FINAL REPORT

INITIAL ENVIRONMENTAL EXAMINATION (IEE) FOR THE GREATER COLOMBO WATER AND WASTEWATER MANAGEMENT IMPROVEMENT INVESTMENT PROGRAMME – PROJECT 02 FOR NARAHENPITA AND KIRULA-NARAHENPITA AREAS

Department of Civil and Environmental Engineering

Faculty of Engineering

University of Ruhuna

November 2019

Table of Contents

List of Figures

List of Tables

List of Annexes

Abbreviations

ADB- Asian Development Bank

CEA-Central Environmental Authority

CEB- Ceylon Electricity Board

CMP-Contingency Management Plan

CMC- Colombo Municipal Council

DSD- Divisional Secretariat Division

DSIDC - Design Supervision, and Institutional Development Consultants

EAs-Environmental Assessments

EIA-Environmental Impact Assessment

EMP-Environmental Management Plan

EPA-Environmental Protection Agency

EPL- Environmental Protection License

GOSL - Government of Sri Lanka

GCWMP - Greater Colombo Wastewater Management Project

GN - Grama Niladhari

GNDs - Grama Niladhari Divisions

GoSL- Government of Sri Lanka

GRM -Grievance Redress Mechanism

IUCN - International Union of Conservation Nature

NEA-National Environmental Act

NWSDB - National Water Supply & Drainage Board

PAA-Project Approving Agency

PMU- Project Management Unit

PP- Project Proponent

PS-Pumping Station

RDA- Road Development Authority

SLLR&DC- Sri Lanka Land Reclamation and Development Cooperation

ToR – Terms of Reference

UDA - Urban Development Authority

Executive Summary

The Greater Colombo Water and Wastewater Management Improvement Investment Project (GCWMIIP) was implemented by the Ministry of Local Government & Provincial Councils via Colombo Municipal Council (CMC) and National Water Supply & Drainage Board (NWSDB) to improve the urban environment and public health for the urban and suburban residents in Colombo through improvements of wastewater management services.

Existing sewerage system in Greater Colombo area serves Colombo Municipal Council (CMC), Dehiwala-Mount Lavinia Municipal Council (MC) and Kolonnawa Urban Council (UC). However, the existing system is relatively old, and coverage is limited only up to 80 % of the CMC. Further the system has various issues related to operation and management. Therefore, there is emerging requirement for a new sewage system. In this background, CMC has requested for financial support to expand the sewer service to unsewered areas. Subsequently, GOSL has obtained loans from the Asian Development Bank (ADB) and European Investment Bank (EIB) to execute the GCWWMIIP. Presently, priority has been given to three unsewered wards namely Kirupalapone, Pamankade and Kirula. However, this report describes the proposed activities to be carried out in the Kirula-Narahenpita area only. The proposed sub-project aims at developing wastewater disposal sewer network in Kirula and Narahenpita area will be funded by the EIB as a loan (EIB/ADB Loan No. 3348 SRI (SF)). It is expected that the proposed project will help to meet the basic sanitation needs of a large population of low-income community in the unsewered area in the Kirula–Narahenpita area. Hence, the project aims to deliver improved wastewater management services in an effective and efficient manner in the Greater Colombo Area by connecting the unsewered areas to the main sewer system.

Kirula-Narahenpita project area has an extent of approximately 0.89 km2 (around 2.4% of the CMC area) and coming under the Thimbirigasyaya Divisional Secretariat Division (DSD). In the Kirula-Narahenpita area, the project work comprises of laying 12.3 km of sewer pipelines using dig and non-dig trenchless methods along with construction of 2 pumping stations (i.e., one at “Dabare Road” and the other at “Nawala Road”; to be discussed later). This consists of 9.97km length identified for open cut method and 2.33 km length for micro tunneling method. The project will give beneficial effects in social, sanitary and environmental by enhancing living standard of the people residing in this area and the floating community. The considerations of environmental impacts during construction and operational stages are to be concerned according to environmental regulations in Sri Lanka and ADB. The proposed project is included under the prescribed projects list needing approval under EA regulation in Sri Lanka and as well as the project can be categorized under

Category-B project under ADB SPS, 2009, hence need to obtain an Environmental Approval. To execute the project the approval should be granted by the CEA based on the Initial Environmental Examination (IEE) report. Therefore, this IEE report was aimed;

- to evaluate the baseline data and information relating to physical, biological and social environments within the Kirula-Narahenpita area to study the existing environmental conditions.
- to study the potential positive/negative impacts anticipated during the construction and operation phases of the proposed sewage collection network covering Kirula-Narahenpita area.
- to propose environmental impact mitigation methods to avoid/reduce the effects of adverse impacts
- to develop a suitable environmental management plan covering the different phases of the project
- to propose a suitable environmental monitoring program at the different stages of the project to ensure the success of proposed mitigation measures

It was well noticed that the existing septic tank facilities at the CMC area are not considered suitable for the requirements, therefore a new sewer to convey sewage flows to the existing public sewerage system for treatment is required. On the other hand, with the rapid growth of residing and floating population and economic growth in CMC areas including Kirula-Narahenpita area that could increase more pressure on land availability and hence the current practice of septic tank effluent disposal system could become more ineffective in future, by deteriorating environmental and sanitary conditions. Therefore, it is expected this new improved wastewater management services, by connecting the unsewered areas to the main sewer system, will give beneficial effects in social, sanitary and environmental by enhancing living standard of the people and creating a pleasant environment.

Anticipated environmental impacts were identified as moderate and to occur during both the construction and operational phases. Proper design consideration is needed to minimize the emissions of odor causes gases which may induce an annoyance to the surrounding neighborhood. During the construction phase, soil erosion and siltation in nearby water bodies may happen. The natural drainage pattern in the construction area may be disturbed with the discharge of construction debris, solid waste and any run-off carrying construction debris. Most of the anticipated impacts during the construction phase can be mitigated by the construction measures decided to be followed for the proposed project. It is recommended to carry out construction of the wet well structures and micro tunneling work, demolishing work only during dry season. It is also recommended to remove the excavated soil and other

construction/demolishing wastes as soon as possible and to storage, treatment and recycling of the bentonite slurry (drilling fluid) under the proper approval and supervised by relevant officers. It is also expected that generated noise and vibration due to the construction activities may affect the residents in the project area. IEE team recommend minimizing construction activities during the night and scheduling construction work that cause high noise and vibration within authorized construction embodiment times with the least inconvenience to the public. It is expected that dust may also generate due to demolition, exaction and trenching work although the impact is temporary and short term. The existing public utilities may be disturbed by the construction activities of the sewerage network and two pumping stations. The proposed project will hardly affect the archeologically interested sites and on flora and fauna. Traffic congestion may be envisaged especially at the construction work sites of collection system and two pumping stations. Apart from potential impacts during construction phase the sub-project will require resettlement of 6 families residing in 5 houses established in land plot belongs to Sri Lanka Railways.

In general, it is unlikely that there would be any significant adverse or negative socio-cultural impacts affect to the community, residents and both commercial and public establishments. The Project Monitoring Unit (PMU) should be responsible for implementing and monitoring safeguards compliance activities, public relations activities and community participation activities in the project areas covered by CMC. It is highly recommended PMU to have an environment specialist, who is responsible for safeguards functions. It is also strongly recommended to strictly follow the proposed construction activities, mitigatory measures and monitoring plan recommended by this IEE report.

1 INTRODUCTION

Colombo is the commercial capital and the largest city of Sri Lanka. Colombo metropolitan area has a population of around 750,000 (according to 2011 census). The city has a large floating population also. Therefore, under Colombo city development, the Government of Sri Lanka (GOSL) has proposed a wastewater management project with the aim of the improving wastewater management and hence improving sanitary condition and public health in the capital.

The Ministry of Local Government & Provincial Councils via Colombo Municipal Council (CMC) executes proposed Greater Colombo Wastewater Management Project (GCWMP). The GCWMP is designed to improve the urban environment and public health for the urban facilities and suburban residents in Colombo through improvements of wastewater management services. The project involves in upgrading the sewerage infrastructures, strengthening institutional and operational capacity and project management and implementation.

Existing sewerage system in Greater Colombo area serves Colombo Municipal Council (CMC), Dehiwala-Mount Lavinia Municipal Council (MC) and Kolonnawa Urban Council (UC). However, the existing system is relatively old and limited only for around 80 % coverage of the CMC. The existing septic tank facilities at the CMC area are not considered suitable for the requirements, therefore a new sewer to convey sewage flows to the existing public sewerage system for treatment is required. Further the system has various issues related to operation and management. Therefore, there is emerging requirement for a new sewage system. In this background, CMC has requested for financial support to expand the sewer service to unsewered areas. Subsequently, GOSL has obtained loans from the Asian Development Bank (ADB) and European Investment Bank (EIB) (EIB/ADB Loan No. 3348 SRI (SF)). On the other hand, CMC needs institutional capacity development support to fulfill its aim to deliver an efficient wastewater management service to ensure adequate sanitation, together with good hygiene.

Presently, priority has been given to three unsewered wards namely Kirupalapone, Pamankade and Kirula. However, this report describes the proposed activities to be carried out in the Kirula-Narahenpita area only.

This report evaluates the proposed design, construction and operation and maintenance activities related to Kirula- Narahenpita sewer network development project. Kirula-Narahenpita project area has an extent of approximately 0.89 km^2 (around 2.4% of the CMC area) and coming under the Thimbirigasyaya Divisional Secretariat Division (DSD). The project area has recorded a population of about 35,000

in approximately according to 2011 census. The project area has a large population living in underserved settlements.

In the Kirula-Narahenpita area, the project work comprises of laying 12.3 km of sewer pipelines using dig and non-dig trenchless methods along with construction of 2 pumping stations (i.e., one at "Dabare Road" and the other at "Nawala Road"; to be discussed later). This consists of 9.97km length identified for open cut method and 2.33 km length for micro tunneling method. Proposed sub project area is shown in Figure 1.1 and the proposed sewer network for Kirula- Narahenpita area is shown in Figure 1.2.

