Initial Environmental Examination

March 2016

SRI: Additional Financing of Local Government Enhancement Sector Project – Bendiwewa Water Supply Subproject

Prepared by the Ministry of Provincial Councils and Local Government for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 15 March 2016)

Currency unit	–	Sri Lankan Rupee (Rs)
Rs1.00	=	$0.007
$1.00	=	Rs 145

ABBREVIATIONS

ADB	-	Asian Development Bank
AF	-	Additional Financing
BPL	-	below poverty line
CEA	-	Central Environmental Authority
CKD	-	chronic kidney disease
DCCCRM	-	Department of Coast Conservation and Coastal Resource Management
DSC	-	Design and Supervision Consultants
EDP	-	Economically Displaced Person
EIA	-	environmental impact assessment
EMP	-	environmental management plan
EPL	-	Environmental Protection License
FGD	-	focus group discussion
IEE	-	initial environmental examination
IGS	-	Income Generating Schemes
IOL	-	Inventory of Losses
GRC	-	Grievance Redress Committee
GRM	-	grievance redress mechanism
GSMB	-	Geological Service and Mine Bureau
LGESP	-	Local Government Enhancement Sector Project
LGIIP	-	Local Government Infrastructure Improvement Project
MIS	-	management information system
MPR	-	Monthly Progress Report
MPCLG	-	Ministry Provincial Councils and Local Government
NCP	-	North Central province
NGO	-	nongovernment organization
NWSDB	-	National Water Supply and Drainage Board
NIRP	-	National Involuntary Resettlement Policy
O&M	-	operation and maintenance
PS	-	Pradeshiya Shabha
PAM	-	project administration manual
PMU	-	project management unit
PPTA	-	project preparatory technical assistance
PMC	-	Project Management Consultants
RDA	-	Road Development Authority
PRDA	-	Provincial Road Development Authority
SPCU	-	subproject coordination unit
SPS	-	Safeguard Policy Statement

GLOSSARY

Pradeshiya Sabha	–	Local authorities established under the Pradeshiya Sabhas Act Number 15 of 1987. Smallest political unit in urban and rural areas.

NOTE

In this report, "$" refers to US dollars.

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APPENDIXES

EXECUTIVE SUMMARY

1. The Local Government Enhancement Sector Project (LGESP) was approved by ADB on 29 September 2012 with an amount of $59 million equivalent from ADB's Special Fund Resources. The loan became effective on 29 November 2011 and the loan closing date is 31 December 2016. Ministry of Provincial Council and Local Government (MPCLG) is the executing agency, and subproject coordination unit (SPCU) is established in each provincial council (total seven) to supervise and coordinate and project implementation. LGESP has been supporting local infrastructure improvement and basic service delivery in less-developed areas in seven provinces (excluding the Northern and Eastern Provinces), based on a bottom-up, demand-driven approach. The additional financing is required to scale up a well-performing project. It includes (i) improvement of water supply systems in areas affected by chronic kidney diseases (CKD); (ii) improvement of local infrastructure and basic services delivery; and (iii) advancing policy reform of local government and strengthening their capacity.

2. **Additional Financing.** The additional financing will scale up the project that is performing well, by supporting water supply systems improvement in CKD-affected areas, and improving local infrastructure and basic services delivery and advancing local government policy reform and capacity strengthening in *Pradeshiya Sabhas* not supported previously.

3. **Impact and Outcome.** The impact will be local authorities' capacity financially and technically strengthened in less-developed areas of seven provinces in Sri Lanka. The outcome will be improved local infrastructure and services delivered effectively by local authorities or NWSDB in less-developed areas of seven provinces in Sri Lanka. The impact statement is unchanged. The outcome statement was changed because most of the water supply schemes in areas affected by CKD will be operated by NWSDB.

4. The additional financing has three outputs. Output 1 has been added for the additional financing.

5. **Output 1: Water supply systems in CKD-affected areas improved**. The additional financing will finance development and expansion of water supply systems in CKD-affected areas in the four provinces (Central, North Central, North Western, and Uva) to provide safe drinking water. The schemes include development of new water supply systems and expansion of existing systems, mostly run by NWSDB. Facilities such as raw water intakes, water treatment plants, overhead tanks, and transmission and distribution networks are eligible for financing. About 30 schemes will be developed or expanded, and will be implemented by respective provincial councils with technical inputs and supervision support from NWSDB. Considering the nature and complexity of the schemes, the piped-network will be operated by NWSDB, except in local authorities which have adequate operational capacity. If local authorities are identified to be the appropriate entity to implement the subprojects, such local authorities will first have to submit a reform plan, as practiced in the original project, prior to the subproject implementation. PMU, through design and supervision consultants (DSCs), will provide capacity augmentation for construction supervision, when the resources available from NWSDB are insufficient.

6. **Output 2: Local infrastructure and basic service delivery improved.** Social and economic infrastructure will be improved by newly participating local authorities. The approach will remain the same: 29 new *Pradeshiya Sabhas* from five provinces (Central, North Western, Southern, Uva, and Western) which have not been supported under the LGIIP and LGESP will first have to submit a reform plan approved through a council resolution, which will be reviewed

and confirmed by the Ministerial Committee of MPCLG to ensure that the minimum reform requirements are met. Then they will be qualified for the provision of a capital grant for infrastructure improvement. Eligible subprojects include (i) environmental infrastructure, (ii) economic infrastructure, (iii) public health infrastructure, and (iv) other local authority facilities. PMU, through DSCs, will support preparation of design and ensure the quality of the work. For both outputs 1 and 2, only the subprojects that meet the subproject selection criteria will be implemented.

7. **Output 3: Local government policy reform advanced and capacity strengthened**. The additional financing will support establishment of IT solutions, which were developed under the original project and installed in the original 108 *Pradeshiya Sabhas*, in 29 new *Pradeshiya Sabhas*, and further advance business process reengineering in both original and new *Pradeshiya Sabhas.* The activities will include (i) implementation support of the guidelines developed under the capacity development TA (CDTA), (ii) development and installation of additional software to simplify and increase efficiency of local administration, and (iii) capacity building programs to strengthen technical, financial, and administrative capacity of the original and new *PradeshiyaSabhas*, provincial councils, and MPCLG.

8. **The subproject.** The Proposed Bendiwewa water supply project is an extension of the Minneriya water supply scheme being operated in the Thamankaduwa DS of Polonnaruwa district. Thambalawewa GN Division is situated approximately 12 km away from the Minneriya Town. The distribution extension proposed for the Thambalawewa GN Division covers three more GNDs namely; Agbopura, Sudukanda – Nikawewa and Singha Udagama. The current population in these areas is around 5,509.The people living in these villages are presently using well water for drinking purpose. Around 36 numbers of CKD patients have been identified in these areas and it has become the responsibility of National Water Supply and Drainage Board (NWSDB) to provide drinking water to these GN divisions. The main water sump to Bendiwewa supply scheme is the Patapilikanda water tower which has total discharging capacity of 3,000 m^3/day. The existing Minneriya water supply scheme is pumping to Higurakgoda and Minneriya distribution networks adequately. It is expected to provide about 1000 new water connections in these proposed areas. The total length of the pipe line to be laid is 26 Km that includes 21 Km long 90mm pipe line and 5 Km long 110 mm pipe line. The distribution network will be laid in Thabalawewa, Saranasirigama, Malakapura and Sudukanda–Nikawewa areas of the Thamankaduwa DS area.

9. **Screening and assessment of potential impacts.** ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for environmental assessment are described in ADB's Safeguard Policy Statement (SPS), 2009. The subproject is a considered small-scale project and potential environmental impacts have been assessed using ADB Rapid Environmental Assessment Checklist for Water Supply. Then potential negative impacts were identified in relation to pre-construction, construction and operation of the improved infrastructure.

10. **Categorization.** Based on results of the assessment and ADB SPS, the subproject is classified as environmental Category B, i.e., the subproject is judged to be unlikely to have significant adverse environmental impacts. An initial environmental examination (IEE) is required to determine whether significant environmental impacts warranting an environmental impact assessment are likely.

11. This IEE aims to (i) provide critical facts, significant finding, and recommended actions; (ii) present the national and local legal and institutional framework within which the

environmental assessment has been carried out; (iii) provide information on existing geographic, ecological, social and temporal context including associated facilities within the subproject's area of influence; (iv) assess the subproject's likely positive and negative direct and indirect impacts to physical, biological, socioeconomic, and physical cultural resources in the subproject's area of influence; (v) identify mitigation measures and any residual negative impacts that cannot be mitigated; (vi) describe the process undertaken during project design to engage stakeholders and the planned information disclosure measures and the process for carrying out consultation with affected people and facilitating their participation during project implementation; (vii) describe the subproject's grievance redress mechanism for resolving complaints about environmental performance; (viii) present the set of mitigation measures to be undertaken to avoid, reduce, mitigate, or compensate for adverse environmental impacts; (ix) to describe the monitoring measures and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures; and (x) identify indicative costs and who is responsible for carrying out the mitigation and monitoring measures.

12. **Location of the subproject.** Bendiwewa is an area which includes Thambalawewa GN Division is situated approximately 12 km away from the Minneriya Town. The distribution extension proposed for the Thambalawewa GN Division covers three more GNDs namely; Agbopura, Sudukanda – Nikawewa and Singha Udagama. These areas are deep rural areas having no access to pure clean drinking water. The pipe lines to be laid will be within the ROWs of roads and there is adequate space for laying pipes these locations.

13. **Environmental Management Plan.** The subproject is unlikely to cause significant adverse impacts because: (i) the rapid sand filters will involve straightforward construction and operation, so impacts will be mainly localized; (ii) predicted impacts are localized and likely to be associated with the construction process and are produced because the process is invasive, involving excavation and earth movements; and (iii) being located mainly in an existing built-up area, will not cause direct impact on terrestrial biodiversity values. An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels.

14. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between PMU, SPMU, consultants and contractors. The EMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (i) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (ii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iii) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (iv) ensure that safety recommendations are complied with. The EMP includes a monitoring program to measure the environmental condition and effectiveness of implementation of the mitigation measures.

15. The contractor will be required to submit to SPMU, for review and approval, a site environmental plan (SEP) including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEP; and (iv) budget for SEP implementation. No works are allowed to commence prior to approval of SEP.

16. A copy of the EMP/approved SEP will be kept on site during the construction period at all times. The EMP included in the bid and contract documents. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

17. **Consultations and disclosure.** Consultations with stakeholders, NWSDB engineers, and Central Environmental Authority (CEA) have been conducted to discuss engineering and potential environmental issues. The main comments discussed at the meetings include request of clean drinking water from NWS&DB, stop CKD patients rising up in the area, support to be extended from the local community, willingness to donate land plots if needed, formation of local society to resolve environmental and social issues and monitor the project works, request of awareness programs to be conducted, equal distribution of water supply throughout the day, request of water connections to all the households, efficient communication for water pipe repairs and renovation of pipes and joints in the future. CEA confirms environmental clearance is not required for the subproject as the capacity and activities do not fall under category of "Prescribed Projects" in the National Environmental Act (NEA) of CEA. The public participation processes undertaken during project detailed design ensure that stakeholders and affected people are engaged during the preparation/finalization of the IEE. The planned information disclosure measures and process for carrying out consultation with affected people will facilitate their participation during project implementation. This IEE and any update/s and environmental monitoring reports will be publicly disclosed in ways and languages understood by stakeholders and affected people.

18. **Grievance Redress Mechanism.** The subproject will follow the existing GRM process established in the on-going LGESP. Assessment of the existing GRM shows that it has provided citizens with an effective platform for redress of their grievances. This IEE describes the existing GRM including informal and formal channels, time frame and mechanisms for resolving complaints about environmental performance.

19. **Findings and Recommendations.** The negative environmental impacts arising due to execution of the proposed water supply scheme are minor and negligible as compared to the long term Socio-economic and health benefits to be delivered to people of the project area. Negative impacts can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures as per EMP. It is recommended that (i) IEE be made part of the bid and contract documents to ensure that mitigation measures are appropriately budgeted and legally binding to the contractors; (ii) monitor diligently contractor/s EMP implementation by PMU, SPMU and consultants on EMP implementation by contractors; (iii) involve stakeholders in all phases of implementation and disclose relevant project related documents; and (iv) continue existing GRM process.

20. **Conclusion.** The subproject is unlikely to cause significant adverse impacts. As per ADB SPS, the subproject is classified as environmental Category B and does not require further EIA.

I. INTRODUCTION

A. Introduction

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B. Background of the IEE

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9. **Scope of IEE.** The IEE was based mainly on secondary sources of information and field reconnaissance surveys; as the subproject is of small scale, construction of the rapid sand filters will involve straight forward construction methods and impacts were assessed to be site-specific, short in duration and limited mostly to construction phase only, no field monitoring (environmental) survey was conducted. However, baseline monitoring on noise and dust levels will be conducted by the contractors prior to start of civil works to activities will be limited within permissible values, or not above the background values if these are above the permissible limits. Stakeholder consultation was an integral part of the IEE.

II. DESCRIPTION OF THE SUBPROJECT

10. Due to geochemical condition of the province and use of agrochemicals in the agricultural sector of the NCP, the ground water quality and surface water quality have been dramatically deteriorated causing CKD to considerable number of people living in the Polonaruwa district and the people in adjoining villages of the Eastern Province. The fluoride in soils is high and it gets dissolved and readily available in the groundwater. The main cause for CKD is due to consumption of inferior quality of water with high fluoride content by the poor farming community in these areas. It is crucial to mention that CKD is spreading very fast in the NCP and with the objective of avoiding and minimizing the spread of CKD affected people in the NCP, Government of Sri Lanka requested ADB to extend the existing ADB funded "Puraneguma project" giving more priority to expand large scale water supply projects in the NCP in collaboration with NWSDB who has established and are managing large scale water supply schemes in the NCP.

11. The Minneriya water supply scheme is one of the largest water supply schemes commenced in 1980 with the objective of providing clean drinking water for the people of Higurakkgoda and Thamankaduwa Divisional Secretariat areas. The current water supply covers about 4000 households' water connections. The main water source for the supply project is the Minneriya water tank in the Polonnaruwa district. The water treatment plant is located at Minneriya and it can treat and supply about 13,500 m^3/day as per the present capacity of the water plant.

12. The main water treatment plant located at Minneriya operates under following steps to purify the water

(i) Aeration
(ii) Flocculation
(iii) Sedimentation
(iv) Filtration
(v) Chlorination

13. Appendix 1 provides the detailed water treatment process. The water quality of treated water complies with given Sri Lanka Institute for standards (SLS) for drinking water as shown in Appendix 3.

14. Minimal sludge has been generated since the operation of MWTP. The sludge produced is removed and spread in the nearby disturbed forested areas (not protected forest) surface as it could be absorbed well to the surface of the soil. However, the supernatant water is released to the nearby natural water body. It was observed through discussions with the water engineers of NWSDB and people of the area that MWTP has been operated without creating any environmental hazards and social disharmony due to disposing of sludge to abandoned forest areas and treated water to outside waters. As well, it was found that no complaints received so far on the operation of the existing water supply scheme or due to malfunctioning of MWTP.

15. The water quality of treated water is at highest quality standard complying with the given SLS standards for drinking water. It is important that biological matters in the form of total Coliform bacteria and E-coli Bacteria are not present in the delivered water samples. In addition, overall war water samples tested were at high quality drinkable status as compared to other numerous water sources of the Polonnaruwa district.

C. Need for the Subproject

16. In order to meet the demands of water for 5,509 number of people living in the Thambalagamuwa GN and other surrounding GN divisions, the Minneriya water supply scheme has to be extended for 26Km by laying pipe lines as the CKD affected persons are increasing rapidly in the proposed area and the current statistics show that 36 number of CKD affected people are living without clean drinking water. The people use the dug well water as the water source for drinking which is already contaminated with high Fluoride content and other heavy elements.

D. Details of the Subproject

17. NWSDB has prepared the details of the subproject and has first submitted to the office of the Commissioner of Local Government (CLG) in the Provincial Council (PC) along with the brief project report. A detailed project report (DPR) including detail designs, bill of quantities and

cost estimates will be submitted to the CLG with the assistance of the subproject coordinating unit (SPCU) in the PC office and the Resource Development Consultant Ltd (RDC) who work as the Consultants of the subproject.

18. The DPR is then submitted to the office of LGESP for its appraisal and approval of the subproject. Once the Project is approved, SPCU initiates the tender procedure to select a contractor to carry out the work. The work will be supervised by the technical staff of the NWSDB with the assistance of the staff of SPCU. The NWSDB will be responsible for the management of the construction work of the subproject. Select a contractor to carry out the work. The work will be supervised by the technical staff of the NWSDB with the assistance of the staff of SPCU. The NWSDB will be responsible for the management of the construction work of the subproject.

19. **Location.** Thambalawewa GN Division is situated approximately 12 km away from the Minneriya Town. The distribution extension proposed for the Thambalawewa GN Division covers three more GNDD namely; Agbopura, Sudukanda–Nikawewa and Singha Udagama. These areas are deep rural areas having no access to pure clean drinking water. The pipe lines to be laid will be within the Right of Ways (ROWs) of roads and there is adequate space for laying pipes along roads.

20. **Details of the component:** NWS&DB is planning to lay around 26km long pipe line from Gurukula junction upto four village areas covering three more GN divisions adjacent to Thambelawewa GN division. The detailed design has been made and relevant Bill of Quantities (BOQ) has been finalized for bidding process. The detailed design was finalized after meeting with the local community and other stake holders at the consultation meeting held on 18th February 2016 Figure 5 provides the layout of main pipe lines and transmission lines as per detailed design. Table 1 provides the major features of the subproject.

Table 1: Major Features of the Proposed Water Supply Subproject

Major Features	Description	Location
Transmission and distribution pipe line network	1.4 Km long main water pipe line starting from Gurukula school to Thambalawewa Junction will be laid with pipe diameter of 110mm. Another 24.5 km of distribution pipe lines with 90 mm will be buried from the Thambalagamuwa junction to other four village areas such as Thabalawewa, Sudukanda-Nikkawewa, Saranasirigama and Malakapura.These distribution areas are situated in far remote areas without access to clean drinking water. Most of the roads are in gravel form and about length of 5 km is in asphalt and concrete road condition. The pipes to be fitted in the system are in good quality as mentioned in the project proposal report.	As mentioned in the schematic diagram Figure 03.
Chlorination	Chlorine is added to the storage tank to disinfect the biological properties of water prior to distribution. Additional residual chlorine (RCL) is added to meet the standards of the Sri Lanka Standards Institute (SLSI) (0.2mg/l) at the last dead end of the distribution system. 20 minutes of retention period is provided for RCL at the storage tank.	At identified points of the storage tank

E. Implementation Schedule

21. The subproject is to be implemented over a period of 6 months. This includes one month for bidding and engagement of contractors, five months of construction and finally commissioning of the new rapid sand filters.

III. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

22. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. This states that ADB requires environmental assessment of all ADB investments.

23. **Screening and categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project; the sensitivity, scale, nature, and magnitude of its potential impacts; and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts, and are assigned to one of the following four categories:

(i) **Category A.** Projects could have significant adverse environmental impacts. An EIA is required to address significant impacts.
(ii) **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
(iii) **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.
(iv) **Category FI.** Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all projects will result in insignificant impacts.

24. ADB Rapid Environmental Assessment (REA) Checklist for water supply and for urban development for municipal infrastructures will be used for the screening and categorization.

25. **Environmental Management Plan.** An EMP, which addresses the potential impacts and risks identified by the environmental assessment, shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the project's impact and risks.

26. **Public disclosure.** ADB will post thee safeguard documents on its website as well as disclose relevant information in accessible manner in local communities:

(i) for environmental category A projects, draft EIA report at least 120 days before Board consideration;
(ii) final or updated EIA and/or IEE upon receipt; and
(iii) Environmental monitoring reports submitted by the Project Management Unit (PMU) during project implementation upon receipt.

27. LGESP will not consider Category A subprojects. Preparation of IEE for Category B and Due Diligence Report for Category C subproject will follow the updated environmental assessment and review framework.

B. National Laws

28. **Responsibility of Environmental Management in Sri Lanka.** The National Environmental Act (NEA) was passed in 1981, and in 1982 the Central Environmental Authority (CEA) as a regulatory and enforcement agency was created. A cabinet-level ministry with the appointment of a Minister of Environment was created in 1990to handle the subject of environment and to ensure that environmental issues are given the required attention. The Ministry of Environment and Natural Resources (MENR) was set up in 1999 and formulated a National Environment Policy (NEP) in 2003, which is now being implemented. This policy set out the course of action needed in order to maintain Sri Lanka's natural resources and the living environment whilst allowing development projects to be implemented. Ministry of Mahaweli Development and Environment has been established on January 2015 and the mandate of environmental management of the country is now held with this new Ministry.

29. **Applicable environmental legislations:** The implementation of LGESP Additional Financing will be governed by Government of Sri Lanka environmental acts, rules, regulations, and standards. These regulations impose restrictions on the activities to minimize/mitigate likely impacts on the environment. It is the responsibility of the project executing and implementing agencies to ensure that projects are consistent with the legal framework whether national, state, or municipal/local. Compliance is required in all stages of the project, including design, construction, and operation and maintenance. National laws and regulations that can be relevant to the project are briefly described in the Table below.

