, and vehicle transport within the interim standards stipulated by CEA
- (iii) Blasting operation (if any) should be carried out with the approval of the GS&MB, and the CEA

Land Stability and Soil Erosion Aspects

- (i) Excavation, blasting operations and removal of soil/rock should be done as per the proper engineering designs to avoid ground instability and slope failures
- (ii) Adequate erosion management measures shall be applied during the construction in order to prevent siltation of surface water bodies at downstream areas and neighbouring marsh/paddy lands during the construction
- (iii) Uprooting the trees should be done with appropriate equipment to minimize the damage to soil
- (iv) Natural water paths and valleys should be kept free from any obstruction through any kind of construction or disposal of soil/rocks etc.
- (v) Adverse impacts on existing drainage systems/natural storm paths of the project areas are to be avoided
- (vi) Soil removed during the construction should not be dumped at the edge of any water bodies or disposed into surrounding environment without proper protection measures and approval
- (vii) Provision of silt traps where required and carrying out rock excavation, canal lining, and other related earth & concrete work in the LB canal must be carried out with the minimum disturbances to the existing natural aquatic and terrestrial ecosystems along the LB canal and to the livelihood and socio-economic activities of the community living in the area

(B) Operation and Maintenance

58. Activities related to the operation and maintenance phase of the Works under each contract.
59. The Contractor will be responsible for fulfilling the mitigatory measure requirements set out under the Section B (Construction) throughout the construction period. **Table 3-2** shows the Environmental Monitoring Plan (EMoP) of the key monitoring aspects identified related to the EMP to ensure that required mitigation measures are in place, which complies with the appropriate safeguard policies.

Table 3-1 : Summary of the anticipated impacts and specific mitigations measures during the construction and operation phases

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
(i) Activities related to initial mobilisation and establishment of the site					
1. Felling of trees and vegetation clearance	a. Loss of habitats b. Disturbance to the wildlife migratory paths and their movements c. Induce human-elephant conflict d. Habitat deterioration and threat to the fauna and flora	<ul style="list-style-type: none"> The vegetation clearance in the protected areas (Elahera Girthale sanctuary area) should be carried out in section wise based on the approved construction schedule with the DWC and proper communication to be adopted with the respective parties to avoid issues The centreline and exact working areas within the 40m strip to be marked on ground prior to start tree felling, to identify the exact number of trees to avoid unnecessary tree felling The Contractor shall remove only the required trees that would disturb the construction activities within the 40 m belt identified /marked along the canal trace from 0+100 km to 3+860 km as per the attached list in the Annex 4 (excluding canal deviation from 2+820 km to 3+860 km). The tree list for the deviated section would be marked by the officers of the Forest Department (FD) once the approval is granted, as the deviated section is falls under FD authority. No site clearance to be done along the entire trace, which could result opening the sanctuary for the public access, enhance disturbance for wildlife movements and habitat fragmentation If there are any trees to be removed, the Contractor must obtain required approval from the DWC under the guidance of Environmental Specialist of PMDSC and PMU In advance of tree felling and vegetation removal, PMU shall carry out tree transplanting and animal translocations where necessary as per the Wild Life Management Plan recommendations. If the translocation programs to be conducted, PMU needs to plan it in advance identifying the list of species to be translocation, suitable season for the translocation, followed by a proper monitoring program to ensure the maximum survival rate of the translocation species from the site. 	<ul style="list-style-type: none"> The approval from relevant government agency (Local authority / DWLC / FD) is obtained for the all pre-identified and marked trees to be removed which are more than 30 DBH/cm Trees are removed from the site before starting the construction activities contacting concerned department (Timber cooperation/ Local authority etc) Reforestation program is initiated by the Contractor as per the guidance given in the EMP and contract documents and the habitat loss to planted area (Ha) should be 1:3 ratio No burning of vegetation parts within the construction site Excess vegetation 	Contractor to implement PMU/PMDSC to guide the Contractor EO of Contractor, Environmental officer of PIU and the environmental specialist of PMU	Weekly during the pre-construction stage

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> Trees shall be removed from the construction sites before commencement of construction with prior permission from the DWC and with the Timber cooperation. Compensatory plantation by way of Re-plantation of at least 3 times over the number of trees cut should be carried out in the project area. Contractor shall make every effort to avoid removal and/or destruction of trees of religious, cultural and aesthetic significance. If such action is unavoidable the Engineer shall be informed in advance and carry out public consultation and report on the same should be submitted to the Resident Engineer. Contractor shall adhere to the guidelines and recommendations made by the Central Environmental Authority, if any with regard to felling of trees and removal of vegetation. Removed trees must be handed over to the Timber Corporation Precautions to be taken to avoid introducing/spreading of any invasive species during site clearance 	matter is properly disposed or allow to re-use by the community		
2. Construction of labour camps	a. Contamination of receptors (water, land, air) b. Environmental & Social damages c. Social unrest	<ul style="list-style-type: none"> The location, layout and basic facility provision of labour camp must be submitted to the Engineer prior to their construction. The location of labour camps must be strictly avoided the areas of wildlife/forest protected, any areas with environmental and social sensitivity (near religious places, schools, canal reservations etc.) The contractor should give priority to hiring labour from the surrounding areas to avoid the need for labour camps The prior approval of Pradeshiya Sabha-Local Authority shall be obtained for construction of labour camp The construction will commence only upon the written approval of the Engineer. The Contractor shall maintain necessary living accommodation and ancillary facilities in functional and hygienic manner 	<ul style="list-style-type: none"> Site is not established within areas protected under FFPO and FO Site Management Plan for the camp available and Camp is installed strictly in accordance with Safety Management Plan Labour camps with proper facilities such as enough spaces, ventilation, beds, 	Self-monitoring by EO of the Contractor EO of PIU and Resident Engineer of PMDSC for supervision	Weekly inspection during the Pre-construction period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>and as approved by the Engineer.</p> <ul style="list-style-type: none"> • All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp must be planned and implemented with concurrence from the Local Public Health Inspector (PHI) • Adequate health care is to be provided for the work force. The layout of the construction camp and details of the facilities provided should be prepared and shall be approved by the engineer. • The required training, notices and sign boards in and around the site related to best construction & engineering practices, occupational health and safety, communicable diseases, best behavioural practices shall be facilitated by the Contractor at the labour recruitment • The procedural and infrastructural requirements for emergency responses shall be incorporated in to the camp site construction plan and be duly made available • Labour camp sites after use should be cleared and the site should be reinstated to previous condition at the close of the construction work. 	<p>mosquito nets, lavatories, bathing facilities, drinking water are available</p> <ul style="list-style-type: none"> • Waste water collection and treatment is implemented properly • The sewage system for the camp is planned and implemented with concurrence from the Local Public Health Officer (PHI) • Camp is kept clean from debris, garbage, etc. Waste is collected and disposed of in approved sites 		
3. Material Sourcing	<p>a. Resource depletion</p> <p>b. Damage to wildlife, forest resources</p> <p>c. Environment Pollution</p> <p>d. Health & safety issues</p>	<ul style="list-style-type: none"> • The contractor is required to ensure that sand, aggregates and other quarry material is sourced from licensed sources • The contractor is required to maintain the necessary licenses and environmental clearances for all borrow and quarry material they are sourcing –including soil, fine aggregate and coarse aggregates • Sourcing of any material from protected areas and/or designated natural areas, including tank beds, are strictly prohibited • If the contractor uses a non-commercial borrow/quarry sites, the sites should be remediated accordingly once material sourcing has been completed 	<ul style="list-style-type: none"> • Site is not established within areas protected under FFPO and FO Water and air quality • EPLs from CEA have been obtained and not expired • LGA permits are available Construction material storage areas • Obtained required ap- 	Resident Engineer of PMDSC for supervision and Contractor will execute EO of PIU to provide necessary guidance	Once a week during the Preconstruction and Construction Period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> The contractor should submit in writing all the relevant numbers and relevant details of all pre-requisite licenses etc. and report of their status accordingly. Selected quarry sites should have proper safety measures such as warnings, safety nets etc., and third party insurance cover to protect external parties that may be affected due to blasting. It is recommended not to seek material from quarries that have ongoing disputes with the community. The maintenance and rehabilitation of the access roads in the event of damage by the Contractor's operations shall be a responsibility of the Contractor. Copies of all relevant licenses should be maintained by the Contractor for review and documentation by the engineer 	<p>provals from the Defence Ministry to use/transport explosives for quarry operations</p> <ul style="list-style-type: none"> Borrow site reinstatement Approved site rehabilitation plan is available Operation manual is available on site Excessive site noise managed by restricting operating hours Noise & vibration level has been checked periodically Dust control is implemented No spreading of invasive species promoted No unnecessary or improper interference has been done to the convenience of public, access, occupation of public, private road, or foot paths 		
4. Water for construction activities	a. Resource depletion b. Community unrest	<ul style="list-style-type: none"> The contractor should arrange adequate supply of water for the project purpose throughout the construction period from a source agreed upon with the engineer. 	Obtained required approvals from relevant line agencies	Resident Engineer of	Once a week during the

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> Water may not be obtained for project purposes, including for labor camps, from public or community water supply schemes without a prior approval from the relevant authority. Extraction of water from ground water or surface water bodies without the permission from Engineer and the relevant authority Permission for the extraction of water should be obtained prior to the commencement of the project, from the relevant authority 	(NWSDB/water resources board)	PMDSC for supervision and Contractor will execute EO of PIU to provide necessary guidance	Preconstruction and Construction Period
5. Power for construction work	a. Risk of electrocution	<ul style="list-style-type: none"> Proper CEB power supply to be obtained adhering to the National regulations All electrical wiring and supply related work should confirm to British Standards (BS) or relevant Sri Lankan Standards. Adequate precautions will be taken to prevent danger of electrocuting from electrical equipment and power supply lines including distribution boards, transformers, etc. Measures such as danger signboards, danger/red lights, fencing and lights will be provided to protect the public and workers. All electric power driven machines to be used in the construction shall be free from defect, be properly maintained and kept in good working order, be regularly inspected and as per BS provisions and to the satisfaction of the Engineer 	Obtained required approvals from relevant line agencies (CEB/ Local authority)	Resident Engineer of PMDSC for supervision and Contractor will execute EO of PIU to provide necessary guidance	Once a week during the Preconstruction and Construction Period
6. Handling and storage of explosives	a. Risk of wild fire b. Disturbance to the wildlife behaviours c. Risk of safety and accidents	<ul style="list-style-type: none"> Except as provided in the contract or ordered or authorized by the Engineer, the Contractor shall not use explosives. Where the use of explosives is ordered or authorized, the Contractor shall comply with the requirements of the following as applicable; <ol style="list-style-type: none"> The handling of explosives to the site and on the site, will be carried out by the supplier and blasting contractor under a license to conduct such work Transportation of explosives from the explosive supplier to the quarry areas will be conducted in such a 	Obtained required approvals from relevant line agencies (DWC/Police station/ Regional Explosive controller)	Resident Engineer of PMDSC for supervision and Contractor will execute EO of PIU to provide necessary guidance	Once a week during the Preconstruction and Construction Period

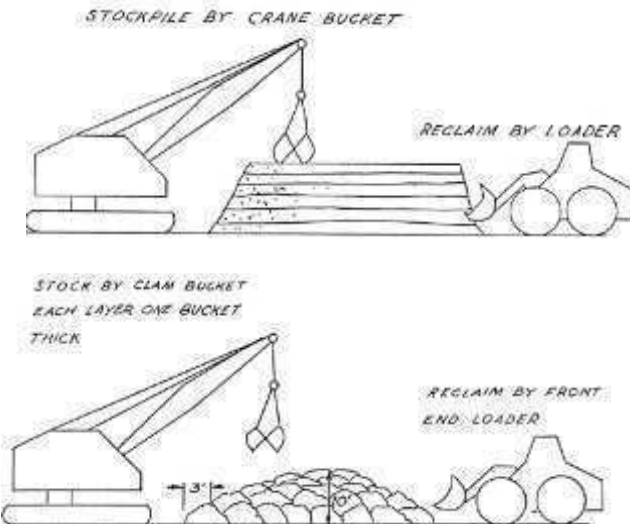
Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>manner as to safeguard human health and prevent impacts on the environment. The transfer will be arranged so that, delays between the points of transfer are minimized, explosives are not left at any location other than designated locations and explosives are not left unattended during transportation.</p> <p>iii. Explosives transported from the explosives supplier to the site will be transported by fully licensed and certified transport carriers; always utilizing a double-driver system; clearly visible signs marked "EXPLOSIVES" in letters not less than 150 mm in height when carrying explosives; equipped with correct fire extinguisher; carriers not be refuelled if explosives or detonators are on board except where the mobile equipment is designed and used solely for transportation of bulk blasting agents and have its engine shut off and its parking brake engaged while loading or unloading explosives, except where the vehicle uses an engine-powered device for loading and unloading.</p> <p>iv. Storage of Explosives in magazines, to be fully licenced, equipped with security reader system and proper locking system as per GoSL regulations</p> <p>v. On site storage near the work site to be made when required only, and would be placed in designated work area under constant (24 hour) watch/supervision. Explosives will never be left unattended, at any time.</p> <p>vi. Locations of the magazines/ storage areas will be site specific and will follow the guidelines below;</p> <ol style="list-style-type: none"> a minimum of 500 metres away from camps or any structures that frequently house personnel, any environmentally sensitive area a minimum of 500 metres away from project activities set on flat terrain to reduce the risk of spillage 			

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>d. area around magazines to be flagged with required signage and no other fire forming agents/ fuels etc. to be around (within 100 m)</p> <ul style="list-style-type: none"> The Contractor shall at all times take every possible precaution and shall comply with relevant laws and regulations relating to the importation, handling, transportation, storage and use of explosives. Contractor shall obtain Ministry of Defense (MoD) approval for importing and handling explosives and keep the Local Police informed of the same Only trained and certified persons will work with explosives. The explosives personnel will undertake formal training and on-the-job training to ensure compliance with legislation. Internal audits and inspections of all components related to the explosives management will be conducted on a regular basis by qualified personnel, and the results recorded according to quality and safety standard operating procedures. All recommendations and orders made by regulators and inspectors will be responded to and acted upon accordingly. 			
7. Storage of fuel, oil and toxic substances	<p>a. Safety and Fire risk</p> <p>b. Pollution due to leakages, spills</p>	<ul style="list-style-type: none"> All fuel storage in construction site should be fenced and stored only within the fuel storage container. Fuel storage area should not be near any water source or source of explosive, ignition areas (within 100 meters) Hazardous materials should be stored in the storage device explicitly specified. Such as fuel, oil and paint and other dangerous items should also develop temporary storage requirements. The storage area is limited to the persons concerned before entering The point should also be stored in the vehicle from damage, and regularly check for leaks, damage and contamination Machinery and equipment maintenance is limited to be within the scope of the contractor camp. Operating surface (i.e., within the fenced area of the concrete floor) must be 	Obtained required approvals from relevant line agencies (DWC/Local Gov Authority)	Resident Engineer of PMDSC for supervision and Contractor will execute EO of PIU to provide necessary guidance	Once a week during the Preconstruction and Construction Period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>designed properly to ensure that oil and other fuel can concentrate to a suitable container . In the event of oil / fuel leaks, remove contaminated soil is required to properly licensed locations for processing</p> <ul style="list-style-type: none"> To prevent grease, oils, fuels, solvents and chemicals for water and soil erosion caused by pollution or must always adopt appropriate preventive measures 			
(ii) Environmental impact management issues related to construction activities					
8. Excavation and blasting activities involved in cut and cover sections	<p>a. Dust, noise and vibration</p> <p>b. Habitat deterioration</p> <p>c. Loss of fauna and flora</p> <p>d. Terrifying wildlife and possible human - wildlife conflicts due to their aggressive behaviours</p>	<ul style="list-style-type: none"> Prior approval to be obtained from the DWC and blasting to be carried out under the guidance of DWC as the project area is within the jurisdiction of FFPO The contractor shall modify the method of construction until compliance with the criteria, if vibration levels exceed the relevant vibration criteria²(considering type 3 and 4 structure types made up of lighter construction and archeologically sensitive areas) Prior to commencement of excavation, blasting activity, the Contractor shall undertake a condition survey of existing structures within the zone of influence, as agreed with the relevant government agencies and the Engineer Contractor shall carry out monitoring at the nearest vibration sensitive receptor during blasting or when other equipment causing vibrations are used Contractor shall pay due consideration on vibration impacts of blasting on adjoining structures. Explosive loads shall be determined so that excessive vibration can be avoided and blasts shall be controlled blasting in nature. Notwithstanding to these provisions contractor is liable for any damage caused by blasting work Blasting shall be carried out during fixed hours (preferably 	Obtained required approvals from relevant line agencies (DWC)	Resident Engineer of PMDSC for supervision and Contractor will execute EO of PIU to provide necessary guidance	Once a week during the Preconstruction and Construction Period

² Interim Standards for vibration of the Operation of Machinery, Construction Activities and Vehicle Movements Traffic – Vibration in PPV, 2-8 mm/sec
Interim Standards on Air Blast Over Pressure and Ground Vibration for Blasting Activities; less than 5 in PPV, mm/sec

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		during mid-day), as permitted by the Engineer. The timing should be made known to all the people within 500 m (200 m for pre-splitting) from the blasting site in all directions. People, except those who actually light the fuse shall be excluded from the area of 200 m (50 m for pre-splitting) from the blasting site in all directions at least 10m minutes before the blasting.			
9. Maintaining disposal and dumping sites	a. Resource depletion b. Damage to wildlife resources c. Environment Pollution d. Health & safety issues e. Dust impacts, stability, potential impact to underlying infrastructure and fire risk. f. In addition to adverse health and amenity impacts from dust, odour and leachate, outdoor stockpiles of materials can also harbour vermin such as rodents and mosquitoes which may lead to the risk of diseases.	<ul style="list-style-type: none"> • The topsoil will be managed separately from overburden material and placed in stockpiles for use in reclamation activities. • Earth, metal available from construction site excavation works as per design, may be used as fill materials on the cur and cover sections, subject to approval of the engineer • The identified disposal sites for the UEC ICB1 construction package are given in the Figure 1-1. • Maximum stockpile heights for material management or resource recovery activities shall be in the range of 3–5 metres. • The height of stockpiles should generally be lower than surrounding structures. Stockpiles should generally be below fence lines when within five metres of the site boundary. • Stockpiling needs to be conducted with materials flow and capacity of the site in mind. That is, the stockpiling of materials must not be a process of continual growth, but needs to be a balanced and systematic approach to materials input, processing, output, storage, reuse or sale and removal offsite, to demonstrate responsible and sustainable management for recycling and reuse. 	<ul style="list-style-type: none"> • Site is not established within areas protected under FFPO and FO Water and air quality • EPLs from CEA have been obtained and not expired • LGA permits are available Construction material storage areas • Borrow site reinstatement • Approved site rehabilitation plan is available • Operation manual is available on site • Excessive site noise managed by restricting operating hours • Noise & vibration level has been checked periodically • Dust control is implemented on dump, excavation or topsoil 	Resident Engineer of PMDSC for supervision and Contractor will execute PIU- EO to supervise	Once a week during Pre-construction and Construction Period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		 <ul style="list-style-type: none"> • The waste rock material and aggregates can be piled separately and encourage the other developers to reuse such material at a reasonable rate and the earned money to be used on site rehabilitation activities • Storage and stockpiling should be considered as a temporary measure and there must be no stockpiling for speculative purposes; an immediate market should exist for a material being stored for recycling or reuse. An immediate market means that it is an identified and recognised market as demonstrated by the existence of a known customer with a demonstrated and available beneficial use for the material. • Materials must be stored away from surface watercourses, flood zones and groundwater recharge areas to prevent environmental harm to water. • Ensure appropriate separation distances to assist in the minimisation of the potential for adverse impacts such as odour, dust, noise and other impacts on amenity. 	<p>stockpile site</p> <ul style="list-style-type: none"> • Slopes are stable and no possibilities of eroding / landslides • Sediment laden run-off from excavation or dumping sites does not enter natural water courses • No water ways/ bodies blocked • Water logging is not evident in the site • No soil/water contamination from oil/fuel/leachate /debris etc. • No damage to important flora/fauna or habitats • No human - wildlife conflicts • No spreading of invasive species promoted • No unnecessary or improper interference has been done to the convenience of public, access, occupation of public, private road, or foot paths • No materials have 		

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> Controls such as barriers, covering, minimised storage timeframes and generally good housekeeping should be implemented to help mitigate potential impacts from vermin Depending on the size and composition of the stockpile, there should be sufficient spacing between stockpiles to allow access in case of emergency and to help prevent the spread of fire. This spacing should at least be equal to the height of the stockpile or adequate for emergency vehicle access, whichever is the greater. The Contractor shall comply with the environmental requirements/guidelines issued by the CEA and the respective local authorities in respect of locating borrow areas and with regard to all operations related to excavation and transportation of earth from such sites. No disposal-sites be used (currently approved) or newly established within areas protected under FFPO and FO All borrow pits/disposal areas should be rehabilitated at the end of their use by the Contractor in accordance with the requirements/guidelines issued by the CEA and the respective local authority. 	<p>been stacked or placed to cause danger or inconvenience to any person or the public</p> <ul style="list-style-type: none"> Tires of vehicles are free of mud and entrained material before entering public roads Public roads are cleaned of any material dropped during transit Haulage routes and the vehicle fleet schedules are strictly followed to ensure no traffic congestions 		
10. Information Disclosure among Stakeholders	a. Social unrest b. Disturbances to the livelihood	<ul style="list-style-type: none"> Discussions should be conducted with the residents who reside around the immediate vicinity of the construction site; provide them with information on the project activities muster their views for possible impact mitigation as this will also ensure a good rapport and less complains. This should be done immediately once the Contractor is mobilized. The Community organizations and religious chiefs to be addressed and discuss the expectations and project interventions, and arrange the method of communication during the project activities where necessary The Contractor will maintain a log of any grievances/complaints and actions taken to resolve them. (Types of complaints, numbers of complaints, how complaints were resolved, numbers unresolved, those sent to next level of 	<ul style="list-style-type: none"> People informed about the project activities prior to the Contractor mobilization People are notified on inconveniences, road closure, stopping water issue in the canals, drinking water supply, electricity breaks, etc., Meeting with community members 	EO & Social & Resettlement Officer of PIU Resident Engineer of PMDSC for supervision Contractor will execute	Every 2 weeks

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>GRM, satisfactory outcome etc.)</p> <ul style="list-style-type: none"> A copy of the approved EIA report, the CEA Approval and any other approval issued by Government Authority and the EMP should be available at all times at the project supervision office on site. 	<p>on construction activities, environmental impacts and mitigation measures held</p> <ul style="list-style-type: none"> Grievance Log maintained Complaints observed during the last visit addressed 		
11. Health & Safety related to all construction activities	a. Public and Worker Safety	<ul style="list-style-type: none"> The construction site should be barricaded at all time in a day with adequate marking, safety tape, flags, reflectors etc. for safety of individuals using the site daily basis. (Items such as parking cones, lights, tubular markers, orange and white strips and barricades of a luminous nature for night visibility shall be procured where deemed necessary) At all times, the Contractor shall provide safe and convenient passage for vehicles, pedestrians and livestock. Work that affects the use of existing accesses shall not be undertaken without providing adequate provisions to the prior satisfaction of the Engineer. <ul style="list-style-type: none"> a) Alternative accesses to be arranged; b) Adequate signage for detours is provided. The construction site should be clearly demarcated by the above means and restriction of access to public to the site will help the safety of public. Safety signboards should be displayed at all necessary locations. The Contractor should obtain a Third party insurance to compensate any damages, injuries caused to the public or labourers during the construction period. All construction vehicles should be operated by experienced and trained operators under supervision. Basic on-site safety training should be conducted for all la- 	<ul style="list-style-type: none"> Warning signs and exclusion barriers erected around work site areas Workers are provided with and are using the uniform, applicable safety / protection equipment for site conditions Worker's health checks implemented Sanitary-hygienic conditions for workers are provided: drinking and washing water supply, mealtime utilities, toilets, rest time, resting areas etc. First aid kit is available on-site and is accessible to all workers Fire extinguisher 	Contractor will execute and EO of PIU with the supervision engineers will monitor under the supervision of RE	Every 2 weeks during the Construction period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>bourers during the EMP training prior to the start of the construction activities.</p> <ul style="list-style-type: none"> • All digging and installation work should be completed in one go, if this task is not accomplished in the area should be isolated using luminous safety tape and barricading structures surrounding the whole area. • Trenches should be progressively rehabilitated once work is completed. • Material loading and unloading should be done in an area, well away from traffic and barricaded • Construction wastes should be removed within 24 hours from the site to ensure public safety. • The procedural and infrastructural arrangements shall be in place to ensure the compliance with the Labor Law of Sri Lanka (Factories Ordinance Act No. 45 of 1942) and the Core Labor Standards 2006 (ADB & ILO) and as otherwise required by the Program Health and Safety manual (and updated documents) prepared by the PMDSC • Health and safety manual to be referred followed by the training conducted by the Health and Safety Specialist of PMDSC • Emergency management plan included in the Health and safety manual to be updated accordingly considering site conditions related to the UEC-ICB 1 construction package which is located in a wild life protected area. • Contractor to be prepared with emergency Management by establishing communication links with key agencies, resource allocation and continuity through mock drills etc. to promptly address the potential links of fire, chemical pollution, wild animal attacks, impact on wild animals, health impacts on workforce etc. 	<p>available</p> <ul style="list-style-type: none"> • Security/emergency alarms/ lighting etc are in place • Copy of ERP and emergency contact list are available, updated and posted in a visible place at all work sites • Accident report maintained • Damage of utilities and/or other structures managed • Program' H&S Manual and its updates • Maintained Risk Register 		
	b. Safety Gear for Labor	<ul style="list-style-type: none"> • Protective footwear and protective goggles should be provided to all workers employed in mixing of materials like cement, concrete etc. 			

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> Welder's protective eye-shields shall be provided to workers who are engaged in welding works. Earplugs shall be provided to workers exposed to loud noise, and workers working on crushing, compacting, or concrete mixing operation. The Contractor shall supply all necessary safety appliances such as safety goggles, helmets, safety belts, ear plugs, mask etc. to workers and staffs. In addition, the Contractor shall maintain in stock at the site office, gloves, ear muffs, goggles, dust masks, safety harness and any other equipment considered necessary. Safety gear should be worn for specific potential risks of a specified activity in which the worker is engaging. A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored on a monthly basis and recorded 			
	c. Prevention of accidents	<ul style="list-style-type: none"> Prevention of accidents involving human beings, animals or vehicles falling or accidents due to open trenches/manholes during the construction period. This needs to be ensured with proper barricading, signage boards and lighting etc. A readily available first aid unit, including an adequate supply of sterilized dressing materials and appliances should be available at the site office at all times Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital should also be insured. Safety protocols/ arrangements for working; (i) over heights, (ii) near or over water, (iii) during night time/ under poor lighting and (iv) in confined spaces etc. Site emergency response protocol including evacuation plan shall be available and displayed at key locations in the site. The evacuation route and assembly points shall be duly marked with sign boards and mock drill shall be undertaken in a defined time intervals. 			



Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> • A brief/ detailed site safety orientation (induction) shall be given to any new comer to the site by the Contractor's safety staff. • A qualified and experienced safety staff shall be available to ensure site safety compliance. • any person entering to the active work site shall wear necessary safety gears and follow the safety protocols • Names and contact information for emergency services such as Ambulance services, hospitals, police and the fire brigade should be prepared as a sign board and displayed at the work site. 			
12. Transport and Storage of construction materials and machinery operation	a. Spreading dust and impact due to hazardous material	<ul style="list-style-type: none"> • All material should be transported in fully covered trucks. Overloading of vehicles with materials should be controlled and done in a manner to suit the truck capacity and tailgates of the trucks should be closed. • Construction material such as cement, sand and metal should be stored in closed structures or in a contained manner. • Material haulage routes and stockpiling areas to be well defined with the prior approval of the respective authorities and the engineer, and all the measures to be followed by the suppliers to avoid any environmental issues (dust, noise, nuisance to public, traffic etc.) 	<ul style="list-style-type: none"> • Required licence and approval in compliance with CEA regulations • Emission from machineries has been controlled • All the machineries have been fitted with proper exhaust silencers • Exhaust silencers have been checked periodically • Tires of vehicles are free of mud and entrained material before entering public roads • Public roads are cleaned of any material dropped during transit 	EO of PIU will monitor with the assistance of supervision Engineers Contractor will execute under the self-monitoring of EO of the Contractor	Every 2 weeks during the Construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
			<ul style="list-style-type: none"> • Haul trucks use tarpaulins to cover loads for transportation on public roads • Haul truck tailgates and sides fit properly and do not allow material to fall on public roads • Haulage routes and the vehicle fleet schedules are strictly followed to ensure no traffic congestions 		
	b. Pollution of Soil and Water via Fuel and Lubricants	<ul style="list-style-type: none"> • The Contractor shall ensure that all construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites shall be located away from rivers, at least 200m away, and irrigation canal/ponds. • The Contractor shall ensure that all vehicles/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. • The Contractor shall arrange for collection, storing and disposal of oily wastes to the pre-identified disposal sites (list to be submitted to the Engineer) and approved by the Engineer. Oil spills and collected petroleum products will be disposed of in accordance with standards set by the CEA/MEMD. • The engineer will certify that all arrangements comply with the guidelines of CEA/MEMD or any other relevant laws. 	<ul style="list-style-type: none"> • Hazardous material are transported/ stored and handled as per the safety data sheet • All the locations are well identified and demarcated for vehicle parking, fuel / lubricants storage, vehicle, machinery and equipment maintenance and refuelling etc • Above sites are located away from rivers/ water ways, at least 200m away • Visual observations of waste remains left 	Supervision Engineers under RE will monitor EO of PIU will periodically monitor Contractor will execute under the self monitoring of EO of the Contractor Periodical water quality monitoring through qualified 3rd party consultant	Ever 2 weeks during the Construction phase Water quality monitoring every 3 months

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
			<p>onto the soil surface (oil spills, grease patches, any other chemical spillage etc.)</p> <ul style="list-style-type: none"> • Vehicles and machinery are up to the standard operation conditions (standard emission conditions, no oil/grease leak etc.) 		
13. Clearing of site removal and disposal of construction debris and excavated materials	<p>a. Environmental Pollution</p> <p>b. Nuisance to the public</p>	<ul style="list-style-type: none"> • During site clearance activities, removal of vegetation and debris must be carried out swiftly and in well-planned manner. • The Contractor shall identify the sites for disposal of material cleared. • Plants, shrubs and other vegetation cleared should not be burned on site. • Spoil and other disposal materials should only be dumped at sites for which prior approval from relevant authorities such as the Local Authority has been obtained. Taking into account the following • The dumping does not impact natural drainage courses • No endangered / rare flora are impacted by such dumping • Should be located in non-residential areas located on the downwind side • Located at least 100m from the designated forest land. • Avoid disposal on productive land. • Should be located with the consensus of the local community, in consultation with the Local Authority and the relevant Road Development Authority • Minimize the construction debris by balancing the cut and fill requirements. • The Contractor should avoid any spillage of spoil when transporting such materials to the approved material dumping sites. 	<ul style="list-style-type: none"> • The work site and the surrounding area kept clean free from debris, garbage, etc. • Sign boards in place to direct / notify about waste / spoil disposal location and mechanism within and around the work site • EPL for waste water treatment facilities and waste disposal sites are obtained and up-to-date • Drainage paths not blocked • Construction wastes are removed within 24 hours from the site • Hazardous material are transported/ stored and handled as 	Supervision Engineers under RE will monitor EO of PIU will periodically monitor Contractor will execute under the self-monitoring of EO of the Contractor	Every 2 weeks during the Pre-Construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> Hazardous waste shall be disposed of as per the Schedule VIII of Part 11 of the National Environmental (Protection & Quality) Regulation No. 1 of 2008, as amended by the gazette notification No. 1534/18 dated 01 February 2008 on the generator of scheduled waste 	<ul style="list-style-type: none"> per the safety data sheet Waste disposal sites are located away from rivers/ water ways, at least 200m away and 100 m away from the forest lands 		
14. Activities related to significant noise and vibration	a. Noise from vehicles, machinery and equipment	<ul style="list-style-type: none"> Noise generating work should be limited to day time (6:00AM to 6:00PM). No work that generates excessive noise should be carried out during the night hours where in close proximity (from 6:00PM to 6:00AM on the following day). All equipment and machinery should be operated at noise levels that do not exceed the permissible level of 75 dB (during construction) for the daytime. For all construction activities undertaken during the night time, it is necessary to maintain the noise level at below 50 dB as per the Central Environmental Authority (CEA) noise control regulations All equipment should be in good serviced condition. Regular maintenance of all construction vehicles and machinery to meet noise control regulations stipulated by the CEA in 1996 (Gazette Extra Ordinary, No.924/12) must be conducted for vehicles/machinery that will be used in construction on the site and for transport. Ideally noise generating work should not be carried out during public holidays and religious days. Special care should be taken as there is a temple nearby. Labour gangs should be warned to work with minimum noise. Strict labour supervision should be undertaken in this respect. Number of night time resident labourers should be minimized. 	<ul style="list-style-type: none"> Construction equipment - estimated noise emissions and operating schedules Allowable noise levels in the boundary of construction sites are kept below 75 dB in day time. Operation hours Allowable vibration limits as per the CEA interim standards (2008) and World Bank EHS guidelines Stationary construction equipment are kept at least 500m away from sensitive receptors (temporary, schools, public places etc.) 	Supervision Engineers under RE will monitor EO of PIU will periodically monitor Contractor will execute under the self monitoring of EO of the Contractor Periodical Noise & Vibration monitoring through qualified 3rd party consultant through an accredited laboratory	Every 2 weeks during the Construction phase Noise & Vibration quarterly year concerning the construction activity schedule
	b. Vehicular noise pollution at residential / sensitive receptors	<ul style="list-style-type: none"> Idling of temporary trucks or other equipment should not be permitted during periods of loading / unloading or when they are not in active use. The practice must be ensured, especially near residential / commercial / sensitive areas. 	<ul style="list-style-type: none"> Idling of temporary trucks or other equipment are not permitted during periods of 	Supervision Engineers under RE will monitor	Every 2 weeks during the Construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> Stationary construction equipment will be kept at least 500m away from sensitive receptors, where possible. These include places of worship and households. All possible and practical measures to control noise emissions during drilling shall be employed. Contractor shall submit the list of high noise/vibration generating machinery & equipment to the engineer for approval. Servicing of all construction vehicles and machinery must be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced. Maintenance of vehicles, equipment and machinery shall be regular and up to the satisfaction of the Engineer to keep noise levels at the minimum. 	<p>loading / unloading or when they are not in active use</p> <ul style="list-style-type: none"> The vehicles/ machineries used by the Contractor (specially the high noise & vibration generating) is as per the list approved by the RE and no additional are used 	EO of PIU will periodically monitor Contractor will execute under the self-monitoring of EO of the Contractor	
15. Activities related to the emission of dust	a. Impact of dust	<ul style="list-style-type: none"> Ambient air quality and emission levels to be maintained as per the World Bank EHS guidelines (2007) as these standards are more stringent than the GoSL standards, gazetted under NEA. All construction materials such as sand, metal, lime, bricks etc. Should be transported under cover to the site and stored under cover at the site. Plastic sheeting (of about 6 mm minimum thickness) can be used and held in place with weights, such as old tires or cinder blocks, with the edges of the sheeting buried, or by the use of other anchoring systems. This will minimize the levels of airborne dust. 	<ul style="list-style-type: none"> Construction area is barricaded properly to avoid spreading dust/emissions etc Trucks are operating using covers Material stored under cover using proper anchoring systems Tires of trucks / machineries are cleaned before entering city roads Regular watering of access roads and the construction site Turfing of finished earthen structures Dust masks are provided for the workers 	Supervision Engineers under RE will monitor EO of PIU will periodically monitor Contractor will execute under the self monitoring of EO of the Contractor Periodical Ambient Air quality monitoring through qualified 3rd party consultant assigned to ac-	Every 2 weeks during the Construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> Mud patches caused by material transporting vehicles on the access road should be immediately cleaned  <ul style="list-style-type: none"> Continual water sprinkling should be carried out in the work and fill areas and the access road if dust stir is observed. Water sprinkling should be done more frequently on the days that are dry and windy (at least four times a day) as the levels of dust can be elevated during dry periods.  <ul style="list-style-type: none"> Dust masks should be provided to the labourers for the use at required times. 	<ul style="list-style-type: none"> and using at the required time Ambient air quality including dust levels monitored through an accredited laboratory during this week 	credited laboratory	
16. Activities related to the hindrance of	a. Impact of hindrance to surface runoff, soil erosion and sedimentation	<ul style="list-style-type: none"> The debris material shall be disposed in such a manner that the tank, canals and other existing drainage paths are not blocked. 	<ul style="list-style-type: none"> Drains not blocked by sediment or other debris 	Supervision Engineers under RE will monitor	Every 2 weeks during the Construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
surface run-off and soil erosion		<ul style="list-style-type: none"> • Drainage paths associated with the dam and other irrigation structures should be improved / erected to drain rain water properly. • Silt traps will be constructed to avoid siltation into the waterways, the tank and canals, where necessary. • To avoid siltation, drainage paths should not be directed to the tank and irrigation canals and they should be separated from these water bodies • Bund Embankment slopes, slopes of cuts, etc. Shall not be unduly exposed to erosive forces. These exposed slopes shall be graded and covered by grass or other suitable materials per the specifications. • All fills, back fills and slopes should be compacted immediately to reach the specified degree of compaction and establishment of proper mulch. • Work that leads to heavy erosion shall be avoided during the raining season. If such activities need to be continued during rainy season prior approval must be obtained from the Engineer by submitting a proposal on actions that will be undertaken by the Contractor to prevent erosion. • The work, permanent or temporary shall consist of measures as per design or as directed by the engineer to control soil erosion, sedimentation and water pollution to the satisfaction of the engineer. Typical measures include the use of berms, dikes sediment basins, fibber mats, mulches, grasses, slope drains and other devices. All sedimentation and pollution control works and maintenance thereof are deemed, as incidental to the earthwork or other items of work and no separate payment will be made for their implementation. 	<ul style="list-style-type: none"> • No flood due to construction work • Silt traps in places • No slope failures and cuts made according to technical standards specified in the design • Earth work is done during the dry spell • Turfing of completed embankments/ slopes • Grievance log for any public complaints related to erosion/slope failures etc • Visual observation of any turbidity of downstream water ways and erosion, slope failures, deposition of soil/sediment in the agriculture lands • Earth material & debris of the excavated material is properly placed / disposed/ re-use for back filling • Surface water quality measurements of the adjacent water ways as per the baseline conditions set at least 6 months prior to the contract mobilization 	EO of PIU will periodically monitor Contractor will execute under the self monitoring of EO of the Contractor	

Program Management, Design and Supervision Consultant

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
	<p>endemic and threatened fauna and flora species which have been identified during the ecological survey in the associated habitats of the project areas including the identified borrow sites</p> <ul style="list-style-type: none"> Habitat loss and pollution of water, including sedimentation, oil-grease contamination, emissions due to the operation of machinery and vehicles would affect the survival of such species Significant levels of noise and dust produced during material extraction, transportation and construction work, and due to heavy machinery there may be temporary disturbances to the animals (especially 	<p>to family Clusiaceae, recorded during the tree survey in between 1+150 km and 1+200 km of the canal trace closer the stream to be protected /translocated to the plant nursery and replanted at a suitable habitat within the project area</p> <ul style="list-style-type: none"> If any other similar critical species is found, the same procedure to be followed under the instructions of the Environmental specialist PMDSC Construction workers shall be instructed to protect fauna, including wild animals and aquatic life as well as their habitats. Hunting, poaching and unauthorized fishing by project workers is not allowed. No solid or liquid waste should be dumped into natural habitats 			

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
	migratory birds) inhabiting in the associated wetlands				
	f. The threat of spreading of alien invasive species	<ul style="list-style-type: none"> • Close monitoring of transportation, storage of borrowing material for the spread of any invasive species must be done. Vehicles should be covered during transportation. • Washing the vehicles periodically to prevent carrying any invasive species • All the material transporting vehicles must be covered during transportation. Frequent checks for invasive species must be undertaken by the Environmental Officer of PMU and the Contractor (having a sound ecological background). 	<ul style="list-style-type: none"> • Monthly inspection of soil storage areas, wash down areas, vehicle parking areas and disposal sites for the presence of weeds or alien invasive species by an experienced / knowledgeable Environmental officer with • Community awareness about the invasive species spreading, causes, prevention etc. 	EO of PIU will monitor	Frequent monitoring during the specific activities take place
	g. Impact on aquatic fauna and flora due to possible disturbances to the existing stream network and Kongetiya tank	<ul style="list-style-type: none"> • Natural water paths and valleys should be kept free from any obstruction through any kind of construction or disposal of soil/rocks etc. • The project area must be barricaded properly using sand bags to avoid disturbances to the naturalized habitats existing at the level crossings • Construction work to be carried out in the dry spell 	<ul style="list-style-type: none"> • Records on fish die • Turbidity and other water quality parameters 	EO of PIU will monitor	Every 2 weeks during the construction phase
	h. Dispersion of excavated material in nearby wetlands and adjoining wildlife /forest areas	<ul style="list-style-type: none"> • The excavated matter should be timely disposed to the identified disposal sites, so that that dispersion can be avoided. • As far as possible, the excavated material shall be used for construction activities like (i) strengthening of bank or (ii) formation of embankments. If the material is going to be used for this purpose, then it should be timely used, so that the detrimental effects of the de-silted matter can be minimized 	<ul style="list-style-type: none"> • Visual inspection 	Supervision Engineers under RE will monitor EO of PIU will periodically monitor Contractor will execute under	Every 2 weeks during the construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
				the self monitoring of EO of the Contractor	
	Impact on Social Environment				
	a. Disruption to people due to access issues	<ul style="list-style-type: none"> At all times, the Contractor shall provide safe and convenient passage for vehicles, pedestrians and livestock. Work that affects the use of existing accesses shall not be undertaken without providing adequate provisions to the prior satisfaction of the Engineer The works shall not interfere unnecessarily or improperly and ensure convenience of public at all times On completion of the works, all temporary obstructions to access shall be cleared away, all rubbish and piles of debris that obstruct access be cleared to the satisfaction of the Engineer Providing advance information to the public about the planned construction works and activities causing disruption to access and the temporary arrangements made to give relief to public in order to avoid any inconveniences due to the construction activities 	<ul style="list-style-type: none"> Complaints from the Community Grievance log 	EO & Social & Resettlement Officer of PIU Resident Engineer of PMDSC for supervision Contractor will execute	Every 2 weeks

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
	b. Traffic control and safety	<ul style="list-style-type: none"> The Contractor shall take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as may be required by the Engineer for the information and protection of traffic approaching or passing through the construction area. The provision of traffic safety measures shall be considered incidental to work and follow The Institute for Construction Training and Development (ICTAD) guidelines and instructions given by the Police, if any Vehicles travelling in and out of the PA should maintain a low speed of less than 30 kmph and require that the contractor put sign posts in those locations giving speed limits In the event the road within the PA is blocked by wildlife the contractor will not disturb the wildlife until they move away from the path, with noise or other means 	<ul style="list-style-type: none"> Visual Observation Speed limits and required sign boards Complaints from the Community 	EO & Social & Resettlement Officer of PIU Resident Engineer of PMDSC, PRDA for supervision and Contractor will execute	When applicable
Impact on Physical Environment					
	a. Noise pollution & vibration	<ul style="list-style-type: none"> The Contractor & the Site Engineer shall ensure to comply with the mitigatory measures described under Activity # 13 (Environmental Impact Management) of this Table 3.1. 	<ul style="list-style-type: none"> Construction equipment - estimated noise emissions and operating schedules Allowable noise levels in the boundary of construction sites are kept below 75 dB in day time. Operation hours 	Supervision Engineers under RE will monitor EO of PIU will periodically monitor Contractor will execute under the self monitoring of EO of the Contractor	Every 2 weeks during the construction
	b. Wastes of machinery or vehicles; <ul style="list-style-type: none"> The leftover / used / discarded oil 	<ul style="list-style-type: none"> It should be ensured by the executing entity that, the machines and vehicles (for the purpose of silt transportation) should be properly serviced and well-maintained. These should be handled by expert staff. 	<ul style="list-style-type: none"> Visual Inspection and continuous monitoring 	Supervision Engineers under RE will monitor	Every 2 weeks during the construction

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
	and/or greases could cause environmental pollution, may be water pollution <ul style="list-style-type: none"> • If the waste goes to canals/water-bodies/other water sources • Soil pollution if the waste remains left onto the soil surface 	<ul style="list-style-type: none"> • Any leftover/used/discarded oil and/or greases should not be allowed to be disposed off at the site, so that the associated pollution can be avoided. • Any leftover/ used/ discarded oil/ greases shall be disposed in compliance with the CEA regulations and Local Authority guidelines. 		EO of PIU will periodically monitor Contractor will execute under the self monitoring of EO of the Contractor	
	c. In the absence of a comprehensive disposal plan, there could be overall environmental degradation in that particular area. d. Degradation/pollution of local water-bodies	<ul style="list-style-type: none"> • Close supervision should be kept to ensure proper disposal / stockpiling of excavated material and construction waste at pre-decided & approved sites, as per the plan (Figure 1-1). (CEMP should clearly indicate such) • After the completion of work in a+ .n area, it should be ensured that the area gets restored to its original shape; in addition to this no excess machinery should be kept • If there are any excess of excavated material unused for back-filling, should be disposed in a predicated/ approved site and site need to be treated properly; 	<ul style="list-style-type: none"> • Visual Inspection and continuous monitoring • Proper disposal plan in place including storage areas etc. • Public complaints 	Supervision Engineers under RE will monitor EO of PIU will periodically monitor Contractor will execute under the self monitoring of EO of the Contractor	When applicable
	e. Hindrance to surface runoff f. Increasing the possibilities of erosion	<ul style="list-style-type: none"> • Contractor's activities shall not lead to flooding conditions as a result of blocked drainage paths and drains. • The contractor shall take all measures necessary or as erected by the Engineer to keep all drainage paths and drains clear of blockage at all times • If flooding or stagnation of water is caused by contractor's activities, contractors shall provide suitable means to (a) prevent loss of access to any land or property and (b) prevent damage to land and property. Contractor shall compensate 	<ul style="list-style-type: none"> • Turbidity of downstream water ways • Public complaints 	Supervision Engineers under RE will monitor EO of PIU will periodically monitor Contractor will execute under	Every 2 weeks during the construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		for any loss of income or damage as a result <ul style="list-style-type: none"> Contractor's activities shall not lead to aggravate floods in flood prone areas when working in flood prone areas. When working in flood prone areas during rainy season the contractor shall avoid storing materials, chemicals and other items of work in areas where those can be washed away by the floods. 		the self monitoring of EO of the Contractor	
	g. Increase in vehicular traffic during transport of construction materials	<ul style="list-style-type: none"> A proper traffic management plan should be in place, including a route diversion/alternative routes where applicable. 	<ul style="list-style-type: none"> Vehicle fleet Transport routes taken by construction related vehicles Implementation of traffic management where necessary 	Supervision Engineers under RE will monitor EO of PIU will periodically monitor Contractor will execute under the self monitoring of EO of the Contractor	Every 2 weeks during the construction phase
	h. Health problem may occur due to poor sanitation facilities and breeding of mosquitoes. Poor solid waste management shall be a major concern.	<ul style="list-style-type: none"> The Contractor shall take all precautions to prevent odour and offensive smell emanating from chemicals and processes applied in construction works or from labor camps. In a situation when/ where odour or offensive smell does occur, the Contractor shall take immediate action to rectify the situation. The Contractor is responsible for any compensation involved with any health issue arisen out of bad odour and offensive smells. To prevent the breeding of vectors, the labor camps should be kept clean and hygienic. If there is any outbreak of disease, then the MOH or PHI of the area should be informed immediately. PHI and his staff to be requested for fumigation anti-mosquitoes chemicals at regular period to avoid spreading of Dengue, Malaria etc. 	<ul style="list-style-type: none"> Periodical checks of Water stagnating points Time framing Visual inspection of drainage and sanitation issues Appropriate selection of fill disposal and dispersal locations Presence of proper sanitation, water supply and waste disposal facilities 	EO of PIU will monitor	Every 2 weeks during the construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
			<ul style="list-style-type: none"> Complaints from the Community Grievance log 		
	i. Dust, soil & other debris materials are generated during earthworks	<ul style="list-style-type: none"> The Contractor & the Site Engineer shall ensure to comply with the mitigatory measures described under Activity # 14 (Environmental Impact Management) of this Table 3.1. 	<ul style="list-style-type: none"> Regular watering of access roads Turfing of finished earthen structures 		
	a. Loss of stripped top soil removed during excavation for edge widening	<ul style="list-style-type: none"> Top soil of the agricultural areas and any other productive areas where it has to be removed for the purpose of this project shall be stripped to a specified depth of 150mm and stored in stockpiles of height not exceeding 2m, if directed by the engineer. If the Contractor is in any doubt on whether to conserve the topsoil or not for any given area he shall obtain the direction from the engineer in writing Removed top soil could be used as a productive soil when re-planting/establishing vegetation Stockpiled topsoil must be returned to cover the areas including cut slopes where the topsoil has been removed due to project activities. Residual topsoil must be distributed on adjoining/proximate barren areas as identified by the engineer in a layer of thickness of 75mm – 150mm. Topsoil thus stockpiled for reuse shall not be surcharged or overburdened. As far as possible multiple handling of topsoil stockpiles should be kept to a minimum. 	<ul style="list-style-type: none"> Turbidity of downstream water ways Public complaints 	Supervision Engineers under RE will monitor EO of PIU will periodically monitor Contractor will execute under the self monitoring of EO of the Contractor	Every 2 weeks during the construction phase
Operation & Maintenance Phase					
1. Restoration of the eco-system	Aggravation of human wildlife conflict Habitat degradation Increase access to the sanctuary area	<ul style="list-style-type: none"> Implementing the recommendations given by the IUCN through the Wildlife Management Plan and EIA report Reforestation to be done in 3 times of habitat loss 	<ul style="list-style-type: none"> Conditions given by WDC 	Irrigation Department	Bi annually
2. Proper water management	Increased illegal cultivation	<ul style="list-style-type: none"> Water issue from the tanks, which are to be developed under the UEC ICB 1 and ICB3, located closer to the sanctuary 	<ul style="list-style-type: none"> Visual inspection 	Irrigation Department	Annually

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
	vation and encroachment of wildlife habitats	<p>boundary (Kongetiya, Heerati Oya, Madettewa tanks), only for the authorized paddy fields which are currently cultivate using the water of the above tanks. No water issue is allowed for the unauthorized cultivations within the sanctuary area and it is recommended to get involved an officer from the DWC during the water management of the above mentioned tanks.</p> <ul style="list-style-type: none"> Following the conditions lay down by the CEA and DWC, comprehensive Wildlife Management Plan (WMP) together with a monitoring programme is prepared by the IUCN as a consultancy awarded by the PMU, and incorporation of the recommendations given in the WMP required to be done by the PMU and Irrigation Department, during the construction and operation phases. 			

Note: Any other environmental management action, alternative or mitigatory measure identified in addition to what is stated in the updated EMP, required to be included in the CEMP and obtain approval from the Environmental Specialist of PMDSC and PMU, prior to implement it on site by the contractor, other third party or through PIU

Table 3-2 : Environmental Monitoring Plan (EMoP)

	Mitigation Activities and Method of monitoring environmental Changes	Location / timing of sampling	Parameters to be monitored	Frequency of monitoring	Responsibility
Construction Phase					
1.	Establishment and maintenance of Contractor's facilities	Labour camps Storage / stock piling areas Disposal sites Borrow areas	<ul style="list-style-type: none"> • Site is not established within areas protected under FFPO and FO • Site Management Plan for the camp available and Camp is installed strictly in accordance with Safety Management Plan • Labour camps with proper facilities such as enough spaces, ventilation, beds, mosquito nets, lavatories, bathing facilities, drinking water are available • Waste water collection and treatment is implemented properly • The sewage system for the camp is planned and implemented with concurrence from the Local Public Health Officer (PHI) • Camp is kept clean from debris, garbage, etc. Waste is collected and disposed of in approved sites • Required approval are granted • Approved site rehabilitation plan is available 	Weekly	Self monitoring by EO of the Contractor Environmental Officer of PIU
2.	Surface Run-off, soil erosion, slope failures from hill slopes	Project area	Soil erosion from cleared ground sections along anicut axis and LB canal trace Disposal of excavated unusable soil materials, dredged material and construction wastes Soil erosion from excavated soil materials along canal traces Placement of soil stockpiles and other erodable construction material Silt traps in places Turfing of completed embankments/ slopes	Every 2 weeks	Engineering supervisors and PIU Environmental Officer

	Mitigation Activities and Method of monitoring environmental Changes	Location / timing of sampling	Parameters to be monitored	Frequency of monitoring	Responsibility
3.	Water quality, Ambient air Quality, Noise and vibrations, sediment	Along the existing canal at the identified locations for the base-line data collection During construction period and first 3 years of the operational phase	a) Surface Water Quality Temperature (oC), pH, Electrical Conductivity (µs/cm), DO (mg/l), BOD (mg/l), COD (mg O ₂ /L), TDS (mg/l), TSS (mg/l), Turbidity (NTU), Total coliform, Oil & Grease	Quarterly intervals for the routine monitoring during the construction phase	Independent accredited laboratory contracted through the PMDSC under the approval of PMU Resident Engineer will facilitate and Environmental Specialist of PMDSC will supervise
			b) Ambient Air Quality Particulate Matter (PM10, PM 2.5), SO ₂ , NO ₂ , CO		
			c) Existing Noise Levels 24 hrs measurements and 3 hr measurements (2 hr Day and 1 Hr night)	Quarterly intervals for the routing monitoring during the construction phase selecting appropriate construction activity which produce significant noise & vibration (i.e. blasting activities)	
			d) Existing Vibration level 1 hr measurements		
			e) Sediment sampling Surface and bottom suspended sediment concentrations	Quarterly intervals for the routing monitoring during the construction phase	
		Correcting any environmental issue (i.e. oil spill, sedimentation, high noise & vibration, upon any complain of non compliance etc.)	As and when required	Self monitoring by EO of the Contractor	
4.	Nuisance to general public	Along the canal trace	Traffic reports Road surface of routes used to transport material Grievance log maintenance	Every 2 weeks	GRC, Environmental Officer, Social and Resettlement Officer of PIU

	Mitigation Activities and Method of monitoring environmental Changes	Location / timing of sampling	Parameters to be monitored	Frequency of monitoring	Responsibility
5.	Proper disposal of solid, liquid and construction waste	Within the project area and immediate surrounding	Waste management plan in place and implementation Approval for the identified waste dumping sites Public complaints / Grievance Log maintenance Visual inspection Visual inspection of camp sites, project offices and construction sites Interviews with local authorities for compliance	Every 2 weeks	GRC , Environmental Officer, Social and Re-settlement Officer of PIU
6.	Introduction of weeds and Alien invasive species	Construction material storage areas, vehicle wash down areas, vegetation and weed removal during preconstruction stage	Monthly inspection of soil storage areas, wash down areas, vehicle parking areas and disposal sites for the presence of weeds or alien invasive species by an experienced / knowledgeable Environmental officer with Community awareness about the invasive species spreading, causes, prevention etc. Removal techniques, minimizing habitat degradation and standard disposal practices	Every 4 weeks during the construction period	Environmental officer of PIU
7.	Restoration of construction area, Reinstatement of borrow areas, temporary material storage areas and Areas used for labour camps and offices	Reinstatement of construction area subjected to cut and cover sections shall be completed timely manner following section wise construction and completion program. The reinstated sections shall be subjected to tree plantation keeping O&M space. All Borrow Areas, material storage areas, sites where temporary labour camps	Visual inspection to determine whether these areas have been properly rehabilitated Identify whether sites have been invaded by weeds or alien invasive plant species	Daily, during the end of Construction period prior to handover the site	Resident Engineer, Environmental officer of PIU, Environmental specialist of PMU/PMDSC

	Mitigation Activities and Method of monitoring environmental Changes	Location / timing of sampling	Parameters to be monitored	Frequency of monitoring	Responsibility
		and offices were located, areas used for parking construction related vehicles and wash down areas for vehicles			
Operation Phase					
8.	Human-wildlife conflict mitigation	UEC area	Level of conflict and effectiveness of the mitigation measures as per the recommendations given the ongoing Wildlife management plan carried out by IUCN	Once a month during the cropping season	Irrigation Engineer

4 PROCEDURES FOR DEALING WITH CHANCE FINDS

60. Chance found Flora and Fauna

- (i) Under the terms of the construction contract the Contractor is required to take reasonable precautions to prevent workmen or any other persons from removing and/or damaging any flora (plants/vegetation) or fauna (animals), including any unlicensed fishing in any water body or unlicensed hunting/trapping/collecting of any animal
- (ii) If any wild animals – particularly elephants – are found near the construction site at any point of time, the Contractor is required to immediately upon discovery thereof to notify the Engineer and carry out any instructions given by the Engineer for dealing with the same
- (iii) The Engineer will report to the nearby office of the Forest Department and/or the local range or divisional office of the Department of Wildlife Conservation, and will take appropriate steps/measures in consultation with the respective officials, if required

61. Chance Found Archaeological Property

- (i) All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation
- (ii) Under the terms of the construction contract the Contractor will take reasonable precautions to prevent his workmen or any other persons from removing or damaging any such article or thing. Immediately upon discovery thereof he will notify the Engineer, following which the Contractor will await further instructions from the Engineer for dealing with the find, during which time all work that might affect the find will be stopped
- (iii) Where appropriate, the Engineer will seek direction from the Archaeological Department of Sri Lanka and inform the PIU environmental officer to follow the Chance Find Procedures

5 DESCRIPTION OF PLANNED ENVIRONMENTAL MONITORING

62. The mitigation measures proposed in the working draft of the EMP will be carried out by the responsible agencies. **Table 3-2** presents the monitoring parameters, frequency and responsible agency for measuring ambient environment quality of different media, such as air, water, vibration etc.

63. The baseline conditions of existing water quality, air quality and noise levels will have been established before commencement of the construction, through an accredited, CEA approved laboratory as a third party consultancy appointed with the approval of PMU. The National standards related to the key parameters are shown in **Table 5-1**:

Table 5-1 : National Standards related to Key Parameters for Air and Water Quality and Noise Levels

Environmental Protection License (EPL)	National Environmental Act, No. 47 of 1980 as amended by Act, Nos. 56 of 1988 and 53 of 2000. I,
Tolerance limits for waste discharge	National Environmental (Protection and Quality) Regulations, No. 1 of 2008
Prohibition of Polythene or any polythene product of 20 micron or below in thickness	Order published under the Gazette Notification No.1466/5 dated 10.10.2006
License for discharge, emission or disposal of waste/scheduled waste management	Regulations published under the Gazette Notification No. 1534/18 dated 01.02.2008
Municipal Solid Waste	Order published under the Gazette Notification No. 1627/19 dated 10.11.2009
Air emission, fuel & vehicle importation standards	Regulations published under the Gazette Notification No. 1295/11 dated 30.06.2003
Prohibition of Ozone depleting substances	Order published under the Gazette Notification No. 1309/20 dated 10.10.2003
List of vehicle exhaust emission standards	Order published under the Gazette Notification No. 1557/14 dated 09.07.2008
Permissible Ambient Air Quality Standards in relation to class of Air Pollutants	Regulations published under the Gazette Notification No. 1562/22 dated 15.08.2008
Air emission, fuel & vehicle Importation standards	Amended Regulations published under the Gazette Notification No. 1887/20 dated 05.11.2014 with the corrected Gazette Notification No. 1895/43 dated 02.01.2015
Noise Standards	Order published under the Gazette Notification No. 924/12 dated 23.05.1996 & Order published under the Gazette Notification No. 1738/37 dated 29.12.2011
Vibration standards	CEA interim standards (2008)
Hazardous waste disposal	Schedule VIII of Part 11 of the National Environmental (Protection & Quality) Regulation No. 1 of 2008, as amended by the gazette notification No. 1534/18 dated 01.02.2008 for the Scheduled Waste generation and disposal

64. As of ADB's SPS (2009), standards related to pollution control and emission need to be met with Environmental Health and Safety (EHS) guidelines for Air Emissions and Ambient Air Quality (2007)³ and WHO drinking water quality and effluent standards.

³ www.ifc.org/ehsguidelines

6 PROCEDURES FOR SITE REHABILITATION

65. Under the terms of the construction Contract the Contractor is responsible for reinstating ('restoring') areas used for construction purposes to their initial state, whether the initial state was agricultural land or not, and the procedures to be followed are summarized in **Table 6-1**. It is required that the Contractor provides details on the following activities in the CEMP:

Table 6-1 : Procedures Relating to Reinstatement

Clearing/Closure of Construction Sites/Labour Camps	<ul style="list-style-type: none"> • A general site restoration plan should be prepared by the Contractor for the approval of the Engineer, indicating the methods of reinstatement appropriate for each area (including storage yards, borrow areas and quarries), the sequencing of the different areas of the site and the schedule details. The approved plan is to be implemented by the Contractor prior to demobilization from the site. • On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expenses, to the entire satisfaction of the Engineer.
Environmental Enhancement / Landscaping	<ul style="list-style-type: none"> • Where landscape plantation, including grassing of canal banks and edge treatment of water bodies, is specified or called for in the construction contract, this shall be executed in compliance with either the detailed design or approved typical design guidelines. • The Contractor also shall remove all debris, piles of unwanted earth, spoil material etc. from all workplaces and disposed of at locations designated or acceptable to the Engineer.

7 REFORESTATION

66. Reforestation is considered as an extra mitigation measure to be carried out in 1:3 ratio to compensate the tree felling associated with the project activities and that will be separately instructed in accordance with specifications provided by the Resident Engineer (after approval by the CEA and relevant stakeholder agency, Forest or Wildlife department) to be carried out by the Contractor (or by means of nominated sub-contractor). A Provisional Sum has been included in the Bill of Quantities (BOQ) to cover the associated costs.

8 REPORTING & REVIEW

67. Monitoring of impacts requires a proper documentation and reporting system and a computerized database for the individual issues, including preconstruction, construction and post construction (operation and maintenance) monitoring results. The database related to each construction contract will be established and maintained at the site during the construction period and regularly copied to the PMU/PIU system, to which the PMDSC also has access for overall monitoring of the impacts.