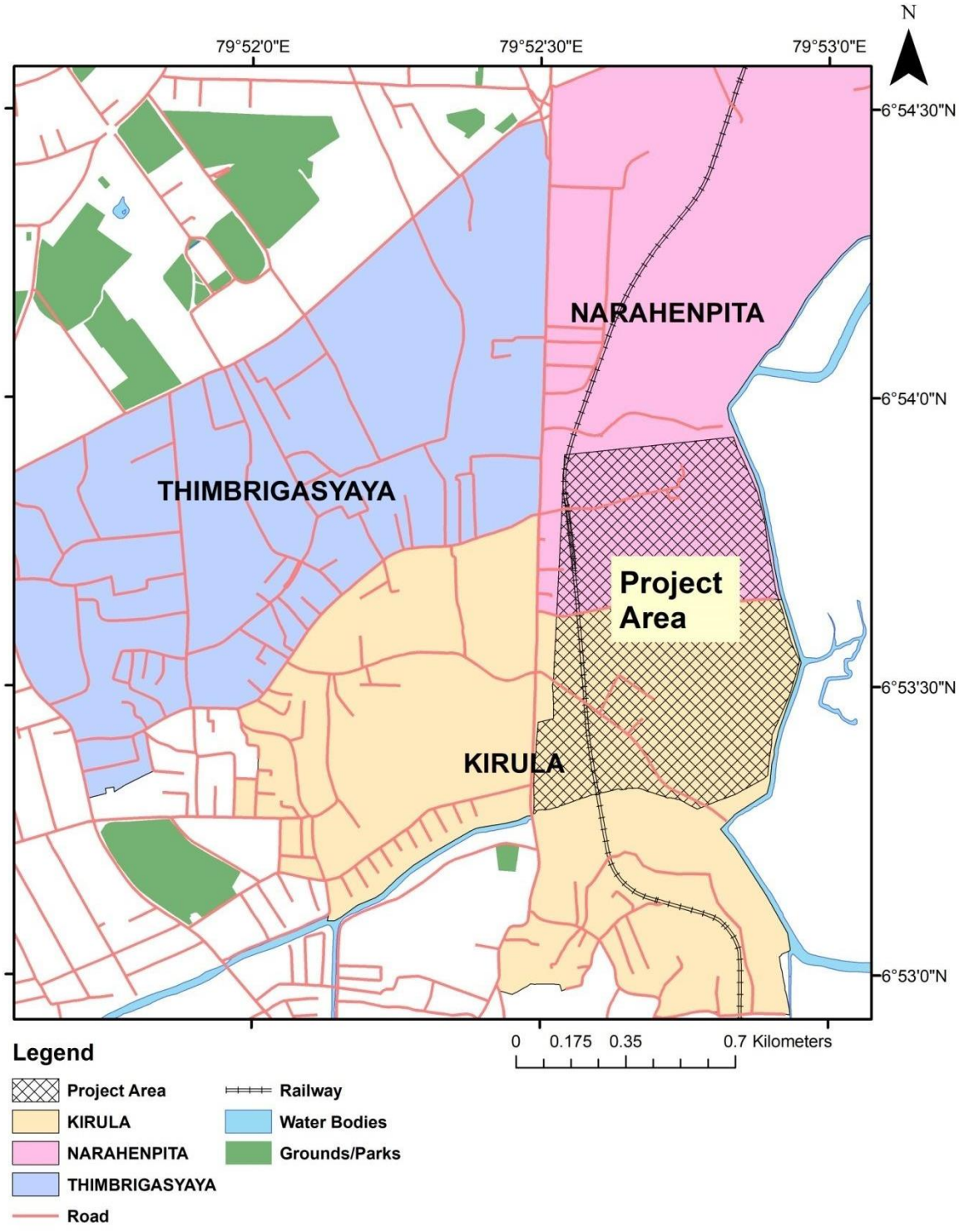


Figure 1.1- Proposed Sub Project Area

Figure 1.2- Plan view of proposed sewer network

1.1 Objective and justification of the project

Objectives

Objectives of this proposed project are to upgrade sewerage infrastructure in Greater Colombo; by providing proper sewerage facilities to the citizens and to strengthen the CMC in providing wastewater management services. This report evaluates the proposed activities to be carried out in the Kirula-Narahenpita area in the viewpoint of environment and social aspect.

The expected benefits of the project are (Kirula-Narahenpita) to rehabilitate existing sewer network and improve health and hygienic conditions in Colombo City.

Justification

Existing sewerage system in Greater Colombo area serves Colombo Municipal Council (CMC), Dehiwala-Mount Lavinia Municipal Council (MC) and Kolonnawa Urban Council (UC). However, the existing system is relatively old and having limited coverage only upto 80 % of the CMC. Further the system has various issues related to operation and management. The existing septic tank facilities at the CMC area are not considered suitable for the requirements, therefore a new sewer to convey sewage flows to the existing public sewerage system for treatment is required. This situation has led to a challenging condition in wastewater disposal in Colombo. Therefore, there is emerging requirement for a new sewage system.

Therefore, this project will help to meet the basic sanitation needs of a large population of low-income community in the unsewered area in the Kirula–Narahenpita area. Hence, the project aims to deliver improved wastewater management services in an effective and efficient manner in the Greater Colombo Area by connecting the unsewered areas to the main sewer system. Expected project benefits in the project area are the prevention of the ground and surface water pollution and particularly protection of the public health.

1.2 Objectives of the IEE report

The construction and operation of the proposed wastewater management network requires an approval under provisions in part IVC of the National Environmental Act 47 of 1980 (The Government Gazette No: 772/22 of 24th June 1993). The approval should be granted by the CEA by issuing an EPL for which an Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) report based on the Terms of Reference (TOR) (Annex 1) developed by the CEA, is necessary.

Following are the objectives of this IEE report:

1. To evaluate the baseline data and information relating to physical, biological and social environments within the Kirula-Narahenpita area to study the existing environmental conditions.
2. To study the potential positive/negative impacts anticipated during the construction and operation phases of the proposed sewage collection network covering Kirula-Narahenpita area.

3. To propose environmental impact mitigation methods to avoid/reduce the effects of adverse impacts
4. To develop a suitable environmental management plan covering the different phases of the project
5. To propose a suitable environmental monitoring program at the different stages of the project to ensure the success of proposed mitigation measures

1.3 Compatibility with other projects/programs/plans in the area

The area falls into a mixed development zone and a primary residential zone according to UDA zoning plan for Colombo city. The possible uses under this planning are listed in the Table 2.1. Accordingly, future development trends of the area including private sector investments will be high-rise buildings for condominiums, offices, hospitals, schools etc. All these developments will need sewerage and wastewater disposal. Therefore, the project will facilitate possible future development activities.

2 POLICY, LEGAL AND LEGISLATIVE FRAMEWORK

2.1 Zoning Requirements

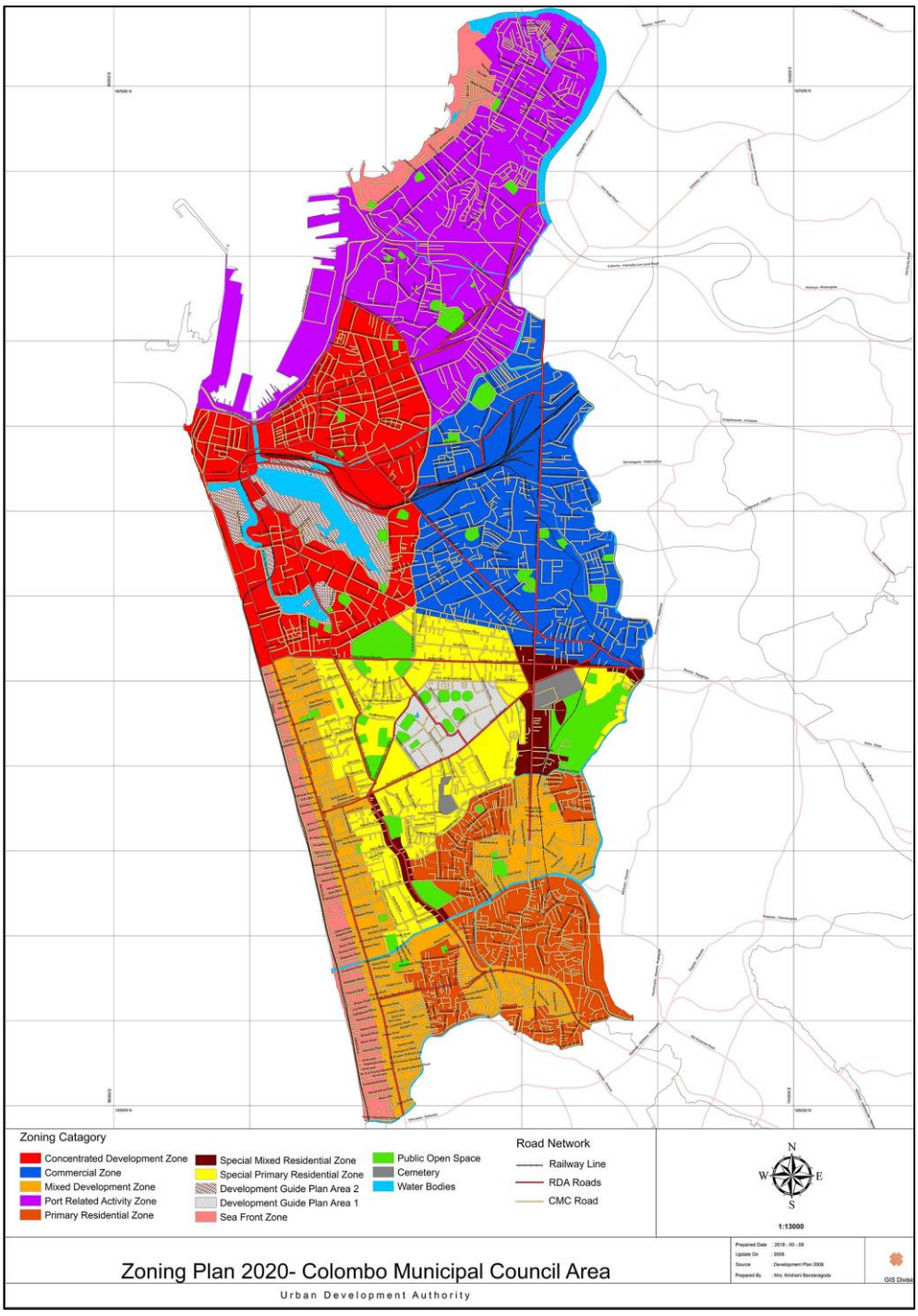


Figure 2.1: Zoning Plan 2020 – Colombo Municipal Council Area (Source: UDA)

The project area falls into a primary residential zone and a mixed development zone as per the zoning plan by Urban Development Authority (Figure 2.1). The permissible uses for these zones are listed in Table 2.1.

Table 2.1: Permissible uses of land in Mixed Development zones and Primary Residential zones (Source: City of Colombo Development Plan according to Colombo Municipal Council)

Permissible uses in Mixed Development Zone	Permissible uses in Primary Residential Zone
Diplomatic Embassies (Chanceries)	Dwelling Houses/Units, Apartment Buildings
Banks, Commercial Offices, Professional Offices and Retail Shops.	Banks, Professional Offices – each of net floor area not exceeding 200 sq.m., each within sites of extent exceeding 500 sq.m.
Hotels and Restaurants	Retail shops not exceeding a floor area of 100 sq.m.
Dwelling Houses/Units and Apartment buildings	Customer Care Services – Barber Shops, Beauty Salons, health & fitness centres and allied activities; each having a net floor area not exceeding 200 sq.m, each within sites of extent exceeding 500 sq.m.
Health Institutions	Places of Religious Worship - each within a site extent exceeding 500 sq.m.
Educational Institutions	Educational Institutions – Preschool and Primary Schools, each within sites of extent exceeding 500 sq.m. and 0.5 ha, respectively.
Open Air Trading Areas	Socio Cultural Institutions
Customer Care Services - Barber Shops, Beauty	Public Outdoor Recreational Spaces
Salons and allied activities	Vehicle Parks
Indoor Amusement and Entertainment	Petrol Filling Stations
Establishments	
Places of public worship – each within sites of extent exceeding 500 sq.m.	
Socio-Cultural Institutions	
Service Industries - Bakeries, Laundries, Printing	
Presses, Computer Repair and allied activities, subject to regulatory requirements of Central Environmental Authority, where necessary.	
Public Outdoor Recreational Spaces	
Vehicle Parks	
Petrol Filling Stations	

2.2 Approvals for the proposed development from state agencies

The project-approving agency for this project is CEA along with other approving bodies such as the Road Development Authority (RDA), Sri Lanka Land Reclamation

and Development Corporation (SLLR&DC), Urban Development Authority (UDA), Sri Lanka Railways, Ceylon Electricity Board (CEB), Sri Lanka Telecom, Land Commissioner and Department of Archaeology. The consent letters are shown in Annex 2.

The Road Development Authority (RDA)
Since the proposed project has interactions with the existing roads in constructing sewer network, the approval of this authority must be obtained.

Sri Lanka Land Reclamation and Development Corporation (SLLR&DC)

If the construction activities of the project have an impact on areas declared controlled by the SLLR&DC, then their approval should be obtained. Consent letter issued from SLLR&DC for the land to be used for sewer pipe lying is attached in Annex 2.

The Urban Development Authority (UDA)
If the construction activities of the project have an impact on areas declared under the UDA Act, then the UDA has a regulatory power on the development of such project. Consent letter issued from the Urban Development Authority (UDA) for the land to be used for pumping stations is attached in Annex 2.