Table 2: Applicable National Laws and Regulations

Laws and Regulations	Provisions and Main Content
National Environmental Act No.47 of 1980, Amendment No.56 of 1988, and other Amendments	The NEA is a framework environmental statue that makes provision for the protection, management and enhancement of the environment, for the regulation, maintenance and control of the quality of the environment, and for the prevention and control of pollution by implementing the subproject.
National Environmental (Noise Control) Regulations No. 01 of 1996	Regulates maximum allowable noise levels for construction activities during subproject activities
National Environmental (Protection & Quality) Regulations, No. 01 of 1990	Provides standards for discharging effluents into inland surface water during subproject activities.
Fauna and Flora Protection Act (1993)	An act to amend the fauna and flora protection ordinance (Chapter 469) of 1938, which provide for the protection and conservation of the fauna and flora of Sri Lanka and their habitats; for the prevention of commercial and other misuse of such fauna and flora and their habitats, for the conservation of the biodiversity of Sri Lanka; and to provide for matters connected there with or incidental there to.
Felling of Trees Control Act No. 09 of 1951 as Amended through Act No. 30 of 1953	This Act sought to prohibit and control the felling of specified trees (mainly intended to stop indiscriminate felling of specified trees) in the country.
Water Resources Board Act No. 29 of 1964, Amendment	Control, regulation and development (including the conservation and utilization) of the water resources; the prevention of the

Laws and Regulations	Provisions and Main Content
No.42 of 1999	pollution of rivers, streams and other water resources; the formulation of national policies relating to the control and use of the water resources.
The Soil Conservation Act, No. 25 of 1951 Amended in 24 of 1996	An act to make provisions for the enhancement and substances of productive capacity of the soil, to restore degraded land for the prevention and mitigation of soil erosion, for the conservation of soil resources and protection of land against damage by floods, salinity, alkalinity and drought and to provide for matters connected there with or incidental there to
Explosive Act No. 36 of 1976	To provide the control of explosions and regulations of matters connected with explosive activities.
Fisheries and Aquatic Resources Act 1996	The Act addresses the management, regulation, conservation and development of fisheries and aquatic resources during subproject activities.
Flood Protection Ordinance No. 04 of 1924	An ordinance for the protection of areas subjected to damage from floods. This includes declaration of flood areas, preparation of schemes for flood protection and other rules and regulations regarding flood in the country.
Geological Survey and Mines Bureau (GSMB) Act No. 33 of 1992	Regulates the exploration for minerals, mining, transportation, processing, trading in export of mineral products and usage of quarries and sand mines in the country.
Crown Land Ordinance Act No. 1947	The act dealing with allocation and control of Crown lands In Sri Lanka for private and government activities.
Irrigation Act No. 23 of 1983	An act to formulate policies and programs in regard to the subjects of irrigation, reservoirs, water resources management and prevention of pollution of rivers, streams and other water recourses. Promotion, construction, operation and maintenance of irrigation schemes, drainage and flood control in the country.
Regulations of Local Authorities	Regulates and control actions and methods taken place within the command area relevant to the government laws and regulations.
National Water Supply and Drainage Board Act No 2 of 1974	This Act governs the supply and distribution of quality and safe drinking water to the Sri Lankan community. There are amendments made to this Act at different times.

30. **Applicability to the subproject.** The Bendiwewa Water Supply Subproject does not fall within the category of “Prescribed Projects” listed in Gazette Extra-ordinary No. 772/22 of 24th June 1993 and subsequent amendments, which needs to go through the EIA process and subsequent conditional approval from the CEA of the Ministry of Environment and Natural Resource (MENR). These may, however be subjected to an environmental review, if the Project Approving Agency (PAA) and the CEA deem it necessary. Further,

(i) The subproject **is not located within 100 m** from the boundaries of or within any area declared under the National Heritage Wilderness Act no 4 of 1988.
(ii) The subproject **is not located within 100 m** from the boundaries of or within any area declared under the Forest Ordinance (Chapter 451).
(iii) The subproject **is not located within** coastal zone as defined in the Coast Conservation Act No 57 of 1981.
(iv) The subproject **is not located within** any erodible area under the Soil Conservation Act (Chapter 450).
(v) The subproject **is not located within** flood prone areas declared under Flood Protection Ordinance (Chapter 449).

(vi) The subproject **is not located within** low lying area of North Central Province which is a flood protection area declared under the Sri Lanka Land Reclamation and Development Corporation Act 15 of 1968 as amended by Act No 52 of 1982.
(vii) The subproject **is not located within** 60 meters from the bank of a public stream as defined in the Crowns Lands Ordinance (Chapter 454) and having width of more than 25 meters at any point of its course.
(viii) There **are no** reservations beyond the full supply level of a reservoir within the proposed subproject site.
(ix) The subproject **is not located within** any archaeological reserve, ancient or protected monument as defined or declared under the Antiquities Ordinance (Chapter 188).
(x) The subproject **is not located within** any area declared under the Botanic Gardens Ordinance (Chapter 446).
(xi) The subproject **is not located within**100 meters from the boundaries of, or within, any area declared as a Sanctuary under the Fauna and Flora protection Ordinance (Chapter 454).
(xii) The subproject **is not located** within 100m from high flood level contour of a public lake as defined by the Crown Land Ordinance (1947, 1949, and 1956) including those declared under Section 71 of the ordinance.
(xiii) The subproject **is not located** within 100m from the boundaries of or within any area declared under the Forest Ordinance (Chapter 451)
(xiv) The subproject **is not located** within the area declared under the Urban Development Authority Act No. 41 of 1978 and Act No. 4 of 1982 Section 29.

31. Table 3summarizes the permits required for the subproject relevant to its implementation and activities.

Table 3: Key Permits needed for the sub project activities

Project stage	Clearance and Permits	Activity	Relevant Agency
Pre-construction stage (Although the clearances and approval should be obtained during the pre-construction stage and it is not valid throughout the project cycle. However this should be renewed once before the expiry date)	Industrial Mining License (IML)	Operation of borrow areas (material extraction sites)	GS&MB
	Environmental Protection License (EPL)	Operation of borrow areas (material extraction sites)	CEA
	Explosive Permits	Blasting activities	MoD
	Local Government Authorities Trade License	Operation of metal quarries, crushers, borrow areas, dispersal sites, labour camps	LAs
	Approval for removal of trees	Laying of main pipe lines along the ROW of roads	DS, DoF, DWLC,

DoF-Department of Forests, DWLC-Department of Wild Life Conservation, DS-Divisional secretariat, LAs-Local Authority, MOD-Ministry of Defense

C. Environmental Standards

32. **Environmental Protection License (EPL).**Discharge of waste to the environment is controlled by the National Environmental (Protection & Quality) Regulations No. 01 1990 (Gazette 595/16, 1990) and the amendments published in Gazette 1159/22 of 2000, under the

NEA. These regulations establish the need for any person discharging waste to do so only under a license (Environmental Protection License or EPL) issued by the CEA, and in accordance with the gazetted discharge standards and criteria. The EPL can be issued up to three years (Gazette 1159/22).

33. **Status of EPL.** NWSDB does not need to obtain the EPL for operation of Minneriya water treatment plant (MWTP) under the Minneriya Water supply scheme. As its current Capacity is13,500 m^3/day which is much less than the required Capacity which is 500,000 m^3/day. As well, the subproject will only involve with laying of pipelines construction, the subproject will not require to apply for EPL under any circumstances.

34. **Drinking Water Quality Parameters.** Appendix 3 provides the applicable SLI) the values to be complied with prior distribution of the water supply. The design of the subproject has taken into consideration and the guideline values. It should be noted that results of water testing on treated water from MWTP conducted by NWSDB show compliance with SLI standards. Results further show E-coli and Coli-form bacteria are not present in the treated water being delivered to consumers in the existing water supply areas.

IV. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. Methodology Used for the Baseline Study

35. The IEE was based mainly on secondary sources of information and field reconnaissance surveys; as the subproject is involved with laying of pipe lines, The laying of pipe lines will have some limited environmental impacts that are localized and short term as per the methodology of construction. However, baseline monitoring on noise and dust levels will be conducted by the contractors prior to start of civil works and they will be limited within permissible values, or not above the background values. If these are above the permissible limits. Stakeholder consultation was an integral part of the IEE.

36. A baseline survey was conducted to collect the data and information on physical condition, biodiversity status (habitat types, animals and plant species), land use pattern and socio-Economic structure of the project area. The line transect method and sampling were carried out about 50-100m from either side of road sections determined for burying pipelines in the proposed project area. The land use pattern up to 50m or impact influential area on both sides of the existing centre line of the existing road was studied through field visits made during the under mentioned period. The plant species, bird species were identified and recorded, and some of the biodiversity species were identified using taxonomic booklets. Group and individual interviews were conducted to collect views of people in the area. Some government institutions like RDA, PRDA, PS and Forest department were consulted to get their views for implementation of the proposed project.

37. Resource Development Consultants (RDC) conducted the field assessments from 19th to 21st January 2016 in the Polonnaruwa district of Sri Lanka.

38. The literature survey broadly covered the following:

(i) Project details, reports, maps, and other documents available with the Design and Supervision Consultant (DSC) team of the on-going ADB-funded LGESP
(ii) Discussions with Feasibility Study team
(iii) Secondary data from previous project reports and published articles, and

(iv) Literature on land use, soil, geology, hydrology, climate, socioeconomic profiles, and environmental planning documents collected from Government of Sri Lanka agencies and websites.

39. A separate socioeconomic study was conducted to determine the demographic information, archaeological and religious places, densely populated pockets, and settlements.

40. The data collected was analyzed and interpretations made to assess the physical, biological, and socioeconomic features of the subproject site. The relevant information is presented in the succeeding paragraphs.

B. Physical Characteristics of the Subproject Area

41. **Location.** Bendiwewa in the area which includes Thambalawewa GN Division along with other 3 GN divisions. It is situated approximately 12 km away from the Minneriya Town. The distribution extension proposed for the Thambalawewa GN Division covers three more GNDD namely; Agbopura, Sudukanda – Nikawewa and Singha Udagama. The current population in these areas is around 5,509.The people living in these villages are presently using well water for drinking purpose. Around 36 numbers of CKD patients have been identified in these areas. At present, NWSDB water supply line has been laid up to Gurukula School and NWS&DB is planning to lay around 26km long distribution pipe lines covering the total area

42. **Geology, Geomorphology and Soil.** More than 90 percent of Sri Lankan rocks are metamorphic rocks that are metamorphic in high grades such as granulate and amphibolites facies. The North, North Western segment from Puttalam to Trincommalee consists mainly of Miocene age limestone, sedimentary formations deposited in Tertiary and Quaternary periods.

43. Most of the Sri Lankan crystalline rocks belong to Precambrian ages (older than 570 million years) while others are of more recent origin. This Precambrian age metamorphic rocks are sub divided into three major litho logical groups as High land, Wanni complex and Vijayan complex. Therefore, according to this categorization, a majority of the Anuradhapura district belong to the Wanni complex where Precambrian metamorphic rocks are prominent. Metasediments, Charnockitic gneisses, basic rocks, migmatites and granitic gneisses, granites and pegmatite are particularly present in this region

44. Reddish brown earth is the prominent soil type in the Polonnaruwa district.Sri Lanka has been sub divided in to different agro- ecological zones considering soil type, temperature, rainfall and land use etc.In the project area, Reddish Brown earth, Low Humic Gley soils and Grumusol soils are present. Alluvial soil is very common at river basins and catchment areas. Reddish Brown Earth and Low Humic Gley soils are highly fertile soils suitable for agricultural operations and located more or less in undulating land scape. This reddish brown earth soil category falls within the well-drained to moderately drained soil type. However, the Low Humic Gley soil is suitable for growing paddy.

45. **Topography and Climate.** The topography of the Polonnaruwa district is flat and gently undulating with 3-4 percent slope except few hills and isolated outcrops of bare rocks. The elevation of hills is ranging from 1000feet to 500 feet, however, about 75% of the hills are below 500 feet in elevation. The area gently slopes from south -west to North –East. The longest river of Sri Lanka, the Mahaweli River enters to the Polonnaruwa district from the South –West direction and flow towards the North-East direction.

46. The water is a deficient resource and highly fluctuating based on the rainfall of the district. The annual rainfall varies between 1150mm to 1850 mm. From October to January, the north - east monsoon rain brings relatively high rain fall to all areas in the Polonnaruwa district while the conventional rain from March to May brings relatively low rainfall especially in afternoons of the day. Hence the balance period of the year is experienced with the drought period causing lot of problems to people finding water as a scare resource. The average temperature in the project area varies from 29C0 to 32 C0 as shown in the table 4. The highest temperature recorded is 34 C^0 from June to August of the year.

Table 4: Climate data of the area

Parameter	Figures
Temperature (C^0)	$29C^0$-33 C^0
Precipitation (mm)	1050-1850mm

47. **Hydrology and Drainage.** The high rainfall of certain years is followed by low rainfall of years inducing the cause of water need in the district. The evapo-transpiration is high as the high temperature is present almost throughout the year. Therefore, ancient people damned the natural water collection locations and built reservoirs and small type of water tanks. The Parakrama Samudraya is one of the water bodies existing in the Polonnaruwa district for provision of water during the dry period of the year.

48. In addition, few water streams and Mahaweli river flow across the district nourishing the water need of the people and environment. The Minneriya water tank located in the Thamnakaduwa area is the water sources for the proposed water supply scheme in the area. However, two other water bodies such as Thabalawewa, Girithalewewa and Bendiwewa are situated in the proposed project area. The Thamalawewa is fed by the Girithalewawa while the Girithale and Bediwawa tanks are fed by the natural rain fall. These water tanks store water and supplement water through irrigation schemes established under the Mahaweli development program.

49. Surface drainage system in the Polonnaruwa district is well existent as established drains, canals and natural and man-made water bodies are present in most parts of the district. In the proposed project area, both side drains are present within first 5 Kms from Gurukula School, Thambalawewa to Nikawe and other 21 Kms have no established side drains either side of ROW of existing roads. As well, the surface run off generated during rains is drained off to water bodies, Villus, streams and other low land inland areas. Hence, there will not be any drainage issues in the event of the proposed project being implemented in the area. On the other hand, there are no historic records drainage issues present in the Polonnaruwa district.

50. **Surface Water Quality.** The surface water is highly polluted due to addition of Agrochemicals, human fecal matters and accumulation of geochemically dissolved element like Mn, Cu, fluoride and chloride. The water quality parameters like low dissolved oxygen, high electric conductivity; high Ecoli bacteria and total Coli form bacteria have been noticed in surface water samples. Other main sources of pollution of surface waters in the Polonnaruwa are the opening of drainage to water tanks and discharge of industrial effluents to surface water sources.

51. It could be observed that two surface water bodies namely Bendiwewa and Thambalawewa water tanks are located within 500m of the project boundary. Therefore, contamination of surface water could occur due to addition of agrochemicals, and other

geological factors embedded in the ground. People of the area believe that surface water is highly contaminated and unsuitable for drinking.

52. **Ground Water Quality.** The water quality parameters of ground water include high fluoride and chloride contents, increased total solids and high electrical conductivity as per the water quality reports published by WHO and NWS&DB in 2010 and 2014. Geochemically, Na/K with CL (Chloride)- is high in the ground water in the Polonnaruwa district especially during the dry period. It is also believed that high fluoride content in ground water has affected to cause dental fluorosis and Chronic Kidney Disease (CKD). Number of people suffering from CKD is on the increase despite medical treatments. It was found that heavy elements like Cr, Mn and Cu are high in ground water too. Although the actual cause of CKD is not known, high fluoride content and total solids have affected seriously on the people of Pollonnaruwa district.

53. **Air Quality and Noise Level.** Habarana –Polonnaruwa main road is passing through dense forests, paddy lands, home gardens, residential areas, some small towns and Kaduruwella town. This main road is wide enough to pass vehicles without traffic flows up to the Welikanda. The vehicle emissions are easily dissipated along the road during the day time. The cities of the Polonnaruwa are not crowded like in other areas of the country. The Air quality in the Polonnaruwa is high as compared to Colombo and Kandy as no complaint on air quality deterioration issue has come up for investigation.

54. The proposed project areas fall in rural areas where rural roads running through residential areas mixed with paddy lands and forest patches. A green belt is well established to absorb vehicle emissions and prevent drifting of dust for long distance. According to air quality reports published, there are no records on investigating on air quality in Polonnaruwa district or suburbs areas for last one decade. Domestic sources of air pollution will include emissions from burning of forest patches for Chena cultivation (slash and burn cultivation), wood and kerosene burning stoves in settlements and villages. As the project area is rich in vegetation, all such emissions will be very well dissipated

55. Vehicle Emission Test (VET) became mandatory with effect from 15th July 2008 to enforce environmental regulations and conform to the environmental standards on vehicle emission as per the Motor Traffic Act (Emission control) Regulation of 1994, 817/6, Part I, Section I. This move is a part of the efforts to improve the air quality in the island and this regulation is applicable for all construction sites if air quality is going to be deteriorated.

56. The subproject site mostly includes rural setting with a good vegetation cover. Therefore, the noise levels are relatively low. According to Schedules I and II of National environmental (Noise Control) regulations No.1 1996 (924/12), the study area belongs to “Low noise area”. Therefore, the ambient noise level of the area can be considered as 55 dB (A) during day time (06.00 hrs-18.00 hrs) and 45 dB (A) night time (18.00 hrs - 06.00 hrs). Rich vegetation in the subproject site acts as an efficient noise absorbent.

C. Ecological Characteristics of the Project Area

57. **Forests and ecological sensitive areas.** The major forest type observed in the Polonnaruwa district is the dry mixed ever green forests or monsoon forests. Occasionally, there are few patches of thorny scrubland forests, riverine forests along the Mahaweli River, Villus, grasslands and abandoned degraded forest lands. The main invader in vegetation in the past was *Phyllantus ollyphyllus*. However, three other plant invaders like Lantana Camera, *Panicum Maximum a*nd *Pennisetum polystachyon* seem to have beaten and replaced the plant species

Phyllantus Pollyphyllus and occupy in open gaps of forest vegetation and road sides. These alien plant species have degraded the fertile agricultural soil and reduced the production Capacity dramatically. The trees living in the proposed project area are similar to trees in the dry ever green forests. However, only few Kaluwera and Burutha trees are situated along roads of the proposed project area. Along the Nikawewa road, one water stream crossing the road harbours some fish species and other aquatic species as observed in the field. However, there are no endangered and threatened animals and plant species sheltering bin the project area.

58. The appearance of the forests differs seasonally and depicts an annual cyclical variation in floristic diversity of the ground vegetation. The leaves of trees are small and compound, and also without drip tips as compared to the lowland rain fed forests. These trees grow without buttresses and tree trunks branch lower down. Epiphytes and lianas are relatively spare in this forest type (Gunatilake at al, 2008). As explained earlier, some of the forest tree species are highly vulnerable for harvesting timber and among them; Kaluwera and Burutha are very attracted by illicit timber fellers. In addition, the forest cover to some extent has been denuded for chena farming in these forests.

59. **Distribution of faunal species.** There are no large animals sheltering in the residential areas. However, monkeys, variety of birds, snakes and retiles are also living in the proposed project areas. A list of existing fauna and flora living outside the project area is attached in the Appendix 04.

60. **Wetlands.** There are some Villus and semi marshy area situated in the Polonaruwa district. However, no wet lands are naturally located as specified in the Convention on Wetlands of UNEP. The proposed project area is not located close to a marshy land too. Therefore, it can be concluded that there will not be any environmental impact on the wetland or marshy land due to implementation of the proposed project.

61. **Coastal Marine Environment.** The subproject is not located close to a coastal marine environment.

D. Socio Economic Profile

62. Bendiwawa water supply project is a water supply scheme identified to be implemented under the proposed additional financing to currently ongoing Local Government Enhancement Sector Project to provide pure and safe drinking water to CKD prone areas. The water supply scheme covers villages such as Malakapura, Saranasirigama, Dahamigama, Sudukanda-nikawewa coming under two GN Divisions namely Agbopura and Thambalawewa under Hingurankoda Divisional Secretariat. In addition, Singhaudagam GN division will also be benefited from this water supply scheme. This GN Division is coming under the purview of Thamankaduwa Divisional Secretariat area. There are about 21 CKD patients who receive treatment and public donations from the government of Sri Lanka. The project area is situated about 3 Km away from the Polonnaruwa- Jayanthipura main road. The Thambalawewa road, which starts from Jayanthipura town leads the way to Thambalawewa and Agbopura and provide access to all the villages in the area .Extent of the land area in three GN Divisions is as follows. Thambalawewa- Sq. Km 2.5, Sudukandanikawewa- Sq. Km 4.5 and Singhaudagama- Sq. Km 7.

Table 5: Villages in GN Divisions.

Singhaudagama GN	Thambalawawa GN	Nikawewa GN.
SinghaUdagama, Aluthoya, 125 Gama etc.	Udakalagama and thambalawewayaya 14/8	Sudukanda, Dahamigama.

Table 6: Population Details

Singhaudagama GN		Thambalawewa GN		Sudukandanikawewa GN	
No. families	Population	No. families	Population	Families.	Population.
350	1423	293	1368	276	850

63. As per the population figures shown above, the proposed water supply scheme will serve about 3631 people in 1019 families living in three GN divisions. It can be mentioned that people of these areas are desperately in need the safe and pure drinking water supply.

64. Three tables given below show the age wise distribution of the population in three GN Divisions. Accordingly, it is easy to observe that there are vulnerable groups such as 310 children bellow five years and 101 senior citizens above 70 years in proposed water supply areas. Therefore, the proposed water supply scheme is a paramount need for the protection of healthy future generation.

Table 7: Age wise distribution of population. – Singhaudagama GN Division

Below 1year		1-5		5-18		18-30		30-60		60-70		Above70		Total	
F	M	F	M	F	M	F	M	F	M	F	M	F	M	**F**	**M**
66	59	96	89	102	118	115	98	213	194	86	77	52	51	**730**	**686**

Table 8: Age wise distribution of population. – Thambalawawa GN Division

Below 1year		1-5		5-18		18-30		30-60		60-70		Above70		Total	
F	M	F	M	F	M	F	M	F	M	F	M	F	M	**F**	**M**
6	3	43	33	264	267	168	169	146	141	39	38	31	20	**697**	**671**

Table 9: Age wise distribution of population. – Nikawewa GN Division

Below 1year		1-5		5-18		18-30		30-60		60-70		Above70		Total	
F	M	F	M	F	M	F	M	F	M	F	M	F	M	**F**	**M**
12	11	13	13	55	47	68	56	144	127	146	131	12	15	**450**	**400**

Table 10: Ethnic wise distribution of the population

GND	Singhala	Tamil	Muslim	Malay	Other	Total
Singhaudugama	1416	0	0	0	0	**1416**
THambalawewa	1368	0	0	0	0	**1368**
Nikawewa	850	0	0	0	0	**850**

Table 11: Religions wise distribution of population

GND	Buddhist	Hindu	Islam	Christian	Other	Total
Singhaudagama.	1390	0	0	0	0	**1390**

GND	Buddhist	Hindu	Islam	Christian	Other	Total
Thambalawewa	1359	0	0	9	0	**1368**
Nikawewa	850	0	0	9	0	**850**

65. The above tables show that there is no diversity in relation to the religion and ethnicity in these villages. All are Singhalese and Buddhists except 18 Christians. But it is easy to understand that there will not be an ethnic conflict in these areas. The community members further mentioned that the whole village community is working collectively and living harmoniously. There are about 30 Community Based Organizations in these three GN Divisions and all these families have taken membership in CBOs and participate actively in social activities.