68. The Contractor's monthly progress reports will contain a specific section reporting on environmental issues, including the results of any testing and verification conducted by the Contractor during the month. These reports are to be submitted to the Engineer and to the PMU. The monitoring performed by the PIU Environmental Officer, together with the Engineer's assigned site staff, will also be reported to the respective PIU Project Director. This report will include any information arising from the Contractor's monthly report, and the PMDSC Environmental Specialist will be involved in the review process. Semi Annual Monitoring Report (SAMR) prepared by the PMDSC shall be submitted to the ADB and CEA by the PMU. Any other monitoring reports, if requested by the EMC, shall be submitted by the PIU through PMU.

9 CONTRACTOR'S COSTS

69. The Contractor's costs of establishing the temporary site camps and facilities, including all utilities and general systems needed during the construction period, are covered under a number of specific payment items in Bill No.1 (Preliminaries) of the Bill of Quantities of the respective Contract. If it is envisaged that the Contractor should carry out specific repair and maintenance work to existing roads over and above his normal responsibility to prevent damage deterioration, this may be covered by a dedicated payment item to be instructed by the Engineer. A dedicated payment item for clearance and restoration of the site provides a degree of specific leverage for the Engineer to ensure this is done properly.

70. Where it is envisaged that specific additional environmental mitigation measures will be required, which are not the direct responsibility of the Contractor, such as reforestation of areas not affected by construction activities, a dedicated Provisional Sum or other type of payment item would also be provided.

71. In general, however, the management of relevant environmental obligations is an intrinsic element of the Contractor's working method for each type of construction work, and therefore the costs associated with specific activities or measures would be embedded in the respective payment items for the actual work.

ANNEX 1 : CONDITIONAL APPROVAL FOR THE EIA FROM CEA



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மகாவலி நீர்ப் பாதுகாப்புக்கான முதலீட்டுத் திட்டம்
Mahaweli Water Security Investment Program

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மகாவலி அபிவிருத்தி மற்றும் சுற்றுடல் அமைச்சு
Ministry of Mahaweli Development & Environment

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திட்ட முகாமைத்துவப் பணிமுறை
Program Management Unit



නො. 493 1/1, ටී. ඩී. ජයා මාවත, කොළඹ 10.

இல. 493 1/1, டி. பி. ஜெயா மாவத்தை கொழும்பு 10.

No. 493 1/1, T. B. Jayah Mawatha, Colombo 10.

Program Director: 0112 675811 Consultant: 0112 65810 General Office: 0112 675810 Office Fax: 0112 675810 @ - pdadbproject@gmail.com

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දිනය }
திகதி } 01.04.2016
Date }

Team Leader
PMDSC

Sub: Proposed Upper Elahera Canal from Mannakkatiya Tank to Mahakanadarawa Tank and Kalu Ganga – Moragahakanda Link Canal Project

The Central Environmental Authority CEA has granted approval for the implementation of the above mentioned project by their letter no 08/EIA/Water/04/2012 dated 31.03.2016.

A copy of the environmental approval letter of the above mentioned project is sent herewith for your information and necessary action.

Eng. N. A. Sisira Kumara
Program Director (MWSIP)
Ministry of Mahaweli Development and Environment

Cc: 1. Mr. Lance Gore, ADB - f. i. pls.
2. Project Director (UEC) - A copy of the environmental approval letter of the UEC Project is sent herewith for your information and necessary action pls.
3. Environmental Specialist, MWSIP - --do--
4. Resettlement Specialist, MWSIP - --do--

MWSIP - PMDSC	
493, T.B. Jayah Mawatha, Colombo 10	
Registered Incoming By:	ASR
Seen:	Team Leader D. Team Leader
Date:	01 APR 2016
Action By:	SP, PLWCD, MJB, APK
Copies to:	
Primary File Location:	7023
Copy to Files:	11.1, 26.6

PIU Office : (UECP)
Upper Elahera Canal Project
Address - UEC Project Office
Mahaweli Authority of Sri Lanka,
Madatugama.
Telephone No. 025-3248604
Fax No. 025-3248604
e-mail - darmasiri.2000@yahoo.co.uk

PIU Office : (NWPCP)
North Western Province Canal Project
Address - Irrigation Department
P.O. Box. 44,
Kurunegala.
Telephone No. 037-3970783
Fax No. 037-2222532
e-mail - rajaseka3@yahoo.com

PIU Office : (MLBCRP)
Minipe LB Canal Rehabilitation Project
Address - DIB Office
Irrigation Department,
Hassaleka.
Telephone No. 055-2257205/ 0718199519
Fax No. 055-2257205
e-mail - mediwaka.susantha@yahoo.com

PD Office : (ISEWIP)
Improving System Efficiency & Water
Productivity Improvement Project
Address - 11, Jawatta Road,
Colombo 05.
Telephone No. 0718-101628
Fax No. 0112-554063
e-mail - dealwis.lalith@yahoo.com

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Date

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மத்திய சுற்றுடல் அதிகாரசபை

Central Environmental Authority

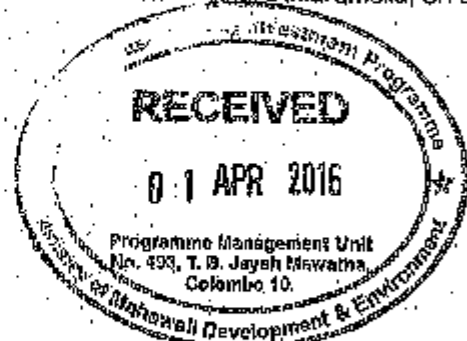


08/EJA/Water/04/2012

31 March 2016

"පරිසර සියලු" 104, පෙරේරා පොලීසියෙහි මාවත, මන්නාරම, පි. ලංකාව.
"பரிசு பியச" 104, சென்னை சென்னை மாவட்டம், பத்தா(மல்லை), இலங்கை.
"Parisara Piyasa", 104, Denzil Kobbekaduwa Mawatha, Battaramulla, Sri Lanka.
Web : www.cea.lk

Director General
Mahaweli Authority of Sri Lanka
No. 500, T.B. Jayah Mawatha
Colombo 10.



MODIFICATION TO CONFIGURATION OF MORAGAHAKANDA - KALU GANGA PROJECTS PROPOSED UPPER ELAHERA CANAL, CANAL FROM MANNAKKATTIYA TANK TO MAHAKANADARAWA TANK AND KALU GANGA-MORAGAHAKANDA LINK CANAL PROJECT

This is to inform you that the Central Environmental Authority (CEA), after study of the Environmental Impact Assessment Report (EIAR) of the Proposed Modification to Configuration of Moragahakanda - Kalu Ganga Projects dated June 2015, the comments received from the public and your responses to such comments dated January 2016 and additional information submitted on 05.02.2016 as clarifications for the queries raised by the Technical Evaluation Committee appointed by the CEA, has decided, in terms of regulation 13 of the National Environmental (Procedure for approval of projects) Regulations, No. 1 of 1993 to grant approval for the implementation of the above project subject to the following terms and conditions.

1. GENERAL CONDITIONS

- 1.1 This environmental approval is valid for implementation of the Proposed Modification to Configuration of Moragahakanda - Kalu Ganga Projects as described in the EIAR dated June 2015 submitted by the Mahaweli Authority of Sri Lanka (MASL).
- 1.2 This approval is granted on the basis that all information provided by the MASL in the EIAR dated June 2015 and subsequent information dated January 2016 and 05.02.2016 the addendum dated January 2016 are true and accurate.
- 1.3 This approval is valid for a period of 3 years from the date of issue of this letter, unless upon application in writing to this Authority within thirty days prior to the expiry date, the validity period is extended.
- 1.4 The MASL where necessary should obtain fresh approvals in respect of any alterations that would be made to the initial project proposal submitted to CEA as per the EIAR dated June 2015.

Chairman Tel : 2872341, 2877348 Fax : 2872347	Director General Tel : 2872359 Fax : 2872608	Gen. Office Tel : 2872273, 2873447, 2873448 Fax : 2872277-280	Complain Unit : 0713603333, 2888999
Deputy Director Generals Tel : 2865286 Fax : 2877315	Envr. Pollution Control Division Tel : 2873453 Fax : 2872605	Envr. Mgt & Assess. Division Tel : 2872358 Fax : 2872106	Envr. Edu. & Awareness Division Tel : 2872297 Fax : 2872600
Director Tel : 2872301 (Admin), 2877288 (Planning) Fax : 2872601 (Admin), 2863984 (Finance)	2873452 (EPC) 2872606 (Lab) 2882335 (WMO)	2872346 (NRMA), 2876543 (EIA) 2867263 (R&D) Fax : 2872395	2867266 (IEA) Fax : 2872609 Media Unit : 2873449
			2872604 (Legal) (Western Extension) Tel : 2862631 Fax : 2862293



- 1.5 The MASL is bound to ensure that these terms and conditions are adhered to and have full control over a third party that may be involved in project implementation. The CEA should have access to the contract documents pertaining to environmental aspects, entered into by the MASL and any outside contractors. The conditions in this letter should be included in the contract documents, so that the contractor or sub-contractor is held responsible for carrying them out during construction and on completion of the work.

The MASL would be held responsible for the breach of any such conditions by any contractor or sub-contractor.

- 1.6 The MASL shall intimate to CEA the date of commencement of the project activities/construction activities, inclusive of a phased implementation schedule.
- 1.7 A copy of this approval letter and the EIAR should be kept at the project site at all times for purpose of perusal by concerned agencies.
- 1.8 It is the duty of the MASL to inform the CEA of any adverse environmental impacts which may arise during project implementation which is not anticipated at this stage. In such an event, relevant guidelines and necessary mitigatory measures should be implemented as directed by the CEA. The MASL should ensure that such impacts are properly assessed and addressed even at a later stage of project implementation.
- 1.9 The MASL should co-ordinate closely with planning agencies, relevant Provincial and Local Authorities, Divisional Secretaries and other Government Departments to resolve any conflict with existing and future development plans of the area.
- 1.10 Relevant Local Authorities in the project area should be kept informed regarding the project activities and should have written approval of the same.
- 1.11 Necessary approval of the Department of Wildlife Conservation (DWC)/Forest Department (FD) should be obtained for the release of lands belonging to DWC / FD for the project activities prior to commencement of construction activities. Trees in the project area should be enumerated and removed with the consultation of DWC / FD through the State Timber Corporation.
- 1.12 Costs to be incurred in giving effect to the implementation of the terms and conditions of this letter should be borne by the MASL as project implementation costs.
- 1.13 Any additional conditions stipulated by the CEA as and when required shall be strictly adhered to.



2 ECOLOGICAL ASPECTS

- 2.1 The conditions laid down in the letter no. D8/6/1/1/252-11 dated 16.03.2016 issued by the Director General, DWC should be strictly adhered to, to avoid / mitigate impacts on wildlife in the project area.
- 2.2 A comprehensive Wildlife Management Plan (WMP) together with a monitoring programme should be prepared by the MASL in consultation with the DWC prior to commencing construction activities of the project.

This plan should mainly address the following:

- Identification and declaration of additional area as protected areas to provide connectivity between remaining forest areas for migration of wild animals.
 - Identification and implementation of habitat enrichment programmes
 - Implementation of animal rescue programmes
 - Identification and prediction of Human Elephant Conflict areas and requirement of electric fencing
 - Community based mechanism for maintenance of electric fences
 - Budgetary allocation for implementation of the WMP.
 - Schedule of implementation of the WMP
- 2.3 Open canal section should be designed in such a way that it would facilitate wild animals for obtaining their water requirement and their movement in consultation with the DWC.
 - 2.4 Small tanks within the wildlife reservation should be developed to provide water for wild animals. No illegal cultivation shall be allowed within the Wildlife Reserve using this water.
 - 2.5 Adequate reservation for open canal section should be demarcated and managed properly for avoiding encroachments.
 - 2.6 Reforestation/enrichment planting should be carried out within the above reservation areas in close consultation with the FD using native tree species.
 - 2.7 Reforestation programme should be carried out in any other suitable areas including the catchment of Huruluwewa in close consultation with the FD / DWC using native tree species. Suitable lands for reforestation / regeneration should be identified in consultation with the FD.
 - 2.8 Reforestation / enrichment areas should be clearly marked on a map and submitted to the CEA, FD and DWC together with the replanting schedule.
 - 2.9 Existing protected areas and proposed protected areas should be clearly mapped and submitted to CEA, DWC and FD.
 - 2.10 Wildlife movements should not be disturbed due to the construction of canals within the existing protected areas and wildlife influenced areas.



- 2.11 Proposed canals falling within the protected areas should be covered to avoid any disturbance for wildlife movements.
- 2.12 No new roads or any other permanent structures should be constructed within protected areas without the prior approval of DWC/FD.
- 2.13 Precautions should be taken to reduce construction impacts on existing natural systems such as forest areas, streams and tanks and wild animals within these habitats.
- 2.14 Minimum number of trees should be cut during construction. Trees should be preserved as far as possible along the trace of canal area. Trees may be removed only in cases where it is absolutely essential. The MASL should take required action to remove such trees in consultation with the DWC / FD.
- 2.15 Low noise generating measures should be adopted in carrying out blasting activities within wildlife influenced areas. Necessary guidelines should be obtained from DWC in this regard.

3. HYDROLOGICAL ASPECTS

- 3.1 The MASL should ensure that the riparian rights of the downstream water users will not be affected in allocating water for UEC diversion from Moragahakanda Reservoir.

The MASL shall formulate proper guidelines on allocation of water for different users in consultation with the relevant stakeholders, in order to avoid any conflicts.

- 3.2 The drainage paths or stream crossings should not be disturbed during construction period. Temporary by pass structures should be provided to streams during the construction period.
- 3.3 The UEC should be operated in such a way that the existing natural stream flows are not retained by the level crossings at KogetiyaWewa , BogahaWewa and MadettawaWewa.
- 3.4 Adequate water should be retained at identified level crossings (Kogetiya, Bogahawewa and Medettawa tanks) for use of the wildlife of the area as recommended in section 5.1 of the EIA report in consultation with the DWC.
- 3.5 Necessary measures should be taken to mitigate water pollution due to contaminant leakage from machinery and workers' sites during the construction phase.
- 3.6 Required measures should be taken to prevent leakage of ground water to the tunnel.
- 3.7 Any dewatering of ground water table within the project area including the tunneling section/s should be monitored during construction phase. In the event any dewatering occurs as a result of any project activity, the MASL shall take action to mitigate or compensate the affected parties for any loss in respect of their agricultural productivity in relation to these lands.



- 3.8 Necessary precaution should be taken to avoid illegal tapping of water at open canal section.

4 GEOLOGICAL/LAND STABILITY AND SOIL EROSION ASPECTS

- 4.1 Excavation blasting operations and removal of existing rock / soil should be done in accordance with proper engineering designs. Height and angle of cutting slopes should be designed with proper geological and geotechnical details to avoid ground instability and slope failures.

- 4.2 Earth retaining structures should be applied wherever required to prevent initiation of local failures.

- 4.3 Backfilling of the temporary tunnel portal area should be properly done in accordance with standard methods and proper vegetation cover should be introduced to minimize soil erosion in such areas.

- 4.4 Adequate erosion management measures shall be exercised during construction in order to prevent siltation of surface water bodies at downstream areas, neighboring marsh / paddy lands during construction.

- 4.5 Uprooting the trees should be done with appropriate equipment to minimize the damage to the soil.

- 4.6 Natural water paths and valleys should be kept free from any obstruction through any kind of construction or disposal of soil/rocks etc. All efforts should be made during construction period to avoid adverse impacts on existing drainage system / natural storm paths of the project area. The mitigatory measures indicated in section 5.1.2 of the EIA report should be adhered to.

- 4.7 Exposed areas should be kept suitably protected to prevent erosion or emission of dusts during dry periods.

- 4.8 Earth work should be carried out during low rainfall season to minimize soil erosion.

5 DISPOSAL OF EXCAVATED MATERIAL

- 5.1 Excavated materials as far as possible should be used in construction of road works and other construction sites which are associated with the project. Care must be taken by the way of adequate safeguards been put in place to prevent erosion and washing away of any of this material into water ways.

- 5.2 Tunnel muck and excess soil should be properly disposed to suitable dumping sites. The details regarding such disposal sites should be submitted to CEA and approvals obtained.



- 5.3 Soil / debris removed during the preparation of ground for construction of project components should not be disposed / dumped into neighboring forest areas.

6. SOCIAL ASPECTS

- 6.1 A detailed socio economic survey should be carried out covering the proposed development area in order to identify affected families, sub families, agricultural lands and business enterprises in order to serve as baseline data. The data should be used in the preparation of a socio infrastructure plan. This data will also help to identify new encroachments in the area.
- 6.2 Suitable relocation sites should be identified in close proximity to the existing dwellings considering the preference of affected families.
- 6.3 A detailed resettlement plan and compensation package should be prepared inclusive of relocation sites. All compensation should be paid on the basis of the principals contained in the National Involuntary Resettlement Policy. The resettlement plan and the compensation package so prepared should be submitted to the Ministry of Lands for approval prior to commencing construction activities.
- 6.4 Acquisition of land and payment of compensation should be expedited in order to minimize the uncertainty of people.
- 6.5 In the case of cultivated paddy land coming under the tenant farmer system, compensation should be paid to both the landowner and the tenant farmer.
- 6.6 The MASL should initiate a consultative dialogue with the persons likely to be affected by the project with immediate effect. They should be kept informed well in advance, regarding the project components and also the compensation packages as well as the proposed date of commencement of project activities.
- 6.7 The MASL should provide necessary compensation, if existing water sources of the communities are affected by the project during construction phase of the project.
- 6.8 Any damages to the existing roads due to implementation of project activities should be re-routed or modified appropriately in order to avoid impacts on existing transportation system of the project area.
- 6.9 A grievance redress mechanism should be established in order to resolve social problems of affected community due to implementation of the project as recommended in section 5.5 of the EIA report.



7. EXTRACTION OF CONSTRUCTION MATERIAL

- 7.1 Quarrying of rock, sand soil and other material for construction activities should be done with the approval of the GS&MB. Approvals from the FD / DWC or other concerned agencies should be obtained wherever required.
- 7.2 Required licenses / permits for the operation of quarry sites / metal crushers, concrete batching plants, asphalt plants etc. should be obtained from the CEA / relevant Local Authority.

8 RESTORATION / REHABILITATION OF CONSTRUCTIONS SITES

- 8.1 Abandoned quarry sites, borrow pits and temporary transport routes should be rehabilitated and suitable replanting programmes implemented in these areas in consultation with the FD / DWC.
- 8.2 Temporary used areas shall be restored properly and post-construction unusable material shall be disposed of in consultation with the relevant Local Authorities. The land used for temporary establishments shall be restored up to the level of satisfactions.
- 8.3 Rehabilitation of construction site(s) and spoil dump areas should be completed prior to commissioning of the operational activities. The disturbed areas due to constructions of labor camps, spoil areas, stockpile areas, workshops, office etc. shall be rehabilitated and replanted with suitable tree species.

9 WASTE DISPOSAL

- 9.1 Measures should be taken to prevent discharge of tunnel muck, cement, cement mix, fuel oil, lubricants, waste oil, polythene and other waste materials into water bodies during construction and operation period. Oil separation devices should be installed where required.
- 9.2 Proper sanitary facilities should be provided for the work force involved in the construction activities.

10 ARCHAEOLOGICAL ASPECTS

The approvals from the Department of Archaeology should be obtained prior to commencement of the project. If any archeological remnants are encountered within the project area suitable measures should be adapted to conserve in consultation with the Archeology Department.

11 NOISE AND VIBRATION

- 11.1 All constructional activities shall be carried out in such a way, so as not to cause nuisance to the wildlife and neighborhood. The noise level during construction shall not exceed 75 dB (A) from 06.00 hrs to 21.00 hrs and 50 dB (A) from 21.00 hrs to 06.00 hrs to be measured at the boundary of the site.



11.2 Appropriate mitigatory measures should be adopted in order to maintain the vibration levels generated by construction activities, operation of machineries and equipment, and vehicle transport within the interim standards stipulated by the CEA.

11.3 Blasting operation if any should be carried out with the approval of the GS&MB, and the CEA.

12 TRANSPORTATION OF MATERIAL AND MACHINERY

12.1 Suitable action should be taken to identify the routes of transport and to mitigate traffic issues during construction. Required approvals should be obtained from relevant traffic authorities.

12.2 Transport, loading and unloading of materials shall be carried out in such a way as not to cause nuisance to the surrounding environment.

12.3 Construction material should be adequately covered during transportation to avoid wind induced dust and spillage.

12.4 The vehicles and the machinery used in the project should be maintained regularly in order to avoid smoke emissions.

13 SAFETY/EMERGENCIES

The MASL shall draw up an Emergency Preparedness Plan for contingencies such as issues associated with floods etc. The MASL should ensure that all relevant personnel are trained and aware of their responsibilities in executing the plan. Copies of the plan shall be placed at suitable locations and consulted on a regular basis.


14 ENVIRONMENTAL MANAGEMENT PLAN

14.1 The MASL shall forward to the CEA a detailed Environmental Management Plan (EMP) incorporating the mitigatory measures proposed precisely and the monitoring plan. It should contain the significant impacts identified at each site, site specific mitigation measures to be implemented for each significant impact, schedule of implementation of mitigation measures, parameters to be monitored with intervals/frequencies and the responsible agencies for implementation of the EMP. The EMP should be approved by the monitoring committee.

14.2 A monitoring committee consisting of representatives of FD, CEA, DWC, Irrigation Department, GS&MB, Department of Agrarian Development, Department of Archaeology, District Secretary/Matale /Anuradhapura/ Polonnaruwa, Divisional Secretary, Elahera/ Galenbindunuwewa/ Palugaswewa/ Hingurakgoda/ Dambulla / Naula/ Kekirawa and any other member deemed necessary will be appointed by the CEA to monitor implementation of EMP by the MASL.



- 14.3 Periodic compliance report should be submitted by the MASL on progress of the implementation of the EMP.
- 14.4 Suitably trained qualified officer/s who would be responsible for implementation of the EMP shall be assigned.
- 14.5 This Officer(s) shall act as the contact person(s) for members of the public and shall liaise with local organizations.
- 14.6 All costs incurred by the monitoring committee appointed by the CEA to oversee implementation of the EMP shall be borne by the MASL.


Prof. Lal Mervin Dharmasiri

Chairman

CENTRAL ENVIRONMENTAL AUTHORITY

CC: Secretary / Ministry of Mahweli Development and Environment
Conservator General of Forest / Forest Department
Commissioner General / Department of Agrarian Development
Director General / Dept. of Wildlife Conservation
Director General / Irrigation Department
Director General / National Building Research Organization
Director General / Department of Archeology
Director General / Department of Agriculture
Director General / Geological Surveys and Mines Bureau
Divisional Secretary, Elahera / Galenbindunuwewa / Palugaswewa / Hingurakgoda / Dambulla /
Naula / Kekirawa
Chairman, Pradeshhiya Sabha, Elahera / Galenbindunuwewa / Hingurakgoda / Dambulla /
Naula / Kekirawa
Director / Central Province / CEA
Deputy Director / North Central Province / CEA

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வனசீவராசிகள் பாதுகாப்புத் திணைக்களம்
DEPARTMENT OF WILDLIFE CONSERVATION

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 பிரதான அலுவலகம், இல. 811/அ, ஜயந்திபுர வீதி, மத்தரமுல்லை
 Head Office - No. 811/A, Jayanthipura Road, Battaramulla



මගේ අංකය
 எனது இல.
 My No.

වජ/6/11/252 - II

ඔබේ අංකය
 உமது இல.
 Your No.

දිනය
 திகதி
 Date

2016.03.16

සභාපති,
 මධ්‍යම පරිසර අධිකාරිය,
 බත්තරමුල්ල.

මහත්මයාණෙනි,

මෞරගහකන්ද කළුගල ව්‍යාපෘතීන් හා ඒකාබද්ධව ඉදි කිරීමට නියමිත ඉහළ ඇලහැර ඇල මාර්ගය,
මානාත්තවටිය සිට මහකනදොව වැවට ජලය සපයන ඇල මාර්ගය සහ මෞරගහකන්ද හා කළුගල ජලාශ
සම්බන්ධ කර ඉදිකරන ඇල මාර්ග ව්‍යාපෘතිය

උක්ත කරුණ සම්බන්ධයෙන් ඔබ විසින් මා වෙත යොමු කර ඇති අංක 08/EIA/water/04/2012 හා 2016.01.13 දිනැති ලිපිය හා බැඳේ.

02. උක්ත ව්‍යාපෘතියට අදාළ ඇල මාර්ගය මින්තේරිය-හිරිපිලේ ස්වභාව රක්ෂිතය හා ඇලහැර හිරිපිලේ අභය භූමිය හරහා මෙන්ම මින්තේරිය ජාතික උද්‍යානයෙහි කොටසක් හරහා භූගතවද ගමන් කරනු ලබයි. ඒ අනුව ඉහත ඇල මාර්ගය මගින් සිදු වන පාරිසරික හා වනජීවී සම්පත් වලට වන බලපෑම අවම වන ලෙස, පාරිසරික බලපෑම අගයීමකට යටත්ව එහි කොන්දේසි ප්‍රකාරව හා පහත සඳහන් කොන්දේසි ප්‍රකාරව ජාතික අවසානයවයක් සේ සලකා සිදු කිරීම සම්බන්ධයෙන් අප දෙපාර්තමේන්තුවෙහි විරුද්ධත්වයක් නොමැති බව කාරුණිකව දන්වා සිටිමි.

- 2.1 ඇලහැර අභය භූමියේ මායිමෙන් හා දැනට ඉදි කර ඇති වීදුලි වැටට සමාන්තරව විවෘතව ඇල ඉදි කරන කොටසේ වනාන්තර දෙසින් අලි ඇතුන් හා වනජීවීන්ට ජල අවශ්‍යතා සපුරා ගැනීමට හැකි වන සේ එම ඉවුර ඉතා අඩු බෑවුම් පිහිටන ලෙස හා ගම්මානය දෙසට අලි ඇතුන්ට ගමන් කළ නොහැකි ලෙස ගම්මානය මාත්ත දැඩි බෑවුමක් පවතින ලෙස ඇල ඉවුරු සකස් කළ යුතුය.
- 2.2 රක්ෂිතය තුළ මායිමට ආසන්නව ඉදි කරන කෝන්ගුරිය, හිරිපිලිය, මාදැක්කැව වැව ආදී වැව වල ජලයෙන් දැනට කුඹුරු කරන්නේ නම් පමණක් නිත්‍යානුකූල කුඹුරු වලට පමණක් ජලය ලබා දීම හා රක්ෂිතය තුළ කිසිදු අනවසර වගා කිරීමක් සඳහා ජලය ලබා නොදීම. (මෙහිදී ජල පාලන කටයුතු වලට යාමේදී වනජීවී නිලධාරියකු යොදා ගැනීමද සිදු වේ).
- 2.3 උක්ත සඳහන් කළ වැව වල ජලය වනජීවීන්ට භාවිතා කළ හැකි පරිදි මුළු ධාරිතාවෙන් 50% ක් පමණක් නිදහස් කළ හැකි වන පරිදි ජල පාලන සොරොට් සකස් කිරීම.

- 2.4 ලබාදී ඇති ශෝථිත ඇල මාර්ගය දැක්වෙන සිතියම් ප්‍රකාරව ප්‍රවහනහඳුල්පත හෙවත් මාදුන්නැව වැවෙන් ඔබ්බට මින්තෝරිය ගිරිතලේ ස්වභාව රක්ෂිතය තුල, පීඨිරිය අභය භූමිය, මින්තෝරිය ජාතික උද්‍යානය තුල හා හුරුම වැව වන රක්ෂිතය තුලදී අදාළ ඇල මාර්ගය පොළොව ඇතුළතින් පමණක් (cut & cover , double conduit හෝ tunnel ලෙස) ගමන් කරන ලෙස සැකසීම.
- 2.5 මින්තෝරිය ගිරිතලේ ස්වභාවික රක්ෂිතය මධ්‍යයේ පිහිටා ඇති ජේතුලම වැව ප්‍රතිසංස්කරණය කිරීමේදී එහි ජලය දැනට රක්ෂිතය තුල අනවසර වශා කටයුතු සිදු කරන කිසිවකුට ලබා නොදීම හා එම අනවසර වශාකරුවන් රක්ෂිතයෙන් ඉවත් කර විකල්ප ඉඩම් ලබා දීම හා අදාළ අනවසර වශා ඉඩම් වනජීවීන් සඳහා වෙන් කිරීම.
- 2.6 රක්ෂිතය තුල ඉදි කරන වැව වලින් අනවසර වශාවන් වලක්වා ගැනීම සඳහා ජලය නිකුත් කරන සොරොට් (Sluice gate) නොමැතිව සකස් කිරීම.
- 2.7 වනජීවී රක්ෂිත හරහා ඇල මාර්ග පොළොව අභ්‍යන්තරයෙන් ගමන් කළද එහි ඉදි කිරීම කටයුතු වලදී විශාල පරිසර හානියක් සිදුවන අතර අදාළ කටයුතු නිමවූ වහාම එම ප්‍රදේශය එා තත්වයට පත් කර වනජීවීන්ට හුදුසු පරිදි සකස් කිරීම.
- 2.8 මෙම ව්‍යාපෘතිය මගින් සිදුවන වනජීවී වාසස්ථාන අහිමි වීම ප්‍රතිපූර්ණය කිරීම පිණිස යාබද කැලෑ ඉඩම් පවතී නම් රක්ෂිත කිරීම හා පවතින රක්ෂිත ඉඩම් තුල වනජීවී වාසස්ථාන වැඩිදියුණු කිරීම.
- 2.9 මෙම ව්‍යාපෘතිය මගින් වනජීවී වාසස්ථාන වලට හා සංක්‍රමණ වලට බලපෑම් ඇති විය හැකි බැවින් ඒවා අධ්‍යයනය කර පිළියම් ගෙවීම සඳහා "වනජීවීන්ට වන බලපෑම් අධ්‍යයනයක්" සිදු කිරීම හා එමගින් හඳුනාගන්නා බලපෑම් අවම කිරීම සඳහා අවශ්‍ය ප්‍රතිපාදන ව්‍යාපෘතිය මගින් ලබා දීම.
- 2.10 මෙම ව්‍යාපෘතිය යටතේ මින්තෝරිය හා කඩුඩුල්ල වැව සඳහා ජලය ලබා දෙන්නේනම්, එම වැව වල දැනට වසර දූරා සිදුවන ජල මට්ටමේ වෙනස්කම් වලට අනුකූල වන ජේ පමණක් ජලය නිකුත් කිරීම, නිසං සමයේ අදාළ ජලාශ වල ජල මට්ටම පහල යාමත් සමඟ අලි ඇතුන් 400ක් පමණ ඒ ආශ්‍රිතව ගැවසෙන අතර එම වැව ජල සංචිත ලෙස වසර දූරා පුරවා තැබීමෙන් වන අලිත්ට වාසස්ථාන අහිමි වේ.
- 2.11 මීට අමතරව පරිසර බලපෑම් ඇගයීමෙන් සිදු කරන නිර්දේශ ක්‍රියාත්මක කිරීම.

පොදු කොන්දේසි -

- 2.12 මෙම ව්‍යාපෘතියෙහි ඉදි කිරීම හෝ නඩත්තු කටයුතු සිදු කරනු ලබන කිසිදු සේවකයකු රාත්‍රියේදී රක්ෂිතය තුල නවාතැන් නොගත යුතුය.
- 2.13 අදාළ ප්‍රදේශය හරහා අලි ඇතුන් ඇතුළු වනජීවී සංක්‍රමණ සිදු වන අවස්ථාවලදී නාවකාලිකව අදාළ කටයුතු නතර කර සේවකයන් ආරක්ෂිත ස්ථාන තරා යොමු කළ යුතුය.

- 2.14 මේ සඳහා දැනට භාවිතා වන මාර්ග පමණක් භාවිතා කළ යුතු අතර අළුතින් මාර්ග ඉදි නොකළ යුතුය.
- 2.15 සතුන්ට අනතුරුදායක වන ආකාරයේ ගැඹුරු වලවල් ඇති වන පරිදි ව්‍යාපෘති කටයුතු සිදු කිරීමෙන් වැළකිය යුතුය.
- 2.16 ප්‍රදේශයේ ස්වභාවික ඇල පද්ධති වලට බාධා ඇති නොවන අයුරින් මෙම ව්‍යාපෘතිය සිදු කළ යුතුය.
- 2.17 මෙම ප්‍රදේශයෙහි පාරිසරික වශයෙන් යම් බලපෑමක් ඇති වුවහොත් ඒ පිළිබඳව ව්‍යාපෘති යෝජක විසින් වනජීවී සංරක්ෂණ දෙපාර්තමේන්තුව වෙත දැන්විය යුතු අතර වනජීවී දෙපාර්තමේන්තු උපදේශකත්වය යටතේ එම බලපෑම අවම කිරීමට කටයුතු කළ යුතුය.
- 2.18 ව්‍යාපෘති ප්‍රදේශයෙහි පුරාවිද්‍යා වටිනාකමකින් යුත් පුරාවස්තුවක් හමු වුවහොත් ඒ පිළිබඳව පුරාවිද්‍යා දෙපාර්තමේන්තුවට හා වනජීවී සංරක්ෂණ දෙපාර්තමේන්තුව වෙත දැන්විය යුතුය.
- 2.19 මෙම අවසරය ලබා දීමේ ලිපියෙහි පිටපතක් යම් අවශ්‍යතාවයකදී පෙන්වීම සඳහා ව්‍යාපෘති භූමියෙහි තැබිය යුතුය.
- 2.20 වනසත්ව වාසස්ථාන විනාශ නොකිරීම හා වනසත්ව සංචරණ මාර්ග වලට බාධා නොවන අයුරින් මෙම ව්‍යාපෘතිය සිදු කළ යුතුය.
- 2.21 රක්ෂිත ප්‍රදේශ තුළ ඇති ශාක හා සත්ව කොටස් එකතු කිරීම සිදු නොකළ යුතුය.
- 2.22 මෙම ව්‍යාපෘතිය මගින් එකතු වන අපද්‍රව්‍ය විධිමත්ව බැහැර කිරීමට කටයුතු කළ යුතුය.
- 2.23 මෙම ව්‍යාපෘතිය හේතුවෙන් වනජීවී රක්ෂිතයෙහි මාර්ග, නිර්මිත හෝ වෙනත් දේපල වලට හානි වුවහොත් ඒවා ව්‍යාපෘති යෝජක විසින් ප්‍රතිපුරණය කළ යුතුය.
- 2.24 මෙම ව්‍යාපෘතියේදී අධිබලැති පිරිසවීම ද්‍රව්‍ය යොදා පිපිරවීම් කිසිවක් සිදු කිරීමට අවසර ලබා දෙනු නොලැබේ.
- 2.25 වනජීවී රක්ෂිත තුළ ගොඩනැගිලි කිසිවක් ඉදි කිරීම කිසිවක් සිදු කිරීමට අවසර ලබා දෙනු නොලැබේ.
- 2.26 මෙම ව්‍යාපෘතියෙහි සේවකයන්ට හෝ යම් දේපලකට වනසතුන්ගෙන් වන හානිය සම්බන්ධයෙන් වනජීවී සංරක්ෂණ දෙපාර්තමේන්තුව විසින් වග කියනු නොලැබේ.
- 2.27 වනජීවී සංරක්ෂණ දෙපාර්තමේන්තු නිලධාරීන්ට හා මෙම ව්‍යාපෘතියට අදාළ අනෙකුත් රාජ්‍ය ආයතන නිලධාරීන්ට අවශ්‍ය විටකදී ව්‍යාපෘති ප්‍රදේශය පරීක්ෂා කිරීමට අවසර ලබා දිය යුතුය.
- 2.28 මෙහි සඳහන් කොන්දේසි වලට අමතරව වනජීවී සංරක්ෂණ දෙපාර්තමේන්තුව හෝ අදාළ වෙනත් පාලන වෙතින් අවස්ථානුකූලව පනවනු ලබන අනෙකුත් නීතිරීති සඳහා ව්‍යාපෘති යෝජක බැඳී සිටිය යුතුය.

- 2.29 පරිසරයට හානියක් නොවන හෝ අවම හානියක් සිදු වන අයුරින් උක්ත ව්‍යාපෘතිය සිදු කළ යුතුය.
- 2.30 ඉහත ව්‍යාපෘතියෙන් බැහැරව වෙනත් කාර්යයන් සඳහා වනාන්තර රක්ෂිත තුළ ඉඩම් යොදා ගැනීම නොකළ යුතුය.
- 2.31 මෙම ව්‍යාපෘතිය මගින් පරිසරයට සහ වනජීවීන්ට අහිතකර බලපෑම් ඇති වුවහොත් නව කොන්දේසි ඇතුළත් කිරීම, නිවැරදි කොන්දේසි සංශෝධනය හෝ මෙම අනුමැතිය අවලංගු කිරීමේ බලතල වනාන්තර සංරක්ෂණ දෙපාර්තමේන්තුවෙහි අධ්‍යක්ෂ ජනරාල් සතුය.
- 2.32 මෙහිදී සිදු කරන ලබන සියළු කටයුතු ව්‍යාපෘතියට හා වෘක්ෂලතා ආරක්ෂක ආඥා පනතේ විධිවිධාන උල්ලංඝනය නොවන ආකාරයෙන් සිදු කළ යුතුය.

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ANNEX 2 : FORMAT FOR CONTRACTOR'S SCHEDULE ON ENVIRONMENT MANAGEMENT

Programme Management, Design and Supervision Consultant (PMDSC)
MAHAWELI WATER SECURITY INVESTMENT PROGRAMME (MWSIP)

Contractor's Schedule on Environmental Safeguard Measures

(This plan should be submitted by the Contractor/EO to the Resident Engineer 7 days prior to every week)

Day of the week	Date	Work Site (Construction area / burrow pits/quarry sites/disposal yards/TBM sites etc.)	Scheduled Construction activity (as per the list of works)	Planned working hours (Day/Night)	Special mitigatory measure requirements (If yes pls explain)	Prepared with necessary resources (Yes/No)	If No, explain
Monday							
Tuesday							
Wednesday							
Thursday							
Friday							
Saturday							
Sunday							

ANNEX 3 : Environmental Monitoring Form A-C

Programme Management, Design and Supervision Consultant (PMDSC)

MAHAWELI WATER SECURITY INVESTMENT PROGRAMME (MWSIP)**ENVIRONMENTAL MONITORING FORMAT 01 - CONSTRUCTION SITE****Instructions to the monitoring officer**

- Contractor is notified on all non-conformances and requested to make arrangements on improvement. Notes on Use of Mitigation Monitoring Form
- This form, or an adaptation of it, should be used during routine (preferably weekly) site inspections by the PIU Environmental Officer/unit or representative (Supervision Consultant) to monitor implementation of the approved CEMP during the construction phase of MWSIP project contract packages.
- Routine site inspections should cover all current/relevant construction activities being implemented on the project site at the time of inspection. Ideally, the Contractor's Environmental officer/focal point should accompany the PIU Environmental Officer or representative during routine inspections.
- Once completed, the form should be sent to the Contractor for his information and action including any photographs. A copy of the completed form is retained in the data management system of the PIU for reference during subsequent site inspections and for referral during preparation of monitoring reports.
- Column 1 Construction Activity – All current/relevant construction activities taking place on the project site, for which mitigation measures are required under the EMP/CEMP, are listed.
- Column 2 Mitigation Measure – Specific mitigation measures required under the EMP/CEMP for the corresponding construction activity are listed.
- Column 4 Corrective Action Request – Where the inspection identifies non-compliance or ineffective implementation of a mitigation measure, specific corrective actions are identified, discussed and agreed with the Contractor including a deadline for effective corrective action.
- Column 5 Resolution Status of Previous CARs – Each subsequent site inspection involves review of the resolution status of previous CARs. This is useful in assessing the responsiveness of the Contractor to environmental non compliances and where necessary provides the basis for determining when a contractual non-compliance penalty may need to be invoked (eg persistent noncompliance / no response to CAR).

*** Mitigation Effectiveness Rating Criteria**

1	Very Good	2	Good
3	Fair	4	Poor
5	Very Poor		

Attachments: (Eg. Photos, Remarks, Laboratory reports, etc)

FORM 01: MITIGATION MONITORING OF THE CONSTRUCTION SITE

Project	:					
Package	:			Contractor	:	
Sub Contractor	:			Scope of Inspection	:	
Weather condition	:	Rainy/windy/sunny/gloomy		Date & Time	:	
Name of the Assessor	:			Position & Organization	:	
Monitoring visit was carried out with the presence of -----						
Work site location and description:						

Construction Activity		Monitoring Parameter (as EMP / CEMP)	Mitigation Implemented Yes / No / NA	Mitigation Effective* 1 to 5	Corrective Action Request (CAR) including deadline for Effective CA.	Resolution Status of previous CAR (re-solved/outstanding actions required)
Environment						
All activities	1.	Person in charge on environmental management is appointed and is present on-site				
All activities	2.	Person in charge on emergency management is appointed and is present on-site				
All activities	3.	Person in charge on health and safety is appointed and is present on-site				
All activities	4.	Approved CEMP and relevant EIA/IEE reports available in the site office for the reference				
All activities	5.	Environment Method Statement (EMS) is prepared and approved for the particular week				
All activities	6.	Grievance log and Environmental Issue log is available and duly updated				
Health & safety						
All activities	7.	Warning signs and exclusion barriers erected around work site areas				
All activities	8.	Workers are provided with and are using the uniform, applicable safety/protection equipment for site conditions				
All activities	9.	Worker's health checks implemented				
All activities	10.	Sanitary-hygienic conditions for workers are provided: drinking and washing water supply, mealtime utilities, toilets, rest time, resting areas etc				
All activities	11.	First aid kit is available on-site and is accessible to all workers				
All activities	12.	Fire extinguisher available				
All activities	13.	Security/emergency alarms/ lighting etc are in place				
Emergency Response Plan						
All activities	14.	Copy of ERP and emergency contact list are available, updated and posted in a visible place at all work sites				
All activities	15.	Accident report maintained				
All activities	16.	Damage of utilities and/or other structures managed				
Trainings and orientation courses						
All activities	17.	Orientation course to identify the work responsibilities and institutional arrangements held				
All activities	18.	Workers briefed on CEMP at time of starting employment & where new recruitments take place				
All activities	19.	Workers briefed on ERP at time of starting				

Construction Activity		Monitoring Parameter (as EMP / CEMP)	Mitigation Implemented Yes / No / NA	Mitigation Effective* 1 to 5	Corrective Action Request (CAR) including deadline for Effective CA.	Resolution Status of previous CAR (re-solved/outstanding actions required)
		employment				
All activities	20.	Job-specific environmental and safety training for workers provided				
Public communication and grievance redress mechanism: Environmental issues						
All activities	21.	People informed about the project activities prior to the contractor mobilization				
All activities	22.	People are notified on inconveniences: road closure, stopping water issue in the canals, drinking water supply, electricity breaks, etc., Meeting with community members on construction activities, environmental impacts and mitigation measures held				
All activities	23.	Grievance Log maintained				
All activities	24.	Complaints observed during the last visit addressed				
All activities	25.	Media engagement taken place				
Environmental parameters: Dust Control						
Earth work, stock piling, material loading, unloading and transport, demolition of existing structures, construction waste disposal, operation of quarry/burrow sites and all other construction work related to dust emissions	26.	Construction area is barricaded properly to avoid spreading dust/emissions etc				
	27.	Trucks are operating using covers				
		Material stored under cover using proper anchoring systems				
	28.	Tires of trucks / machineries are cleaned before entering city roads				
	29.	Regular watering of access roads and the construction site				
	30.	Turfing of finished earthen structures				
	31.	Dust masks are provided for the workers and using at the required time				
	32.	Ambient air quality including dust levels monitored through an accredited laboratory during this week				
Noise & Vibration Control						
Activities related to producing noise & vibration such as, construction vehicle movement and machinery operations, noise generate from the labour activities, blasting, tunneling, excavations, burrow and quarry site operations etc.	33.	Construction equipment - estimated noise emissions and operating schedules				
	34.	Allowable noise levels in the boundary of construction sites are kept below 75 dB in day time.				
	35.	Managed by restricting operating hours				
	36.	Allowable vibration limits as per the CEA interim standards (2008)				
	37.	Stationary construction equipment are kept at least 500m away from sensitive receptors (temporary, schools, public places etc.)				
	38.	Idling of temporary trucks or other equipment are not permitted during periods of loading / unloading or when they are not in active use				
	39.	The vehicles/machineries used by the contractor (specially the high noise & vibration generating) is as per the list approved by the RE and no additional are used				
Hindrance to surface runoff, soil erosion and sedimentation						
All activities related to earth work	40.	Drains not blocked by sediment or other debris				
	41.	No flood due to construction work.				
	42.	Silt traps in places				
	43.	No slope failures and cuts made according to technical standards specified in the design				
	44.	Earth work is done during the dry spell				

Construction Activity		Monitoring Parameter (as EMP / CEMP)	Mitigation Implemented Yes / No / NA	Mitigation Effective* 1 to 5	Corrective Action Request (CAR) including deadline for Effective CA.	Resolution Status of previous CAR (re-solved/outstanding actions required)
	45.	Turfing of completed embankments/ slopes				
	46.	Grievance log for any public complaints related to erosion/slope failures etc				
	47.	Visual observation of any turbidity of downstream water ways and erosion, slope failures, deposition of soil/sediment in the agriculture lands				
	48.	Earth material & debris of the excavated material is properly placed / disposed/ reuse for back filling				
	49.	Surface water quality measurements of the adjacent water ways as per the baseline conditions set at least 6 months prior to the contract mobilization				
Environment Pollution / Contamination of receptors (water, land, air)						
All activities related to environmental contamination	50.	The work site and the surrounding area kept clean free from debris, garbage, etc.				
	51.	No foul smelling in and around the site				
	52.	No over flowing of drains/pits etc No water ways/bodies blocked by the debris				
	53.	Sign boards in place to direct / notify about waste / spoil disposal location and mechanism within and around the work site				
	54.	EPL for waste water treatment facilities and waste disposal sites are obtained and up-to-date				
	55.	Construction wastes are removed within 24 hours from the site				
	56.	Drainage paths not blocked				
	57.	Waste water disposal paths not directed to water ways / open lands				
	58.	Hazardous material are transported/ stored and handled as per the safety data sheet				
	59.	Safety data sheet is available in the office and stores all the time related to the all chemicals use				
	60.	All the locations are well identified and demarcated for vehicle parking, fuel / lubricants storage, vehicle, machinery and equipment maintenance and refuelling etc				
	61.	Above sites are located away from rivers/ water ways, at least 200m away and 100 m away from the wild life areas/forest areas etc.				
	62.	No open burning of waste/ litter/vegetative parts/plastics or any other material within or surrounding areas of the construction site				
	63.	Starting and finishing times of major earth-works near water bodies stick to the schedule (during dry period)				
	64.	Visual observations of waste remains left onto the soil surface (oil spills, grease patches, any other chemical spillage etc.)				
	65.	Vehicles and machinery are up to the standard operation conditions (standard emission conditions, no oil/grease leak etc)				
Ground water / Surface water resources						
TBM Operational activities / tunneling	66.	Water leaking in the tunnelling areas				
	67.	Ground water levels to be monitored				

Construction Activity		Monitoring Parameter (as EMP / CEMP)	Mitigation Implemented Yes / No / NA	Mitigation Effective* 1 to 5	Corrective Action Request (CAR) including deadline for Effective CA.	Resolution Status of previous CAR (re-solved/outstanding actions required)
All activities associated with surface water ways	68.	Existing canals, streams or water sources have not been obstructed without relevant permission of the Engineer.				
	69.	No any kind of water ways diverted/alternated without relevant permission of the Engineer.				
Ecological resources						
Felling of trees and vegetation clearance	70.	The approval from relevant government agency (Local authority/ DWLC/FD) is obtained for the all pre-identified and marked trees to be removed which are more than 30 DBH/cm				
	71.	Trees are removed from the site before starting the construction activities contacting concerned department (Timber cooperation/ Local authority etc)				
	72.	Reforestation programme is initiated by the Contractor as per the guidance given in the EMP and contract documents				
	73.	No burning of vegetation parts within the construction site				
	74.	Excess vegetation matter is properly disposed or reused				
Site maintenance	75.	Proximity to ecological protected areas/sensitive areas and the relevant maps displayed on site and guidance on conservation practices to be				
Alien Invasive Species (AIS) management during material transport, weed removal, de-silting, and other activities which has a possibility of spreading AIS	76.	Inspection of soil storage areas, wash down areas, vehicle parking areas and disposal sites for the presence of weeds or alien invasive species by an Environmental officer who identify the IAS and take necessary actions to control the spreading (cleaning vehicles tiers, monthly monitoring of areas where the material transport etc.)				
	77.	Poster displayed / hand outs distributed with the photos of identified IAS to educate villagers/ labours etc				
Canal weed removal/ de-silting	78.	Weeds removed and placed in a way that drainage will be directed away from the bank and slope				
	79.	Transportation and disposal of removed weed done as per the instructions given by the Engineer, through the identified routes and disposal sites to avoid contamination of associated waterways				
All activities	80.	Any project activity within wild life/forest protected areas strictly avoided				
	81.	Activities which disturb wild life are avoided (hunting, poaching, fishing in the waterways, making noises, lighting during night etc.)				
	82.	Any records of wildlife deaths, human wild life conflicts, fish kills in or around the project area are recorded in the environmental log and justify the reasons/actions taken etc.				
	83.	The conditions laid in the approval letter issued by the Wild life department followed (Annexed with revised EMP)				
	84.	No extra felling of trees other than the identified and approved				

Construction Activity		Monitoring Parameter (as EMP / CEMP)	Mitigation Implemented Yes / No / NA	Mitigation Effective* 1 to 5	Corrective Action Request (CAR) including deadline for Effective CA.	Resolution Status of previous CAR (re-solved/outstanding actions required)
	85.	Reforestation initiated/done as per the guidance given in the EIA/EMP				
	86.	No solid/liquid waste disposed to the wild life habitats				
	87.	Elephant fences regularly monitored and managed as per the guidance given in the EIA/EMP				
	88.	Environmental log is updated with any issue related to ecological /wild life disturbance				
	89.	Any complaints received from DWLC is addressed immediately				
Socio-economic						
Rehabilitation/ construction activities related to irrigation canals and tanks	90.	All construction activities commence just after Maha season (November - February) cultivation and construction activities to be completed below Full Supply level of the canal /tank before commencing next Maha season				
De-silting & rehabilitation of irrigation canals, tanks etc.	91.	Any temporary water issues / shortages managed as per the guidance given in CEMP				
	92.	Visual observation of any silt material deposited / drained onto the irrigation areas/paddy field etc.				
Activities related to the obstruction of livelihood activities of the community, blockage of access roads / entrance etc.	93.	Temporary access roads/ bridges and alternative roads provided where necessary				
	94.	Notice public complaints and social unrest				
	95.	Proper signalling, displays, and community awareness				
	96.	Contractor has provided convenient passage for vehicles, pedestrians and livestock				
All construction activities	97.	Grievance log is maintained in the project office up to date and the solutions given for the issues				
Increase in vehicular traffic during transport of construction materials/ waste disposal etc.	98.	Vehicle fleet is managed as per the schedule				
	99.	Transport routes taken by construction related vehicles				
	100.	Traffic management Plan is in place where necessary				
Construction site management and labour operations	101.	Periodical checks of Water stagnating points for any offensive smells emanating from chemicals and processes applied in construction works or from labour camps				
	102.	Time framing of construction work as per the schedules approved				
	103.	Visual inspection of drainage and sanitation issues				
	104.	Appropriate selection of fill disposal and dispersal locations				
	105.	Presence of proper sanitation, water supply and waste disposal facilities				
	106.	Periodical health checks for the exposed community in the immediate vicinity and the labour force/ project staff held				
	107.	Awareness programmes on health management held for the community and the project staff				
	108.	CSR programmes developed and held to attract community to achieve project goals				

Construction Activity		Monitoring Parameter (as EMP / CEMP)	Mitigation Implemented Yes / No / NA	Mitigation Effective* 1 to 5	Corrective Action Request (CAR) including deadline for Effective CA.	Resolution Status of previous CAR (re-solved/outstanding actions required)
Cultural and archaeological						
All activities	109.	No work spilled over to the cultural properties, premises and precincts.				
	110.	Any artefacts recorded are informed to the relevant department				

Attachments: (Eg. Photos, Remarks, Laboratory reports, etc)

Authorization

The monitoring form is dully filled and the information provided is true and up-to-date.

Form filled by;

Name: ----- Designation: -----

Signature

Approved by;

Resident Engineer

Date:

Environmental Officer (PIU)

Date:

Programme Management, Design and Supervision Consultant (PMDSC)

MAHAWELI WATER SECURITY INVESTMENT PROGRAMME (MWSIP)**ENVIRONMENTAL MONITORING FORMAT 02- QUARRY / BURROW/ DISPOSAL SITES****Instructions to the monitoring officer**

- Contractor is notified on all non-conformances and requested to make arrangements on improvement. Notes on Use of Mitigation Monitoring Form
- This form, or an adaptation of it, should be used during routine (preferably weekly) site inspections by the PIU Environmental Officer/unit or representative (Supervision Consultant) to monitor implementation of the approved CEMP during the construction phase of MWSIP project contract packages.
- Routine site inspections should cover all current/relevant construction activities being implemented on the project site at the time of inspection. Ideally, the Contractor's Environmental officer/focal point should accompany the PIU Environmental Officer or representative during routine inspections.
- Once completed, the form should be sent to the Contractor for his information and action including any photographs. A copy of the completed form is retained in the data management system of the PIU for reference during subsequent site inspections and for referral during preparation of monitoring reports.
- Column 1 Construction Activity – All current/relevant construction activities taking place on the project site, for which mitigation measures are required under the EMP/CEMP, are listed.
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- Column 4 Corrective Action Request – Where the inspection identifies non-compliance or ineffective implementation of a mitigation measure, specific corrective actions are identified, discussed and agreed with the Contractor including a deadline for effective corrective action.
- Column 5 Resolution Status of Previous CARs – Each subsequent site inspection involves review of the resolution status of previous CARs. This is useful in assessing the responsiveness of the Contractor to environmental non compliances and where necessary provides the basis for determining when a contractual non-compliance penalty may need to be invoked (eg persistent noncompliance / no response to CAR).

*** Mitigation Effectiveness Rating Criteria**

1	Very Good	2	Good
3	Fair	4	Poor
5	Very Poor		

Attachments: (Eg. Photos, Remarks, Laboratory reports, etc)

FORM 02: MITIGATION MONITORING OF THE QUARRY / BURROW / DISPOSAL SITES

Project	:				
Package	:			Contractor	:
Sub Contractor	:			Scope of Inspection	:
Weather condition	:	Rainy/windy/sunny/gloomy		Date & Time	:
Name of the Assessor	:			Position & Organization	:

Monitoring visit was carried out with the presence of -----

Quarry/ Borrow/Disposal Site location and description:

	Monitoring Parameter (as EMP / CEMP)	Mitigation Implemented Yes / No / NA	Mitigation Effective* 1 to 5	Corrective Action Request (CAR) including deadline for Effective CA.	Resolution Status of previous CAR (resolved/outstanding actions required)
Regulatory measures / Approvals					
1.	Sites are identified / boundaries demarcated				
2.	Site is not established within areas protected under FFPO and FO				
3.	EPLs from CEA have been obtained and not expired				
4.	LGA permits are available				
5.	Obtained required approvals from the Defense Ministry to use/transport explosives for quarry operations				
6.	Approved site rehabilitation plan is available				
7.	Operation manual is available on site				
Noise/Vibration management					
8.	Excessive site noise managed by restricting operating hours				
9.	Noise & vibration level has been checked periodically				
Air quality					
10.	Dust control is implemented on dump, excavation or topsoil stockpile site				
11.	Emission from machineries has been controlled.				
12.	No harmful/significant dust generation during quarry operation				
13.	All the machineries have been fitted with proper exhaust silencers				
14.	Exhaust silencers have been checked periodically.				
Water quality / Soil					
15.	Slopes are stable and no possibilities of eroding / landslides				
16.	Sediment laden runoff from excavation or dumping sites does not enter natural water courses				
17.	No water ways/bodies blocked				
18.	Water logging is not evident in the site				
19.	No soil/water contamination from oil/fuel/leachate /debris etc.				
Ecological Resources					
20.	No damage to critical/ endangered flora/fauna or habitats identified in the IEE/EIA				
21.	No activities related to human - wild life conflicts				
22.	No spreading of invasive species promoted				
Nuisance to human / cultural resources					
23.	No unnecessary or improper interference has been done to the convenience of public,				

	Monitoring Parameter (as EMP / CEMP)	Mitigation Implemented Yes / No / NA	Mitigation Effective* 1 to 5	Corrective Action Request (CAR) including deadline for Effective CA.	Resolution Status of previous CAR (resolved/outstanding actions required)
	access, occupation of public, private road, or foot paths.				
24.	No nuisance to public due to foul smelling, dust, noise /vibration etc.				
25.	No materials have been stacked or placed to cause danger or inconvenience to any person or the public.				
26.	No work spilled over to the cultural properties, premises and precincts.				
27.	Tires of vehicles are free of mud and entrained material before entering public roads				
28.	Public roads are cleaned of any material dropped during transit				
29.	No significant fuel and oil spills visible in the excavated or dumping area				
30.	Haul trucks use tarpaulins to cover loads for transportation on public roads				
31.	Haul truck tailgates and sides fit properly and do not allow material to fall on public roads				
32.	Haulage routes and the vehicle fleet schedules are strictly followed to ensure no traffic congestions				
Site maintenance and safety					
33.	Surface of the site is properly maintained				
34.	Contractor has taken necessary measures for the safety				
35.	Workers' safety has been assured supplying and wearing helmets, jackets, boots and masks and ear plugs etc.				
36.	Hazardous waste disposal is done as per the CEA standards				

Attachments: (Eg. Photos, Remarks, Laboratory reports, etc)

Authorization

The monitoring form is fully filled and the information provided is true and up-to-date.

Form filled by;

Name: ----- Designation: -----

Signature

Approved by;

Resident Engineer

Date:

Environmental Officer (PIU)

Date:

Programme Management, Design and Supervision Consultant (PMDSC)

MAHAWELI WATER SECURITY INVESTMENT PROGRAMME (MWSIP)**ENVIRONMENTAL MONITORING FORMAT 03- LABOUR CAMPS & CONTRACTOR'S
FACILITIES & EQUIPMENTS****Instructions to the monitoring officer**

- Contractor is notified on all non-conformances and requested to make arrangements on improvement. Notes on Use of Mitigation Monitoring Form
- This form, or an adaptation of it, should be used during routine (preferably weekly) site inspections by the PIU Environmental Officer/unit or representative (Supervision Consultant) to monitor implementation of the approved CEMP during the construction phase of MWSIP project contract packages.
- Routine site inspections should cover all current/relevant construction activities being implemented on the project site at the time of inspection. Ideally, the Contractor's Environmental officer/focal point should accompany the PIU Environmental Officer or representative during routine inspections.
- Once completed, the form should be sent to the Contractor for his information and action including any photographs. A copy of the completed form is retained in the data management system of the PIU for reference during subsequent site inspections and for referral during preparation of monitoring reports.
- Column 1 Construction Activity – All current/relevant construction activities taking place on the project site, for which mitigation measures are required under the EMP/CEMP, are listed.
- Column 2 Mitigation Measure – Specific mitigation measures required under the EMP/CEMP for the corresponding construction activity are listed.
- Column 4 Corrective Action Request – Where the inspection identifies non-compliance or ineffective implementation of a mitigation measure, specific corrective actions are identified, discussed and agreed with the Contractor including a deadline for effective corrective action.
- Column 5 Resolution Status of Previous CARs – Each subsequent site inspection involves review of the resolution status of previous CARs. This is useful in assessing the responsiveness of the Contractor to environmental non compliances and where necessary provides the basis for determining when a contractual non-compliance penalty may need to be invoked (eg persistent noncompliance / no response to CAR).

*** Mitigation Effectiveness Rating Criteria**

1	Very Good	2	Good
3	Fair	4	Poor
5	Very Poor		

Attachments: (Eg. Photos, Remarks, Laboratory reports, etc)

FORM 03: MITIGATION MONITORING OF THE LABOUR CAMPS & CONTRACTOR'S FACILITIES & EQUIPMENTS

Project	:			:	
Package	:		Contractor	:	
Sub Contractor	:		Scope of Inspection	:	
Weather condition	:	Rainy/windy/sunny/gloomy	Date & Time	:	
Name of the Assessor	:		Position & Organization	:	

Monitoring visit was carried out with the presence of -----

Quarry/ Borrow/Disposal Site location and description:

	Monitoring Parameter (as EMP / CEMP)	Mitigation Implemented Yes / No / NA	Mitigation Effective* 1 to 5	Corrective Action Request (CAR) including deadline for Effective CA.	Resolution Status of previous CAR (resolved/outstanding actions required)
1.	Sites are identified / boundaries demarcated				
2.	Site is not established within areas protected under FFPO and FO				
3.	EPLs from CEA have been obtained and not expired				
4.	LGA permits are available				
5.	Approved site rehabilitation plan is available				
6.	Site Management Plan for the camp available and Camp is installed strictly in accordance with Safety Management Plan				
7.	Labour camps with proper facilities such as enough spaces, ventilation, beds, mosquito nets, lavatories, bathing facilities, drinking water are available				
8.	Waste water collection and treatment is implemented properly				
9.	The sewage system for the camp is planned and implemented with concurrence from the Local Public Health Officer (PHI)				
10.	Camp is kept clean from debris, garbage, etc. Waste is collected and disposed of in approved sites				
11.	Vehicles' and machinery parking and maintenance is organized properly: re-fuelling, clean repair etc.				
12.	Fuel, chemicals, lubricants and other liquid materials' storage is organized properly in accordance with ERP				
13.	Storage of hazardous material is organized properly in accordance with ERP				
14.	The required training , notices and sign boards in and around the site related to good construction & engineering practices, occupational health and safety, communicable diseases, good behavioural practices shall be facilitated by the contractor at the labor recruitment				
15.	Safety gear for workers has been supplied				
16.	Medical centre/ambulance room is available with nurse and first aid medicine				
17.	A vehicle is available to take patients immediately to the hospital				
18.	Excessive site noise managed by restricting operating hours				
19.	Water logging is not evident in the site				
20.	No soil/water contamination from oil/fuel/leachate /debris etc				

	Monitoring Parameter (as EMP / CEMP)	Mitigation Implemented Yes / No / NA	Mitigation Effective* 1 to 5	Corrective Action Request (CAR) including deadline for Effective CA.	Resolution Status of previous CAR (resolved/outstanding actions required)
21.	Not facilitating for human - wild life conflicts				
22.	No unnecessary or improper interference has been done to the convenience of public, access, occupation of public, private road, or foot paths				

Attachments: (Eg. Photos, Remarks, Laboratory reports, etc)

Authorization

The monitoring form is dully filled and the information provided is true and up-to-date.