Sri Lanka Railways, Ceylon Electricity Board (CEB), Sri Lanka Telecom

Since this project may have impact on the services provided by these organizations and their land the approval of these organizations must be obtained. Consent letter issued from Sri Lanka Railways for the land to be used for pumping stations is attached in Annex 2.

The Department of Archaeology
All undiscovered antiquities (other than monuments) whether lying or hidden beneath the surface of the ground or in any water or lake or within the territorial sea of Sri Lanka, shall be deemed to be subject to the provisions of the Antiquities Ordinance, No.9 of 1940 (now Act) and the subsequent amendments, particularly the Antiquities (Amendment) Act No. 24 of 1998.

2.3 Legislative and National Policy Requirements

National Environmental Act (NEA) was enacted in 1980 and Central Environmental Authority (CEA) was established in 1981 as a regulatory and enforcement agency under the NEA. The CEA's statutory and enforcement powers were strengthened significantly in 1988, by an amendment to the NEA. A cabinet level ministry to handle

the subject of environment was created in 1990, with the appointment of a Minister of Environment to ensure that environmental issues are given the required attention.

Following enactments comprises the policy, legal and administrative framework of the proposed project:

- National Environment Act. No. 47 of 1980 as amended by Act No. 56 of 1988
- Fauna and Flora Protection Ordinance as amended by Act No. 49 of 1993 and subsequent amends.
- The Antiquities Ordinance, No.9 of 1940 (now Act) and the subsequent amendments, particularly the Antiquities (Amendment) Act No. 24 of 1998 is the primary Act.
- Sri Lanka Land Reclamation and Development Corporation Act No 15 of 1968 as amended by Act No 52 of 1982
- National Water Supply and Drainage Board Law, 1974
- Urban Development Authority Law No 37, 1978

Central Environmental Authority

The National Environmental Act No. 47 of 1980 as amended by Act No. 56 of 1988 (NEA)

The requirements for undertaking the IEE/EIA for the proposed WWCTDS are governed by the National Environmental Act (NEA) No. 47 of 1980 (as amended by Act No. 56 of 1988). The CEA maintains overall responsibility for the EIA requirements of the NEA. The IEE/EIA process is implemented through a designated PAA, who takes the responsibility for administering individual IEE/EIAs according to the location and nature of the project. CEA is the PAA of this IEE. The CEA has carried out scoping sessions through an Environmental Scoping Committee, with representatives from the all stakeholders and concerning parties of this project and prepared the ToR for this IEE.

The Department of Wildlife Conservation

Fauna and Flora Protection Ordinance as amended by Act No. 49 of 1993

The Department of Wildlife Conservation has been vested with the powers of authority in granting permission to development projects proposed to be within a national reserve, sanctuary or any other area declared under the Fauna and Flora Protection Ordinance or within 1 *km* boundary of such area.

The Archaeological Department

The Antiquities Ordinance, No.9 of 1940 and the subsequent amendments, particularly the Antiquities (Amendment) Act No. 24 of 1998 is the primary Act.

Any development project on such land shall not be permitted, until the Director-General of Archaeology submits a report, as to the effects the implementation of such scheme, or project may have upon such land or any antiquities within it.

In addition to approval of the EIA, under the requirements of Sections 43A and 43B of the Antiquities (Amendment) Act No. 24 of 1998, separate approval is required from the Director General, Department of Archaeology, for the satisfactory completion of an IEE/EIA. This is put into effect through the 'Project Procedure Regulation No. 1 of 2000 (published in Gazette Extraordinary No. 1152/14, October 2000).

2.3.1 Initial Environmental Evaluation (IEE)

Following the submission of preliminary information, the PAA decides whether an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) is required, based on the likely significance of the proposed project's impacts on the environment. The PAA issues terms of reference (TOR) for preparation of the IEE or EIA reports. A series of guidelines for implementing the IEE/EIA process have been issued by the CEA, commencing with a general guide for PAAs (now in its third edition: CEA 1998). All costs associated with environmental impact assessment must be borne by the project proponent.

The EIA / IEE requirements under the NEA have been already discussed in the previous chapter. Project Proponent has been requested to undertake an IEE study at the discretion of the CEA along with the ADB (to be discussed later) since the proposed project is a prescribed project as per the NEA. Furthermore, compliance is required in design, construction, and operation and maintenance stages of the proposed project including with other environmental regulations and mandatory requirements listed as follows.

- *Mines and Minerals Act No. 33 of 1992*
- *Occupational Health and Safety – Sri Lankan Manual on Traffic Control Devices (Part II - Road Work Areas)*
- *National Environmental (Noise Control) Regulations No.1 1996*
- *Manual on Traffic Control Devices, 2nd Edition, 2007 by the Ministry of Roads and Highways and the Road Development Authority*
- *Felling of Trees (Control) Act No 9 (1951)*
- *Factories Ordinance No 45 of 1942 (as amended)*
- *Workmen's Compensation Ordinance No 19 of 1934 (as amended)*
- *Presidential Directive, PD/498 dated 1.8.1991, captioned "Safety Precautions to be taken in the construction of buildings"*
- *Presidential Directive, PD/498 dated 1.8.1991, captioned "Safety Precautions to be taken in the construction of buildings"*

2.4 ADB Policies with reference to Environmental Assessments (EAs)

The proposed sub-project aims at developing wastewater disposal sewer network in Kirula and Narahenpita area will be funded by the EIB as a loan (EIB/ADB Loan No. 3348 SRI (SF)). EIB does not have detailed policies regarding the projects funded by them. Therefore, the ADB procedures for environmental assessments are in operation in Sri Lanka and are described in the ADB's Environmental Policy and Operational Procedures, which form part of the Bank's Operations Manual (SPS 2009; IEE, Kirulapone, 2015). 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. According to the manual, ADB requires environmental assessment for project loans. The project proponent is responsible for the environmental assessment.

ADB Policy uses a categorization system to reflect the significance of a project's potential environmental impacts. "A project's category is determined by the category of its most environmentally sensitive component, including direct, indirect, cumulative, and induced impacts in the project's area of influence" (SPS, para. 50). There are four main categories of projects that are recognized by the ADB. These are;

i. Category A projects: significant adverse environmental impacts that are irreversible, diverse or unprecedented. Category A projects requires a full-scale Environmental Impact Assessment (EIA). A draft EIA, including the Environmental Management Plan, must be made available on the ADB's website at least 120 days prior to Board approval.

ii. Category B projects: less adverse environmental impacts that are site specific, few of which are irreversible, and mitigation measures that can be designed more readily than for Category A projects. Category B projects require an initial environmental evaluation.

iii. Category C projects: minimal or no adverse environmental impacts. Category C projects require further environmental assessment actions/documents.

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 and social management system, unless all Projects will result in insignificant impacts.

In this case, the ADB has categorized the GCWMP as a Category B project such that IEE is mandatory. This is because once completed, its environmental and social impacts will be largely beneficial; any negative impacts of location, design, construction, or operation are expected to be minor; and avoidance, mitigation, or compensation for negative impacts should to be relatively straightforward. Hence the

TOR issued by the CEA has been refined by the ADB with the consent of the CEA (Annex 1).

2.4.1 Environmental Management Plans (EMP) under ADB policies

To addresses the potential impacts and risks identified by the environmental assessment Environmental Management Plans (EMP) is to be prepared. Chapter 8 of this IEE report discuss the level of detail and complexity of the EMP and the priority

of the identified measures and actions to be taken. ADB requires that an EMP must be developed as part of the EIAs/IEEs.

2.4.2 Public Disclosure under ADB policies

Usually, ADB posts the draft EIA/IEE report at least 120 days before Board consideration, Final or updated EIA and/or IEE upon receipt; and Environmental Monitoring Reports submitted by Project Management Unit (PMU) during project implementation upon receipt, so that other stakeholders or affected people or general public can provide inputs into the proposed project design and implementation.

Along with the national rules and regulations, any international conventions which of which Sri Lanka is a party, are applicable for selection and screening of projects under restricted or sensitive areas. However, this proposed project, have no relevance to those international conventions (e.g., no Ramsar and World Heritage Sites).

2.5 Gap analysis between national/local and ADB requirements

CEA's Procedures

The requirement for environmental assessment (EA) of projects was established under the amendment introduced to National Environmental Act (NEA). EA regulations were originally gazetted in 1993 (Gazette (Extra Ordinary) No. 772/22 of June 24)) and updated in 1995 (859/14 of Feb. 23). The gazettes list development activities requiring environmental approval under the Act ("Prescribed Projects"). For this proposed project, the activities such as "laying of gas and liquid (excluding water) transfer pipelines of length exceeding 1 km", and "construction of waste treatment plants treating toxic or hazardous waste" are included under the prescribed projects list needing approval under EA regulation.

The Central Environmental Authority is empowered to implement regulations under national environmental act in Sri Lanka. An environmental assessment must be done through initial environmental examination (IEE) process for the concerned project as

decided by CEA. IEE process is being done presently through a third-party consultancy firm as per the TOR issued by the CEA for this project. The CEA will form a technical evaluation committee TEC including different government agencies that have been already identified to be relevant to the proposed project and will then request for presentations to be made by the Project Proponent for the TEC during a scoping committee meeting. In the scoping committee meeting, a decision would be taken whether to undertake an IEE or EIA based on the TOR (**Annex 1**).

ADB`s Procedures

The ADB's new business processes require an assessment of environmental considerations as a fundamental part of the supporting thematic analyses for the Country Strategy and Program (CSP). Environment is considered at all stages of the ADB's business processes from CSP development through Project Preparation Technical Assistance and Loan (PPTA/Loan) processing to completion and post evaluation (Figure 2.2). During loan implementation and supervision, ADB review missions are undertaken to review the progress on implementation of the mitigation and monitoring requirements outlined the environmental management plan. During project completion and project evaluation, reports are prepared to document the actual environmental impacts, the degree of implementation of the environmental management plan, and to evaluate the overall effectiveness of the EMP in reducing and preventing adverse environmental impacts.

ADB evaluates the project briefs and other relevant documents submitted by the project proponent. Environment categories are to be determined using rapid environmental assessment (REA). REA uses sector-specific checklists developed based on the ADB's past knowledge and experience (ADB, 2003). Checklists have been developed for many sectors and are included in Annex 3. Through REA, any project is classified as one of the environmental categories (A, B, C, or FI) by ADB. Project's category is determined by the category of its most environmentally sensitive component (ADB, 2003).

(i) Category A: Projects with potential for significant adverse environmental impacts. An environmental impact assessment (EIA) is required to address significant impacts.

(ii) Category B: Projects judged to have some adverse environmental impacts, but of lesser degree and/or significance than those for category A projects. An initial environmental examination (IEE) is required to determine whether or not 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 unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are still reviewed.

(iv) Category FI: Projects are classified as category FI if they 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 subprojects will result in insignificant impacts

Therefore, this proposed project is considered as "Category B" where an IEE is required to determine whether environmental impacts are significant or not.