Table 12: Employment status

GND	Government Sector		Private Sector.		Self Employment (Agri.)		Self-Employment (Non Agri.)		Labor.		Foreign employment.	
	M	F	M	F	M	F	M	F	M	F	M	F
Singhaudagama	28	22	34	76	210	95	56	48	125	55	12	25
Thambalawawa	9	88	12	24	61	45	103	140	-	-	4	9
Nikawewa.	8	4	13	11	45	21	14	11	-	13-	-	6

M-Male F-Female

66. **Employment Status:** The table shows that men and women are equally sharing employment opportunities available to them. These figures match with the figures in the table related to the education level. Most of the educated people have been able to find employment in some or the other organizations, majority of self-employed persons are engaged in agricultural activities. However those who live in Thambalawewa village are mostly engaged in self-employment other than agriculture. In all three divisions, considerable number of people have taken up employment in foreign countries. It is important to note that majority of migrant workers are women.

Table 13: Housing Status

GN Division	Walls			Roof			
	Bricks	Cement/ Stone	Other	Roof tile	Asbestos	Tagrams	Other
Singhaudagama	430	-	10	15	310	110	5
Thambalawawa	263	5	5	124	140	4	5
Nikawewa	254	21	1	251	23	1	1

67. **Housing &Sanitation: Housing** condition of the beneficiary group is satisfactory. Majority of them live satisfactorily completed houses. Further it is observed that they all have satisfactory toilets. Few people have to build own toilets as they share toilet facility in day today life.

Table 14: Toilet facilities

GN Division	Separate toilet for the house	Sharing toilet facility	Using common toilet
Singhaudagama	438	10	5
Thambalawawa	243	25	-
Nikawewa	256.	-	-

68. **Toilet facilities**: As shown in the table 14, majority of the residences have own their toilets in gardens. According to the field observations they have sufficient land space to build toilets in their gardens too. With the provision of water supply to many residences, the sewage collection and impact on the environment will be negligible.

69. **Marketing:** Community members in these villages go to Jayanthipura town to do purchasing and marketing. There are about 28 small boutiques in villages to buy day today needs. According to the community members they do not have problem to buy their needs. Only problem is selling their paddy harvest at a reasonable price. The government agencies are lethargic and private sector traders and mill owners try to purchase at the lowest rate. According to them a permanent arrangement should be made to purchase the total paddy production of farmers at a reasonable price.

70. **Health:** There is a child and maternal care clinic in the Nikawewa village. Medical officers from MOH office come periodically to conduct this clinic. Community members go to Jayanthipura hospital for other treatments. However, as mentioned earlier, the CKD issue has become a serious problem in these areas. Doctors from Hingurakgoda and Thamankaduwa MOH offices come to villages to screen the community members for CKD. According to information from the MOH offices and the community, each GN Division has about 7 to 10 CKD patients. According to the doctors when they screen 200 people, the number of average positive cases of CKD is around 7 people.

Table 15: Education

GND	1-5 years	6-11 years	O-L	A-L	Graduate
Singhaudagama.GN	661.	273	104	78	0
Thambalawawa GN	371	457	301	109	6
Nikawewa GN	311	252	107	89	0

71. **Education:** Community members in these villages are interested in education and send all their children to schools. The Above table shows that considerable number of parents also has reached the O-L or A-L in their education. There is a school in Thambalawewa village. For higher education children go to schools in Girithale, Jayanthipura and Polonnaruwa. Our discussions with community members revealed that the general awareness of the community is satisfactory.

Table 16: Gender distribution in population

Singhaudagama GN			Thambalawewa GN			Nikawewa GN		
Male	Female	Total	Male	Female	Total	Male	Female	Total
686	730	**1416**	671	697	**1368**	450	400	**850**

72. **Gender:** Gender distribution figures the sex ratio is similar to provincial sex ratio. There are 209 women headed families compared to 810 men headed families in these three GN Divisions. These figures clearly show that the women take lead role in running a few families due various circumstances like men working abroad etc.

73. The total figure for the whole Thamankaduwa DS Division is 2453 women headed families as compared to 16205 men headed families. Table related to employment status shows that the women have been able to maintain their contribution in all aspects.

74. **Drinking water:** Following table shows that majority of community members take water from wells in their villages. During public consultation people informed that water from wells in these areas is not safe for drinking. Another important aspect is that these areas have been identified as a dangerous zone in relation to CKD patients. Discussion with community members revealed that about 7 people have lost their lives due to CKD. At present there are about 36 people who have been identified as acute CKD patients, are receiving treatment. Doctors at Hingurakgoda MOH office mentioned that they conduct regular clinics to screen the patient and refer the cases to Hingurakgoda and Polonnaruwa hospitals.

75. **Source of water supply: However** the community members are paying extra attention on drinking water and at present all the people are accustomed to buy purified water. According to them, the price of a litre of drinking water is about Rs.2.00. In our discussions with the community they appreciated the project and pledged all the support to implement the project smoothly.

Table 17: Source of water supply

GN Division	Protected well	Unprotected well	Tube well	Pipe born water (NGOs laid)	Natural sources
Singhaudagama.	330	28	3	94	-
Thambalawawa.	57	34	3	5	4
Nikawewa.	32	14	5	6	-

76. The households in the project areas do not have protected piped water supply drinking water except in few stretches where NGOs supplied pipe born water which according to the people is also not clean and not properly chlorinated as shown in the table 17.

77. **Communication:** As elsewhere in the country, the community members use modern instruments for communication. Majority of people use mobile phones for their communication needs. Expansion of land line shows a slow development in these villages.

Table 18: Availability of communication facility

Singhaudaga	Thambalawea	Sudukanda Nikawewa
Mobile. 90%/ Land 10%	Mobile 93%/ Land 7%	Mobile 92%/ Land 8%

78. **Electricity:** At present, almost all the people have electricity with the new program of the government. Our field visit confirmed that all the houses even in remote areas have got electric connections (EC). Following table was prepared with the information collected from the Grama Niladharies of three Divisions and the Technical Officer at the Hingurakgoda PS.

Table 19: Electricity

Singhaudagam.		Thambalawea		Sudukanda Nikawewa	
With EC	Without EC	With EC	Without EC	With EC	Without EC
98%	2%	97%	3%	98%	2%

EC: Electricity

E. Social and Cultural Characteristics

79. **Transport Service:** There is a bus service to these villages from Jayanthipura. The community members use the service to fulfill their transport needs. There is only one bus travel between the village and the town. The bus makes three trips per day. But more than 95% of community members own a bicycle or three wheels for their traveling.

80. **Temples:** About 99% of the people in the proposed project area are Buddhists and visit Buddhist temples regularly. Five temples including Bendiwewa temple, Thabalagamuwa temple, Saransirigama temple have situated in these villages. It is not easy to see places of worship of other religions in the project area.

81. **Schools:** Two schools namely Thambalawewa School and Agbopura School are two main schools situated in the project area. In addition; three primary level schools in the concerned project area are also attended by children of these villages.

F. Site Specific Description of Environmental Conditions

82. The NWS&DB has laid pipes up to the Gurukula School in Thambalawewa. Along the Bendiwewa road from this location, residential areas mixed with home gardens, abandoned lands and few forest patches are situated at both sides of the road for about 6.5 km. The green belt is observed along this stretch of the road at both sides. At 6+600Km, on the Left Side of the ROW, a seasonal stream is crossing the road and flows down towards the North–East direction.

83. After the asphalt road stretch, concrete road section starts and runs about 5 km. Along this concrete road, there are residential areas mixed with agricultural areas and abandoned gardens. Beyond the concrete road section, gravel road section starts and runs towards the deep rural areas where houses in poor condition can be seen. The people of these areas walk a long distance to fetch water. Also, they walk to water tanks situated in the neighborhood for bathing.

84. The gravel road running is dived at a point and runs to three directions further inside of rural areas. It is understood that the people of these areas do need the water supply from NWSDB as water scarcity is serious at many months of the year. As well, the ground water level also is situated at far deep as observed in dug wells. Hence, it is very difficult for the rural community living in the proposed project area to get pure drinking water. It is observed that in the Saranasirigama village area, Angammedilla National Park is situated about 200m away from the village boundary.

85. Angammedilla National Park is one of the National parks in Sri Lanka. This National Park was declared in 1988 in order to protect the drainage basin of the Parkrama Saumdraya and Minneriya and Girithale irrigation tanks, water sources in Sudu Kanda (Sinhala for "White hill") and habitats and wildlife of the adjacent forests.

V. ANTICIPATED IMPACTS AND MITIGATION MEASURES

86. **Screening and assessment of potential impacts.** The subproject is considered small-scale and potential environmental impacts have been assessed using ADB Rapid Environmental Assessment Checklist for Water Supply (Appendix 5) then potential negative impacts were identified in relation to pre-construction, construction and operation of the improved infrastructure.

A. Pre-Construction

87. Discussions were carried out with design engineers about technical solutions to mitigate environmental impacts arising during implementation period of the subproject. Subsequently the subproject was looked at in the light of environmental concerns and construction methodologies complying with CEA and ADB SPS 2009.

88. Although there are some potential adverse environmental impacts, they are mostly temporary and localized. The net environmental impacts are positive and large. However, Potential negative impacts for subproject categories are summarized in Table 20. These can largely be avoided through proper subproject design or mitigated through adopting proper mitigation measures and management of the project which will be incorporated into contractors' contract documents. The consent letters have been obtained from Higurakgoda and Thamankaduwa Pradeshiya shabhas to carry our civil works within the ROW of roads as shown in the appendix 15.

B. Construction

89. Based on the REA Checklist, the subproject is unlikely to cause significant adverse impacts because: (i) only pipe laying along roads will be carried as major construction activities (ii) predicted impacts during construction are localized and likely to be associated with the construction process and are produced because the process is invasive, involving excavation and earth movements; and (iii) areas where civil construction activities are to go have no specific biodiversity impacts as only few smaller trees will be uprooted.(iv) no water ways or sensitive flood areas are intercepted during the construction.(v) no resettlement activities or relocation of utilities are needed as existing ROW is used for laying pipes.(vi) no voluntary or involuntary land acquisition is required (vii) minor traffic condition may be created along roads and near some commercial establishments due to piling of materials and equipment. The potential impacts identified include impact on air quality due to increased dust generation, increased noise levels, generation and disposal soil, traffic flows and increased soil erosion due to excavation works.

90. When working during dry periods, dust generation could be anticipated in project areas and it may slightly affect residences and commercial establishments close to roads and to road users. Systematic watering in excavated sections will be mitigate the issue.

91. Noise level should be below 75dB(A). Machines used for drilling and mixing of concretes should not produce the sound level above 75db(A) and it should be measured using relevant equipment. Additionally, sound controlled devices on machineries and equipment need to be adopted as per CEA environmental regulations.

92. The trenches will be dug by the workforce as per engineering designs and as a result, the excavated soil is loaded to a lorry by a backhoe once the back filling is completed. Excavated soil will be covered with a tarpaulin cover while transporting. It will minimize the impacts on the environment and health of the people due to emissions of dust in the wind.

93. Excavation along existing road sections using medium level backhoe to lay PVC pipes will create minor scale impacts for road users. Proper traffic management system with appropriate sign boards should be established by the contractor.

94. It is advised to carry out the construction activities during the dry season especially from June to September of the year and avoid the construction during the rainy season as it will induce soil erosion and create run off condition on the site. Therefore to avoid soil erosion and increased silt run-off, excavated soil should not be stockpiled at the site and taken away as soon as the back filing is finished.

95. There will be no damage and interruption to the public utilities. Laying PVC pipes in trenches along roads may sometimes disturb the existing utility lines like Telecom lines, access to residences or other existing structures such as culverts and drains. NWSDB has already identified such locations and will inform the contractor for necessary relocation or precautions if needed. Systematic and careful cutting of the earth and refilling after burying pipes will avoid potential damages on existing utilities and other permanent structures. Technical designs will also explain construction procedures. However, as per field observations, few small trees will have to be uprooted for laying of pipes.

96. Space is available in surrounding areas of the project for construction materials storage and staging area. Thus stock piling of construction materials, natural drainage paths at the site and surrounding will not be disturbed.

97. Storage of PVC pipes, other related materials and construction equipment should not be done along road sides. The overall construction program period needs to be shortened using sufficient labour force and equipment as it will minimize the inconvenience on residents, commercial establishments and other transport services at construction sites.

98. Construction workers will be deployed from neighborhood to worksites.

99. The construction activities will be conducted during daylight hours to minimize the disturbances to local residents. Due to construction activities, access to the business premises located may be disturbed during the day time. This could be reduced through adopting temporary access provisions and traffic sign boards as business accesses should not be disturbed unnecessarily. It is needed to mention that project area has no a widely spread business network rather few small shops scattered in the area. It is needed to inform the businessmen in advance about the proposed construction program for better preparedness for proposed construction activities.

100. All organic and other forms of solid wastes generated will be disposed to CEA approved disposal yards. The excavated soil will be disposed to disposal yards directly.

101. Construction impacts from construction of the water supply system will cause inconvenience to the people in the area. The contractor should attempt to minimize inconveniences on people finishing off scheduled works in a specific area before opening another area for construction. It is important to maintain cleanliness of the construction area during the progress of work.

102. Natural drainage patterns in the project area will not be impacted by the construction activities as no diversion of canal or waterways will be made during the implementation of project activities.

103. Land use pattern and livelihood activities including paddy field works will not affected by the project activities as the construction will be carried out only along the right of way of the road

(ROW) without invading private lands, residential areas and forest areas situated in the vicinity of the construction area.

104. Construction activities may cause harm and danger to the lives and welfare of workers. Potential impacts are negative and long-term but reversible with the implementation of mitigation measures.

105. **Mitigation measures.** As discussed above, the potential impacts identified during construction include impacts on air quality due to increased dust generation, increased noise levels, increased traffic flows due to road excavations for laying pipes and dumping of soils along roads, drainage issues due to piling of materials and disposal of soil, solid waste generation due to camping and increased soil erosion due to excavation works. Measures to mitigate the potential impacts are presented in Table 21. Both the contractor and NWSDB will be responsible for mitigation activities and monitoring of effectiveness of these measures. Supervision of the activities has to be done mainly through the respective SPCU and CLG.

C. Operation and Maintenance

106. The proposed water supply scheme will be operated and maintained by NWSDB. A sound operational and maintenance plan and schedules will be formulated by NWSDB prior to commissioning of the sub project.

107. Potential environmental impacts during operations and maintenance of the sub project include (i) possible water leakages through pipe joints (ii) generation of additional sludge and frequent back wash operations for cleaning filters and; (iii) increased sewage due to improved water supply system; and (iv) illegal water connections and wastage of water

108. This will be involved with regular checking and recording of performance for signs of deterioration, servicing and replacement of parts, etc. A small number of people will be employed to operate and maintain the water supply system.

109. The main requirement for maintenance of the transmission and distribution system will be for the detection and repair of leakages. Generally the existing flat topography and usage of good quality PVC pipes for construction ensures that pipeline breaks and water leakages are very rare and are mainly limited to joints between pipes. The repair of household connections and the provision of new connections to increase the number of people will reduce the incidence of illegal connections that are often a major source of leakages. There may be occasions to carry out pipe repairs based on the routine maintenance or on public complaints.

110. Monitoring of water quality and quantity should be done on regular basis by NWS&DB during the operational period. The water quality tests should be done by NWS&DB and relevant MOH office.

111. Increased in sewage is anticipated due to improved water supply system. However, this impact is assessed to be not significant and can be mitigated as results of the socio-economic survey which shows about the availability of sanitation facilities in households.

112. **Mitigation measures.** As discussed above, the potential impacts identified during operation and maintenance include (i) possible water leakages through pipe joints (ii) generation of additional sludge and frequent back wash operations for cleaning filters and; (iii) increased

sewage due to improved water supply system; and (iv) illegal water connections and wastage of water. Measures to mitigate the potential impacts are presented in Table 21. NWSDB will be responsible for mitigation activities and monitoring of effectiveness of these measures.

113. Table 20 summarizes the potential impacts at different phases of subproject implementation, severity and duration. It can be seen that the potential impacts are during construction and operation and maintenance are not significant and temporary in duration. Table 21 provides the mitigation measures to ensure that impacts are within acceptable limits and remain insignificant throughout subproject implementation.

Table 20: Environmental Impacts during Construction and Operational Phases

Activity	Potential Negative Impacts	Severity	Duration
Pre-Construction Phase	Obtaining permits for use of ROW for burying pipe lines	N	T
	Approvals obtained for burrowing of earth	M	T+P
Construction Phase	Traffic congestion during road excavation	M	T
	Damages to existing roads	M	T
	Increased Noise and dust	N	T
	Impacts on existing habitats	N	T
	Damages to natural drainage pattern	N	T
	Waste generation and camping around	M	T
	Occupational health and safety	M	T+P
	Community health and safety	N	T
Operational Phase	Increased in sewage generation	N	T+P
	Possible negative impacts due to poor operation and maintenance (O&M) systems on the project by NWS&DB	N	T
	Possible negative impacts to quality and quantity of water supplied by the project and other water intakes	N	T
	Possible negative impacts to PVC pipes laid along roads due to allowing of all heavy vehicles to be parked	M	T
	Generation of waste materials	N	T

N - Negligible, M - Moderate, S - Severe, T - Temporary, P - Permanent

Table 21: Mitigation Measures for Potential Environmental Impacts

Activity	Potential Negative Impacts	Mitigation Measures
Pre-Construction Phase	Permits to be obtained for cutting trees	Cut down branches of trees rather than removing.
	Approvals obtained for burrowing of earth	Source the materials from qualified suppliers.
Construction Phase	Traffic congestion during road excavation	To implement a proper traffic control plan using sign boards, barricade tapes, and flag men.
		Alternative spaces to store materials/ park machineries need to be arranged.
	Damages to existing roads	Excavations to be carried out after study of design drawings. It will minimize unnecessary damages on roads
		Small to medium size machineries will be used for narrow roads.

Activity	Potential Negative Impacts	Mitigation Measures
	Dust generation	Regularly spray water on excavated soil surface to minimize generation of dust.
		When transporting all materials such as earth, sand and cement, cover them with tarpaulin to avoid spillage of materials and production of dust due to wind.
		Appropriate measures shall be in place to minimize the emissions of dust while handling, loading/unloading of materials
		Avoid transporting of excavated soils and mud during rainy days
	Increased noise level	Construction activities be carried out only during day time from 7am to 5.pm every day and limited night work be done for the concrete slabs. All machineries used in this regard will have noise control devices to reduce the sound level below 75 db as specified by CEA environmental regulations and as shown in the Appendix 8.
	Impacts on existing habitats	No endemic or endangered tree species are damaged and to control soil erosion, plant more trees in the project area and the neighborhood
	Damages to natural drainage pattern	No impact for drainage flow as drainage flows down along roads and surrounding areas.
	Waste generation and camping around	The solid wastes generated need to be removed to appropriate disposal yards
	Occupational health and safety	- Employ workers with adequate experience, training, and know-how. - These workers shall be led by an experienced supervisor or engineer, who will provide the leadership in daily activities. - A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: (i) no alcohol/drugs on site; (ii) prevent excessive noise; (iii) construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility); (iv) no fires permitted on site except if needed for the construction works; (v) trespassing on private/commercial properties adjoining the site is forbidden; (vi) other than pre-approved security staff, no workers shall be permitted to live on the construction site; and (vii) no worker

Activity	Potential Negative Impacts	Mitigation Measures
		may be forced to do work that is potentially dangerous or that he/she is not trained to do. - The contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. If necessary, the EE and/or a translator shall be called to the site to further explain aspects of environmental or social behavior that are unclear. - The rules that are explained in the worker conduct section must be followed at all times.
	Community health and safety	- Contractor's activities and movement of staff will be restricted to designated construction areas. - Should the construction staff be approached by members of the public or other stakeholders, staff shall assist them in locating the SPCU or contractor, or provide a number through which they may contact the SPCU or contractor. - The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from the site by the SPCU. - Disruption of access for local residents, commercial establishments, institutions, etc. must be minimized and must have the SPCU's permissions. - Provide walkways and metal sheets where required to maintain access for people and vehicles. - Consult businesses and institutions regarding operating hours, and factor this in work schedules. - The contractor is to inform neighbors in writing of disruptive activities at least 24 hours beforehand. This can take place by way of leaflets placed in the postboxes giving the SPCU's and contractor's details or other method approved by the SPCU. Provide sign boards for pedestrians to inform them of nature and duration of construction works and contact numbers for concerns/complaints. - The contractor will ensure that there is provision of alternate access to business establishments during the construction, so that there is no closure of these shops or any loss of clientage. - The contractor will ensure that any damage to properties and utilities will be restored or compensated to pre-work conditions. - Lighting on the construction site shall be pointed downwards and away from oncoming

Activity	Potential Negative Impacts	Mitigation Measures
		traffic and nearby houses. - The site must be kept clean to minimize the visual impact of the site. - If screening is being used, this must be moved and re-erected as the work front progresses. - Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors. - Notice of particularly noisy activities must be given to residents/businesses adjacent to the construction site. Examples of these include: noise generated by jackhammers, diesel generator sets, excavators, etc. - Noisy activities must be restricted to the times given in the project specification or general conditions of contract. - The SPCU and contractor are responsible for ongoing communication with those people who are interested in or affected by the project. - A complaints register (refer to the grievance redressal mechanism) shall be housed at the site office. This shall be in carbon copy format, with numbered pages. Any missing pages must be accounted for by the contractor. This register is to be tabled during monthly site meetings. - Interested and affected parties need to be made aware of the existence of the complaints book and the methods of communication available to them. - The contractor must address queries and complaints by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to the SPCU's attention immediately; and (iv) taking remedial action as per SPCU's instruction. - The contractor shall immediately take the necessary remedial action on any complaint/grievance received by him and forward the details of the grievance along with the action taken to the SPCU within 48 hours of receipt of such complaint/grievance.
Operation and Maintenance Phase	Increased in sewage generation	The local community has well-built sanitation facilities and will manage the sewage generated
	Possible negative impacts due to poor operation and maintenance (O&M) systems on the project by NWS&DB	Measures will be taken to avoid poor operation and maintenance systems for the entire water project.
	Possible negative impacts to quality and quantity of water supplied by the project and other water intakes	Water quality and quantity tests to be carried out on regular basis (dry and wet periods) and No diversion of water from the primary water intakes to irrigation or other means.
	Possible negative impacts to PVC pipes	Pipelines laid in the passage of road

Activity	Potential Negative Impacts	Mitigation Measures
	laid along roads due to allowing of all heavy vehicles to be parked	ROW Is located far from parking areas
	Generation of waste materials	Collect solid wastes and dispose to CEA approved disposal yards

VI. PUBLIC CONSULTATION AND INFORMATION DISCLOUSURE

A. Consultations Conducted

114. Consultations with stakeholders, NWSDB engineers, and CEA have been conducted to discuss engineering and potential environmental issues. The main issues raised at the meetings include requests of clean drinking water to arrest the growth of CKD patients in the area, support to be extended from the local community, willingness to donate land plots if needed, formation of local society to resolve environmental and social issues and monitor the project works, request of awareness programs to be conducted, equal distribution of water supply throughout the day, request of water connections to all the households, efficient communication for water pipe repairs and renovation of pipes and joints in the future.