Form filled by;

Name: ----- Designation: -----

Signature

Approved by;

Resident Engineer

Date:

Environmental Officer (PIU)

Date:

ANNEX 4 : TREE LIST IDENTIFIED FOR FELLING UEC-ICB-1

Annex 1: Tree List UEC ICB 1 along the canal trace from 0+350 to 3+800 km within 40 m belt

ABBREVIATIONS

TS – Taxonomic Status, **N** – Native, **I** – Introduced or Exotic, **NCS** – National Conservation Status, **VU** – Vulnerable, **NT** - Near Threatened, **EN** - Endangered, **GBH** - Girth at Breast Height, **VL** - Very large

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
From 0+900 km to 3+800 km (from Naula Elahera road towards Kongetiya reservoir)	1	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	177		
	2	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		135	140	165
	3	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	N		116		
	4	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	N		119		
	5	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	94		
	6	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	154		
	7	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		111		
	8	Sterculiaceae	Malvaceae	<i>Sterculia foetida</i>	Thelambu	N		161		
	9	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		115	156	
	10	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	92		
	11	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		90		
	12	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		145		
	13	Meliaceae	Meliaceae	<i>Chukrasia tabularis</i>	Hulan Hik	N	NT	94		
	14	Celastraceae	Celastraceae	<i>Cassine glauca</i>	Neralu	E		112		
	15	Meliaceae	Meliaceae	<i>Chukrasia tabularis</i>	Hulan Hik	N	NT	94		
	16	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		255		
	17	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	N		90		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	18	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	N		132		
	19	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	N		140		
	20	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	N		167		
	21	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	106		
	22	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	150		
	23	Meliaceae	Meliaceae	<i>Chukrasia tabularis</i>	Hulan Hik	N	NT	101		
	24	Euphorbiaceae	Phyllanthaceae	<i>Margaritaria indicus</i>	Karawu	N	VU	171		
	25	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	90		
	26	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	126		
	27	Euphorbiaceae	Phyllanthaceae	<i>Margaritaria indicus</i>	Karawu	N	VU	90		
	28	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		168		
	29	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		180	107	
	30	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	104		
	31	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	181		
	32	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	120		
	33	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	141	116	124
	34	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	174		
	35	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	179	177	
	36	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		242		
	37	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		139		
	38	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	160		
	39	Meliaceae	Meliaceae	<i>Chukrasia tabularis</i>	Hulan Hik	N	NT	118		
	40	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		112	108	
	41	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		137	115	
	42	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	157		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	43	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	162		
	44	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	173		
	45	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		98		
	46	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		97		
	47	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		112		
	48	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		118		
	49	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		99		
	50	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	132		
	51	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		114		
	52	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		170		
	53	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		167		
	54	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	90	80	82
	55	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		90		
	56	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	90		
	57	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	119		
	58	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	115		
	59	Ebenaceae	Ebenaceae	<i>Diospyros ovalifolia</i>	Kunumella	N		102		
	60	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	90	78	
	61	Rubiaceae	Rubiaceae	<i>Psydrax dicoccos</i>	Gal Panderu	N		74		
	62	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		90		
	63	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	70		
	64	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	85	69	
	65	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		103	85	
	66	Moraceae	Moraceae	<i>Ficus sp.</i>	Nuga	N		VL		
	67	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	108		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	68	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		114		
	69	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	156		
	70	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	103		
	71	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	128		
	72	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	110		
	73	Euphorbiaceae	Phyllanthaceae	<i>Margaritaria indicus</i>	Karawu	N	VU	70		
	74	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		107		
	75	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		85		
	76	Flacourtiaceae	Achariaceae	<i>Hydnocarpus venenata</i>	Makulu	E		95		
	77	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		96		
	78	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	113		
	79	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	270		
	80	Datiscaceae	Tetramelaceae	<i>Tetrameles nudiflora</i>	Niguna	N		265		
	81	Datiscaceae	Tetramelaceae	<i>Tetrameles nudiflora</i>	Niguna	N		270		
	82	Datiscaceae	Tetramelaceae	<i>Tetrameles nudiflora</i>	Niguna	N		263		
	83	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	111		
	84	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	230		
	85	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		114		
	86	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	98		
	87	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		126		
	88	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	113		
	89	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		139	95	
	90	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	114		
	91	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		117		
	92	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		147		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	93	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		130		
	94	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		147		
	95	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		98		
	96	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		124	80	
	97	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	N		179		
	98	Apocynaceae	Apocynaceae	<i>Alstonia scholaris</i>	Ruk Attana	N		127		
	99	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		125		
	100	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	94		
	101	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		120		
	102	Moraceae	Moraceae	<i>Ficus sp.</i>	Nuga	N		320		
	103	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	112		
	104	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		146		
	105	Moraceae	Moraceae	<i>Ficus sp.</i>	Nuga	N		310		
	106	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	123		
	107	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		105		
	108	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		96		
	109	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		115		
	110	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	92		
	111	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	142		
	112	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		133		
	113	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	121		
	114	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		98		
	115	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		126		
	116	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		106		
	117	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	101		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	118	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		95		
	119	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		96		
	120	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	121		
	121	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	124		
	122	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	122		
	123	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		90	83	82
	124	Euphorbiaceae	Phyllanthaceae	<i>Bridelia retusa</i>	Ketakeela	N		156		
	125	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		137		
	126	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		118		
	127	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	99		
	128	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		95		
	129	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		177		
	130	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	109		
	131	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	101		
	132	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	106		
	133	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		131		
	134	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		170		
	135	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		168		
	136	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		97		
	137	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	95		
	138	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	125		
	139	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	101		
	140	Euphorbiaceae	Phyllanthaceae	<i>Bridelia retusa</i>	Ketakeela	N		92		
	141	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	97		
	142	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		195		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	143	Moraceae	Moraceae	<i>Ficus sp.</i>	Nuga	N		VL		
	144	Moraceae	Moraceae	<i>Ficus sp.</i>	Nuga	N		VL		
	145	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		198		
	146	Datiscaceae	Tetramelaceae	<i>Tetrameles nudiflora</i>	Niguna	N		170		
	147	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	160		
	148	Euphorbiaceae	Picrodendraceae	<i>Mischodon zeylanicus</i>	Tammanna	N		99		
	149	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	90		
	150	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		154		
	151	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		107		
	152	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		90		
	153	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		105		
	154	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		112		
	155	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		116		
	156	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		127		
	157	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		147		
	158	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	210		
	159	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	95		
	160	Euphorbiaceae	Phyllanthaceae	<i>Margaritaria indicus</i>	Karawu	N	VU	90		
	161	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		105		
	162	Celastraceae	Celastraceae	<i>Cassine glauca</i>	Neralu	E		97		
	163	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		95		
	164	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		94		
	165	Celastraceae	Celastraceae	<i>Cassine glauca</i>	Neralu	E		108		
	166	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	205		
	167	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		92		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	168	Rubiaceae	Rubiaceae	<i>Mitragyna parvifolia</i>	Helamba	N		104		
	169	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		116		
	170	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		101		
	171	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		310		
	172	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	109		
	173	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		90		
	174	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		105		
	175	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		132		
	176	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		178		
	177	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		125		
	178	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		115		
	179	Euphorbiaceae	Picrodendraceae	<i>Mischodon zeylanicus</i>	Tammanna	N		104		
	180	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		127		
	181	Euphorbiaceae	Picrodendraceae	<i>Mischodon zeylanicus</i>	Tammanna	N		105		
	182	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	149		
	183	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		96		
	184	Euphorbiaceae	Picrodendraceae	<i>Mischodon zeylanicus</i>	Tammanna	N		97		
	185	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	N		119		
	186	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		104		
	187	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	132		
	188	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		95	92	
	189	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		105		
	190	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		135		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	191	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		91		
	192	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		106		
	193	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	108		
	194	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		102		
	195	Euphorbiaceae	Picrodendraceae	<i>Mischodon zeylanicus</i>	Tammanna	N		92		
	196	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	90		
	197	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		100		
	198	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		101		
	199	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		128		
	200	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		108		
	201	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		101		
	202	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		135		
	203	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		99		
	204	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		144		
	205	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		115		
	206	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		103	93	
	207	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		123		
	208	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		91		
	209	Rubiaceae	Rubiaceae	<i>Mitragyna parvifolia</i>	Helamba	N		116		
	210	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	320		
	211	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		92		
	212	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		131		
	213	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		190	143	
	214	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		107		
	215	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		96		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	216	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		220	235	240
	217	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		130		
	218	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	94		
	219	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		94		
	220	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		240		
	221	Meliaceae	Meliaceae	<i>Chukrasia tabularis</i>	Hulan Hik	N	NT	102		
	222	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	120		
	223	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	90		
	224	Moraceae	Moraceae	<i>Ficus sp.</i>	Nuga	N		VL		
	225	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		110	161	
	226	Oleaceae	Oleaceae	<i>Chionanthus zeylanica</i>	Geratiya	N		105		
	227	Moraceae	Moraceae	<i>Ficus sp.</i>	Nuga	N		VL		
	228	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		105		
	229	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		101		
	230	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		117		
	231	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		110		
	232	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	176		
	233	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		190		
	234	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		91		
	235	Fabaceae	Fabaceae	<i>Bauhinia racemosa</i>	Mayila	N		119		
	236	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	96		
	237	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	108		
	238	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	101		
	239	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	145		
	240	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		92		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	241	Rutaceae	Rutaceae	<i>Pleiospermium alatum</i>	Tumpat Kurundu	N		108		
	242	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		91		
	243	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		120		
	244	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		165		
	245	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	90		
	246	Moraceae	Moraceae	<i>Ficus sp.</i>	Nuga	N		VL		
	247	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	103		
	248	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	106		
	249	Sapindaceae	Sapindaceae	<i>Sapindus emarginata</i>	Kaha Penela	N		144		
	250	Ebenaceae	Ebenaceae	<i>Diospyros ebenum</i>	Kaluwara	N	EN	180		
	251	Euphorbiaceae	Euphorbiaceae	<i>Sapium insigne</i>	Tel Kaduru	N		124		
	252	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	171		
	253	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	102		
	254	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	101		
	255	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		117		
	256	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		131		
	257	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		106		
	258	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		102		
	259	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	99		
	260	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		107		
	261	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	139		
	262	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	95		
	263	Rubiaceae	Rubiaceae	<i>Mitragyna parvifolia</i>	Helamba	N		96		
	264	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	N		106		
	265	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	156		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	266	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	165		
	267	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		111		
	268	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		180		
	269	Fabaceae	Fabaceae	<i>Erythrina fusca</i>	Yak Erabadu	N	NT	96		
	270	Fabaceae	Fabaceae	<i>Erythrina fusca</i>	Yak Erabadu	N	NT	104		
	271	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		149		
	272	Oleaceae	Oleaceae	<i>Chionanthus zeylanica</i>	Geratiya	N		119		
	273	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	136		
	274	Oleaceae	Oleaceae	<i>Chionanthus zeylanica</i>	Geratiya	N		122		
	275	Euphorbiaceae	Euphorbiaceae	<i>Sapium insigne</i>	Tel Kaduru	N		124		
	276	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	92		
	277	Oleaceae	Oleaceae	<i>Chionanthus zeylanica</i>	Geratiya	N		95		
	278	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		125		
	279	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		127		
	280	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	98		
	281	Ebenaceae	Ebenaceae	<i>Diospyros ebenum</i>	Kaluwara	N	EN	93		
	282	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		142		
	283	Fabaceae	Fabaceae	<i>Erythrina fusca</i>	Yak Erabadu	N	NT	107		
	284	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		149		
	285	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		93		
	286	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		179		
	287	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	106		
	288	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	115		
	289	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	92		
	290	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		117		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	291	Moraceae	Moraceae	<i>Ficus sp.</i>	Nuga	N		VL		
	292	Moraceae	Moraceae	<i>Ficus sp.</i>	Nuga	N		VL		
	293	Fabaceae	Fabaceae	<i>Erythrina fusca</i>	Yak Erabadu	N	NT	132		
	294	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		107		
	295	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		104		
	296	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		98		
	297	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		101		
	298	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		90		
	299	Fabaceae	Fabaceae	<i>Bauhinia racemosa</i>	Mayila	N		123		
	300	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		111		
	301	Euphorbiaceae	Phyllanthaceae	<i>Bridelia retusa</i>	Ketakeela	N		134		
	302	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		134		
	303	Rubiaceae	Rubiaceae	<i>Mitragyna parvifolia</i>	Helamba	N		102		
	304	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		133		
	305	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		148		
	306	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		198		
	307	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		93		
	308	Rubiaceae	Rubiaceae	<i>Mitragyna parvifolia</i>	Helamba	N		123		
	309	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		113		
	310	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		120		
	311	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	N		90		
	312	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	N		120		
	313	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	130		
	314	Sapindaceae	Sapindaceae	<i>Sapindus emarginata</i>	Kaha Penela	N		129		
	315	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	112		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	316	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		124		
	317	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		103		
	318	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		116		
	319	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		184		
	320	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		214		
	321	Sapindaceae	Sapindaceae	<i>Sapindus emarginata</i>	Kaha Penela	N		117		
	322	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		138		
	323	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		103		
	324	Rutaceae	Rutaceae	<i>Chloroxylon swietenia</i>	Burutha	N	VU	96		
	325	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		230		
	326	Ebenaceae	Ebenaceae	<i>Diospyros ebenum</i>	Kaluwara	N	EN	123		
	327	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		113		
	328	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		112		
	329	Sapindaceae	Sapindaceae	<i>Sapindus emarginata</i>	Kaha Penela	N		102		
	330	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		98		
	331	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		165		
	332	Ebenaceae	Ebenaceae	<i>Diospyros ebenum</i>	Kaluwara	N	EN	186		
	333	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		184		
	334	Sapindaceae	Sapindaceae	<i>Sapindus emarginata</i>	Kaha Penela	N		110		
	335	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		172		
	336	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	93		
	337	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	126		
	338	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		124		
	339	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	150		
	340	Rutaceae	Rutaceae	<i>Pleiospermium alatum</i>	Tumpat Kurundu	N		105		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	341	Rubiaceae	Rubiaceae	<i>Psydrax dicoccos</i>	Gal Panderu	N		123		
	342	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		193		
	343	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		175		
	344	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		197		
	345	Rubiaceae	Rubiaceae	<i>Psydrax dicoccos</i>	Gal Panderu	N		102		
	346	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		139		
	347	Rubiaceae	Rubiaceae	<i>Psydrax dicoccos</i>	Gal Panderu	N		93		
	348	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		332		
	349	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	290		
	350	Moraceae	Moraceae	<i>Ficus sp.</i>	Nuga	N		VL		
	351	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		130		
	352	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	215		
	353	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	90		
	354	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		160	148	92
	355	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	N		138		
	356	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		140		
	357	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	164		
	358	Fabaceae	Fabaceae	<i>Bauhinia racemosa</i>	Mayila	N		131		
	359	Moraceae	Moraceae	<i>Ficus sp.</i>	Nuga	N		VL		
	360	Ebenaceae	Ebenaceae	<i>Diospyros malabarica</i>	Timbiri	N		118	107	
	361	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	91		
	362	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		125		
	363	Euphorbiaceae	Phyllanthaceae	<i>Margaritaria indicus</i>	Karawu	N	VU	146		
	364	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	283		
	365	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		96		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	366	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		97		
	367	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		111		
	368	Anacardiaceae	Anacardiaceae	<i>Mangifera zeylanica</i>	Etamba	E		134		
	369	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		122		
	370	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		139		
	371	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		165		
	372	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		111		
	373	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		138		
	374	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		144		
	375	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		107		
	376	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		317		
	377	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		100		
	378	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		155		
	379	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		152	111	
	380	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		164		
	381	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		123		
	382	Flacourtiaceae	Achariaceae	<i>Hydnocarpus venenata</i>	Makulu	E		118		
	383	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		111		
	384	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		104		
	385	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		104	106	101
	386	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		103		
	387	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	105		
	388	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	143		
	389	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		99		
	390	Euphorbiaceae	Phyllanthaceae	<i>Margaritaria indicus</i>	Karawu	N	VU	103		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	391	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		133		
	392	Ebenaceae	Ebenaceae	<i>Diospyros ovalifolia</i>	Kunumella	N		96		
	393	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		120		
	394	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		191		
	395	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		105		
	396	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	90		
	397	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	N		91		
	398	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		120	98	
	399	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	100		
	400	Ebenaceae	Ebenaceae	<i>Diospyros ebenum</i>	Kaluwara	N	EN	157		
	401	Lauraceae	Lauraceae	<i>Alseodaphne semecarpifolia</i>	Wewarana	N	VU	106		
	402	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		94		
	403	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		90		
	404	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		104		
	405	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	140		
	406	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		131		
	407	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		118		
	408	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	220		
	409	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		97		
	410	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		110		
	411	Ebenaceae	Ebenaceae	<i>Diospyros ebenum</i>	Kaluwara	N	EN	167		
	412	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	210		
	413	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		121		
	414	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	120		
	415	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		98		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	416	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		126		
	417	Rutaceae	Rutaceae	<i>Pleiospermium alatum</i>	Tumpat Kurundu	N		139		
	418	Rubiaceae	Rubiaceae	<i>Ixora pavetta</i>	Maharatambala	N		136		
	419	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		101		
	420	Rutaceae	Rutaceae	<i>Pleiospermium alatum</i>	Tumpat Kurundu	N		98		
	421	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		150		
	422	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	132		
	423	Ebenaceae	Ebenaceae	<i>Diospyros ebenum</i>	Kaluwara	N	EN	102	84	
	424	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		159		
	425	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		130		
	426	Sapotaceae	Sapotaceae	<i>Manilkara hexandra</i>	Palu	N	VU	117		
	427	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		90		
	428	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		127		
	429	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		98		
	430	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		120		
	431	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		96		
	432	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		107		
	433	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		90		
	434	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	255		
	435	Sapindaceae	Sapindaceae	<i>Dimocarpus longan</i>	Mora	N		95		
	436	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	105		
	437	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		132	83	
	438	Sapindaceae	Sapindaceae	<i>Dimocarpus longan</i>	Mora	N		145		
	439	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		111		
	440	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		149		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	441	Sapindaceae	Sapindaceae	<i>Dimocarpus longan</i>	Mora	N		100		
	442	Verbenaceae	Lamiaceae	<i>Tectona grandis</i>	Thekka	I		144		
	443	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	150		
	444	Lauraceae	Lauraceae	<i>Alseodaphne semecarpifolia</i>	Wewarana	N	VU	92		
	445	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		120		
	446	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		122		
	447	Ebenaceae	Ebenaceae	<i>Diospyros ebenum</i>	Kaluwara	N	EN	126		
	448	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		105		
	449	Ebenaceae	Ebenaceae	<i>Diospyros ovalifolia</i>	Kunumella	N		97		
	450	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		95		
	451	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		157		
	452	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		101		
	453	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		113		
	454	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		96		
	455	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		95		
	456	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		125		
	457	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		100		
	458	Celastraceae	Celastraceae	<i>Pleurostylia opposita</i>	Panakka	N		113		
	459	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		124		
	460	Ebenaceae	Ebenaceae	<i>Diospyros ovalifolia</i>	Kunumella	N		91		
	461	Ebenaceae	Ebenaceae	<i>Diospyros ovalifolia</i>	Kunumella	N		95		
	462	Ebenaceae	Ebenaceae	<i>Diospyros ebenum</i>	Kaluwara	N	EN	245		
	463	Euphorbiaceae	Euphorbiaceae	<i>Sapium insigne</i>	Tel Kaduru	N		153	105	
	464	Ebenaceae	Ebenaceae	<i>Diospyros ebenum</i>	Kaluwara	N	EN	134		
	465	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		170		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	466	Ebenaceae	Ebenaceae	<i>Diospyros ovalifolia</i>	Kunumella	N		95		
	467	Hernandiaceae	Hernandiaceae	<i>Gyrocarpus americanus</i>	Diya Labu	N		112		
	468	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	96		
	469	Hernandiaceae	Hernandiaceae	<i>Gyrocarpus americanus</i>	Diya Labu	N		99		
	470	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		116		
	471	Euphorbiaceae	Putranjivaceae	<i>Drypetes sepiaria</i>	Weera	N		141		
	472	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	95		
	473	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		105		
	474	Hernandiaceae	Hernandiaceae	<i>Gyrocarpus americanus</i>	Diya Labu	N		91		
From 0+900 km to 0+350 km (From Naula - Elahera Road up to Moragahakanda reservoir) Note: 0+000 to 0+350 km is already cleared under Moragahakanda project	475	Rubiaceae	Rubiaceae	<i>Mitragyna parvifolia</i>	Helamba	N		179		
	476	Rubiaceae	Rubiaceae	<i>Mitragyna parvifolia</i>	Helamba	N		159		
	477	Euphorbiaceae	Phyllanthaceae	<i>Margaritaria indicus</i>	Karawu	N	VU	110		
	478	Rubiaceae	Rubiaceae	<i>Mitragyna parvifolia</i>	Helamba	N		157		
	479	Rubiaceae	Rubiaceae	<i>Mitragyna parvifolia</i>	Helamba	N		143	147	
	480	Fabaceae	Fabaceae	<i>Bauhinia racemosa</i>	Mayila	N		94		
	481	Tiliaceae	Malvaceae	<i>Grewia damine</i>	Daminiya	N		95		
	482	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		98		
	483	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		161		
	484	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		127	106	89
	485	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		133		
	486	Sapotaceae	Sapotaceae	<i>Madhuca longifolia</i>	Mi	N	NT	118		
	487	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		126		
	488	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		141		
	489	Rubiaceae	Rubiaceae	<i>Nauclea orientalis</i>	Bakmi	N		119		
	490	Combretaceae	Combretaceae	<i>Terminalia arjuna</i>	Kumbuk	N		181		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	491	Rubiaceae	Rubiaceae	<i>Nauclea orientalis</i>	Bakmi	N		143		
	492	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		130		
	493	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		101		
	494	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		148	135	118
	495	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		151		
	496	Rubiaceae	Rubiaceae	<i>Mitragyna parvifolia</i>	Helamba	N		104		
	497	Flacourtiaceae	Achariaceae	<i>Hydnocarpus venenata</i>	Makulu	E		106		
	498	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		133		
	499	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		104		
	500	Euphorbiaceae	Phyllanthaceae	<i>Margaritaria indicus</i>	Karawu	N	VU	210		
	501	Sapotaceae	Sapotaceae	<i>Madhuca longifolia</i>	Mi	N	NT	202		
	502	Apocynaceae	Apocynaceae	<i>Alstonia scholaris</i>	Ruk Attana	N		192		
	503	Moraceae	Moraceae	<i>Streblus asper</i>	Geta Netul	N		92		
	504	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		107	92	
	505	Euphorbiaceae	Phyllanthaceae	<i>Margaritaria indicus</i>	Karawu	N	VU	140		
	506	Apocynaceae	Apocynaceae	<i>Alstonia scholaris</i>	Ruk Attana	N		127		
	507	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		128		
	508	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		194		
	509	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		144		
	510	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		157		
	511	Apocynaceae	Apocynaceae	<i>Alstonia scholaris</i>	Ruk Attana	N		150	210	
	512	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		102		
	513	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	151		
	514	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	99		
	515	Euphorbiaceae	Phyllanthaceae	<i>Margaritaria indicus</i>	Karawu	N	VU	127		

Canal Trace	Tree No	Family Old	Family New	Scientific Name	Common Name	TS	NCS	GBH (cm)		
								Trunk 1	Trunk 2	Trunk 3
	516	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		145		
	517	Sapindaceae	Sapindaceae	<i>Lepisanthes tetraphylla</i>	Dambu	N		124		
	518	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		103		
	519	Sterculiaceae	Malvaceae	<i>Pterospermum suberifolium</i>	Welan	N		109		
	520	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	112		
	521	Verbenaceae	Lamiaceae	<i>Vitex altissima</i>	Milla	N	NT	96		
	522	Tiliaceae	Malvaceae	<i>Grewia helicterifolia</i>	Bora Daminiya	N		157		
	523	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	147	145	
	524	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	124		
	525	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	145		
	526	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		154		
	527	Meliaceae	Meliaceae	<i>Melia azedarach</i>	Lunu Midella	I		255		
	528	Ulmaceae	Ulmaceae	<i>Holoptelea integrifolia</i>	Goda Kirilla	N	NT	167		
	529	Sapindaceae	Sapindaceae	<i>Schleichera oleosa</i>	Koon	N		102		
	530	Rubiaceae	Rubiaceae	<i>Haldina cordifolia</i>	Kolon	N		212		
	531	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		96		
	532	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		96		
	533	Myrtaceae	Myrtaceae	<i>Syzygium cumini</i>	Madan	N		121	90	
	534	Bignoniaceae	Bignoniaceae	<i>Stereospermum colais</i>	Dunu Madala	N		120	107	

ANNEX 5 : IUCN RECOMMENDATIONS ON UEC-ICB-1 PRIORITY AREAS



Proposal for priority species translocation from Package 01 area of UECP

December 2016







Introduction

One plant species and four animal species have been identified by previously submitted report "Recommendations on Priority Areas Identified for Commencement of Constructions in the Upper Elahara Canal Project" as priority species for translocation from UEC package 1 area before the land clearance for commence the construction work. Following methodology and estimate budget is prepared in order to completion of above proposed work based on the latter dated 19th December 2016 with the title of "Upper Elahera Canal Project Request cost estimates for the translocation of fauna and flora"

Objective of the Proposed Activity

To translocate priority species from the UEC package 01 area before commence the land clearance.

Priority species are; *Dendrolobium tringulare* (a plant) *Euplecta layardi* (A Land Snail) *Theobaldius parma* (A Land Snail) *Oziothelphusa minneriyaensis* (A Freshwater Crab) *Rhinophis philippinus* (Cuvier's earth snake)

	
<i>Oziothelphusa minneriyaensis</i>	<i>Theobaldius parma</i>
	
<i>Euplecta layardi</i>	<i>Rhinophis philippinus</i>

Priority Animal species

Methodology for Collection and Translocation

Plant - *Dendrolobium tringulare*

The *Dendrolobium tringulare* plant will be searched in possible habitats along the channel trace. All individual plants will be removed including the already identified specimens from the site. First, each individual plant will be temporarily put into a large sealed polythene bags in order to avoid dehydration. Later, the removed plants will be planted in nursery bags and transported to the nursery until planting period starts. As it is impossible to replant these plants in a suitable habitat it is recommended to keep these removed plant under nursery care up until October 2017 on time for the second inter monsoon rains.

Animals

For the animals in this project, sampling will be carried out day and night* in order to search priority animal species which is needed to be translocated in following order below. It is proposed to carryout animal rescue programme just before the land clearance in order to avoid recolonization.

(Euplecta layardi/ Theobaldius parma) - Land Snails

Night sampling from 6.30pm to 9.30pm will be carried out due to the nocturnal habitat of these two species. Tree trunks, branches and fallen logs will be searched to collect the land snails. Collected specimens will be temporally transferred to specimen jars or bags until they can be released the following morning.

Oziothelphusa minneriyaensis - Freshwater Crab

Seasonal stream beds will be searched for freshwater crabs. All the collected specimens will be temporarily transferred to the specimen collection bottle.

Rhinophis philippinus - Cuvier's Earth Snake

Cuvier's earth snake is a fossorial snake which lives in soil and under the decaying logs. The ground and logs will be searched for this species.

* However, night samplings depend on the access to the site during the night and also to the movement of the elephants.

Site Selection for Translocation

Rescued animals (land snails and snakes) will be released the following day into suitable terrestrial habitats located in adjacent areas. The captured population of *Oziothelphusa minneriyaensis* will be released to nearby seasonal or perennial streams. Depending on the number of specimen that will be collected from each species, this will decide the number of locations which will be used for translocations.

Recording and Reporting

All species that are collected from the area will be recorded with GPS location. The GPS locations of species are expected to provide reports that include GPS points for the total translocated individuals.

Required Support from the Project Office

- Permission to enter the Elahera-Girithale sanctuary
- Permission to collect and translocate species
- The required support from the DWC field officer that includes thunders and guns for protection
- Coordination support to hire village labors (Two or three persons)
- Find nursery mechanisms to protect the removed plants (*Dendrolobium tringulare*)

Proposed budget for UEC package 01 translocation

Budget for Priority Animal Species Translocation at UEC package 01 area*

Description	Unit	Unit Price	No. of Units	Amount (LKR)
<u>Staff Cost</u>				
Project team Leader - Devaka Weerakoon	Days	20,000	0.5	10,000
Field team coordinator - Naalin Perera	Days	10,000	5	50,000
Fauna Ecologist - Sampath Goonatilake	Days	12,500	4	50,000
Land Snail Assistant - Rohana Jayasekara	Days	7,500	4	30,000
<u>Transport and field expenses</u>				
Travel to site and on site transportation	Km	60	600	36,000
Perdium for field work (Four officers and driver)	man days	3,500	16	56,000
<u>Translocation</u>				
Field equipments and field consumables	Lump	2,000	1	2,000
payment for DWC officer	man days	1,000	3	3,000
payment for DWC officer (Night Sampling)	man days	1,000	2	2,000
Total				237,000

Budget for Priority Plant Species Translocation at UEC package 01 area*

Description	Unit	Unit Price	No. of Units	Amount (LKR)
<u>Staff Cost</u>				
Project team Leader - Devaka Weerakoon	Days	20,000	0.5	10,000
Field team coordinator - Naalin Perera	Days	10,000	4	40,000
Flora Assistant - Thanga Wijewickrama	Days	7,500	3	22,500
<u>Transport and field expenses</u>				
Travel to site and on site transportation	Km	60	550	33,000
Perdium for field work (Four officers and driver)	man days	3,500	9	31,500
<u>Translocation</u>				
Field equipments and field consumables	Lump	3,000	1	3,000
Labour hiring (Two Persons)	man days	1,000	6	6,000
payment for DWC officer	man days	1,000	3	3,000
Total				149,000

* Budget is not included cost for nursery care and replanting of *Dendrolobium tringulare* in forthcoming rainy season.

Mahaweli Water Security Investment Program

UPPER ELAHERA CANAL (UEC) FROM 27+509 KM TO 55+600 KM
INCLUDING 27.7 KM LONG TUNNELS

UPDATED ENVIRONMENTAL MANAGEMENT PLAN (EMP) – UEC-ICB-2A

August 2017



Program Management, Design and Supervision Consultant

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UPDATED ENVIRONMENTAL MANAGEMENT PLAN (EMP) – UEC-ICB-2A

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ABBREVIATIONS

ADB	Asian Development Bank
APs	Affected Persons
BOD	Biological Oxygen Demand
BoQ	Bill of Quantities
CEA	Central Environmental Authority
CEMP	Contractor's Environmental Management Plan
DoI	Department of Irrigation
DWC	Department of Wildlife Conservation
EA	Executive Agency
EIA	Environment Impact Assessment
EMC	Environmental Monitoring Committee
EO	Environmental Officer
EPL	Environmental Protection License
ERP	Emergency Recovery Plan
FFPO	Fauna & Flora Protection Ordinance
FO	Forest Ordinance
GoSL	Government of Sri Lanka
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GSMB	Geological Survey & Mines Bureau
H&S	Health and Safety
IAS	Invasive Alien Species
IEE	Initial Environmental Examination
IEER	Initial Environmental Examination Report
IMS	Information Management System
LB	Left Bank
LGA	Local Government Authority
MDP	Mahaweli Development Program
MFF	Multi Tranche Financing Facility
MLBCRP	Minipe Left Bank Canal Rehabilitation Project
MLLD	Ministry of Land and Land Development
MMDE	Ministry of Mahaweli Development and Environment
MOH	Medical Officer in Health
MRB	Mahaweli River Basin
MWSIP	Mahaweli Water Security Investment Program
NCPCP	North Central Province Canal Project
NWPCP	North Western Province Canal Project
PD	Project Director (of PIU)
PD-PMU	Program Director - Program Management Unit
PHI	Public Health Inspector
PIU	Project Implementation Unit
PMDSC	Project Management & Design Supervision Consultant
PMU	Project Management Unit
PSC	Program Steering Committee
RE	Resident Engineer
SEA	Strategic Environment Assessment
TDS	Total Dissolved Oxygen
TSS	Total Suspended Solids
UECP	Upper Elahera Canal Project

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1 INTRODUCTION

1. The Mahaweli Water Security Investment Program (MWSIP), under the Ministry of Mahaweli Development and Environment of the Government of Sri Lanka (GoSL), is a project funded by the Asian Development Bank (ADB) Loan No. 47381-002-SRI (SF) and GoSL, which assists the goal to maximize the productivity of the Mahaweli River Basin (MRB) water resources, by transferring available water to the north and north western dry zone areas for irrigation, drinking and commercial purposes.

2. The investment program will implement Phase I of the North Central Province Canal Project (NCPCP), using the Asian Development Bank's (ADB's) Multi Tranche Financing Facility (MFF) modality, loaned to the government in three tranches. The updated Mahaweli Development Program (MDP) comprises three main individual investment projects:

- (i) Upper Elahera Canal Project (UECP)
- (ii) North Western Province Canal Project (NWPCP)
- (iii) Minipe Left Bank Canal Rehabilitation Project (MLBCRP)

3. The objective of Upper Elahera Canal (UEC), having a total length of 101 km, is to transfer Mahaweli water from Moragahakanda reservoir to Huruluwewa reservoir in Yan Oya basin, North Central Province Canal, and Eruwewa – Mahakandarawa cascade system in Malwathu Oya basin and reroute the present supply of water from Huruluwewa Feeder Canal (HFC) to Huruluwewa, Nachchaduwa and Nuwara Wewa via UEC.

4. The UEC is to be implemented in three of the Program tranches:

- (i) Tranche 1 includes the construction of the UEC from 0+100 km to 6+226 km (UEC-ICB-1)
- (ii) Tranche 2 will include the construction of UEC Tunnel 3 and Tunnel 4 from 27+509 km to 55+600 km (UEC-ICB-2A), and the Kaluganga - Moragahakanda Transfer Canal (KMTC) from 0+000 km to 8+830 km (UEC-ICB-2B)
- (iii) Tranche 3 will include construction of UEC from 6+226 km to 17+700 km (UEC-ICB-3), UEC from 17+700 km to 27+509 km (UEC-ICB-04), from 55+600 km to 65+500 km (UEC-ICB-5), and transfer canal from end of UEC to Mahakanadarawa Reservoir is to be constructed under UEC-ICB-6

5. This Environmental Management Plan (EMP) is prepared based on the project interventions anticipated under the UEC-ICB-2A package, for the execution of the works comprising the construction of the UEC from 27+509 km to 55+600 km, which includes Tunnel 3 and Tunnel 4 together with a short section of cut-and-cover canal. The layout plan for the UEC-ICB-2A is given in **Figure 1-1**.

6. The scope of works of this contract package, UEC-ICB-2A, includes construction of a 27.7 km long section of the UEC (from 27+509 km to 55+600 km), comprising the 26.6 km long Tunnel 3, the 1.1 km long Tunnel 4, and associated roads and other works. **Table 1-1** describes the locations for the difference structure types under the package, and the relevant drawings for the specific design are given in the Volume III of Bidding Document (Drawings).

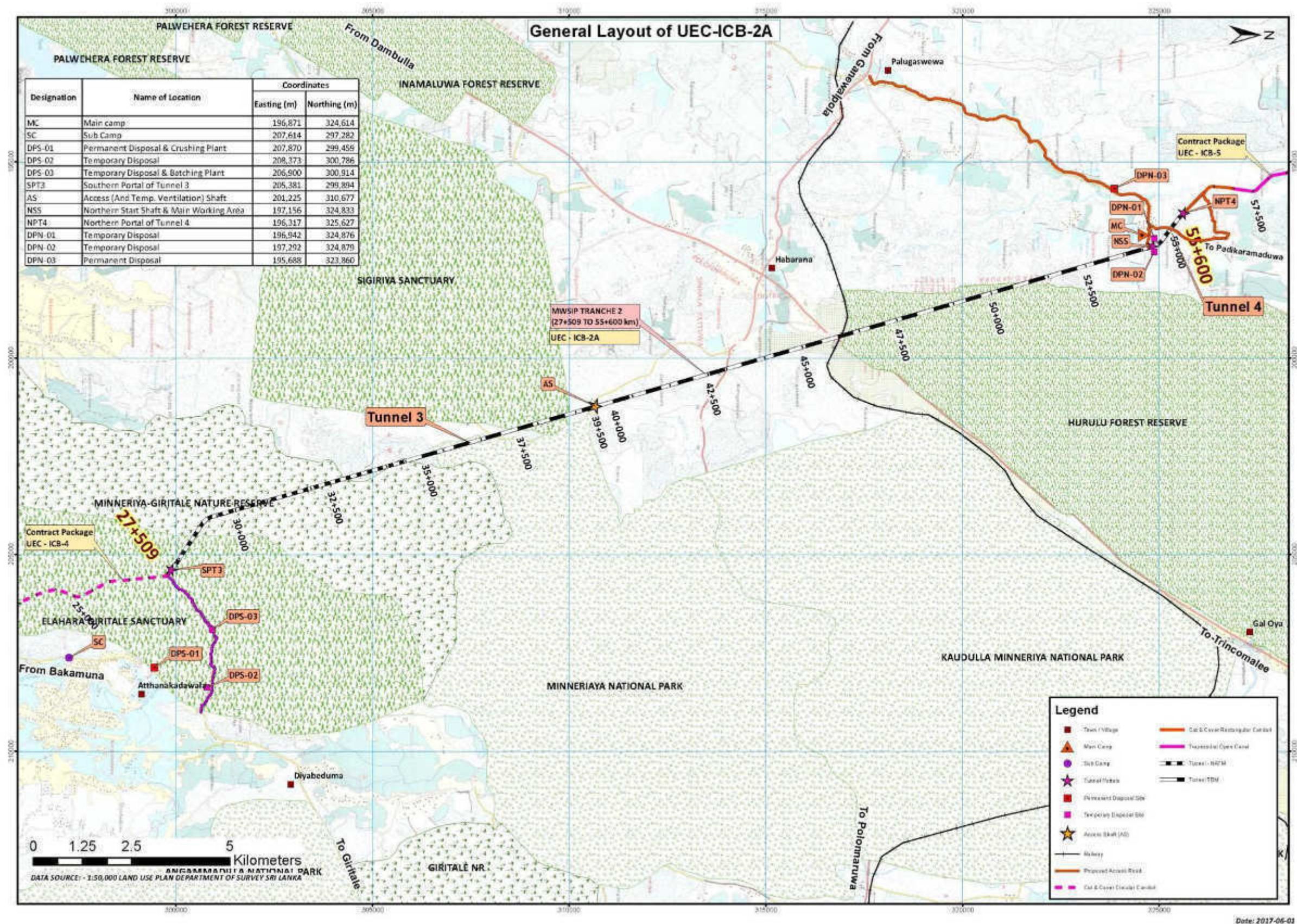


Figure 1-1 : General Layout Plan for UEC-ICB-2A

Table 1-1 : Different Canal Structure Types with Location under UEC-ICB-2A

No.	From (km)	To (km)	Length (m)	Structure
1	27.5090	27.6980	189.00	Cut & Cover: Circular Conduits (7m Dia with 3m Base-ment)
2	27.6980	27.7000	2.00	Transition (7m Dia. Conduit - 7.4 Dia NATM Tunnel)
3	27.7000	27.7100	10.00	Tunnel No.3: NATM Concrete Lined Tunnel (7.4m Dia with 6.06m Basement) n = 0.015
4	27.7100	27.7120	2.00	Transition (7.4m Dia Lined - 8m Dia Shotcreted)
5	27.7120	31.4980	3786.00	Tunnel No.3: NATM Shotcrete Finish Tunnel (8m Dia with 6m Basement) n=0.0195
6	31.4980	31.5000	2.00	Transition (8m Dia Shotcreted - 7.4m Dia Lined)
7	31.5000	31.5880	88.00	Tunnel No.3: NATM Concrete Lined Tunnel (7.4m Dia with 6.06m Basement) n = 0.015
8	31.5880	31.5900	2.00	Transition (7.4m Dia Lined - 8m Dia Shotcreted)
9	31.5900	32.6830	1093.00	Tunnel No.3: NATM Shotcrete Finish Tunnel (8m Dia with 6m Basement) n=0.0195
10	32.6830	32.6850	2.00	Transition (8m Dia Shotcreted - 7.4m Dia Lined)
11	32.6850	32.7550	70.00	Tunnel No.3: NATM Concrete Lined Tunnel (7.4m Dia with 6.06m Basement) n = 0.015
12	32.7550	32.7570	2.00	Transition (7.4m Dia Lined - 8m Dia Shotcreted)
13	32.7570	33.3980	641.00	Tunnel No.3: NATM Shotcrete Finish Tunnel (8m Dia with 6m Basement) n=0.0195
14	33.3980	33.4000	2.00	Transition (8m Dia Shotcreted - 7.4m Dia Lined)
15	33.4000	33.9090	509.00	Tunnel No.3: NATM Concrete Lined Tunnel (7.4m Dia with 6.06m Basement) n = 0.015
16	33.9090	33.9110	2.00	Transition (7.4m Dia Lined - 8m Dia Shotcreted)
17	33.9110	34.0780	167.00	Tunnel No.3: NATM Shotcrete Finish Tunnel (8m Dia with 6m Basement) n=0.0195
18	34.0780	34.0800	2.00	Transition (8m Dia Shotcreted - 6.8m Dia Lined)
19	34.0800	34.1010	21.00	(Dismantling Chamber): TBM Tunnel with Segmental Lining (6.8m Dia with 3.2m Basement) - n = 0.015
20	34.1010	34.1040	3.00	Transition (6.8m Dia Lined - 7.6m Dia Unlined)
21	34.1040	35.8360	1732.00	Tunnel No.3: TBM Tunnel Unlined Finish (7.6m Dia. with 5.05m Basement) - n = 0.017

No.	From (km)	To (km)	Length (m)	Structure
22	35.8360	35.8380	2.00	Transition (7.6m Dia Unlined - 6.8m Dia Lined)
23	35.8380	41.8900	6052.00	Tunnel No.3: TBM Tunnel Segmental Lined Finish (6.8m Dia. with 3.2m Basement) - n = 0.015
24	41.8900	41.8930	3.00	Transition (6.8m Dia Lined - 7.6m Dia Unlined)
25	41.8930	42.4050	512.00	Tunnel No.3: TBM Tunnel Unlined Finish (7.6m Dia. with 5.05m Basement) - n = 0.017
26	42.4050	42.4070	2.00	Transition (7.6m Dia Unlined - 6.8m Dia Lined)
27	42.4070	43.1600	753.00	Tunnel No.3: TBM Tunnel Segmental Lined Finish (6.8m Dia. with 3.2m Basement) - n = 0.015
28	43.1600	43.1620	2.00	Transition (6.8m Dia Lined - 7.4m Dia Shotcrete)
29	43.1620	44.0160	854.00	Tunnel No.3: TBM Tunnel Shotcrete Finish (7.4m Dia. with 4.07m Basement) - n = 0.0172
30	44.0160	44.0180	2.00	Transition (7.4m Dia Shotcrete - 7.6m Dia Unlined)
31	44.0180	44.0980	80.00	Tunnel No.3: TBM Tunnel Unlined Finish (7.6m Dia. with 5.05m Basement) - n = 0.017
32	44.0980	44.1000	2.00	Transition (7.6m Dia Unlined - 6.8m Dia Lined)
33	44.1000	45.2620	1162.00	Tunnel No.3: TBM Tunnel Segmental Lined Finish (6.8m Dia. with 3.2m Basement) - n = 0.015
34	45.2620	45.2650	3.00	Transition (6.8m Dia Lined - 7.6m Dia Unlined)
35	45.2650	45.3980	133.00	Tunnel No.3: TBM Tunnel Unlined Finish (7.6m Dia. with 5.05m Basement) - n = 0.017
36	45.3980	45.4000	2.00	Transition (7.6m Dia Unlined - 6.8m Dia Lined)
37	45.4000	52.2650	6865.00	Tunnel No.3: TBM Tunnel Segmental Lined Finish (6.8m Dia. with 3.2m Basement) - n = 0.015
38	52.2650	52.2680	3.00	Transition (6.8m Dia Lined - 7.6m Dia Unlined)
39	52.2680	52.7120	444.00	Tunnel No.3: TBM Tunnel Unlined Finish (7.6m Dia. with 5.05m Basement) - n = 0.017
40	52.7120	52.7140	2.00	Transition (7.6m Dia Unlined - 6.8m Dia Lined)
41	52.7140	54.2914	1577.40	Tunnel No.3: TBM Tunnel Segmental Lined Finish (6.8m Dia. with 3.2m Basement) - n = 0.015

7. UEC-ICB-2A is designed mainly as a tunnel to minimize the impacts on the wildlife and forests habitats, since about 70% of the package area is passing beneath wildlife protected areas such as Elahera Girithale sanctuary, Minneriya Girithale nature reserve, Sigiriya sanctuary, along the edge of Minneriya National park and Hurulu Forest reserve.

8. Although the canal traverses underground through the sensitive habitats, some level of ground disturbance and habitat fragmentation are anticipated at the sites identified for the southern portal of Tunnel 3 (SPT3 shown in **Figure 1-1**), access roads and permanent and temporary disposal sites identified within Elahera -Girithale sanctuary area (DPS 1, DPS 2 and DPS 3). Hence, the contractor requires sufficient time allocated within its contract period on the preconstruction activities to carry out tree enumeration surveys and obtain approval prior to tree felling and vegetation clearances followed by proper survey work to demarcate the boundaries prior to starting site clearances. In addition, the proposed sites for the contractor's facilities, other than the areas proposed in the approved EIA, need to be verified and approved prior to the site establishment by submitting a complete Environmental Method Statement.

9. Quite significant changes in design have been made under this package since the approval of the original EIA study. These are shown in summary form in Table 1.2 and explained in more detail in the report, "Addendum to the Environmental Impact Assessment (EIA): Upper Elahera Canal Project", has been prepared (June 2017) which was submitted to CEA and ADB for their concurrence prior to the commencement of construction. The main design changes related to this package are as follows:

- (i) The "Tunnel 3" described in EIA as TBM (from 27+509 km to 54+249 km) is redesigned considering the geological conditions and advance rates achieved underground with a TBM drive from the north (from 34+104 km to 54+291 km) and NATM drill-and-blast drive from the south (from 27+700 to 34+078 km) increasing the tunnel length slightly by about 175 m compared to the original design which is an environmentally favourable condition;
- (ii) Site access to southern portal of Tunnel 3 passes through Elahera Girithale sanctuary (SA 1-6 shown in **Figure 1-2**). These road sections exist as gravel roads, but need widening;
- (iii) Ventilation shaft around 39+400 km (30 m x 40 m spoil pile) (shown in **Figure 1-1**) is located at the edge of Sigiriya sanctuary and Minneriya National Park;
- (iv) Tunnel 4 (54+302 km to 55+400 km) will replace the originally proposed section of deep cut and cover canal to the north of Tunnel 3 and will be constructed by NATM.

10. This EMP comprises the following sections, incorporating the mitigatory measures and the monitoring plan:

- (i) Introduction
- (ii) Summary of Potential Impacts
- (iii) Description of Planned Mitigatory Measures
- (iv) Potential Land Acquisition Impacts
- (v) Procedures for Dealing with Chance Finds
- (vi) Description of Planned Environmental Monitoring
- (vii) Procedures for Site Rehabilitation
- (viii) Reporting & Review
- (ix) Contractor's Cost



1.1 Purpose of this Document

11. This Environmental Management Plan (EMP) is based on Environmental Impact Assessment (EIA) prepared in June 2015, the requirements of the letter of conditional approval of the CEA (Ref. 08/EIA/WATER/04/2012 dated as 31 March 2016) and the conditional approval issued by the Department of Wildlife Conservation (DWC) on 16 March 2016 (wa.jee/6/1/1/252 ii) (Annex 1 including Appendix A), Facility Administration Manual (MWSIP RRP Sri 47381-001 of 2015) and Environmental Assessment Review Framework (2014) of the Asian Development Bank (ADB), were taken into account in preparing this EMP.

12. This updated EMP is developed for the final designs of the civil works and other work contracts of the respective contract packages. The Works to be executed under each construction contract are clearly defined in the various Sections of the Bidding Document for that Contract.

13. The purpose of the EMP is to provide a framework for minimizing the adverse environmental impacts of the Project in all its phases. It defines the roles of key stakeholders, and reporting and feedback mechanisms. The EMP also provides a basis for the systematic collection of data to determine the actual environmental effects of the Project, compliance with regulatory standards, and measurement of the success of the environmental protection activities identified during the EIA process.

14. This draft updated EMP, prepared by the Project Management Design & Supervision Consultant (PMDSC) in May 2017, is submitted to the MMDE's Program Management Unit (PMU) for review, acceptance and onward transmission to the Central Environmental Authority (CEA) and ADB. The EMP approved by the CEA will be considered as the Final EMP to be used in the contract document, which will be the baseline document in preparing the Contractor's Environmental Management Plan (CEMP). The CEMP, which will be prepared by the Contractor after mobilization, will be submitted to the Environmental Monitoring Committee (EMC) appointed by the CEA. The overall project environmental monitoring shall be undertaken by the EMC appointed by the CEA. A detailed and specific CEMP for each of the contract packages is required as per the contractual requirements specified in section 6.17.2 of the bidding document and shall be approved by the PMDSC/PMU. The guidelines for the preparation of CEMP are given under section 1.3 of this EMP. As per the ADB recommendation, no actual physical construction work is allowed on the site other than the survey work until the CEMP is prepared and approved.

15. The monitoring program, including the Monitoring Scope, institutional responsibilities and the implementation schedule, are also included in the EMP. In consideration of recommendations given as mitigation measures for potential environmental impacts indicated in the EIA report, as well as the conditions mentioned in the CEA approval letter, the parameters to be monitored continuously during the project implementation with participation from Project Implementation Unit (PIU) project staff of the Irrigation Department are incorporated in the EMP. The CEA approval letter, including **Appendix 1** (conditions given by the Wildlife Department), is attached at **Annex A**.

1.2 Management Structure

16. The Ministry of Mahaweli Development and Environment (MMDE) is the Executing Agency (EA) of the entire Investment Program and Mahaweli Authority of Sri Lanka (MASL) is the Project Implementing Agency (PIA) for implementing Upper Elahera Canal (UEC) project. The management structure for the MWSIP PMU Organization and Environmental Management is described in **Figures 1-3** and **1-4** respectively.

17. The Program Director (PD) is the head of the Investment Program implementation, and the PMU operates under his management. There are three Project Directors responsible for the implementation of the three main projects (MLBCRP, UECP and NWPCP) assigned to each Project Implementation Unit (PIU) based in the respective field offices.

18. A safeguards cell is established in the PMU, which is responsible for overseeing the overall monitoring and verification of the environment and resettlement activities of the investment program with the assistance of the PIU and the PMDSC. The two counterpart personnel of Environmental Specialist and Social Safeguard Specialist with relevant experience are assigned to the safeguards cell, and will have responsibility for ensuring compliance of the safeguards requirements including (i) environment, and (ii) resettlement, including gender issues. The EA will be responsible for overall coordination, planning, and financing of the resettlement implementation program (RIP) and the implementation of RIPs is the responsibility of PMU.

19. The Resident Engineer (RE) appointed under the PMDSC assumes primary responsibility for ensuring the implementation by the Contractors of the CEMP. The relevant activities will be guided by the Environmental Specialist of PMDSC and supported by the Site Engineering Supervisors. An Environmental Officer is assigned to the Project Team under the Project Director of PIU, and with the guidance of the Environmental Specialist and Social and Resettlement Specialist of PMU will hold environmental monitoring responsibilities. PMDSC will assist during the monitoring activities as resources allow (allowance may need to be made for dedicated environmental staff to be added to the PMDSC team). The duties of the Environmental Officer will include: (i) oversight of construction contractors for monitoring and implementing mitigation measures; (ii) preparing and implementing environment policy guidelines and environmental good practices; (iii) liaising with the environmental agencies and seeking their help to solve the environment-related issues of project implementation; (iv) providing awareness training on environmental and social issues related to the program; and (v) preparation of environmental monitoring reports once a year for the IEE as required by ADB.

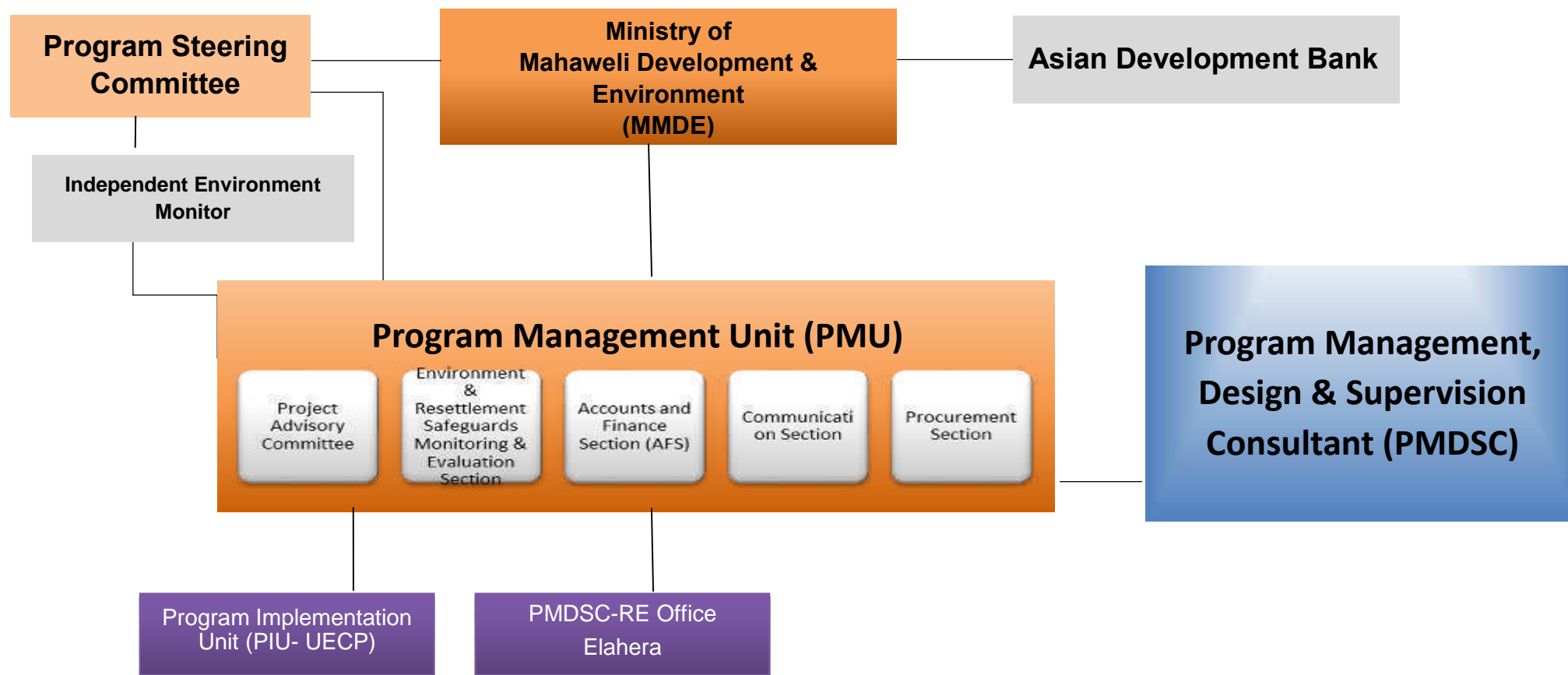


Figure 1-3 : MWSIP Organizational Chart

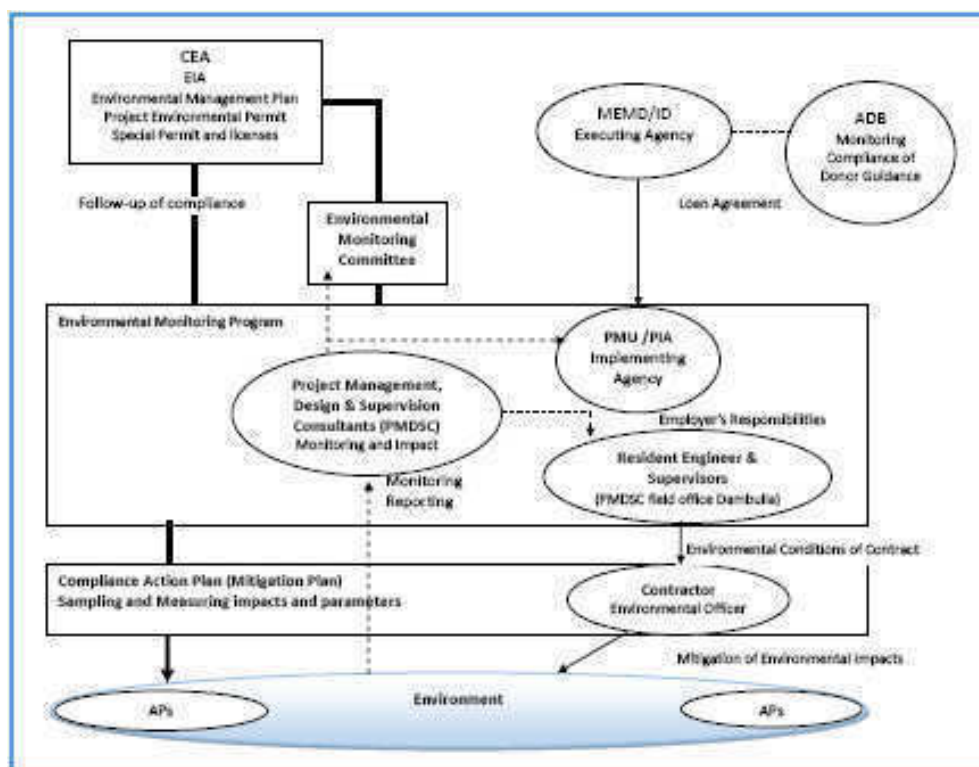


Figure 1-4 : Environmental Management Organization Chart

20. The Environmental Specialists engaged by the PMDSC will: (i) update the environmental assessments including EMP based on detailed designs; (ii) ensure EMPs are included in bidding documents and civil works contracts; (iii) provide guidance to the contractors to properly carry out the implementation of the CEMPs; (iv) review and evaluate the effectiveness with which the CEMPs are implemented, and recommend corrective actions to be taken as necessary; and (v) maintain documents for preparing periodic environmental monitoring reports to ADB/CEA with the coordination of PMU Environmental Specialist. The PMU Environmental Specialist of PMU will (i) provide oversight on environmental management aspects of the project and ensure that the relevant requirements of the EMPs that are included in the CEMPs are being implemented by the contractors; (ii) facilitate and ensure that contractors comply with all government rules and regulations regarding permits as well as any other relevant approvals required for works for which they are responsible; (iii) conduct ongoing consultation with the community during implementation of the project; and (iv) establish a grievance redress mechanism and ensure it is operated satisfactorily.

21. For the purpose of implementing the Environmental Management Plan, an EMC has been set up under the CEA. The EMC comprises representatives from the Department of Irrigation (DoI), Program Management Unit (PMU), representatives of Divisional Secretaries, and representatives from other stakeholder agencies. The PMU and PMDSC will monitor the implementation of the EMP and will report through periodical progress reports to the EMC of CEA as well as to the ADB.

22. The key responsibilities of the PMU/PIU and PMDSC staff engaged in environmental safeguard compliance are summarized in **Table 1-2**.

Table 1-2 : Key Responsibilities of the PMU/PIU and PMDSC staff relating to safeguard compliance

Organisation	Position	Responsibilities
PMDSC	<ul style="list-style-type: none"> Environmental Specialists Social and resettlement Safeguards Specialists 	<ul style="list-style-type: none"> Update the environmental assessments including EMP based on detailed designs Ensure EMPs are included in bidding documents and civil works contracts Preparation of Environmental Monitoring formats Provide guidance to the contractors to properly carry out the implementation of the EMPs Guidance on routine environmental monitoring activities, carried out as a joint effort by PIU Environmental Officer, and staff recruited under the Resident Engineer as per the resources allowed and periodical site inspections Review and evaluate the effectiveness with which the EMPs are implemented, and recommend corrective actions to be taken as necessary Maintain documents for preparing periodic environmental monitoring reports to ADB/CEA with the coordination of PMU Environmental Specialist Preparing due diligence reports on safeguard Undertaking any necessary additional surveys and investigations to support designs and implementation Preparing Strategic Environmental Assessment (SEA)
	<ul style="list-style-type: none"> Chief Resident Engineer Resident Engineer 	<ul style="list-style-type: none"> Monitoring compliance with environmental Management Plans
PMU	<ul style="list-style-type: none"> Environmental Specialist Social and Resettlement Specialist 	<ul style="list-style-type: none"> Provide oversight on environmental management aspects of the project and ensure that the relevant requirements of the EMPs which are included in the CEMPs are being implemented by the contractors Facilitate and ensure contractors comply with all government rules and regulations regarding permits as well as any other relevant approvals required for works for which they are responsible Conduct ongoing consultation with the community during implementation of the project; and Establish a grievance redress mechanism and ensure it is operated satisfactorily. Implementing resettlement implementation and land acquisition plans where necessary
PIU	<ul style="list-style-type: none"> Environmental Officer 	<ul style="list-style-type: none"> EMP Monitoring with the assistance of the Engineering Assistants of PMDSC as resources allow

Organisation	Position	Responsibilities
	<ul style="list-style-type: none"> Social and Resettlement Officer 	<ul style="list-style-type: none"> Preparing and implementing environment policy guidelines and environmental good practices Liaising with the environmental agencies and seeking their help to solve the environment-related issues of project implementation Providing awareness training on environmental and social issues related to the program in the project impact area Preparation of environmental monitoring reports biannually for the EIA as required by ADB

1.3 Contractors' EMP and Compliance Monitoring

23. Each Contractor is required under his construction contract to develop a CEMP based on the EMP presented here, and the guideline for CEMP is given below, as well as the environmental compliance mechanism that is in place to ensure that the EMP is implemented properly. The Environmental Monitoring Plan (EMoP) (see **Table 3-2**) has been developed, including key monitoring aspects and responsible parties, to ensure environmental best practices during the construction and operation phases of this project.