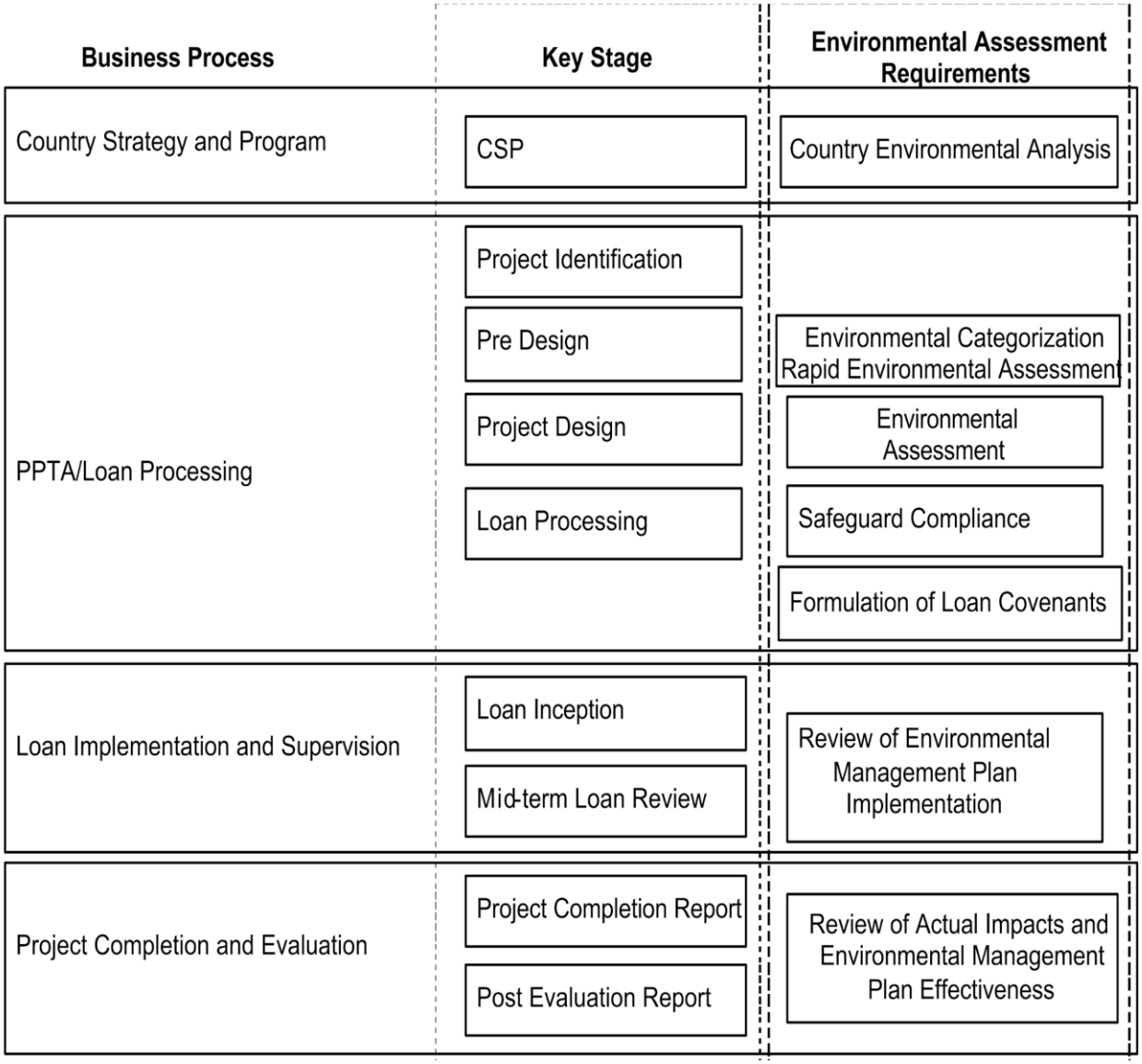


Figure 2.2- Environmental Requirements in ADB's Business Processes (Source ADB, 2003)

Recent IEE reports for similar sub-project in Kirulapone (IEE, Kirulapone, 2015) summarized the differences between ADB EIA procedure and CEA EIA procedure as shown in Table 2.2.

Table 2.2 - Difference between ADB EIA procedure and CEA EIA procedure

(Source: IEE, Kirulapone, 2015)

S.NO	ADB EIA Procedure	CEA EIA Procedure	Differences
1	ADB's environmental categorization has four categories, namely, A, B, C and FI.	Under National Environmental Act, the Prescribed list for EIA is given in the Acts	In the Local EIA prescribed list, no definition for IEE is given. The categorization is defined by the Technical Evaluation Committee appointed by the PPA
2	Detail TOR provided	Details TOR provided	Analysis of alternatives in discussed in Chapter 2. Specific topics such as Information Disclosure, Consultation and Participation and Grievance redress mechanisms are very rarely or not at all considered in CEA and other PAA issued TORs for EAs.
3	A draft EIA, including the Environmental Management Plan, must be made available on the ADB's website at least 120 days prior to Board approval.	The draft EIA report is usually made available to the public for 30 working days in the local government offices and made available in the web	It is mandatory to publish a notice in the paper to enable the interested parties to access the report.

3 DESCRIPTION OF THE PROPOSED PROJECT

3.1 The Study Area/ Project Location

The project is within the Colombo Municipal Council (CMC) limits, Western Province of Sri Lanka. The CMC having an area of 37 km^2, covers the Colombo and Thimbirigasyaya Divisional Secretariat Divisions (DSDs). The project implementing area falls under the Thimbirigasya DSD (Annex 4), which mainly covers south part of Colombo city within the wards of Narahenpita and Kirula (Figure 3.1).

The area is located between longitudes 79˚52′30˝E and 79˚53′00˝E, and latitudes 6˚53′00˝N and 6˚54′00˝N in Narahenpita and Kirula Grama Niladhari (GN) Divisions which are densely populated. The populations in Narahenpita and Kirula GN divisions are 11,194 and 20,237 respectively (Census of Population and Housing 2012).

3.2 Location maps / Photographs

Layout arrangement of Kirula-Narahenpita sewer network is shown in Figure 3.2 together with locations of the two proposed pump houses at; Dabare Mawatha in Narahenpita (6˚53′51.36˝N, 79˚52′41.21˝E) and Nawala Road (6˚53′26.70˝N, 79˚52′45.68˝E).

The land reserved for proposed pump station at Dabare Mawatha in Narahenpita is owned by Sri Lanka Railways (SLR) and covers an extent of 25 perches. Currently the land is occupied by six families (in five houses) and declared as unauthorized settlements (Figure 3.3).

The land reserved for proposed pump station at Nawala Road is 40 perches in extent and belongs to Urban Development Authority (UDA). The land is currently used for temporary labor camp for a building construction company and categorized as a bare land (Figure 3.3).

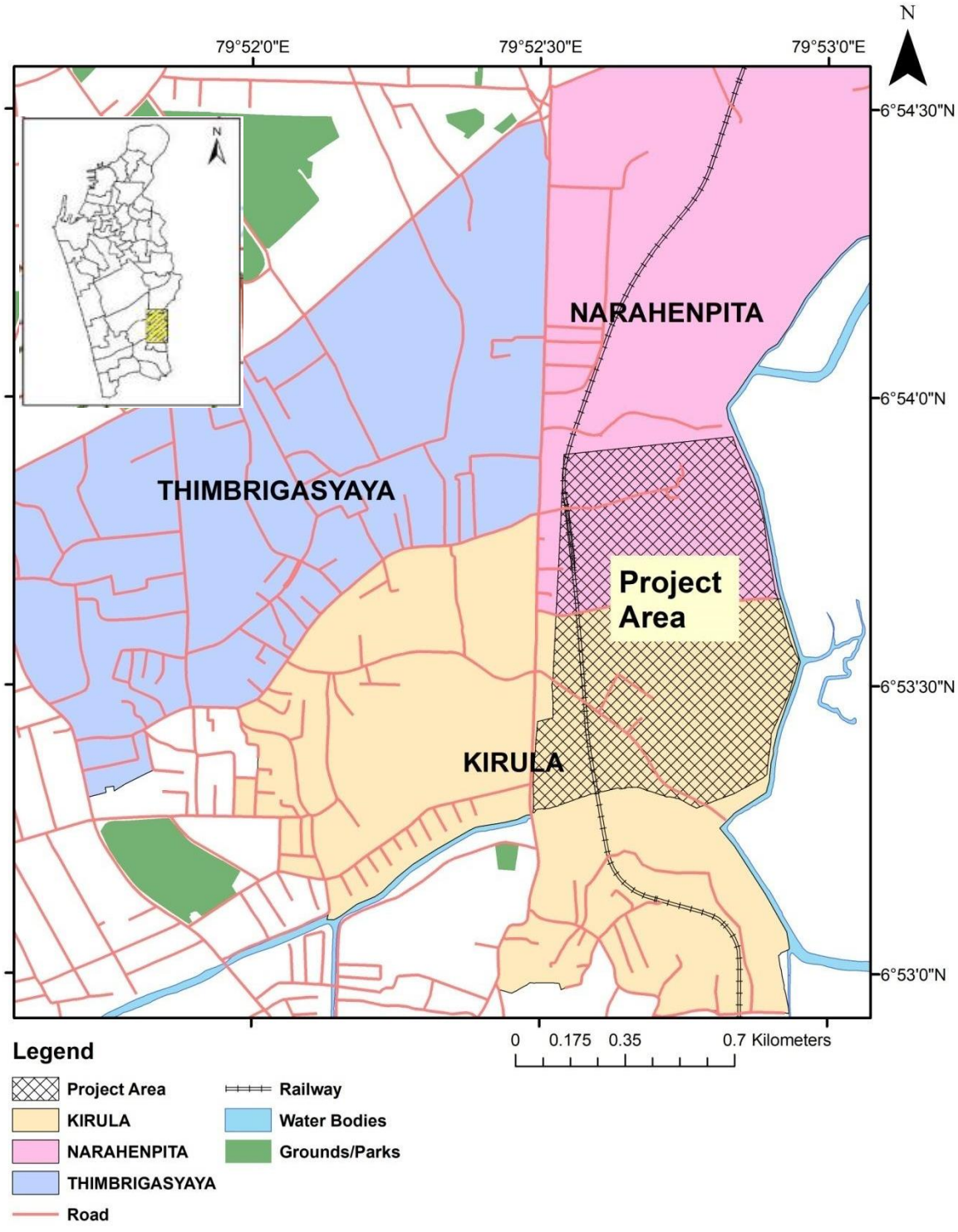


Figure 3.1- Location map of the project area with the wards of Kirula, Narahenpita and Thimbirigasyaya