115. In order to gather the public views on shaping the technical design and community friendly implementation process, public consultation meeting was held with the participation of all relevant stakeholders and in the presence of NWSDB staff at the Sri Jinendraramaya temple. Thambalawewa, on 18th February 2016. NWSDB explained technical, social and environmental aspects and health benefits to be delivered due to execution of the subproject in the area. Appendix 6 provides the report on public consultation.

116. Recommendations of the public consultation

(i) It is required to provide water connections to all households in the area
(ii) It is required to extend the water supply line by another 300 m from Angamadil area.
(iii) People willing extend the co-operation for implementation of the project.
(iv) The environmental and social issues will be resolved with the participation of local community.

Table 22: Summary of the Public Consultation Conducted

Date of consultation meeting	Place held	Consultation tool	Aim of the meeting	Participants	Issues raised
08/02/2016	At the Sri Jinendraramaya temple.	Group discussion and individual interviews	To educate the People of Thambalawewa about the potential environmental and social issues and delivery of pure drinking water with the support of	Local residents of Thambalawewa and officers from Thamankaduwa PS, DS,NWSDB and SPCU, RDC, Forest Department and Grama Niladari	Water connections to all households, bad ground water quality, change of the technical design, resolving social and environmental issues and reducing CKD

Date of consultation meeting	Place held	Consultation tool	Aim of the meeting	Participants	Issues raised
			NWSDB and PMU		patients in the future through provision of clean drinking water and extension of water supply system.

B. Future Consultation and Disclosure

117. The public consultation and disclosure program with stakeholders will remain a continuous process throughout the project implementation. During the construction and operation of the project, public and institutional consultation will continue, if there would be any necessity for discussing issues in respect of change of designs in association with Contractor and NWSDB. In order to avoid undue delays in implementation and completion of the project, it is required to identify the issues and points to be discussed at this stage and hold discussions with relevant organizations, institutions, CBOs and NGOs in the subproject site.

118. As well, minutes of the meeting recorded need to be attached to IEE report and the progress reports produced during the project period. The points discussed for adoption in the construction and operation activities has to be performed for enhancing the trust and mutual understanding of all stakeholders of the project.

C. Disclosure of information

119. Disclosure of information at an early stage of the project has many benefits such as to avoid any objections by the public towards successful project implementation, passing of misinformation in to the hands of public through misinformed means.

120. While disclosure of information can be done through the Divisional Secretariat and the Grama Niladari (village administrative officer) of the area, Farmer Based Organizations (FBOs), Community Based Organizations (CBO) and village societies are also possible sources of disseminating project related information.

121. Village leaders such as the head priest of the temple can also be resource persons for such an activity. The use of mass media to advertise the availability of the report could help information disclosure to other interested groups outside the subproject site.

122. According to the requirements of the ADB SPS, the draft IEE will be disclosed in ADB website before the Management Review Meeting (MRM) is held. The IEE report in Tamil/Sinhala versions also will be kept open for the public and other interested parties for comments at offices of NWSDB, DS secretary and PMU. The IEE will also be disclosed at the project website **www.puraneguma.lk** and will be kept available for reference in the office of the subproject coordination unit at Anuradhapura, North Central Province.

VII. GRIEVANCE REDRESS MECHANISM

123. Project-specific grievance redress mechanism (GRM) has been established to receive, evaluate, and facilitate the resolution of affected person's concerns, complaints and grievances about the social and environmental performance of LGESP. The GRM of the project has been prepared and accepted by ADB and disclosed in the project website The GRM chart providing information on receipt of complaints and levels of redressal is displayed in all subproject sites, local authorities' offices, SPCU offices and other important places. The SPCU records all grievances received and address them on priority. To date all grievances are addressed at the stage of first tier.

124. The GRM aims to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project. The GRM is project-specific and not intended to bypass the government's own redress process; rather it is intended to address affected people's concerns and complaints promptly, making it readily accessible to all segments of the affected people and is scaled to the risks and impacts of the project.

125. The PMU and SPCUs will make the public aware of the GRM through public awareness campaigns. Grievances can be filed in writing using the Complaint Register and Complaint Forms (Appendix 7) or by phone with any member of the PMU or SPCU. The contact details of the respective SPCUs will serve as a main avenue for complaints and will be publicized through display on notice boards outside their offices and at construction sites. The safeguard documents made available to the public in an accessible version will include information on the GRM and will be widely disseminated throughout the corridor by the safeguards officers in the PMU and SPCUs.

126. **First tier of GRM.** The SPCU is the first tier of GRM which offers the fastest and most accessible mechanism for resolution of grievances. The Safeguards Manager – Social and Gender in the SPCU will be designated as the key officer for grievance redress. Resolution of complaints will be done at the earliest. Investigation of grievances will involve site visits and consultations with relevant parties (e.g., affected persons, contractors, traffic police, etc.). The Community Development Officer of the local authority or in the absence of Community Development Officer, any officer who is given the responsibility of this, would coordinate with the safeguards and gender manager of SPCU in redressing the grievances. Grievances will be documented and personal details (name, address, date of complaint, etc.) will be included unless anonymity is requested. A tracking number will be assigned for each grievance, including the following elements:

(i) Complaint Register and Complaint Forms (including the description of the grievance) with an acknowledgement of receipt given to the complainant when the complaint is registered;
(ii) Grievance monitoring sheet with actions taken (investigation, corrective measures); and
(iii) Closure sheet (Result of Grievance Redressal), one copy of which will be handed to the complainant after he/she has agreed to the resolution and signed-off.

127. The updated register of grievances and complaints will be available to the public at the SPCU office, construction sites, and other key public offices. Shall the grievance remain unresolved it will be escalated to the second tier.

128. **Second Tier of GRM.** The Social Safeguards and Gender Manager of SPCU will activate the second tier of GRM[1] by referring the unresolved issue (with written documentation), The Grievance Redress Committee (GRC) will be established before commencement of site works. A hearing will be called with the GRC, if necessary, where the affected person can present his and/or her concern or issues. The process will facilitate resolution through mediation. This local GRC will meet as necessary when there are grievances to be addressed. The local GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision at the earliest. The contractor will have observer status on GRC. If unsatisfied with the decision, the existence of the GRC will not impede the complainant's access to the Government's judicial or administrative remedies.

129. The safeguards and gender manager of SPCUs will be responsible for processing and placing all papers before the GRC, maintaining database of complaints, recording decisions, issuing minutes of the meetings and monitoring to see that formal orders are issued and the decisions carried out.

130. **Third tier of GRM.** In the event that a grievance cannot be resolved directly by the SPCUs (first tier) or GRC (second tier), the affected person can seek redress through third tier at the central level. The third tier - Central Grievance Redressal Committee consists of (i) Project Director as Chairman; and (ii) Legal Officer of MPCLG as member and Social Safeguard and Gender Officer of PMU as Member Secretary.

131. In case the grievance is not solved at this level, then the complainant can refer the same to the court of law.

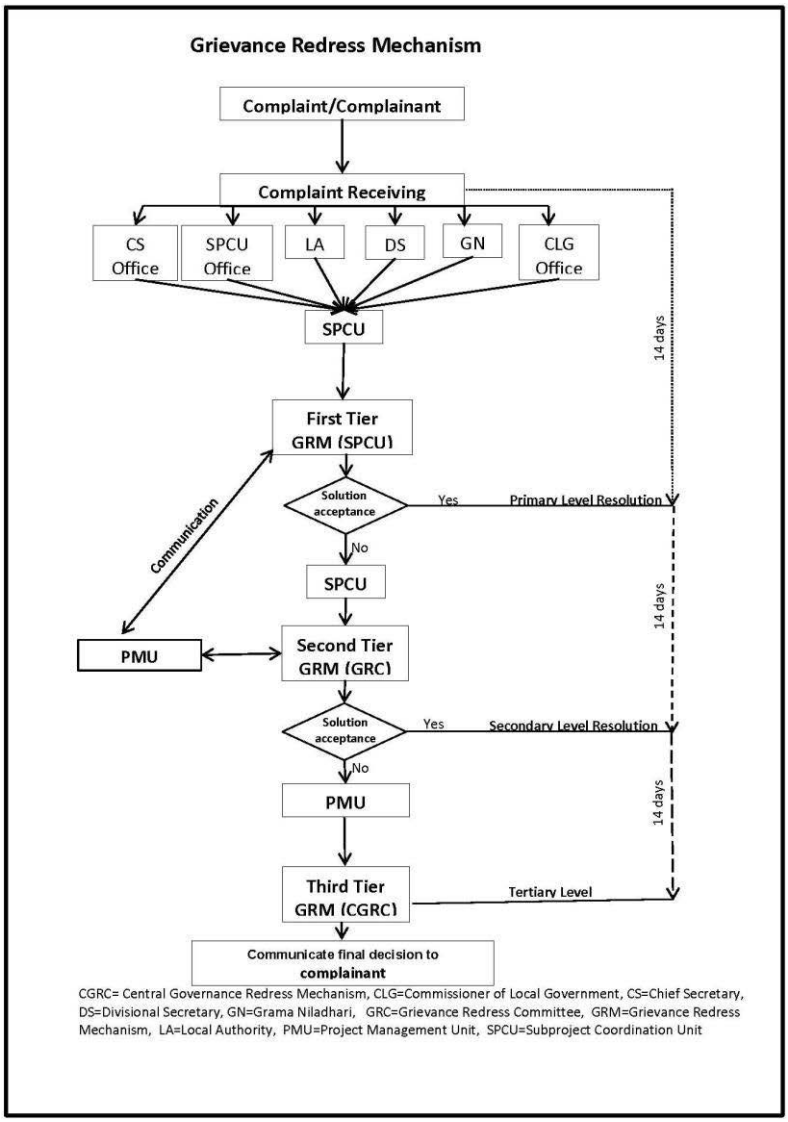
132. The detailed GRM is hosted in the project website.

133. The safeguard monitoring reports will include the following aspects pertaining to progress on grievances: (i) number of cases registered with the GRC, level of jurisdiction (first, second and third tiers), number of hearings held, decisions made, and the status of pending cases; and (ii) lists of cases in process and already decided upon may be prepared with details such as name, ID with unique serial number, date of notice, date of application, date of hearing, decisions, remarks, actions taken to resolve issues, and status of grievance (i.e. open, closed, pending).

134. All costs involved in resolving the complaints (meetings, consultations, communication and reporting and/or information dissemination) will be borne by the executing agency.

[1] The GRC will consist of the following persons (i) Commissioner of Local Government of the Province as Chairman, (ii) Divisional Secretary of the area; (iii) Chairman of the respective pradeshiyasabha; (iv) representative of nongovernment organizations and/or community based organizations working in the area as nominated by CLG; (v) Member of clergy of pradeshesiya area; (vi) Chairman of Samathamandal; (vii) GramaNiladhari of the area; (vii) Social Safeguard and gender Manager-as Member Secretary of the GRC. The functions of the local GRC are as follows: (i) resolve problems quickly and provide support to affected persons arising from various issues including environmental and social issues.

Figure 1: Tiers of GRM



VIII. ENVIRONMENTAL MANAGEMENT PLAN

135. An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels.

136. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between PMU, SPMU, consultants and contractors. The EMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (i) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (ii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iii) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (iv) ensure that safety recommendations are complied with. The EMP includes a monitoring program to measure the environmental condition and effectiveness of implementation of the mitigation measures.

137. The contractor will be required to submit to SPMU, for review and approval, a site environmental plan (SEP) including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEP; and (iv) budget for SEP implementation. No works are allowed to commence prior to approval of SEP.

138. A copy of the EMP/approved SEP will be kept on site during the construction period at all times. The EMP included in the bid and contract documents. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

A. Safeguards Implementation Arrangements

139. The MPCLG is the executing agency. A National Steering Committee, headed by the Secretary of MPCLG, will provide policy guidance to the project. A ministerial committee, also headed by the Secretary of MPCLG, will be responsible for decisions on overall approvals and operational policies of the project.

140. A PMU in the MLGPC, headed by a Project Director, will be responsible for overall coordination, management, administration, project implementation, monitoring, and supervision. The PMU will function as the project office of the executing agency, will be in-charge of subproject appraisal and approval, and will ensure compliance with ADB loan covenants. An Environment Safeguards Officer (PMU ESO) will have the following responsibilities: (i) support project director in addressing all environment-related safeguards issues of the project; (ii) implement the EARF; (iii) monitor physical and on-physical activities under the Project; (iv) monitor implementation of safeguards plans; (v) guide the SPCUs as and when necessary; and (vi) endorse and/or submit periodic monitoring reports received from SPCU to the PMU , project director, who will then submit these to ADB. It will also coordinate with national and state agencies to resolve inter-departmental issues, if any.

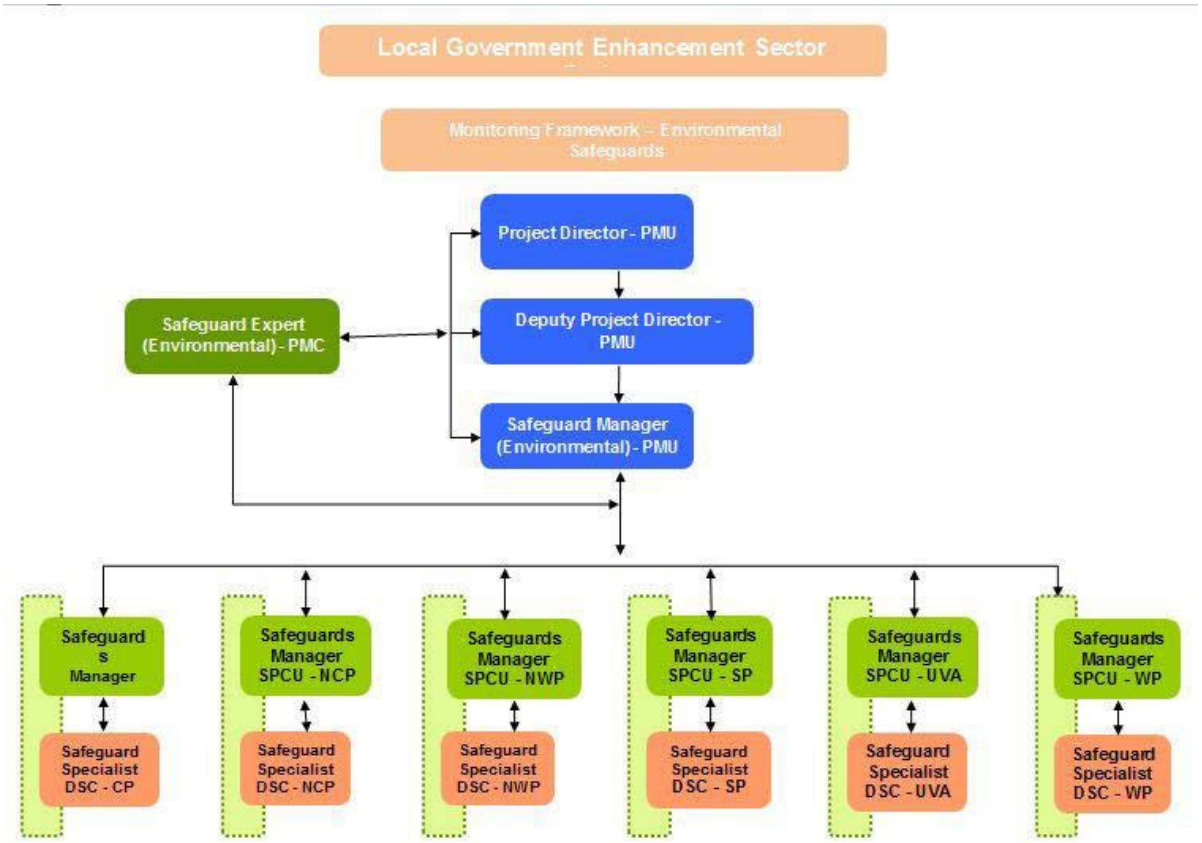
141. The PMU will be assisted by PMC Safeguard Specialist (PMC SS). The PMC SS will (i) review and finalize all reports in consultation with the PMU ESO; (ii) provide project management support, (iii) assure the technical quality of design and construction; (iv) review EIA/IEE/resettlement plan/indigenous peoples plan reports submitted by SPCUs; and (v) provide advice on policy reforms. In addition, the PMC SS will assist the PMU on the procurement needs and other project implementation aspects and shall play a central role in ensuring capacity building on environmental management of the PMU, contractors, and line departments through capacity development support and training.

142. SPCU in each of the seven provinces will take responsibility for supporting subproject preparation, screening and endorsement, procurement, implementation monitoring including quality control and assurance and ensuring safeguards compliance. It is essential that Provincial Councils provide clear guidance to the target Pradeshiya Sabhas in their development planning and subproject identification process, to ensure coherence with the provincial physical development plans and facilitate collaboration among neighboring local authorities possibly for joint infrastructure development. Each SPCU will be headed by the Commissioner of Local Government who will be assigned as the Provincial Project Director and will be the administrative head. For each SPCU, a senior engineer will be appointed as the executive head and will be in-charge of the day-to-day activities of the unit. The Safeguard Manager of SPCU will be responsible for: (i) review of the EIAs/IEEs prepared by DSCs as well as the implementation of the EMP provided in each EIA/IEE; (ii) undertake surveys and record their

observations throughout the construction period to ensure that safeguards and mitigation measures are provided as intended; (iii) implement and monitor safeguards compliance activities, public relations activities, gender mainstreaming activities and community participation activities; (iv) obtain statutory clearances from government agencies/other entities; and (v) coordinate for obtaining ROW clearances with related provincial and national agencies.

143. Environment Specialists will also be appointed as part of the DSC teams to (i) prepare IEEs in the detailed design stage; (ii) assist in the monitoring of EMP during construction stage; and (iii) prepare EIAs/IEEs for new subprojects, where required to comply with national law and/or ADB procedure.

Figure 2: Safeguards Implementation Arrangement



B. Institutional Capacity Development Program

144. The PMC SS will be responsible for training of PMU and SPCUs staff on environmental awareness and management in accordance with both ADB and government requirements. Specific modules customized for the available skill set shall be devised after assessing the capabilities of the target participants and the requirements of the project. The entire training will cover basic principles of environmental assessment and management; mitigation plans and programs, implementation techniques, monitoring methods and tools. Typical modules that will be present for the training session would be as follows: (i) sensitization; (ii) introduction to environment and environmental considerations in urban development projects; (iii) review of IEEs and integration into the subproject detailed design; (iv) improved coordination within nodal

departments; and (v) monitoring and reporting system. The proposed training program along with the frequency of sessions is presented in Table 23.

Table 23: Training Program for Environmental Management

Program	Description	Participants	Form of Training	Duration/ Location	Conducting Agency
A. Pre-Construction Stage					
Awareness Workshop	Awareness of requirements of environmental safeguard s in design, execution and managing the assets created under the project including procedures to be followed and approvals to be obtained.	Senior officers of MPCLG, NSC members and elected representatives of *Pradeshiya Sabhas*	Workshop	½ day	PMU with support of PMC and ADB (SLRM)
Sensitization Workshop	Introduction to Environment: Basic Concept of environment Environmental Regulations and Statutory requirements as per Government and ADB	*Pradeshiya Sabhas*, SPCU Staff	Workshop	½ Working Day	SPCU, DSC, PMU
Session I					
Module I	Introduction to Environment: Basic Concept of environment Environmental Regulations and Statutory requirements as per Government and ADB	*Pradeshiya Sabhas*, SPCU Staff	Lecture	½ Working Day	SPCU, DSC, PMU
Module II	Environmental Considerations in Urban Development Projects: Environmental components affected by urban development in construction and operation stages Activities causing pollution during construction and operation stages Environmental Management Good Practices in Urban Infrastructure Projects	*Pradeshiya Sabhas*, SPCU Staff	Workshop		SPCU, DSC, PMU
Module III	Review of IEE and its	*Pradeshiya*	Lecture	½	SPCU, DSC,

Program	Description	Participants	Form of Training	Duration/ Location	Conducting Agency
	Integration into Designs: IEE Methodology Environmental Provisions in the EMPs Implementation Arrangements Methodology of Assessment of Pollution Monitoring Methodology for site selection of burrow areas, waste disposal areas etc.	*Sabhas*, SPCU Staff	and Field Visit	Working Day	PMU
Module IV	Improved Coordination with other Institutions: Overview of the Project Environmental and Social Impacts Statutory Permissions Procedural Requirements Cooperation and Coordination with other Institutions. Requirement of target setting, team work and team building	*Pradeshiya Sabhas*, SPCU Staff	Lecture and/or Interactive Sessions		SPCU, DSC, PMU
Module V	Special Issues in the Project Bio-Diversity Assessment and Conservation Geomorphologic Assessment and Soil and Erosion Protection Statutory Permissions – Procedural Requirements Consultation and Counseling	*Pradeshiya Sabhas*, SPCU Staff	Lecture	½ Working Day	SPCU, DSC, PMU
	Working out responsibility chart and plan of action			½ Working Day	
B. Construction Stage					
Session II					
Module VI	Role during Construction Roles and Responsibilities of officials/ contractors/ consultants towards protection of	*Pradeshiya Sabhas*, SPCU Staff	Lecture and/or Interactive Sessions	½ Working Day	SPCU, DSC, PMU

Program	Description	Participants	Form of Training	Duration/ Location	Conducting Agency
	environment Implementation Arrangements Monitoring mechanisms Introducing necessities of auditing, checks and balances				
Module VII	Monitoring and Reporting System	*Pradeshiya Sabhas*, SPCU Staff	Lecture and/or Interactive Sessions	½ Working Day	SPCU, DSC, PMU

ADB = Asian Development Bank, DSC = Design and Supervision Consultants, MPCLG = Ministry of Provincial Councils and Local Government, PMU = project management unit, SLRM = Sri Lanka Resident Mission, SPCU = subproject coordination unit.