24. Contractor's EMP will be reviewed by PMDSC/PMU to ensure that it addresses requirements mentioned in the CEA approvals and ADB loan covenants, and this CEMP will be submitted to the EMC for approval in compliance with CEA approval conditions (Ref. 08/EIA/WATER/04/2012 dated 31 March 2016).

25. The Contract will refer to the approved EIA Report and the CEA Environmental Approval (Ref. 08/EIA/WATER/04/2012 dated 31 March 2016) for the applicable Laws and Regulations related to environmental management (Section 1.5 of the EIA report) and to the clearances and permits to be obtained prior to commencing the work, including those for which it will be his responsibility to obtain confirmation.

26. The CEMP will be based on the detailed implementation plan and the Contractor's actual construction methodologies, the work schedule, and the types of work and the details given in the Specifications. The CEMP shall be consistent with the project EMP and prepared based on the Contractor's activities at the corresponding locations.

The CEMP shall address all environmental and social matters relevant to the Works, which shall include as a minimum, but not be limited to, the following areas:

- (i) **Definition of project boundaries** (footprint of the construction activities, other contractors' facility locations, disposal areas, borrow areas (if any), worker camp areas, machinery yards, access roads, transportation routes of borrow, disposal material etc.)
- (ii) **Identification of environmental values and sensitive receptors** of the site and its surrounds (once the site boundaries are defined, the sensitive receptors and the environmental values of the area need to be confirmed. The EIA/IEE document and the updated EMP will often provide the necessary information. Such information can be presented as an overlay of the engineering drawings or maps)
- (iii) **Construction activities** - based on the construction plan/schedule prepared, it is important to mention what the various phases of work are for each site, as different phases include different activities and thus different environmental management requirements (e.g., site survey, vegetation clearance, soil stripping and earth movement, excavation, electric elephant fencing, concrete work, blasting etc.)

- (iv) **Risk Assessment Matrix:** Risk assessment and environmental management measures based on the construction activities

(Risk is assessed as the likelihood that the activity will have an effect on the environment as well as the consequence of the effect occurring. Hence, it is often described as “**Risk = Likelihood x Consequence**”)

- (v) **Site plans** - completed risk matrix provides a detailed assessment of the environmental management requirements for a construction site. The identified environmental management requirements need to be included in a site plan. The site plans range from simple line drawings to marked-up engineering drawings, to detailed overlays on aerial photographs. A site plan must cover the extent of the construction activity and should contain;

- (a) Indication of North, and scale;
- (b) Existing and planned supporting infrastructure (e.g., access roads, water ways, electricity supply etc.);
- (c) Location of planned work;
- (d) Drainage system;
- (e) Location of sensitive receptors (e.g. animal crossings etc.)

The environmental management measures are then overlaid onto the site plan. This can be done by hand or by using computer graphics / symbols depending on what is available. **ADB will not consider a CEMP to be complete unless a site plan accompanies the risk assessment matrix.**

- (vi) **Environmental Work Plans** - the completed CEMP shall provide the details of all the environmental management requirements for all stages of the construction process. If the work is undertaken as individual work teams, the environmental work plans need to be prepared separately targeting each work team for respective work activities (e.g. clearing, excavation, concrete work, back filling).
- (vii) the Contractor's organisational structure showing the implementation, supervision and reporting and responsibilities of key personnel;
- (viii) the construction programme and work activities;
- (ix) requirement of environmental license and approvals
- (x) the Contractor's plans for specific environmental measures, including:
- (a) relocation of utilities if required (minimize/avoid disruption of services such as power, water supply etc.)
 - (b) Contractor's Facilities Management Plan for management of impacts due to establishment and operation (includes detailed designs, methodologies and installation locations of all construction related facilities, such as access roads, workers' camps, storage areas, equipment maintenance areas etc., pollution control facilities, such as drainage channels, settling tank/ponds and septic tanks, temporary noise barriers etc.)
 - (c) liaison with local authorities and residents
 - (d) air pollution (dust and gaseous emissions) control
 - (e) noise and vibration control
 - (f) waste management (solid, liquid, hazardous)
 - (g) wastewater collection, treatment and disposal
 - (h) prevention of contamination of natural water courses and groundwater

- (i) water extraction, treatment and supply
- (j) protection of wildlife and fish
- (k) establishment, operation and reinstatement of spoil disposal areas
- (l) protection and replanting of flora
- (m) drainage and storm water management
- (n) erosion and sedimentation control
- (o) traffic management
- (p) minimising disturbance in public areas (including from construction traffic)
- (q) damage to and maintenance of existing roads, bridges, culverts etc.
- (r) chemicals and hazardous substances/materials management, spillage prevention
- (s) workers and public safety
- (t) emergency response
- (u) dealing with geological, paleontological and archaeological remains, graves etc.
- (v) reinstatement of Site areas used for facilities, access and temporary construction roads;
- (xi) the approach and schedule for implementing the mitigation measures specified in the Project EMP;
- (xii) plan for self-monitoring and reporting to ensure compliance with the EMP/CEMP provisions

27. The preparation of the CEMP and implementation of required environmental mitigation actions will be the responsibility of the Contractor through an experienced Environmental Officer dedicated for the entire construction period having a sound knowledge and professionally qualified in environmental science/ management and ecology, since the project area is associated with wildlife protected areas and forest reserve (Elahera Girithale sanctuary, Minneriya Girithale nature reserve, Minneriya National park, Sigiriya Sanctuary and Hurulu Forest Reserve).

28. Further it is required to submit the Environmental Method Statement (EMS) for the project interventions or the construction activities, such site clearing, identification and establishment of contractor's facilities (camp sites, office and laboratory, disposal areas, batching plants, crusher plant, waste management, site restoration etc.) that have a significant environmental impact.

29. Other key documents that need to be maintained by the contractor during the construction stage are, (i) Contractor's schedule on Environmental Management (attached with Construction schedule of daily/weekly basis), (ii) Environmental Issue log, (iii) Grievance log, and (iv) monthly monitoring report followed by routing self-monitoring carried out based on the "monitoring forms".

30. Environmental compliance monitoring is essential for successfully implementing the project-specific environmental management program developed through the Environmental Assessment carried out for the project and the EMP prepared, taking into account project-specific environmental impacts that may arise and mitigation measures required to make the project both environmentally and economically viable.

31. Environmental compliance monitoring involves a systematic collection and analysis of environmental mitigation/compliance-related information as the project progresses. It aims to improve the efficiency and effectiveness of the project. Monitoring will help determine whether the project is meeting the environmental standards and whether the environmental mitigation component results in the expected outputs. It is important that the environmental officers assigned to each PIU, and the supervision staff of the Engineer under the construction contracts, understand the importance of monitoring as a tool for analysing and understanding the status of the project.

32. During the construction phase the Contractor is responsible for implementation of all the requirements of the EMP, which are identified in the CEMP, while the Resident Engineer will supervise the compliance. Monitoring will ensure that the contractor complies with the terms and conditions of the CEMP for which he is responsible. The Project Director of the PIU is responsible for the assignment of Environmental Officers to carry out the monitoring together with the Engineer and supervision staff of the respective construction contract. The PMU Environmental Specialist, apart from supervising the work of the PIU Environmental Officers, will prepare monitoring protocols and will arrange for any necessary training for the PIU Environmental Officers and, if appropriate, specifically assigned staff from the Engineer's supervision team. The national and international Environmental Specialists of the PMDSC will also provide technical support for the environmental monitoring work.

33. The Contractor is responsible for implementation of the CEMP while the PMDSC and PMU are responsible for compliance monitoring and reporting to the EMC appointed by the CEA. Monitoring will ensure that the contractor complies with the terms and conditions of the CEMP. The Resident Engineer with his supervisory staff will carry out monitoring related to the CEMP, and the periodical environmental monitoring activities as per the updated EMP will be carried out by the PIU Environmental Officer with the involvement of engineering supervisory staff of PMDSC as allowed by the resources availability. Environmental Specialists assigned to PD-PMU and PMDSC will provide technical inputs as and when required. In addition, the Environmental Specialist of the PMU is responsible for preparing environmental monitoring protocols and training the environmental officer as well as supervising the work done by environment officer-PIU. In addition, s/he will oversee and attend to resolution of critical issues on the environmental management, grievance redress mechanism, compliance with regulatory and ADB safeguard requirements, reviewing environmental documentation submitted to ADB and CEA and presenting the Project environmental progress as and when required by PMU. The national and international environmental specialists of the PMDSC are to provide technical support for the environmental monitoring work through (i) updating the EIAs and IEE, and the respective EMPs based on final detailed designs; (ii) training and building capacity of PMU and PIU staff on environmental management, supervision, reporting, and monitoring of implementation of EMPs; (iii) orienting contractors on implementation of the EMPs; (iv) reviewing the environmental method statements provided by contractors and guide them on any revisions required; (v) monitoring implementation of the EMP and recommending any corrective actions on any unforeseen environmental impacts; and (vi) taking the lead in preparing environmental monitoring reports for PMU to be submitted to ADB and CEA.

34. It is the responsibility of the PMDSC staff working under the Resident Engineer to undertake monitoring of CEMP as part of construction supervision, with technical inputs from the PIU environmental officer. The monitoring formats for monitoring EMP implementation at the construction site, and other indirect impact areas, such as quarries, borrow and waste disposal and dumping areas, shall be prepared by the Environmental Specialist of the PMDSC and introduced at the orientation program. All forms of monitoring should be accompanied by regular monitoring reports including, where appropriate, dated photographs, interview results, and any test reports produced by independent firms or accredited laboratories (such as water, air and sediment quality). All the reports produced should be kept with the Project Director of the PIU, and a copy should also be kept on site by the Engineer to be made readily available to any interested party.

35. Apart from the routine monitoring conducted by the PIU Environmental Officers and the Engineer's staff, the PMU Environmental Specialist will also carry out periodic reviews (at quarterly intervals) to ensure that all the mitigation measures proposed have been carried out as specified in the EMP. The PIU Environmental Officers will report directly to the respective PIU Project Director, and the PIU Project Directors as well as the PMU Environmental Specialist then report to the Program Director.

Table 1-3 summarizes the site environmental monitoring and recording/ reporting events.

Table 1-3 : Summary of site environmental monitoring and recording/ reporting events

No.	Mode	Frequency	Purpose/ Action	Agency Responsible
1.	Ambient Environmental quality monitoring (Air Quality, Noise, Vibration, Water and Sediment quality)	Quarterly intervals for the routine monitoring during the construction phase	Ensure compliance particularly for the key parameters having critical impacts	Independent accredited laboratory contracted through the PMDSC
2.		As and when required	Correcting any environmental issue (i.e. oil spill, sedimentation, high noise & vibration, upon any complain of non-compliance etc.)	Contractor's Environmental Officer under the guidance and supervision of counterpart staffs of PIU/PMU and Site Engineer
3.	Monitoring Contractor's EMP items particularly related with constructional impacts on physical environment (hydrology, soil, ambient air quality, noise & vibration, traffic, vehicle speed etc.)	As per the implementation schedule given in the CEMP	<ul style="list-style-type: none"> Site Environmental monitoring walk around the construction area and other direct /indirect impact areas (borrow sites, disposal, stockpiling and Contractor's facilities) Completing the Monitoring formats Feeding monitoring data into the Data base (Information Management System -IMS) Accidental Environmental issues to be informed to the Environmental Officer / PIU and Environmental Officer PMU/PMDSC and take immediate remedial actions 	Construction Supervision Engineers and PIU Environmental Officer, under the guidance of Environmental Specialist of PMU/PMDSC
4.	Monitoring impacts and implementation of mitigatory measures as per the updated EMP (particularly impacts related to the ecological and socio-economic aspects) and conditions given by CEA Environmental approval	Once in 2 weeks		PIU Environmental Officer with the assistance of the supervision engineers as per the availability of the resources , under the guidance of Environmental Specialist of PMU/PMDSC
5.	Reporting and reviewing	Monthly	Monthly compliance monitoring reports	Environmental Officer (EO) of PIU with Resident Engineer
			<ul style="list-style-type: none"> Daily Review mitigations Daily updating Environmental Issue log, Environmental safety log, Grievance log Concise summary of environment management during past month; 2 weeks in advance of Monthly Progress meeting 	Environmental officer of the Contractor Review by the RE / PIU

No.	Mode	Frequency	Purpose/ Action	Agency Responsible
	Social and Resettlement monitoring reports	Quarterly / annually	<ul style="list-style-type: none"> Social and Resettlement safeguard compliance monitoring 	Social and Resettlement specialist/officer of PMDSC and PMU and PIU
6.	Site audit including health and safety audit	Weekly-regular	Site environment monitoring walk round by EO-PIU with RE's and Contractor's relevant staffs	EO-PIU with Engineer and Contractor
7.	Site audit including health and safety audit	Monthly-regular	Site environment inspection by RE and PD with participation of ES-PMU, EO-PIU & other relevant staffs	EO-PIU with counterpart staffs of Engineer and Contractor
8.	Surprise site audit	Once in 2 months (minimum)	Non-notified site inspection/ document review by ES-PMU and ES-PMDSC	ES-PMU
9.	Monthly Project Progress Meeting (MPPM)	Monthly-regular	Key environment events/ concerns will be taken up at PD and RE level	PD-PIU, RE-PMDSC and ES-PMU & EO-PIU
10.	Monthly Environment Meeting	Monthly-regular	As a follow-up meeting to sort out matters arising at MPPM and in the Monthly Environmental Monitoring Reports (EMR) or any new developments	EO-PIU with counterpart staffs of Engineer and Contractor. ES-PMU as required
	Environment Monitoring Committee	Quarterly or as advice by CEA	Site monitoring, review of reports and mitigations adopted as decide by the EMC	EO-PIU to coordinate
11.	Periodical EMR	Semi-annual to ADB and quarterly (unless otherwise specified) to EMC (CEA)	A summary of Project environment management over the last semester/quarter or defined period by EMC, including self-monitoring findings, issues with mitigations and independent ambient environment monitoring results, progress in grievance redress and forecast for next year etc.	Produce by PMDSC Review & Submit to ADB & CEA by PMU
12.	Progress Meeting of the Program	Monthly	Brief summary of the key achievements, drawbacks and issues on environment management	PD-PIU, ES-PMU & PMDSC
13.	Steering Committee Meeting of the Program	Monthly	Brief summary of the key achievements, drawbacks and issues with inputs from monthly progress meeting; on environment management	PD-PMU, PD-PIU (and ES-PMU & PMDSC as required)

36. The PIU Project Director shall facilitate the EMC, which is appointed and managed by the CEA, where the responsible PIU Environmental Officer, supported by the PMU Environmental Specialist, will present a quarterly report on the environmental monitoring activities and progress related to mitigation measures. The CEA Monitoring Committee meeting should then be followed by a site visit to clarify any specific issues pertaining to monitoring.

37. The PMU Environmental Specialist will be responsible for preparing and submitting a regular Monitoring Report to the ADB, which will be displayed in the ADB website.

38. The following section summarizes the most important potential environmental and social impacts related to construction of a 28.1 km long section of the UEC (from 27+509 km to 55+600 km), which includes the 26.8 km long Tunnel 3, the 1.1 km long Tunnel 4, and associated roads and other works (**UEC-ICB-2A**). as per the Scope of Work and the List of Works specified in Section 6 (Employer's Requirements) of the Bidding Documents for the relevant contract packages.

40. The key disturbance areas at the start shaft for Tunnel 3 (North end) and Tunnel 4 (South end) are within a Forest reserve and closer to Amuna Damana Pitiya Tank and Yan Oya stream, which get flooded during heavy rains. Hence, the working area shown in **Figure 2-1** is located in the flood plain of above surface water bodies and associated stream network. This area will be used for all immediate surface support facilities for driving both tunnels. Further although this area is a state land comes under Forest department, area is currently used for Chena and seasonal paddy cultivation encroached by the nearby villagers and would cause a temporary disturbance for their livelihood. Further there are some rural residents along the access roads to this identified area, which will have an impact on their day-to-day activities due to the construction vehicles and machinery movements.

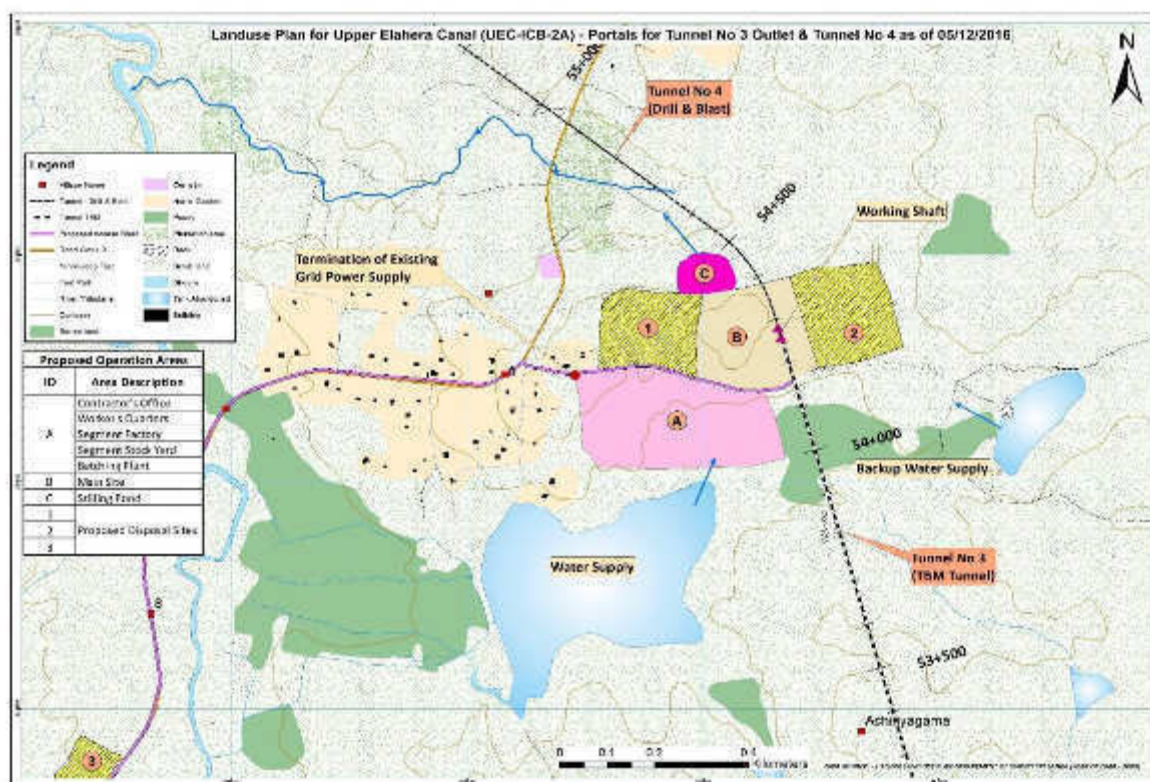


Figure 2-1 : Project affected area associated with the Start Shaft at northern end of Tunnel 3 and southern end of Tunnel 4

41. The nature of impacts and their significance would be varying within this UEC-ICB-2A contract package depending on the specific structure and its location. **Table 4-1** of the EIA report clearly describes the differences of impacts based on the construction method, and hence the actual impact

levels and their significance need to be addressed in the CEMP based on the exact construction method used.

42. **Tables 2-1 and 3-1** provide summaries for the anticipated impacts during pre-construction and construction stages and the details of mitigation measures are given in Section 3 of this document.

Table 2-1 : Anticipated Impacts during pre - Construction & Construction

Impact Components	Tunnels TBM	Tunnels NATM	Tunnel Portals	Cut and Cover sections	Structures	Worker Facilities	Construction Yards, vehicle parks	Access Roads	Disposal Sites
Physical Resources									
Soil erosion	M	M	H	H	M	L	M	M	H
Surface Water pollution	L	M	H	L	L	M	M	M	M
Air pollution	L	M	M	H	L	L	M	M	M
Mineral resources	M	M	M	M	M	M	M	M	L
Slope failure	L	M	H	L	L	L	L	M	L
Drainage patterns	-	-	M	M	-	L	M	M	L
Ground water table	H	H	M	M	-	L	L	-	-
Ground Water Pollution	M	M	M	L	-	L	M	L	L
Environmental flows	-	-	L	M	-	L	L	M	M
Noise and vibration	H		H	H	L	L	M	M	M
Ecological Resources									
Habitat loss, fragmentation, and degradation	-	-	H	M	L	H	H	H	H
Terrestrial fauna and flora	-	-	H	M	L	H	H	H	H
Aquatic fauna and flora	-	-	L	-	-	L	L	L	L
Critical habitats	-	-	M	L	-	-	-	-	-
Rare/Endemic species	-		M	L	-	L	L	M	-
Threatened species	-	-	M	L	-	L	L	M	-
Direct impacts on protected areas	-		M	L	-	-	-	-	-
Migratory routes of animals	L	L	M	M	-	M	M	M	-
Biodiversity loss/ecosystem function	-	-	M	L	-	L	L	L	L
Human-elephant conflict	-	-	M	M	L	M	M	M	L
Threats by Alien Invasive species	L	L	L	H	-	M	M	M	M
Increased access to protected areas	-	-	H	M	-	M	M	M	H
Socio-cultural aspects									
Health and safety of communities	-		M	M	L	M	M	M	M
Disruption of social cohesion of communities	-		M	L	-	L	L	M	L
Worker health and Safety aspects									
Occupational health and safety	M		M	M	M	M	H	M	M

Impact Components	Tunnels TBM	Tunnels NATM	Tunnel Portals	Cut and Cover sections	Structures	Worker Facilities	Construction Yards,, vehicle parks	Access Roads	Disposal Sites
Archaeological and Cultural Resources									
Direct impacts	-		-	-	-	-	-	-	-
Theft and vandalism of artifacts and sites	-		-	L	L	H	H	H	L
Unanticipated events									
Health related issues	L		M	L	-	M	L	L	L
Climate related issues	L		M	L	L	L	L	M	L
Construction related issues	M		M	M	M	M	M	M	M

Abbreviations: H- Highly significant, M-Moderately significant, L-Low significance

3 DESCRIPTION OF PLANNED MITIGATORY MEASURES

43. A site specific Environmental Management Plan (EMP) has been provided containing (i) project activity; (ii) potential environmental impacts; (iii) planned mitigation measures; (iv) monitoring scope; (v) institutional responsibility; and (vi) proposed timing for implementing mitigation measures related to the Construction package UEC-ICB-2A depending on the availability of construction related information, and this would be converted to a Contractor's Environment Management Plan (CEMP) once the construction method and program and methodology is finalized by the Contractor.

44. The EMP in **Table 3-1** is divided into three sections for ease of reference – of specific relevance to the Contractor's responsibilities on site are the activities under Section B (Construction):

(A) Preconstruction

45. Activities related to land acquisition, addressing grievances of affected communities, livelihood management related to the forthcoming construction works.

(B) Construction

- (i) Activities related to initial mobilisation and establishment of the site:
 - (a) achieving initial access into the site and construction of temporary access roads
 - (b) preparation of site establishment areas for the various temporary site facilities
 - (c) construction of Contractor's camps, including facilities for offices, storage, accommodation, equipment, aggregate production/storage, concrete production etc., as well as facilities for the Employer and the Engineer, and establishment of associated utilities and systems
 - (d) establishment of borrow areas, ready to commence operations
 - (e) establishment of quarries, ready to commence operations
 - (f) facilitating site requirements such as water, electricity etc.
- (ii) Environmental impact management issues related to construction activities:
 - (a) Health and safety related to all construction activities
 - (b) Transport and storage of construction materials and machinery operation
 - (c) Clearing of site, removal and disposal of construction debris and excavated materials
 - (d) Activities related to significant noise and vibration
 - (e) Activities related to the emission of dust
 - (f) Activities related to the hindrance of surface runoff and soil erosion
 - (g) Construction / removal of water diversions
 - (h) Provision of information disclosure among stakeholders.
- (iii) Special environmental impact management issues related to construction activities:

The impacts related to the list of works are identified in Section 6 (Employer's Requirements) of the Bidding Document, such as:

(a) Ecological Aspects

- UEC-ICB-2A project area lies within environmentally sensitive areas (wildlife and forest), and associated with natural streams, and hence especially at the tunnel

portal and access would create adverse impacts to the existing faunal community in the area and surrounding habitats

- Disturbance to terrestrial natural habitats will most likely result in introduction of alien invasive species
- Increased access to forested areas by humans during construction, which is less so during the operation and maintenance phase. However, opening up of formerly relatively undisturbed areas to humans leads to increased poaching, clearance of forest patches, setting fires, removal of timber, non-timber forest products such as medicinal plants, ornamental plants, stones, sand and gravel from stream beds, and introduction of alien invasive species etc. Removal of vegetation, creation of inlet and outlet portals, and access roads along steep hill sides will cause significant loss, fragmentation and degradation of natural habitats, increased soil erosion, increased risk of slope failure
- Wildlife movements will be restricted and some groups/herds may move away due to noise and vibration generated from construction activities wildlife/elephant movements should not be disturbed
- Proposed selection of suitable construction materials, borrow, disposal, and stock piling areas avoiding the protected areas under the Fauna and Flora Protection Ordinance (FFPO) or Forest Ordinance (FO) of GoSL and complying with ADB SPS (2009) unless it is unavoidable, and such places with no alternatives requires to obtain relevant approval followed by a proper Environmental Assessment.

(b) Land stability and soil erosion aspect

- Excavation, blasting operations and removal of soil/rock should be done as per the proper engineering designs to avoid ground instability and slope failures
- Adequate erosion management measures shall be applied during the construction in order to prevent siltation of surface water bodies at downstream areas, neighbouring marsh/paddy lands during the construction
- Uprooting the trees should be done with appropriate equipment to minimize the damage to soil
- Natural water paths and valleys should be kept free from any obstruction through any kind of construction or disposal of soil/rocks etc.
- Avoid adverse impacts on existing drainage systems/natural storm paths of the project area
- Soil removed during the construction should not be dumped at any edge of waters or disposed into surrounding environment without proper protection measures and approval

(c) Impacts anticipated due to tunnelling activities

- The blasting operations will lead to rock movement, minor fragmentations and vibrations, and are thus directly related to the local geology. Hence, appropriate blasting design will be adopted which will consider safety, blast geometry, free faces, burden, spacing, initiation pattern and angled holes to the approval of the Engineer, represented by PMDSC.
- Water from excavation at tunnelling to ascent should be drained in the duct by gravity. Diversion of the polluted superficial drain from the territory of construction site should be carried out through special treatment facilities

- Development of a comprehensive erosion and sediment control plan prior to earth-moving activities; (i) Construct settling ponds where silt-laden water can settle before being discharged into natural watercourses; (ii) Application of erosion and sediment control practices to prevent excessive onsite damage; (iii) Apply perimeter control practices to protect the disturbed areas from onsite runoff and to prevent sediment damage to areas below the construction site; (iv) Keeping run-off velocities low and trying to retain much of the run-off on the site and stabilization of the disturbed areas as soon as the final grade has been attained
- Installation of a water proofing system between the initial ground support system and the final concrete lining where specified. Water collection basins will be required to put at each end of the portals where drainage water will be collected.
- For the cut & cover and conduit sections of the canal, the groundwater table can be affected during the construction stage. All the tunnels are required to be lined throughout reaches that are considered permeable. Open canal section is lined and cut and cover conduits are concrete structures. Therefore, construction methods decided by the designers will minimize the adverse impacts on ground water table.
- A specific Emergency Management Plan based on the environment/safety risk assessment in the method statement for tunnel construction will need to be prepared.

(d) Disposal of construction waste material and disposal areas

- The disposal sites will not contain any toxic material, but only the excavated material from the tunnel and the canal.
- A considerable portion of the soil removed in the excavation will be used for forming the canal bunds, backfilling of cut and cover conduits and other structures. Excavated material will also be used for filling abandoned borrow areas found at the project area. In addition, the cut and cover sections will be covered with excavated earth up to the ground level.

(C) *Operation and Maintenance*

46. Activities related to the operation and maintenance phase of the Works under each contract.

47. The Contractor will be responsible for fulfilling the mitigatory measure requirements set out under Section B (Construction) throughout the construction period. **Table 3-2** shows the Environmental Monitoring Plan (EMoP) of the key monitoring aspects identified related to the EMP to ensure that required mitigation measures are in place, which complies with the appropriate safeguard policies.

Table 3-1 : Summary of the anticipated impacts and mitigations related to the UEC-ICB-2A contract package

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
1. Making access to wildlife protected areas during surveys and site access preparations	a. Disconnecting electric fences and there by wildlife threats to the nearby villages b. Making free access to the protected areas and there by illegal timber logging, collecting wildlife species	<ul style="list-style-type: none"> Only authorized people to access the areas under the supervision and accompany with Wildlife/Forest officers Realigning electric fences in consultation with Wildlife department 	<ul style="list-style-type: none"> Effectiveness of mitigation measures 	RE.PMDSC and PD/PIU and Wildlife/forest dept.	Daily during the initial stage
2. Felling of trees	a. Loss of habitats b. Habitat fragmentation	<ul style="list-style-type: none"> The Contractor shall remove only the required trees that would disturb the construction activities. Once the surveys are completed, boundaries need to be marked for the areas that need to clear Tree enumeration survey to be carried out by PMDSC and prepare the list of trees to be felled and submitted to PMU for the approval process The Contractor must obtain required approval from the Divisional Secretariat under the guidance of PMDSC and PMU Timber Cooperation will involve tree felling (trees of more than 30 cm DBH, and removal of roots, vegetation clearances and disposal shall be done by the contractor) Trees shall be removed from the construction sites before commencement of construction with prior 	<ul style="list-style-type: none"> The approval from relevant government agency (Local authority / DWLC / FD) is obtained for the all pre-identified and marked trees to be removed which are more than 30 DBH/cm Trees are removed from the site before starting the construction activities contacting concerned department (Timber co- 	Contractor to implement PMU/PMDSC to guide the Contractor EO of Contractor, Environmental officer of PIU and the environmental specialist of PMU	Weekly during the preconstruction stage

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>permission from the concerned department.</p> <ul style="list-style-type: none"> Compensatory plantation by way of Re-plantation of 3 times of the number of trees cut should be carried out in the project area. Contractor shall make every effort to avoid removal and/or destruction of trees of religious, cultural and aesthetic significance. If such action is unavoidable the Engineer shall be informed in advance and carry out public consultation and report on the same should be submitted to the Engineer. Contractor shall adhere to the guidelines and recommendations made by the Central Environmental Authority, if any with regard to felling of trees and removal of vegetation. Removed trees must be handed over to the Timber Corporation 	<p>operation/ Local authority etc)</p> <ul style="list-style-type: none"> Reforestation program is initiated by the Contractor as per the guidance given in the EMP and contract documents and the habitat loss to planted area (Ha) should be 1:3 ratio No burning of vegetation parts within the construction site Excess vegetation matter is properly disposed or reused 		
<p>3. Site clearance and removal of vegetation</p> <p>4. Slope failure and soil erosion due to removal of vegetation</p>	<p>c. causing soil erosion, siltation & sedimentation of waterways, blocking of adjacent lands, adverse impacts on community</p>	<ul style="list-style-type: none"> Minimum areas cleared for construction of canal, structures and other facilities; carry out work in dry seasons; design adequate drainage pathways with silt traps as required; See also below for site specific details Removal of detached/unstable rocks, boulders; terracing adopted in deep cuts of 15m and above; consolidation grouting and shot-creting; Sub-surface drains at tunnel portal areas and steep hill sides ; slope protection at exposed earth surfaces; all other measures as specified in contract documents turfing for 	<ul style="list-style-type: none"> Areas marked in maps and plans at planning stage vs. areas actually cleared Effectiveness of mitigation measures 	<p>Contractor to implement</p> <p>PMU/PMDSC to keep NBRO informed (Independent Monitoring agency responsible for landslides)</p> <p>EO of Contractor, Environmental officer of PIU and the</p>	<p>Weekly during the preconstruction stage</p>

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
				environmental specialist of PMU	
5. Creation of access roads for project and modification of existing roads	a. Disturbances to wildlife movements b. causing change of drainage patterns, soil erosion and road surface damage, affecting community safety	<ul style="list-style-type: none"> No new roads or any other permanent structures to be constructed within protected areas without prior approval of DWC/FD Precautions should be taken to reduce construction impacts on existing natural systems such as forest areas, streams, tanks and wild animals within these habitats All roads designed and constructed to prevent these negative impacts, including providing adequate culverts, slope protection Safety barriers at dangerous locations, and bypasses at locations where existing roads are crossed by open canal or cut & cover conduits. Adequate signs to indicate traffic diversion and speed limits within and surrounding areas of the construction site. Maximum allowable speed limits to be determined depending on the site conditions (probably less than 30 kmph) 	<ul style="list-style-type: none"> Effectiveness of mitigation measures 	Contractor to implement PMU/PMDSC to guide the Contractor EO of Contractor, Environmental officer of PIU and the environmental specialist of PMU	Weekly during the preconstruction stage
6. Construction of labour camps	c. Contamination of receptors (water, land, air) d. Environmental & Social damages e. Social unrest	<ul style="list-style-type: none"> The location, layout and basic facility provision of labour camp must be submitted to the Engineer prior to their construction. The location of labour camps must be strictly avoided the areas of wildlife/forest protected, any areas with environmental and social sensitivity (near religious places, schools, canal reservations etc.) The prior approval of Pradeshiya Sabha-Local Authority shall be obtained for construction of labour 	<ul style="list-style-type: none"> Site is not established within areas protected under Fauna and Flora Protection Ordinance (FFPO) and Forest Ordinance (FO) Site Management Plan for the camp available and Camp is 	Self monitoring by EO of the Contractor EO of PIU and Resident Engineer of PMDSC for supervision	Weekly inspection during the Preconstruction period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>camp</p> <ul style="list-style-type: none"> • The construction will commence only upon the written approval of the Engineer. • The Contractor shall maintain necessary living accommodation and ancillary facilities in functional and hygienic manner and as approved by the Engineer. • All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp must be planned and implemented with concurrence from the Local Public Health Inspector (PHI) • Adequate health care is to be provided for the work force. The layout of the construction camp and details of the facilities provided should be prepared and shall be approved by the engineer. • The required training, notices and sign boards in and around the site related to best construction & engineering practices, occupational health and safety, commutable diseases, best behavioural practices shall be facilitated by the Contractor at the labour recruitment • The procedural and infrastructural requirements for emergency responses shall be incorporated in to the camp site construction plan and be duly made available • Labour camp sites after use should be cleared and the site should be reinstated to previous condition 	<p>installed strictly in accordance with Safety Management Plan</p> <ul style="list-style-type: none"> • Labour camps with proper facilities such as enough spaces, ventilation, beds, mosquito nets, lavatories, bathing facilities, drinking water are available • Waste water collection and treatment is implemented properly • The sewage system for the camp is planned and implemented with concurrence from the Local Public Health Officer (PHI) • Camp is kept clean from debris, garbage, etc. Waste is collected and disposed of in approved sites 		

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		at the close of the construction work.			
7. Transport and Storage of construction materials and machinery operation	a. Spreading dust and impact due to hazardous material	<ul style="list-style-type: none"> • All material should be transported in fully covered trucks. Overloading of vehicles with materials should be controlled and done in a manner to suit the truck capacity and tailgates of the trucks should be closed. • Construction material such as cement, sand and metal should be stored in closed structures or in a contained manner. • Material haulage routes and stockpiling areas to be well defined with the prior approval of the respective authorities and the engineer, and all the measures to be followed by the suppliers to avoid any environmental issues (dust, noise, nuisance to public, traffic etc.) • Maximum allowable speed limits to be determined depending on the site conditions (probably less than 30 kmph) 	<ul style="list-style-type: none"> • Required licence and approval in compliance with CEA regulations • Emission from machineries has been controlled • All the machineries have been fitted with proper exhaust silencers • Exhaust silencers have been checked periodically • Tires of vehicles are free of mud and entrained material before entering public roads • Public roads are cleaned of any material dropped during transit • Haul trucks use tarpaulins to cover loads for transportation on public roads • Haul truck tailgates 	<p>EO of PIU will monitor with the assistance of supervision Engineers</p> <p>Contractor will execute under the self-monitoring of EO of the Contractor</p>	Every 2 weeks during the Construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
			<p>and sides fit properly and do not allow material to fall on public roads</p> <ul style="list-style-type: none"> Haulage routes and the vehicle fleet schedules are strictly followed to ensure no traffic congestions 		
8. Handling and storage of explosives	<ul style="list-style-type: none"> a. Risk of wild fire b. Disturbance to the wildlife behaviours b. Risk of safety and accidents 	<ul style="list-style-type: none"> Except as provided in the contract or ordered or authorized by the Engineer, the Contractor shall not use explosives. Where the use of explosives is ordered or authorized, the Contractor shall comply with the requirements of the following as applicable; <ul style="list-style-type: none"> i. The handling of explosives to the site and on the site, will be carried out by the supplier and blasting contractor under a license to conduct such work ii. Transportation of explosives from the explosive supplier to the quarry areas will be conducted in such a manner as to safeguard human health and prevent impacts on the environment. The transfer will be arranged so that, delays between the points of transfer are minimized, explosives are not left at any location other than designated locations and explosives are not left unattended during transportation. iii. Explosives transported from the explosives supplier to the site will be transported by fully licensed and certified transport carriers; always utilizing a double-driver system; clearly 	<ul style="list-style-type: none"> Obtained required approvals from relevant line agencies (DWC/Police station/Regional Explosive controller) 	Resident Engineer of PMDSC for supervision and Contractor will execute EO of PIU to provide necessary guidance	Once a week during the Pre-construction and Construction Period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>visible signs marked "EXPLOSIVES" in letters not less than 150 mm in height when carrying explosives; equipped with correct fire extinguisher; carriers not be refuelled if explosives or detonators are on board except where the mobile equipment is designed and used solely for transportation of bulk blasting agents and have its engine shut off and its parking brake engaged while loading or unloading explosives, except where the vehicle uses an engine-powered device for loading and unloading.</p> <p>iv. Storage of Explosives in magazines, to be fully licenced, equipped with security reader system and proper locking system as per GoSL regulations</p> <p>v. On site storage near the work site to be made when required only, and would be placed in designated work area under constant (24 hour) watch/supervision. Explosives will never be left unattended, at any time.</p> <p>vi. Locations of the magazines/ storage areas will be site specific and will follow the guidelines below;</p> <ol style="list-style-type: none"> a minimum of 500 metres away from camps or any structures that frequently house personnel, any environmentally sensitive area a minimum of 500 metres away from project activities set on flat terrain to reduce the risk of spillage area around magazines to be flagged with required signage and no other fire forming agents/ fuels etc. to be around (within 			

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>100 m)</p> <ul style="list-style-type: none"> The Contractor shall at all times take every possible precaution and shall comply with relevant laws and regulations relating to the importation, handling, transportation, storage and use of explosives. Contractor shall obtain Ministry of Defense (MoD) approval for importing and handling explosives and keep the Local Police informed of the same Only trained and certified persons will work with explosives. The explosives personnel will undertake formal training and on-the-job training to ensure compliance with legislation. Internal audits and inspections of all components related to the explosives management will be conducted on a regular basis by qualified personnel, and the results recorded according to quality and safety standard operating procedures. All recommendations and orders made by regulators and inspectors will be responded to and acted upon accordingly. 			
9. Storage of fuel, oil and toxic substances	<p>a. Safety and Fire risk</p> <p>b. Pollution due to leakages, spills</p>	<ul style="list-style-type: none"> All fuel storage in construction site should be fenced and stored only within the fuel storage container. Fuel storage area should not be near any water source or source of explosive, ignition areas (within 100 meters) Hazardous materials should be stored in the storage device explicitly specified. Such as fuel, oil and paint and other dangerous items should also develop temporary storage requirements. The storage area is limited to the persons concerned before entering The point should also be stored in the vehicle from 	<ul style="list-style-type: none"> Obtained required approvals from relevant line agencies (DWC/Local Gov Authority) 	Resident Engineer of PMDSC for supervision and Contractor will execute EO of PIU to provide necessary guidance	Once a week during the Pre-construction and Construction Period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>damage, and regularly check for leaks, damage and contamination</p> <ul style="list-style-type: none"> Machinery and equipment maintenance is limited to be within the scope of the contractor camp. Operating surface (ie, within the fenced area of the concrete floor) must be designed properly to ensure that oil and other fuel can concentrate to a suitable container . In the event of oil / fuel leaks, remove contaminated soil is required to properly licensed locations for processing To prevent grease, oils, fuels, solvents and chemicals for water and soil erosion caused by pollution or must always adopt appropriate preventive measures 			
10. Tunnel excavation, Drill and blasting	<p>a. Effect on wildlife</p> <p>b. Excavation activity from tunnels may have some impact on the fossil finds in the sedimentary</p> <p>c. The blasting operations will lead to rock movement, minor fragmentations and vibrations. Thus directly impacting</p>	<ul style="list-style-type: none"> Low noise generation measures should be adopted in carrying out blasting activities within wildlife influenced areas. Necessary guidelines, approvals should be obtained from DWC in this regard Blasting operations should be carried out with the approval of GSMB and CEA Appropriate mitigatory measures should be adopted to maintain vibration levels generated by blasting as of the interim standards stipulated by CEA¹(considering type 3 and 4 structure types made up of lighter construction and archeologically sensitive areas) 	<ul style="list-style-type: none"> 		

¹ Interim Standards for vibration of the Operation of Machinery, Construction Activities and Vehicle Movements Traffic – Vibration in PPV, 2-8 mm/sec

Interim Standards on Air Blast Over Pressure and Ground Vibration for Blasting Activities; less than 5 in PPV, mm/sec

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
	the geology. d. Likely impact on the geological resources will occur from the extraction of materials (borrow of earth, stone metals, granular sub base and aggregates for base courses and bridges).	<ul style="list-style-type: none"> In case of finding of mineralized zones along the tunnel alignment during excavation, it will be brought to the notice of the GSMB for directions from their end. Appropriate blasting design will be adopted which will consider safety, blast geometry, free faces, burden, spacing, initiation pattern and angled holes. 			
11. Creation of cut and cover and conduit sections	a. Changes to Ground Water Table in	<ul style="list-style-type: none"> Layer of permeable sand/gravel to enable drainage on both sides of these sections, canal lining, treatment of weak zones Continuous ground water monitoring in every 2 weeks, in the four presently monitoring observation wells and 14 nos of proposed observation wells are identified by the Engineer, and given in the Annex C 	<ul style="list-style-type: none"> Effectiveness of mitigation measures by monitoring ground water levels in identified 16 locations and additional 4 locations where necessary depending on the contractor's Geo technical surveys 	Contractor to implement PMU/PMDSC to guide the Contractor NBRO (Independent Monitoring) EO of Contractor, Environmental officer of PIU and the environmental specialist of PMU	Weekly during the preconstruction stage
12. TMB & NATM tunnel sections	a. Changes to Ground Water Table in tunnel sections b. Surface and ground water pollution c. Damage or deterioration to structures,	<ul style="list-style-type: none"> Grouting & Concrete lining of areas that require such interventions; Contingency Plan in case of unanticipated events Any dewatering of ground water table, contractor shall take actions to mitigate or compensate affected parties/ habitats 	<ul style="list-style-type: none"> Effectiveness of mitigation measures by monitoring ground water levels in identified 16 locations and additional 4 locations 	Contractor to implement PMU/PMDSC to guide the Contractor NBRO (Independent Monitoring)	Weekly during the preconstruction stage

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
	buildings or other features	<ul style="list-style-type: none"> • Development of a comprehensive erosion and sediment control plan prior to earth-moving activities; f Construct settling ponds where silt-laden water can settle before being discharged into natural water-courses; f Application of erosion and sediment control practices to prevent excessive onsite damage; f Apply perimeter control practices to protect the disturbed areas from onsite runoff and to prevent sediment damage to areas below the construction site f Keeping run-off velocities low and trying to retain much of the run-off on the site f Stabilization of the disturbed areas as soon as the final grade has been attained. • Installation of a water proofing system between the initial ground support system and the final concrete lining. • Continuous ground water monitoring in every 2 weeks, in the four presently monitoring observation wells and 14 nos of proposed observation wells are identified by the Engineer, and given in the Annex C • Daily inspections and measurements should be continued until the tunnel excavation front has advanced beyond the affected location by at least 500 m either sides of the tunnel as described in Risk Management Plan for UEC ICB 2A (i.e. the specific structures, buildings and features identified as having been affected shall be carefully inspected, detailed measurements of all evidence of possible damage or deterioration taken, and movement reference strips) 	<p>where necessary depending on the contractor's Geo technical urveys</p> <ul style="list-style-type: none"> • Inspection for the daily structural damages within 500 m either sides of the tunnel 	EO of Contractor, Environmental officer of PIU and the environmental specialist of PMU	

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> Frequency of the inspections and measurements may be reduced to once per week, and if this condition persists the frequency may be reduced to monthly once the tunnel excavation has passed beyond the affected location by at least 1,000 m. 			
13. Management of construction waste / tunnel muck/ excavated material	a. Pollution\ b. Hindrance to surface run off c. Disturbances to wildlife movements	<ul style="list-style-type: none"> all the spoil material which is to be removed to disposal areas will be produced from the excavation of Tunnel 3 by NATM from the southern portal, the excavation of Tunnel 3 by TBM from the northern start shaft, and the excavation of Tunnel 4 by NATM from the northern start shaft. The following disposal areas have therefore been identified and designated by the Employer, located as follows: <ol style="list-style-type: none"> DPN-01 – area for stockpiling/temporary disposal, adjacent to the working area surrounding the Tunnel 3 northern start shaft (to the west); DPN-02 – area for stockpiling/temporary disposal, adjacent to the working area surrounding the Tunnel 3 northern start shaft (to the east); DPN-03 – area for permanent disposal, ca. 2.1 km from the Tunnel 3 northern start shaft along the road towards Palugaswewa; DPS-01 – area for permanent disposal (and aggregate crushing plant) adjacent to the road from Bakamuna to Giritale, near Atthanakadawala, ca. 6.1 km from the southern portal of Tunnel T3; 	<ul style="list-style-type: none"> Effectiveness of mitigation measures 	Contractor to implement PMU/PMDSC to guide the Contractor NBRO (Independent Monitoring) EO of Contractor, Environmental officer of PIU and the environmental specialist of PMU	Weekly during the preconstruction stage

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>e. DPS-02 – area for stockpiling/temporary disposal adjacent to the road from the Tunnel 3 southern portal towards the Elahera Minneriya Yoda Ela, ca. 3.8 km from the portal;</p> <p>f. DPS-03 – area for stockpiling/temporary disposal (and concrete batching plant) adjacent to the road from the Tunnel 3 southern portal towards the Elahera Minneriya Yoda Ela, ca. 2.1 km from the portal.</p> <ul style="list-style-type: none"> • The Contractor may utilise these designated disposal areas for spoil material arising from the Works, however it is important to note that the areas designated for stockpiling/temporary disposal must be free of spoil deposits by the end of the construction period. • In case the Contractor requires disposal areas at any time in excess of these designated disposal areas for material arising from the Works, or prefers to find disposal areas closer, identified sites need to avoid any natural streams, critical habitats, sensitive receptors, and proper approvals need to be obtained; the Contractor shall submit a site restoration plan for each identified borrow/disposal area to the Engineer which demonstrates the suitability of the site; • No borrow or disposal areas, either permanent or temporary, shall be located in protected areas (wild-life or forestry) unless specifically identified in the Bidding Document or by the Engineer • Re-use and recycle the materials and proper disposal of waste in accordance with permit. • Waste waters removed from the tunnel in case of their discharge in reservoirs or the system of rain 			

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		sewerage which does not have treatment facilities in the distance from discharge point to reservoir should be preliminary treated. For this purpose grids for manual treatment, mud settlers, petrol- and oil collectors, filters settlers and other means of water treatment from pollution should be installed in the cameras of dewatering plants before the entrance to water chamber sumps			
14. Borrowing of earth and management of borrow sites 15. Maintaining disposal and dumping sites	a. Resource depletion b. Damage to wildlife, forest resources c. Environment Pollution d. Health & safety issues	<ul style="list-style-type: none"> The identified disposal sites for the UEC ICB 2A construction package are given in the Figure 1-1. Earth available from construction site excavation works as per design, may be used as embankment materials, subject to approval of the engineer The Contractor shall comply with the environmental requirements/guidelines issued by the CEA and the respective local authorities in respect of locating borrow areas and with regard to all operations related to excavation and transportation of earth from such sites. The Contractor can also find suitable soil materials from currently operated, licensed borrow pits in the surrounding area, subject to approval of the engineer No borrow-sites be used (currently approved) or newly established within areas protected under FFPO and FO Borrow areas shall not be opened without having a valid mining license from the GSMB. The location, 	<ul style="list-style-type: none"> Site is not established within areas protected under FFPO and FO Water and air quality EPLs from CEA have been obtained and not expired LGA permits are available Construction material storage areas Borrow site reinstatement Approved site rehabilitation plan is available Operation manual is available on site Excessive site noise managed by restricting operating hours Noise & vibration 	Resident Engineer of PMDSC for supervision and Contractor will execute PIU- EO to supervise	Once a week during Preconstruction and Construction Period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>depth of excavation and the extent of the pit or open cut area shall be as approved by the engineer.</p> <ul style="list-style-type: none"> • All borrow pits/disposal areas should be rehabilitated at the end of their use by the Contractor in accordance with the requirements/guidelines issued by the CEA and the respective local authority. • Establishment of borrow pits/areas and its operational activities shall not cause any adverse impact to the nearby properties. Also shall not be a danger of health hazard to the people. • The Contractor shall take all steps necessary to ensure the stability of slopes, including those related to temporary works and borrow pits. • If the Contractor uses non-commercial borrow/quarry sites, the sites should be remediated accordingly once material sourcing has been completed. The Project Supervision Engineer will require maintaining the numbers and relevant details of all necessary licenses etc. and report of their status accordingly. 	<p>level has been checked periodically</p> <ul style="list-style-type: none"> • Dust control is implemented on dump, excavation or topsoil stockpile site • Slopes are stable and no possibilities of eroding / landslides • Sediment laden runoff from excavation or dumping sites does not enter natural water courses • No water ways/ bodies blocked • Water logging is not evident in the site • No soil/water contamination from oil/fuel/leachate /debris etc. • No damage to important flora/fauna or habitats • No human - wildlife conflicts • No spreading of invasive species promoted 		

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
			<ul style="list-style-type: none"> • No unnecessary or improper interference has been done to the convenience of public, access, occupation of public, private road, or foot paths • No materials have been stacked or placed to cause danger or inconvenience to any person or the public • Tires of vehicles are free of mud and entrained material before entering public roads • Public roads are cleaned of any material dropped during transit • Haulage routes, speed limits (Max 30 kmph) and the vehicle fleet schedules are strictly followed to ensure no traffic congestions 		

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
16. Information Disclosure among Stakeholders	a. Social unrest b. Disturbances to the livelihood	<ul style="list-style-type: none"> Discussions should be conducted with the residents who reside around the immediate vicinity of the construction site; provide them with information on the project activities muster their views for possible impact mitigation as this will also ensure a good rapport and less complains. This should be done immediately once the Contractor is mobilized. The Community organizations and religious chiefs to be addressed and discuss the expectations and project interventions, and arrange the method of communication during the project activities where necessary The Contractor will maintain a log of any grievances/complaints and actions taken to resolve them. (Types of complaints, numbers of complaints, how complaints were resolved, numbers unresolved, those sent to next level of GRM (Refer Annex B for the GRM adopted by MWSIP), satisfactory outcome etc.) A copy of the approved EIA report, the CEA Approval and any other approval issued by Government Authority and the EMP should be available at all times at the project supervision office on site. 	<ul style="list-style-type: none"> People informed about the project activities prior to the Contractor mobilization People are notified on inconveniences, road closure, stopping water issue in the canals, drinking water supply, electricity breaks, etc., Meeting with community members on construction activities, environmental impacts and mitigation measures held Grievance Log maintained Complains observed during the last visit addressed 	EO & Social & Resettlement Officer of PIU Resident Engineer of PMDSC for supervision Contractor will execute	Every 2 weeks
17. Health & Safety related to all construction activities	a. Public and Worker Safety	<ul style="list-style-type: none"> The construction site should be barricaded at all time in a day with adequate marking, safety tape, flags, reflectors etc. for safety of individuals using the site daily basis. (Items such as parking cones, lights, tubular markers, orange and white strips and 	<ul style="list-style-type: none"> Warning signs and exclusion barriers erected around work site areas 	Contractor will execute and EO of PIU with the supervision engineers will monitor	Every 2 weeks during the Construction period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>barricades of a luminous nature for night visibility shall be procured where deemed necessary)</p> <ul style="list-style-type: none"> At all times, the Contractor shall provide safe and convenient passage for vehicles, pedestrians and livestock. Work that affects the use of existing accesses shall not be undertaken without providing adequate provisions to the prior satisfaction of the Engineer. <ul style="list-style-type: none"> Alternative accesses to be arranged; Nearby pedestrian access be arranged (across canals in the case of bridge reconstruction); Adequate signage for detours is provided. The construction site should be clearly demarcated by the above means and restriction of access to public to the site will help the safety of public. Safety signboards should be displayed at all necessary locations. The Contractor should obtain a Third party insurance to compensate any damages, injuries caused to the public or labourers during the construction period. All construction vehicles should be operated by experienced and trained operators under supervision. Basic on-site safety training should be conducted for all labourers during the EMP training prior to the start of the construction activities. 	<ul style="list-style-type: none"> Workers are provided with and are using the uniform, applicable safety / protection equipment for site conditions Worker's health checks implemented Sanitary-hygienic conditions for workers are provided: drinking and washing water supply, mealtime utilities, toilets, rest time, resting areas etc First aid kit is available on-site and is accessible to all workers Fire extinguisher available Security/emergency alarms/ lighting etc are in place Copy of ERP and emergency contact list are available, updated and posted in a 	tor under the supervision of RE	

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> • All digging and installation work should be completed in one go, if this task is not accomplished in the area should be isolated using luminous safety tape and barricading structures surrounding the whole area. • Trenches should be progressively rehabilitated once work is completed. • Material loading and unloading should be done in an area, well away from traffic and barricaded • Construction wastes should be removed within 24 hours from the site to ensure public safety. • The procedural and infrastructural arrangements shall be in place to ensure the compliance with the Labour Law of Sri Lanka (Factories Ordinance Act No. 45 of 1942) and the Core Labour Standards 2006 (ADB & ILO) and as otherwise required by the Program Health and Safety manual (and updated documents) prepared by the PMDSC • Health and safety manual to be referred followed by the training conducted by the Health and Safety Specialist of PMDSC 	<p>visible place at all work sites</p> <ul style="list-style-type: none"> • Accident report maintained • Damage of utilities and/or other structures managed • Program' H&S Manual and its updates • Maintained Risk Register 		
	b. Safety Gear for Labour	<ul style="list-style-type: none"> • Protective footwear and protective goggles should be provided to all workers employed in mixing of materials like cement, concrete etc. • Welder's protective eye-shields shall be provided to workers who are engaged in welding works. 			

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> • Earplugs shall be provided to workers exposed to loud noise, and workers working on crushing, compacting, or concrete mixing operation. • The Contractor shall supply all necessary safety appliances such as safety goggles, helmets, safety belts, ear plugs, mask etc. to workers and staffs. • In addition, the Contractor shall maintain in stock at the site office, gloves, ear muffs, goggles, dust masks, safety harness and any other equipment considered necessary. Safety gear should be worn for specific potential risks of a specified activity in which the worker is engaging. • A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored on a monthly basis and recorded 			
	c. Prevention of accidents	<ul style="list-style-type: none"> • Prevention of accidents involving human beings, animals or vehicles falling or accidents due to open trenches/manholes during the construction period. This needs to be ensured with proper barricading, signage boards and lighting etc. • A readily available first aid unit, including an adequate supply of sterilized dressing materials and appliances should be available at the site office at all times • Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital should also be insured. 			


Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> • Safety protocols/ arrangements for working; (i) over heights, (ii) near or over water, (iii) during night time/ under poor lighting and (iv) in confined spaces etc. • Site emergency response protocol including evacuation plan shall be available and displayed at key locations in the site. The evacuation route and assembly points shall be duly marked with sign boards and mock drill shall be undertaken in a defined time intervals. • A brief/ detailed site safety orientation (induction) shall be given to any new comer to the site by the Contractor's safety staff. • A qualified and experienced safety staff shall be available to ensure site safety compliance. • any person entering to the active work site shall wear necessary safety gears and follow the safety protocols • Names and contact information for emergency services such as Ambulance services, hospitals, police and the fire brigade should be prepared as a sign board and displayed at the work site. 			
	a. Pollution of Soil and Water via Fuel and Lubricants	<ul style="list-style-type: none"> • The Contractor shall ensure that all construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites shall be located away from rivers, at least 200m away, and irrigation canal/ponds. • The Contractor shall ensure that all vehicles/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage 	<ul style="list-style-type: none"> • Hazardous material are transported/ stored and handled as per the safety data sheet • All the locations are well identified and 	<p>Supervision Engineers under RE will monitor</p> <p>EO of PIU will periodically monitor Contractor will execute under the self monitoring of EO of the</p>	<p>Ever 2 weeks during the Construction phase</p> <p>Water quality monitoring every 3 months</p>


Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>of fuels and lubricants does not contaminate the ground.</p> <ul style="list-style-type: none"> The Contractor shall arrange for collection, storing and disposal of oily wastes to the pre-identified disposal sites (list to be submitted to the Engineer) and approved by the Engineer. Oil spills and collected petroleum products will be disposed of in accordance with standards set by the CEA/MEMD. The engineer will certify that all arrangements comply with the guidelines of CEA/MEMD or any other relevant laws. 	<p>demarcated for vehicle parking, fuel / lubricants storage, vehicle, machinery and equipment maintenance and refuelling etc</p> <ul style="list-style-type: none"> Above sites are located away from rivers/ water ways, at least 200m away Visual observations of waste remains left onto the soil surface (oil spills, grease patches, any other chemical spillage etc.) Vehicles and machinery are up to the standard operation conditions (standard emission conditions, no oil/grease leak etc) 	<p>Contractor</p> <p>Periodical water quality monitoring through qualified 3rd party consultant</p>	
18. Clearing of site removal and disposal of construction debris and excavation	<p>a. Environmental Pollution</p> <p>b. Nuisance to the public</p>	<ul style="list-style-type: none"> During site clearance activities, removal of vegetation and debris must be carried out swiftly and in well-planned manner. The Contractor shall identify the sites for disposal of material cleared. 	<ul style="list-style-type: none"> The work site and the surrounding area kept clean free from debris, garbage, etc. Signboards in place to direct / notify about 	<p>Supervision Engineers under RE will monitor</p> <p>EO of PIU will periodically monitor Contractor will execute</p>	Every 2 weeks during the Pre-Construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
vated materials		<ul style="list-style-type: none"> Plants, shrubs and other vegetation cleared should not be burned on site. Spoil and other disposal materials should only be dumped at sites for which prior approval from relevant authorities such as the Local Authority has been obtained. Taking into account the following The dumping does not impact natural drainage courses No endangered / rare flora are impacted by such dumping Should be located in non-residential areas located on the downwind side Located at least 100m from the designated forest land. Avoid disposal on productive land. Should be located with the consensus of the local community, in consultation with the Local Authority and the relevant Road Development Authority Minimize the construction debris by balancing the cut and fill requirements. The Contractor should avoid any spillage of spoil when transporting such materials to the approved material dumping sites. Hazardous waste shall be disposed of as per the Schedule VIII of Part 11 of the National Environmental (Protection & Quality) Regulation No. 1 of 2008, as 	<ul style="list-style-type: none"> waste / spoil disposal location and mechanism within and around the work site EPL for waste water treatment facilities and waste disposal sites are obtained and up-to-date Drainage paths not blocked Construction wastes are removed within 24 hours from the site Hazardous material are transported/ stored and handled as per the safety data sheet Waste disposal sites are located away from rivers/ water ways, at least 200m away and 100 m away from the forest lands 	under the self-monitoring of EO of the Contractor	

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		amended by the gazette notification No. 1534/18 dated 01.02.2008 on the generator of scheduled waste			
19. Activities related to significant noise and vibration	a. Noise from vehicles, machinery and equipment	<ul style="list-style-type: none"> Noise generating work should be limited to day time (6:00AM to 6:00PM). No work that generates excessive noise should be carried out during the night hours where in close proximity (from 6:00PM to 6:00AM on the following day). All equipment and machinery should be operated at noise levels that do not exceed the permissible level of 75 dB (during construction) for the daytime. For all construction activities undertaken during the night time, it is necessary to maintain the noise level at below 50 dB as per the Central Environmental Authority (CEA) noise control regulations All equipment should be in good serviced condition. Regular maintenance of all construction vehicles and machinery to meet noise control regulations stipulated by the CEA in 1996 (Gazette Extra Ordinary, No 924/12) must be conducted for vehicles/machinery that will be used in construction on the site and for transport. Ideally noise generating work should not be carried out during public holidays and religious days. Special care should be taken as there is a temple nearby. 	<ul style="list-style-type: none"> Construction equipment - estimated noise emissions and operating schedules Allowable noise levels in the boundary of construction sites are kept below 75 dB in day time. Operation hours Allowable vibration limits as per the CEA interim standards (2008) and World Bank EHS guidelines Stationary construction equipment are kept at least 500m away from sensitive receptors (temporary, schools, public places etc.) 	<p>Supervision Engineers under RE will monitor</p> <p>EO of PIU will periodically monitor</p> <p>Contractor will execute under the self-monitoring of EO of the Contractor</p> <p>Periodical Noise & Vibration monitoring through qualified 3rd party consultant through an accredited laboratory</p>	<p>Every 2 weeks during the Construction phase</p> <p>Noise & Vibration quarterly year concerning the construction activity schedule</p>

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> Labour gangs should be warned to work with minimum noise. Strict labour supervision should be undertaken in this respect. Number of night time resident labourers should be minimized. 	<ul style="list-style-type: none"> Idling of temporary trucks or other equipment are not permitted during periods of loading / unloading or when they are not in active use The vehicles/ machineries used by the Contractor (specially the high noise & vibration generating) is as per the list approved by the RE and no additional are used 	<p>Supervision Engineers under RE will monitor</p> <p>EO of PIU will periodically monitor</p> <p>Contractor will execute under the self-monitoring of EO of the Contractor</p>	Every 2 weeks during the Construction phase
	b. Vehicular noise pollution at residential / sensitive receptors	<ul style="list-style-type: none"> Idling of temporary trucks or other equipment should not be permitted during periods of loading / unloading or when they are not in active use. The practice must be ensured, especially near residential / commercial / sensitive areas. Stationary construction equipment will be kept at least 500m away from sensitive receptors, where possible. These include places of worship and households. All possible and practical measures to control noise emissions during drilling shall be employed. Contractor shall submit the list of high noise/vibration generating machinery & equipment to the engineer for approval. Servicing of all construction vehicles and machinery must be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced. Maintenance of vehicles, equipment and machinery shall be regular and up to the satisfaction of the Engineer to keep noise levels at the minimum. 			
20. Activities related to the emission of	a. Impact of dust	<ul style="list-style-type: none"> Ambient air quality and emission levels to be maintained as per the World Bank EHS guidelines (2007) 	<ul style="list-style-type: none"> Construction area is barricaded properly 	Supervision Engineers under RE will	Every 2 weeks

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
dust		<p>as these standards are more stringent than the GoSL standards, gazetted under NEA.</p> <ul style="list-style-type: none"> • All construction materials such as sand, metal, lime, bricks etc. Should be transported under cover to the site and stored under cover at the site. Plastic sheeting (of about 6 mm minimum thickness) can be used and held in place with weights, such as old tires or cinder blocks, with the edges of the sheeting buried, or by the use of other anchoring systems. This will minimize the levels of airborne dust. • Mud patches caused by material transporting vehicles on the access road should be immediately cleaned  <ul style="list-style-type: none"> • Continual water sprinkling should be carried out in the work and fill areas and the access road if dust stir is observed. Water sprinkling should be done more frequently on the days that are dry and windy (at least four times a day) as the levels of dust can be elevated during dry periods. 	<p>to avoid spreading dust/emissions etc</p> <ul style="list-style-type: none"> • Trucks are operating using covers • Material stored under cover using proper anchoring systems • Tires of trucks / machineries are cleaned before entering city roads • Regular watering of access roads and the construction site • Turfing of finished earthen structures • Dust masks are provided for the workers and using at the required time • Ambient air quality including dust levels monitored through an accredited laboratory during this week 	<p>monitor</p> <p>EO of PIU will periodically monitor</p> <p>Contractor will execute under the self-monitoring of EO of the Contractor</p> <p>Periodical Ambient Air quality monitoring through qualified 3rd party consultant assigned to accredited laboratory</p>	during the Construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		 <ul style="list-style-type: none"> Dust masks should be provided to the labourers for the use at required times. 			
21. Activities related to the hindrance of surface runoff and soil erosion	a. Impact of hindrance to surface runoff, soil erosion and sedimentation	<ul style="list-style-type: none"> The debris material shall be disposed in such a manner that the tank, canals and other existing drainage paths are not blocked. Drainage paths associated with the dam and other irrigation structures should be improved / erected to drain rain water properly. Silt traps will be constructed to avoid siltation into the waterways, the tank and canals, where necessary. To avoid siltation, drainage paths should not be directed to the tank and irrigation canals and they should be separated from these water bodies Bund Embankment slopes, slopes of cuts, etc. Shall not be unduly exposed to erosive forces. These exposed slopes shall be graded and covered by grass or other suitable materials per the specifications. 	<ul style="list-style-type: none"> Drains not blocked by sediment or other debris No flood due to construction work Silt traps in places No slope failures and cuts made according to technical standards specified in the design Earth work is done during the dry spell Turfing of completed embankments/ slopes 	<p>Supervision Engineers under RE will monitor</p> <p>EO of PIU will periodically monitor</p> <p>Contractor will execute under the self-monitoring of EO of the Contractor</p>	Every 2 weeks during the Construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> • All fills, backfills and slopes should be compacted immediately to reach the specified degree of compaction and establishment of proper mulch. • Work that leads to heavy erosion shall be avoided during the raining season. If such activities need to be continued during rainy season prior approval must be obtained from the Engineer by submitting a proposal on actions that will be undertaken by the Contractor to prevent erosion. • The work, permanent or temporary shall consist of measures as per design or as directed by the engineer to control soil erosion, sedimentation and water pollution to the satisfaction of the engineer. Typical measures include the use of berms, dikes sediment basins, fiber mats, mulches, grasses, slope drains and other devices. All sedimentation and pollution control works and maintenance thereof are deemed, as incidental to the earthwork or other items of work and no separate payment will be made for their implementation. 	<ul style="list-style-type: none"> • Grievance log for any public complaints related to erosion/slope failures etc. • Visual observation of any turbidity of downstream water ways and erosion, slope failures, deposition of soil/sediment in the agriculture lands • Earth material & debris of the excavated material is properly placed / disposed/ re-use for back filling • Surface water quality measurements of the adjacent water ways as per the baseline conditions set at least 6 months prior to the contract mobilization 		

Table 3-2 : Environmental Monitoring Plan (EMoP)

	Mitigation Activities and Method of monitoring environmental Changes	Location / timing of sampling	Parameters to be monitored	Frequency of monitoring	Responsibility
Construction Phase					
1.	Establishment and maintenance of Contractor's facilities	Labour camps Storage / stock piling areas Disposal sites Borrow areas	<ul style="list-style-type: none"> • Site is not established within areas protected under FFPO and FO • Site Management Plan for the camp available and Camp is installed strictly in accordance with Safety Management Plan • Labour camps with proper facilities such as enough spaces, ventilation, beds, mosquito nets, lavatories, bathing facilities, drinking water are available • Waste water collection and treatment is implemented properly • The sewage system for the camp is planned and implemented with concurrence from the Local Public Health Officer (PHI) • Camp is kept clean from debris, garbage, etc. Waste is collected and disposed of in approved sites • Required approval are granted • Approved site rehabilitation plan is available 	Weekly	Self-monitoring, recording and reporting by EO of the Contractor Environmental Officer of PIU Resident Engineer (RE) of PMDSC
2.	Surface Run-off, soil erosion, slope failures from hill slopes	Project area	Soil erosion from cleared ground sections along anicut axis and LB canal trace Disposal of excavated unusable soil materials, dredged material and construction wastes	Every 2 weeks	Engineering supervisors and PIU Environmental Officer

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	Mitigation Activities and Method of monitoring environmental Changes	Location / timing of sampling	Parameters to be monitored	Frequency of monitoring	Responsibility
		Correcting any environmental issue (i.e. oil spill, sedimentation, high noise & vibration, upon any complain of non compliance etc.)	surface and bottom suspended sediment concentrations f) Any other parameters required to be measured to ensure compliance with regulatory requirements	As and when required	Self monitoring by EO of the Contractor
4.	Ground water level monitoring by establishing bore holes	where required during tunnelling activities	Ground water levels/ quality	Regular monitoring before, during and after the construction	Self monitoring by the contractor under the supervision of RE
5.	Nuisance to general public	Along the canal trace	Traffic reports Road surface of routes used to transport material Grievance log maintenance	Every 2 weeks	GRC , Environmental Officer, Social and Resettlement Officer of PIU
6.	Water shortages to farmers due to canal diversion for repair work	Along the canal trace	Public complaints Interview survey of selected farmer organizations	Every 4 weeks during the cultivation period	GRC , Environmental Officer, Social and Resettlement Officer of PIU
7.	Proper disposal of solid, liquid and construction waste	Project area	Waste management plan in place and implementation Approval for the identified waste dumping sites Public complaints / Grievance Log maintenance Visual inspection Visual inspection of camp sites, project offices and construction sites	Every 2 weeks	GRC , Environmental Officer, Social and Resettlement Officer of PIU Resident Engineer (RE) of PMDSC

	Mitigation Activities and Method of monitoring environmental Changes	Location / timing of sampling	Parameters to be monitored	Frequency of monitoring	Responsibility
			Interviews with local authorities for compliance		
8.	Introduction of weeds and Alien invasive species	Construction material storage areas, vehicle wash down areas, vegetation and weed removal during pre-construction stage	<p>Monthly inspection of soil storage areas, wash down areas, vehicle parking areas and disposal sites for the presence of weeds or alien invasive species by an experienced / knowledgeable Environmental officer with</p> <p>Community awareness about the invasive species spreading, causes, prevention etc.</p> <p>Removal techniques, minimizing habitat degradation and standard disposal practices</p>	Every 4 weeks during the construction period	Environmental officer of PIU

4 PROCEDURES FOR DEALING WITH CHANCE FINDS

48. Chance found Flora and Fauna;

- (i) Under the terms of the construction contract the Contractor is required to take reasonable precautions to prevent workmen or any other persons from removing and/or damaging any flora (plants/vegetation) or fauna (animals), including any unlicensed fishing in any water body or unlicensed hunting/trapping/collecting of any animal
- (ii) If any wild animals – particularly elephants – are found near the construction site at any point of time, the Contractor is required to immediately upon discovery thereof notify the Engineer and carry out any instructions given by the Engineer for dealing with the same
- (iii) The Engineer will report to the nearby office of the Forest Department and/or the local range or divisional office of the Department of Wildlife Conservation, and will take appropriate steps/measures in consultation with the respective officials, if required

49. Chance Found Archaeological Property;

- (i) All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation
- (ii) Under the terms of the construction contract the Contractor will take reasonable precautions to prevent his workmen or any other persons from removing or damaging any such article or thing. Immediately upon discovery thereof he will notify the Engineer, following which the Contractor will await further instructions from the Engineer for dealing with the find, during which time all work that might affect the find will be stopped
- (iii) Where appropriate, the Engineer will seek direction from the Archaeological Department of Sri Lanka and inform the PIU environmental officer to follow the Chance Find Procedures

5 DESCRIPTION OF PLANNED ENVIRONMENTAL MONITORING

50. The mitigation measures proposed in the working draft of the EMP will be carried out by the responsible agencies. **Table 1-3 and Table 3-2** present the monitoring requirements and the parameters, frequency and responsible agency for measuring ambient environment quality of different media like air, water, vibration etc.

51. The baseline conditions of existing water quality, air quality and noise levels have been established before commencement of the construction, through an accredited, CEA approved laboratory as a third party consultancy appointed with the approval of PMU. The National standards related to the key parameters are shown in **Table 5-1**:

Table 5-1 : National Environmental Regulations related to Air, Water, Noise Pollution, Vibration Impact Control and Solid Waste Management

Environmental Protection License (EPL)	National Environmental Act, No. 47 of 1980 as amended by Act, Nos. 56 of 1988 and 53 of 2000. I,
Tolerance limits for waste discharge	National Environmental (Protection and Quality) Regulations, No. 1 of 2008
Prohibition of Polythene or any polythene product of 20 micron or below in thickness	Order published under the Gazette Notification No.1466/5 dated 10.10.2006
License for discharge, emission or disposal of waste/scheduled waste management	Regulations published under the Gazette Notification No. 1534/18 dated 01.02.2008
Municipal Solid Waste	Order published under the Gazette Notification No. 1627/19 dated 10.11.2009
Air emission, fuel & vehicle importation standards	Regulations published under the Gazette Notification No. 1295/11 dated 30.06.2003
Prohibition of Ozone depleting substances	Order published under the Gazette Notification No. 1309/20 dated 10.10.2003
List of vehicle exhaust emission standards	Order published under the Gazette Notification No. 1557/14 dated 09.07.2008
Permissible Ambient Air Quality Standards in relation to class of Air Pollutants	Regulations published under the Gazette Notification No. 1562/22 dated 15.08.2008
Air emission, fuel & vehicle Importation standards	Amended Regulations published under the Gazette Notification No. 1887/20 dated 05.11.2014 with the corrected Gazette Notification No. 1895/43 dated 02.01.2015

Noise Standards	Order published under the Gazette Notification No. 924/12 dated 23.05.1996 & Order published under the Gazette Notification No. 1738/37 dated 29.12.2011
Vibration standards	Based on Amended ABOP Vibration standards published by CEA (2008) - parameters and testing frequencies shall be based on the Interim standards (adopted by CEA) for vibration of the operation of machinery, construction activities and vehicle movement traffic
Hazardous waste disposal	Schedule VIII of Part 11 of the National Environmental (Protection & Quality) Regulation No.1 of 2008, as amended by the gazette notification No. 1534/18 dated 01.02.2008 for the Scheduled Waste generation and disposal

52. As of ADB's SPS (2009), standards related to pollution control and emission need to be met with Environmental Health and Safety (EHS) guidelines for Air Emissions and Ambient Air Quality (2007)² and WHO drinking water quality and effluent standards.

² www.ifc.org/ehsguidelines

6 PROCEDURES FOR SITE REHABILITATION

53. Under the terms of the construction Contract the Contractor is responsible for reinstating ('restoring') areas used for construction purposes to their initial state, whether the initial state was agricultural land or not, and the procedures to be followed are summarized in **Table 6-1**. It is required that the Contractor provides details on the following activities in the CEMP:

Table 6-1 : Procedures Relating to Reinstatement

Clearing/Closure of Construction Sites/Labour Camps	<ul style="list-style-type: none"> • A general site restoration plan should be prepared by the Contractor for the approval of the Engineer, indicating the methods of reinstatement appropriate for each area (including storage yards, borrow areas and quarries), the sequencing of the different areas of the site and the schedule details. The approved plan is to be implemented by the Contractor prior to demobilization from the site. • On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expenses, to the entire satisfaction of the Engineer.
Environmental Enhancement / Landscaping	<ul style="list-style-type: none"> • Where landscape plantation, including grassing of canal banks and edge treatment of water bodies, is specified or called for in the construction contract, this shall be executed in compliance with either the detailed design or approved typical design guidelines. • The Contractor also shall remove all debris, piles of unwanted earth, spoil material etc. from all workplaces and disposed of at locations designated or acceptable to the Engineer.

54. The acceptance of the project site by the Government Authority (Mahaweli Authority of Sri Lanka (MASL)) is required to formally declare the restoration is done as of satisfaction to the Engineer. Hence, site restoration is essential within the project completion period.

7 REFORESTATION

1. Reforestation is considered as an extra mitigation measure to be carried out in 1:3 ratio to compensate the tree felling associated with the project activities and that will be separately instructed in accordance with specifications provided by the Resident Engineer (after approval by the CEA and relevant stakeholder agency, Forest or Wildlife department) to be carried out by the Contractor (or by means of nominated sub-contractor). A Provisional Sum has been included in the Bill of Quantities (BOQ) to cover the associated costs.

8 REPORTING & REVIEW

55. Monitoring of impacts requires a proper documentation and reporting system and a computerized database for the individual issues, including preconstruction, construction and post construction (operation and maintenance) monitoring results. The database related to each construction contract will be established and maintained at the site during the construction period and regularly copied to the PMU/PIU system, to which the PMDSC also has access for overall monitoring of the impacts.

56. The Contractor's monthly progress reports will contain a specific section reporting on environmental issues, and the draft format shall be shared by PMDSC after contract mobilization.

57. The monitoring performed by the PIU Environmental Officer, together with the Engineer's assigned site staff, will also be reported to the respective PIU Project Director. This report will include any information arising from the Contractor's monthly report, and the PMDSC and PMU Environmental Specialist will be involved in the review process. The PD/PMU will then forward the report to CEA and ADB.

58. Semi-annual Environmental Monitoring Reports prepared by the PMDSC shall be submitted to the ADB and CEA by PMU and any other Environmental Monitoring Report if requested by the EMC shall be submitted by the PIU through PMU.

9 CONTRACTOR'S COSTS

59. The Contractor's costs of establishing the temporary site camps and facilities, including all utilities and general systems needed during the construction period, are covered under a number of specific payment items in Bill No. 1 (Preliminaries) of the Bill of Quantities of the respective Contract. If it is envisaged that the Contractor should carry out specific repair and maintenance work to existing roads over and above his normal responsibility to prevent damage deterioration, this may be covered by a dedicated payment item to be instructed by the Engineer. A dedicated payment item for clearance and restoration of the site provides a degree of specific leverage for the Engineer to ensure this is done properly.

60. Where it is envisaged that specific additional environmental mitigation measures will be required, which are not the direct responsibility of the Contractor, such as reforestation of areas not affected by construction activities, a dedicated Provisional Sum or other type of payment item would also be provided.

61. In general, however, the management of relevant environmental obligations is an intrinsic element of the Contractor's working method for each type of construction work, and therefore the costs associated with specific activities or measures would be embedded in the respective payment items for the actual work.

ANNEX A : CEA APPROVAL WITH CONDITIONS



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Mahaweli Water Security Investment Program

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மகாவலி அபிவிருத்தி மற்றும் சுற்றுடல் அமைச்சு
Ministry of Mahaweli Development & Environment

වැඩසටහන් කළමනාකරණ ඒකකය
திட்ட முகாமைத்துவப் பணிமுறை
Program Management Unit



නො. 493 1/1, ටී. ඩී. ජයා මාවත, කොළඹ 10.

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திகதி } 01.04.2016
Date }

Team Leader
PMDSC

Sub: Proposed Upper Elahera Canal from Mannakkatiya Tank to Mahakanadarawa Tank and Kalu Ganga – Moragahakanda Link Canal Project

The Central Environmental Authority CEA has granted approval for the implementation of the above mentioned project by their letter no 08/EIA/Water/04/2012 dated 31.03.2016.

A copy of the environmental approval letter of the above mentioned project is sent herewith for your information and necessary action.

Eng. N. A. Sisira Kumara
Program Director (MWSIP)
Ministry of Mahaweli Development and Environment

Cc: 1. Mr. Lance Gore, ADB - f. i. pls.
2. Project Director (UEC) - A copy of the environmental approval letter of the UEC Project is sent herewith for your information and necessary action pls.
3. Environmental Specialist, MWSIP - do--
4. Resettlement Specialist, MWSIP - do--

MWSIP - PMDSC	
493, T.B. Jayah Mawatha, Colombo 10	
Registered Incoming By:	ASR
Seen:	Team Leader D. Team Leader
Date:	01 APR 2016
Action By:	SP, PLWCD, MJB, APK
Copies to:	
Primary File Location:	7023
Copy to Files:	11.1, 26.6

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Hassaleka.
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e-mail - mediwaka.susantha@yahoo.com

PD Office : (ISEWIP)
Improving System Efficiency & Water
Productivity Improvement Project
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e-mail - dealwis.lalith@yahoo.com

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உமது தொடர்பு
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மத்திய சுற்றுடல் அதிகாரசபை

Central Environmental Authority

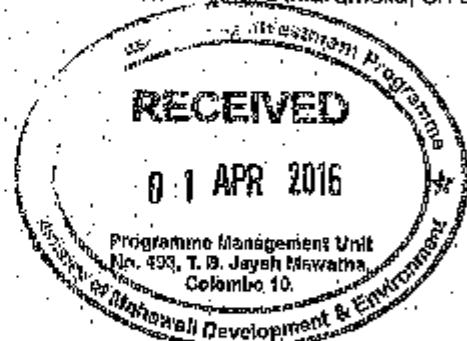


08/EJA/Water/04/2012

31 March 2016

"පරිසර සියලු" 104, පෙරේරා පොලීසියකරුවන් මාවත, වත්තරමුල්ල, පී. එස්. එස්.
"பரிசு பியச" 104, சென்சில் கொப்பேகடுவ மாவத்தை, பத்தா(முல்லை), இலங்கை.
"Parisara Piyasa", 104, Denzil Kobbekaduwa Mawatha, Battaramulla, Sri Lanka.
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Director General
Mahaweli Authority of Sri Lanka
No. 500, T.B. Jayah Mawatha
Colombo 10.



MODIFICATION TO CONFIGURATION OF MORAGAHAKANDA - KALU GANGA PROJECTS PROPOSED UPPER ELAHERA CANAL, CANAL FROM MANNAKKATTIYA TANK TO MAHAKANADARAWA TANK AND KALU GANGA-MORAGAHAKANDA LINK CANAL PROJECT

This is to inform you that the Central Environmental Authority (CEA), after study of the Environmental Impact Assessment Report (EIAR) of the Proposed Modification to Configuration of Moragahakanda - Kalu Ganga Projects dated June 2015, the comments received from the public and your responses to such comments dated January 2016 and additional information submitted on 05.02.2016 as clarifications for the queries raised by the Technical Evaluation Committee appointed by the CEA, has decided, in terms of regulation 13 of the National Environmental (Procedure for approval of projects) Regulations, No. 1 of 1993 to grant approval for the implementation of the above project subject to the following terms and conditions.

1. GENERAL CONDITIONS

- 1.1 This environmental approval is valid for implementation of the Proposed Modification to Configuration of Moragahakanda - Kalu Ganga Projects as described in the EIAR dated June 2015 submitted by the Mahaweli Authority of Sri Lanka (MASL).
- 1.2 This approval is granted on the basis that all information provided by the MASL in the EIAR dated June 2015 and subsequent information dated January 2016 and 05.02.2016 the addendum dated January 2016 are true and accurate.
- 1.3 This approval is valid for a period of 3 years from the date of issue of this letter, unless upon application in writing to this Authority within thirty days prior to the expiry date, the validity period is extended.
- 1.4 The MASL where necessary should obtain fresh approvals in respect of any alterations that would be made to the initial project proposal submitted to CEA as per the EIAR dated June 2015.

Chairman Tel : 2872341, 2877348 Fax : 2872347	Director General Tel : 2872359 Fax : 2872608	Gen. Office Tel : 2872273, 2873447, 2873448 Fax : 2872277-280	Complain Unit : 0713603333, 2888999
Deputy Director Generals Tel : 2865286 Fax : 2877315	Envr. Pollution Control Division Tel : 2873453 Fax : 2872605	Envr. Mgt & Assess. Division Tel : 2872358 Fax : 2872106	Envr. Edu. & Awareness Division Tel : 2872297 Fax : 2872600
Director Tel : 2872301 (Admin), 2877288 (Planning) Fax : 2872601 (Admin), 2863984 (Finance)	2873452 (EPC) 2872606 (Lab) 2882335 (WMO)	2872346 (NRMA), 2876543 (EIA) 2867263 (R&D) Fax : 2872395	2867266 (IEA) Fax : 2872609 Media Unit : 2873449
			2872604 (Legal) (Western Extension) Tel : 2862631 Fax : 2862293



- 1.5 The MASL is bound to ensure that these terms and conditions are adhered to and have full control over a third party that may be involved in project implementation. The CEA should have access to the contract documents pertaining to environmental aspects, entered into by the MASL and any outside contractors. The conditions in this letter should be included in the contract documents, so that the contractor or sub-contractor is held responsible for carrying them out during construction and on completion of the work.

The MASL would be held responsible for the breach of any such conditions by any contractor or sub-contractor.

- 1.6 The MASL shall intimate to CEA the date of commencement of the project activities/construction activities, inclusive of a phased implementation schedule.
- 1.7 A copy of this approval letter and the EIAR should be kept at the project site at all times for purpose of perusal by concerned agencies.
- 1.8 It is the duty of the MASL to inform the CEA of any adverse environmental impacts which may arise during project implementation which is not anticipated at this stage. In such an event, relevant guidelines and necessary mitigatory measures should be implemented as directed by the CEA. The MASL should ensure that such impacts are properly assessed and addressed even at a later stage of project implementation.
- 1.9 The MASL should co-ordinate closely with planning agencies, relevant Provincial and Local Authorities, Divisional Secretaries and other Government Departments to resolve any conflict with existing and future development plans of the area.
- 1.10 Relevant Local Authorities in the project area should be kept informed regarding the project activities and should have written approval of the same.
- 1.11 Necessary approval of the Department of Wildlife Conservation (DWC)/Forest Department (FD) should be obtained for the release of lands belonging to DWC / FD for the project activities prior to commencement of construction activities. Trees in the project area should be enumerated and removed with the consultation of DWC / FD through the State Timber Corporation.
- 1.12 Costs to be incurred in giving effect to the implementation of the terms and conditions of this letter should be borne by the MASL as project implementation costs.
- 1.13 Any additional conditions stipulated by the CEA as and when required shall be strictly adhered to.



2 ECOLOGICAL ASPECTS

- 2.1 The conditions laid down in the letter no. D3/6/1/1/252-11 dated 16.03.2016 issued by the Director General, DWC should be strictly adhered to, to avoid / mitigate impacts on wildlife in the project area.
- 2.2 A comprehensive Wildlife Management Plan (WMP) together with a monitoring programme should be prepared by the MASL in consultation with the DWC prior to commencing construction activities of the project.

This plan should mainly address the following:

- Identification and declaration of additional area as protected areas to provide connectivity between remaining forest areas for migration of wild animals.
 - Identification and implementation of habitat enrichment programmes
 - Implementation of animal rescue programmes
 - Identification and prediction of Human Elephant Conflict areas and requirement of electric fencing
 - Community based mechanism for maintenance of electric fences
 - Budgetary allocation for implementation of the WMP.
 - Schedule of implementation of the WMP
- 2.3 Open canal section should be designed in such a way that it would facilitate wild animals for obtaining their water requirement and their movement in consultation with the DWC.
 - 2.4 Small tanks within the wildlife reservation should be developed to provide water for wild animals. No illegal cultivation shall be allowed within the Wildlife Reserve using this water.
 - 2.5 Adequate reservation for open canal section should be demarcated and managed properly for avoiding encroachments.
 - 2.6 Reforestation/enrichment planting should be carried out within the above reservation areas in close consultation with the FD using native tree species.
 - 2.7 Reforestation programme should be carried out in any other suitable areas including the catchment of Huruluwewa in close consultation with the FD / DWC using native tree species. Suitable lands for reforestation / regeneration should be identified in consultation with the FD.
 - 2.8 Reforestation / enrichment areas should be clearly marked on a map and submitted to the CEA, FD and DWC together with the replanting schedule.
 - 2.9 Existing protected areas and proposed protected areas should be clearly mapped and submitted to CEA, DWC and FD.
 - 2.10 Wildlife movements should not be disturbed due to the construction of canals within the existing protected areas and wildlife influenced areas.



- 2.11 Proposed canals falling within the protected areas should be covered to avoid any disturbance for wildlife movements.
- 2.12 No new roads or any other permanent structures should be constructed within protected areas without the prior approval of DWC/FD.
- 2.13 Precautions should be taken to reduce construction impacts on existing natural systems such as forest areas, streams and tanks and wild animals within these habitats.
- 2.14 Minimum number of trees should be cut during construction. Trees should be preserved as far as possible along the trace of canal area. Trees may be removed only in cases where it is absolutely essential. The MASL should take required action to remove such trees in consultation with the DWC / FD.
- 2.15 Low noise generating measures should be adopted in carrying out blasting activities within wildlife influenced areas. Necessary guidelines should be obtained from DWC in this regard.

3. HYDROLOGICAL ASPECTS

- 3.1 The MASL should ensure that the riparian rights of the downstream water users will not be affected in allocating water for UEC diversion from Moragahakanda Reservoir.

The MASL shall formulate proper guidelines on allocation of water for different users in consultation with the relevant stakeholders, in order to avoid any conflicts.

- 3.2 The drainage paths or stream crossings should not be disturbed during construction period. Temporary by pass structures should be provided to streams during the construction period.
- 3.3 The UEC should be operated in such a way that the existing natural stream flows are not retained by the level crossings at KogetiyaWewa , BogahaWewa and MadettawaWewa.
- 3.4 Adequate water should be retained at identified level crossings (Kongetiya, Bogahawewa and Medettawa tanks) for use of the wildlife of the area as recommended in section 5.1 of the EIA report in consultation with the DWC.
- 3.5 Necessary measures should be taken to mitigate water pollution due to contaminant leakage from machinery and workers' sites during the construction phase.
- 3.6 Required measures should be taken to prevent leakage of ground water to the tunnel.
- 3.7 Any dewatering of ground water table within the project area including the tunneling section/s should be monitored during construction phase. In the event any dewatering occurs as a result of any project activity, the MASL shall take action to mitigate or compensate the affected parties for any loss in respect of their agricultural productivity in relation to these lands.



- 3.8 Necessary precaution should be taken to avoid illegal tapping of water at open canal section.

4 GEOLOGICAL/LAND STABILITY AND SOIL EROSION ASPECTS

- 4.1 Excavation blasting operations and removal of existing rock / soil should be done in accordance with proper engineering designs. Height and angle of cutting slopes should be designed with proper geological and geotechnical details to avoid ground instability and slope failures.

- 4.2 Earth retaining structures should be applied wherever required to prevent initiation of local failures.

- 4.3 Backfilling of the temporary tunnel portal area should be properly done in accordance with standard methods and proper vegetation cover should be introduced to minimize soil erosion in such areas.

- 4.4 Adequate erosion management measures shall be exercised during construction in order to prevent siltation of surface water bodies at downstream areas, neighboring marsh / paddy lands during construction.

- 4.5 Uprooting the trees should be done with appropriate equipment to minimize the damage to the soil.

- 4.6 Natural water paths and valleys should be kept free from any obstruction through any kind of construction or disposal of soil/rocks etc. All efforts should be made during construction period to avoid adverse impacts on existing drainage system / natural storm paths of the project area. The mitigatory measures indicated in section 5.1.2 of the EIA report should be adhered to.

- 4.7 Exposed areas should be kept suitably protected to prevent erosion or emission of dusts during dry periods.

- 4.8 Earth work should be carried out during low rainfall season to minimize soil erosion.

5 DISPOSAL OF EXCAVATED MATERIAL

- 5.1 Excavated materials as far as possible should be used in construction of road works and other construction sites which are associated with the project. Care must be taken by the way of adequate safeguards been put in place to prevent erosion and washing away of any of this material into water ways.

- 5.2 Tunnel muck and excess soil should be properly disposed to suitable dumping sites. The details regarding such disposal sites should be submitted to CEA and approvals obtained.



- 5.3 Soil / debris removed during the preparation of ground for construction of project components should not be disposed / dumped into neighboring forest areas.

6. SOCIAL ASPECTS

- 6.1 A detailed socio economic survey should be carried out covering the proposed development area in order to identify affected families, sub families, agricultural lands and business enterprises in order to serve as baseline data. The data should be used in the preparation of a socio infrastructure plan. This data will also help to identify new encroachments in the area.
- 6.2 Suitable relocation sites should be identified in close proximity to the existing dwellings considering the preference of affected families.
- 6.3 A detailed resettlement plan and compensation package should be prepared inclusive of relocation sites. All compensation should be paid on the basis of the principals contained in the National Involuntary Resettlement Policy. The resettlement plan and the compensation package so prepared should be submitted to the Ministry of Lands for approval prior to commencing construction activities.
- 6.4 Acquisition of land and payment of compensation should be expedited in order to minimize the uncertainty of people.
- 6.5 In the case of cultivated paddy land coming under the tenant farmer system, compensation should be paid to both the landowner and the tenant farmer.
- 6.6 The MASL should initiate a consultative dialogue with the persons likely to be affected by the project with immediate effect. They should be kept informed well in advance, regarding the project components and also the compensation packages as well as the proposed date of commencement of project activities.
- 6.7 The MASL should provide necessary compensation, if existing water sources of the communities are affected by the project during construction phase of the project.
- 6.8 Any damages to the existing roads due to implementation of project activities should be re-routed or modified appropriately in order to avoid impacts on existing transportation system of the project area.
- 6.9 A grievance redress mechanism should be established in order to resolve social problems of affected community due to implementation of the project as recommended in section 5.5 of the EIA report.



7. EXTRACTION OF CONSTRUCTION MATERIAL

- 7.1 Quarrying of rock, sand soil and other material for construction activities should be done with the approval of the GS&MB. Approvals from the FD / DWC or other concerned agencies should be obtained wherever required.
- 7.2 Required licenses / permits for the operation of quarry sites / metal crushers, concrete batching plants, asphalt plants etc. should be obtained from the CEA / relevant Local Authority.

8 RESTORATION / REHABILITATION OF CONSTRUCTIONS SITES

- 8.1 Abandoned quarry sites, borrow pits and temporary transport routes should be rehabilitated and suitable replanting programmes implemented in these areas in consultation with the FD / DWC.
- 8.2 Temporary used areas shall be restored properly and post-construction unusable material shall be disposed of in consultation with the relevant Local Authorities. The land used for temporary establishments shall be restored up to the level of satisfactions.
- 8.3 Rehabilitation of construction site(s) and spoil dump areas should be completed prior to commissioning of the operational activities. The disturbed areas due to constructions of labor camps, spoil areas, stockpile areas, workshops, office etc. shall be rehabilitated and replanted with suitable tree species.

9 WASTE DISPOSAL

- 9.1 Measures should be taken to prevent discharge of tunnel muck, cement, cement mix, fuel oil, lubricants, waste oil, polythene and other waste materials into water bodies during construction and operation period. Oil separation devices should be installed where required.
- 9.2 Proper sanitary facilities should be provided for the work force involved in the construction activities.

10 ARCHAEOLOGICAL ASPECTS

The approvals from the Department of Archaeology should be obtained prior to commencement of the project. If any archeological remnants are encountered within the project area suitable measures should be adapted to conserve in consultation with the Archeology Department.

11 NOISE AND VIBRATION

- 11.1 All constructional activities shall be carried out in such a way, so as not to cause nuisance to the wildlife and neighborhood. The noise level during construction shall not exceed 75 dB (A) from 06.00 hrs to 21.00 hrs and 50 dB (A) from 21.00 hrs to 06.00 hrs to be measured at the boundary of the site.



11.2 Appropriate mitigatory measures should be adopted in order to maintain the vibration levels generated by construction activities, operation of machineries and equipment, and vehicle transport within the interim standards stipulated by the CEA.

11.3 Blasting operation if any should be carried out with the approval of the GS&MB, and the CEA.

12 TRANSPORTATION OF MATERIAL AND MACHINERY

12.1 Suitable action should be taken to identify the routes of transport and to mitigate traffic issues during construction. Required approvals should be obtained from relevant traffic authorities.

12.2 Transport, loading and unloading of materials shall be carried out in such a way as not to cause nuisance to the surrounding environment.

12.3 Construction material should be adequately covered during transportation to avoid wind induced dust and spillage.

12.4 The vehicles and the machinery used in the project should be maintained regularly in order to avoid smoke emissions.

13 SAFETY/EMERGENCIES

The MASL shall draw up an Emergency Preparedness Plan for contingencies such as issues associated with floods etc. The MASL should ensure that all relevant personnel are trained and aware of their responsibilities in executing the plan. Copies of the plan shall be placed at suitable locations and consulted on a regular basis.


14 ENVIRONMENTAL MANAGEMENT PLAN

14.1 The MASL shall forward to the CEA a detailed Environmental Management Plan (EMP) incorporating the mitigatory measures proposed precisely and the monitoring plan. It should contain the significant impacts identified at each site, site specific mitigation measures to be implemented for each significant impact, schedule of implementation of mitigation measures, parameters to be monitored with intervals/frequencies and the responsible agencies for implementation of the EMP. The EMP should be approved by the monitoring committee.

14.2 A monitoring committee consisting of representatives of FD, CEA, DWC, Irrigation Department, GS&MB, Department of Agrarian Development, Department of Archaeology, District Secretary/Matale /Anuradhapura/ Polonnaruwa, Divisional Secretary, Elahera/ Galenbindunuwewa/ Palugaswewa/ Hingurakgoda/ Dambulla / Naula/ Kekirawa and any other member deemed necessary will be appointed by the CEA to monitor implementation of EMP by the MASL.



- 14.3 Periodic compliance report should be submitted by the MASL on progress of the implementation of the EMP.
- 14.4 Suitably trained qualified officer/s who would be responsible for implementation of the EMP shall be assigned.
- 14.5 This Officer(s) shall act as the contact person(s) for members of the public and shall liaise with local organizations.
- 14.6 All costs incurred by the monitoring committee appointed by the CEA to oversee implementation of the EMP shall be borne by the MASL.


Prof. Lal Mervin Dharmasiri

Chairman

CENTRAL ENVIRONMENTAL AUTHORITY

CC: Secretary / Ministry of Mahweli Development and Environment
Conservator General of Forest / Forest Department
Commissioner General / Department of Agrarian Development
Director General / Dept. of Wildlife Conservation
Director General / Irrigation Department
Director General / National Building Research Organization
Director General / Department of Archeology
Director General / Department of Agriculture
Director General / Geological Surveys and Mines Bureau
Divisional Secretary, Elahera / Galenbindunuwewa / Palugaswewa / Hingurakgoda / Dambulla /
Naula / Kekirawa
Chairman, Pradeshiya Sabha, Elahera / Galenbindunuwewa / Hingurakgoda / Dambulla /
Naula / Kekirawa
Director / Central Province / CEA
Deputy Director / North Central Province / CEA

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வனசீவராசிகள் பாதுகாப்புத் திணைக்களம்
DEPARTMENT OF WILDLIFE CONSERVATION

ප්‍රධාන කාර්යාලය - අංක 811/අ, ජයන්තිපුර පාර, මත්තරමුල්ල
 பிரதான அலுவலகம், இல. 811/அ, ஜயந்திபுர வீதி, மத்தரமுல்லை
 Head Office - No. 811/A, Jayanthipura Road, Battaramulla



මගේ අංකය
எனது இல.
My No.

එච්/6/11/252 - II

ඔබේ අංකය
உமது இல.
Your No.

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திகதி
Date

2016.03.16

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උක්ත කරුණ සම්බන්ධයෙන් ඔබ විසින් මා වෙත යොමු කර ඇති අංක 08/EIA/water/04/2012 හා 2016.01.13 දිනැති ලිපිය හා බැඳේ.

02. උක්ත ව්‍යාපෘතියට අදාළ ඇල මාර්ගය මින්නේරිය-හිරිපිලේ ස්වභාව රක්ෂිතය හා ඇලහැර හිරිපිලේ අභය භූමිය හරහා මෙන්ම මින්නේරිය ජාතික උද්‍යානයෙහි කොටසක් හරහා භූගතවද ගමන් කරනු ලබයි. ඒ අනුව ඉහත ඇල මාර්ගය මගින් සිදු වන පාරිසරික හා වනජීවී සම්පත් වලට වන බලපෑම අවම වන ලෙස, පාරිසරික බලපෑම ඇගයීමකට යටත්ව එහි කොන්දේසි ප්‍රකාරව හා පහත සඳහන් කොන්දේසි ප්‍රකාරව ජාතික අවසානයවයක් සේ සලකා සිදු කිරීම සම්බන්ධයෙන් අප දෙපාර්තමේන්තුවෙහි විරුද්ධත්වයක් නොමැති බව කාරුණිකව දන්වා සිටිමි.

- 2.1 ඇලහැර අභය භූමියේ මායිමෙන් හා දැනට ඉදි කර ඇති වීදුලි වැටට සමාන්තරව විවෘතව ඇල ඉදි කරන කොටසේ වනාන්තර දෙසින් අලි ඇතුන් හා වනජීවීන්ට ජල අවශ්‍යතා සපුරා ගැනීමට හැකි වන සේ එම ඉවුර ඉතා අඩු බෑවුම් පිහිටන ලෙස හා ගම්මානය දෙසට අලි ඇතුන්ට ගමන් කළ නොහැකි ලෙස ගම්මානය මාත්ත දැඩි බෑවුමක් පවතින ලෙස ඇල ඉවුරු සකස් කළ යුතුය.
- 2.2 රක්ෂිතය තුළ මායිමට ආසන්නව ඉදි කරන කෝන්ගැටිය, හිරිපිටිය, මාදැක්කැව වැව ආදී වැව වල ජලයෙන් දැනට කුඹුරු කරන්නේ නම් පමණක් නිත්‍යානුකූල කුඹුරු වලට පමණක් ජලය ලබා දීම හා රක්ෂිතය තුළ කිසිදු අනවසර වගා කිරීමක් සඳහා ජලය ලබා නොදීම. (මෙහිදී ජල පාලන කටයුතු වලට යාමේදී වනජීවී නිලධාරියකු යොදා ගැනීමද සිදු වේ).
- 2.3 උක්ත සඳහන් කළ වැව වල ජලය වනජීවීන්ට භාවිතා කළ හැකි පරිදි මුළු ධාරිතාවෙන් 50% ක් පමණක් නිදහස් කළ හැකි වන පරිදි ජල පාලන සොරොට් සකස් කිරීම.

- 2.4 ලබාදී ඇති ශෝථිත ඇල මාර්ගය දැක්වෙන සිතියම් ප්‍රකාරව ප්‍රවෘත්තියට ලක්වන හෙවත් මාර්ගය වැටෙන ඔබ්බට මින්තේරිය ගිරිතලේ ස්වභාව රක්ෂිතය තුළ, පීඨිත අභය භූමිය, මින්තේරිය ජාතික උද්‍යානය තුළ හා හුරු වැව වන රක්ෂිතය තුළදී අදාළ ඇල මාර්ගය පොළොව ඇතුළතින් පමණක් (cut & cover , double conduit හෝ tunnel ලෙස) ගමන් කරන ලෙස සැකසීම.
- 2.5 මින්තේරිය ගිරිතලේ ස්වභාවික රක්ෂිතය මධ්‍යයේ පිහිටා ඇති ජේතුලම වැව ප්‍රතිසංස්කරණය කිරීමේදී එහි ජලය දැනට රක්ෂිතය තුළ අනවසර වශයෙන් කටයුතු සිදු කරන කිසිවකුට ලබා නොදීම හා එම අනවසර වශයෙන් රක්ෂිතයෙන් ඉවත් කර විකල්ප ඉඩම් ලබා දීම හා අදාළ අනවසර වශයෙන් ඉඩම් වනජීවීන් සඳහා වෙන් කිරීම.
- 2.6 රක්ෂිතය තුළ ඉදි කරන වැව වලින් අනවසර වශයෙන් වලක්වා ගැනීම සඳහා ජලය නිකුත් කරන සොරොට් (Sluice gate) නොමැතිව සකස් කිරීම.
- 2.7 වනජීවී රක්ෂිත හරහා ඇල මාර්ග පොළොව අභ්‍යන්තරයෙන් ගමන් කළද එහි ඉදි කිරීම කටයුතු වලදී විශාල පරිසර හානියක් සිදුවන අතර අදාළ කටයුතු නිමවූ වහාම එම ප්‍රදේශය එම තත්ත්වයට පත් කර වනජීවීන්ට හුදුසු පරිදි සකස් කිරීම.
- 2.8 මෙම ව්‍යාපෘතිය මගින් සිදුවන වනජීවී වාසස්ථාන අහිමි වීම ප්‍රතිපූර්ණය කිරීම පිණිස යාබද කැලෑ ඉඩම් පවතී නම් රක්ෂිත කිරීම හා පවතින රක්ෂිත ඉඩම් තුළ වනජීවී වාසස්ථාන වැඩිදියුණු කිරීම.
- 2.9 මෙම ව්‍යාපෘතිය මගින් වනජීවී වාසස්ථාන වලට හා සංක්‍රමණ වලට බලපෑම් ඇති විය හැකි බැවින් ඒවා අධ්‍යයනය කර පිළියම් ගෙවීම සඳහා "වනජීවීන්ට වන බලපෑම් අධ්‍යයනයක්" සිදු කිරීම හා එමගින් හඳුනාගන්නා බලපෑම් අවම කිරීම සඳහා අවශ්‍ය ප්‍රතිපාදන ව්‍යාපෘතිය මගින් ලබා දීම.
- 2.10 මෙම ව්‍යාපෘතිය යටතේ මින්තේරිය හා කඩුළුල්ල වැව සඳහා ජලය ලබා දෙන්නේනම්, එම වැව වල දැනට වසර දූරා සිදුවන ජල මට්ටමේ වෙනස්කම් වලට අනුකූල වන සේ පමණක් ජලය නිකුත් කිරීම, නිසං සමයේ අදාළ ජලාශ වල ජල මට්ටම පහළ යාමත් සමඟ අලි ඇතුන් 400ක් පමණ ඒ ආශ්‍රිතව ගැවසෙන අතර එම වැව ජල සංචිත ලෙස වසර දූරා පුරවා තැබීමෙන් වන අලිත්ව වාසස්ථාන අහිමි වේ.
- 2.11 මීට අමතරව පරිසර බලපෑම් ඇගයීමෙන් සිදු කරන නිර්දේශ ක්‍රියාත්මක කිරීම.

පොදු කොන්දේසි -

- 2.12 මෙම ව්‍යාපෘතියෙහි ඉදි කිරීම හෝ නඩත්තු කටයුතු සිදු කරනු ලබන කිසිදු සේවකයකු රාත්‍රියේදී රක්ෂිතය තුළ නවාතැන් නොගත යුතුය.
- 2.13 අදාළ ප්‍රදේශය හරහා අලි ඇතුන් ඇතුළු වනජීවී සංක්‍රමණ සිදු වන අවස්ථාවලදී නාවකාලිකව අදාළ කටයුතු නතර කර සේවකයන් ආරක්ෂිත ස්ථාන තරා යොමු කළ යුතුය.

- 2.14 මේ සඳහා දැනට භාවිතා වන මාර්ග පමණක් භාවිතා කළ යුතු අතර අළුතින් මාර්ග ඉදි නොකළ යුතුය.
- 2.15 සතුන්ට අනතුරුදායක වන ආකාරයේ ගැඹුරු වලවල් ඇති වන පරිදි ව්‍යාපෘති කටයුතු සිදු කිරීමෙන් වැළකිය යුතුය.
- 2.16 ප්‍රදේශයේ ස්වභාවික ඇල පද්ධති වලට බාධා ඇති නොවන අයුරින් මෙම ව්‍යාපෘතිය සිදු කළ යුතුය.
- 2.17 මෙම ප්‍රදේශයෙහි පාරිසරික වශයෙන් යම් බලපෑමක් ඇති වුවහොත් ඒ පිළිබඳව ව්‍යාපෘති යෝජක විසින් වනජීවී සංරක්ෂණ දෙපාර්තමේන්තුව වෙත දැන්විය යුතු අතර වනජීවී දෙපාර්තමේන්තු උපදේශකත්වය යටතේ එම බලපෑම අවම කිරීමට කටයුතු කළ යුතුය.
- 2.18 ව්‍යාපෘති ප්‍රදේශයෙහි පුරාවිද්‍යා වටිනාකමකින් යුත් පුරාවස්තුවක් හමු වුවහොත් ඒ පිළිබඳව පුරාවිද්‍යා දෙපාර්තමේන්තුවට හා වනජීවී සංරක්ෂණ දෙපාර්තමේන්තුව වෙත දැන්විය යුතුය.
- 2.19 මෙම අවසරය ලබා දීමේ ලිපියෙහි පිටපතක් යම් අවශ්‍යතාවයකදී පෙන්වීම සඳහා ව්‍යාපෘති භූමියෙහි තැබිය යුතුය.
- 2.20 වනසත්ව වංශස්ථාන විනාශ නොකිරීම හා වනසත්ව සංවරණ මාර්ග වලට බාධා නොවන අයුරින් මෙම ව්‍යාපෘතිය සිදු කළ යුතුය.
- 2.21 රක්ෂිත ප්‍රදේශ තුළ ඇති ශාක හා සත්ව කොටස් එකතු කිරීම සිදු නොකළ යුතුය.
- 2.22 මෙම ව්‍යාපෘතිය මගින් එකතු වන අපද්‍රව්‍ය විධිමත්ව බැහැර කිරීමට කටයුතු කළ යුතුය.
- 2.23 මෙම ව්‍යාපෘතිය හේතුවෙන් වනජීවී රක්ෂිතයෙහි මාර්ග, නිර්මිත හෝ වෙනත් දේපල වලට හානි වුවහොත් ඒවා ව්‍යාපෘති යෝජක විසින් ප්‍රතිපුරණය කළ යුතුය.
- 2.24 මෙම ව්‍යාපෘතියේදී අධිබලැති පිරිසවීම ද්‍රව්‍ය යොදා පිපිරවීම් කිසිවක් සිදු කිරීමට අවසර ලබා දෙනු නොලැබේ.
- 2.25 වනජීවී රක්ෂිත තුළ ගොඩනැගිලි කිසිවක් ඉදි කිරීම කිසිවක් සිදු කිරීමට අවසර ලබා දෙනු නොලැබේ.
- 2.26 මෙම ව්‍යාපෘතියෙහි සේවකයන්ට හෝ යම් දේපලකට වනසතුන්ගෙන් වන හානිය සම්බන්ධයෙන් වනජීවී සංරක්ෂණ දෙපාර්තමේන්තුව විසින් වග කියනු නොලැබේ.
- 2.27 වනජීවී සංරක්ෂණ දෙපාර්තමේන්තු නිලධාරීන්ට හා මෙම ව්‍යාපෘතියට අදාළ අනෙකුත් රාජ්‍ය ආයතන නිලධාරීන්ට අවශ්‍ය විටකදී ව්‍යාපෘති ප්‍රදේශය පරීක්ෂා කිරීමට අවසර ලබා දිය යුතුය.
- 2.28 මෙහි සඳහන් කොන්දේසි වලට අමතරව වනජීවී සංරක්ෂණ දෙපාර්තමේන්තුව හෝ අදාළ වෙනත් පාලන වෙතින් අවස්ථානුකූලව පනවනු ලබන අනෙකුත් නීතිරීති සඳහා ව්‍යාපෘති යෝජක බැඳී සිටිය යුතුය.

- 2.29 පරිසරයට හානියක් නොවන හෝ අවම හානියක් සිදු වන අයුරින් උක්ත ව්‍යාපෘතිය සිදු කළ යුතුය.
- 2.30 ඉහත ව්‍යාපෘතියෙන් බැහැරව වෙනත් කාර්යයන් සඳහා වනාන්තර රක්ෂිත තුළ ඉඩම් යොදා ගැනීම නොකළ යුතුය.
- 2.31 මෙම ව්‍යාපෘතිය මගින් පරිසරයට සහ වනජීවීන්ට අහිතකර බලපෑම් ඇති වුවහොත් නව කොන්දේසි ඇතුළත් කිරීම, නිවැරදි කොන්දේසි සංශෝධනය හෝ මෙම අනුමැතිය අවලංගු කිරීමේ බලතල වනාන්තර සංරක්ෂණ දෙපාර්තමේන්තුවෙහි අධ්‍යක්ෂ ජනරාල් සතුය.
- 2.32 මෙහිදී සිදු කරන ලබන සියළු කටයුතු ව්‍යාපෘතියට හා වෘක්ෂලතා ආරක්ෂක ආඥා පනතේ විධිවිධාන උල්ලංඝනය නොවන ආකාරයෙන් සිදු කළ යුතුය.

මෙයට - විශ්වාසී,

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එල්.එස්.එම්.පී.වික්රමසිරි බණ්ඩාර
වනාන්තර සංරක්ෂණ අධ්‍යක්ෂ ජනරාල්

පිටපත් -

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|--|---|---------------------------|
| ලේකම්, මහවැලි සංවර්ධන හා පරිසර අමාත්‍යාංශය | - | කාරුණික දැ.ගැ.පි හා අ.ක.ස |
| අතිරේක ලේකම්, ජල සම්පත් සැලසුම්, මහවැලි සංවර්ධන හා පරිසර අමාත්‍යාංශය | - | කාරුණික දැ.ගැ.පි හා අ.ක.ස |
| අධ්‍යක්ෂ ජනරාල්, ශ්‍රී ලංකා මහවැලි අධිකාරිය | - | - 250 - |
| සහකාර අධ්‍යක්ෂ (පොළොන්නරුව) | - | කාරුණික දැ.ගැ.පි හා අ.ක.ස |
| උද්‍යාන භාරකරු (මන්නේරිය පා.උ) | - | කාරුණික දැ.ගැ.පි හා අ.ක.ස |

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ANNEX B : SUMMARY OF GRM ADOPTED BY MWSIP

දුක් ගැනවිලි විසදීමේ යාන්ත්‍රණය යනු

ව්‍යාපෘතිය ක්‍රියාත්මක වීම නිසා පිටිබවට පත්වන ප්‍රශ්නවලට කළ දුක් ගැනවිලි ඉදිරිපත් කොට ඒ සඳහා විසඳුම් ලබා ගැනීමට ඇති මාර්ගයකි. කිසිදු විෂයක්කින් තොරව පිටිබවට පත් වූ ඕනෑම පුද්ගලයෙකුට මෙම ක්‍රමවේදය සඳහා යොමු විය හැක.

දුක් ගැනවිලි විසදීමේ යාන්ත්‍රණය මගින් විසඳුම් ලබා ගත හැකි අංශ

1. ඉඩම් අත්පත් කර ගැනීම සම්බන්ධ ගැටලු
2. වන්දි ගෙවීමේ ක්‍රමවේදය පිළිබඳව තොරතුරු
3. නැවත පදිංචි කිරීමේදී ඇති වන ගැටලු
4. ඉඩම් අයිතිය සම්බන්ධ ගැටලු
5. වන්දි ගෙවීම් ප්‍රමාද වීම්
6. ප්‍රතිසංස්කරණ සහයෝගීතා වැඩසටහන්
7. ව්‍යාපෘතිය හා සම්බන්ධ සමාජ සහ පාරිසරික ගැටලු

දුක් ගැනවිලි විසදීමේ යාන්ත්‍රණය මගින් විසඳුම් ලබා ගත නොහැකි අංශ

1. උසාවියෙන් විසඳුම් ලබා ගැනීමට අපේක්ෂිත හා උසාවියට යොමුකර ඇති ගැටලු.
2. ලබා දීමට යෝජිත වන්දි ප්‍රමාණය ගැන තීරණය ගැනීම.

දුක් ගැනවිලි විසදීමේ යාන්ත්‍රණයට ගැටලු යොමු කිරීමේ ක්‍රමවේදය

දුක් ගැනවිල්ල වාර්තාව හා ලිපිතව ඉදිරිපත් කළ හැක. එය ග්‍රාම නිලධාරී, ව්‍යාපෘති නැවත පදිංචි කිරීමේ නිලධාරී හෝ ව්‍යාපෘති පරිසර නිලධාරී වෙත ඉදිරිපත් කල හැකි අතර එයට අදාල පෝරමය (GRC-A) එම නිලධාරී මණ්ඩලය සතුව ඇත. එසේ ඉදිරිපත් කරනු ලබන දුක්ගැනවිලි ව්‍යාපෘති අධ්‍යක්ෂකගේ මාර්ගෝපදේශනාවටයෙන් අදාල නිලධාරීන් විසින් සනිටුසක් ඇතුළත විසදිය යුතු වේ.

එසේ විසදිය නොහැකි ගැටලු ව්‍යාපෘති නැවත පදිංචි කිරීමේ නිලධාරී හෝ ව්‍යාපෘති පරිසර නිලධාරී විසින් ව්‍යාපෘති ක්‍රියාත්මක කිරීමේ ඒකකය වෙත යොමු කෙරේ. ඒ සඳහා සති දෙකක කාලයක් ප්‍රමාණවත් වේ.

එසේත් විසදිය නොහැකි ගැටලු දිස්ත්‍රික් ලේකම් වෙත යොමු කෙරේ. මෙහිදී ද සනිටුසක් විසඳුම් ලබා දිය යුතු අතර එසේ විසදිය නොහැකි ගැටලු ව්‍යාපෘති කළමනාකරණ ඒකකය වෙත යොමුකල යුතු වේ. මෙම සම්පූර්ණ ක්‍රියාදාමය උපරිම සති හතරකින් නිම කිරීමට අපේක්ෂිතය.

මෙම කමිටු සත් කිරීම සහ සඳහන් ආකාරයට කිදු කෙරේ.

ප්‍රජාවට පැමිණිලි ඉදිරිපත් කිරීමේදී ව්‍යාපෘතිය ක්‍රියාත්මක කිරීමේ නිලධාරීන්, ව්‍යාපෘති කළමනාකරණ නිලධාරීන්, ග්‍රාම නිලධාරීන් හෝ ප්‍රාදේශීය ලේකම් වෙතට ඒවා ඉදිරිපත් කල හැකි වේ. සියලුම දුක්ගැනවිලි ව්‍යාපෘතිය ක්‍රියාත්මක කිරීමේ ඒකකයේ වාර්ථාගත කෙරේ.



පැමිණිලි විසදීමේ ක්‍රමවේදය

දුක් ගැනවිලි විසදීමේ කමිටුව ග්‍රාම නිලධාරී

ග්‍රාම නිලධාරී මට්ටමින් ගැටලු නොවිසඳුනහොත්



දුක් ගැනවිලි විසදීමේ කමිටුව ව්‍යාපෘතිය ක්‍රියාත්මක කිරීමේ ඒකකය

ව්‍යාපෘති ක්‍රියාත්මක කිරීමේ ඒකකය මට්ටමින් ගැටලු නොවිසඳුනහොත්



දුක් ගැනවිලි විසදීමේ කමිටුව දිස්ත්‍රික් ලේකම්

දිස්ත්‍රික් ලේකම් මට්ටමින් ගැටලු නොවිසඳුනහොත්,



දුක් ගැනවිලි විසදීමේ කමිටුව ව්‍යාපෘති කළමනාකරණ ඒකකය/ අමාත්‍යාංශ මට්ටමින්

ග්‍රාම නිලධාරී මට්ටමින් දුක්ගැනවිලි විසදීමේ කමිටුවේ සාමාජිකයින්

1. ග්‍රාම නිලධාරී (සභාපති)
2. ග්‍රාමීය මට්ටමේ රජයේ නිලධාරීන්
3. ග්‍රාමීය මට්ටමේ පුද්ගල පක්ෂ (බෞද්ධ, හින්දු, කතෝලික, ඉස්ලාම්)
4. ප්‍රජා නියෝජිතයින් (ප්‍රජා මූල සංවිධාන)
5. නියෝජිත (උපදේශක අංශය, ඉදිකිරීමේ අංශය)
6. පරිසර නිලධාරී, නැවත පදිංචි කිරීමේ නිලධාරී

ව්‍යාපෘතිය ක්‍රියාත්මක කිරීමේ ඒකකයේ දුක්ගැනවිලි විසදීමේ කමිටුවේ සාමාජිකයින්.

1. ප්‍රාදේශීය ලේකම් (සභාපති)
2. ව්‍යාපෘති අධ්‍යක්ෂ
3. ප්‍රාදේශීය සහායක ලේකම්
4. නැවත පදිංචි කිරීමේ නිලධාරී, පරිසර නිලධාරී
5. ග්‍රාම නිලධාරී
6. අදාල ප්‍රදේශයේ ප්‍රජා මූල සංවිධාන නිලධාරීන් 4ක් (02 ක් කාන්තාවන් විය යුතුය)
7. නියෝජිත (උපදේශක අංශය, ඉදිකිරීමේ අංශය)

දිස්ත්‍රික් ලේකම් මට්ටමින් දුක් ගැනවිලි විසදීමේ කමිටුවේ සාමාජිකයින්.

1. දිස්ත්‍රික් ලේකම් (සභාපති)
2. ප්‍රාදේශීය ලේකම්, අදාල අනෙකුත් ආයතනික නිලධාරීන්
3. ප්‍රාදේශීය සහායක ලේකම්
4. මැතිව නිලධාරී
5. ග්‍රාම නිලධාරී (අදාල ප්‍රදේශයේ)
6. නැවත පදිංචි කිරීමේ නිලධාරී, පරිසර නිලධාරී
7. අදාල ප්‍රදේශයේ ප්‍රජා මූල සංවිධාන නිලධාරීන් 4ක් (02 ක් කාන්තාවන් විය යුතුය)
8. නියෝජිත (උපදේශක අංශය, ඉදිකිරීමේ අංශය)

ව්‍යාපෘති කළමනාකරණ ඒකකයේ දුක්ගැනවිලි විසඳීමේ කමිටු සාමාජිකයින්

1. වැඩසටහන් අධ්‍යක්ෂ (සභාපති)
2. දිස්ත්‍රික් ලේකම් (අදාල දිස්ත්‍රික්කයේ)
3. ප්‍රාදේශීය ලේකම් (අදාල ප්‍රදේශයේ)
4. ව්‍යාපෘති අධ්‍යක්ෂ
5. නැවත පදිංචි කිරීමේ විශේෂඥ, පරිසර විශේෂඥ
6. ව්‍යාපෘති අධ්‍යක්ෂවරු (අදාල ව්‍යාපෘතියේ)
7. අදාල ප්‍රදේශයේ ප්‍රජා මූල සංවිධාන නිලධාරීන් 04ක් (02 ක් කාන්තාවන් විශ්ලිතව)
8. නියෝජිත (උපදේශක අංශය, ඉදිකිරීමේ අංශය)

දුක් ගැනවිලි විසඳීමේ ව්‍යාපෘති ඒකක මට්ටමේ කමිටුව මසකට වරක් ව්‍යාපෘතිය ක්‍රියාත්මක කිරීමේ ඒකකයේ දී රැස් වේ.



සියලුම පැමිණිලි හා ඒවා විසඳීමට ගන්නා ලද සියලුම ක්‍රියාමාර්ග දුක්ගැනවිලි විසඳීමේ ලේඛනයේ ලේඛනගත කෙරේ. මෙම ලේඛන ව්‍යාපෘතිය ක්‍රියාත්මක කිරීමේ ඒකකයේ හා ඒවායේ පිටපත් ප්‍රාදේශීය ලේකම් කාර්යාලයේ ස්ථානගත කෙරේ.



මහවැලි ජල සුරක්ෂිතතා ආයෝජන වැඩසටහන මගින් පිඩාවට පත් වන සියලුම ප්‍රජාවට විසඳුම් ලබා දේ. මෙම ව්‍යාපෘතියේ ඉතා වැදගත්ම සාධකය ප්‍රජාව වන අතර ඔබේ ගැටලු විසඳීමට අපි කැප වන්නෙමු.

වැඩි දුරටත් තොරතුරු ලබා ගැනීමට

මිණිපේ වම් ඉවුරු ඇළ ව්‍යාපෘතිය.

ඉංජි - එස්.ඩී.මැදිවක මහතා,
ව්‍යාපෘති අධ්‍යක්ෂ,
ප්‍රාදේශීය වාරිමාර්ග ඉන්ජිනේරු කාර්යාල පරිශ්‍රය, සඟලක.
දුරකථන අංකය: 055- 2258977

ඉහළ ඇලහැර ඇළ ව්‍යාපෘතිය,
ඉංජි - එස්.ඒ. ඒ. ධර්මසිරි මහතා,
ව්‍යාපෘති අධ්‍යක්ෂ,
ශ්‍රී ලංකා මහවැලි අධිකාරිය, මඩුවගම.
දුරකථන අංකය: 025- 2054896

වයඹ පළාත් ඇළ ව්‍යාපෘතිය,
ඉංජි - අමෝක පෙරේරා මහතා,
ව්‍යාපෘති අධ්‍යක්ෂ,
වාරිමාර්ග දෙපාර්තමේන්තුව, නැ.පෙ. 44, කුරුණෑගල.
දුරකථන අංක: 037-3970783
ජංගම දුරකථන: 071-4432826

ව්‍යාපෘති කළමනාකරන ඒකකය.