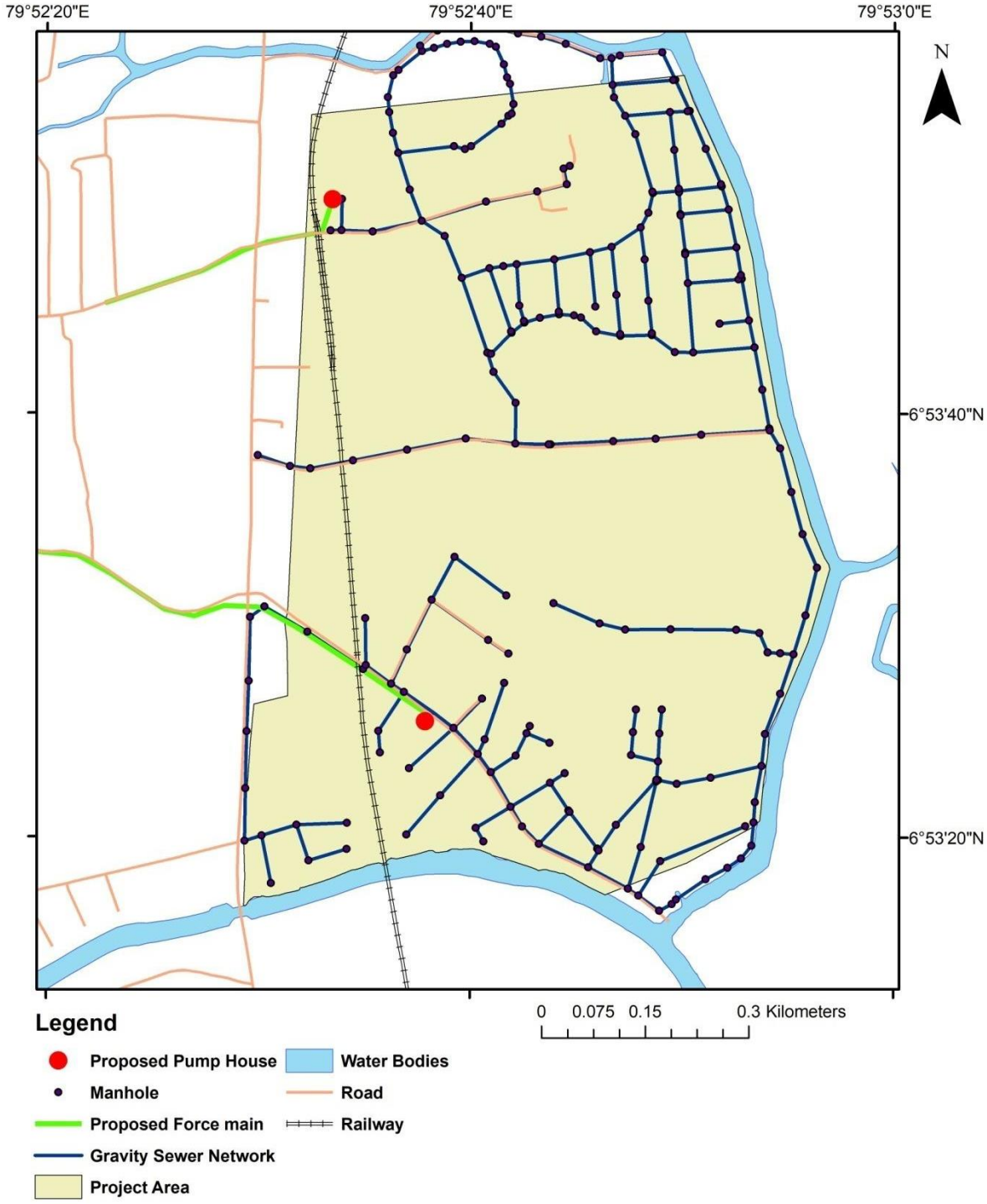


Figure 3.2- Layout arrangement of Kirula-Narahenpita sewer network

A) Pumping station 1 – "Dabare Road" pumping station

B) Pumping station 2- "Nawala Road" pumping station

Figure 3.3 - Close views of the sites proposed for the pumping stations at Dabare Mawatha in Narahenpita; at Nawala Road

Table 3.1 – List of roads where pipelines will be laying in Kirula area

Sewer Name	Road Name	Beginning of the Road	End of the Road	Road		Minor roads connected to the road
				length- (m)	width- (m)	
DM - 1	Kinda Ela Road	Heen Ela (D25 Manhole)	1st lane - evergreen garden - D5-11 Manhole	100	15	Heen ela road 1st Lane 2nd lane 3rd Lane
	Heen Ela Road	Heen Ela No 21/R35 house- D14 Manhole	D25 manhole Kinda elaroad	300	4	Kinda Ela road Victor dabare road circular Road A
	E.Victor Dabare Mawathe	Vinston prera Sport gorund	D14 Manhole - Heen Ela road	400	5	Mohandiram E DabareMawathe Heen Ela road
	Mohandiram E.Dabare mawatha	proposed pumping station in Muhandiram Dabare Mawatha	evergreen road- victor dabare road	150	7	Evergreen Road E victor Dabare road
DM - 2	Mohandiram E.Dabare mawatha	Mohandiram E Dabare Mawatha-Kelani weli railroad	CMC Reception hall	20	8	Kelani weli rail line
DM - 3	Kinda Ela Road	D5 -11 Manhole - Evergreen garden 1st crossroad	B5-13 manhole 8th lane	50	15	1st crossroad 8th lane
	1st crossroad	D5-9 Manhole, Circular road A	D5-11 manhole kinda ela road	100	8	Circular road A middle road Kinda ela road
	Circular road A	D5-2 Manhole- Circular road junction	D5-9Manhole 1st lane circular road A	400	9	Evergreen road 1 st lane 2nd Lane 3rd lane 4th lane 5th lane 6th lane 1st crossroad
	Ever Green Road	D5 Manhole Evergreen road junction	D5-2 manhole circular road A evergreen road	50	10	Muhandiram E Dabare mawatha circular Road A
DM-4	Kinda Ela Road	Circular road B- Kinda Ela road	8th lane - kinda ela road	50	15	Circular r road B 9th Lane 8th Lane
	Circular road B	Oasis hospital gate	Kinda ela road	500	10	Evergreen road 1 st lane 2nd Lane 3rd lane 4th lane 5th lane 6th lane Middle road

Sewer Name	Road Name	Beginning of the Road	End of the Road	Road		Minor roads connected to the road
				length-(m)	width-(m)	
	Ever Green Road	Circularod A junction - Evergreen road	Circular road B junction evergreen road	50	10	circular Road A circular RoadB
DM - 5	Kirimandala road	Evergreen road-kirimandala mawatha	elvitigala mawatha Baseline road	200	10	Evergreen road Baseline road
	Ever Green Road	Oasis hospital main gate	Near Asiri hospital - kirimandala Mawatha	100	10	Circular road A Kirimandala Mawatha
DM - 6	Kirimandala road	Evergreen road-kirimandala mawatha	N14 manhole-kirimandala road	25	10	Evergreen road
DM - 7	9th Lane	D5-2-16 manhole - circular road B	D5-14 manhole 8th lane Kinda ela road	40	8	Middle road Kinda Ela Road
	Middle road	D5-2-11 manhole circular road B	D5-2-16 manhole 9th lane middle road	40	8	Circular road 9th Lane
DM - 8	Middle road	D5 - 16 manhole - middle road 9th lane	D5-13 -1 Manhole 8th lane middle road	30	8	8th Lane 9th lane
DM - 9	Kinda Ela Road	D5-2-12 manhole circular road B kinda ela road	Kirimandala mawatha Bridge	30	10	circular road B Kirimandala mawatha
DM - 10	D5-2-15 to D5-2-13	D5-2-13 manhole-Kinda ela road	D5-2-15 manhole	50	8	Kinda Ela road
DM - 11	1st lane	1st lane circular road B	1st lane Circular road A	75	5	circular Road A circular RoadB
DM - 12	2nd lane	2nd lane circular road B	2nd lane Circular road A	75	5	circular Road A circular RoadB
DM - 13	3rd lane	3rd Lane Circular road B	3rd lane Circular road A	75	5	circular Road A circular RoadB
DM - 14	4th lane	D5-6 Manhole circular road A	4th lane - man hole D5-6-1	50	5	circular Road A circular RoadB
DM - 15	5th lane	5th lane circular road B	5th lane circular road A	75	5	circular Road A circular RoadB
DM - 16	6th lane	6th lane circular road B	6th lane circular road A	75	5	circular Road A circular RoadB
DM - 17	Middle road	1st crossroad middle road junction	7th lane middle road	25	6	1 st coss road 7th lane
	7th Lane	7th lane middle road	Kinda ela road	40	6	Middle road Kinda Ela Road
DM - 18	Middle road	7th lane middle road	8th lane junction middle road	25	6	7th lane 8th Lane

Sewer Name	Road Name	Beginning of the Road	End of the Road	Road		Minor roads connected to the road
				length-(m)	width-(m)	
	8th Lane	8th lane middle road	Kinda ela road	25	6	Middle road Kinda Ela Road
DM - 19	Mohandiram E. Dabare mawatha	evergreen junction-Mohandiram E dabare road	No 64 house mohandiram E dabare mawatha	200	9	Ever green road E victor Dabare road
DM - 20	D7-5 to D7-4 D7-1 to D7	Children park-Victor dabare road	No21/R/64 house on victor dabare mawatha	200	3.5	Victor E Dabare road
DM - 21	D7-5 to D13-11	No21/R/64 house national housing road	Heen ela road	200	3.5	Heen ela road
DM - 22	Circular road A	1st crossroad junction circular road A	Heen ela road	200	8	1st crossroad 2nd lane 3rd lane heen Ela road
DM - 23	3rd lane	3rd lane circular road A	Kinda ela road	50	6	circular road A Kinda Ela Road
DM - 24	2nd lane	2nd lane circular road A	Kinda ela road	50	6	circular road A Middle road kinde Ela road
DM - 25	Middle road	2nd lane middle road	1st lane middle road	60	6	2nd lane 1st crossroad

Table 3.2 - List of roads where pipelines will be laying in Narahenpita area

Sewer Name	Road Name	Beginning of the road	End of the road	Road		Populated Area	Minor roads connected to the road
				Length-(m)	Width-(m)		
NR 1	Kirimandala mawatha	Agriculture Department building	Heen Ela road	200	10	Highly populated	Economic center road,Samanala uyana road,Kinda Ela road
	Kinda Ela road	Kirimandala Mawatha junction - Kinda Ela road	Nawala road	400	6	Highly populated	Kirimandala mawatha,Nawala road,Economic center road
	Nawala road	Kinda Ela road	Ramasamwatte road near proposed pump house,Nawala road	300	12	Highly populated	Kinda Ela road, Sri Sadhdharma Mawatha,entraanc e road to Open University
	N8 - N3	Ramashamiwaththa Road	infront of proposed pump house,Nawala road	15	12	highly populated	Ramasamwaththe road
	N3 - N2	N3 Manhole - Nawala road	infront of proposed pump house,Nawala road	15	6	no	Nawala road
NR 2	N6-3 to N6-2		infront of agricultural department office		7	Moderate	Economic center road,Samadhi wihara road
	N6-2 to N5	Samadh Vihara Mawatha, NLDB milk Center	milco company,Samadhi wihara road	200	7	Moderate	Nawala road,Economic center road
NR 3	N6-5 to N6-1	Survey department office Vihara Mawatha	Near Sanasa Office	100	6	no	Samadhi wihara mawatha
NR 4	N5-14 to N5-8	near Thimbirigasyaya DS office /oliver Gunathilaka Garden Junction	Oliver Gunathulaka Garden Road	150	8	no	Elvitigala Mawatha
	Elvitigala Mawatha	Nawalaroad junction,Elwitigala Mawatha	Srimath Oliver Gunathilaka Garden Junction,Elvitigala Mawatha	200	15	highly populated	Nawala road, Srimatha Oliver Gunathilaka Garden Road
	Nawala road	Coconut development authority Nawala Road	Nawala road junction,Elwitigala Mawatha	150	12	Highly populated	Samdhiwihara Mawatha,Pichcha malwatte road, Elvitigala Mawatha, Kelani Weli Rail Road
NR5	N5-10 to N5-9	Srimath Oliver Gunathilaka garden road - N5-9 Man hole	N5-10 Man hole of Srimath Oliver Gunathilaka road	50	7	no	Oliver Gunathilka Garden road