C. Staffing Requirement and Budget

145. The costs for environmental safeguard activities which are responsibilities of the PMC and DSC are included in respective consultant packages. The cost of mitigation measures during construction stage will be incorporated into the contractor's costs. Thus, remaining costs related to environmental safeguards cover the following activities:

(i) Conduct of IEE or EIA studies, preparing and submitting reports and public consultation and disclosure;
(ii) EPL applications, if required;
(iii) Conduct of environmental monitoring for baseline data generation and long-term surveys along with GIS based mapping and infrastructure system;
(iv) Replacement and maintenance of trees, if required; and
(v) Conduct of environmental capacity-building lectures and workshops for creating awareness.

146. The indicative costs of these various inputs are shown in Table 24.

Table 24: Indicative Cost of EMP Implementation

Item	Quantity	Unit Cost (US$)	Sub-total Cost (US$)	Source of Funds
Administrative Cost				
(i) Public Consultations	Lump sum per province (7 provinces)	$1,000	$7,000	Project Cost - PMU Costs (to be paid under incremental administration cost)
(ii) Environmental Monitoring				
(a) Design Stage to establish baseline environmental data	Lump sum per province (7 provinces)	$3,000	$21,000	Project Cost - PMU Costs (to be done under the guidance of PMC / SPCU by SPCU staff and accounted under incremental administration cost.
(b) Construction Phase		-	-	Civil Works Contractor Costs
(c) O&M		-	-	*Pradeshiya Sabhas'* cost

Item	Quantity	Unit Cost (US$)	Sub-total Cost (US$)	Source of Funds
(iii) Landscaping and tree-planting	Lump sum per province (7 provinces)	$2, 000	$14,000	Civil Works Contractor Costs
(iv) Capacity Building Expenses	Lump sum per province (7 provinces)	$1,000	$7,000	On job training is done by PMC / DSC - Any other workshops and/or sessions on these will be under Project Cost - PMU Costs and accounted under Capacity Building expenditure.

D. Environmental Management Plan

147. The contractor will be required to submit to SPMU, for review and approval, a site environmental plan (SEP) including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEP; and (iv) budget for SEP implementation. No works are allowed to commence prior to approval of SEP.

148. Table 25 shows the proposed environmental program for the project. It includes all relevant parameters, location, responsibility of mitigation and monitoring, method and frequency of monitoring.

E. Environmental Monitoring Program

149. Table 25 shows the proposed environmental program for the project. It includes all relevant parameters, location, responsibility of mitigation and monitoring, method and frequency of monitoring.

Table 25: Environmental Management Plan

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Source of Funds
Pre-Construction Phase	Permits to be obtained for cutting trees	Cut down branches of trees rather than removing.	Contractor	NWSDB, SPCU and CLG	Left trees in the project area	Contractor's, cost
	Approvals obtained for burrowing of earth	Source the materials from qualified suppliers.	Contractor	NWSDB SPCU and CLG	Field reports and observations	Contractor's, cost
Construction Phase	Traffic congestion during road excavation	To implement a proper traffic control plan using sign boards, barricade tapes, and flag men.	Contractor	NWSDB SPCU and CLG	Field reports and observations	Contractor's, cost
		Alternative spaces to store materials/ park machineries need to be arranged.	Contractor	NWSDB SPCU and CLG	Field reports and observations	Contractor's, cost
	Damages to existing roads	Excavations to be carried out after study of design drawings. It will minimize unnecessary damages on roads	Contractor	NWSDB SPCU and CLG	Field reports and observations	Contractor's, cost
		Small to medium size machineries will be used for narrow roads.	Contractor	NWSDB SPCU and CLG	Field reports and observations	Contractor's, cost
	Dust generation	Regularly spray water on excavated soil surface to minimize generation of dust.	Contractor	NWSDB SPCU and CLG	Field report and complaints if any	Contractor's, cost
		When transporting all materials such as earth, sand and cement, cover them with tarpaulin to avoid spillage of materials and production of dust due to wind.	Suppliers	NWSDB SPCU and CLG	Field report and complaints if any	Contractor's, cost

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Source of Funds
		Appropriate measures shall be in place to minimize the emissions of dust while handling, loading/unloading of materials	Contractor	NWSDB	Field report and complaints if any	Contractor's, cost
		Avoid transporting of excavated soils and mud during rainy days	Contractor/ Engineer/ Consultant	NWSDB SPCU and CLG	Field report and complaints if any	No cost
	Increased noise level	Construction activities be carried out only during day time from 7am to 5.pm every day and limited night work be done for the concrete slabs. All machineries used in this regard will have noise control devices to reduce the sound level below 75 db as specified by CEA environmental regulations and as shown in the Appendix 8.	Contractor	NWSDB SPCU and CLG	Noise reports	Contractor's cost
	Impacts on existing habitats	No endemic or endangered tree species are damaged and to control soil erosion, plant more trees in the project area and the neighborhood	Contractor	NWSDB SPCU and CLG	Field report and complaints if any	Contractor's cost
	Damages to natural drainage pattern	No impact for drainage flow as drainage flows down along roads and surrounding areas.	Contractor	NWSDB SPCU and CLG	Field report and complaints if any	Contractor's cost
	Waste generation	The solid wastes generated need to be	Contractor	NWSDB ,SPCU and CLG	Field reports	Contractor's cost

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Source of Funds
	and camping around	removed to appropriate disposal yards				
	Occupational health and safety	- Employ workers with adequate experience, training, and know-how. - These workers shall be led by an experienced supervisor or engineer, who will provide the leadership in daily activities. - A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: (i) no alcohol/drugs on site; (ii) prevent excessive noise; (iii) construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility); (iv) no fires permitted on site except if needed for the construction works; (v) trespassing on private/commercial properties adjoining the site is forbidden; (vi)	Contractor	NWSDB SPCU and CLG	OH&S Records	Contractor's cost

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Source of Funds
		other than pre-approved security staff, no workers shall be permitted to live on the construction site; and (vii) no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do. - The contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. If necessary, the EE and/or a translator shall be called to the site to further explain aspects of environmental or social behavior that are unclear. - The rules that are explained in the worker conduct section must be followed at all times.				
	Community health and safety	- Contractor's activities and movement of staff will be restricted to designated construction areas. - Should the construction staff be approached by members of the public or other stakeholders, staff shall assist them in locating the SPCU or contractor, or	Contractor	NWSDB SPCU and CLG	Complaints	Contractor's cost

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Source of Funds
		provide a number through which they may contact the SPCU or contractor. - The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from the site by the SPCU. - Disruption of access for local residents, commercial establishments, institutions, etc. must be minimized and must have the SPCU's permissions. - Provide walkways and metal sheets where required to maintain access for people and vehicles. - Consult businesses and institutions regarding operating hours, and factor this in work schedules. - The contractor is to inform neighbors in writing of disruptive activities at least 24 hours beforehand. This can take place by way of leaflets placed in the postboxes giving the SPCU's and contractor's details or other method approved by the SPCU. Provide sign boards for pedestrians to inform them of nature and duration of construction works and				

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Source of Funds
		contact numbers for concerns/complaints. - The contractor will ensure that there is provision of alternate access to business establishments during the construction, so that there is no closure of these shops or any loss of clientage. - The contractor will ensure that any damage to properties and utilities will be restored or compensated to pre-work conditions. - Lighting on the construction site shall be pointed downwards and away from oncoming traffic and nearby houses. - The site must be kept clean to minimize the visual impact of the site. - If screening is being used, this must be moved and re-erected as the work front progresses. - Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors. - Notice of particularly noisy activities must be given to residents/businesses adjacent to the construction site. Examples of these include: noise generated by jackhammers, diesel				

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Source of Funds
		generator sets, excavators, etc. - Noisy activities must be restricted to the times given in the project specification or general conditions of contract. - The SPCU and contractor are responsible for ongoing communication with those people who are interested in or affected by the project. - A complaints register (refer to the grievance redressal mechanism) shall be housed at the site office. This shall be in carbon copy format, with numbered pages. Any missing pages must be accounted for by the contractor. This register is to be tabled during monthly site meetings. - Interested and affected parties need to be made aware of the existence of the complaints book and the methods of communication available to them. - The contractor must address queries and complaints by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to the SPCU's attention immediately; and (iv) taking remedial action as per				

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Source of Funds
		SPCU's instruction. - The contractor shall immediately take the necessary remedial action on any complaint/grievance received by him and forward the details of the grievance along with the action taken to the SPCU within 48 hours of receipt of such complaint/grievance.				
Operation and Maintenance Phase	Increased in sewage generation	The local community has well-built sanitation facilities and will manage the sewage generated	Local community	Public health inspectors	Field reports and public health inspector's report	Not required
	Possible negative impacts due to poor operation and maintenance (O&M) systems on the project by NWS&DB	Measures will be taken to avoid poor operation and maintenance systems for the entire water project.	NWSDB	NWSDB	Field reports	Operational cost borne by NWSDB
	Possible negative impacts to quality and quantity of water supplied by the project and other water intakes	Water quality and quantity tests to be carried out on regular basis (dry and wet periods) and No diversion of water from the primary water intakes to irrigation or other means.	NWSDB	NWSDB	Field reports	Operational cost borne by NWSDB
	Possible negative	Pipelines laid in the passage of road ROW is	NWSDB	NWSDB	Field reports	Operational cost borne by NWSDB

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Source of Funds
	impacts to PVC pipes laid along roads due to allowing of all heavy vehicles to be parked	located far from parking areas				
	Generation of waste materials	Collect solid wastes and dispose to CEA approved disposal yards	NWSDB	NWSDB	Field reports	Operational cost borne by NWSDB

Table 26: Environmental Monitoring Program

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Location	Frequency
Pre-Construction Phase	Permits to be obtained for cutting trees	Cut down branches of trees rather than removing.	Contractor	NWSDB, SPCU and CLG	Left trees in the project area	Project area	Before commencing
	Approvals obtained for burrowing of earth	Source the materials from qualified suppliers rather attempting to burrowing from sites	Contractor	NWSDB SPCU and CLG	Field reports and observations	Location around	Before commencing
Construction Phase	Traffic congestion during road excavation	To implement a proper traffic control plan using sign boards, barricade tapes, and flag men.	Contractor	NWSDB SPCU and CLG	Field reports and observations	Project area	weekly
		Alternative spaces to store materials/ park machineries need to be arranged.	Contractor	NWSDB SPCU and CLG	Field reports and observations	Project area	Once three months
	Damages to existing roads	Excavations to be carried out after study of design drawings. It will minimize unnecessary damages on roads	Contractor	NWSDB SPCU and CLG	Field reports and observations	Project area	Once two months

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Location	Frequency
		Small to medium size machineries will be used for narrow roads.	Contractor	NWSDB SPCU and CLG	Field reports and observations	Project area	Once every month
	Dust generation	Regularly spray water on excavated soil surface to minimize generation of dust.	Contractor	NWSDB SPCU and CLG	Field report and complaints if any	Project area	weekly
		When transporting all materials such as earth, sand and cement, cover them with tarpaulin to avoid spillage of materials and production of dust due to wind.	Suppliers	NWSDB SPCU and CLG	Field report and complaints if any	Off the project site	weekly
		Appropriate measures shall be in place to minimize the emissions of dust while handling, loading/unloading of materials	Contractor	NWSDB	Field report and complaints if any	Project site	weekly
		Avoid transporting of excavated soils and mud during rainy days	Contractor/ Engineer/ Consultant	NWSDB SPCU and CLG	Field report and complaints if any	Project site and off the site	monthly
	Increased noise level	Construction activities be carried out only during day time from 7am to 5.pm every day and limited night work be done for the concrete slabs. All machineries used in this regard will have noise control devices to reduce the sound level below 75 db as specified by CEA environmental	Contractor	NWSDB SPCU and CLG	Noise reports	Project site	Daily

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Location	Frequency
		regulations and as shown in the Appendix 8.					
	Impacts on existing habitats	No endemic or endangered tree species are damaged and to control soil erosion, plant more trees in the project area and the neighborhood	Contractor	NWSDB SPCU and CLG	Field report and complaints if any	Project site	Once Six months
	Damages to natural drainage pattern	No impact for drainage flow as drainage flows down along roads and surrounding areas.	Contractor	NWSDB SPCU and CLG	Field report and complaints if any	Project site	Once three months
	Waste generation and camping around	The solid wastes generated need to be removed to appropriate disposal yards	Contractor	NWSDB, SPCU and CLG	Field reports	Project site	Once three months
	Occupational health and safety	- Employ workers with adequate experience, training, and know-how. - These workers shall be led by an experienced supervisor or engineer, who will provide the leadership in daily activities. - A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: (i) no alcohol/drugs on site; (ii) prevent	Contractor	NWSDB SPCU and CLG	OH&S Records	Project site	Monthly

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Location	Frequency
		excessive noise; (iii) construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility); (iv) no fires permitted on site except if needed for the construction works; (v) trespassing on private/commercial properties adjoining the site is forbidden; (vi) other than pre-approved security staff, no workers shall be permitted to live on the construction site; and (vii) no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do. - The contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. If necessary, the EE and/or a translator shall be called to the site to					

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Location	Frequency
		further explain aspects of environmental or social behavior that are unclear. - The rules that are explained in the worker conduct section must be followed at all times.					
	Community health and safety	- Contractor's activities and movement of staff will be restricted to designated construction areas. - Should the construction staff be approached by members of the public or other stakeholders, staff shall assist them in locating the SPCU or contractor, or provide a number through which they may contact the SPCU or contractor. - The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from the site by the SPCU. - Disruption of access for local residents, commercial establishments, institutions, etc. must be minimized and must have the SPCU's permissions. - Provide walkways and metal sheets where required to maintain	Contractor	NWSDB SPCU and CLG	Complaints	Project site	Monthly

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Location	Frequency
		access for people and vehicles. - Consult businesses and institutions regarding operating hours, and factor this in work schedules. - The contractor is to inform neighbors in writing of disruptive activities at least 24 hours beforehand. This can take place by way of leaflets placed in the postboxes giving the SPCU's and contractor's details or other method approved by the SPCU. Provide sign boards for pedestrians to inform them of nature and duration of construction works and contact numbers for concerns/complaints. - The contractor will ensure that there is provision of alternate access to business establishments during the construction, so that there is no closure of these shops or any loss of clientage. - The contractor will ensure that any damage to properties and utilities will be restored or compensated to pre-work conditions. - Lighting on the construction site shall be pointed downwards and away from oncoming traffic and nearby houses.					

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Location	Frequency
		- The site must be kept clean to minimize the visual impact of the site. - If screening is being used, this must be moved and re-erected as the work front progresses. - Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors. - Notice of particularly noisy activities must be given to residents/businesses adjacent to the construction site. Examples of these include: noise generated by jackhammers, diesel generator sets, excavators, etc. - Noisy activities must be restricted to the times given in the project specification or general conditions of contract. - The SPCU and contractor are responsible for ongoing communication with those people who are interested in or affected by the project. - A complaints register (refer to the grievance redressal mechanism) shall be housed at the site office. This shall be in carbon copy format, with					

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Location	Frequency
		numbered pages. Any missing pages must be accounted for by the contractor. This register is to be tabled during monthly site meetings. - Interested and affected parties need to be made aware of the existence of the complaints book and the methods of communication available to them. - The contractor must address queries and complaints by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to the SPCU's attention immediately; and (iv) taking remedial action as per SPCU's instruction. - The contractor shall immediately take the necessary remedial action on any complaint/grievance received by him and forward the details of the grievance along with the action taken to the SPCU within 48 hours of receipt of such complaint/grievance.					

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Location	Frequency
Operation and Maintenance Phase	Lowering water quality due to addition of affluent	No industries to be located around the water source and more Chlorine will be added to the water	NWSDB	NWSDB	Reports on maintenance operation	Water source	weekly
	Sludge generation	Collect in an underground chamber and allow for settling and remove the solid sludge to abandoned forest areas	NWSDB	NWSDB	Maintenance reports	MWTP	Daily
	Increased in sewage generation	The local community has well-built sanitation facilities and will manage the sewage generated	Local community	Public health inspectors	Field reports and public health inspector's report	Local area	Once three months
	Possible negative impacts due to poor operation and maintenance (O&M) systems on the project by NWS&DB	Measures will be taken to avoid poor operation and maintenance systems for the entire water project.	NWSDB	NWSDB	Field reports	MWTP and project area	Once every month
	Possible negative impacts to quality and quantity of water supplied by the project and other	Water quality and quantity tests to be carried out on regular basis (dry and wet periods) and No diversion of water from the primary water intakes to irrigation or	NWSDB	NWSDB	Field reports	MWTP and project site	Once month

Activity	Potential Negative Impacts	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Parameter/s to be Monitored	Location	Frequency
	water intakes	other means.					
	Possible negative impacts to PVC pipes laid along roads due to allowing of all heavy vehicles to be parked	Pipelines laid in the passage of road ROW is located far from parking areas	NWSDB	NWSDB	Field reports	Project site	Once three months
	Proper maintenance of Rapid Sand Filter (RSF)	Trained NWS&DB staff will be appointed to backwash RSF	NWSDB	NWSDB	Field reports	MWTP	Daily
	Generation of waste materials	Collect solid wastes and dispose to CEA approved disposal yards	NWSDB	NWSDB	Field reports	MWTP	Weekly

MWTP-Minneriya Water Treatment Plant

IX. MONITORING AND REPORTING

150. The PMU will continue to monitor and measure the progress of EMP implementation. The monitoring activities will be corresponding with the subproject's risks and impacts and will be identified in the EIAs/IEEs for the subprojects. The PMU and SPCUs will continue to undertake site inspections, document review to verify compliance with the EMP and progress toward the final outcome and recording information of the work, deviation of work components from original scope.

151. DSC will submit monthly monitoring and implementation reports to SPCU, who will take follow-up actions, if necessary. SPCU will submit the quarterly monitoring and implementation reports to PMU who will then submit to the project director. The PMU will submit semi-annual monitoring reports to ADB. The suggested monitoring report format is in Appendix 9. Project budgets will reflect the costs of monitoring and reporting requirements. For subprojects likely to have significant adverse environmental impacts during operation, reporting will continue at the minimum on an annual basis. Monitoring reports will be posted in a location accessible to the public.

152. For projects likely to have significant adverse environmental impacts, the executing agency will retain qualified and experienced external experts to verify its monitoring information. The executing agency will document monitoring results, identify the necessary corrective actions, and reflect them in a corrective action plan. The executing agency, in each quarter, will study the compliance with the action plan developed in the previous quarter. Compliance with loan covenants will be screened by the executing agency.

153. ADB will review project performance against the executing agency's commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the project's risks and impacts. Monitoring and supervising of social and environmental safeguards will be integrated into the project performance management system. ADB will monitor projects on an ongoing basis until a project completion report is issued. ADB will carry out the following monitoring actions to supervise project implementation:

(i) conduct periodic site visits for projects with adverse environmental or social impacts;
(ii) conduct supervision missions with detailed review by ADB's safeguard specialists/officers or consultants for projects with significant adverse social or environmental impacts;
(iii) review the periodic monitoring reports submitted by executing agency to ensure that adverse impacts and risks are mitigated as planned and as agreed with ADB;
(iv) work with executing agency to rectify to the extent possible any failures to comply with their safeguard commitments, as covenanted in the legal agreements, and exercise remedies to re-establish compliance as appropriate; and
(v) Prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

X. CONCLUSIONS AND RECOMMENDATIONS

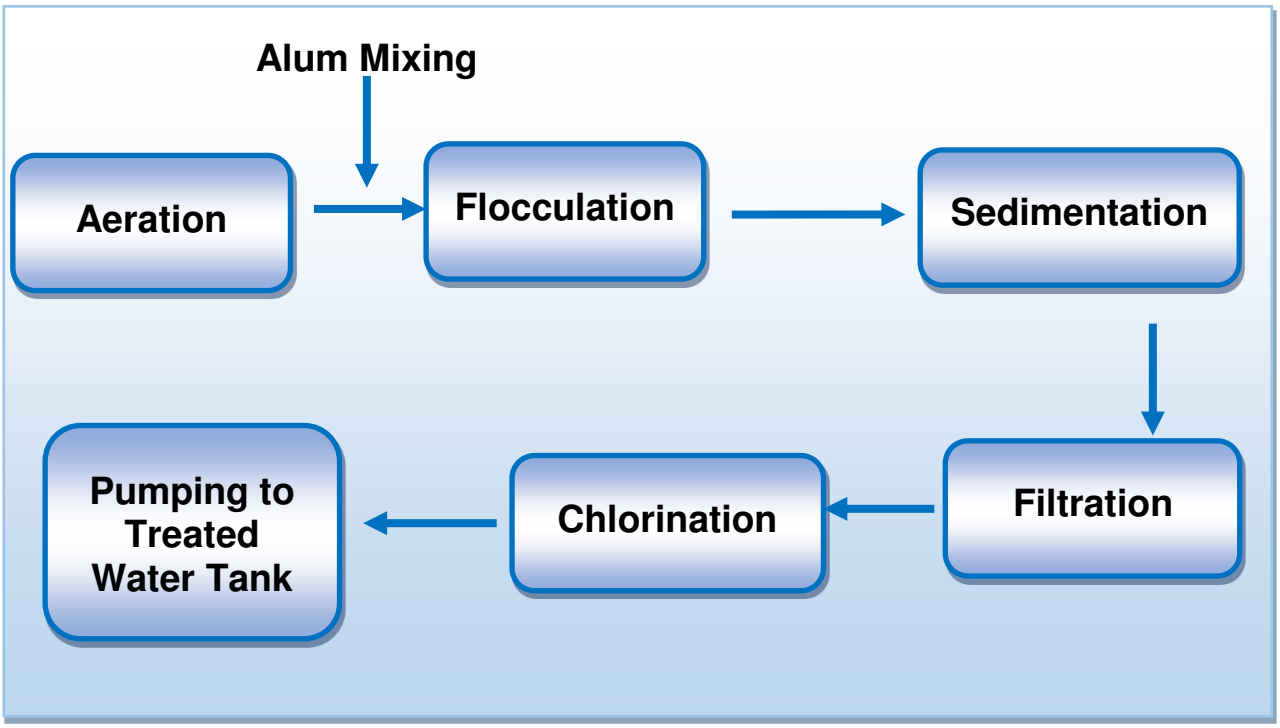
154. The negative environmental impacts arising due to execution of the proposed water supply scheme are minor and negligible as compared to the long term Socio-economic and health benefits to be delivered to people of the project area. During the dry period from June to August, water quantity and quality should be carefully assessed by NWS&DB / SPCU as the water level of the Minneriya water tank may go down due to climatic changes in the area. Negative impacts can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures as per EMP.