අනෝමා බටහේල මහත්මිය,
නැවත පදිංචි කිරීමේ විශේෂඥ,
මහවැලි ජල සුරක්ෂිතතා ආයෝජන වැඩසටහන,
අංක 493 1/L, ඩී.බී. ජය මාවත, කොළඹ 10.
දුරකථන අංක: 011-2675810
ජංගම දුරකථන: 077-1035020

පී. මුණමලේ මහතා,
පරිසර විශේෂඥ,
මහවැලි ජල සුරක්ෂිතතා ආයෝජන වැඩසටහන,
අංක 493 1/L, ඩී.බී. ජය මාවත, කොළඹ 10.
දුරකථන අංක: 011-2675810
ජංගම දුරකථන: 077-1035020

මහවැලි ජල සුරක්ෂිතතා ආයෝජන වැඩසටහන
අංක 493 1/L, ඩී.බී. ජය මාවත, කොළඹ 10.
දුරකථන 011 2675810
ෆැක්ස් 011 2675810



මහවැලි ජල සුරක්ෂිතතා ආයෝජන
වැඩසටහන
මහවැලි සංවර්ධන හා පරිසර අමාත්‍යාංශය

දුක්ගැනවිලි විසඳීමේ යාන්ත්‍රණය

මහවැලි ජල සුරක්ෂිතතා ආයෝජන වැඩසටහන

මෙම වැඩසටහන අයිතියානු සංවර්ධන බැංකුවේ ආධාර ඇතිව ශ්‍රී ලංකා රජය මගින් මහවැලි සංවර්ධන හා පරිසර අමාත්‍යාංශය යටතේ ක්‍රියාත්මක කරනු ලබන වැඩසටහනකි. මේ යටතේ පහත සඳහන් ව්‍යාපෘති ක්‍රියාත්මක කිරීම සඳහා මුල්‍ය ආධාර සැපයේ.

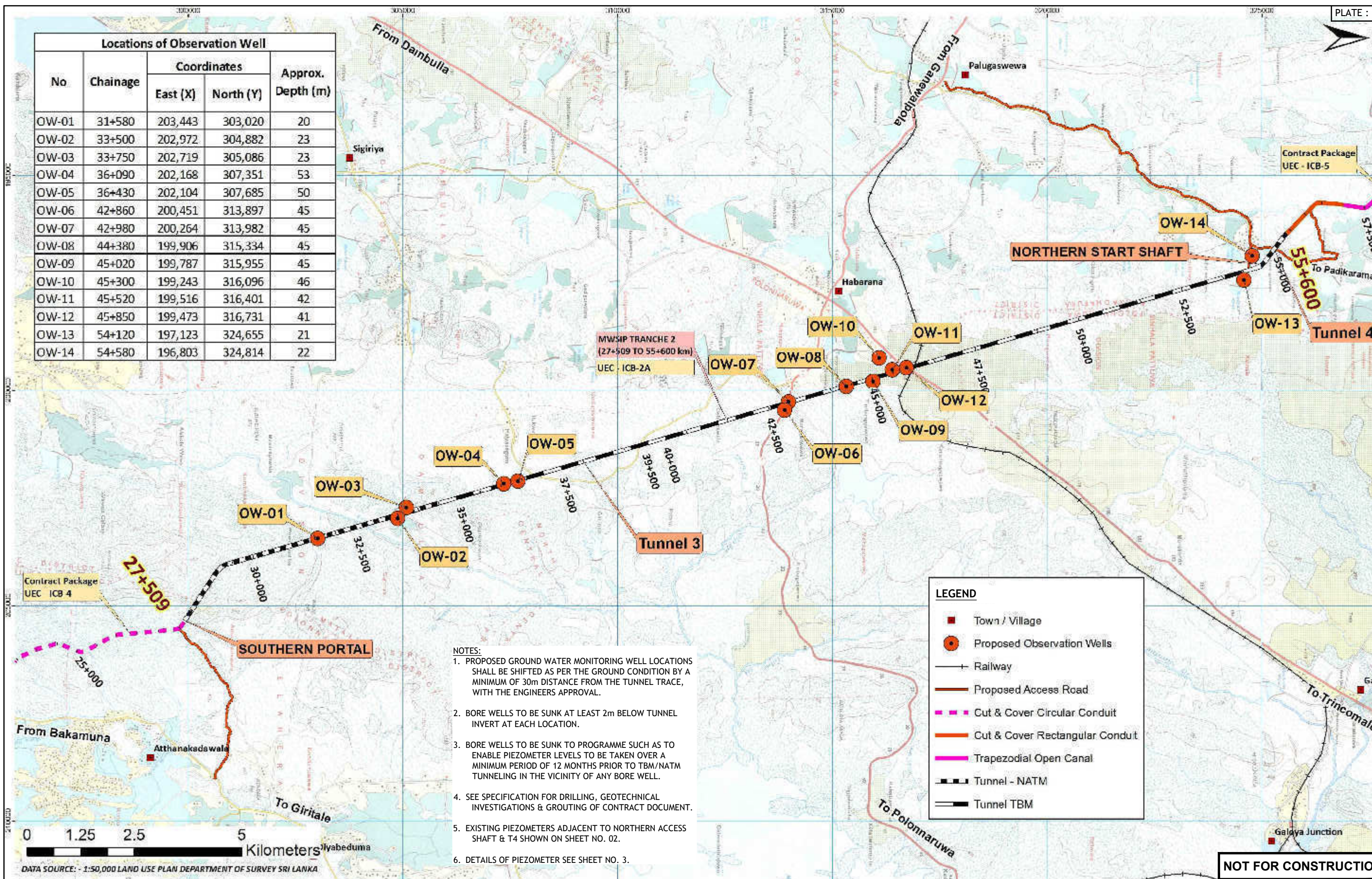
- ❖ ඉහළ ඇලහැර ඇළ ව්‍යාපෘතිය
- ❖ වයඹ පළාත් ඇළ ව්‍යාපෘතිය
- ❖ මිණිපේ වම් ඉවුරු ඇළ ප්‍රතිසංස්කරණ ව්‍යාපෘතිය.

මෙම ආයෝජන වැඩසටහන මගින් ශ්‍රී ලංකාවේ වියළි කලාපයට අයත් ලඟුරු, ලඟුරුමැද හා වයඹ පළාත්වල, ගොවිබිම්වලට මහවැලි ජලය සැපයේ. එමගින් වාර්ෂික වැසි අඩු කර කෘෂිකර්මාන්තය නැතිවීමටත්, ලඟු ජලනිගයකින් පිඩාවිදින ජනතාවට පානීය ජලය සැපයීමටත්, කෘෂි නිෂ්පාදන පදනම් කරගත් වාණිජමය ආර්ථික කටයුතු වෙලටත් ව සංවර්ධනය කිරීමටත් මූලිකව අපේක්ෂා කෙරේ.

MWSIP



ANNEX 3 : GROUND WATER MONITORING WELL LOCATIONS PROPOSED BY THE ENGINEER



REVISION			APPROVED	N.A.S.K.		14 Mar. 17
NO.	DATE	DESCRIPTION	RECOMMENDED	M.R.C.		14 Mar. 17
			SUBMITTED	S.S.		14 Mar. 17
			CHECKED	M.P.		14 Mar. 17
			DRAWN	H.E.W.		14 Mar. 17
			DESIGNED	I.D.W.		14 Mar. 17

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT

MAHAWELI WATER SECURITY INVESTMENT PROGRAM

CONSULTANT

LAHMEYER INTERNATIONAL

GC

Infotechs IDEAS

ENGINEERING CONSULTANTS LIMITED

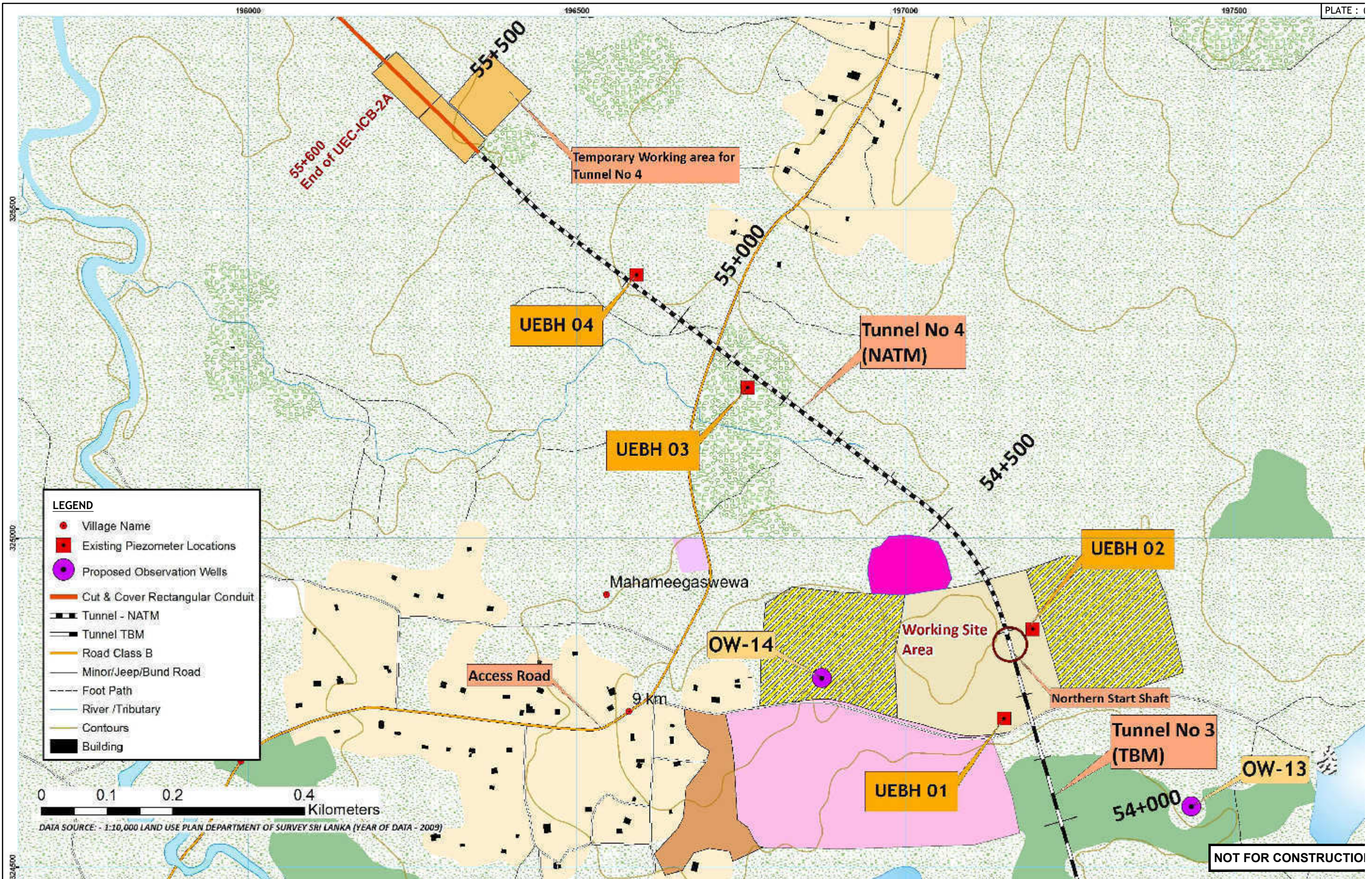
NIRAS

CONSTRUCTION OF UPPER ELAHERA CANAL
UEC/ICB-2A
CONSTRUCTION OF UEC TUNNELS
FROM 27+509 km TO 55+600 km

GROUND WATER MONITORING
DETAILS OF OBSERVATION WELLS

DATE: 14 Mar. 2017
DRAWING NO.
UE-I2A-T-GEO-01
SHEETS 01 OF 03
SCALE
AS SHOWN
ORIGINAL
A3

Path: D:\MWSIP\DATA BY PERUMAL\UEC-ICB-2A\FROM PANDULA\UEC_ICB-2A\UE-I2A-T-GEO-001 - GROUND WATER MONITORING - 3.DWG Printed : 28-Aug-17



REVISION			APPROVED	N.A.S.K.		14 Mar. 17
NO.	DATE	DESCRIPTION	RECOMMENDED	M.R.C.		14 Mar. 17
			SUBMITTED	S.S.		14 Mar. 17
			CHECKED	M.P.		14 Mar. 17
			DRAWN	H.E.W.		14 Mar. 17
			DESIGNED	I.D.W.		14 Mar. 17

EMPLOYER

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT

MAHAWELI WATER SECURITY INVESTMENT PROGRAM

CONSULTANT

LAHMEYER INTERNATIONAL

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NIRAS

CONSTRUCTION OF UPPER ELAHERA CANAL
UEC/ICB-2A
CONSTRUCTION OF UEC TUNNELS
FROM 27+509 km TO 55+600 km

GROUND WATER MONITORING
EXISTING STAND PIPE PIEZOMETERS AT START SHAFT & T4

DATE: 14 Mar. 2017
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Mahaweli Water Security Investment Program

**KALUGANGA – MORAGAHAKANDA TRANSFER CANAL (KMTC)
0+000 KM TO 8+830 KM UNDER TRANCHE 2**

UPDATED ENVIRONMENTAL MANAGEMENT PLAN (EMP) – UEC-ICB-2B

August 2017



Program Management, Design and Supervision Consultant

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UPDATED ENVIRONMENTAL MANAGEMENT PLAN (EMP) – UEC-ICB-2B

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ABBREVIATIONS

ADB	Asian Development Bank
APs	Affected Persons
BOD	Biological Oxygen Demand
BoQ	Bill of Quantities
CEA	Central Environmental Authority
CEMP	Contractor's Environmental Management Plan
DoI	Department of Irrigation
DWC	Department of Wildlife Conservation
EA	Executive Agency
EIA	Environment Impact Assessment
EMC	Environmental Monitoring Committee
EO	Environmental Officer
EPL	Environmental Protection License
ERP	Emergency Recovery Plan
FFPO	Fauna & Flora Protection Ordinance
FO	Forest Ordinance
GoSL	Government of Sri Lanka
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GSMB	Geological Survey & Mines Bureau
H&S	Health and Safety
IAS	Invasive Alien Species
IEE	Initial Environmental Examination
IEER	Initial Environmental Examination Report
IMS	Information Management System
LB	Left Bank
LGA	Local Government Authority
MDP	Mahaweli Development Program
MFF	Multi Tranche Financing Facility
MLBCRP	Minipe Left Bank Canal Rehabilitation Project
MLLD	Ministry of Land and Land Development
MMDE	Ministry of Mahaweli Development and Environment
MOH	Medical Officer in Health
MRB	Mahaweli River Basin
MWSIP	Mahaweli Water Security Investment Program
NCPCP	North Central Province Canal Project
NWPCP	North Western Province Canal Project
PD	Project Director (of PIU)
PD-PMU	Program Director - Program Management Unit
PHI	Public Health Inspector
PIU	Project Implementation Unit
PMDSC	Project Management & Design Supervision Consultant
PMU	Project Management Unit
PSC	Program Steering Committee
RE	Resident Engineer
SEA	Strategic Environment Assessment
TDS	Total Dissolved Oxygen
TSS	Total Suspended Solids
UECP	Upper Elahera Canal Project

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1 INTRODUCTION

1. The Mahaweli Water Security Investment Program (MWSIP), under the Ministry of Mahaweli Development and Environment of the Government of Sri Lanka (GoSL), is a project funded by the Asian Development Bank (ADB) (Loan No. 47381-002-SRI (SF) and GoSL, which assists the goal to maximize the productivity of the Mahaweli River Basin (MRB) water resources, by transferring available water to the north and north western dry zone areas for irrigation, drinking and commercial purposes.

2. The investment program will implement Phase I of the North Central Province Canal Project (NCPCCP), using the Asian Development Bank's (ADB's) Multi Tranche Financing Facility (MFF) modality, loaned to the government in three tranches. The updated Mahaweli Development Program (MDP) comprises three main individual investment projects:

- (i) Upper Elahera Canal Project (UECP)
- (ii) North Western Province Canal Project (NWPCP)
- (iii) Minipe Left Bank Canal Rehabilitation Project (MLBCRP)

3. The objective of Upper Elahera Canal (UEC), having a total length of 101 km, is to transfer Mahaweli water from Moragahakanda reservoir to Huruluwewa reservoir in Yan Oya basin, North Central Province Canal, and Mananakattiya – Eruwewa – Mahakandarawa cascade system in Malwathu Oya basin and reroute the present supply of water from Huruluwewa Feeder Canal (HFC) to Huruluwewa, Nanchchaduwa and Nuwara Wewa via UEC.

4. UEC is to be implemented in 3 Tranches:

- (i) Tranche 1 is to construct the UEC from 0+100 km to 6+226 km (UEC-ICB-1)
- (ii) Tranche 2 will include construction of UEC Tunnel 3 and Tunnel 4 from 27+509 km to 55+600 km (UEC-ICB-2A), and the Kaluganga – Moragahakanda Transfer Canal (KMTC) 0+000 km to 8+830 km (UEC-ICB-2B).
- (iii) Tranche 3 will include construction of UEC from 6+226 km to 17+700 km (UEC-ICB-3), UEC from 17+700 km to 27+509 km (UEC-ICB-4), 55+600 to 65+500 km (UEC-ICB-5) and transfer canal from end of UEC to Mahakanadarawa reservoir is to be constructed under UEC-ICB-6.

5. This Environmental Management Plan (EMP) is prepared based on the project interventions anticipated under the construction of the Kaluganga – Moragahakanda Transfer Canal (KMTC) 0+000 km to 8+830 km. The Works includes two main tunnels, approximate length of 8 km, two aqueducts and associated structures. Details of the tunnel design are presented in the Design Report of September 2016¹. The general alignment of the KMTC is from the southeast to the northwest, with the following features:

- (i) KMTC Tunnel 1 is 1,940 m in length (chainage 0+557.77 to 2+467.77 km), with overburden varying between 5 to 80 m
- (ii) KMTC Tunnel 2 is 6,040 m in length (chainage 2+732.77 to 8+772.77 km), with overburden varying between 6 to 378 m

6. Both tunnels will be constructed according to the principles of the New Austrian Tunnelling Method (NATM), which is a sequential tunnel excavation method successfully applied in a wide range of ground conditions. Excavation will be by drill and blast or by mechanical means in unfavourable rock conditions (e.g., excavator or hydraulic hammer). Support consists of shotcrete reinforced with wire

¹ KMTC Tunnel 1 and 2 Draft Design Report, PMDSC, September 2016

mesh, rock bolts, lattice girders and advance support (e.g. forepoling) where required. For both tunnels, excavation will proceed from both portals at the same time.

7. This EMP comprises the following sections, incorporating the mitigatory measures and the monitoring plan:

- (i) Introduction
- (ii) Summary of Potential Impacts
- (iii) Description of Planned Mitigatory Measures
- (iv) Procedures for Dealing with Chance Finds
- (v) Description of Planned Environmental Monitoring
- (vi) Procedures for Site Rehabilitation
- (vii) Reporting & Review
- (viii) Contractor's Cost

1.1 Purpose of this Document

8. This Environmental Management Plan (EMP) is based on Environmental Impact Assessment (EIA) prepared in June 2015 and the requirements of the letter of conditional approval of the CEA (Ref. 08/EIA/WATER/04/2012 dated as 31 March 2016) and the conditional approval issued by the Department of Wild Life Conservation (DWC) on 16th March 2016 (wa.jee/6/1/1/252 ii) (Annex 1 including Appendix A), Facility Administration Manual (MWSIP RRP Sri 47381-001 of 2015) and Environmental Assessment Review Framework (2014) of the Asian Development Bank (ADB), were taken into account in preparing this EMP.

9. The EMP is developed for the final designs of the civil works and other work contracts of the respective contract package. The Works to be executed under each construction Contract are clearly defined in the various Sections of the Bidding Document.

10. The purpose of the EMP is to provide a framework for minimizing the adverse environmental impacts of the Project in all its phases. It defines the roles of key stakeholders, and reporting and feedback mechanisms. The EMP also provides a basis for the systematic collection of data to determine the actual environmental effects of the Project, compliance with regulatory standards, and measurement of the success of the environmental protection activities identified during the EIA process.

11. The first draft of the updated EMP prepared by the Project Management Design & Supervision Consultant (PMDSC) in November 2016 was submitted to the MMDE's Program Management Unit (PMU) along with the bidding documents prepared for the UEC- ICB-2B contract package.

12. This revised updated EMP considers design changes made after submission of the 2015 EIA and "Addendum to the Environmental Impact Assessment (EIA): Upper Elahera Canal Project", has been prepared (June 2017) which was submitted to CEA and ADB for their concurrence prior to the commencement of construction. It is resubmitted to PMU for review, acceptance and onward transmission to the Central Environmental Authority (CEA) and ADB. The EMP approved by the CEA will be considered as the Final EMP to be used in the contract document, which will be the baseline document in preparing the Contractor's Environmental Management Plan (CEMP).

13. The CEMP, which will be prepared by the Contractor after mobilization, will be submitted to the Environmental Monitoring Committee (EMC) appointed by the CEA. The overall project environmental monitoring shall be undertaken by the EMC appointed by the CEA. A detailed and specific CEMP for each of the Contract packages is required as per the contractual requirements specified in the section 6.17.2 of the bidding document and shall be approved by the PMDSC/PMU. The guidelines for the preparation

of CEMP are given under the section 1.3 of this EMP. As per the ADB recommendation, no actual physical construction work is allowed on the site other than the survey work until the CEMP is prepared and approved.

14. The monitoring program, including the monitoring scope, institutional responsibilities and the implementation schedule, are also included in the EMP. In consideration of recommendations given as mitigation measures for potential environmental impacts indicated in the EIA report, as well as the conditions mentioned in the CEA approval letter, the parameters to be monitored continuously during the project implementation with participation from Project Implementation Unit (PIU) project staff of the Irrigation Department are incorporated in the EMP. The CEA approval letter, including **Appendix 1** (conditions given by the Wildlife Department), is attached at **Annex A**.

1.2 Management Structure

15. The Ministry of Mahaweli Development and Environment (MMDE) is the Executing Agency (EA) of the entire Investment Program and the Irrigation Department is the Project Implementing Agency (PIA) for implementing Upper Elahera Canal (UEC) project. The management structure for the MWSIP PMU Organization and Environmental Management is described in **Figures 1-1** and **1-2** respectively.

16. The Program Director (PD) is the head of the Investment Program implementation, and the PMU operates under his management. There are three Project Directors responsible for the implementation of the three main projects (MLBCRP, UECP and NWPCP) assigned for each Project Implementation Unit (PIU) based in the respective field offices.

17. A safeguards cell is established in the PMU, which is responsible for overseeing the overall monitoring and verification of the environment and resettlement activities of the investment program with the assistance of the PIU and the PMDSC. The two counterpart personnel of Environmental Specialist and Social Safeguard Specialist with relevant experience are assigned to the safeguards cell, and will have responsibility for ensuring compliance of the safeguards requirements including (i) environment, and (ii) resettlement, including gender issues. The MMDE as the Executive Agency (EA) will be responsible for overall coordination, planning, and financing of the resettlement implementation program (RIP) and the implementation of RIPs is the responsibility of PMU.

18. The Resident Engineer (RE) appointed under the PMDSC, closely supervised by the Chief Resident Engineer (CRE) of PMDSC, assumes primary responsibility for ensuring the implementation by the Contractors of the CEMP. The relevant activities will be guided by the Environmental Specialist of PMDSC and supported by the Site Engineering Supervisors. An Environmental Officer is assigned to the Project Team under the Project Director of PIU, and with the guidance of the Environmental Specialist and Social and Resettlement Specialist of PMU will hold environmental monitoring responsibilities. PMDSC will assist during the monitoring activities as resources allow (allowance may need to be made for dedicated environmental staff to be added to the PMDSC team). The duties of the Environmental Officer will include: (i) oversight of construction contractors for monitoring and implementing mitigation measures; (ii) preparing and implementing environment policy guidelines and environmental good practices; (iii) liaising with the environmental agencies and seeking their help to solve the environment-related issues of project implementation; (iv) providing awareness training on environmental and social issues related to the program; and (v) preparation of environmental monitoring reports once a year for the EIA as required by ADB.

19. The Environmental Specialist engaged by the PMDSC will: (i) update the environmental assessments including EMP based on detailed designs; (ii) ensure EMPs are included in bidding documents and civil works contracts; (iii) provide guidance to the contractors to properly carry out the implementation of the CEMPs; (iv) review and evaluate the effectiveness with which the CEMPs are implemented, and recom-

mend corrective actions to be taken as necessary; and (v) maintain documents for preparing periodic environmental monitoring reports to ADB/CEA with the coordination of PMU Environmental Specialist. The PMU Environmental Specialist of PMU will (i) provide oversight on environmental management aspects of the project and ensure that the relevant requirements of the EMPs that are included in the CEMPs are being implemented by the contractors; (ii) facilitate and ensure that contractors comply with all government rules and regulations regarding permits as well as any other relevant approvals required for works for which they are responsible; (iii) conduct ongoing consultation with the community during implementation of the project; and (iv) establish a grievance redress mechanism and ensure it is operated satisfactorily.

20. For the purpose of implementing the Environmental Management Plan, an EMC has been set up under the CEA. The EMC comprises representatives from the Department of Irrigation (DoI), Program Management Unit (PMU), representatives of Divisional Secretaries, and representatives from other stakeholder agencies. The PMU and PMDSC will monitor the implementation of the EMP and will report through periodical progress reports to the EMC of CEA as well as to the ADB.

21. The key responsibilities of the PMU/PIU and PMDSC staff engaged in environmental safeguard compliance is summarized in the **Table 1-1**.

Table 1-1: Key responsibilities of the PMU/PIU and PMDSC staff relating to safeguard compliance

PMDSC	<ul style="list-style-type: none"> • Environmental Specialists • Social Safeguard Specialists 	<ul style="list-style-type: none"> • Update the environmental assessments including EMP based on detailed designs • Ensure EMPs are included in bidding documents and civil works contracts • Preparation of Environmental Monitoring formats • Provide guidance to the contractors to properly carry out the implementation of the EMPs • Guidance on routine environmental monitoring activities, carried out as a joint effort by PIU Environmental Officer, and staff recruited under the Resident Engineer as per the resources allowed and periodical site inspections • Review and evaluate the effectiveness with which the EMPs are implemented, and recommend corrective actions to be taken as necessary • Maintain documents for preparing periodic environmental monitoring reports to ADB/CEA with the coordination of PMU Environmental Specialist • Preparing due diligence reports on safeguard • Undertaking any necessary additional surveys and investigations to support designs and implementation • Preparing Strategic Environmental Assessment (SEA)
PMU	<ul style="list-style-type: none"> • Environmental Specialist • Social and Resettlement Specialist 	<ul style="list-style-type: none"> • Provide oversight on environmental management aspects of the project and ensure that the relevant requirements of the EMPs which are included in the CEMPs are being implemented by the contractors • Facilitate and ensure contractors comply with all government rules and regulations regarding

		permits as well as any other relevant approvals required for works for which they are responsible <ul style="list-style-type: none"> • Conduct ongoing consultation with the community during implementation of the project; and • Establish a grievance redress mechanism and ensure it is operated satisfactorily. • Implementing resettlement implementation and land acquisition plans where necessary
PIU	<ul style="list-style-type: none"> • Environmental Officer • Social and Resettlement Officer 	<ul style="list-style-type: none"> • EMP Monitoring and implementing mitigation measures with the assistance of the Engineering Assistants of PMDSC as resources allow • Preparing and implementing environment policy guidelines and environmental good practices • Liaising with the environmental agencies and seeking their help to solve the environment-related issues of project implementation • Providing awareness training on environmental and social issues related to the program • Preparation of environmental monitoring reports once a year for the IEE as required by ADB

1.3 Contractors' EMP and Compliance Monitoring

22. Each Contractor is required under his construction contract to develop a CEMP based on the EMP presented here, and the guideline for CEMP is given below, as well as the environmental compliance mechanism that in place to ensure that the EMP is implemented properly. The Environmental Monitoring Plan (EMoP) (see **Table 3-2**) has been developed, including key monitoring aspects and responsible parties, to ensure environmental best practices during the construction and operation phases of this project.

23. Contractor's EMP will be reviewed by PMDSC to ensure that it addresses requirements mentioned in the CEA approvals and ADB loan covenants, and this CEMP will be submitted to the EMC for approval in compliance with CEA approval condition No.14 (Ref. 08/EIA/WATER/07/2012 dated as 23 February 2016).

24. The Contract will refer to the approved EIA Report and the CEA Environmental Approval (Ref. 08/EIA/WATER/04/2012 dated 31 March 2016) for the applicable Laws and Regulations related to environmental management (Section 1.5 of the EIA report) and to the clearances and permits to be obtained prior to commencing the work, including those for which it will be his responsibility to obtain confirmation.

25. The CEMP will be based on the detailed implementation plan and the Contractor's actual construction methodologies, the work schedule, and the types of work and the details given in the Specifications. The CEMP shall be consistent with the project EMP and prepared based on the Contractor's activities at the corresponding locations. The CEMP shall address all environmental and social matters relevant to the Works, which shall include as a minimum, but not be limited to, the following areas:

- (i) **Definition of project boundaries** (footprint of the construction activities, other contractors' facility locations, disposal areas, borrow areas (if any), worker camp areas, machinery yards, access roads, transportation routes of borrow, disposal material etc.)
- (ii) **Identification of environmental values and sensitive receptors** of the site and its surrounds (once the site boundaries are defined, the sensitive receptors and the environmental values of the area need to be confirmed. The EIA/IEE document and the updated EMP will often provide

the necessary information. Such information can be presented as an overlay of the engineering drawings or maps)

- (iii) **Construction activities** - based on the construction plan/schedule prepared, it is important to mention what the various phases of work are for each site, as different phases include different activities and thus different environmental management requirements (e.g., site survey, vegetation clearance, soil stripping and earth movement, excavation, electric elephant fencing, concrete work, blasting etc.)

- (iv) **Risk Assessment Matrix:** Risk assessment and environmental management measures based on the construction activities

(Risk is assessed as the likelihood that the activity will have an effect on the environment as well as the consequence of the effect occurring. Hence, it is often described as “**Risk = Likelihood x Consequence**”)

- (v) **Site plans** - completed risk matrix provides a detailed assessment of the environmental management requirements for a construction site. The identified environmental management requirements need to be included in a site plan. The site plans range from simple line drawings to marked-up engineering drawings, to detailed overlays on aerial photographs. A site plan must cover the extent of the construction activity and should contain;

- (a) Indication of North, and scale;
- (b) Existing and planned supporting infrastructure (e.g., access roads, water ways, electricity supply etc.);
- (c) Location of planned work;
- (d) Drainage system;
- (e) Location of sensitive receptors (e.g. animal crossings etc.)

The environmental management measures are then overlaid onto the site plan. This can be done by hand or by using computer graphics / symbols depending on what is available. **ADB will not consider a CEMP to be complete unless a site plan accompanies the risk assessment matrix.**

- (vi) **Environmental Work Plans** - the completed CEMP shall provide the details of all the environmental management requirements for all stages of the construction process. If the work is undertaken as individual work teams, the environmental work plans need to be prepared separately targeting each work team for respective work activities (e.g. clearing, excavation, concrete work, back filling).
- (vii) the Contractor's organisational structure showing the implementation, supervision and reporting and responsibilities of key personnel;
- (viii) the construction programme and work activities;
- (ix) requirement of environmental license and approvals
- (x) the Contractor's plans for specific environmental measures, including:
- (a) relocation of utilities if required (minimize/avoid disruption of services such as power, water supply etc.)
 - (b) Contractor's Facilities Management Plan for management of impacts due to establishment and operation (includes detailed designs, methodologies and installation locations of all construction related facilities, such as access roads, workers' camps, storage areas, equipment maintenance areas etc., pollution control facilities, such as drainage channels, settling tank/ponds and septic tanks, temporary noise barriers etc.)
 - (c) liaison with local authorities and residents

- (d) air pollution (dust and gaseous emissions) control
- (e) noise and vibration control
- (f) waste management (solid, liquid, hazardous)
- (g) wastewater collection, treatment and disposal
- (h) prevention of contamination of natural water courses and groundwater
- (i) water extraction, treatment and supply
- (j) protection of wildlife and fish
- (k) establishment, operation and reinstatement of spoil disposal areas
- (l) protection and replanting of flora
- (m) drainage and storm water management
- (n) erosion and sedimentation control
- (o) traffic management
- (p) minimising disturbance in public areas (including from construction traffic)
- (q) damage to and maintenance of existing roads, bridges, culverts etc.
- (r) chemicals and hazardous substances/materials management, spillage prevention
- (s) workers and public safety
- (t) emergency response
- (u) dealing with geological, paleontological and archaeological remains, graves etc.
- (v) reinstatement of Site areas used for facilities, access and temporary construction roads;
- (xi) the approach and schedule for implementing the mitigation measures specified in the Project EMP;
- (xii) plan for self-monitoring and reporting to ensure compliance with the EMP/CEMP provisions

26. The preparation of the CEMP and implementation of required environmental mitigation actions will be the responsibility of the Contractor through an experienced Environmental Officer dedicated for the entire construction period having a sound knowledge and professionally qualified in environmental science/ management and ecology, since the project area is associated with environmentally sensitive and critical habitats as per the ADB's SPS (2009) definition.

27. Further it is required to submit the Environmental Method Statement (EMS) for the project interventions or the construction activities, such site clearing, identification and establishment of contractor's facilities (camp sites, office and laboratory, disposal areas, batching plants, crusher plant, waste management, site restoration etc.) that have a significant environmental impact.

28. Other key documents that need to be maintained by the contractor during the construction stage are, (i) Contractor's schedule on Environmental Management (attached with Construction schedule of daily/weekly basis), (ii) Environmental Issue log, (iii) Grievance log, and (iv) monthly monitoring report followed by routing self-monitoring carried out based on the "monitoring forms".

29.

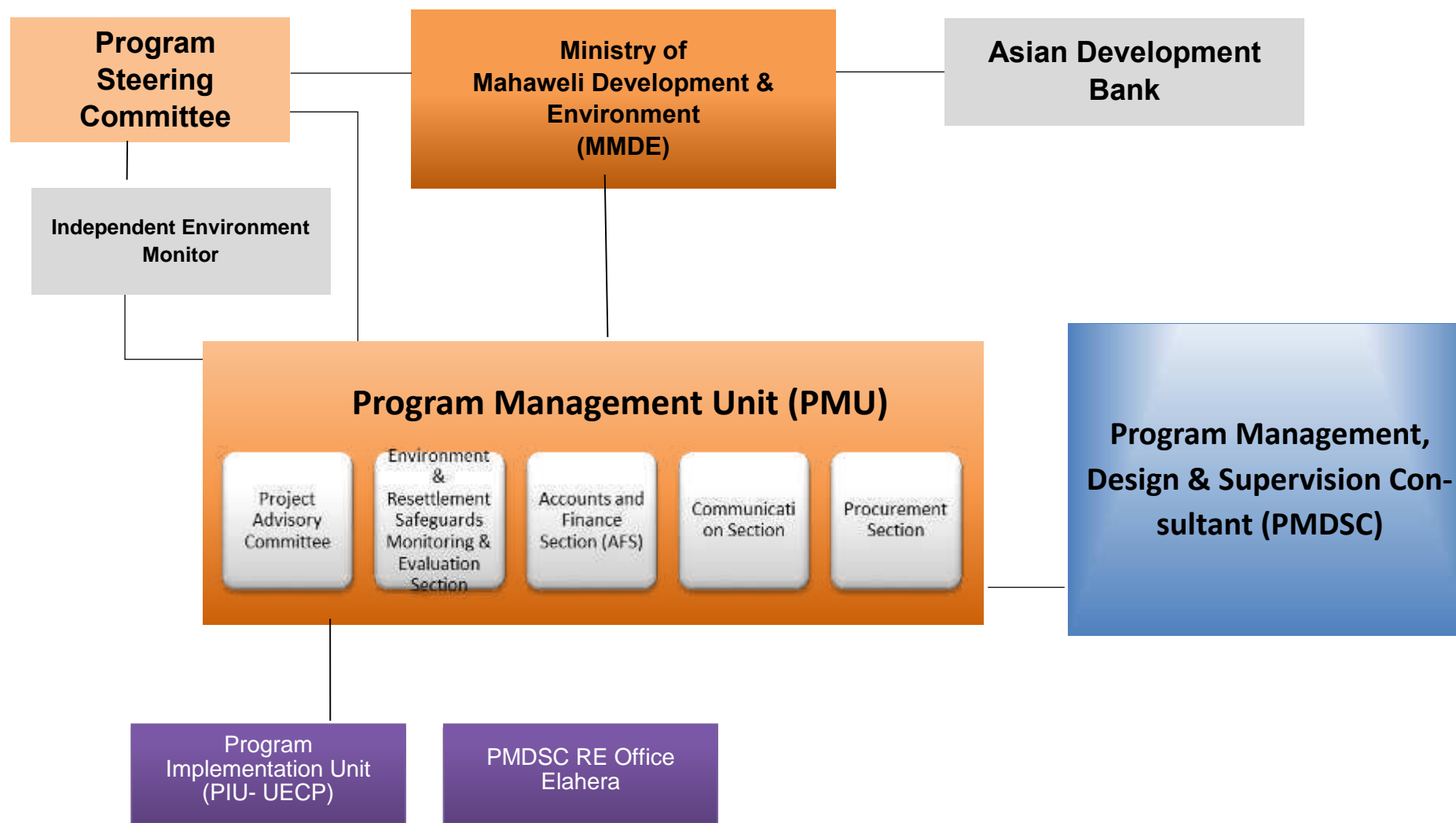


Figure 1-1: MWSIP Organizational Chart

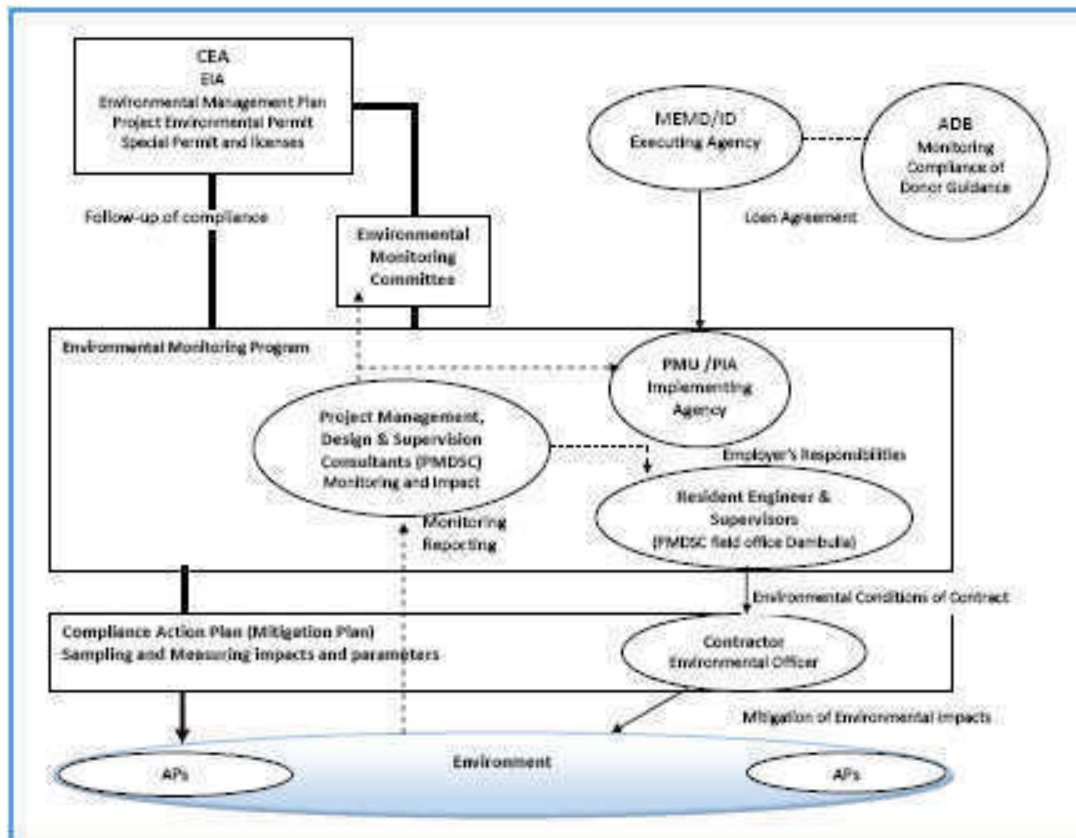


Figure 1-2: Environmental Management Organization Chart

30. Environmental compliance monitoring is essential for successfully implementing the project-specific environmental management program developed through the Environmental Impact Assessment carried out for the project and the EMP prepared, taking into account project-specific environmental impacts that may arise and mitigation measures required to make the project both environmentally and economically viable.

31. Environmental compliance monitoring involves a systematic collection and analysis of environmental mitigation/compliance-related information as the project progresses. It aims to improve the efficiency and effectiveness of the project. Monitoring will help determine whether the project is meeting the environmental standards and whether the environmental mitigation component results in the expected outputs. It is important that the environmental officers assigned to each PIU, and the supervision staff of the Engineer under the construction contracts, understand the importance of monitoring as a tool for analysing and understanding the status of the project.

32. During the construction phase the Contractor is responsible for implementation of all the requirements of the EMP, which are identified in the CEMP, while the Resident Engineer will supervise the compliance monitoring. Monitoring will ensure that the contractor complies with the terms and conditions of the CEMP for which he is responsible. The Project Director of the PIU is responsible for the assignment of Environmental Officers to carry out the monitoring together with the Engineer and supervision staff of the respective construction contract. The PMU Environmental Specialist, apart from supervising the work of the PIU Environmental Officers, will prepare monitoring protocols and will arrange for any necessary training for the PIU Environmental Officers and, if appropriate, specifically assigned staff from the Engineer's supervision team. The national and international Environmental Specialists of the PMDSC will also provide technical support for the environmental monitoring work.

33. The Contractor is responsible for implementation of the CEMP while the PMDSC and PMU are responsible for compliance monitoring and reporting to the EMC appointed by the CEA. Monitoring will ensure that the contractor complies with the terms and conditions of the CEMP. The Resident Engineer with his supervisory staff will carry out monitoring related to the CEMP, and the periodical environmental monitoring activities as per the updated EMP will be carried out by the PIU Environmental Officer with the involvement of engineering supervisory staff of PMDSC as allowed by the resources availability. Environmental Specialists assigned to PD-PMU and PMDSC will provide technical inputs as and when required. In addition, the Environmental Specialist of the PMU is responsible for preparing environmental monitoring protocols and training the environmental officer as well as supervising the work done by environment officer-PIU. In addition, s/he will oversee and attend to resolution of critical issues on the environmental management, grievance redress mechanism, compliance with regulatory and ADB safeguard requirements, reviewing environmental documentation submitted to ADB and CEA and presenting the Project environmental progress as and when required by PMU. The national and international environmental specialists of the PMDSC are to provide technical support for the environmental monitoring work through (i) updating the EIAs and IEE, and the respective EMPs based on final detailed designs; (ii) training and building capacity of PMU and PIU staff on environmental management, supervision, reporting, and monitoring of implementation of EMPs; (iii) orienting contractors on implementation of the EMPs; (iv) reviewing the environmental method statements provided by contractors and guide them on any revisions required; (v) monitoring implementation of the EMP and recommending any corrective actions on any unforeseen environmental impacts; and (vi) taking the lead in preparing environmental monitoring reports for PMU to be submitted to ADB and CEA.

34. It is the responsibility of the PMDSC staff working under the Resident Engineer to undertake monitoring of CEMP as part of construction supervision, with technical inputs from the PIU environmental officer. The monitoring formats for monitoring EMP implementation at the construction site, and other indirect impact areas, such as quarries, borrow and waste disposal and dumping areas, shall be prepared by the Environmental Specialist of the PMU and PMDSC and introduced at the orientation program. All forms of monitoring should be accompanied by regular monitoring reports including, where appropriate, dated photographs, interview results, and any test reports produced by independent firms or accredited laboratories (such as water, air and sediment quality). All the reports produced should be kept with the Project Director of the PIU, and a copy should also be kept on site by the Engineer to be made readily available to any interested party.

35. Apart from the routine monitoring conducted by the PIU Environmental Officers and the Engineer's staff, the PMU Environmental Specialist will also carry out periodic reviews (at quarterly intervals) to ensure that all the mitigation measures proposed have been carried out as specified in the EMP. The PIU Environmental Officers will report directly to the respective PIU Project Director, and the PIU Project Directors as well as the PMU Environmental Specialist then report to the Program Director. **Table 1-2** summarizes the site environmental monitoring and recording/ reporting events.

Table 1-2: Summary of site environmental monitoring and recording/ reporting events

No.	Mode	Frequency	Purpose/ Action	Agency Responsible
1.	Ambient Environmental quality monitoring (Air Quality, Noise, Vibration, Water and Sediment quality)	Quarterly intervals for the routing monitoring during the construction phase	Ensure compliance particularly for the key parameters having critical impacts	Independent accredited laboratory contracted through the PMDSC
2.		As and when required	Correcting any environmental issue (i.e. oil spill, sedimentation,	Contractor's Environmental Officer under the guidance

No.	Mode	Frequency	Purpose/ Action	Agency Responsible
			high noise & vibration, upon any complain of non-compliance etc.)	and supervision of counterpart staffs of PIU/PMU and Site Engineer
3.	Monitoring Contractor's EMP items particularly related with constructional impacts on physical environment (hydrology, soil, ambient air quality, noise & vibration, traffic, vehicle speed etc)	As per the implementation schedule given in the CEMP	<ul style="list-style-type: none"> Site Environmental monitoring walk around the construction area and other direct /indirect impact areas (borrow sites, disposal, stockpiling and Contractor's facilities) Completing the Monitoring formats Feeding monitoring data into the Data base (Information Management System -IMS) 	Construction Supervision Engineers and PIU Environmental Officer, under the guidance of Environmental Specialist of PMU/PMDSC
4.	Monitoring impacts and implementation of mitigatory measures as per the updated EMP (particularly impacts related to the ecological and socio-economic aspects) and conditions given by CEA Environmental approval	As per the implementation schedule given in the updated EMP	<ul style="list-style-type: none"> Accidental Environmental issues to be informed to the Environmental Officer / PIU and Environmental Officer PMU/PMDSC and take immediate remedial actions 	PIU Environmental Officer with the assistance of the supervision engineers as per the availability of the resources , under the guidance of Environmental Specialist of PMU/PMDSC
5.	Reporting and reviewing	Monthly	Monthly compliance monitoring reports	Environmental Officer (EO) of PIU with Resident Engineer
			<ul style="list-style-type: none"> Daily Review mitigations Daily updating Environmental Issue log, Environmental safety log, Grievance log Concise summary of environment management during past month; 2 weeks in advance of Monthly Progress meeting 	Environmental officer of the Contractor Review by the RE / PIU
6.	Site audit	Weekly-regular	Site environment monitoring walk round by EO-PIU with RE's and Contractor's relevant staffs	EO-PIU with Engineer and Contractor
7.	Site audit	Monthly-regular	Site environment inspection by RE and PD with participation of ES-PMU, EO-PIU & other relevant staffs	EO-PIU with counterpart staffs of Engineer and Contractor

No.	Mode	Frequency	Purpose/ Action	Agency Responsible
8.	Surprise site audit	Once in 2 months (minimum)	Un noticed site inspection/ document review by ES-PMU and ES-PMDSC	ES-PMU
9.	Monthly Project Progress Meeting (MPPM)	Monthly-regular	Key environment events/ concerns will be taken up at PD and RE level	PD-PIU, RE-PMDSC and ES-PMU & EO-PIU
10.	Monthly Environment Meeting	Monthly-regular	As a follow-up meeting to sort out matters arising at MPPM and in the Monthly Environmental Monitoring Reports (EMR) or any new developments	EO-PIU with counterpart staffs of Engineer and Contractor. ES-PMU as required
	Environment Monitoring Committee	Quarterly or as advice by CEA	Site monitoring, review of reports and mitigations adopted as decide by the EMC	EO-PIU to coordinate
11.	Periodical EMR	Semi-annually to ADB and quarterly to EMC (CEA)	A summary of Project environment management over the last 6 months, including self-monitoring findings, issues with mitigations and independent ambient environment monitoring results, progress in grievance redress and forecast for 6 months etc.	Produce by PMDSC Review & Submit to ADB & CEA by PMU
12.	Progress Meeting of the Program	Monthly	Brief the key achievements, drawbacks and issues on environment management	PD-PIU, ES-PMU & PMDSC
13.	Steering Committee Meeting of the Program	Monthly	Brief the key achievements, drawbacks and issues with inputs from monthly progress meeting; on environment management	PD-PMU, PD-PIU (and ES-PMU & PMDSC as required)

36. The PIU Project Director should convene the CEA Monitoring Committee once every four months at the site of each construction contract, where the responsible PIU Environmental Officer, supported by the PMU Environmental Specialist, will present a report on the environmental monitoring activities and progress related to mitigation measures. The CEA Monitoring Committee meeting should then be followed by a site visit to clarify any specific issues pertaining to monitoring.

37. The PMU Environmental Specialist will be responsible for preparing and submitting a regular Monitoring Report to the ADB, which will be displayed in the ADB website.

2 SUMMARY OF POTENTIAL IMPACTS

38. The following section summarizes the most important, site specific potential environmental and social impacts related to Kaluganga – Moragahakanda Transfer Canal (KMTC) 0+000 km to 8+830 km (UECP/ICB-2B) as per the Scope of Work and the List of Works specified in the Section 6 (Employer's Requirements) of the Bidding Documents for the relevant contract packages.

39. The construction work to be implemented under this contract package are as follows;

- (i) Civil works associated with construction of open canal, aqueducts, Tunnel 01 from 0+560 to 2+468, Tunnel 02 from 2+733 to 8+773 and associated structures
- (ii) Hydro-Mechanical works relevant to 2 Nos Trash racks rectangular flume section at 0+408 km and end of Tunnel 02 at 8+772 km. Further, there is a Stop log at the rectangular flume section at 0+408 km

40. The project impact area is not within a gazetted area at the moment, but it is a proposed forest reserve under the "Detailed Biodiversity Study on Abundance and Behavioural Patterns/Wild Life in the Project Area" under the Kaluganga Reservoir and Agricultural Extension Project (EML, 2011). Further, there are proposals to establish a 100 m buffer zone around the Moragahakanda reservoir and reforestation in the Amban Ganga basin, which will overlap with the proposed project activities under this particular contract package. In addition, the proposed Tunnel 2 portal, disposal areas (DP3) and the access road to tunnel portal (section "e" and new road section "f") is a forest habitat managed under the Forest Conservation Department (FD), lies within the proposed conservation area for Moragahakanda reservoir reservation.

41. Kaluganga - Moragahakanda transfer route goes through highland areas for a small section, but is mostly located in the upland area. The concentration of contours shows that the route is running through very steep terrain. Kaluganga - Moragahakanda transfer canal has to pass through two steep high hill ranges and also a stream called Lel Oya located in between. An aqueduct will convey water across Lel Oya, and on either side tunnel sections are proposed to be incorporated.

42. The main design changes since the 2015 EIA consist of: (i) Tunnels 1 and 2 being constructed by NATM rather than TBM; (ii) more certainty about the route and design of access roads to the outlet (northern portal) of Tunnel 2; and, (iii) more certainty about the locations and capacities of required disposal sites. Volume 1, prepared by PMDSC in June 2017, contains further details of the environmentally sensitive areas identified during a rapid ecological survey undertaken in May 2017.

43. The upstream portal is located around 1km from a Crushing Plant of the Kalu Ganga Dam Contractor. The area of the present crushing plant is shown on **Figure 2-1**, as a proposed dumping site for KMTC tunnel. Current access to the portal site is obtained by walking through the afforested hillside at the limit of the access roadway and dumping area behind the crushing plant. Vehicular access to the portal can be done by extending the existing access along the line of the proposed cut and cover canal for approximately 1 km.

44. The Kaluganga dam Contractor is drawing water from the local river running approx. 1 km to the North of the site access roadway. This portal can hence be fed via a temporary pipeline from the river. Dependent on the use of the water, some means of filtering the water will be required together with a holding tank adjacent to the portal to cater for Contractor's needs. Potable water would be brought in by tanker.

45. Workers will be best accommodated in the area indicated on **Figure 2-1**, located to the North side of the access roadway to the downstream portal (and upstream portal of Tunnel No.2).

46. The working site for the downstream portal site for Tunnel No.1 (T1) will be combined with the upstream portal for Tunnel No.2 (T2). It is envisaged as being the main working site for driving both Tunnel No.1 and Tunnel No.2 tunnels either in part or in full, depending on the Contractor's programme of works and choice of equipment.

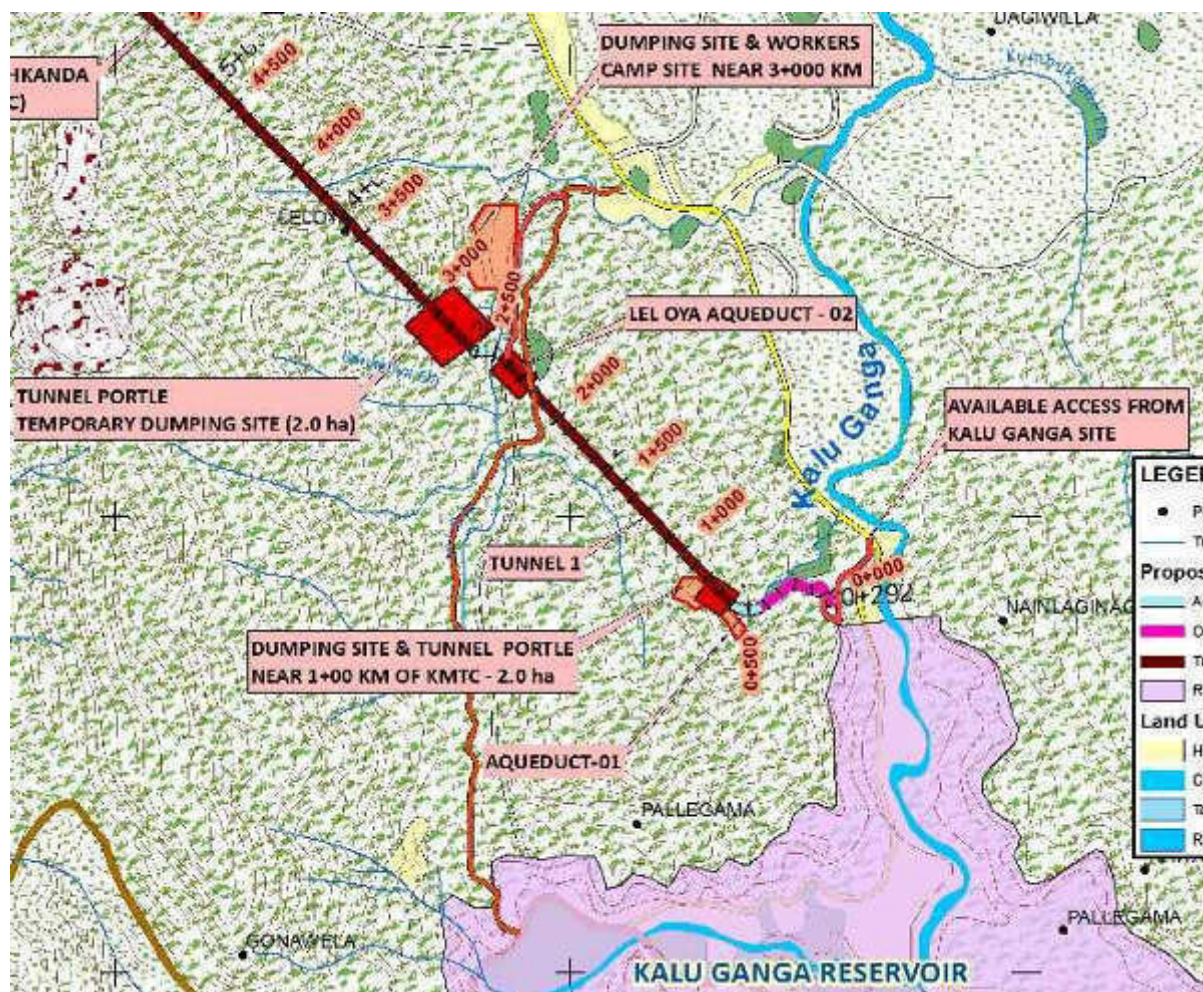


Figure 2-1: Tunnel 1 Portals and Tunnel 2 Upstream Portal: Access Situation

47. There is a single vehicle access track extending approximately 2 km from the main road directly to the location of the cut and cover / aqueduct section connecting the two portals. It is of gravel/sand base and there are no significant gradients or bends. It can readily be widened and / or resurfaced as necessary to accommodate site traffic requirements.

48. The proposed aqueduct section between the two tunnel portals is up to 6 m above the stream bed running down the v-shaped creek. The terrain drops off sharply to the Tunnel No.1 side adjacent to the tunnel line with approx. 50 m distance between stream and portal. Upstream portal to Tunnel No.2 is some 250 m from the stream on a much gentler grade.

49. Large areas of abandoned paddy field are present along the western side of the access roadway and storage of rock spoil can be made in this area (as indicated on existing layout plan). The fields are at significantly lower levels to the portals and it can be anticipated that excavated rock from either tunnel can be pushed over the side of the working area to form a spoil tip, even if of a temporary nature.

50. The access to the west of the road way will have to be ramped up onto the levelled working area between the two portal locations with temporary pipes placed in the stream to maintain free water flow across the site working area.

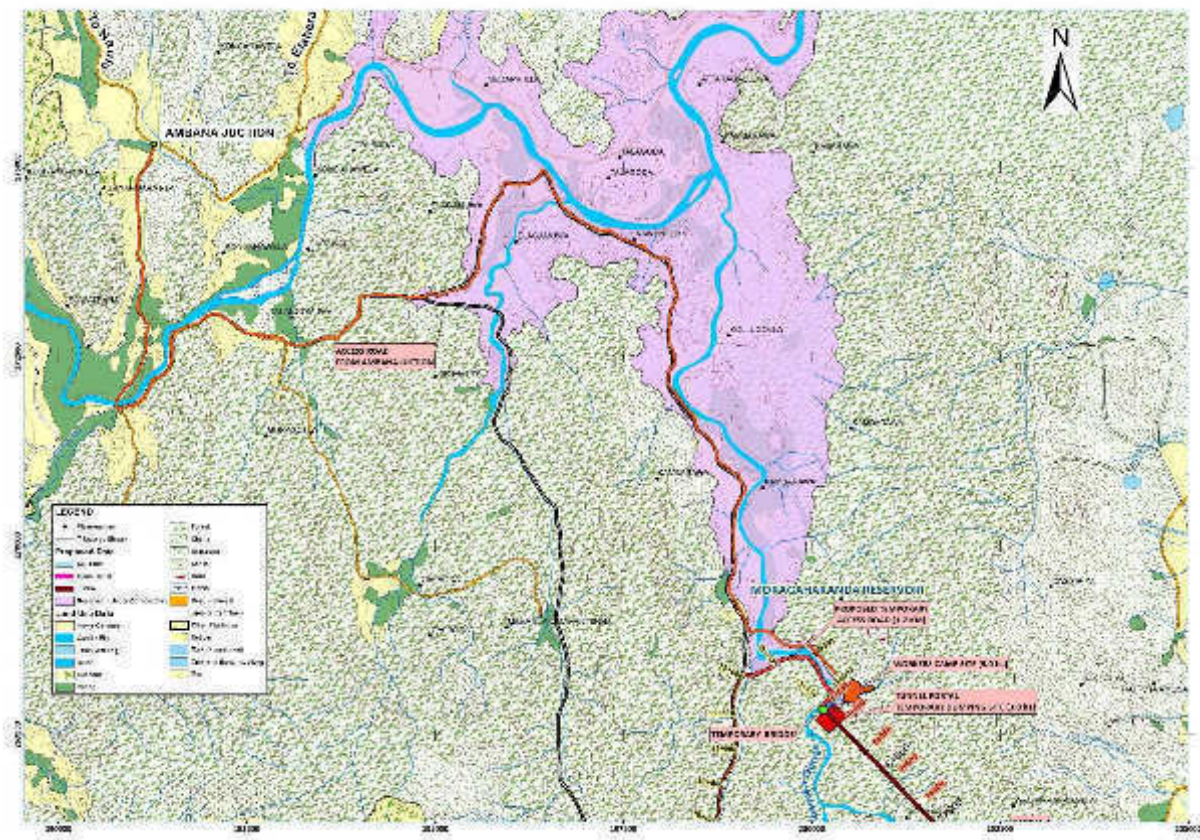


Figure 2-2: Tunnel 2 Downstream Portal: Access Situation

51. The only current access to the downstream portal area of T2 is via roadway from the North (see **Figure 2-2**). The roadway is a branch from the main road at a distance of around 22 km from the proposed portal site. Much of this roadway will become flooded by the Moragahakanda Reservoir at an undisclosed time in the next few years. Access to the working site will then only be possible from the South.

52. The first 15 km or so of the current access roadway can be used as it is, subject to possibly minor resurfacing at some locations. The last 7 km is through forested areas (within buffer zone of Knuckles conservation forest area) and open areas with many small, now abandoned, settlements. Large trees in the areas to be flooded are being cut down and transported out of the area. There are open spaces to the eastern side of the creek which will remain above the proposed reservoir high water level and hence can be used for workers camp, offices and other site facilities, including rock spoil tipping.

53. There is no current access to the portal site from the South with the present roadway reverting to an overgrown track impassable for vehicular traffic some 2.5 km short of the location where a new access roadway of 1.7 km length is indicated on **Figure 2-2** to reach the portal location. However, the proposed access road through the existing forest area would result a significant impact due to tree felling, erosion and possible land instability during rainy season and hence alternative access preparation is encouraged to the contractor.

54. Once the roadway from the North is flooded then access can only be from the South and after completion of the last 4.2 km of roadway.

55. The roadway from the Southern side is a continuation of a roadway off the main road adjacent to T1/T2 work site, a distance of approx. 25 km. Whilst the initial few kilometres of the roadway are asphalted, the roadway degenerates in quality at a number of locations with road surface varying from asphalt, concrete, tar coating and gravel. The terrain is quite mountainous with rapid and steep changes in grade and winding tight bends. Road condition deteriorates generally with distance. It is not suitable for heavy plant and if heavily trafficked for any lengthy duration will require some repair work in various locations.

56. The Tunnel 2 portal runs straight into the hillside within 100 metres of the stream. Drill and blast activities only should contemplate at this location. Ideally the Contractor should aim at completing all activity prior to the North access route being flooded and hence lost.