Sewer Name	Road Name	Beginning of the road	End of the road	Road		Populated Area	Minor roads connected to the road
				Length-(m)	Width-(m)		
NR6	N5-13 to N5-11	N5-11 Mana hole of Srimath Oliver Gunathilaka garden road	N5-13 Manhole	50	6	no	Oliver Gunathilka Garden road
NR7	N5-1-1 to N5-1	Near the Kelani Weli Railway road of Nawala road	Electro private company	40	8	no	Nawala Road
NR8	Pichchamal watte road	Nawala road	Pichchamal Watte road	100	3	no	Nawala Road
NR 23	N8-1 to N7	RamasamWatthe road,Nawala Road	Ramasamiwatte road	100	3	no	Nawala Road
NR 24	N8-2 to N8	LH Piyasena Private company, Nawala Road	N8 - 2 Manhole	50	8	no	Nawala Road
NR 9	N9-2 to N9	Manhole N9 - Nawala road	N-9-2 Manhole	75	5	no	Nawala Road
NR 10	N9-4 to N9-3	Manhole N -3	N9-4 Manhole	50	7	no	Nawala Road
	N9-3 to N9	Manhole 9- Nawala road	N9-3 Manhole	50	7	no	
NR 11	N10-3 to N10	Manhole 10 - Nawala road	N10- 3 Manhole	60	7	no	Nawala road
NR 12	N10-4 to N10-2	Manhole 10-2 /Nawala Road	N10-4 Manhole	25	6	no	
NR 13	N11-4 to N11	Manhole N11 -Nawala road	N11-4 Manhole	25	7	no	Nawala road
NR 14	N13-1 to N11-3	Manhole N11-3	N13-1 manhole	20	7	no	
NR 15	N11-2 to N11	Nawala road	N11-2 Manhole	50	7	no	Nawala Road
NR 16	N14-1 to N13	Manhole N 13 - Nawala road	N14-1 Manhole	60	7	no	Nawala Road
NR 17	N14-9 to N15	Manhole N14 -Nawala road	N-14 -9 Manhole - Srisadhharma mawatha	300	6	no	Nawala Road Sri Sadhdharma mawathe
NR 18	N14-8 to N14-4	N 14 -1 Manhole, Sri sadhharmarama Mawatha	N14-8 Manhole	50	7	Moderate	Sri Sadhdharmarama Mawathe
NR 19	Sri Sadhdharmarama Mawatha	Nawala Road	N14- 3 Manhole - Sri Sadhdharmarama Mawatha	150	7	Moderate	Nawala Road
NR 20	Lake drive road	Nawala Road	End of the Lake Drive road	125	8	no	Nawala Road
NR 21	Sri Sadhdharmarama Mawatha	N14-3 Manhole, Sri Sadhdharmarama Mawatha	Kinda ela road	200	8	Moderate	Sri Sadhdhrama Road

Sewer Name	Road Name	Beginning of the road	End of the road	Road		Populated Area	Minor roads connected to the road
				Length- (m)	Width- (m)		
NR 22	Economic center road	Economic center, Agriculture department	Kinda ela road	350	8	Moderate	Kinda Ela road

Baseline Road

Heen Ela Road

Evergreen Park Road

Muhandiram Dabare Road

Kirimandala Mawatha

Narahenpita Nawala Road

Figure 3.4 - Selected photographs of the road network in the project area

3.3 Existing Condition of Sewer Collection System

<u>Need for the project</u>

Presently there is no pipe-borne wastewater collection system exists in Kirula-Narahenpita urban area, creating problems of managing wastewater. Therefore,

establishment of a new sewer network for Kirula-Narahenpita has become vital. The objective of the project is to implement a new sewerage collection network in unsewered area in Kirula-Narahenpita, which will bring sustainable solution for the existing problem of sewerage disposal while enhancing living standard of the people residing in this area and the floating community. In underserved settlements in the area having small houses located close to each other, storm water and other wastewater congestion has become a common problem. Particularly during rainy seasons, sewerage pits located in high water table areas overflow frequently creating environmental and social problems in the community. Therefore, the proposed project is reasonably justifiable investment to improve the socio economic, environmental and public health condition in Kirula-Narahenpita area. The project is likely to have significant positive impacts on inland, surface waters, environmental health, public health and institutional development.

3.4 Proposed Components

The estimated demand for sewerage disposal in Kirula area is 2333 m^3/day, while that in Narahenpita 3456 m^3/day. Kirula-Narahenpita unsewered area will be connected to main sewer system by installing sewerage pipes in 67 public roads (Main roads, Sub roads and Narrow lanes) (Table 3.1, 3.2 and Figure 3.4) and construction of two pumping stations in public lands (Topography maps - Figure 3.5 and 3.6) (Kirula Narahenpita sewer network key map is shown in Annex 5 and manhole details are shown in Annex 6). The project required pipelines to be installed along 11 main roads including the by roads in urban built up area in Kirula-Narahenpita where government department buildings, commercial buildings and residences are located densely. About 67 sections of roads will be used for project implementation. The land plots demarcated for construction of the two pumping stations are in Kirula (40 perches) and Narahenpita (25 perch) Grama Niladhari divisions and belong to Urban Development Authority (UDA) and Sri Lanka Railways (SLR), respectively.

Land ownerships

The new sewer lines will be installed along the existing public roads. Lands for the proposed two pump stations are owned by two public institutions, Sri Lanka Railways (25 perches land in Narahenpita) and Urban Development Authority (40 perches land in Kirula). Both authorities have agreed to allocate above-mentioned proposed lands for the project on lease basis (See Annex 2). Thus, there is no need to look for alternative lands for laying of sewer pipes and construction of two pumping stations.

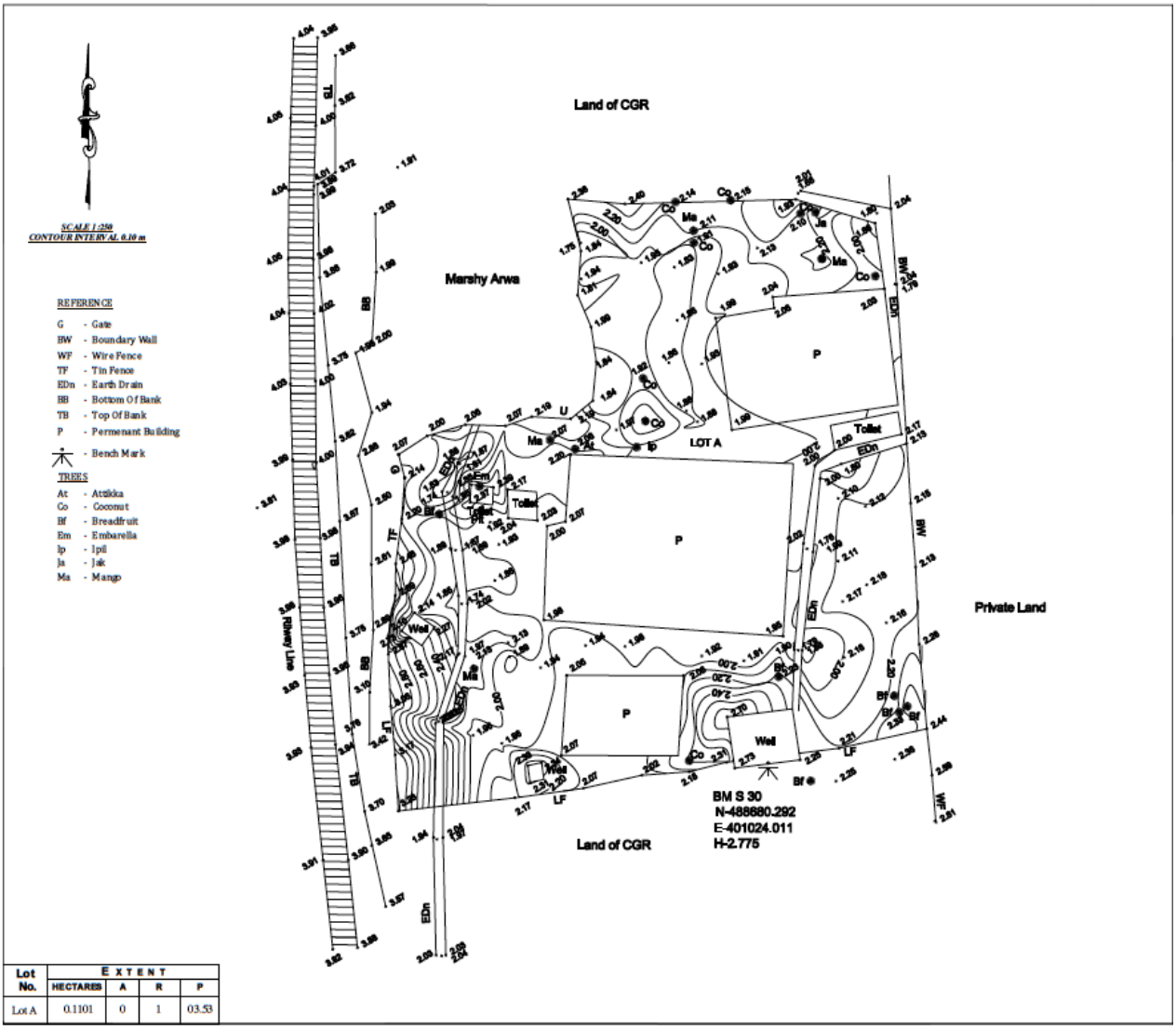


Figure 3.5 – Kirula pump station – topographic layout

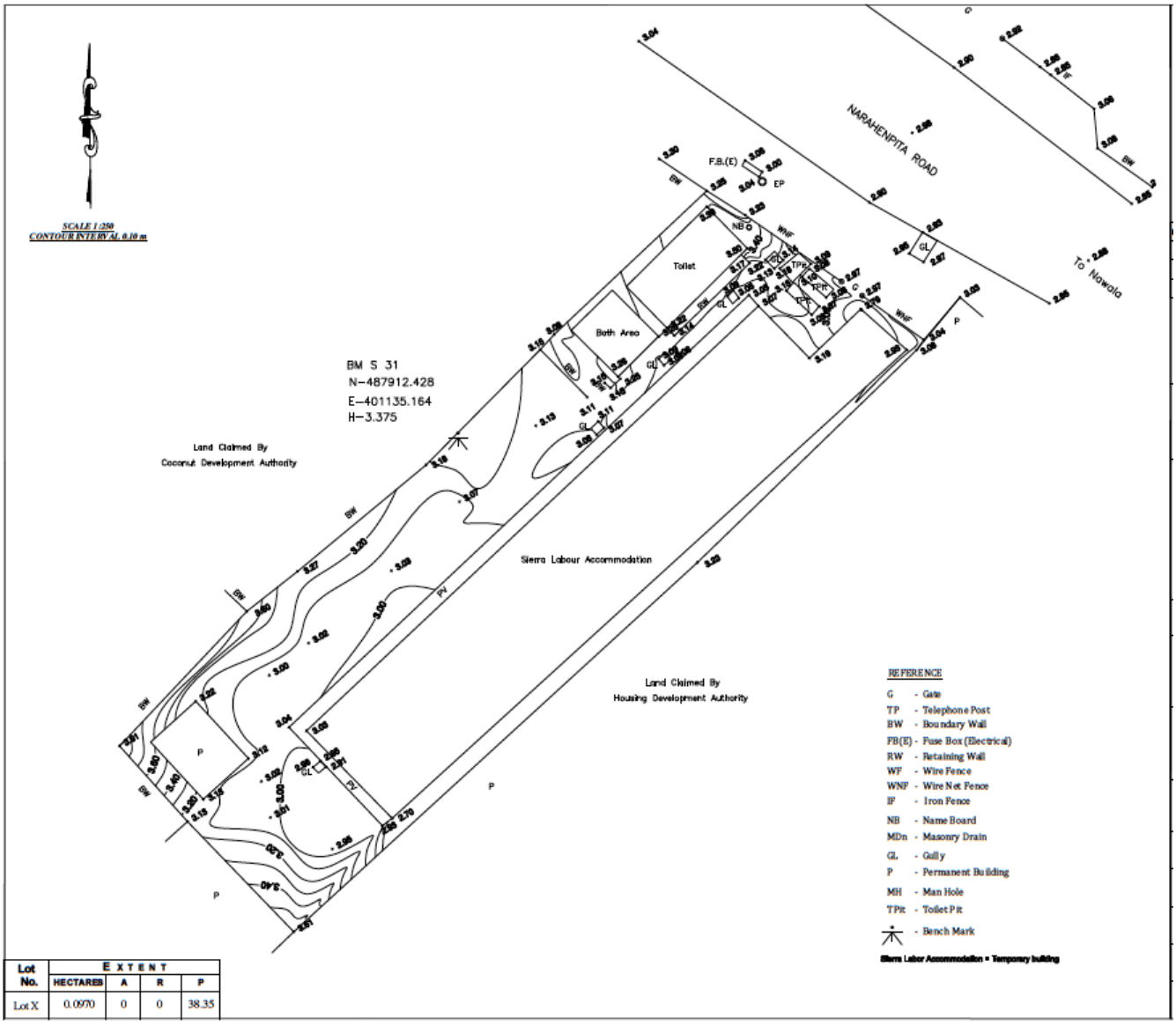


Figure 3.6 - Narahenpita pump station – topographic layout

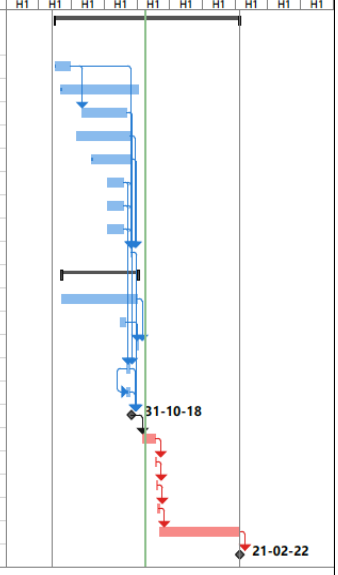
3.5 Implementation Schedule

The implementation schedule of the project in details including planning, designing, tendering and bid documentation and construction is shown in Figure 3.7.