155. It is recommended that (i) IEE be made part of the bid and contract documents to ensure mitigation measures are appropriately budgeted and legally binding to the contractors; (ii) monitor diligently contractor/s EMP implementation by PMU, SPMU and consultants on EMP implementation by contractors; (iii) involve stakeholders in all phases of implementation and disclose relevant project related documents; and (iv) continue existing GRM process.

156. **Conclusion.** The subproject is unlikely to cause significant adverse impacts. As per ADB SPS, the subproject is classified as environmental Category B and does not require further EIA.

Appendix 1: Detailed Water Treatment Process

Figure 3: Detailed Water Treatment Process



Aeration:

The Minneriya water treatment plant is a conventional surface water treatment plant that has a fairly standard sequence of processes. At the same time, the process of aeration takes place by pumping the Pre-Chlorinated water through a special structure to mix with sufficient amount of Air/Oxygen. This aeration will dispel the bad odour, gases dissolved in water and reduce the water hardness to some extent. Depending on the PH value of water, lime liquid is added to increase the pH value. In addition, pre Chlorination is done to disinfect the raw water at the inception of the treatment process. By Pre-Chlorination, algae, biological matter like Bacteria and viruses are killed or neutralized in their Capacity to activate.

Flocculation:

After screening out large objects like fish and sticks, coagulant chemicals/ Alum (AlminiumSulfate) are added to the water to cause the tiny particles suspended in the water. The coagulants make the water cloudy to be attracted to each other and form “flocs.” Flocculation—the formation of larger flocs from smaller flocs—is typically achieved using gentle, constant mixing of the water to encourage particles and small floc to “bump” into each other, stick, and form larger floc. Once the flocs are large and heavy enough to be settled, the water moves into quiet sedimentation or settling basins.

Sedimentation:

Waters exiting in the flocculation basin enter the sedimentation basin or called it as a clarifier or settling basin. It is a large tank with low water velocities, allowing floc to settle to the bottom. The sedimentation basin is best located close to the flocculation basin. Hence, the transition between two processes does not permit the settlement or floc s to break up. The sedimentation basins are generally rectangular flowing from one end to another end for the effective sedimentation process. The particles settled down in the bottom are washed to the waste water tank called “Thinker” where the water is allowed to settle for 24 hours. After 24 hours, the super-nated water is passed through another pipe to separate chamber where super-nated water is released to a nearby natural water body after testing the water quality. This water analysis has proved that the water released after treatments meets the surface water quality standards of CEA. The sludge produced due to sedimentation is discharged to the forest areas where it can be absorbed to the surface of the soil. This forest area has sufficient ground cover to disperse the sludge in the area. However, the sludge lagoons or the dry beds need to be built up in order to remove the water and make the sludge dry in dry beds. It has been planned to establish dry beds in the second phase of the Capacity improvement of the Minneriya water treatment plant.

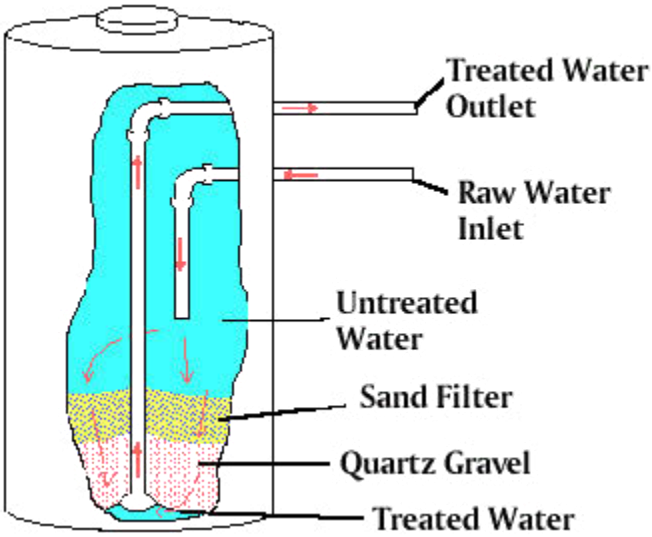
Filtration:

When most of the solids have settled out, the water is passed through rapid sand filters (RSF) that consist of top sand layer and granular or pebble type layer down the sand layer. This is a conventional shallow sand bed structure allowing to filter the water. The larger particles in the water retain on the top of the sand layer while the small particles of organic sediment left in the rapid sand filter are eaten by microscopic organisms including bacteria and protozoans which 'stick' in the layers of slime that form around the sand particles. The clean water which passes through the filter is safe to drink.

This RSF has much greater water treatment filtration rate and the ability to clean automatically using back wash system. The RSF does not use biological filtration and depends primarily on mechanical straining, sedimentation, impaction, interception, adhesion and physical adsorption. In the rapid sand water filter, the complete filtration cycle (filtration and back washing) occurs sequentially.

This rapid sand filters can be cleaned by passing water upward through the filter after blowing compressed air up through the bottom. This air blowing process breaks up the clog and allows to back wash with the water. The back wash water is passed through pipes and ends in a waste water tank where it can retain for about 2 hours. After settling the impurities, the water is released to the natural open water body. This water is much cleaner and meets the surface water quality standards of CEA as per required criteria.

Figure 4: Rapid Sand Filter



Chlorination:

Chlorination is used for disinfection of water and in the Minneriya treatment Plant, gas chlorination is used. Neutralization plant has been installed to overcome any hazardous accidents. 1000kg gas Chlorine tunners are being used in the treatment plant. Chlorine is added to the sump to disinfect the biological properties of water prior to distribution. Additional residual chlorine (RCL) is added to meet the standards of the Sri Lanka Standards Institute (SLSI) (0.2mg/l) at the last dead end of the distribution system. 20 minutes of retention period is provided for RCL at the storage tank.

Appendix 2: Results of Treated Water Quality Testing

NATIONAL WATER SUPPLY & DRAINAGE BOARD
REGIONAL LABORATORY, POLONNARUWA.
Tel : 027 2226652, Fax : 027 2226652, E mail : polonnaruwalab@gmail.com

1. WATER SUPPLY SCHEME : Minneriya
2. SAMPLE COLLECTED DATE : 2015.12.15
3. LABORATORY REG. NO. & SAMPLING POINT :

No.	Time of sampling	Sampling Point
833	14.46	Bore hole
834	14.49	Minneriya Raw water
835	15.03	Settled water
836	15.10	Filtered water
837	15.12	Sump
838	15.29	Tap near the School (Nagalakanda M.V.)
839	15.45	Tap at Puranagama
840	15.22	Tap at Batuoya
841	15.37	Tap at Kahatagahapitiya rd

4. SAMPLE COLLECTED BY : Chemist, Polonnaruwa.
5. REPORT REQUIRED BY : 1. District Engineer (Polonnaruwa)
   2. OIC Minneriya

Results:

Sri Lanka Standards SLS - 614 - 2013	Units	Maximum Requirement	833	834	835	836	837	838	839	840	841
Colour	Hazen	15	4.3	6.9	6.2	2.6	0.9	0.8	0.6	0.5	0.8
Turbidity	NTU	2	2.20	3.75	3.48	1.46	0.34	0.38	0.30	0.22	0.62
Electrical Conductivity	µs/cm		494	230	225	219	234	236	242	276	262
pH		6.5 - 8.5	6.98	7.46	7.66	7.67	7.36	7.26	7.23	7.41	7.43
Chloride(as Cl)	mg / l	250	16	6	-	-	6	-	-	-	-
Total Alkalinity (as $CaCO_3$)	mg / l	200	180	100	-	-	100	-	-	-	-
Total Hardness (as $CaCO_3$)	mg / l	250	160	90	-	-	100	-	-	-	-
Nitrates as N	mg / l	50	0.6	0.9	-	-	0.7	-	-	-	-
Nitrites as N	mg / l	3	0.005	0.027	-	-	0.003	-	-	-	-
Sulphate(as SO_4^{2-})	mg / l	250	12	03	-	-	11	-	-	-	-
Fluorides (as F)	mg / l	1.0	0.66	0.24	-	-	0.21	-	-	-	-
Total phosphate (as PO_4)	mg / l	2.0	1.47	0.27	-	-	0.23	-	-	-	-
Total Iron	mg / l	0.3	0.04	0.08	-	-	0.08	-	-	-	-
Free Ammonia	mg / l	0.06	-	0.16	-	-	0.02	-	-	-	-
Manganese	mg / l	0.1	0.70	-	-	-	-	-	-	-	-
Residual Alum	mg / l	0.2	-	-	-	-	0.068	-	-	-	-
Total Dissolved Solids	mg / l	500	284	174	144	140	150	150	184	177	168
Residual Chlorine	mg / l	1.0	-		-	-	0.82	0.98	0.12	0.52	0.23
BACTERIOLOGICAL QUALITY (SLS 614 - 2013)											
Coliform bacteria	Per 100 ml	0	0	360	-	-	0	0	0	0	0
E-Coli Bacteria	Per 100 ml	0	0	80	-	-	0	0	0	0	0

< : Less than

Recommendation:

Bacteriological, tested basic physical and chemical quality of the sample(Treated water) is satisfactory.

NATIONAL WATER SUPPLY & DRAINAGE BOARD
REGIONAL LABORATORY, POLONNARUWA.
Tel : 027 2226652, Fax : 027 2226652, E mail : polonnaruwalab@gmail.com

1. **WATER SUPPLY SCHEME** : **Minneriya**
2. **SAMPLE COLLECTED DATE** : **2015.11.11**
3. **LABORATORY REG. NO. & SAMPLING POINT** :

No.	Time of sampling	Sampling Point
782	14.38	Bore hole
783	14.44	Minneriya Raw water
784	14.50	Settled water
785	14.54	Filtered water
786	14.58	Sump
787	14.30	Tap near the School (Nagalakanda M.V.)
788	14.36	Tap at Puranagama
789	15.10	Tap at Batuoya
790	15.22	Tap at Kahatagahapitiya rd

4. **SAMPLE COLLECTED BY** : **Chemist, Polonnaruwa.**
5. **REPORT REQUIRED BY** : **1. District Engineer (Polonnaruwa)**
2. OIC Minneriya

Results:

Sri Lanka Standards SLS - 614 - 2013	Units	Maximum Requirement	782	783	784	785	786	787	788	789	790
Colour	Hazen	15	5.3	7.5	1.6	0.8	0.7	0.6	0.1	0.3	0.5
Turbidity	NTU	2	2.80	3.38	1.14	0.42	0.31	0.38	0.18	0.29	0.33
Electrical Conductivity	µs/cm		452	184	193	193	207	203	240	205	215
pH		6.5 - 8.5	6.83	7.33	7.27	7.35	7.17	7.23	7.37	7.32	7.28
Chloride(as Cl)	mg / l	250	12	6	-	-	6	-	-	-	-
Total Alkalinity (as $CaCO_3$)	mg / l	200	180	80	-	-	80	-	-	-	-
Total Hardness (as $CaCO_3$)	mg / l	250	170	60	-	-	70	-	-	-	-
Nitrates as N	mg / l	50	0.3	0.6	-	-	0.4	-	-	-	-
Nitrites as N	mg / l	3	0.004	0.002	-	-	0.002	-	-	-	-
Sulphate(as SO_4^{2-})	mg / l	250	09	01	-	-	12	-	-	-	-
Fluorides (as F)	mg / l	1.0	0.71	0.26	-	-	0.23	-	-	-	-
Total phosphate (as PO_4)	mg / l	2.0	0.98	0.36	-	-	0.37	-	-	-	-
Total Iron	mg / l	0.3	0.02	0.04	-	-	0.04	-	-	-	-
Free Ammonia	mg / l	0.06	-	0.10	-	-	<0.01	-	-	-	-
Manganese	mg / l	0.1	0.80	-	-	-	-	-	-	-	-
Residual Alum	mg / l	0.2	-	-	-	-	0.054	-	-	-	-
Total Dissolved Solids	mg / l	500	284	174	124	124	132	132	184	131	138
Residual Chlorine	mg / l	1.0	-	-	-	-	0.98	0.57	0.13	0.52	0.13
BACTERIOLOGICAL QUALITY (SLS 614 - 2013)											
Coliform bacteria	Per 100 ml	0	0	620	-	-	0	0	0	0	0
E-Coli Bacteria	Per 100 ml	0	0	244	-	-	0	0	0	0	0

< : Less than

Recommendation:

Bacteriological, tested basic physical and chemical quality of the sample(Treated water) is satisfactory.

09.12.2015

Appendix 3: National Drinking Water Quality Standards

DRINKING WATER QUALITY PARAMETERS

PHYSICAL AND CHEMICAL QUAILTY (SLS 614 : 2013)

No.	Sri Lanka Standards SLS 614 : 2013	Units	Maximum Requirement
1	Appearance		
2	Colour	Hazen	15
3	Turbidity	NTU	2
4	pH Value		6.5 – 8.5
5	Electrical Conductivity	µs/cm	-
6	Chloride (as Cl^-)	mg / l	250
7	Total Alkalinity (as $CaCO_3$)	mg / l	200
8	Total Hardness (as $CaCO_3$)	mg / l	250
9	Nitrate (as NO_3^-)	mg / l	50
10	Nitrite (as NO_2^-)	mg / l	3
11	Sulphate (as SO_4^{2-})	mg / l	250
12	Fluoride (as F^-)	mg / l	1.0
13	Total Phosphate (as PO_4^{3-})	mg / l	2.0
14	Total Iron as Fe	mg / l	0.3
15	Total Dissolved Solids	mg / l	500
16	Residual Chlorine (as OCl/HOCl)	mg / l	1.0
17	Manganese (as Mn)	mg / l	0.1
18	Magnesium (as Mg)	mg / l	30
19	Calcium (as Ca)	mg / l	100

BACTERIOLOGICAL QUAILTY (SLS 614: 2013)

No.	Type of Bacteria	SLS 614:2013	
		Pipe born water	Well water
1	Total number of all types of Coli form bacteria present in 100 ml sample at 37 °C	< 3	< 10
2	Number of *E. coli* in 100 ml of sample at 44 °C	0	0

PARAMETERS CONCERNING TOXIC SUBSTANCES

01	Arsenic (as As)	mg / l	0.01
02	Cadmium (as Cd)	mg / l	0.003
03	Total Chromium (as Cr)	mg / l	0.05
04	Cyanide (as CN)	mg / l	0.05
05	Lead (as Pb)	mg / l	0.01
06	Mercury (as Hg)	mg / l	0.001
07	Selenium (as Se)	mg / l	0.01

Appendix 4: List of Flora and Fauna Found in the Vicinity of the Subproject Site

(a) The common faunal species identified in the project areas

Group	Species Name	Common Name	Local Name	Status
Mammals	*Herpestes smithi*	Mongoose	Hothambuwa	Indigenous
	Sus scrofa	Wild boar	WalUra	Indigenous
Birds	*Gallus lafayetii*	Sri Lanka Jungle fowl	Walikukula	Endemic
	Magalaima zeylanica	Brown headed Barbet	Polos Kottaruwa	BrR
	Oriolus xanthomus	Black-hooded Oriole	Kahakurulla	BrR
	Loriculus beryllinus	Sri Lanka Hanging parrot	Gira Malitta	Endemic
Reptiles	*Varanus bengalensis*	Land monitor	Thalagoya	Indigenous
	Varanus salvator	Water monitor	Kabaragoya	Indigenous
	Daboia russelli	Russell's viper	Tith polonga	Indigenous
Butterflies	*Graphium agamemnon*	Green iay	Kola Papilla	Indigenous
	Catopsilia pomona	Lemon emigrant	Kaha piyasariya	Indigenous
	Melanitis phedima	Dark Evening Brown		Indigenous

BrR-Breeding Resident

(b) List of Flora in the project area

Species Name	Common name	Life form	Conservation Status
Manilkara hexandra	Palu	Tree	Native
Chloroxylon swietenia	Burutha	Tree	Native
Drypetes sepiaria	Weera	Tree	Native
Phyllanthus emblica	Nelli	Tree	
Azadirachta indica	Kohomba	Tree	Native
Dimocarpus longan	Mora	Tree	Native
Diospyros ebenum	Kaluwara	Tree	Native
Flueggea leucopyrs	Katu pila	Shrub	Native
Tamarindus indica	Siyabala	Tree	Introduced
Ziziphus oenoplia	Eraminiya	Liana	Native
Limonia acidissima	Divul	Tree	Native
Chloroxylon swietenia	Burutha	Tree	Native
Tragia plukenetii	Walkahabiliya	shrub	Native

Appendix 5: Completed ADB REA Checklist for Water Supply

Screening Questions	Yes	No	Remarks
A. PROJECT SITING IS THE PROJECT AREA…			
• Densely populated?		✓	The population distribution shows that the subproject areas are not densely populated and mainly residential area.
• Heavy with development activities?		✓	
• Adjacent to or within any environmentally sensitive areas?			No protected areas/ecologically sensitive areas along the pipe alignments.
• Cultural heritage site		✓	
• Protected area		✓	
• Wetland		✓	
• Mangrove		✓	
• Estuarine		✓	
• Buffer zone of protected area		✓	
• Special area for protecting biodiversity		✓	
• Bay		✓	
B. POTENTIAL ENVIRONMENTAL IMPACTS Will the project cause…			
• Pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?		✓	Not applicable. Subprojects will involve network improvement only.
• Impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	Not applicable. There are no historical/cultural monuments/areas within or adjacent to subproject alignments.
• Hazard of land subsidence caused by excessive ground water pumping?		✓	Not applicable. Subprojects will involve network improvement only.
• Social conflicts arising from displacement of communities?		✓	No displacements required.
• Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		✓	Not applicable. Subprojects will involve network improvement only.
• Unsatisfactory raw water supply (e.g. Excessive pathogens or mineral constituents)?		✓	Periodic monitoring and analysis conducted by NWSDB on raw water from the sources indicate water quality parameters are within prescribed limits.
• Delivery of unsafe water to distribution system?		✓	Subprojects include extension of distribution network. Any distributed water will be treated and ensured to comply with the National Drinking Water Quality Standards.
• Inadequate protection of intake works or wells, leading to pollution of water supply? •		✓	Not applicable. Subprojects will involve network improvement only.
• Over pumping of ground water, leading to salinization and ground subsidence?		✓	Not applicable.

Screening Questions	Yes	No	Remarks
• Excessive algal growth in storage reservoir?		✓	Storage reservoirs are only for treated water. The water is chlorinated and the reservoirs covered to prevent algal growth.
• Increase in production of sewage beyond capabilities of community facilities?		✓	Not anticipated.
• Inadequate disposal of sludge from water treatment plants?		✓	Not applicable. Subprojects will involve network improvement only.
• inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		✓	Not applicable. Subprojects will involve network improvement only.
• impairments associated with transmission lines and access roads?	✓		Not anticipated. Road closures are not required during pipelaying works. A section-wise approach will limit impairments to traffic and businesses during construction. The EMP ensures measures are included to mitigate the impacts.
• health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.		✓	Not applicable. Subprojects will involve network improvement only.
• health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards during project construction and operation?		✓	Not applicable. Subprojects will involve network improvement only.
• dislocation or involuntary resettlement of people?		✓	Not applicable.
• disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		✓	Not anticipated. The contractor will be encouraged to hire local workers from the local labor force.
• noise and dust from construction activities?	✓		Anticipated during construction activities. Temporary increase in noise level and dusts may be caused by excavation equipment, and the transportation of equipment, materials, and people. The impacts are negative but short-term and site-specific within a relatively small area, and reversible through mitigation measures. Good construction practices will mitigate noise and dust, and will be specified in the EMP.
• increased road traffic due to interference of construction activities?	✓		Anticipated during construction activities. The impacts are negative but short-term and site-specific within a relative small area and reversible through mitigation measures. Traffic management will be specified in the EMP.
• continuing soil erosion/silt runoff from	✓		Due to excavation and run-off from

Screening Questions	Yes	No	Remarks
construction operations?			stockpiled materials. The impacts are negative but short-term and site-specific within a relatively small area and reversible through mitigation measures. Good construction practices will mitigate soil erosion and silt runoff and will be specified in the EMP.
• delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?		✓	Not applicable. Subprojects will involve network improvement only.
• delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		✓	The project will included development of O&M manuals to ensure facilities are kept in working condition, including checking and maintenance of distribution network. Any distributed water must comply with the National Drinking Water Quality Standards.
• accidental leakage of chlorine gas?		✓	Not applicable. Subprojects will involve network improvement only.
• excessive abstraction of water affecting downstream water users?		✓	Not applicable. Subprojects will involve network improvement only.
• competing uses of water?		✓	
• increased sewage flow due to increased water supply		✓	Not applicable. Households have adequate sanitation facilities
• increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant		✓	
• large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	The additional financing will improve existing systems, through capacity building and institutional development to ensure reduced burden on services and infrastructure due to population influx.
• social conflicts if workers from other regions or countries are hired?		✓	Priority in employment will be given to local residents.
• risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?		✓	Not applicable. Construction will not involve use of explosives and chemicals.
• community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	✓		Work areas will be clearly demarcated with signage and safety barriers, and access will be controlled. Only workers and project concerned members will be allowed to visit the operational sites.

Screening Checklist Prepared By:	W.M. Lalith Perera
Position:	Environmental Specialist
Date Prepared:	21.01 2016

Appendix 6: Records of Public Consultation

Date : February 18, 2016
Time : 2.30 Pm.
Venue : Sri Jinendraramaya Temple. Thambalawewa.