57. Water can be drawn from the Kambarawa Ganga stream which runs across the working site immediately in front of the proposed portal site followed by the relevant approvals from the respective Government institutions or agencies. The Kambarawa stream is another ecological hot spot which is the habitat for some critical aquatic species, and this particular portion of the stream is within the FSL of the Moragahakanda reservoir. Hence, under the Moragahakanda project, the identified critical fish species has been translocated by IUCN.

58. It is envisaged that a small workers camp will be sited near the work site as the site is remote from the main work site. The amount of water that can be extracted per borehole needs evaluation by Geologist and subjected to prior approvals.

59. However, the site requirements and selection of areas for temporary storage, disposal sites, access roads should always identify adhering to the standard regulations and guidelines laid by GoSL and ADB.

60. Further reference on the site requirement facilities and the required regulatory and institutional arrangements are described in the approved EIA report (June 2015).

61. Since, there are different types of construction activities involved with this construction package such as construction of Open - lined canals, Aqueducts, Cut and Cover conduits, Inlet and outlet tunnel portals of Tunnel 01 and Tunnel 02 and the construction of Tunnel no 01 with drilling and blasting method, the type of impact anticipated would be differ to one another.

62. The **Tables 2-1** provide summaries for the anticipated impacts during construction and operation and the details of mitigation measures are given in Section 3 of this document as a generic EMP. The detailed EMP will be produced at the contract award once all the designs and construction methodologies are finalized.

Table 2-1: Anticipated Impacts during pre - Construction & Construction

Impact Components	KMTC Transfer Tunnels/ Aqueduct	KMTC Tunnel Portals	Cut and Cover sections	Open Canal sections	Level Crossings	Structures	Worker Facilities	Construction Yards, vehicle parks	Access Roads	Disposal Sites
Physical Resources										
Soil erosion	M	H	H	H	-	M	L	M	M	H
Surface Water pollution	L	M	L	L	-	L	M	L	M	M
Air pollution	L	M	L	L	-	L	L	M	M	L
Mineral resources	M	M	M	M	-	M	M	M	M	L

Impact Components	KMTC Transfer Tunnels/ Aqueduct	KMTC Tunnel Portals	Cut and Cover sections	Open Canal sections	Level Crossings	Structures	Worker Facilities	Construction Yards, vehicle parks	Access Roads	Disposal Sites
Slope failure	M	H	L	L	-	L	L	L	M	L
Drainage patterns	-	-	-	H	M	-	L	M	M	L
Ground water table	H	M	M	L	-	-	L	L	-	-
Ground Water Pollution	M	M	L	L	L	-	L	M	L	L
Environmental flows	-	L	M	M	M	-	L	L	M	M
Noise and vibration	M	H	H	H	-	L	L	M	M	M
Ecological Resources										
Habitat loss, fragmentation, and degradation	-	H	M	H	L	L	H	H	H	H
Terrestrial fauna and flora	-	H	M	H	L	L	H	H	H	H
Aquatic fauna and flora	M	-	-	-	L	-	L	L	L	L
Critical habitats	-	-	-	-	-	-	-	-	-	-
Rare/Endemic species	L	L	L	L	-	-	L	L	M	-
Threatened species	L	L	L	L	-	-	L	L	M	-
Direct impacts on protected areas	-	-	L	M	-	-	-	-	-	-
Migratory routes of animals	L	-	M	H	M	-	M	M	M	-
Biodiversity loss/ecosystem function	M	L	L	L	-	-	L	L	L	L
Human-elephant conflict	L	L	M	H	L	L	M	M	M	L
Threats by Alien Invasive species	L	L	H	H	-	-	M	M	M	M
Increased access to protected areas	M	M	M	M	-	-	M	-	M	-
Socio-cultural aspects										
Health and safety of communities	-	-	M	M	-	L	M	M	M	M
Disruption of social cohesion of communities	-	-	L	H	-	-	L	L	-	L
Worker health and Safety aspects										
Occupational health and safety	M	M	M	M	M	M	M	H	M	M
Archaeological and Cultural Resources										
Direct impacts	-	-	H	H	-	H	L	L	M	L

Impact Components	KMTC Transfer Tunnels/ Aqueduct	KMTC Tunnel Portals	Cut and Cover sections	Open Canal sections	Level Crossings	Structures	Worker Facilities	Construction Yards, vehicle parks	Access Roads	Disposal Sites
Theft and vandalism of artifacts and sites	-	-	L	L	L	L	H	H	H	L
Unanticipated events										
Health related issues	L	-	L	L	-	-	M	L	L	L
Climate related issues	L	M	L	L	L	L	L	L	M	L
Construction related issues	M	M	M	M	-	M	M	M	M	M

Abbreviations: H- Highly significant, M-Moderately significant, L-Low significance

3 DESCRIPTION OF PLANNED MITIGATORY MEASURES

63. A site specific Environmental Management Plan (EMP) has been provided containing (i) project activity; (ii) potential environmental impacts; (iii) planned mitigation measures; (iv) monitoring scope; (v) institutional responsibility; and (vi) proposed timing for implementing mitigation measures related to related to KMTC (0+000 km - 8+830 km) comes under the Construction package UEC-ICB-2B depending on the availability of construction related information, and this would be converted to a Contractor's Environment Management Plan (CEMP) once the construction method and program and methodology is finalized by the Contractor.

64. The EMP in **Table 3-1** is divided into three sections for ease of reference – of specific relevance to the Contractor's responsibilities on site are the activities under Section B (Construction):

(A) Preconstruction

65. Activities related to land acquisition, addressing grievances of affected communities, livelihood management related to the forthcoming construction works.

(B) Construction

- (i) Activities related to initial mobilisation and establishment of the site:
 - (a) achieving initial access into the site and construction of temporary access roads
 - (b) preparation of site establishment areas for the various temporary site facilities
 - (c) construction of Contractor's camps, including facilities for offices, storage, accommodation, equipment, aggregate production/storage, concrete production etc., as well as facilities for the Employer and the Engineer, and establishment of associated utilities and systems
 - (d) establishment of borrow areas, ready to commence operations
 - (e) establishment of quarries, ready to commence operations
 - (f) facilitating site requirements such as water, electricity etc.
- (ii) Environmental impact management issues related to construction activities:
 - (a) Health and safety related to all construction activities
 - (b) Transport and storage of construction materials and machinery operation
 - (c) Clearing of site, removal and disposal of construction debris and excavated materials
 - (d) Activities related to significant noise and vibration
 - (e) Activities related to the emission of dust
 - (f) Activities related to the hindrance of surface runoff and soil erosion
 - (g) Construction / removal of water diversions
 - (h) Provision of information disclosure among stakeholders.
- (iii) Special environmental impact management issues related to construction activities:

66. The impacts related to the list of works identified in the Section 6 (Employers Requirements) of the Bidding Document such as:

Ecological Aspects

- (i) KMTC project area lies within the land use category known as unclassified forest, and consists of a short open canal, two tunnel lengths within steep hill slopes connected by an aqueduct across Lel Oya, a natural stream running in the forests of the two tunnel lengths, continued with drilling and blasting, which could create adverse impacts to the existing faunal community in the area and surrounding habitats
- (ii) Disturbance to terrestrial natural habitats will most likely result in introduction of alien invasive species
- (iii) Special attention need to be given during the site clearance under the close monitoring of PIU and RE staff, to limit the tree felling and vegetation clearance as instructed in EMP compatible with the approved construction schedule
- (iv) Freshwater and riparian habitats of Lel Oya will suffer greater adverse effects unless sites are actively restored and monitored to prevent further damage. Lel Oya is likely to harbor important assemblages of aquatic vertebrates and invertebrates. The aqueduct goes above the stream at a higher level than the water level of Lel Oya. The aquatic species diversity and water quality studies have not been done. The impacts on this stream due to construction of an aqueduct across it will be highly significant during the construction stage by operation of machinery, transport of materials and humans to the site and increased access to forests. Damage to banks, stream bed can result from construction, increase of turbidity, sedimentation and other forms of water pollution will damage the freshwater and riparian communities of natural streams such as Lel Oya
- (v) Increased access to forested areas by humans during construction, which is less so during the operation and maintenance phase. However, opening up of formerly relatively undisturbed areas to humans leads to increased poaching, clearance of forest patches, setting fires, removal of timber, non-timber forest products such as medicinal plants, ornamental plants, stones, sand and gravel from stream beds, and introduction of alien invasive species etc. Removal of vegetation, creation of inlet and outlet portals, and access roads along steep hill sides will cause significant loss, fragmentation and degradation of natural habitats, increased soil erosion, increased risk of slope failure
- (vi) KMTC traverses through an area with higher biodiversity values that starts from the Moragahakanda reservoir. The proposed disposal sites for excavated material of the KMTC need to be rehabilitated after the end of the construction phase
- (vii) Wildlife movements will be restricted and some groups/herds may move away due to noise and vibration generated from construction activities Wild life/elephant movements should not be disturbed
- (viii) Proposed Selection of suitable construction material borrow, disposal, and stock piling areas avoiding the protected areas under the Fauna and Flora Protection Ordinance (FFPO) or Forest Ordinance (FO) of GoSL and complying with ADB SPS (2009)

Disruption of ground water flow

- (i) Concrete lined canal would not cause much disturbance to prevailing ground water flows except in tunnels. In the case of KMTC the geological investigation carried out indicated favourable conditions for tunnelling in both sections fresh and of tight joints at the tunnel. However, during the construction of canal & Tunnel we may anticipate some changes in ground water table
- (ii) For the cut & cover and conduit sections of the canal Ground Water Table can be affected during construction stage. All the tunnels required to be lined at reached which are considered permeable. Open canal section is lined and cut and cover conduits are concrete structures. Therefore, construction methods decided by the designers will minimize the adverse impacts on ground water table

- (iii) Any dewatering of ground water table within the project area including tunnelling sections should be monitored during construction. In the event of any dewatering, as a result of project activity the adequate preparedness of the contractor and need to be well documented and addressed in the CEMP and Environmental Method Statements

Disposal of construction waste material and disposal areas

- (i) The disposal sites will not contain any toxic material, but only the excavated material from the tunnel and the canal.
- (ii) A considerable portion of the soil removed in the excavation will be used for forming the canal bunds, backfilling of cut and cover conduits and other structures. Excavated material will also be used for filling abandoned borrow areas found at the project area. In addition, the cut and cover sections will be covered with excavated earth up to the ground level.

Noise & Vibration (Referring to section 11 of conditional approval Ref. 08/EIA/Water/04/2012 dated as 31.03.2016)

- (i) All constructional activities shall be carried out in such a way, so as not to cause nuisance to the wild life. The noise level during construction shall not exceed 75 dB (A) from 06.00 hrs to 21.00 hrs and 5-dB 9A) from 21.00 hrs to 06.00 hrs to be measured at the boundary of the site
- (ii) Appropriate mitigatory measures should be adopted in order to maintain the vibration levels generated by construction activities, operation machineries and equipment, and vehicle transport within the interim standards stipulated by CEA
- (iii) Blasting operation (if any) should be carried out with the approval of the GS&MB, and the CEA

(C) Operation and Maintenance

67. The Contractor will be responsible for fulfilling the mitigatory measure requirements set out under the Section B (Construction) throughout the construction period. **Table 3-2** shows the Environmental Monitoring Plan (EMoP) of the key monitoring aspects identified related to the EMP to ensure that required mitigation measures are in place, which complies with the appropriate safeguard policies.

Table 3-1: Environmental Management Plan (EMP)

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
1. Site clearance and removal of vegetation 2. Slope failure and soil erosion due to removal of vegetation and soil for KMTC tunnel sections	a. causing soil erosion, siltation & sedimentation of waterways, blocking of adjacent lands, adverse impacts on community	<ul style="list-style-type: none"> Minimum areas cleared for construction of canal, structures and other facilities; carry out work in dry seasons; design adequate drainage pathways with silt traps as required; See also below for site specific details Removal of detached/unstable rocks, boulders; terracing adopted in deep cuts of 15m and above; consolidation grouting and shot-creting; Sub-surface drains at tunnel portal areas and steep hill sides ; slope protection at exposed earth surfaces; all other measures as specified in contract documents 	<ul style="list-style-type: none"> Areas marked in maps and plans at planning stage vs. areas actually cleared Effectiveness of mitigation measures 	Contractor to implement PMU/PMDSC to guide the Contractor NBRO (Independent Monitoring) EO of Contractor, Environmental officer of PIU and the environmental specialist of PMU	Weekly during the preconstruction stage
3. Creation of access roads for project and modification of existing roads	a. causing change of drainage patterns, soil erosion and road surface damage, affecting community safety	<ul style="list-style-type: none"> All roads designed and constructed to prevent these negative impacts, including providing adequate culverts, slope protection Safety barriers at dangerous locations, and bypasses at locations where existing roads are crossed by open canal or cut & cover conduits. Adequate signs to indicate traffic diversion and speed limits within and surrounding areas of the construction site. Maximum allowable speed limits to be determined depending on the site conditions (probably less than 30 kmph) Some sections of the access road to tunnel 2 portal is going through Knuckles conservation forest and rest of the part also within ecologically sensitive ar- 	<ul style="list-style-type: none"> Effectiveness of mitigation measures 	Contractor to implement PMU/PMDSC to guide the Contractor EO of Contractor, Environmental officer of PIU and the environmental specialist of PMU	Weekly during the preconstruction stage

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>eas. Hence adequate measures to be taken to minimize the disturbances to the habitats/fauna and flora</p> <ul style="list-style-type: none"> • Possible alternative access to be considered instead of section “f” of the access road which is proposed through a forest area • The road section rehabilitation should not hinder the surface run off and the stream flows • Compensatory plantation by way of Re-plantation of 3 times of the number of trees cut should be carried out in the project area. 			
4. Creation of cut and cover and conduit sections	b. Changes to Ground Water Table	<ul style="list-style-type: none"> • Layer of permeable sand/gravel to enable drainage on both sides of these sections, canal lining, treatment of weak zones; • Continuous ground water monitoring in every 2 weeks 	<ul style="list-style-type: none"> • Effectiveness of mitigation measures 	<p>Contractor to implement</p> <p>PMU/PMDSC to guide the Contractor</p> <p>NBRO (Independent Monitoring)</p> <p>EO of Contractor, Environmental officer of PIU and the environmental specialist of PMU</p>	Weekly during the preconstruction stage
5. Construction of stream crossing and aqueducts	c. Disturbance to natural drainage patterns and stream crossings during construction of canal	<ul style="list-style-type: none"> • Shorten period of construction; minimize disturbance to natural drainage; suitable drainage methods implemented; restoration of Lel Oya aqueduct site 	<ul style="list-style-type: none"> • Effectiveness of mitigation measures by monitoring ground water levels in identified 5 locations where necessary 	<p>Contractor to implement</p> <p>PMU/PMDSC to guide the Contractor</p> <p>EO of Contractor,</p>	Weekly during the preconstruction stage

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
			depending on the contractor's Geo technical surveys	Environmental officer of PIU and the environmental specialist of PMU	
6. Drill and blast tunnel sections	a. Changes to Ground Water Table in tunnel sections b. Damage or deterioration to structures, buildings or other features	<ul style="list-style-type: none"> Grouting & Concrete lining of areas that require such interventions; Contingency Plan in case of unanticipated events Continuous ground water monitoring in every 2 weeks Daily inspections and measurements should be continued until the tunnel excavation front has advanced beyond the affected location by at least 500 m either sides of the tunnel 	<ul style="list-style-type: none"> Effectiveness of mitigation measures by monitoring ground water levels in identified 5 locations where necessary depending on the contractor's Geo technical surveys 	Contractor to implement PMU/PMDSC to guide the Contractor NBRO (Independent Monitoring) EO of Contractor, Environmental officer of PIU and the environmental specialist of PMU	Weekly during the preconstruction stage
7. Handling and storage of explosives	a. Risk of wild fire b. Disturbance to the wildlife behaviours c. Risk of safety and accidents	<ul style="list-style-type: none"> Except as provided in the contract or ordered or authorized by the Engineer, the Contractor shall not use explosives. Where the use of explosives is ordered or authorized, the Contractor shall comply with the requirements of the following as applicable; <ol style="list-style-type: none"> The handling of explosives to the site and on the site, will be carried out by the supplier and blasting contractor under a license to conduct such work Transportation of explosives from the explosive supplier to the quarry areas will be conducted in such a manner as to safeguard human health and prevent impacts on the environment. The transfer will be arranged so 	<ul style="list-style-type: none"> Obtained required approvals from relevant line agencies (FD/Police station/ Regional Explosive controller) 	Resident Engineer of PMDSC for supervision and Contractor will execute EO of PIU to provide necessary guidance	Once a week during the Preconstruction and Construction Period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>that, delays between the points of transfer are minimized, explosives are not left at any location other than designated locations and explosives are not left unattended during transportation.</p> <p>iii. Explosives transported from the explosives supplier to the site will be transported by fully licensed and certified transport carriers; always utilizing a double-driver system; clearly visible signs marked "EXPLOSIVES" in letters not less than 150 mm in height when carrying explosives; equipped with correct fire extinguisher; carriers not be refuelled if explosives or detonators are on board except where the mobile equipment is designed and used solely for transportation of bulk blasting agents and have its engine shut off and its parking brake engaged while loading or unloading explosives, except where the vehicle uses an engine-powered device for loading and unloading.</p> <p>iv. <u>Storage of Explosives</u> in magazines, to be fully licenced, equipped with security reader system and proper locking system as per GoSL regulations</p> <p>v. <u>On site storage</u> near the work site to be made when required only, and would be placed in designated work area under constant (24 hour) watch/supervision. Explosives will never be left unattended, at any time.</p> <p>vi. Locations of the magazines/ storage areas will be site specific and will follow the guidelines below;</p> <p>a. a minimum of 500 metres away from camps or any structures that frequently</p>			

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> house personnel, any environmentally sensitive area b. a minimum of 500 metres away from project activities c. set on flat terrain to reduce the risk of spillage d. area around magazines to be flagged with required signage and no other fire forming agents/ fuels etc. to be around (within 100 m) • The Contractor shall at all times take every possible precaution and shall comply with relevant laws and regulations relating to the importation, handling, transportation, storage and use of explosives. Contractor shall obtain Ministry of Defense (MoD) approval for importing and handling explosives and keep the Local Police informed of the same • Only trained and certified persons will work with explosives. The explosives personnel will undertake formal training and on-the-job training to ensure compliance with legislation. • Internal audits and inspections of all components related to the explosives management will be conducted on a regular basis by qualified personnel, and the results recorded according to quality and safety standard operating procedures. • All recommendations and orders made by regulators and inspectors will be responded to and acted upon accordingly. 			
8. Storage of fuel, oil and toxic substances	<ul style="list-style-type: none"> a. Safety and Fire risk c. Pollution due to leakages, spills 	<ul style="list-style-type: none"> • All fuel storage in construction site should be fenced and stored only within the fuel storage container. • Fuel storage area should not be near any water source or source of explosive, ignition areas (within 	<ul style="list-style-type: none"> • Obtained required approvals from relevant line agencies 	Resident Engineer of PMDSC for supervision and Contractor will execute EO of	Once a week during the Pre-construction

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>100 meters)</p> <ul style="list-style-type: none"> Hazardous materials should be stored in the storage device explicitly specified. Such as fuel, oil and paint and other dangerous items should also develop temporary storage requirements. The storage area is limited to the persons concerned before entering The point should also be stored in the vehicle from damage, and regularly check for leaks, damage and contamination Machinery and equipment maintenance is limited to be within the scope of the contractor camp. Operating surface (ie, within the fenced area of the concrete floor) must be designed properly to ensure that oil and other fuel can concentrate to a suitable container . In the event of oil / fuel leaks, remove contaminated soil is required to properly licensed locations for processing To prevent grease, oils, fuels, solvents and chemicals for water and soil erosion caused by pollution or must always adopt appropriate preventive measures 	(FD/Local Gov Authority)	PIU to provide necessary guidance	and Construction Period
9. Felling of trees	a. Loss of habitats	<ul style="list-style-type: none"> The vegetation clearance in the protected areas should be carried out in section wise based on the approved construction schedule with the FD and proper communication to be adopted with the respective parties to avoid issues The centreline and exact working areas within the construction area to be marked on ground and the tree enumeration to get completed by PMDSC/RE under guidance of Environmental Specialist of PMDSC. A complete tree list, including conservation and 	<ul style="list-style-type: none"> The approval from relevant government agency (Local authority / DWLC / FD) is obtained for the all pre-identified and marked trees to be removed which are more than 30 DBH/cm Trees are removed 	<p>Contractor to implement</p> <p>PMU/PMDSC to guide the Contractor</p> <p>EO of Contractor, Environmental officer of PIU and the environmental specialist of PMU</p>	Weekly during the preconstruction stage

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>ecological status, prepared during the tree enumeration survey and tree marking exercise shall be submitted to the relevant approving authority (FD/ Divisional Secretary) and they will guide State Timber Cooperation (STS) to cut the identified trees of greater than 30 cm Diameter at Breast Height (DBH).</p> <ul style="list-style-type: none"> • Root removal and clearance of the area disposing remaining branches, roots shall be carried out by the contractor as per pre-defined procedure (CEMP/Method Statement) • The Contractor shall remove only the required trees that would disturb the construction activities within the demarcated belt identified /marked along the canal trace. • No site clearance to be done which could result opening the protected areas for the public access, enhance disturbance for wildlife movements and habitat fragmentation • If there are any additional trees to be removed, the Contractor must obtain required approval from the FD/ relevant authority under the guidance of Environmental Specialist of PMDSC and PMU • In advance of tree felling and vegetation removal, PMDSC/PMU shall carry out tree transplanting and animal translocations where necessary. • If the translocation programs to be conducted, PMU/PIU needs to plan it in advance identifying the list of species to be translocation, suitable season for the translocation, followed by a proper monitoring program to ensure the maximum survival rate of the translocation species from the site. • Compensatory plantation by way of Re-plantation of at least three times of the number of trees cut 	<p>from the site before starting the construction activities contacting concerned department (Timber cooperation/ Local authority etc)</p> <ul style="list-style-type: none"> • Reforestation program is initiated by the Contractor as per the guidance given in the EMP and contract documents and planted area (Ha) (1: 3 ratio) • No burning of vegetation parts within the construction site • Excess vegetation matter is properly disposed or reused 		

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>should be carried out in the project area.</p> <ul style="list-style-type: none"> Contractor shall make every effort to avoid removal and/or destruction of trees of religious, cultural and aesthetic significance. If such action is unavoidable the Engineer shall be informed in advance and carry out public consultation and report on the same should be submitted to the Resident Engineer. Contractor shall adhere to the guidelines and recommendations made by the Central Environmental Authority, if any with regard to felling of trees and removal of vegetation. Removed trees must be handed over to the Timber Corporation Precautions to be taken to avoid introducing/spreading of any invasive species during site clearance Always disturbances to the critical habitats, fauna and flora should be avoided as per ADB SPS (2009) 			
10. Construction of labour camps	<p>b. Contamination of receptors (water, land, air)</p> <p>c. Environmental & Social damages</p> <p>d. Social unrest</p>	<ul style="list-style-type: none"> The location, layout and basic facility provision of labour camp must be submitted to the Engineer prior to their construction. The location of labour camps must be strictly avoided the areas of wildlife/forest protected, any areas with environmental and social sensitivity (near religious places, schools, canal reservations etc.) The prior approval of Pradeshiya Sabha-Local Authority shall be obtained for construction of labor camp The construction will commence only upon the 	<ul style="list-style-type: none"> Site is not established within areas protected under FFPO and FO Site Management Plan for the camp available and Camp is installed strictly in accordance with Safety Management Plan Labour camps with 	<p>Self monitoring by EO of the Contractor</p> <p>EO of PIU and Resident Engineer of PMDSC for supervision</p>	Weekly inspection during the Preconstruction period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>written approval of the Engineer.</p> <ul style="list-style-type: none"> • The Contractor shall maintain necessary living accommodation and ancillary facilities in functional and hygienic manner and as approved by the Engineer. • All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp must be planned and implemented with concurrence from the Local Public Health Inspector (PHI) • Adequate health care is to be provided for the work force. The layout of the construction camp and details of the facilities provided should be prepared and shall be approved by the engineer. • The required training, notices and sign boards in and around the site related to best construction & engineering practices, occupational health and safety, communicable diseases, best behavioural practices shall be facilitated by the Contractor at the labour recruitment • The procedural and infrastructural requirements for emergency responses shall be incorporated in to the camp site construction plan and be duly made available • Labour camp sites after use should be cleared and the site should be reinstated to previous condition at the close of the construction work. 	<p>proper facilities such as enough spaces, ventilation, beds, mosquito nets, lavatories, bathing facilities, drinking water are available</p> <ul style="list-style-type: none"> • Waste water collection and treatment is implemented properly • The sewage system for the camp is planned and implemented with concurrence from the Local Public Health Officer (PHI) • Camp is kept clean from debris, garbage, etc. Waste is collected and disposed of in approved sites 		

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
11. Material sourcing 12. Maintaining disposal and dumping sites	a. Resource depletion b. Damage to wildlife, forest resources c. Environment Pollution d. Health & safety issues	<ul style="list-style-type: none"> The disposal sites for the UEC ICB 2B construction package are given in the Annex B. The contractor is required to ensure that sand, aggregates and other quarry material is sourced from licensed sources The contractor is required to maintain the necessary licenses and environmental clearances for all borrow and quarry material they are sourcing –including soil, fine aggregate and coarse aggregates Sourcing of any material from protected areas and/or designated natural areas, including tank beds, are strictly prohibited If the contractor uses a non-commercial borrow/quarry sites, the sites should be remediated accordingly once material sourcing has been completed The contractor should submit in writing all the relevant numbers and relevant details of all pre-requisite licenses etc. and report of their status accordingly. Selected quarry sites should have proper safety measures such as warnings, safety nets etc., and third party insurance cover to protect external parties that may be affected due to blasting. It is recommended not to seek material from quarries that have ongoing disputes with the community. The maintenance and rehabilitation of the access roads in the event of damage by the Contractor's operations shall be a responsibility of the Contractor. Copies of all relevant licenses should be maintained by the Contractor for review and documentation by 	<ul style="list-style-type: none"> Site is not established within areas protected under FFPO and FO Water and air quality EPLs from CEA have been obtained and not expired LGA permits are available Construction material storage areas Borrow site reinstatement Approved site rehabilitation plan is available Operation manual is available on site Excessive site noise managed by restricting operating hours Noise & vibration level has been checked periodically Dust control is implemented on dump, excavation or topsoil stockpile site 	Resident Engineer of PMDSC for supervision and Contractor will execute PIU- EO to supervise	Once a week during Preconstruction and Construction Period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>the engineer</p> <ul style="list-style-type: none"> • The Contractor shall comply with the environmental requirements/guidelines issued by the CEA and the respective local authorities in respect of locating borrow areas and with regard to all operations related to excavation and transportation of earth from such sites. • Borrow areas shall not be opened without having a valid mining license from the GSMB. The location, depth of excavation and the extent of the pit or open cut area shall be as approved by the engineer. • Establishment of borrow pits/areas and its operational activities shall not cause any adverse impact to the nearby properties. Also shall not be a danger of health hazard to the people. • The Contractor shall take all steps necessary to ensure the stability of slopes, including those related to temporary works and borrow pits. 	<ul style="list-style-type: none"> • Slopes are stable and no possibilities of eroding / land-slides • Sediment laden run-off from excavation or dumping sites does not enter natural water courses • No water ways/ bodies blocked • Water logging is not evident in the site • No soil/water contamination from oil/fuel/leachate /debris etc. • No damage to important flora/fauna or habitats • No human - wild life conflicts • No spreading of invasive species promoted • No unnecessary or improper interference has been done to the convenience 		

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
			<p>of public, access, occupation of public, private road, or foot paths</p> <ul style="list-style-type: none"> • No materials have been stacked or placed to cause danger or inconvenience to any person or the public • Tires of vehicles are free of mud and entrained material before entering public roads • Public roads are cleaned of any material dropped during transit • Haulage routes and the vehicle fleet schedules are strictly followed to ensure no traffic congestions 		
13. Quarry Operations and Management of Quarry	<p>a. Resource depletion</p> <p>b. Damage to wildlife, forest resources</p>	<ul style="list-style-type: none"> • Utilizing the existing quarry sites available in the project influential area as much as possible, which are approved by GSMB with valid EPL and Industrial Mining Licenses; 	<ul style="list-style-type: none"> • Site is not established within areas protected under FFPO and FO Water 	Resident Engineer of PMDSC for supervision and Contractor will execute	Once a week during the Pre-construction

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
Sites	c. Environment Pollution d. Health & safety issues	<ul style="list-style-type: none"> • If new quarries are to be opened, prior approval should be obtained from GSMB, CEA and local authorities such as Pradeshiya Sabha. • Selected quarry sites should have proper safety measures such as warnings, safety nets etc., and third party insurance cover to protect external parties that may be affected due to blasting. • Quarry sites should not be established within protected sites identified under the FFPO and FO • It is recommended not to seek material from quarries that have ongoing disputes with the community. • The maintenance and rehabilitation of the access roads in the event of damage by the Contractor's operations shall be a responsibility of the Contractor. • Copies of all relevant licenses should be maintained by the Contractor for review and documentation by the engineer 	<p>and air quality</p> <ul style="list-style-type: none"> • EPLs from CEA have been obtained and not expired • LGA permits are available Construction material storage areas • Obtained required approvals from the Defence Ministry to use/transport explosives for quarry operations • Borrow site reinstatement • Approved site rehabilitation plan is available • Operation manual is available on site • Excessive site noise managed by restricting operating hours • Noise & vibration level has been checked periodically • Dust control is implemented 	EO of PIU to provide necessary guidance	and Construction Period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
			<ul style="list-style-type: none"> No spreading of invasive species promoted No unnecessary or improper interference has been done to the convenience of public, access, occupation of public, private road, or foot paths 		
14. Water for construction activities	a. Resource depletion b. Community unrest c. Threat to the critical habitats and species	<ul style="list-style-type: none"> The planned water source at Kambarawa Oya is identified as an ecological hot-spot and prior to construction activities, species translocation should be carried out according to a proper plan The contractor should arrange adequate supply of water for the project purpose throughout the construction period from a source agreed upon with the engineer. Water may not be obtained for project purposes, including for labor camps, from public or community water supply schemes without a prior approval from the relevant authority. Extraction of water from ground water or surface water bodies without the permission from Engineer and the relevant authority Permission for the extraction of water should be obtained prior to the commencement of the project, from the relevant authority 	<ul style="list-style-type: none"> Obtained required approvals from relevant line agencies (NWSDB/water resources board) 	Resident Engineer of PMDSC for supervision and Contractor will execute EO of PIU to provide necessary guidance	Once a week during the Pre-construction and Construction Period

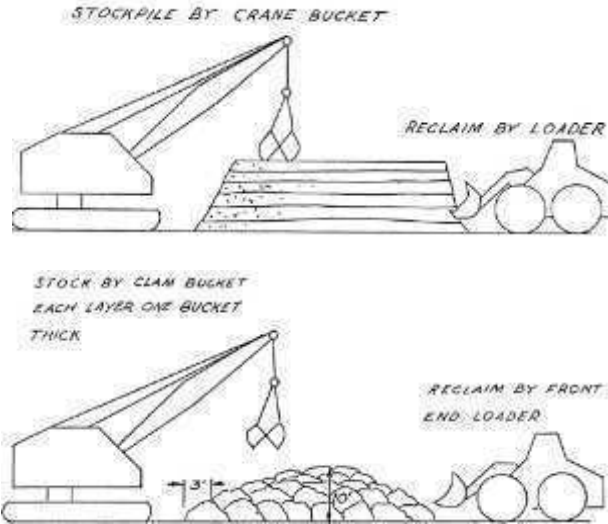
Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
15. Power for construction work	d. Risk of electrocution	<ul style="list-style-type: none"> • Proper CEB power supply to be obtained adhering to the National regulations • All electrical wiring and supply related work should confirm to British Standards (BS) or relevant Sri Lankan Standards. Adequate precautions will be taken to prevent danger of electrocuting from electrical equipment and power supply lines including distribution boards, transformers, etc. Measures such as danger signboards, danger/red lights, fencing and lights will be provided to protect the public and workers. • All electric power driven machines to be used in the construction shall be free from defect, be properly maintained and kept in good working order, be regularly inspected and as per BS provisions and to the satisfaction of the Engineer 	<ul style="list-style-type: none"> • Obtained required approvals from relevant line agencies (CEB/ Local authority) 	<p>Resident Engineer of PMDSC for supervision and Contractor will execute</p> <p>EO of PIU to provide necessary guidance</p>	Once a week during the Pre-construction and Construction Period
16. Handling of explosives	d. Risk of wild fire e. Disturbance to the wildlife behaviours	<ul style="list-style-type: none"> • Except as provided in the contract or ordered or authorized by the Engineer, the Contractor shall not use explosives. Where the use of explosives is so provided or ordered or authorized, the Contractor shall comply with the requirements of the following Sub-Clauses of this Clause besides the law of the land as applicable. • The Contractor shall at all times take every possible precaution and shall comply with relevant laws and regulations relating to the importation, handling, transportation, storage and use of explosives. Contractor shall obtain Ministry of Defense (MoD) approval for importing and handling explosives and keep the Local Police informed of the same 	<ul style="list-style-type: none"> • Obtained required approvals from relevant line agencies (FD/Police station/ Regional Explosive controller) 	<p>Resident Engineer of PMDSC for supervision and Contractor will execute EO of PIU to provide necessary guidance</p>	Once a week during the Preconstruction and Construction Period
17. Excavation and blasting activities involved in cut	e. Dust, noise and vibration f. Habitat deterioration	<ul style="list-style-type: none"> • Prior approval to be obtained from the FD/relevant authority and blasting to be carried out under the guidance of DWC as the project area is within the jurisdiction of FFPO 	<ul style="list-style-type: none"> • Obtained required approvals from relevant line agencies (FD/GSMB/ Local 	<p>Resident Engineer of PMDSC for supervision and Contractor</p>	Once a week during the Pre-construction

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
and cover sections	g. Loss of fauna and flora e. Terrifying wildlife and possible human - wildlife conflicts due to their aggressive behaviours	<ul style="list-style-type: none"> The contractor shall modify the method of construction until compliance with the criteria, if vibration levels exceed the relevant vibration criteria Appropriate mitigatory measures should be adopted to maintain vibration levels generated by blasting as of the interim standards stipulated by CEA²(considering type 3 and 4 structure types made up of lighter construction and archeologically sensitive areas) Prior to commencement of excavation, blasting activity, the Contractor shall undertake a condition survey of existing structures within the zone of influence, as agreed with the relevant government agencies and the Engineer Contractor shall carry out monitoring at the nearest vibration sensitive receptor during blasting or when other equipment causing vibrations are used Contractor shall pay due consideration on vibration impacts of blasting on adjoining structures. Explosive loads shall be determined so that excessive vibration can be avoided and blasts shall be controlled blasting in nature. Notwithstanding to these provisions contractor is liable for any damage caused by blasting work Blasting shall be carried out during fixed hours (preferably during mid-day), as permitted by the Engineer. The timing should be made known to all the people within 500 m (200 m for pre-splitting) 	Authorities/CEA)	will execute EO of PIU to provide necessary guidance	and Construction Period

² Interim Standards for vibration of the Operation of Machinery, Construction Activities and Vehicle Movements Traffic – Vibration in PPV, 2-8 mm/sec

Interim Standards on Air Blast Over Pressure and Ground Vibration for Blasting Activities; less than 5 in PPV, mm/sec

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		from the blasting site in all directions. People, except those who actually light the fuse shall be excluded from the area of 200 m (50 m for pre-splitting) from the blasting site in all directions at least 10m minutes before the blasting.			
18. Maintaining disposal and dumping sites	a. Resource depletion b. Damage to wildlife resources c. Environment Pollution d. Health & safety issues e. Dust impacts, stability, potential impact to underlying infrastructure and fire risk. h. In addition to adverse health and amenity impacts from dust, odour and leachate, outdoor stockpiles of materials can also harbour vermin such as rodents and mosquitoes which may lead to the risk of diseases.	<ul style="list-style-type: none"> The topsoil will be managed separately from overburden material and placed in stockpiles for use in reclamation activities. Earth, metal available from construction site excavation works as per design, may be used as fill materials on the cur and cover sections, subject to approval of the engineer The identified disposal sites for the UEC ICB2B construction package are given in the Figure 1-1. Maximum stockpile heights for material management or resource recovery activities shall be in the range of 3–5 metres. The height of stockpiles should generally be lower than surrounding structures. Stockpiles should generally be below fence lines when within five metres of the site boundary. Stockpiling needs to be conducted with materials flow and capacity of the site in mind. That is, the stockpiling of materials must not be a process of continual growth, but needs to be a balanced and systematic approach to materials input, processing, output, storage, reuse or sale and removal offsite, to demonstrate responsible and sustainable management for recycling and reuse. 	<ul style="list-style-type: none"> Site is not established within areas protected under FFPO and FO Water and air quality EPLs from CEA have been obtained and not expired LGA permits are available Construction material storage areas Borrow site reinstatement Approved site rehabilitation plan is available Operation manual is available on site Excessive site noise managed by restricting operating hours Noise & vibration level has been checked periodically Dust control is implemented on 	Resident Engineer of PMDSC for supervision and Contractor will execute PIU- EO to supervise	Once a week during Preconstruction and Construction Period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		 <ul style="list-style-type: none"> • The waste rock material and aggregates can be piled separately and encourage the other developers to reuse such material at a reasonable rate and the earned money to be used on site rehabilitation activities • Storage and stockpiling should be considered as a temporary measure and there must be no stockpiling for speculative purposes; an immediate market should exist for a material being stored for recycling or reuse. An immediate market means that it is an identified and recognised market as demonstrated by the existence of a known customer with a demonstrated and available beneficial use for the material. • Materials must be stored away from surface water- 	<p>dump, excavation or topsoil stockpile site</p> <ul style="list-style-type: none"> • Slopes are stable and no possibilities of eroding / land-slides • Sediment laden run-off from excavation or dumping sites does not enter natural water courses • No water ways/ bodies blocked • Water logging is not evident in the site • No soil/water contamination from oil/fuel/leachate /debris etc. • No damage to important flora/fauna or habitats • No human - wildlife conflicts • No spreading of invasive species promoted • No unnecessary or improper interference has been done to the convenience of public, access, occupation of public, private road, or foot 		

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>courses, flood zones and groundwater recharge areas to prevent environmental harm to water.</p> <ul style="list-style-type: none"> • Ensure appropriate separation distances to assist in the minimisation of the potential for adverse impacts such as odour, dust, noise and other impacts on amenity. • Controls such as barriers, covering, minimised storage timeframes and generally good housekeeping should be implemented to help mitigate potential impacts from vermin • Depending on the size and composition of the stockpile, there should be sufficient spacing between stockpiles to allow access in case of emergency and to help prevent the spread of fire. This spacing should at least be equal to the height of the stockpile or adequate for emergency vehicle access, whichever is the greater. • The Contractor shall comply with the environmental requirements/guidelines issued by the CEA and the respective local authorities in respect of locating borrow areas and with regard to all operations related to excavation and transportation of earth from such sites. • No disposal-sites be used (currently approved) or newly established within areas protected under FFPO and FO • All borrow pits/disposal areas should be rehabilitated at the end of their use by the Contractor in accordance with the requirements/guidelines issued by the CEA and the respective local authority. 	<p>paths</p> <ul style="list-style-type: none"> • No materials have been stacked or placed to cause danger or inconvenience to any person or the public • Tires of vehicles are free of mud and entrained material before entering public roads • Public roads are cleaned of any material dropped during transit • Haulage routes and the vehicle fleet schedules are strictly followed to ensure no traffic congestions 		
19. Information Disclosure among Stakeholders	<p>a. Social unrest</p> <p>b. Disturbances to the livelihood</p>	<ul style="list-style-type: none"> • Discussions should be conducted with the residents who reside around the immediate vicinity of the construction site; provide them with information on the project activities muster their views for possible 	<ul style="list-style-type: none"> • People informed about the project activities prior to 	EO & Social & Resettlement Officer of PIU	Every 2 weeks

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>impact mitigation as this will also ensure a good rapport and less complains. This should be done immediately once the Contractor is mobilized.</p> <ul style="list-style-type: none"> The Community organizations and religious chiefs to be addressed and discuss the expectations and project interventions, and arrange the method of communication during the project activities where necessary The Contractor will maintain a log of any grievances/complaints and actions taken to resolve them. (Types of complaints, numbers of complaints, how complaints were resolved, numbers unresolved, those sent to next level of GRM, satisfactory outcome etc.) A copy of the approved EIA report, the CEA Approval and any other approval issued by Government Authority and the EMP should be available at all times at the project supervision office on site. 	<p>the Contractor mobilization</p> <ul style="list-style-type: none"> People are notified on inconveniences, road closure, stopping water issue in the canals, drinking water supply, electricity breaks, etc., Meeting with community members on construction activities, environmental impacts and mitigation measures held Grievance Log maintained Complains observed during the last visit addressed 	<p>Resident Engineer of PMDSC for supervision</p> <p>Contractor will execute</p>	
20. Health & Safety related to all construction activities	a. Public and Worker Safety	<ul style="list-style-type: none"> The construction site should be barricaded at all time in a day with adequate marking, safety tape, flags, reflectors etc. for safety of individuals using the site daily basis. (Items such as parking cones, lights, tubular markers, orange and white strips and barricades of a luminous nature for night visibility shall be procured where deemed necessary) At all times, the Contractor shall provide safe and convenient passage for vehicles, pedestrians and 	<ul style="list-style-type: none"> Warning signs and exclusion barriers erected around work site areas Workers are provided with and are using the uniform, applicable safety / 	Contractor will execute and EO of PIU with the supervision engineers will monitor under the supervision of RE	Every 2 weeks during the Construction period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>livestock. Work that affects the use of existing accesses shall not be undertaken without providing adequate provisions to the prior satisfaction of the Engineer.</p> <ul style="list-style-type: none"> a) Alternative accesses to be arranged; b) Nearby pedestrian access be arranged (across canals in the case of bridge reconstruction); c) Adequate signage for detours is provided. <ul style="list-style-type: none"> • The construction site should be clearly demarcated by the above means and restriction of access to public to the site will help the safety of public. • Safety signboards should be displayed at all necessary locations. • The Contractor should obtain a Third party insurance to compensate any damages, injuries caused to the public or labourers during the construction period. • All construction vehicles should be operated by experienced and trained operators under supervision. • Basic on-site safety training should be conducted for all labourers during the EMP training prior to the start of the construction activities. • All digging and installation work should be completed in one go, if this task is not accomplished in the area should be isolated using luminous safety tape and barricading structures surrounding the 	<p>protection equipment for site conditions</p> <ul style="list-style-type: none"> • Worker's health checks implemented • Sanitary-hygienic conditions for workers are provided: drinking and washing water supply, mealtime utilities, toilets, rest time, resting areas etc. • First aid kit is available on-site and is accessible to all workers • Fire extinguisher available • Security/emergency alarms/ lighting etc. are in place • Copy of ERP and emergency contact list are available, updated and posted in a visible place at all work sites 		

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<p>whole area.</p> <ul style="list-style-type: none"> • Trenches should be progressively rehabilitated once work is completed. • Material loading and unloading should be done in an area, well away from traffic and barricaded • Construction wastes should be removed within 24 hours from the site to ensure public safety. • The procedural and infrastructural arrangements shall be in place to ensure the compliance with the Labor Law of Sri Lanka (Factories Ordinance Act No. 45 of 1942) and the Core Labor Standards 2006 (ADB & ILO) and as otherwise required by the Program Health and Safety manual (and updated documents) prepared by the PMDSC • Health and safety manual to be referred followed by the training conducted by the Health and Safety Specialist of PMDSC 	<ul style="list-style-type: none"> • Accident report maintained • Damage of utilities and/or other structures managed • Program' H&S Manual and its updates • Maintained Risk Register 		
	b. Safety Gear for Labour	<ul style="list-style-type: none"> • Protective footwear and protective goggles should be provided to all workers employed in mixing of materials like cement, concrete etc. • Welder's protective eye-shields shall be provided to workers who are engaged in welding works. • Earplugs shall be provided to workers exposed to loud noise, and workers working on crushing, compacting, or concrete mixing operation. 			

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> The Contractor shall supply all necessary safety appliances such as safety goggles, helmets, safety belts, ear plugs, mask etc. to workers and staffs. In addition, the Contractor shall maintain in stock at the site office, gloves, ear muffs, goggles, dust masks, safety harness and any other equipment considered necessary. Safety gear should be worn for specific potential risks of a specified activity in which the worker is engaging. A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored on a monthly basis and recorded 			
	c. Prevention of accidents	<ul style="list-style-type: none"> Prevention of accidents involving human beings, animals or vehicles falling or accidents due to open trenches/manholes during the construction period. This needs to be ensured with proper barricading, signage boards and lighting etc. A readily available first aid unit, including an adequate supply of sterilized dressing materials and appliances should be available at the site office at all times Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital should also be insured. 			

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> • Safety protocols/ arrangements for working; (i) over heights, (ii) near or over water, (iii) during night time/ under poor lighting and (iv) in confined spaces etc. • Site emergency response protocol including evacuation plan shall be available and displayed at key locations in the site. The evacuation route and assembly points shall be duly marked with sign boards and mock drill shall be undertaken in a defined time intervals. • A brief/ detailed site safety orientation (induction) shall be given to any new comer to the site by the Contractor's safety staff. • A qualified and experienced safety staff shall be available to ensure site safety compliance. • any person entering to the active work site shall wear necessary safety gears and follow the safety protocols • Names and contact information for emergency services such as Ambulance services, hospitals, police and the fire brigade should be prepared as a sign board and displayed at the work site. 			
21. Transport and Storage of construction materials and ma-	a. Spreading dust and impact due to hazardous material	<ul style="list-style-type: none"> • All material should be transported in fully covered trucks. Overloading of vehicles with materials should be controlled and done in a manner to suit the truck capacity and tailgates of the trucks should be closed. 	<ul style="list-style-type: none"> • Required licence and approval in compliance with CEA regulations • Emission from machineries has been 	EO of PIU will monitor with the assistance of supervision Engineers Contractor will execute under the self	Every 2 weeks during the Construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
chinery operation		<ul style="list-style-type: none"> Construction material such as cement, sand and metal should be stored in closed structures or in a contained manner. Material haulage routes and stockpiling areas to be well defined with the prior approval of the respective authorities and the engineer, and all the measures to be followed by the suppliers to avoid any environmental issues (dust, noise, nuisance to public, traffic etc.) 	<p>controlled</p> <ul style="list-style-type: none"> All the machineries have been fitted with proper exhaust silencers Exhaust silencers have been checked periodically Tires of vehicles are free of mud and entrained material before entering public roads Public roads are cleaned of any material dropped during transit Haul trucks use tarpaulins to cover loads for transportation on public roads Haul truck tailgates and sides fit properly and do not allow material to fall on public roads Haulage routes and the vehicle fleet schedules are 	monitoring of EO of the Contractor	



Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
			strictly followed to ensure no traffic congestions		
	a. Pollution of Soil and Water via Fuel and Lubricants	<ul style="list-style-type: none"> The Contractor shall ensure that all construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites shall be located away from rivers, at least 200m away, and irrigation canal/ponds. The Contractor shall ensure that all vehicles/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. The Contractor shall arrange for collection, storing and disposal of oily wastes to the pre-identified disposal sites (list to be submitted to the Engineer) and approved by the Engineer. Oil spills and collected petroleum products will be disposed of in accordance with standards set by the CEA/MEMD. The engineer will certify that all arrangements comply with the guidelines of CEA/MEMD or any other relevant laws. 	<ul style="list-style-type: none"> Hazardous material are transported/ stored and handled as per the safety data sheet All the locations are well identified and demarcated for vehicle parking, fuel / lubricants storage, vehicle, machinery and equipment maintenance and refuelling etc Above sites are located away from rivers/ water ways, at least 200m away Visual observations of waste remains left onto the soil surface (oil spills, grease patches, any other chemical spillage etc.) 	<p>Supervision Engineers under RE will monitor</p> <p>EO of PIU will periodically monitor Contractor will execute under the self monitoring of EO of the Contractor</p> <p>Periodical water quality monitoring through qualified 3rd party consultant</p>	<p>Ever 2 weeks during the Construction phase</p> <p>Water quality monitoring every 3 months</p>

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
			<ul style="list-style-type: none"> • Vehicles and machinery are up to the standard operation conditions (standard emission conditions, no oil/grease leak etc.) 		
22. Clearing of site removal and disposal of construction debris and excavated materials	a. Environmental Pollution b. Nuisance to the public	<ul style="list-style-type: none"> • During site clearance activities, removal of vegetation and debris must be carried out swiftly and in well-planned manner. • The Contractor shall identify the sites for disposal of material cleared. • Plants, shrubs and other vegetation cleared should not be burned on site. • Spoil and other disposal materials should only be dumped at sites for which prior approval from relevant authorities such as the Local Authority has been obtained. Taking into account the following • The dumping does not impact natural drainage courses • No endangered / rare flora are impacted by such dumping • Should be located in non-residential areas located on the downwind side • Located at least 100m from the designated forest land. 	<ul style="list-style-type: none"> • The work site and the surrounding area kept clean free from debris, garbage, etc. • Sign boards in place to direct / notify about waste / spoil disposal location and mechanism within and around the work site • EPL for waste water treatment facilities and waste disposal sites are obtained and up-to-date • Drainage paths not blocked • Construction wastes are removed within 	Supervision Engineers under RE will monitor EO of PIU will periodically monitor Contractor will execute under the self-monitoring of EO of the Contractor	Every 2 weeks during the Pre-Construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> • Avoid disposal on productive land. • Should be located with the consensus of the local community, in consultation with the Local Authority and the relevant Road Development Authority • Minimize the construction debris by balancing the cut and fill requirements. • The Contractor should avoid any spillage of spoil when transporting such materials to the approved material dumping sites. • Hazardous waste shall be disposed of as per the Schedule VIII of Part 11 of the National Environmental (Protection & Quality) Regulation No.1 of 2008, as amended by the gazette notification No. 1534/18 dated 01.02.2008 on the generator of scheduled waste 	<ul style="list-style-type: none"> • 24 hours from the site • Hazardous material are transported/ stored and handled as per the safety data sheet • Waste disposal sites are located away from rivers/ water ways, at least 200 m away and 100 m away from the forest lands 		
23. Activities related to significant noise and vibration	a. Noise from vehicles, machinery and equipment	<ul style="list-style-type: none"> • Noise generating work should be limited to day time (6:00AM to 6:00PM). No work that generates excessive noise should be carried out during the night hours where in close proximity (from 6:00PM to 6:00AM on the following day). • All equipment and machinery should be operated at noise levels that do not exceed the permissible level of 75 dB (during construction) for the daytime. For all construction activities undertaken during the night time, it is necessary to maintain the noise level at below 50 dB as per the Central Environmental Authority (CEA) noise control regulations 	<ul style="list-style-type: none"> • Construction equipment - estimated noise emissions and operating schedules • Allowable noise levels in the boundary of construction sites are kept below 75 dB in day time. • Operation hours 	<p>Supervision Engineers under RE will monitor</p> <p>EO of PIU will periodically monitor</p> <p>Contractor will execute under the self-monitoring of EO of the Contractor</p> <p>Periodical Noise & Vibration monitoring</p>	<p>Every 2 weeks during the Construction phase</p> <p>Noise & Vibration quarterly year concerning the construction activity schedule</p>

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> All equipment should be in good serviced condition. Regular maintenance of all construction vehicles and machinery to meet noise control regulations stipulated by the CEA in 1996 (Gazette Extra Ordinary, No.924/12) must be conducted for vehicles/machinery that will be used in construction on the site and for transport. Ideally noise generating work should not be carried out during public holidays and religious days. Special care should be taken as there is a temple nearby. Labour gangs should be warned to work with minimum noise. Strict labour supervision should be undertaken in this respect. Number of night time resident labourers should be minimized. 	<ul style="list-style-type: none"> Allowable vibration limits as per the CEA interim standards (2008) Stationary construction equipment are kept at least 500 m away from sensitive receptors (temporary, schools, public places etc.) Idling of temporary trucks or other equipment are not permitted during periods of loading / unloading or when they are not in active use 	through qualified 3rd party consultant through an accredited laboratory	
	b. Vehicular noise pollution at residential / sensitive receptors	<ul style="list-style-type: none"> Idling of temporary trucks or other equipment should not be permitted during periods of loading / unloading or when they are not in active use. The practice must be ensured, especially near residential / commercial / sensitive areas. Stationary construction equipment will be kept at least 500 m away from sensitive receptors, where possible. These include places of worship and households. All possible and practical measures to control noise emissions during drilling shall be employed. 	<ul style="list-style-type: none"> The vehicles/ machineries used by the Contractor (specially the high noise & vibration generating) is as per the list approved by the RE and no additional are used 	<p>Supervision Engineers under RE will monitor</p> <p>EO of PIU will periodically monitor</p> <p>Contractor will execute under the self-monitoring of EO of the Contractor</p>	Every 2 weeks during the Construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		<ul style="list-style-type: none"> Contractor shall submit the list of high noise/vibration generating machinery & equipment to the engineer for approval. Servicing of all construction vehicles and machinery must be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced. Maintenance of vehicles, equipment and machinery shall be regular and up to the satisfaction of the Engineer to keep noise levels at the minimum. 			
24. Activities related to the emission of dust	a. Impact of dust	<ul style="list-style-type: none"> Ambient air quality and emission levels to be maintained as per the World Bank EHS guidelines (2007) as these standards are more stringent than the GoSL standards, gazetted under NEA. All construction materials such as sand, metal, lime, bricks etc. Should be transported under cover to the site and stored under cover at the site. Plastic sheeting (of about 6 mm minimum thickness) can be used and held in place with weights, such as old tires or cinder blocks, with the edges of the sheeting buried, or by the use of other anchoring systems. This will minimize the levels of airborne dust. Mud patches caused by material transporting vehicles on the access road should be immediately cleaned 	<ul style="list-style-type: none"> Construction area is barricaded properly to avoid spreading dust/emissions etc. Trucks are operating using covers Material stored under cover using proper anchoring systems Tires of trucks / machineries are cleaned before entering city roads 	<p>Supervision Engineers under RE will monitor</p> <p>EO of PIU will periodically monitor</p> <p>Contractor will execute under the self-monitoring of EO of the Contractor</p> <p>Periodical Ambient Air quality monitoring through qualified 3rd party consultant assigned to accredited laboratory</p>	Every 2 weeks during the Construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		 <ul style="list-style-type: none"> Continual water sprinkling should be carried out in the work and fill areas and the access road if dust stir is observed. Water sprinkling should be done more frequently on the days that are dry and windy (at least four time's day) as the levels of dust can be elevated during dry periods.  <ul style="list-style-type: none"> Dust masks should be provided to the labourers for the use at required times. 	<ul style="list-style-type: none"> Regular watering of access roads and the construction site Turfing of finished earthen structures Dust masks are provided for the workers and using at the required time Ambient air quality including dust levels monitored through an accredited laboratory during this week 		

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
25. Activities related to the hindrance of surface runoff and soil erosion	a. Impact of hindrance to surface runoff, soil erosion and sedimentation	<ul style="list-style-type: none"> • The debris material shall be disposed in such a manner that the tank, canals and other existing drainage paths are not blocked. • Drainage paths associated with the dam and other irrigation structures should be improved / erected to drain rain water properly. • Silt traps will be constructed to avoid siltation into the waterways, the tank and canals, where necessary. • To avoid siltation, drainage paths should not be directed to the tank and irrigation canals and they should be separated from these water bodies • Bund Embankment slopes, slopes of cuts, etc. Shall not be unduly exposed to erosive forces. These exposed slopes shall be graded and covered by grass or other suitable materials per the specifications. • All fills, back fills and slopes should be compacted immediately to reach the specified degree of compaction and establishment of proper mulch. • Work that leads to heavy erosion shall be avoided during the raining season. If such activities need to be continued during rainy season prior approval must be obtained from the Engineer by submitting a proposal on actions that will be undertaken by the Contractor to prevent erosion. • The work, permanent or temporary shall consist of measures as per design or as directed by the engineer 	<ul style="list-style-type: none"> • Drains not blocked by sediment or other debris • No flood due to construction work • Silt traps in places • No slope failures and cuts made according to technical standards specified in the design • Earth work is done during the dry spell • Turfing of completed embankments/ slopes • Grievance log for any public complaints related to erosion/slope failures etc. • Visual observation of any turbidity of downstream water ways and erosion, slope failures, depo- 	<p>Supervision Engineers under RE will monitor</p> <p>EO of PIU will periodically monitor</p> <p>Contractor will execute under the self-monitoring of EO of the Contractor</p>	Every 2 weeks during the Construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Institutional Responsibility	Implementation Schedule
		to control soil erosion, sedimentation and water pollution to the satisfaction of the engineer. Typical measures include the use of berms, dikes sediment basins, fiber mats, mulches, grasses, slope drains and other devices. All sedimentation and pollution control works and maintenance thereof are deemed, as incidental to the earthwork or other items of work and no separate payment will be made for their implementation.	<p>sition of soil/sediment in the agriculture lands</p> <ul style="list-style-type: none"> • Earth material & debris of the excavated material is properly placed / disposed/ reuse for back filling • Surface water quality measurements of the adjacent water ways as per the baseline conditions set at least 6 months prior to the contract mobilization 		

Table 3-2: Environmental Monitoring Plan (EMoP)

	Mitigation Activities and Method of monitoring environmental Changes	Location / timing of sampling	Parameters to be monitored	Frequency of monitoring	Responsibility
Construction Phase					
	Establishment and maintenance of Contractor's facilities	Labour camps Storage / stock piling areas Disposal sites Borrow areas	<ul style="list-style-type: none"> • Site is not established within areas protected under FFPO and FO • Site Management Plan for the camp available and Camp is installed strictly in accordance with Safety Management Plan • Labour camps with proper facilities such as enough spaces, ventilation, beds, mosquito nets, lavatories, bathing facilities, drinking water are available • Waste water collection and treatment is implemented properly • The sewage system for the camp is planned and implemented with concurrence from the Local Public Health Officer (PHI) • Camp is kept clean from debris, garbage, etc. Waste is collected and disposed of in approved sites • Required approval are granted • Approved site rehabilitation plan is available 	Weekly	Self monitoring by EO of the Contractor Environmental Officer of PIU
2.	Surface Run-off, soil erosion, slope failures from hill slopes	Project area	Soil erosion from cleared ground sections along anicut axis and LB canal trace Disposal of excavated unusable soil materials, dredged material and construction wastes	Every 2 weeks	Engineering supervisors and PIU Environmental Officer

	Mitigation Activities and Method of monitoring environmental Changes	Location / timing of sampling	Parameters to be monitored	Frequency of monitoring	Responsibility
			Soil erosion from excavated soil materials along canal traces		
			Placement of soil stockpiles and other erodible construction material		
			Silt traps in places		
			Turfing of completed embankments/ slopes		
3.	Water quality, Ambient air Quality, Noise and vibrations, sediment	Along the existing canal at the identified locations for the baseline data collection During construction period and first 3 years of the operational phase	a) Surface Water Quality Temperature (oC), pH, Electrical Conductivity (μs/cm), DO (mg/l), BOD (mg/l), COD (mg O ₂ /L), TDS (mg/l), TSS (mg/l), Turbidity (NTU), Total coliform, Oil & Grease b) Ambient Air Quality Particulate Matter (PM ₁₀ , PM _{2.5}), SO ₂ , NO ₂ , CO c) Existing Noise Levels 24 hrs measurements and 3 hr measurements (2 hr Day and 1 Hr night) d) Existing Vibration level 1 hr measurements e) Sediment sampling	Quarterly intervals for the routing monitoring during the construction phase Quarterly intervals for the routing monitoring during the construction phase selecting appropriate construction activity which produce significant noise & vibration (i.e. blasting activities) Quarterly intervals for the routing monitoring	Independent accredited laboratory contracted through the PMDSC under the approval of PMU Resident Engineer will facilitate and Environmental Specialist of PMDSC will supervise

	Mitigation Activities and Method of monitoring environmental Changes	Location / timing of sampling	Parameters to be monitored	Frequency of monitoring	Responsibility
			surface and bottom suspended sediment concentrations	during the construction phase	
		Correcting any environmental issue (i.e. oil spill, sedimentation, high noise & vibration, upon any complain of non-compliance etc.)		As and when required	Self-monitoring by EO of the Contractor
4.	Nuisance to general public	Along the canal trace	Traffic reports Road surface of routes used to transport material Grievance log maintenance	Every 2 weeks	GRC , Environmental Officer, Social and Re-settlement Officer of PIU
5.	Ground water monitoring wells establishment and periodical monitoring	In and around the Tunnels – 5 locations	Ground water levels	Every 2 weeks during the tunnelling period	Self-monitoring by EO of the Contractor RE/PIU GRC , Environmental Officer, Social and Re-settlement Officer of PIU
6.	Proper disposal of solid, liquid and construction waste	KMTC route	Waste management plan in place and implementation Approval for the identified waste dumping sites Public complaints / Grievance Log maintenance Visual inspection Visual inspection of camp sites, project offices and construction sites	Every 2 weeks	GRC , Environmental Officer, Social and Re-settlement Officer of PIU

	Mitigation Activities and Method of monitoring environmental Changes	Location / timing of sampling	Parameters to be monitored	Frequency of monitoring	Responsibility
			Interviews with local authorities for compliance		
7.	Introduction of weeds and Alien invasive species	Construction material storage areas, vehicle wash down areas, vegetation and weed removal during preconstruction stage	<p>Monthly inspection of soil storage areas, wash down areas, vehicle parking areas and disposal sites for the presence of weeds or alien invasive species by an experienced / knowledgeable Environmental officer with</p> <p>Community awareness about the invasive species spreading, causes, prevention etc.</p> <p>Removal techniques, minimizing habitat degradation and standard disposal practices</p>	Every 4 weeks during the construction period	Environmental officer of PIU
Operation Phase					
1.	Threats to habitats and species in terrestrial protected areas including forest resources by project presence	KMTC route, disposal areas	<p>Incidence and distribution of location of encroachments into protected areas of the DWC and FD; Changes in forest quality of protected area regions adjacent to canal path;</p> <p>Number and locations of poaching, illegal removal of timber trees, medicinal plants; soil gravel and mineral resources, removal of threatened, rare and endemic species of plants and animals by local offices of DWC, FD,GN, DS, local law enforcement authorities; incidence and distribution of locations of gem mining in PA areas crossed by canal path; effectiveness of EMP in protecting habitats and species of protected areas</p>	Once in 3 months	PMU
2.	Threats to riparian and riverine habitats due to project presence	Lel Oya, Kambarawa Oya	Degradation and fragmentation of riverine and riparian habitats at outlet area of KMTC outlet to Moragahakanda (along Kambarawa Oya for 1 km	Once in 3 months	PMU

	Mitigation Activities and Method of monitoring environmental Changes	Location / timing of sampling	Parameters to be monitored	Frequency of monitoring	Responsibility
			on either side of outlet portal; quality and species diversity of riparian habitat at Lel Oya aqueduct;		
3.	Reinstatement of borrow areas, temporary material storage areas and Areas used for labour camps and offices	All Borrow Areas, material storage areas, sites where temporary labour camps and offices were located, areas used for parking construction related vehicles and wash down areas for vehicles	Visual inspection to determine whether these areas have been properly rehabilitated Identify whether sites have been invaded by weeds or alien invasive plant species	Daily, during the end of Construction period prior to handover the site	Resident Engineer, Environmental officer of PIU, Environmental specialist of PMU/PMDSC
4.	Surface Water quality of the LB canal	Sites identified for the baseline data collection and construction phase monitoring	Temperature (oC), pH, Electrical Conductivity ($\mu\text{s}/\text{cm}$), DO (mg/l), BOD (mg/l), COD (mg O ₂ /L), TDS (mg/l), TSS (mg/l), Turbidity (NTU), E-coli, Oil & Grease	Every quarter for three years	PMU
5.	Sediment sampling		Surface and bottom suspended sediment concentrations	End of the cultivation season	PMU

4 PROCEDURES FOR DEALING WITH CHANCE FINDS

68. Chance found Flora and Fauna;

- (i) Under the terms of the construction contract the Contractor is required to take reasonable precautions to prevent workmen or any other persons from removing and/or damaging any flora (plants/vegetation) or fauna (animals), including any unlicensed fishing in any water body or unlicensed hunting/trapping/collecting of any animal
- (ii) If any wild animals – particularly elephants – are found near the construction site at any point of time, the Contractor is required to immediately upon discovery thereof notify the Engineer and carry out any instructions given by the Engineer for dealing with the same
- (iii) The Engineer will report to the nearby office of the Forest Department and/or the local range or divisional office of the Department of Wildlife Conservation, and will take appropriate steps/measures in consultation with the respective officials, if required

69. Chance Found Archaeological Property;

- (i) All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation
- (ii) Under the terms of the construction contract the Contractor will take reasonable precautions to prevent his workmen or any other persons from removing or damaging any such article or thing. Immediately upon discovery thereof he will notify the Engineer, following which the Contractor will await further instructions from the Engineer for dealing with the find, during which time all work that might affect the find will be stopped
- (iii) Where appropriate, the Engineer will seek direction from the Archaeological Department of Sri Lanka and inform the PIU environmental officer to follow the Chance Find Procedures

5 DESCRIPTION OF PLANNED ENVIRONMENTAL MONITORING

70. The mitigation measures proposed in the working draft of the EMP will be carried out by the responsible agencies. **Table 3-2** presents the monitoring parameters, frequency and responsible agency for measuring ambient environment quality of different media like air, water, vibration etc.