Provide Sewarage facilities for Kirula - Narahenpita Area - Summary Programme — Updated On: Thu 04-04-19

Greater Colombo Waste Water Management Improvement Investment Programme (GCWWMIIP)

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Provide Sewerage facilities for Kirula-Narahenpita Area**	**2062 days**	**Fri 01-07-16**	**Mon 21-02-22**	
2	Survey of roads	170 days	Fri 01-07-16	Sat 17-12-16	
3	Geotechnical Investigation of roads	868 days	Fri 26-08-16	Thu 10-01-19	
4	Design of sewer network and drawing preparation	500 days	Mon 01-05-17	Wed 12-09-18	2
5	Topographical survey of PS sites	594 days	Wed 01-03-17	Mon 15-10-18	
6	Geotechnical Investigation of PS lands	441 days	Thu 10-08-17	Wed 24-10-18	
7	Structural design of PSs and drawing preparation	180 days	Thu 01-02-18	Mon 30-07-18	
8	Mechanical design of PSs and drawing preparation	180 days	Thu 01-02-18	Mon 30-07-18	
9	Electrical design of PSs and drawing preparation	180 days	Thu 01-02-18	Mon 30-07-18	
10	Completion of Design Report	7 days	Thu 25-10-18	Wed 31-10-18	4,7,8,9,5,6,2
11	**Preparation of SEMP**	**855 days**	**Fri 16-09-16**	**Fri 18-01-19**	
12	Environmental study (IEER)	841 days	Fri 16-09-16	Fri 04-01-19	
13	Sociological study	60 days	Sun 01-07-18	Wed 29-08-18	
14	SEMP	14 days	Sat 05-01-19	Fri 18-01-19	12,13
15	BOQ & Cost Estimate Preparation	35 days	Thu 13-09-18	Wed 17-10-18	4,7,8,9
16	Preparation of Bid Documents	30 days	Thu 13-09-18	Fri 12-10-18	15SS
17	Submission of Bidding Document	0 days	Wed 31-10-18	Wed 31-10-18	15,16,10
18	Approvals for the bid document	147 days	Tue 05-03-19	Mon 29-07-19	17
19	Award of Contract	3 days	Tue 30-07-19	Thu 01-08-19	18
20	Contract agreement	14 days	Fri 02-08-19	Thu 15-08-19	19
21	Payment of Advance	21 days	Fri 16-08-19	Thu 05-09-19	20
22	Construction activities	900 days	Fri 06-09-19	Mon 21-02-22	21
23	Completion of Contract	0 days	Mon 21-02-22	Mon 21-02-22	22



GCWWMIIP

Task, Split, Milestone, Summary, Project Summary, Inactive Task, Inactive Milestone, Inactive Summary, Manual Task, Duration-only, Manual Summary Rollup, Manual Summary, Start-only, Finish-only, External Tasks, External Milestone, Deadline, Critical, Critical Split, Progress, Manual Progress

Figure 3.7 - Project implementation schedule

3.6 Project implementation

3.6.1 Pre-construction activities

At the pre-construction phase, the appointed contractor should find the suitable sources to get construction materials such as aggregates; sand and soil (backfilling materials) from licensed borrow pits or quarries. The contractor should ensure that these borrow pits or quarries should possess licenses such as licenses from the GSMB for exploration (EL licenses), mining (Industrial Mining Licenses/IML) and transportation of minerals including sand and soil as per the Mines and Minerals Act No. 33 of 1992. Permits are needed from the Forest Department to fell crucial trees such as jack (if available within the development) as per the Felling of Trees (Control) Act No 9 (1951). Further, the contractor should select the suitable batching plant/s with valid EPL to get the ready mixed concrete prior to start the construction activities.

Necessary arrangements need to be made by the Contractor (under the supervision of the Project Management Unit of the GCWMP) with the CMC to dispose municipal solid wastes (MSW) and construction and demolition wastes (CDW) (including excavated material or soil) on a regular basis. The Contractor should appoint a qualified and experienced Environmental Manager / Officer who is responsible to address environmental and social issues including implementation of necessary safeguards and monitoring works to ensure the success of the safeguards and measures implemented.

As such, the Contractor should provide details pertaining to suitable sources of materials, disposal site/s, work camps (if required), material storage areas, etc. to the Project Management Unit (PMU) for approval. Note that establishment of labour camps, site offices, stockpile yards, stores and vehicle yards shall be in comply with rules and regulations of the government. Further, comprehensive geotechnical investigations together with land surveying should be conducted to identify the subsurface soil profile before starting the detail design and construction.

The prospective contractor should submit an acceptable Environmental Management Implementation Plan (EMIP) as detailed in the contract document and get it approved by the Project Management Unit (PMU) of the GCWMP, ADB, CEA and other relevant government agencies and implemented throughout the contract period to mitigate all negative consequences which may arise due to the work being carried out. Contractor is expected to prepare EMIP based on the EMP mentioned in the IEE report (see Chapter 8) prior to commencement of the civil works. Due consideration should be required to be given by the contractor for the rules imposed by all agencies related to the control of all kind of environmental consequences such as pollution of air, ground water, water courses, drains, roads, etc. The Contractor is expected to provide details of signage, information boards, barricades, etc. with the approval of the Project Management Unit (PMU) of the GCWMP, ADB and relevant government agencies for site safety.

3.6.2 Construction activities

Details of land preparation activities

With reference to the 2 pumping stations, it is necessary to clear the lands using excavators and backhoes as well as demolition of the existing infrastructure. Demolition of the existing infrastructure too would be done using excavators and backhoes.

Construction details of Pumping Stations

Two lands have been reserved for the proposed pump stations. The land reserved for the proposed pump station at Dabare Mawatha at Narahenpita is 25 perches in extent

with home garden type vegetation where few mango trees, coconut trees, jack tress and jackfruit trees are grown as shown in Figure 3.8. At present, six families have occupied in 05 houses which are claimed as unauthorized settlements as the concerned land belongs to Sri Lanka Railways. These families should be relocated once the lease is signed by the Sri Lanka Railways with CMC for the construction of pump station (Annex 2).

The reserved land for the proposed second pump station at Nawala road is 40 perches in extent. This is a bare land (Figure 3.9) and the Urban Development Authority (UDA) owns it. In order to construct the pump station in this land, lease has been already signed by UDA with CMC (Annex 2).

Figure 3.8- Proposed land for Pump station at Dabare Mawatha, Narahenpita

Figure 3.9 - Proposed land for Pump station at Nawala road, Narahenpita

With reference to the 2 pumping stations, it is necessary to clear the lands using excavators and backhoes as well as demolition of the existing infrastructure. Demolition of the existing infrastructure too would be done using excavators and backhoes.

According to drawings provided, at both pumping stations, it is necessary to excavate about 13.0 m from the existing ground surface. As such, it is necessary to construct a secant pile shoring system together with struts to support the surrounding soil. Both pumping stations will be constructed of reinforced concrete up to the ground surface and the super-structure with normal building materials. Further, during the underground construction, stability of the secant piled wall should be verified by installing inclinometers at regular intervals. The possibility of floods during heavy rain at two pump station locations is remote due to the location of both stations close to canals with adequate draining up to the sea but ingress of ground water is a possibility.

Excavation of roads, method of laying pipelines

Sewers will be laid only in public right of way or easement due to operation and maintenance difficulties if laid in private lands. The public right of ways and easements are owned or under the jurisdiction of public institutions (i.e., RDA, CMC, SLLRDC, UDA and Sri Lanka Railways). The width of the roads proposed to be used for sewer laying ranges from 3 m wide small by lanes to highways of width around 26 m. Diameter of sewers vary from 225 to 600 mm as shown in Figure 3.6. It is planned to lay sewers along by lanes at the edge of the road with minimum damages to the boundary walls and fences. Further, it is important to avoid conflicts with other utilities. Even in wider roads network will be laid on edge of the road without disturbing other utilities. It is very important to identify the trace of the other utilities prior to start the laying of sewers.

All public roads in the area belong to CMC except Baseline road and B307 Nawala-Narahenpita road which are maintained by the RDA. Right of way or easements belonging to SLLRDC are required to lay pipes along roads adjacent to Kinda Canal. Some reservations belonging to Sri Lanka Railways are also used for pipe laying in areas close to the railway track.

Excavation using open cut method will have to be done in most part of the pipe laying sections. Micro tunneling will have to be carried out in some sections where pipe laying depth is more than 3.0 m and sensitive locations due to narrow roads with high density of population in the adjacent areas of the roads. The total length of pipe laying will be around 12.3 km. This consists of 7.35 km length identified for open cut method and 4.95 km length for micro tunneling method. Figure 3.10 shows the pipes that will be laid using trench-based methods and trenchless technologies (*i.e.* micro tunneling). The depth and width of the trench to be excavated for open cut method will vary from 1.5 m to 3.0 m and 0.8 m to 1.2 m respectively. A suitable gradient of the sewer pipes needs to be maintained for effective flow in gravity sewers to maintain smooth flow. The Open cut trench approach is adopted for pipe laying in the roads with good

subsurface conditions and low water table. However, it can be noted that there is considerable amount of soft soils presence within the areas proposed for the open cut trench approach. As such, "Remove and replacement method" has been proposed as a ground improvement technique if the soft soil presence within the open cut trench areas before lay the pipes. According to borehole investigations done by the Engineering Laboratory Services (ELS) in March-April 2017, most of the locations, water table is very close to the ground surface (about 0.7-1.5m). As such, dewatering is required in most of the locations during the open cut trench approach. It is a responsibility of the contractor to provide adequate shoring during the open trench excavation to provide safe environment for the workers. Further, shoring is required to control the seepage towards the trench to protect the differential settlement of the surrounding structures. Contractor should test all the sewer pipes after laying and before starting the backfilling.

Cranes will be used to carry the pipes and then lay to the excavated trenches as well as to carry the sewer pipes when doing micro tunneling too. The details of pipe types and sizes used for the project is as shown in the Table 3.3.

Table 3.3 – Types and sizes of pipes used in the project

Force main					
Type of laying	315 mm HDPE				
Open cut length (m)	1600				
Gravity pipes					
Type of laying	225 mm VC	300 mm VC	400 mm VC	500 mm VC	600 mm VC
Open cut length (m)	4749	540			
Micro Tunneling length (m)	2112	2017	298	436	218
Total length (m)	6861	2556	298	436	218

Micro Tunneling

Force mains (minimum depth to top of pipe will be 1.2 m) will be laid in shallow trenches using micro tunneling. Micro tunneling will also be adopted while laying sewers along certain roads due to the following reasons and it is estimated that the length of such laying will be around 4.95 km (Figure 3.11).

1. Deep sewers, high water table and encountering sand, silt and similar fine materials
2. Heavy traffic along some roads such as Baseline road and Nawala-Narahenpita road
3. Location of houses and other buildings close to the road
4. Railway crossing at Nawala-Narahenpita road and another road crossing etc.