Participants:

- Chief Incumbent Bikku- Sri Jinendraramaya
- Safeguard consultant. RDC.
- Safeguard Manager.- SPCU-NC.
- Public Health Inspectors- Hingurakgoda and Thamankaduwa
- Officer In charge- Bandiwewa water board.
- Range Officer- Department of Wild Life.
- Technical officers- Thamankaduwa and Hingurakgoda PS and PRDA.
- Grama NIladari- Thambalawewa, Sudukandanikawewa and Singhaudagama.
- Samurdhi Officers- Thambalawewa, Sudukandanikawewa and Singhaudagama.
- Development officers- Thamankaduwa DS Division.
- Public Health Midwife- Hingurakgoda and Thamankaduwa.
- Community members. Attendance sheets attached.

The community consultation meeting was summoned with the assistance of Grama Niladhari and the officers from the PS and DS offices in Hingurakgoda and Thamankaduwa. The Chief Incumbent Bikku of Jinendraramaya also contributed positively and effectively to organize the meeting. Main objective of the meeting was to explain the design related to water supply scheme and get the consent of the community and other stake holders

Main topics discussed

- Objectives of the water supply project and contribution of LGESP and ADB
- Laying of pipe line for water supply scheme and related design
- Services provided by the sub project especially in relation to CKD
- GRM mechanism

Process of the meeting:

The chief incumbent Bikkuvenerable GalporuyayePradeepaWansa Thero gave pansil and religious observation. Officers from PURANAGUMA (Safe guard consultant and Safe guard manager) explained the background of the project and the implementing process. Officer in charge from water board explained the technical aspect of the project and distribution network. After the initial discussions, the community members were given the plans of distribution network to get the feedback on necessary changes in laying of pipe line. Community members examined the maps and they were satisfied about the distribution network. However they wanted to give the water connection to all the houses in all three GN Divisions. At this point, technical officers and PURANAGUMA officer assured them that all people get water connections subject to one change which is the extension of the distributing pipe line by another 300 meters at the Nikawewasambodhi temple road area.

After the general discussion, three community members explained about the dearth need of safe and pure drinking water in the face of CKD issue. Speakers mentioned that the water they get from existing sources including pipe born water managed by Pradeshiya Saba and some

CBOs are not suitable for drinking. They mentioned that majority of people used to get purified drinking water at Rs 2/ per Liter. They explained that once they get drinking water from the proposed water scheme, water that come from existing sources can be used for other purposes such as washing and home gardening. Following three members expressed the views on behalf of the community.

- G.A. Indika Priyantha- Sudukand-nikawewa(Chairaman of CWSS)
- G.A. Samantha Kumara- Singhaudama (His father is a CKD patient)
- P.D. Jayaweera- Thambalawewa- CKD patient.

Finally all the community members expressed their gratitude towards the ADB and the LGESP for making arrangements to resolve one of the largest problems they face with the eruption of the CKD and other water related deceases.

Public Health Inspector- Mr. Susantha Amarasuriya explained about the dangerous situation that has been surfaced with the breakup of CKD situation. He clearly explained the impotency of drinking pure and safe drinking water in order to avoid all dangerous situations in relation to water related deceases. Further he mentioned that water supplied by the water board is safe and standard up to the quality. Further he requested all the community members to participate in screening process and follow advices given by the medical authority on prevention of CKD.

Safeguard consultant and the safeguard manager explained that support and cooperation of community members is very important in implementing the project activities smoothly. Further it was explained about the composition and responsibility of Grievance Redress Mechanism. Project monitoring committee was formed with the participation of community members and relevant officers with the aim of smoothly running the project at implementing level.

Community monitoring committee

- Priyantha Kumara-Singhaudagama- 0273900819.
- IndikaSujeewa-Nikawewa- 0755032944.
- C.G. Manjula.-Thambalawewa (W)
- Siriwardhana. Sdukanda 0719005327.
- D. G. Kumarathunga. 0725306024.
- Two GramaNiladhariesfom two Division.
- The Chief incumbent Bikku will help the team in conflict resolution.

පළාත් පාලන ආයතන ප්‍රවර්ධනය කිරීමේ ආංශික ව්‍යාපෘතිය - පුර නැගුම

වැඩසටහන: ....

ස්ථානය : ....

දිනය : ....

අංකය	සහභාගීවන්නාගේ නම / ප්‍රතිලාභියාගේ නම	තනතුර	කාර්යාලය	දුරකතනය	ස්ත්‍රී/පුරුෂ භාවය		අත්සන	වෙනත් (G/W/D/FH/P/C/L /L/O/Y)
					ස්ත්‍රී	පුරුෂ		
11	MKP නන්දනී				✓		නන්දනී	
12	G M දයාවතී				✓		දයා	
13	M.K.P [illegible]				✓		[illegible]	
14	L.G [illegible]				✓		[illegible]	
15	M.K.P රංජනී				✓		රංජනී	
16	M.K.P [illegible]					✓	[illegible]	
17	D.G [illegible]				✓		[illegible]	
18	P. [illegible]					✓	[illegible]	
9	S.G. පියදාස					✓	[illegible]	
20	R.G. [illegible]	ලේකම් ගු. සං. ස. [illegible]		0724215453		✓	[illegible]	

(W-වැන්දඹු D-ආබාධිත, FH - ස්ත්‍රී ගෘහමූලික ,P-සමෘද්ධිලාභී , C - ළමා, LL-ඉඩම් අහිමි , O - අනාථ, Y- තරුණ)

පළාත් පාලන ආයතන ප්‍රවර්ධනය කිරීමේ ආංශික ව්‍යාපෘතිය - පුර නැගුම

පුර නැගුම

වැඩසටහන:..

ස්ථානය :.. දිනය : ....

අංකය	සහභාගීවන්නාගේ නම / ප්‍රතිලාභියාගේ නම	තනතුර	කාර්යාලය	දුරකතනය	ස්ත්‍රී/පුරුෂ භාවය		අත්සන	වෙනත් (G/W/D/FH/P/C/L/L/O/Y)
					ස්ත්‍රී	පුරුෂ		
21	S. G. [illegible]				✓			[illegible]
22	T. ය [illegible]					✓		[illegible]
23	S. පී. [illegible]					✓		[illegible]
24	ද [illegible]					✓		[illegible]
25	R. [illegible]			027-[illegible] 109		✓		[illegible]
26	[illegible]					✓		[illegible]
27	S. P [illegible]			0722839131		✓		[illegible]
28	[illegible]			071[illegible]5007		✓	[illegible]	
29	Y B [illegible]					✓	[illegible]	
30	T. D. [illegible]			0712017376		✓	[illegible]	

(W-වැන්දඹු D-ආබාධිත, FH - ස්ත්‍රී ගෘහමූලික ,P-සමෘද්ධිලාභී , C - ළමා, LL-ඉඩම් අහිමි , O - අනාථ, Y- තරුණ)

පළාත් පාලන ආයතන ප්‍රවර්ධනය කිරීමේ ආංශික ව්‍යාපෘතිය - පුර නැගුම

වැඩසටහන:...

ස්ථානය :... දිනය : ....

අංකය	සහභාගිවන්නාගේ නම / ප්‍රතිලාභියාගේ නම	තනතුර	කාර්යාලය	දුරකතනය	ස්ත්‍රී/පුරුෂ භාවය		අත්සන	වෙනත් (G/W/D/FH/P/C/L /L/O/Y)
					ස්ත්‍රී	පුරුෂ		
31.	H.M. [illegible]	–	–	0718190068		✓		
32.	[illegible] ලීලාරත්න			0712121645		✓		
33	[illegible]				✓			
34	[illegible]			077-8654443	✓			
35	[illegible]	–	–	–	✓			
36	W. [illegible]	–	–	–		✓		
37	M.A [illegible]	–	–	–	✓			
38	S A [illegible]	–	–	–	✓			
39	[illegible]					✓		
40	[illegible]				✓			

(W-වැන්දඹු D-ආබාධිත, FH - ස්ත්‍රී ගෘහමූලික ,P-සමෘද්ධිලාභී , C - ළමා, LL-ඉඩම් අහිමි , O - අනාථ, Y- තරුණ)

පළාත් පාලන ආයතන ප්‍රවර්ධනය කිරීමේ ආංශික ව්‍යාපෘතිය - පුර නැගුම

වැඩසටහන: .....

ස්ථානය : .....

දිනය : .....

අංකය	සහභාගිවන්නාගේ නම / ප්‍රතිලාභියාගේ නම	තනතුර	කාර්යාලය	දුරකතනය	ස්ත්‍රී/පුරුෂ භාවය		අත්සන	වෙනත් (G/W/D/FH/P/C/L/L/O/Y)
					ස්ත්‍රී	පුරුෂ		
41	[illegible]					✓	[illegible]	
42	[illegible]				✓		[illegible]	
43	H [illegible]			0777855361	✓	✓	[illegible]	
44	H. [illegible]			076 8436067		✓	[illegible]	
45	M.A [illegible]				✓		[illegible]	
46	B. K [illegible]			072-8254335		✓	[illegible]	
47	RML.R [illegible]			0770763884	✓		[illegible]	
48	A.R.M [illegible]			[illegible]	✓		[illegible]	
49	S.G [illegible]			071 7334778	✓		[illegible]	
50	U.K.G. [illegible]			0726060223	✓		[illegible]	

(W-වැන්දඹු D-ආබාධිත, FH - ස්ත්‍රී හෘහමූලික ,P-සමාධිලාභී , C - ළමා, LL-ඉවත් අහිමි , O - අනාථ, Y- ත රැඟ)

පළාත් පාලන ආයතන ප්‍රවර්ධනය කිරීමේ ආංශික ව්‍යාපෘතිය - පුර නැගුම

වැඩසටහන:...

ස්ථානය :...

දිනය : ....

අංකය	සහභාගීවන්නාගේ නම / ප්‍රතිලාභියාගේ නම	තනතුර	කාර්යාලය	දුරකතනය	ස්ත්‍රී/පුරුෂ භාවය		අත්සන	වෙනත් (G/W/D/FH/P/C/L/L/O/Y)
					ස්ත්‍රී	පුරුෂ		
51	R.M. රාණි			–	✓		රාණි	
52	R.M. [illegible]				✓		[illegible]	
53	[illegible]				✓		[illegible]	
54	[illegible]				✓		[illegible]	
56	[illegible]					✓	[illegible]	
57	[illegible]				✓		[illegible]	
58	E.A. [illegible]			0719005326		✓	[illegible]	
59	[illegible]				✓		[illegible]	
60	[illegible]				✗	✓ ✗	[illegible]	
61	[illegible]			2		✓	[illegible]	

(W-වැන්දඹු D-ආබාධිත, FH - ස්ත්‍රී ගෘහමූලික ,P-සමෘද්ධිලාභී , C - ළමා, LL-ඉඩම් අහිමි , O - අනාථ, Y- තරුණ)

පළාත් පාලන ආයතන ප්‍රවර්ධනය කිරීමේ ආංශික ව්‍යාපෘතිය - පුර නැගුම

වැඩසටහන:.....

ස්ථානය :.....

දිනය : .....

අංකය	සහභාගිවන්නාගේ නම / ප්‍රතිලාභියාගේ නම	තනතුර	කාර්යාලය	දුරකතනය	ස්ත්‍රී/පුරුෂ භාවය		අත්සන	වෙනත් (G/W/D/FH/P/C/L/L/O/Y)
					ස්ත්‍රී	පුරුෂ		
62								
63						✓		
64						✓		
65						✓		
66						✓		
67						✓		
68						✓		
69						✓		
70				0275619868		✓		
71				0273900817		✓		
72				0719328560		✓		

(W-වැන්දඹු D-අබාධිත, FH - ස්ත්‍රී ගෘහමූලික ,P-සම්බන්ධීකරණ , C - ළමා, LL-ඉඩම් අහිමි , O - අනාථ, Y- ත රුණු)

පළාත් පාලන ආයතන ප්‍රවර්ධනය කිරීමේ ආංශික ව්‍යාපෘතිය - පුර නැගුම

වැඩසටහන: ....

ස්ථානය : ....

දිනය : 2016/02/18

අංකය	සහභාගීවන්නාගේ නම / ප්‍රතිලාභියාගේ නම	තනතුර	කාර්යාලය	දුරකතනය	ස්ත්‍රී/පුරුෂ භාවය		අත්සන	වෙනත් (G/W/D/FH/P/C/L/L/O/Y)
					ස්ත්‍රී	පුරුෂ		
73	[illegible]	"	"	"		✓	[illegible]	
74	[illegible]	[illegible]	157 [illegible]	071-1561121	✓		[illegible]	
75	[illegible]	[illegible]	157 [illegible]	0772889144	✓		[illegible]	
76	R.M.B.N. [illegible]	[illegible]	[illegible]	071-8357716		✓	[illegible]	
77	D.G.C [illegible]	[illegible] 46/46A	[illegible]	0725306024		✓	[illegible]	
78	G.A.I.P [illegible]	469/[illegible]	[illegible]	0753002944		✓	Indika	
79	H.M.P [illegible]	1674	"		✓		[illegible]	
80	J.M [illegible]	1675	"		✓		[illegible]	
81	M. [illegible]	T.O	[illegible]	0714466623	✓		[illegible]	
82	MU [illegible]	[illegible]	[illegible]			✓	[illegible]	

(W-වැන්දඹු D-ආබාධිත, FH - ස්ත්‍රී ගෘහමූලික ,P-සමෘද්ධිලාභී , C - ළමා, LL-ඉඩම් අහිමි , O - අනාථ, Y- තරුණ)

Appendix 7: Complaint Register and Complaint Forms

(To be available in Local Language)

The _____Project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Shall you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

Date	Place of registration		
Contact Information/Personal Details			
Name:		Gender: __Male ___ Female	Age:
Home Address			
Village / Town			
District			
Phone no.			
E-mail			
Complaint/Suggestion/Comment/Question Please provide the details (who, what, where and how) of your grievance below: If included as attachment/note/letter, please tick here: ___			
How do you want us to reach you for feedback or update on your comment/grievance?			

FOR OFFICIAL USE ONLY

Registered by: (Name of Official registering grievance)			
Verified thru:	___ Note/Letter	___ E-mail	___ Verbal/Telephonic
Reviewed by: (Names/Positions of Official(s) reviewing grievance)			
Action Taken:			
Whether Action Taken Disclosed:		____ Yes	___ No
Means of Disclosure:			

Appendix 8: Applicable Noise Level Standards

PERMISSIBLE NOISE LEVELS IN ACCORDANCE WITH NOISE CONTROL REGULATIONS

Maximum Permissible Noise Levels (as L_{Acq} T) at Boundaries of the land in which the noise source is located shall not exceed the limits set out below.

Area	L_{Acq} T, dB(A)	
	Day Time	**Night Time**
Low Noise (Pradeshiya Sabha area)	50	45
Medium Noise (Municipal Council/Urban Council area)	63*	50
High Noise (EPZZ of BOI & Industrial Estates approved under part IVC of the NEA)	70	60
Silent Zone (100 m from the boundary of a courthouse, hospital, public library, school, zoo, sacred areas and areas set apart for recreation or environmental purposes)	50	45

* Provided that the noise level should not exceed 60 dB (A) inside existing houses, during day time.

Maximum permissible Noise levels at Boundaries of the land in which the source of noise is located in L_{Acq} T for construction activities.

Construction Activities

L_{Acq} T, dB (A)

Day Time	Night time
75	50

The following noise levels will be allowed where the background noise level exceed or is marginal to the given levels in the above table.

(a) For low noise areas in which the background noise level exceeds or is marginal to the given level	Measured Background Noise level + 3dB (A)
(b) For medium noise areas in which the background noise level exceeds or is marginal to the given level	Measured Background Noise level + 3dB (A)
(c) For silent zone in which the background noise level exceeds or is marginal to the given level	Measured Background Noise Level + 3dB (A)

Appendix 9: Suggested Monitoring Report Format

SAMPLE SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT TEMPLATE

This template must be included as an appendix in the EIA/IEE that will be prepared for the project. It can be adapted to the specific project as necessary.

Introduction

- Overall project description and objectives
- Description of sub-projects
- Environmental category of the sub-projects
- Details of site personnel and/or consultants responsible for environmental monitoring
- Overall project and sub-project progress and status

No.	Sub-Project Name	Status of Sub-Project				List of Works	Progress of Works
		Design	Pre-Construction	Construction	Operational Phase		
		☐	☐	☐	☐		
		☐	☐	☐	☐		
		☐	☐	☐	☐		

Compliance status with National/ State/ Local statutory environmental requirements

No.	Sub-Project Name	Statutory Environmental Requirements	Status of Compliance	Action Required

Compliance status with environmental loan covenants

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance	Action Required

Compliance status with the environmental management and monitoring plan

- Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.
- There should be reporting on the following items which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the semi-annual report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:
    - What are the dust suppression techniques followed for site and if any dust was noted to escape the site boundaries;
    - If muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads;
    - adequacy of type of erosion and sediment control measures installed on site, condition of erosion and sediment control measures including if these were intact following heavy rain;

- Are their designated areas for concrete works, and refuelling;
- Are their spill kits on site and if there are site procedure for handling emergencies;
- Is there any chemical stored on site and what is the storage condition?
- Is there any dewatering activities if yes, where is the water being discharged;
- How are the stockpiles being managed;
- How is solid and liquid waste being handled on site;
- Review of the complaint management system;
- Checking if there are any activities being under taken out of working hours and how that is being managed.

Appendix 10: Summary Monitoring Table

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						
Operational Phase						

Overall Compliance with CEMP/ EMP

No.	Sub-Project Name	EMP/ CEMP Part of Contract Documents (Y/N)	CEMP/ EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed and Additional Measures Required

Approach and methodology for environmental monitoring of the project

- Brief description on the approach and methodology used for environmental monitoring of each sub-project

Monitoring of environmental Impacts on Project Surroundings (ambient air, water quality and noise levels)

- Brief discussion on the basis for monitoring
- Indicate type and location of environmental parameters to be monitored
- Indicate the method of monitoring and equipment to be used
- Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements

As a minimum the results should be presented as per the tables below.

Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Site No.	Date of Sampling	Site Location	Parameters (Monitoring Results)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Noise Quality Results

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Government Standard)	
			Day Time	Night Time

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Monitoring Results)	
			Day Time	Night Time

G. SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT

Project Name
Contract Number

NAME: _____ DATE: _____
TITLE: _____ DMA: _____
LOCATION: _____ GROUP: _____

WEATHER CONDITION:
_____

INITIAL SITE CONDITION: _____

CONCLUDING SITE CONDITION:

Satisfactory _____ Unsatisfactory _____ Incident _____Resolved _____ Unresolved _____

INCIDENT:
Nature of incident:

_____

_____

Incident Issues

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Inspection

Emissions	Waste Minimization
Air Quality	Reuse and Recycling
Noise pollution	Dust and Litter Control
Hazardous Substances	Trees and Vegetation

Site Restored to Original Condition Yes [ ] No [ ]

Signature

_____

Sign off

_____ _____

Name **Name**
Position **Position**

Appendix 11: References

1. ADB Safeguards Policy Statement, 2009
2. Forest Department, 2010. Integrated Strategic Environmental Assessment project, Northern Province, Forest Cover Assessment and Identification of Forests and Other Ecological Sensitive Areas for Conservation funded by UNDP.
3. Gunatillake, N., Pethiyagoda, R. and Gunatillake S.-2008-Biodiversity of Sri Lanka
4. National Environmental Act No 47 of 1980 and its amendments/Rules and regulations published in the Extraordinary Gazette Notifications in 1992 and 2006.
5. Sampath Pethikade of Thamankaduwa Divisional secretariat, 2014

Appendix 12: Maps related to the water supply sub project

Figure 5: Schematic diagram of Bendiwewa Scheme.