71. The baseline conditions of existing water quality, air quality and noise levels have been established before commencement of the construction, through an accredited, CEA approved laboratory as a third party consultancy appointed with the approval of PMU. The National standards related to the key parameters are shown in **Table 5-1**:

Table 5-1: National Standards related to Key Parameters for Air and Water Quality and Noise Levels

Environmental Protection License (EPL)	National Environmental Act, No. 47 of 1980 as amended by Act, Nos. 56 of 1988 and 53 of 2000. I,
Tolerance limits for waste discharge	National Environmental (Protection and Quality) Regulations, No. 1 of 2008
Prohibition of Polythene or any polythene product of 20 micron or below in thickness	Order published under the Gazette Notification No.1466/5 dated 10.10.2006
License for discharge, emission or disposal of waste/scheduled waste management	Regulations published under the Gazette Notification No. 1534/18 dated 01.02.2008
Municipal Solid Waste	Order published under the Gazette Notification No. 1627/19 dated 10.11.2009
Air emission, fuel & vehicle importation standards	Regulations published under the Gazette Notification No. 1295/11 dated 30.06.2003
Prohibition of Ozone depleting substances	Order published under the Gazette Notification No. 1309/20 dated 10.10.2003
List of vehicle exhaust emission standards	Order published under the Gazette Notification No. 1557/14 dated 09.07.2008
Permissible Ambient Air Quality Standards in relation to class of Air Pollutants	Regulations published under the Gazette Notification No. 1562/22 dated 15.08.2008
Air emission, fuel & vehicle Importation standards	Amended Regulations published under the Gazette Notification No. 1887/20 dated 05.11.2014 with the corrected Gazette Notification No. 1895/43 dated 02.01.2015
Noise Standards	Order published under the Gazette Notification No. 924/12 dated 23.05.1996

	& Order published under the Gazette Notification No. 1738/37 dated 29.12.2011
Vibration standards	CEA interim standards (2008)
Hazardous waste disposal	Schedule VIII of Part 11 of the National Environmental (Protection & Quality) Regulation No. 1 of 2008, as amended by the gazette notification No. 1534/18 dated 01.02.2008 for the Scheduled Waste generation and disposal

72. As of ADB's SPS (2009), standards related to pollution control and emission need to be met with Environmental Health and Safety (EHS) guidelines for Air Emissions and Ambient Air Quality (2007)³ and WHO drinking water quality and effluent standards.

³ www.ifc.org/ehsguidelines

6 PROCEDURES FOR SITE REHABILITATION

73. Under the terms of the construction Contract the Contractor is responsible for reinstating ('re-storing') areas used for construction purposes to their initial state, whether the initial state was agricultural land or not, and the procedures to be followed are summarized in **Table 6-1**. It is required that the Contractor provides details on the following activities in the CEMP:

Table 6-1: Procedures Relating to Reinstatement

Clearing/Closure of Construction Sites/Labour Camps	<ul style="list-style-type: none"> • A general site restoration plan should be prepared by the Contractor for the approval of the Engineer, indicating the methods of reinstatement appropriate for each area (including storage yards, borrow areas and quarries), the sequencing of the different areas of the site and the schedule details. The approved plan is to be implemented by the Contractor prior to demobilization from the site. • On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expenses, to the entire satisfaction of the Engineer.
Environmental Enhancement / Landscaping	<ul style="list-style-type: none"> • Where landscape plantation, including grassing of canal banks and edge treatment of water bodies, is specified or called for in the construction contract, this shall be executed in compliance with either the detailed design or approved typical design guidelines. • The Contractor also shall remove all debris, piles of unwanted earth, spoil material etc. from all workplaces and disposed of at locations designated or acceptable to the Engineer.

7 REFORESTATION

74. Reforestation is considered as an extra mitigation measure to be carried out in 1:3 ratio to compensate the tree felling associated with the project activities and that will be separately instructed in accordance with specifications provided by the Resident Engineer (after approval by the CEA and relevant stakeholder agency, Forest or Wildlife department) to be carried out by the Contractor (or by means of nominated sub-contractor). A Provisional Sum has been included in the Bill of Quantities (BOQ) to cover the associated costs.

8 REPORTING & REVIEW

75. Monitoring of impacts requires a proper documentation and reporting system and a computerized database for the individual issues, including preconstruction, construction and post construction (operation and maintenance) monitoring results. The database related to each construction contract will be established and maintained at the site during the construction period and regularly copied to the PMU/PIU system, to which the PMDSC also has access for overall monitoring of the impacts.

76. The Contractor's monthly progress reports will contain a specific section reporting on environmental issues, including the results of any testing and verification conducted by the Contractor during the month. These reports are to be submitted to the Engineer and to the PMU. The monitoring performed by the PIU Environmental Officer, together with the Engineer's assigned site staff, will also be reported to the respective PIU Project Director. This report will include any information arising from the Contractor's monthly report, and the PMDSC Environmental Specialist will be involved in the review process. The PD/PIU will then forward the report to CEA and ADB. The reporting format will correspond to the monitoring program as presented elsewhere in this report.

9 CONTRACTOR'S COSTS

77. The Contractor's costs of establishing the temporary site camps and facilities, including all utilities and general systems needed during the construction period, are covered under a number of specific payment items in Bill No.1 (Preliminaries) of the Bill of Quantities of the respective Contract. If it is envisaged that the Contractor should carry out specific repair and maintenance work to existing roads over and above his normal responsibility to prevent damage deterioration, this may be covered by a dedicated payment item to be instructed by the Engineer. A dedicated payment item for clearance and restoration of the site provides a degree of specific leverage for the Engineer to ensure this is done properly.

78. Where it is envisaged that specific additional environmental mitigation measures will be required, which are not the direct responsibility of the Contractor, such as reforestation of areas not affected by construction activities, a dedicated Provisional Sum or other type of payment item would also be provided.

79. In general, however, the management of relevant environmental obligations is an intrinsic element of the Contractor's working method for each type of construction work, and therefore the costs associated with specific activities or measures would be embedded in the respective payment items for the actual work.

ANNEX A : CEA APPROVAL WITH CONDITIONS



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மகாவலி நீர்ப் பாதுகாப்புக்கான முதலீட்டுத் திட்டம்
Mahaweli Water Security Investment Program

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மகாவலி அபிவிருத்தி மற்றும் சுற்றுடல் அமைச்சு
Ministry of Mahaweli Development & Environment

වැඩසටහන් කළමනාකරණ ඒකකය
திட்ட முகாமைத்துவப் பணிமுறை
Program Management Unit



නො. 493 1/1, ටී. ඩී. ජයා මාවත, කොළඹ 10.

இல. 493 1/1, டி. பி. ஜெயா மாவத்தை கொழும்பு 10.

No. 493 1/1, T. B. Jayah Mawatha, Colombo 10.

Program Director: 0112 675811 Consultant: 0112 65810 General Office: 0112 675810 Office Fax: 0112 675810 @ - pdadbproject@gmail.com

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திகதி } 01.04.2016
Date }

Team Leader
PMDSC

Sub: Proposed Upper Elahera Canal from Mannakkatiya Tank to Mahakanadarawa Tank and Kalu Ganga – Moragahakanda Link Canal Project

The Central Environmental Authority CEA has granted approval for the implementation of the above mentioned project by their letter no 08/EIA/Water/04/2012 dated 31.03.2016.

A copy of the environmental approval letter of the above mentioned project is sent herewith for your information and necessary action.

Eng. N. A. Sisira Kumara
Program Director (MWSIP)
Ministry of Mahaweli Development and Environment

- Cc: 1. Mr. Lance Gore, ADB - f. i. pls.
2. Project Director (UEC) - A copy of the environmental approval letter of the UEC Project is sent herewith for your information and necessary action pls.
3. Environmental Specialist, MWSIP - --do--
4. Resettlement Specialist, MWSIP - --do--

MWSIP - PMDSC	
493, T.B. Jayah Mawatha, Colombo 10	
Registered Incoming By:	ASR
Seen:	Team Leader D. Team Leader
Date:	01 APR 2016
Action By:	SP, PLWCD, MJB, APK
Copies to:	
Primary File Location:	7023
Copy to Files:	11.1, 26.6

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Your Ref.

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දිනය
திகதி
Date

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மத்திய சுற்றுடல் அதிகாரசபை

Central Environmental Authority

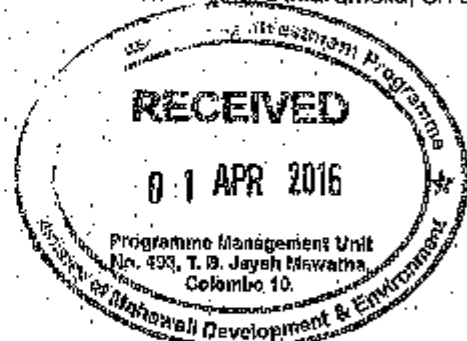


08/EJA/Water/04/2012

31 March 2016

"පරිසර සියලු" 104, පෙරේරා පොලීසියකරුවා මාවත, වත්තරමුල්ල, පි. ලංකාව.
"பரிசுர பியச" 104, செஞ்சில செம்புடேகடுவ மாவத்தை, பத்தா(முல்லை), இலங்கை.
"Parisara Piyasa", 104, Denzil Kobbekaduwa Mawatha, Battaramulla, Sri Lanka.
Web : www.cea.lk

Director General
Mahaweli Authority of Sri Lanka
No. 500, T.B. Jayah Mawatha
Colombo 10.



MODIFICATION TO CONFIGURATION OF MORAGAHAKANDA - KALU GANGA PROJECTS PROPOSED UPPER ELAHERA CANAL, CANAL FROM MANNAKKATTIYA TANK TO MAHAKANADARAWA TANK AND KALU GANGA-MORAGAHAKANDA LINK CANAL PROJECT

This is to inform you that the Central Environmental Authority (CEA), after study of the Environmental Impact Assessment Report (EIAR) of the Proposed Modification to Configuration of Moragahakanda - Kalu Ganga Projects dated June 2015, the comments received from the public and your responses to such comments dated January 2016 and additional information submitted on 05.02.2016 as clarifications for the queries raised by the Technical Evaluation Committee appointed by the CEA, has decided, in terms of regulation 13 of the National Environmental (Procedure for approval of projects) Regulations, No. 1 of 1993 to grant approval for the implementation of the above project subject to the following terms and conditions.

1. GENERAL CONDITIONS

- 1.1 This environmental approval is valid for implementation of the Proposed Modification to Configuration of Moragahakanda - Kalu Ganga Projects as described in the EIAR dated June 2015 submitted by the Mahaweli Authority of Sri Lanka (MASL).
- 1.2 This approval is granted on the basis that all information provided by the MASL in the EIAR dated June 2015 and subsequent information dated January 2016 and 05.02.2016 the addendum dated January 2016 are true and accurate.
- 1.3 This approval is valid for a period of 3 years from the date of issue of this letter, unless upon application in writing to this Authority within thirty days prior to the expiry date, the validity period is extended.
- 1.4 The MASL where necessary should obtain fresh approvals in respect of any alterations that would be made to the initial project proposal submitted to CEA as per the EIAR dated June 2015.

Chairman Tel : 2872341, 2877348 Fax : 2872347	Director General Tel : 2872359 Fax : 2872608	Gen. Office Tel : 2872273, 2873447, 2873448 Fax : 2877277-280	Complain Unit : 0713603333, 2888999
Deputy Director Generals Tel : 2865286 Fax : 2877315	Envr. Pollution Control Division Tel : 2873453 Fax : 2872605	Envr. Mgt & Assess. Division Tel : 2872358 Fax : 2872106	Envr. Edu. & Awareness Division Tel : 2872297 Fax : 2872600
Director Tel : 2872301 (Admin), 2877288 (Planning) Fax : 2872601 (Admin), 2863984 (Finance)	2873452 (EPC) 2872606 (Lab) 2882335 (WMO)	2872346 (NRMA), 2876543 (EIA) 2867263 (R&D) Fax : 2872395	2867266 (IEA) Fax : 2872609 Media Unit : 2873449
			2872604 (Legal) (Western Excavators) Tel : 2862631 Fax : 2862293



- 1.5 The MASL is bound to ensure that these terms and conditions are adhered to and have full control over a third party that may be involved in project implementation. The CEA should have access to the contract documents pertaining to environmental aspects, entered into by the MASL and any outside contractors. The conditions in this letter should be included in the contract documents, so that the contractor or sub-contractor is held responsible for carrying them out during construction and on completion of the work.

The MASL would be held responsible for the breach of any such conditions by any contractor or sub-contractor.

- 1.6 The MASL shall intimate to CEA the date of commencement of the project activities/construction activities, inclusive of a phased implementation schedule.
- 1.7 A copy of this approval letter and the EIAR should be kept at the project site at all times for purpose of perusal by concerned agencies.
- 1.8 It is the duty of the MASL to inform the CEA of any adverse environmental impacts which may arise during project implementation which is not anticipated at this stage. In such an event, relevant guidelines and necessary mitigatory measures should be implemented as directed by the CEA. The MASL should ensure that such impacts are properly assessed and addressed even at a later stage of project implementation.
- 1.9 The MASL should co-ordinate closely with planning agencies, relevant Provincial and Local Authorities, Divisional Secretaries and other Government Departments to resolve any conflict with existing and future development plans of the area.
- 1.10 Relevant Local Authorities in the project area should be kept informed regarding the project activities and should have written approval of the same.
- 1.11 Necessary approval of the Department of Wildlife Conservation (DWC)/Forest Department (FD) should be obtained for the release of lands belonging to DWC / FD for the project activities prior to commencement of construction activities. Trees in the project area should be enumerated and removed with the consultation of DWC / FD through the State Timber Corporation.
- 1.12 Costs to be incurred in giving effect to the implementation of the terms and conditions of this letter should be borne by the MASL as project implementation costs.
- 1.13 Any additional conditions stipulated by the CEA as and when required shall be strictly adhered to.



2 ECOLOGICAL ASPECTS

- 2.1 The conditions laid down in the letter no. D3/6/1/1/252-11 dated 16.03.2016 issued by the Director General, DWC should be strictly adhered to, to avoid / mitigate impacts on wildlife in the project area.
- 2.2 A comprehensive Wildlife Management Plan (WMP) together with a monitoring programme should be prepared by the MASL in consultation with the DWC prior to commencing construction activities of the project.

This plan should mainly address the following:

- Identification and declaration of additional area as protected areas to provide connectivity between remaining forest areas for migration of wild animals.
 - Identification and implementation of habitat enrichment programmes
 - Implementation of animal rescue programmes
 - Identification and prediction of Human Elephant Conflict areas and requirement of electric fencing
 - Community based mechanism for maintenance of electric fences
 - Budgetary allocation for implementation of the WMP.
 - Schedule of implementation of the WMP
- 2.3 Open canal section should be designed in such a way that it would facilitate wild animals for obtaining their water requirement and their movement in consultation with the DWC.
 - 2.4 Small tanks within the wildlife reservation should be developed to provide water for wild animals. No illegal cultivation shall be allowed within the Wildlife Reserve using this water.
 - 2.5 Adequate reservation for open canal section should be demarcated and managed properly for avoiding encroachments.
 - 2.6 Reforestation/enrichment planting should be carried out within the above reservation areas in close consultation with the FD using native tree species.
 - 2.7 Reforestation programme should be carried out in any other suitable areas including the catchment of Huruluwewa in close consultation with the FD / DWC using native tree species. Suitable lands for reforestation / regeneration should be identified in consultation with the FD.
 - 2.8 Reforestation / enrichment areas should be clearly marked on a map and submitted to the CEA, FD and DWC together with the replanting schedule.
 - 2.9 Existing protected areas and proposed protected areas should be clearly mapped and submitted to CEA, DWC and FD.
 - 2.10 Wildlife movements should not be disturbed due to the construction of canals within the existing protected areas and wildlife influenced areas.



- 2.11 Proposed canals falling within the protected areas should be covered to avoid any disturbance for wildlife movements.
- 2.12 No new roads or any other permanent structures should be constructed within protected areas without the prior approval of DWC/FD.
- 2.13 Precautions should be taken to reduce construction impacts on existing natural systems such as forest areas, streams and tanks and wild animals within these habitats.
- 2.14 Minimum number of trees should be cut during construction. Trees should be preserved as far as possible along the trace of canal area. Trees may be removed only in cases where it is absolutely essential. The MASL should take required action to remove such trees in consultation with the DWC / FD.
- 2.15 Low noise generating measures should be adopted in carrying out blasting activities within wildlife influenced areas. Necessary guidelines should be obtained from DWC in this regard.

3. HYDROLOGICAL ASPECTS

- 3.1 The MASL should ensure that the riparian rights of the downstream water users will not be affected in allocating water for UEC diversion from Moragahakanda Reservoir.

The MASL shall formulate proper guidelines on allocation of water for different users in consultation with the relevant stakeholders, in order to avoid any conflicts.

- 3.2 The drainage paths or stream crossings should not be disturbed during construction period. Temporary by pass structures should be provided to streams during the construction period.
- 3.3 The UEC should be operated in such a way that the existing natural stream flows are not retained by the level crossings at KogetiyaWewa , BogahaWewa and MadettawaWewa.
- 3.4 Adequate water should be retained at identified level crossings (Kongetiya, Bogahawewa and Medettawa tanks) for use of the wildlife of the area as recommended in section 5.1 of the EIA report in consultation with the DWC.
- 3.5 Necessary measures should be taken to mitigate water pollution due to contaminant leakage from machinery and workers' sites during the construction phase.
- 3.6 Required measures should be taken to prevent leakage of ground water to the tunnel.
- 3.7 Any dewatering of ground water table within the project area including the tunneling section/s should be monitored during construction phase. In the event any dewatering occurs as a result of any project activity, the MASL shall take action to mitigate or compensate the affected parties for any loss in respect of their agricultural productivity in relation to these lands.



- 3.8 Necessary precaution should be taken to avoid illegal tapping of water at open canal section.

4 GEOLOGICAL/LAND STABILITY AND SOIL EROSION ASPECTS

- 4.1 Excavation blasting operations and removal of existing rock / soil should be done in accordance with proper engineering designs. Height and angle of cutting slopes should be designed with proper geological and geotechnical details to avoid ground instability and slope failures.

- 4.2 Earth retaining structures should be applied wherever required to prevent initiation of local failures.

- 4.3 Backfilling of the temporary tunnel portal area should be properly done in accordance with standard methods and proper vegetation cover should be introduced to minimize soil erosion in such areas.

- 4.4 Adequate erosion management measures shall be exercised during construction in order to prevent siltation of surface water bodies at downstream areas, neighboring marsh / paddy lands during construction.

- 4.5 Uprooting the trees should be done with appropriate equipment to minimize the damage to the soil.

- 4.6 Natural water paths and valleys should be kept free from any obstruction through any kind of construction or disposal of soil/rocks etc. All efforts should be made during construction period to avoid adverse impacts on existing drainage system / natural storm paths of the project area. The mitigatory measures indicated in section 5.1.2 of the EIA report should be adhered to.

- 4.7 Exposed areas should be kept suitably protected to prevent erosion or emission of dusts during dry periods.

- 4.8 Earth work should be carried out during low rainfall season to minimize soil erosion.

5 DISPOSAL OF EXCAVATED MATERIAL

- 5.1 Excavated materials as far as possible should be used in construction of road works and other construction sites which are associated with the project. Care must be taken by the way of adequate safeguards been put in place to prevent erosion and washing away of any of this material into water ways.

- 5.2 Tunnel muck and excess soil should be properly disposed to suitable dumping sites. The details regarding such disposal sites should be submitted to CEA and approvals obtained.



- 5.3 Soil / debris removed during the preparation of ground for construction of project components should not be disposed / dumped into neighboring forest areas.

6. SOCIAL ASPECTS

- 6.1 A detailed socio economic survey should be carried out covering the proposed development area in order to identify affected families, sub families, agricultural lands and business enterprises in order to serve as baseline data. The data should be used in the preparation of a socio infrastructure plan. This data will also help to identify new encroachments in the area.
- 6.2 Suitable relocation sites should be identified in close proximity to the existing dwellings considering the preference of affected families.
- 6.3 A detailed resettlement plan and compensation package should be prepared inclusive of relocation sites. All compensation should be paid on the basis of the principals contained in the National Involuntary Resettlement Policy. The resettlement plan and the compensation package so prepared should be submitted to the Ministry of Lands for approval prior to commencing construction activities.
- 6.4 Acquisition of land and payment of compensation should be expedited in order to minimize the uncertainty of people.
- 6.5 In the case of cultivated paddy land coming under the tenant farmer system, compensation should be paid to both the landowner and the tenant farmer.
- 6.6 The MASL should initiate a consultative dialogue with the persons likely to be affected by the project with immediate effect. They should be kept informed well in advance, regarding the project components and also the compensation packages as well as the proposed date of commencement of project activities.
- 6.7 The MASL should provide necessary compensation, if existing water sources of the communities are affected by the project during construction phase of the project.
- 6.8 Any damages to the existing roads due to implementation of project activities should be re-routed or modified appropriately in order to avoid impacts on existing transportation system of the project area.
- 6.9 A grievance redress mechanism should be established in order to resolve social problems of affected community due to implementation of the project as recommended in section 5.5 of the EIA report.



7. EXTRACTION OF CONSTRUCTION MATERIAL

- 7.1 Quarrying of rock, sand soil and other material for construction activities should be done with the approval of the GS&MB. Approvals from the FD / DWC or other concerned agencies should be obtained wherever required.
- 7.2 Required licenses / permits for the operation of quarry sites / metal crushers, concrete batching plants, asphalt plants etc. should be obtained from the CEA / relevant Local Authority.

8 RESTORATION / REHABILITATION OF CONSTRUCTIONS SITES

- 8.1 Abandoned quarry sites, borrow pits and temporary transport routes should be rehabilitated and suitable replanting programmes implemented in these areas in consultation with the FD / DWC.
- 8.2 Temporary used areas shall be restored properly and post-construction unusable material shall be disposed of in consultation with the relevant Local Authorities. The land used for temporary establishments shall be restored up to the level of satisfactions.
- 8.3 Rehabilitation of construction site(s) and spoil dump areas should be completed prior to commissioning of the operational activities. The disturbed areas due to constructions of labor camps, spoil areas, stockpile areas, workshops, office etc. shall be rehabilitated and replanted with suitable tree species.

9 WASTE DISPOSAL

- 9.1 Measures should be taken to prevent discharge of tunnel muck, cement, cement mix, fuel oil, lubricants, waste oil, polythene and other waste materials into water bodies during construction and operation period. Oil separation devices should be installed where required.
- 9.2 Proper sanitary facilities should be provided for the work force involved in the construction activities.

10 ARCHAEOLOGICAL ASPECTS

The approvals from the Department of Archaeology should be obtained prior to commencement of the project. If any archeological remnants are encountered within the project area suitable measures should be adapted to conserve in consultation with the Archeology Department.

11 NOISE AND VIBRATION

- 11.1 All constructional activities shall be carried out in such a way, so as not to cause nuisance to the wildlife and neighborhood. The noise level during construction shall not exceed 75 dB (A) from 06.00 hrs to 21.00 hrs and 50 dB (A) from 21.00 hrs to 06.00 hrs to be measured at the boundary of the site.



11.2 Appropriate mitigatory measures should be adopted in order to maintain the vibration levels generated by construction activities, operation of machineries and equipment, and vehicle transport within the interim standards stipulated by the CEA.

11.3 Blasting operation if any should be carried out with the approval of the GS&MB, and the CEA.

12 TRANSPORTATION OF MATERIAL AND MACHINERY

12.1 Suitable action should be taken to identify the routes of transport and to mitigate traffic issues during construction. Required approvals should be obtained from relevant traffic authorities.

12.2 Transport, loading and unloading of materials shall be carried out in such a way as not to cause nuisance to the surrounding environment.

12.3 Construction material should be adequately covered during transportation to avoid wind induced dust and spillage.

12.4 The vehicles and the machinery used in the project should be maintained regularly in order to avoid smoke emissions.

13 SAFETY/ EMERGENCIES

The MASL shall draw up an Emergency Preparedness Plan for contingencies such as issues associated with floods etc. The MASL should ensure that all relevant personnel are trained and aware of their responsibilities in executing the plan. Copies of the plan shall be placed at suitable locations and consulted on a regular basis.


14 ENVIRONMENTAL MANAGEMENT PLAN

14.1 The MASL shall forward to the CEA a detailed Environmental Management Plan (EMP) incorporating the mitigatory measures proposed precisely and the monitoring plan. It should contain the significant impacts identified at each site, site specific mitigation measures to be implemented for each significant impact, schedule of implementation of mitigation measures, parameters to be monitored with intervals/frequencies and the responsible agencies for implementation of the EMP. The EMP should be approved by the monitoring committee.

14.2 A monitoring committee consisting of representatives of FD, CEA, DWC, Irrigation Department, GS&MB, Department of Agrarian Development, Department of Archaeology, District Secretary/Matale /Anuradhapura/ Polonnaruwa, Divisional Secretary, Elahera/ Galenbindunuwewa/ Palugaswewa/ Hingurakgoda/ Dambulla / Naula/ Kekirawa and any other member deemed necessary will be appointed by the CEA to monitor implementation of EMP by the MASL.



- 14.3 Periodic compliance report should be submitted by the MASL on progress of the implementation of the EMP.
- 14.4 Suitably trained qualified officer/s who would be responsible for implementation of the EMP shall be assigned.
- 14.5 This Officer(s) shall act as the contact person(s) for members of the public and shall liaise with local organizations.
- 14.6 All costs incurred by the monitoring committee appointed by the CEA to oversee implementation of the EMP shall be borne by the MASL.


Prof. Lal Mervin Dharmasiri

Chairman

CENTRAL ENVIRONMENTAL AUTHORITY

CC: Secretary / Ministry of Mahweli Development and Environment
Conservator General of Forest / Forest Department
Commissioner General / Department of Agrarian Development
Director General / Dept. of Wildlife Conservation
Director General / Irrigation Department
Director General / National Building Research Organization
Director General / Department of Archeology
Director General / Department of Agriculture
Director General / Geological Surveys and Mines Bureau
Divisional Secretary, Elahera / Galenbindunuwewa / Palugaswewa / Hingurakgoda / Dambulla /
Naula / Kekirawa
Chairman, Pradeshiya Sabha, Elahera / Galenbindunuwewa / Hingurakgoda / Dambulla /
Naula / Kekirawa
Director / Central Province / CEA
Deputy Director / North Central Province / CEA

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வனசீவராசிகள் பாதுகாப்புத் திணைக்களம்
DEPARTMENT OF WILDLIFE CONSERVATION

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 பிரதான அலுவலகம், இல. 811/அ, ஜயந்திபுர வீதி, மத்தரமுல்லை
 Head Office - No. 811/A, Jayanthipura Road, Battaramulla



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 எனது இல.
 My No.

වජ/6/1/1/252 - II

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 உமது இல.
 Your No.

දිනය
 திகதி
 Date

2016.03.16

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මෞරගහකන්ද කළුගල ව්‍යාපෘතීන් හා ඒකාබද්ධව ඉදි කිරීමට නියමිත ඉහළ ඇලහැර ඇල මාර්ගය,
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සම්බන්ධ කර ඉදිකරන ඇල මාර්ග ව්‍යාපෘතිය

උක්ත කරුණ සම්බන්ධයෙන් ඔබ විසින් මා වෙත යොමු කර ඇති අංක 08/EIA/water/04/2012 හා 2016.01.13 දිනැති ලිපිය හා බැඳේ.

02. උක්ත ව්‍යාපෘතියට අදාළ ඇල මාර්ගය මින්නේරිය-හිරිපිලේ ස්වභාව රක්ෂිතය හා ඇලහැර හිරිපිලේ අභය භූමිය හරහා මෙන්ම මින්නේරිය ජාතික උද්‍යානයෙහි කොටසක් හරහා භූගතවද ගමන් කරනු ලබයි. ඒ අනුව ඉහත ඇල මාර්ගය මගින් සිදු වන පාරිසරික හා වනජීවී සම්පත් වලට වන බලපෑම අවම වන ලෙස, පාරිසරික බලපෑම ඇගයීමකට යටත්ව එහි කොන්දේසි ප්‍රකාරව හා පහත සඳහන් කොන්දේසි ප්‍රකාරව ජාතික අවසානයටත් සේ සලකා සිදු කිරීම සම්බන්ධයෙන් අප දෙපාර්තමේන්තුවෙහි විරුද්ධත්වයක් නොමැති බව කාරුණිකව දන්වා සිටිමි.

- 2.1 ඇලහැර අභය භූමියේ මායිමෙන් හා දැනට ඉදි කර ඇති වීදුලි වැටට සමාන්තරව විවෘතව ඇල ඉදි කරන කොටසේ වනාන්තර දෙසින් අලි ඇතුන් හා වනජීවීන්ට ජල අවශ්‍යතා සපුරා ගැනීමට හැකි වන සේ එම ඉවුර ඉතා අඩු බෑවුම් පිහිටන ලෙස හා ගම්මානය දෙසට අලි ඇතුන්ට ගමන් කළ නොහැකි ලෙස ගම්මානය මාත්ත දැඩි බෑවුමක් පවතින ලෙස ඇල ඉවුරු සකස් කළ යුතුය.
- 2.2 රක්ෂිතය තුළ මායිමට ආසන්නව ඉදි කරන කෝන්ගුරිය, හිරිපිලිය, මාදැක්කැව වැව ආදී වැව වල ජලයෙන් දැනට කුඹුරු කරන්නේ නම් පමණක් නිත්‍යානුකූල කුඹුරු වලට පමණක් ජලය ලබා දීම හා රක්ෂිතය තුළ කිසිදු අනවසර වගා කිරීමක් සඳහා ජලය ලබා නොදීම. (මෙහිදී ජල පාලන කටයුතු වලට යාමේදී වනජීවී නිලධාරියකු යොදා ගැනීමද සිදු වේ).
- 2.3 උක්ත සඳහන් කළ වැව වල ජලය වනජීවීන්ට භාවිතා කළ හැකි පරිදි මුළු ධාරිතාවෙන් 50% ක් පමණක් නිදහස් කළ හැකි වන පරිදි ජල පාලන සොරොට් සකස් කිරීම.

- 2.4 ලබාදී ඇති ශෝථිත ඇල මාර්ගය දැක්වෙන සිතියම ප්‍රකාරව ප්‍රවහගතඋල්පත හෙවත් මාදුන්නැව වැවෙන් ඔබ්බට මින්තෝරිය ගිරිතලේ ස්වභාව රක්ෂිතය තුල, පීඨිරිය අභය භූමිය, මින්තෝරිය ජාතික උද්‍යානය තුල හා හුරුම වැව වන රක්ෂිතය තුලදී අදාළ ඇල මාර්ගය පොළොව ඇතුලතින් පමණක් (cut & cover , double conduit හෝ tunnel ලෙස) ගමන් කරන ලෙස සැකසීම.
- 2.5 මින්තෝරිය ගිරිතලේ ස්වභාවික රක්ෂිතය මධ්‍යයේ පිහිටා ඇති ජේතුලම වැව ප්‍රතිසංස්කරණය කිරීමේදී එහි ජලය දැනට රක්ෂිතය තුල අනවසර වශා කටයුතු සිදු කරන කිසිවකුට ලබා නොදීම හා එම අනවසර වශාකරුවන් රක්ෂිතයෙන් ඉවත් කර විකල්ප ඉඩම් ලබා දීම හා අදාළ අනවසර වශා ඉඩම් වනජීවීන් සඳහා වෙන් කිරීම.
- 2.6 රක්ෂිතය තුල ඉදි කරන වැව වලින් අනවසර වශාවන් වලක්වා ගැනීම සඳහා ජලය නිකුත් කරන සොරොට් (Sluice gate) නොමැතිව සකස් කිරීම.
- 2.7 වනජීවී රක්ෂිත හරහා ඇල මාර්ග පොළොව අභ්‍යන්තරයෙන් ගමන් කලද එහි ඉදි කිරීම කටයුතු වලදී විශාල පරිසර හානියක් සිදුවන අතර අදාළ කටයුතු නිමවූ වහාම එම ප්‍රදේශය එා තත්වයට පත් කර වනජීවීන්ට හුදුසු පරිදි සකස් කිරීම.
- 2.8 මෙම ව්‍යාපෘතිය මගින් සිදුවන වනජීවී වාසස්ථාන අහිමි වීම ප්‍රතිපූර්ණය කිරීම පිණිස යාබද කැලෑ ඉඩම් පවතී නම් රක්ෂිත කිරීම හා පවතින රක්ෂිත ඉඩම් තුල වනජීවී වාසස්ථාන වැඩිදියුණු කිරීම.
- 2.9 මෙම ව්‍යාපෘතිය මගින් වනජීවී වාසස්ථාන වලට හා සංක්‍රමණ වලට බලපෑම් ඇති විය හැකි බැවින් ඒවා අධ්‍යයනය කර පිළියම් ගෙවීම සඳහා "වනජීවීන්ට වන බලපෑම් අධ්‍යයනයක්" සිදු කිරීම හා එමගින් හඳුනාගන්නා බලපෑම් අවම කිරීම සඳහා අවශ්‍ය ප්‍රතිපාදන ව්‍යාපෘතිය මගින් ලබා දීම.
- 2.10 මෙම ව්‍යාපෘතිය යටතේ මින්තෝරිය හා කඩුඩුල්ල වැව සඳහා ජලය ලබා දෙන්නේනම්, එම වැව වල දැනට වසර දූරා සිදුවන ජල මට්ටමේ වෙනස්කම් වලට අනුකූල වන සේ පමණක් ජලය නිකුත් කිරීම, නිසං සමයේ අදාළ ජලාශ වල ජල මට්ටම පහල යාමත් සමඟ අලි ඇතුන් 400ක් පමණ ඒ ආශ්‍රිතව ගැවසෙන අතර එම වැව ජල සංචිත ලෙස වසර දූරා පුරවා තැබීමෙන් වන අලිත්ට වාසස්ථාන අහිමි වේ.
- 2.11 මීට අමතරව පරිසර බලපෑම් ඇගයීමෙන් සිදු කරන නිර්දේශ ක්‍රියාත්මක කිරීම.

පොදු කොන්දේසි -

- 2.12 මෙම ව්‍යාපෘතියෙහි ඉදි කිරීම හෝ නඩත්තු කටයුතු සිදු කරනු ලබන කිසිදු සේවකයකු රාත්‍රියේදී රක්ෂිතය තුල නවාතැන් නොගත යුතුය.
- 2.13 අදාළ ප්‍රදේශය හරහා අලි ඇතුන් ඇතුළු වනජීවී සංක්‍රමණ සිදු වන අවස්ථාවලදී නාවකාලිකව අදාළ කටයුතු නතර කර සේවකයන් ආරක්ෂිත ස්ථාන තරා යොමු කළ යුතුය.

- 2.14 මේ සඳහා දැනට භාවිතා වන මාර්ග පමණක් භාවිතා කළ යුතු අතර අළුතින් මාර්ග ඉදි නොකළ යුතුය.
- 2.15 සතුන්ට අනතුරුදායක වන ආකාරයේ ගැඹුරු වලවල් ඇති වන පරිදි ව්‍යාපෘති කටයුතු සිදු කිරීමෙන් වැළකිය යුතුය.
- 2.16 ප්‍රදේශයේ ස්වභාවික ඇල පද්ධති වලට බාධා ඇති නොවන අයුරින් මෙම ව්‍යාපෘතිය සිදු කළ යුතුය.
- 2.17 මෙම ප්‍රදේශයෙහි පාරිසරික වශයෙන් යම් බලපෑමක් ඇති වුවහොත් ඒ පිළිබඳව ව්‍යාපෘති යෝජක විසින් වනජීවී සංරක්ෂණ දෙපාර්තමේන්තුව වෙත දැන්විය යුතු අතර වනජීවී දෙපාර්තමේන්තු උපදේශකත්වය යටතේ එම බලපෑම අවම කිරීමට කටයුතු කළ යුතුය.
- 2.18 ව්‍යාපෘති ප්‍රදේශයෙහි පුරාවිද්‍යා වටිනාකමකින් යුත් පුරාවස්තුවක් හමු වුවහොත් ඒ පිළිබඳව පුරාවිද්‍යා දෙපාර්තමේන්තුවට හා වනජීවී සංරක්ෂණ දෙපාර්තමේන්තුව වෙත දැන්විය යුතුය.
- 2.19 මෙම අවසරය ලබා දීමේ ලිපියෙහි පිටපතක් යම් අවශ්‍යතාවයකදී පෙන්වීම සඳහා ව්‍යාපෘති භූමියෙහි තැබිය යුතුය.
- 2.20 වනසත්ව වාසස්ථාන විනාශ නොකිරීම හා වනසත්ව සංචරණ මාර්ග වලට බාධා නොවන අයුරින් මෙම ව්‍යාපෘතිය සිදු කළ යුතුය.
- 2.21 රක්ෂිත ප්‍රදේශ තුළ ඇති ශාක හා සත්ව කොටස් එකතු කිරීම සිදු නොකළ යුතුය.
- 2.22 මෙම ව්‍යාපෘතිය මගින් එකතු වන අපද්‍රව්‍ය විධිමත්ව බැහැර කිරීමට කටයුතු කළ යුතුය.
- 2.23 මෙම ව්‍යාපෘතිය හේතුවෙන් වනජීවී රක්ෂිතයෙහි මාර්ග, නිර්මිත හෝ වෙනත් දේපල වලට හානි වුවහොත් ඒවා ව්‍යාපෘති යෝජක විසින් ප්‍රතිපුරණය කළ යුතුය.
- 2.24 මෙම ව්‍යාපෘතියේදී අධිබලැති පිරිසවීම ද්‍රව්‍ය යොදා පිපිරවීම් කිසිවක් සිදු කිරීමට අවසර ලබා දෙනු නොලැබේ.
- 2.25 වනජීවී රක්ෂිත තුළ ගොඩනැගිලි කිසිවක් ඉදි කිරීම කිසිවක් සිදු කිරීමට අවසර ලබා දෙනු නොලැබේ.
- 2.26 මෙම ව්‍යාපෘතියෙහි සේවකයන්ට හෝ යම් දේපලකට වනසතුන්ගෙන් වන හානිය සම්බන්ධයෙන් වනජීවී සංරක්ෂණ දෙපාර්තමේන්තුව විසින් වග කියනු නොලැබේ.
- 2.27 වනජීවී සංරක්ෂණ දෙපාර්තමේන්තු නිලධාරීන්ට හා මෙම ව්‍යාපෘතියට අදාළ අනෙකුත් රාජ්‍ය ආයතන නිලධාරීන්ට අවශ්‍ය විටකදී ව්‍යාපෘති ප්‍රදේශය පරීක්ෂා කිරීමට අවසර ලබා දිය යුතුය.
- 2.28 මෙහි සඳහන් කොන්දේසි වලට අමතරව වනජීවී සංරක්ෂණ දෙපාර්තමේන්තුව හෝ අදාළ වෙනත් පාලන වෙතින් අවස්ථානුකූලව පනවනු ලබන අනෙකුත් නීතිරීති සඳහා ව්‍යාපෘති යෝජක බැඳී සිටිය යුතුය.

- 2.29 පරිසරයට හානියක් නොවන හෝ අවම හානියක් සිදු වන අයුරින් උක්ත ව්‍යාපෘතිය සිදු කළ යුතුය.
- 2.30 ඉහත ව්‍යාපෘතියෙන් බැහැරව වෙනත් කාර්යයන් සඳහා වනාන්තර රක්ෂිත තුළ ඉඩම් යොදා ගැනීම නොකළ යුතුය.
- 2.31 මෙම ව්‍යාපෘතිය මගින් පරිසරයට සහ වනජීවීන්ට අහිතකර බලපෑම් ඇති වුවහොත් නව කොන්දේසි ඇතුළත් කිරීම, නිවැරදි කොන්දේසි සංශෝධනය හෝ මෙම අනුමැතිය අවලංගු කිරීමේ බලතල වනාන්තර සංරක්ෂණ දෙපාර්තමේන්තුවෙහි අධ්‍යක්ෂ ජනරාල් සතුය.
- 2.32 මෙහිදී සිදු කරන ලබන සියළු කටයුතු ව්‍යාපෘතියට හා වෘක්ෂලතා ආරක්ෂක ආඥා පනතේ විධිවිධාන උල්ලංඝනය නොවන ආකාරයෙන් සිදු කළ යුතුය.

මෙයට - විශ්වාසී,

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එල්.එස්.එම්.පී.වික්රමසිරි බණ්ඩාර
වනාන්තර සංරක්ෂණ අධ්‍යක්ෂ ජනරාල්

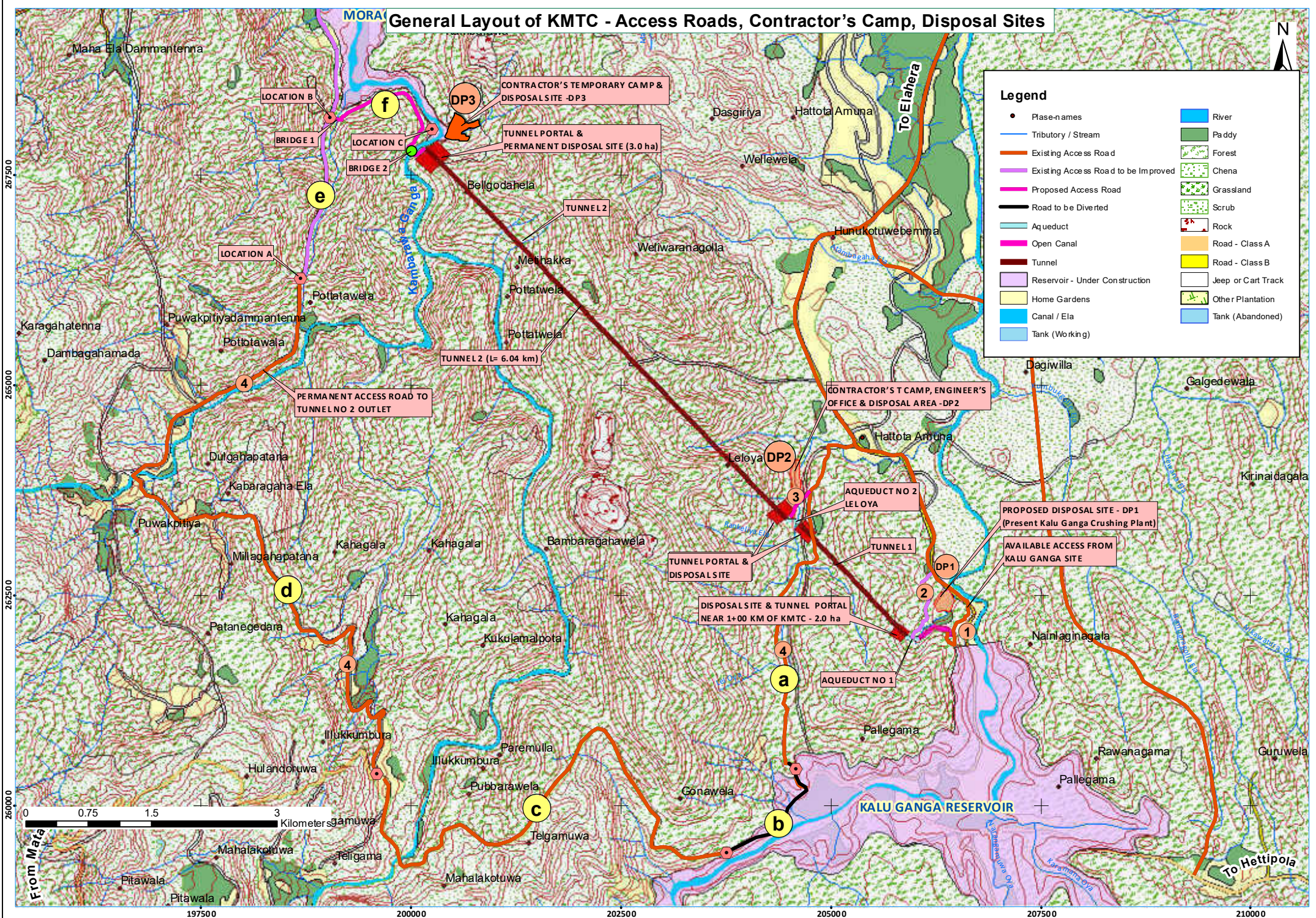
පිටපත් -

- | | | |
|--|---|---------------------------|
| ලේකම්, මහවැලි සංවර්ධන හා පරිසර අමාත්‍යාංශය | - | කාරුණික දැ.ගැ.පි හා අ.ක.ස |
| අතිරේක ලේකම්, ජල සම්පත් සැලසුම්, මහවැලි සංවර්ධන හා පරිසර අමාත්‍යාංශය | - | කාරුණික දැ.ගැ.පි හා අ.ක.ස |
| අධ්‍යක්ෂ ජනරාල්, ශ්‍රී ලංකා මහවැලි අධිකාරිය | - | - 250 - |
| සහකාර අධ්‍යක්ෂ (පොළොන්නරුව) | - | කාරුණික දැ.ගැ.පි හා අ.ක.ස |
| උද්‍යාන භාරකරු (මන්නේරිය පා.උ) | - | කාරුණික දැ.ගැ.පි හා අ.ක.ස |

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ANNEX B : MAP SHOWING POSSIBLE ACCESS ROADS, IDENTIFIED DISPOSAL SITES FOR THE UEC-ICB-2B

General Layout of KMTC - Access Roads, Contractor's Camp, Disposal Sites



ANNEX C : SUMMARY OF GRM ADOPTED BY MWSIP

දුක් ගැනවිලි විසඳීමේ යාන්ත්‍රණය යනු

ව්‍යාපෘතිය ක්‍රියාත්මක වීම නිසා පිටතට පත්වන ප්‍රශ්නවලට කළ දුක් ගැනවිලි ඉදිරිපත් කොට ඒ සඳහා විසඳුම් ලබා ගැනීමට ඇති මාර්ගයකි. කිසිදු විෂයක්කින් තොරව පිටතට පත් වූ ඕනෑම පුද්ගලයෙකුට මෙම ක්‍රමවේදය සඳහා යොමු විය හැක.

දුක් ගැනවිලි විසඳීමේ යාන්ත්‍රණය මගින් විසඳුම් ලබා ගත හැකි අංශ

1. ඉඩම් අත්පත් කර ගැනීම සම්බන්ධ ගැටලු
2. වන්දි මෙවීමේ ක්‍රමවේදය පිළිබඳව තොරතුරු
3. නැවත පදිංචි කිරීමේදී ඇති වන ගැටලු
4. ඉඩම් අයිතිය සම්බන්ධ ගැටලු
5. වන්දි මෙවීම ප්‍රමාද වීම
6. ප්‍රතිසංස්කරණ සහයෝගිතා වැඩසටහන්
7. ව්‍යාපෘතිය හා සම්බන්ධ සමාජ සහ පරිසරික ගැටලු

දුක් ගැනවිලි විසඳීමේ යාන්ත්‍රණය මගින් විසඳුම් ලබා ගත නොහැකි අංශ

1. උසාවියෙන් විසඳුම් ලබා ගැනීමට අපේක්ෂිත හා උසාවියට යොමුකර ඇති ගැටලු.
2. ලබා දීමට යෝජිත වන්දි ප්‍රමාණය ගැන තීරණය ගැනීම.

දුක් ගැනවිලි විසඳීමේ යාන්ත්‍රණයට ගැටලු යොමු කිරීමේ ක්‍රමවේදය

දුක් ගැනවිලි උදාහරණයක් ලෙස ඉදිරිපත් කළ හැක. එය ග්‍රාම නිලධාරී, ව්‍යාපෘති නැවත පදිංචි කිරීමේ නිලධාරී හෝ ව්‍යාපෘති පරිසර නිලධාරී වෙත ඉදිරිපත් කළ හැකි අතර එයට අදාළ පෝරමය (GRC-A) එම නිලධාරී මණ්ඩලය සතුව ඇත. එසේ ඉදිරිපත් කරනු ලබන දුක් ගැනවිලි ව්‍යාපෘති අධ්‍යක්ෂකගේ මාර්ගෝපදේශනාවටයෙන් අදාළ නිලධාරීන් විසින් සනිටුසාණ ඇතුළත විසඳිය යුතු වේ.

එසේ විසඳිය නොහැකි ගැටලු ව්‍යාපෘති නැවත පදිංචි කිරීමේ නිලධාරී හෝ ව්‍යාපෘති පරිසර නිලධාරී විසින් ව්‍යාපෘති ක්‍රියාත්මක කිරීමේ ඒකකය වෙත යොමු කෙරේ. ඒ සඳහා සති දෙකක කාලයක් ප්‍රමාණවත් වේ.

එසේත් විසඳිය නොහැකි ගැටලු දිස්ත්‍රික් ලේකම් වෙත යොමු කෙරේ. මෙහිදී ද සනිටුසාණ විසඳුම් ලබා දිය යුතු අතර එසේ විසඳිය නොහැකි ගැටලු ව්‍යාපෘති කළමනාකරණ ඒකකය වෙත යොමුකළ යුතු වේ. මෙම සම්පූර්ණ ක්‍රියාදාමය උපරිම සති හතරකින් නිම කිරීමට අපේක්ෂිතය.

මෙම කමිටු සත් කිරීම සහ සඳහන් ආකාරයට කිසි කෙරේ.

ප්‍රජාවට පැමිණිලි ඉදිරිපත් කිරීමේදී ව්‍යාපෘතිය ක්‍රියාත්මක කිරීමේ නිලධාරීන්, ව්‍යාපෘති කළමනාකරණ නිලධාරීන්, ග්‍රාම නිලධාරීන් හෝ ප්‍රාදේශීය ලේකම් වෙතට ඒවා ඉදිරිපත් කළ හැකි වේ. සියලුම දුක් ගැනවිලි ව්‍යාපෘතිය ක්‍රියාත්මක කිරීමේ ඒකකයේ වාර්ථාගත කෙරේ.



පැමිණිලි විසඳීමේ ක්‍රමවේදය

දුක් ගැනවිලි විසඳීමේ කමිටුව ග්‍රාම නිලධාරී

ග්‍රාම නිලධාරී මට්ටමින් ගැටලු නොවිසඳුනහොත්



දුක් ගැනවිලි විසඳීමේ කමිටුව ව්‍යාපෘතිය ක්‍රියාත්මක කිරීමේ ඒකකය

ව්‍යාපෘති ක්‍රියාත්මක කිරීමේ ඒකකය මට්ටමින් ගැටලු නොවිසඳුනහොත්



දුක් ගැනවිලි විසඳීමේ කමිටුව දිස්ත්‍රික් ලේකම්

දිස්ත්‍රික් ලේකම් මට්ටමින් ගැටලු නොවිසඳුනහොත්,



දුක් ගැනවිලි විසඳීමේ කමිටුව ව්‍යාපෘති කළමනාකරණ ඒකකය/ අමාත්‍යාංශ මට්ටමින්

ග්‍රාම නිලධාරී මට්ටමින් දුක් ගැනවිලි විසඳීමේ කමිටුවේ සාමාජිකයින්

1. ග්‍රාම නිලධාරී (සභාපති)
2. ග්‍රාමීය මට්ටමේ රජයේ නිලධාරීන්
3. ග්‍රාමීය මට්ටමේ පුද්ගල පක්ෂ (බෞද්ධ, හින්දු, කතෝලික, ඉස්ලාම්)
4. ප්‍රජා නියෝජිතයින් (ප්‍රජා මූල සංවිධාන)
5. නියෝජිත (උපදේශක අංශය, ඉදිකිරීමේ අංශය)
6. පරිසර නිලධාරී, නැවත පදිංචි කිරීමේ නිලධාරී

ව්‍යාපෘතිය ක්‍රියාත්මක කිරීමේ ඒකකයේ දුක් ගැනවිලි විසඳීමේ කමිටුවේ සාමාජිකයින්.

1. ප්‍රාදේශීය ලේකම් (සභාපති)
2. ව්‍යාපෘති අධ්‍යක්ෂ
3. ප්‍රාදේශීය සහායක ලේකම්
4. නැවත පදිංචි කිරීමේ නිලධාරී, පරිසර නිලධාරී
5. ග්‍රාම නිලධාරී
6. අදාළ ප්‍රදේශයේ ප්‍රජා මූල සංවිධාන නිලධාරීන් 4ක් (02 ක් කාන්තාවන් විය යුතුය)
7. නියෝජිත (උපදේශක අංශය, ඉදිකිරීමේ අංශය)

දිස්ත්‍රික් ලේකම් මට්ටමින් දුක් ගැනවිලි විසඳීමේ කමිටුවේ සාමාජිකයින්.

1. දිස්ත්‍රික් ලේකම් (සභාපති)
2. ප්‍රාදේශීය ලේකම්, අදාළ අනෙකුත් ආයතනික නිලධාරීන්
3. ප්‍රාදේශීය සහායක ලේකම්
4. මැතිවර නිලධාරී
5. ග්‍රාම නිලධාරී (අදාළ ප්‍රදේශයේ)
6. නැවත පදිංචි කිරීමේ නිලධාරී, පරිසර නිලධාරී
7. අදාළ ප්‍රදේශයේ ප්‍රජා මූල සංවිධාන නිලධාරීන් 4ක් (02 ක් කාන්තාවන් විය යුතුය)
8. නියෝජිත (උපදේශක අංශය, ඉදිකිරීමේ අංශය)

1. වැඩසටහන් අධ්‍යක්ෂ (සභාපති)
2. දිස්ත්‍රික් ලේකම් (අදාල දිස්ත්‍රික්කයේ)
3. ප්‍රාදේශීය ලේකම් (අදාල ප්‍රදේශයේ)
4. ව්‍යාපෘති අධ්‍යක්ෂ
5. නැවත පදිංචි කිරීමේ විශේෂඥ, පරිසර විශේෂඥ
6. ව්‍යාපෘති අධ්‍යක්ෂවරු (අදාල ව්‍යාපෘතියේ)
7. අදාල ප්‍රදේශයේ ප්‍රජා මූල සංවිධාන නිලධාරීන් 04ක් (02 ක් කාන්තාවන් විශ්ලිතව)
8. නියෝජිත (උපදේශක අංශය, ඉදිකිරීමේ අංශය)

දුක් ගැනවිලි විසඳීමේ ව්‍යාපෘති ඒකක මට්ටමේ කමිටුව මසකට වරක් ව්‍යාපෘතිය ක්‍රියාත්මක කිරීමේ ඒකකයේ දී රැස් වේ.



❖ සියලුම පැමිණිලි හා ඒවා විසඳීමට ගන්නා ලද සියලුම ක්‍රියාමාර්ග දුක්ගැනවිලි විසඳීමේ ලේඛනයේ ලේඛනගත කෙරේ. ලේඛන ලේඛන ව්‍යාපෘතිය ක්‍රියාත්මක කිරීමේ ඒකකයේ හා ඒවායේ පිටපත් ප්‍රාදේශීය ලේකම් කාර්යාලයේ ස්ථානගත කෙරේ.



මහවැලි ජල සුරක්ෂිතතා ආයෝජන වැඩසටහන මගින් පිඩාවට පත් වන සියලුම ප්‍රජාවට විසඳුම් ලබා දේ. මෙම ව්‍යාපෘතියේ ඉතා වැදගත්ම සාධකය ප්‍රජාව වන අතර ඔබේ ගැටලු විසඳීමට අපි කැප වන්නෙමු.

වැඩි දුරටත් තොරතුරු ලබා ගැනීමට

මිණිපේ වම් ඉවුරු ඇළ ව්‍යාපෘතිය.

ඉංජි - එස්.ඩී.මැදිවක මහතා,
ව්‍යාපෘති අධ්‍යක්ෂ,
ප්‍රාදේශීය වාරිමාර්ග ඉන්ජිනේරු කාර්යාල පරිශ්‍රය, සඟලක.
දුරකථන අංකය: 055- 2258977

ඉහළ ඇලහැර ඇළ ව්‍යාපෘතිය,
ඉංජි - එස්.ඒ. ඒ. ධර්මසිරි මහතා,
ව්‍යාපෘති අධ්‍යක්ෂ,
ශ්‍රී ලංකා මහවැලි අධිකාරිය, මඩුවගම.
දුරකථන අංකය: 025- 2054896

වයඹ පළාත් ඇළ ව්‍යාපෘතිය,
ඉංජි - අමෝක පෙරේරා මහතා,
ව්‍යාපෘති අධ්‍යක්ෂ,
වාරිමාර්ග දෙපාර්තමේන්තුව, නැ.පෙ. 44, කුරුණෑගල.
දුරකථන අංක: 037-3970783
සංඛ්‍යා දුරකථන: 071-4432826

ව්‍යාපෘති කළමනාකරණ ඒකකය.

අනෝමා බටහේල මහත්මිය,
නැවත පදිංචි කිරීමේ විශේෂඥ,
මහවැලි ජල සුරක්ෂිතතා ආයෝජන වැඩසටහන,
අංක 493 1/L, ඩී.බී. පියා මාවත, කොළඹ 10.
දුරකථන අංක: 011-2675810
සංඛ්‍යා දුරකථන: 077-1035020

පී. මුණමලේ මහතා,
පරිසර විශේෂඥ,
මහවැලි ජල සුරක්ෂිතතා ආයෝජන වැඩසටහන,
අංක 493 1/L, ඩී.බී. පියා මාවත, කොළඹ 10.
දුරකථන අංක: 011-2675810
සංඛ්‍යා දුරකථන: 077-1035020

මහවැලි ජල සුරක්ෂිතතා ආයෝජන වැඩසටහන
අංක 493 1/L, ඩී.බී. පියා මාවත, කොළඹ 10.
දුරකථන 011 2675810
ෆැක්ස් 011 2675810



මහවැලි ජල සුරක්ෂිතතා ආයෝජන
වැඩසටහන
මහවැලි සංවර්ධන හා පරිසර අමාත්‍යාංශය

දුක්ගැනවිලි විසඳීමේ යාන්ත්‍රණය

මහවැලි ජල සුරක්ෂිතතා ආයෝජන වැඩසටහන

මෙම වැඩසටහන අයිතියානු සංවර්ධන බැංකුවේ ආධාර ඇතිව ශ්‍රී ලංකා රජය මගින් මහවැලි සංවර්ධන හා පරිසර අමාත්‍යාංශය යටතේ ක්‍රියාත්මක කරනු ලබන වැඩසටහනකි. මේ යටතේ පහත සඳහන් ව්‍යාපෘති ක්‍රියාත්මක කිරීම සඳහා මුල්‍ය ආධාර සැපයේ.

- ❖ ඉහළ ඇලහැර ඇළ ව්‍යාපෘතිය
- ❖ වයඹ පළාත් ඇළ ව්‍යාපෘතිය
- ❖ මිණිපේ වම් ඉවුරු ඇළ ප්‍රතිසංස්කරණ ව්‍යාපෘතිය.

මෙම ආයෝජන වැඩසටහන මගින් ශ්‍රී ලංකාවේ වියළි කලාපයට අයත් ලඟුරු, ලඟුරුමැද හා වයඹ පළාත්වල, ගොවිබිම්වලට මහවැලි ජලය සැපයේ. එමගින් වාර්ෂිකව දියුණු කර කෘෂිකර්මාන්තය නැන්වීමටත්, ලඟු ජලනිගයකින් පිඩාවිදින ජනතාවට පානීය ජලය සැපයීමටත්, කෘෂි නිෂ්පාදන පදනම් කරගත් වාණිජමය ආර්ථික කටයුතු වෙලටත් ව සංවර්ධනය කිරීමටත් මූලිකව අපේක්ෂා කෙරේ.

MWSIP