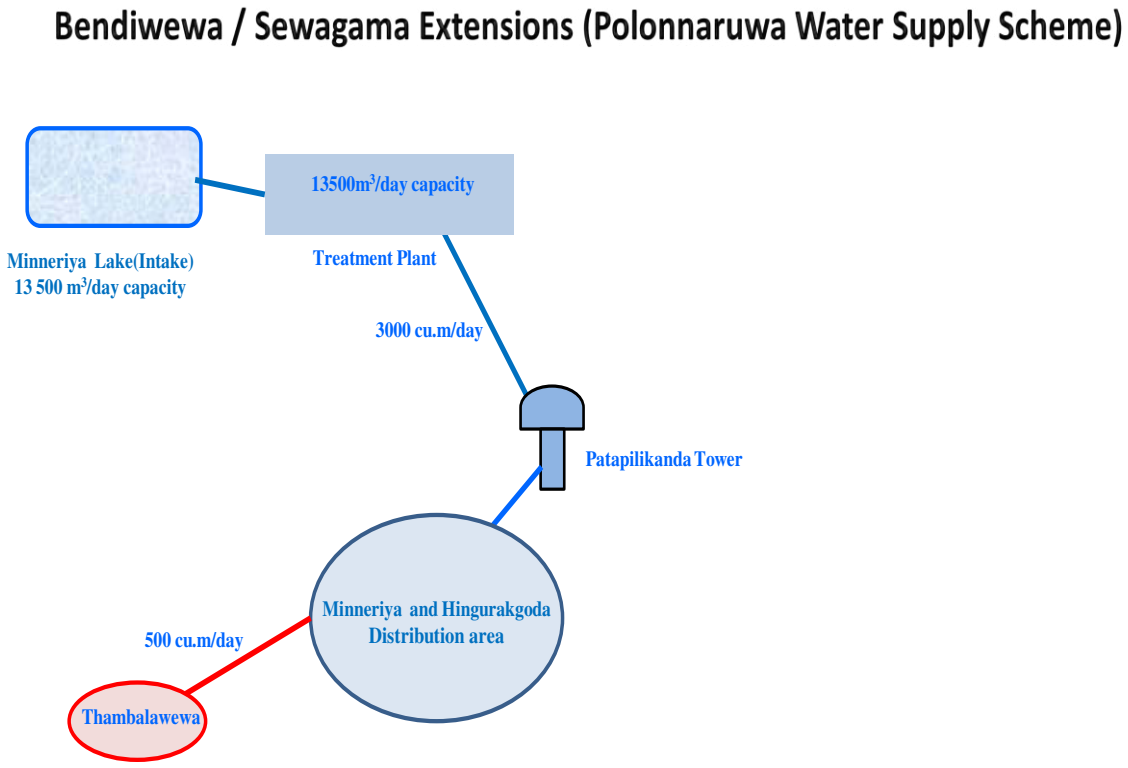


Figure 6: Drawings of the water supply sub project

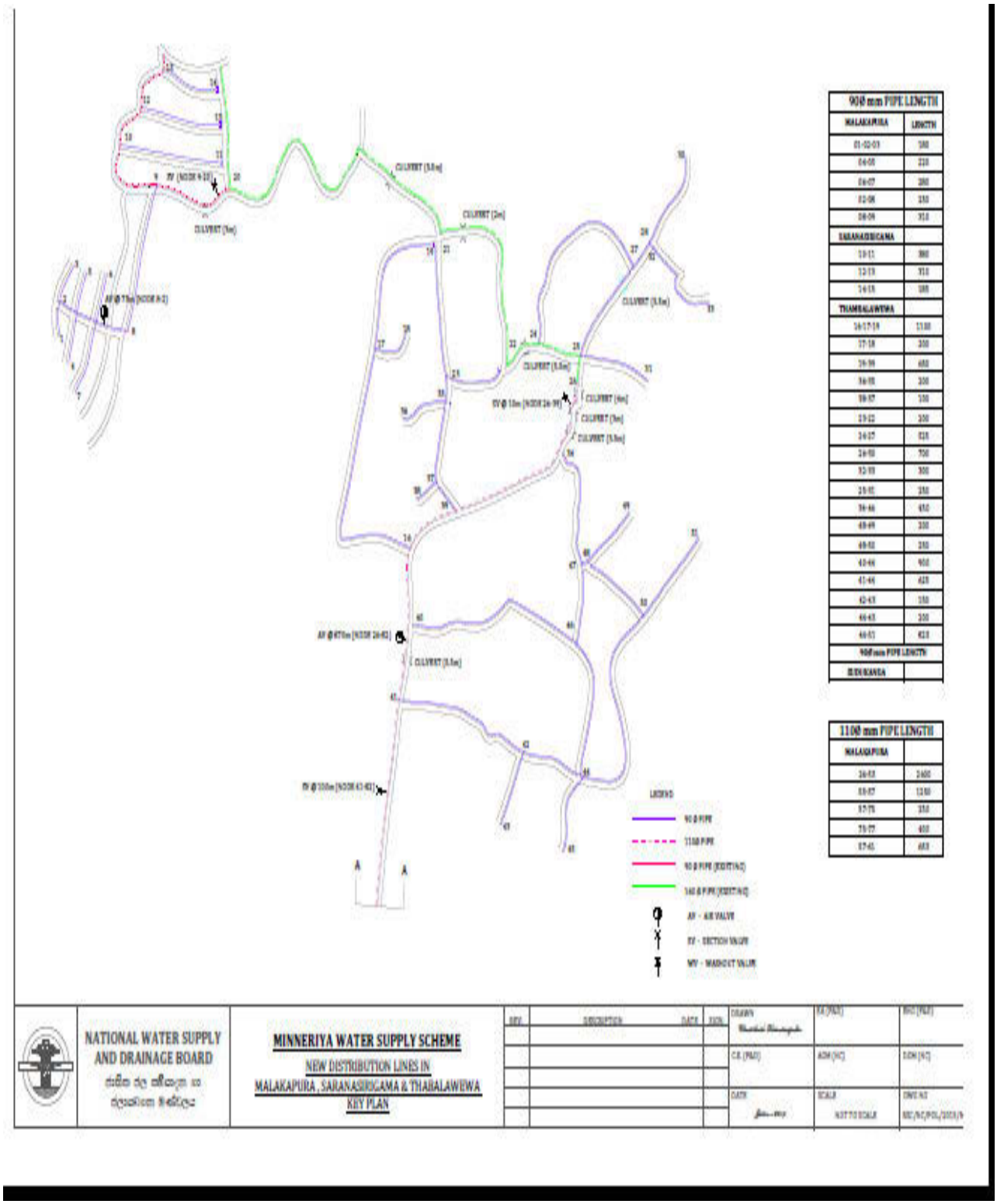


Figure 7: Drawings of the water supply sub project

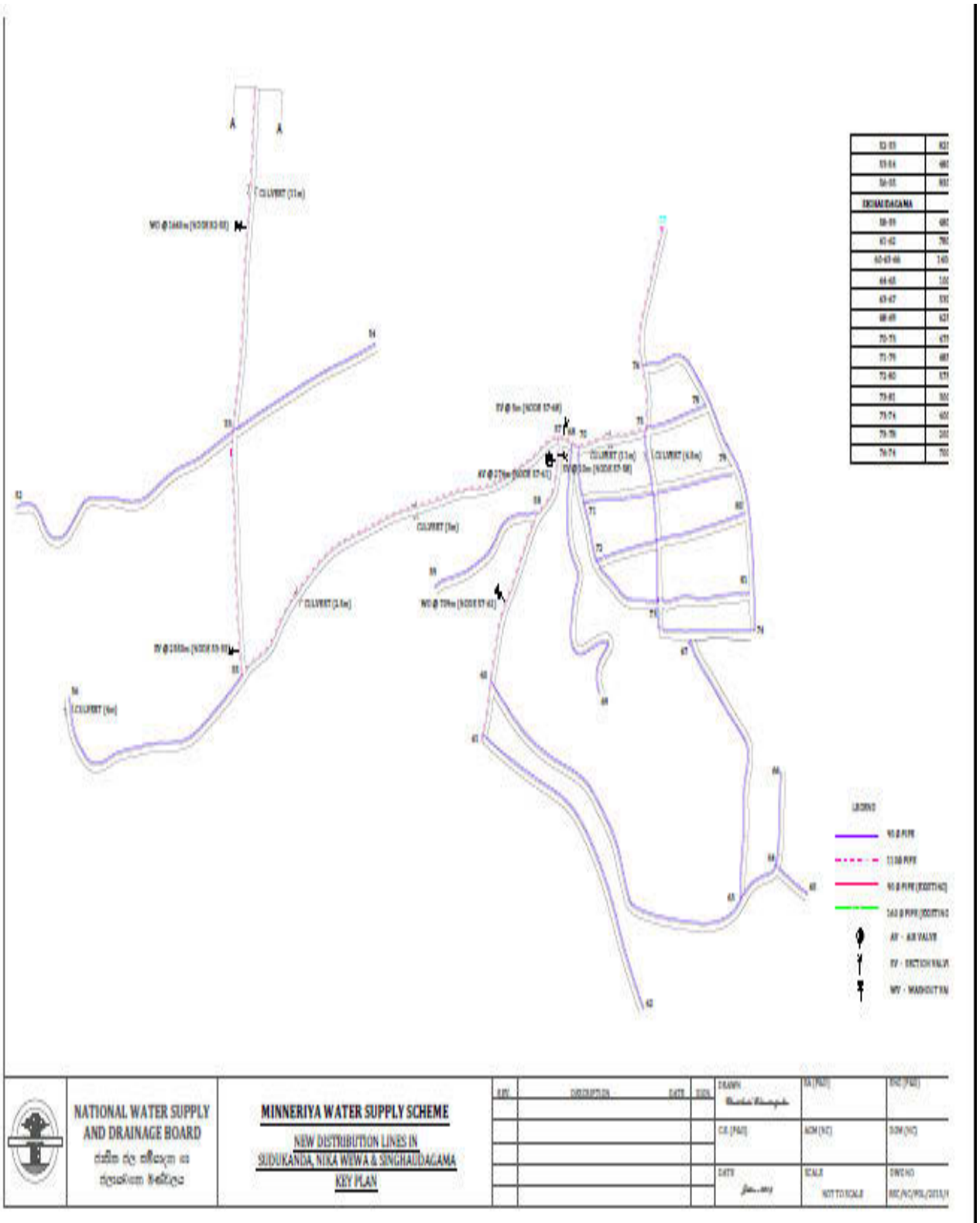


Figure 8: Map showing pipe line laying in the proposed area

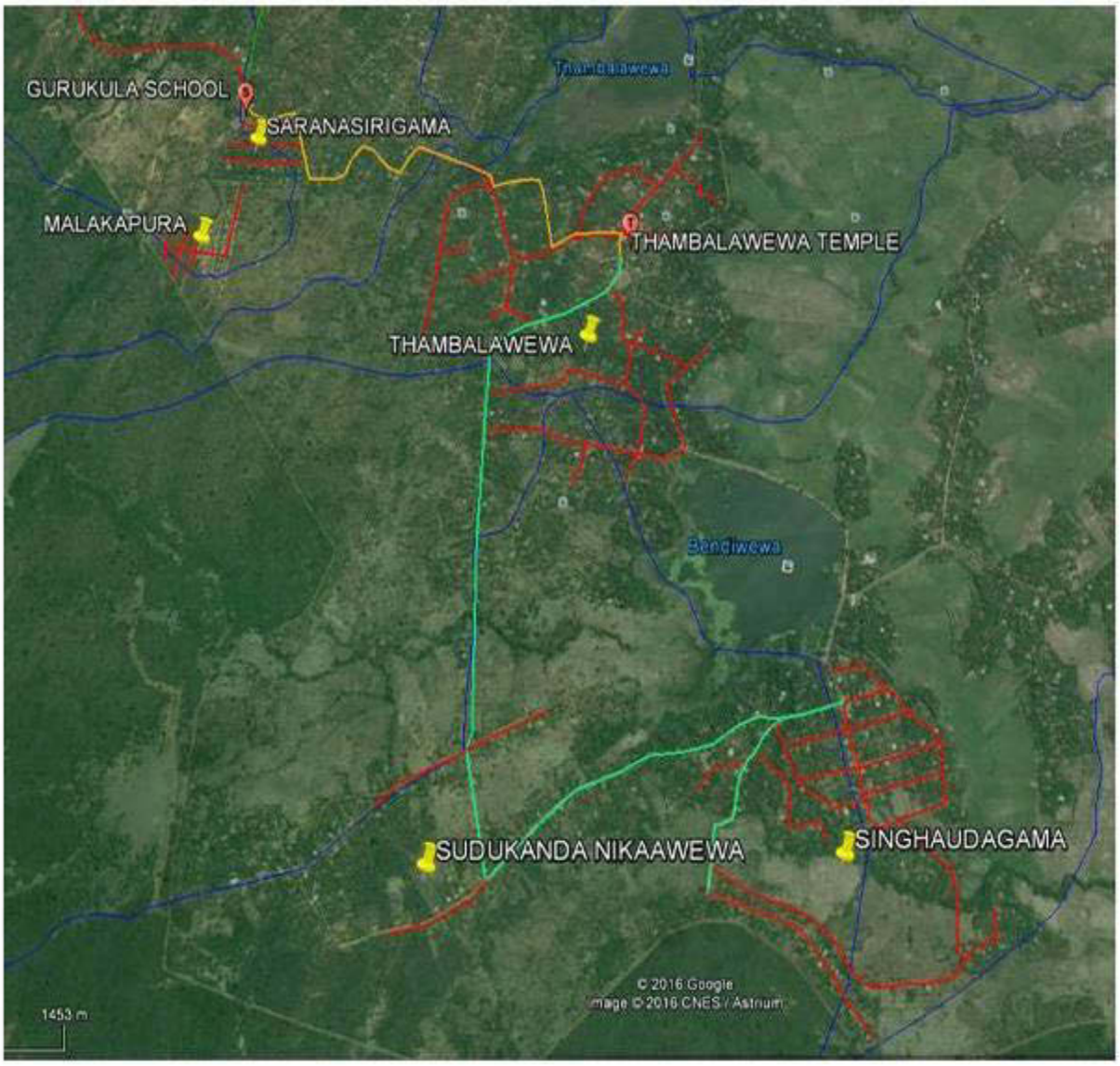
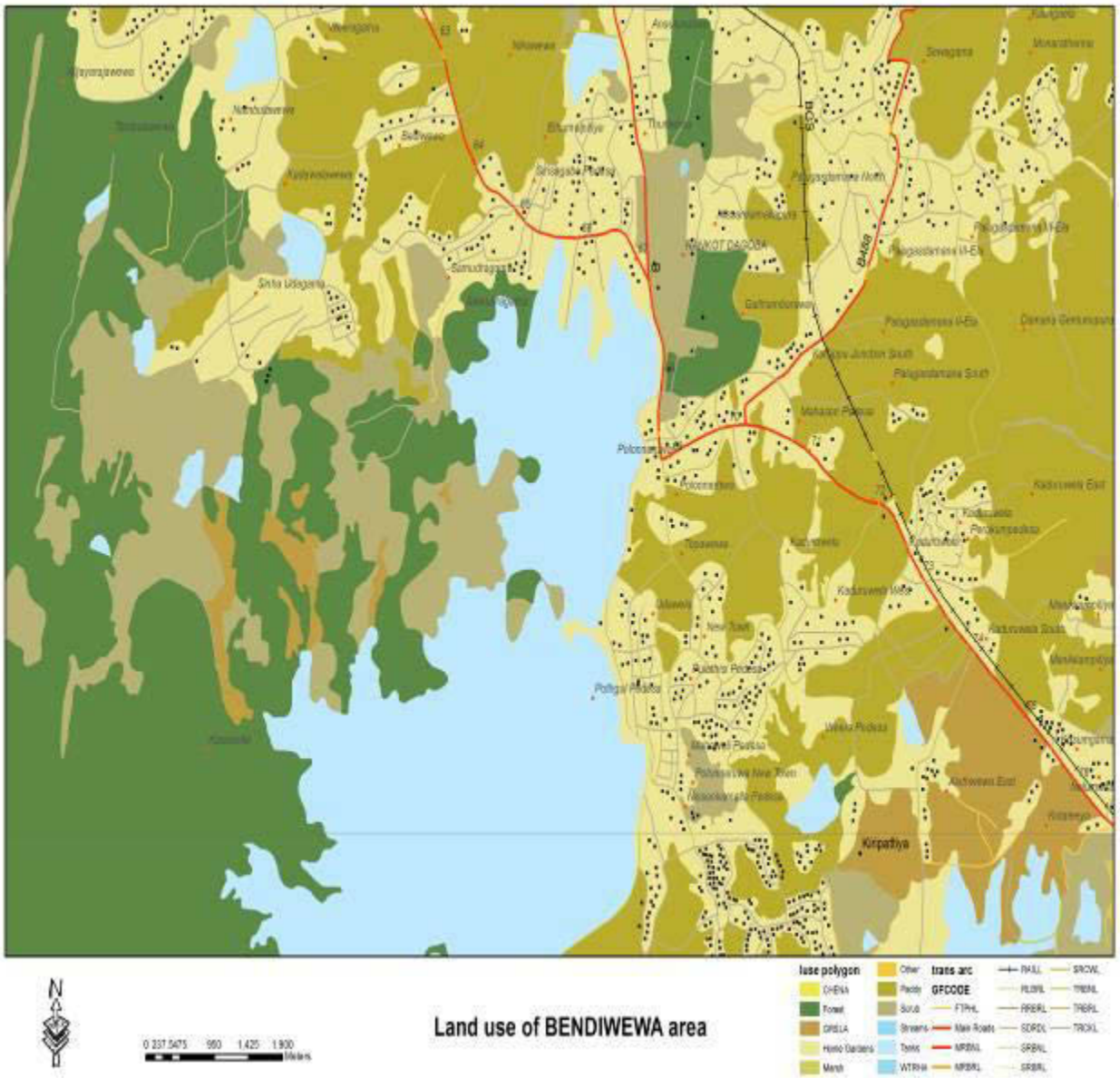


Figure 9: Map showing the Land use pattern in the proposed area



Appendix 13: Photographs of the project area

Figure 10: Thambalawewa project area

Figure 11: Starting location of the Bendiwewa Water Supply Project

Figure 12: Nikawewa area

Figure 13: Abandoned lands at both sides of the road

Figure 14: The stream in the project area

Figure 15: Tree branches hanging down

Figure 16: Concrete road in the project area

Figure 17: Drains at the road site

Figure 18: Gravel Road in the rural areas

Figure 19: Gravel road and trees at site

Figure 20: Public consultation

Figure 21: Participants Public Consultation

Appendix 14: Consent Letters

තමන්කඩුව ප්‍රාදේශීය සභාව - පොළොන්නරුව
தமன்கடுவ பிரதேச சபை - பொலன்னறுவ
THAMANKADUWA PRADESHIYA SABHA - POLONNARUWA

මගේ අංකය / எனது இல. / My No. උමැප/පො/තප්‍රාස/කර්ම/01/2015 — ඔබේ අංකය / உமது இல. / Your No. — දිනය / திகதி / Date 2015-12-21

සහකාර සාමාන්‍යාධිකාරී (උතුරු මැද),
ජාතික ජලසම්පාදන හා ජලාපවහන මණ්ඩලය,
අනුරාධපුරය.

පුදු කන්ද නිකා වැව ගම්මානය අවට පවතින මාර්ගයන්හි බෙදා හැරීමේ නළ එලීම සඳහා අවසර ලබාගැනීම

ඉහත කරුණ සම්බන්ධව ඔබේ අංක P D/P/HIN /102-V හා 2015-12-08 දිනැති ලිපිය හා බැදේ.

02. එම ජල සම්පාදන ව්‍යාපෘතිය යටතේ ජල නල එලීම සඳහා කැපීම යනාදී කාර්යයන් පහත සඳහන් කොන්දේසි වලට යටත්ව සිදු කිරීමට අවසරය ලබා දෙමි.

1. කපනු ලබන සියලුම මාර්ග නැවත යථා තත්වයට පත් කළ යුතුය.
2. කොන්ක්‍රීට් හාර හෝ ගල් ඇතිරූ මාර්ගයන්හි ප්‍රතිසංස්කරණය කිරීමේදී ප්‍රාදේශීය සභාව දැනුවත් කළ යුතුය.
3. වෙනත් පුද්ගලික හෝ රජයේ දේපළ හානි පිළිබඳ ප්‍රාදේශීය සභාව වගකියනු නොලැබේ.
4. ජල නල එලීමේදී මාර්ග මායිමේ සිට අවම මීටර් 3ක් වත් ඇතින් එලීම සිදු කළ යුතුය.

ලේකම්,
තමන්කඩුව ප්‍රාදේශීය සභාව,
පොළොන්නරුව.

ලේකම්, තමන්කඩුව ප්‍රාදේශීය සභාව, පොළොන්නරුව

RECEIVED
29 DEC 2015

කාර්යාලය / அலுவலகம் / Office 027-2222275 — ලේකම් / Office 027-2222026 — සභාපති / Chairman: Office 027-2223702, Residence 027-3271888 — උප සභාපති / Vice Chairman: Office 027-2224379, Residence 027-2224959 — ලේකම් / Secretary: 027-2222275, 027-4924228

දුරකථන / தொலைபேசி / Telephone
කාර්යාලය / நிவස
සභාපති 027-2246782 027-3272696
027-4924512 027-4924516
E-mail susantha.hingurakgoda@gmail.com
ලේකම් 027-4924513 027 4924516
ෆැක්ස් / பக்ஸ / Fax 027-2246782
කාර්යාලය 027-2246275
ජයන්තිපුර උප කාර්යාලය 027-2222090
මින්නේරිය උප කාර්යාලය 027-2246227

ප්‍රාදේශීය සභාව
හිඟුරක්ගොඩ
பிரதேச சபை
ஹிங்குரக்கொடை
PRADESHIYA SABHA
HINGURAKGODA

මගේ අංකය / எனது இல / My No. එච්සිපි/එච්පි/පිඑස්/33/06/2015
ඔබේ අංකය / உமது இல / My No.
දිනය / திகதி / Date 2015.12.18

සත්‍ය පිටපතක් බව සහතික කරමි.
ජේ.මු. චන්ද්‍රසේකර
ලේකම්
ප්‍රාදේශීය සභාව
හිඟුරක්ගොඩ.

සහකාර සාමාන්‍යාධිකාරී (උතුරු මැද),
ජාතික ජල සම්පාදන හා ජලාපවහන මණ්ඩලය,
ගොඩගේ මාවත,
අනුරාධපුරය
මහත්මයාණෙනි,

තඹලවැව මාලකපුර සහ සිංහලදගම දක්වා පවතින මාර්ගයන්හි බෙදාහැරීමේ නළ එලීම සඳහා අවසර ලබාගැනීම සම්බන්ධවයි.

ඉහත කරුණ සම්බන්ධයෙන් මා වෙත එවා ඇති ඔබේ අංක P&D/P/HIN/102-V[1] හා 2015.12.09 දිනැති ලිපිය සම්බන්ධයෙනි .

02 ඒ අනුව මින්නේරිය ජල සම්පාදන ව්‍යාපෘතිය යටතේ පහත සඳහන් යෝජිත අංක 1,2,3 හා 4 සඳහා හිඟුරක්ගොඩ ප්‍රාදේශීය සභා බල ප්‍රදේශයට අයත් මාර්ගවල ජල නළ එලීම මාර්ග මධ්‍යයේ සිට අඩි 15 සිට අඩි 20 ක් දුරින් කාණු කැපීමට නිර්දේශ කරමි.

අංකය	විස්තරය	දිග(m)
1.	තඹලවැව ගම්මානය අවට ප්‍රදේශය	8727
2.	මාලකපුර ගම්මානය අවට ප්‍රදේශය	1240
3.	සුදුකන්ද - නිකවැව ගම්මානය අවට ප්‍රදේශය	2150
4.	සරණසිරිගම ගම්මානය අවට ප්‍රදේශය	875

ජල නළ එලීමේ දී මාර්ගවල කරනු ලබන කාණු කැපීම් හා පළුදු කිරීම් අප ආයතනයේ කාර්මික නිලධාරීගේ අධීක්ෂණය යටතේ යථා තත්ත්වයට පත් කළ යුතු බව කාරුණිකව දන්වා සිටිමි.

මෙයට - විශ්වාසී,

ලේකම්,
ප්‍රාදේශීය සභාව,
හිඟුරක්ගොඩ

ජේ.මු. චන්ද්‍රසේකර
ලේකම්
ප්‍රාදේශීය සභාව
හිඟුරක්ගොඩ.

පිටපත -
01. කාර්මික නිලධාරී :- ඇ.පි.

/සඩි/හිගු/සනුල