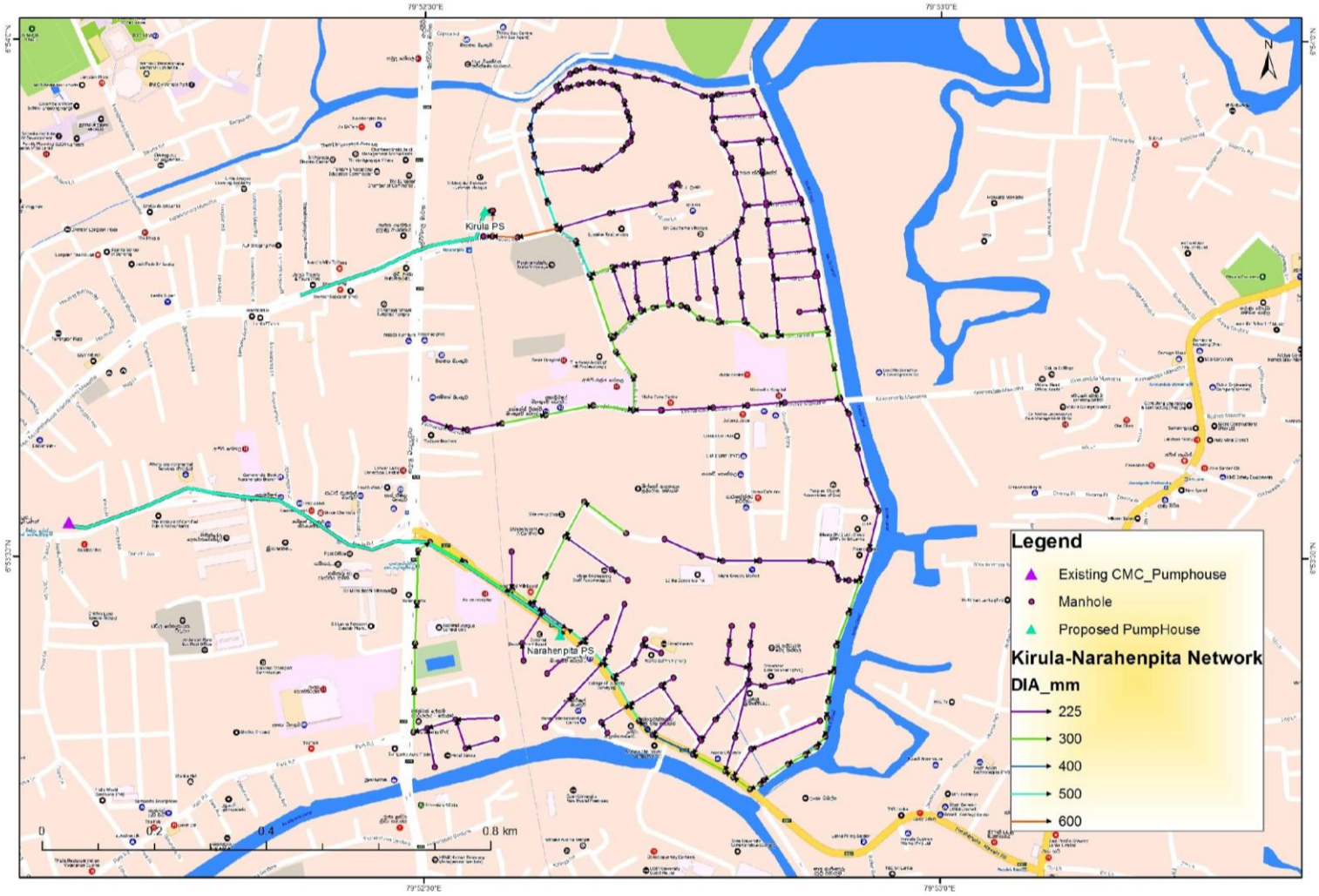


Figure 3.10 – Sewer network (variation of pipe diameter)

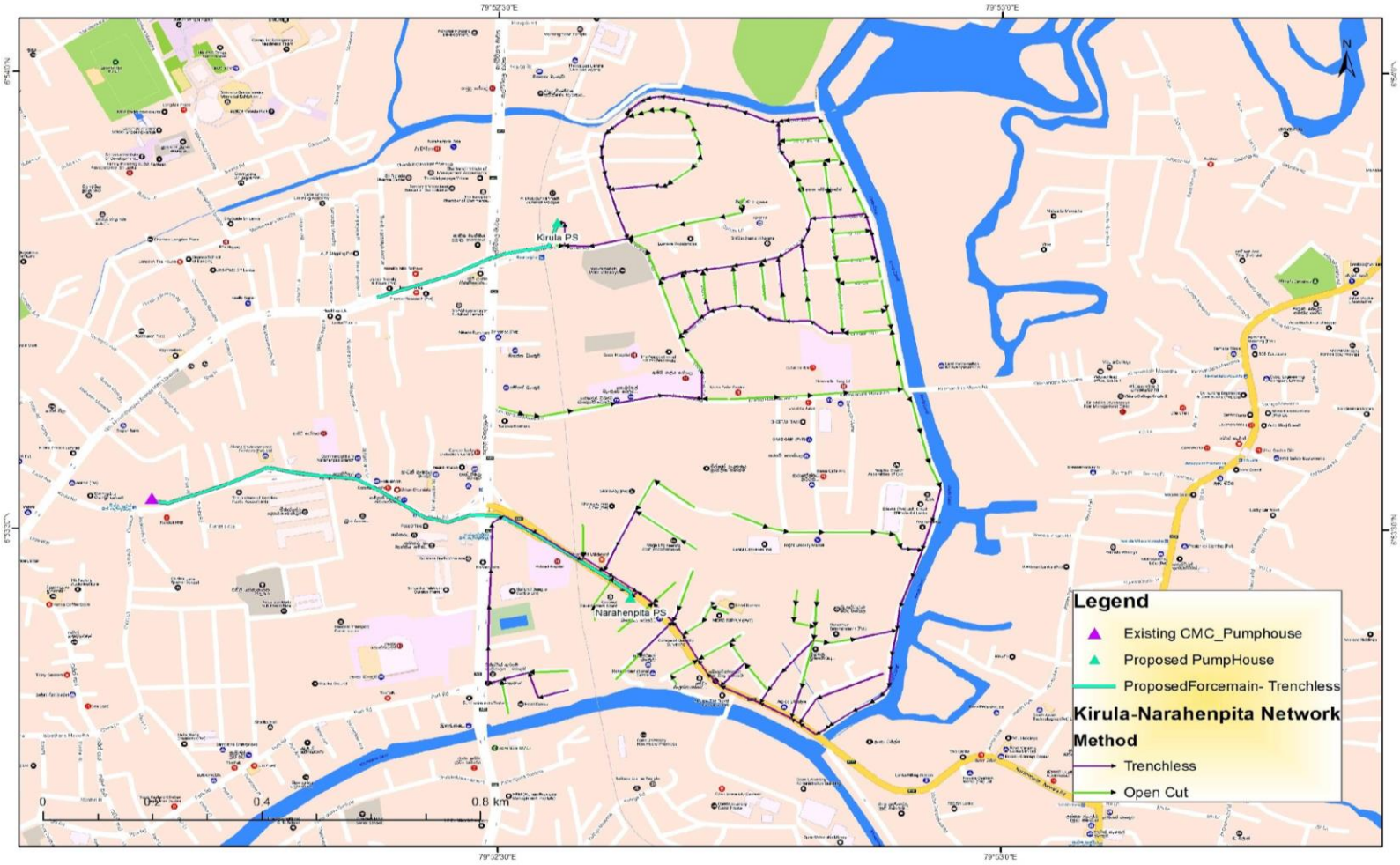


Figure 3.11 – Areas proposed for micro tunneling and open trench method

Micro-tunneling is a trenchless construction method, which utilizes hydraulic jacks to push pipes through the ground behind a remotely operated Tunnel Boring Machine (TBM). Excavation for micro-tunneling is limited to the endpoints for each drive at designated launching (jacking) and receiving pits. The launching pit contains the hydraulic jacks used to push the pipes. The receiving pit is used to recover the TBM at the end of each drive. The excavated material is carried via augers and conveyors, or by recycled slurry through closed system pipelines to the surface for processing and disposal. The remote-control cabin for operating the TBM, as well as cranes and other construction equipment, is at the surface near the jacking pit. Because of the nature of the work, micro-tunneling operation may extend beyond normally permitted hours for construction activities. In micro tunneling, the 2 end points (excavated pits) will be converted to manholes (Figure 3.12).

Figure 3.12 - Micro tunneling method for laying pressure sewer lines

To prevent inconvenience to public by opening of roads ad-hoc basis by the contractors, pipe laying program should be included in the Contract document. This program will set sequence of roads for pipe laying and sets limits for laying distances. Contractor will be allowed to move to other areas for work only after completing the previous work. In the preparation of this program which will be a guide to the Contractor, the prevailing traffic arrangements/demand and minimizing the period without vehicular access to properties should be considered.

Mobilization heavy machinery

Mobilization of heavy machineries should be done by the contractor according to the construction programme. Key machineries at the initial stages of construction would involve excavators and backhoes, cranes, dump trucks / tippers, compacting rollers, micro tunneling and rotational drilling machines. Further, it is a responsibility of the contractor to park all machineries involve for the construction at appropriate locations without disturbing the public activities. Noise and vibration generated during the usage of heavy machineries should be properly monitored and take appropriate actions if it is needed.

Disposal of excavated material and other solid waste

The appointed Contractor will be required to safely store and dispose excavated/dredged materials and construction and demolition (CD) wastes which will include land clearing debris (including infrastructure material or building material) and soil under the supervision of the Project Proponent, ADB/EIB and relevant government agencies such as CEA. The approximate loose volume of the excavated soil at pumping stations is about 8800 m^3 whereas loose volume of the excavated soil at open trenches is about 1000 m^3. It is a responsibility of the appointed contractor to find a suitable dump site with the approval of the relevant organizations such as CEA and CMC (or relevant local authority) etc. to dispose these materials. Further, contractor should transport these materials accordance to the government regulations with minimum disturbance to the surrounding environment and public. Some of these excavated materials (suitable soil) can be used for backfilling with the approval of the Engineer; as such it is a responsibility of the contractor to store these materials at suitable location/s without disturbing the surrounding environment.

Trench backfilling and compaction

All the trenches which are excavated to lay the pipes and to construct the manholes should be backfilled with suitable materials and should be properly compacted using rammers or compaction rollers. Certain portion of the backfilling material can be obtained from the excavated soil (suitable soil) with the approval of the Engineer. Finally, all the roads which are used to lay the sewer pipes should be reinstatement.

Techniques and equipment to be used

Key machinery at the initial stages of construction would involve;

i. Excavators and backhoes (for land clearing and building demolition at the proposed pumping station sites and excavations for sewer pipe laying),
ii. Tippers or dump trucks (to transport construction material including sewer pipes and CD wastes)

iii. Containers (to transport construction material)
iv. Cranes (to carry and lay the sewer pipes to the excavated trenches as well as to carry the sewer pipes and HDPE force mains during micro-tunneling works). Micro tunneling machines (for sewer pipe laying covering a total of 4.95 km; examples of such locations are; along Baseline road, Nawala-Narahenpita road, section close to Kinda canal, railway crossing at Nawala-Narahenpita road etc.) and the congested areas.
v. Concrete pump cars and concrete mixture trucks (for supply ready mixed concrete for secant pile construction and other concrete works)

Discharge of dewatered water

Since water table is very close to the ground surface, dewatering is required in most of the locations during the open cut trench approach. The pumped-out water should be sent through the existing road drains with suitable silt traps. The nominated contractors are advised to do adequate trial pits along those roads selected for open cut trenching to obtain necessary information for pipe laying. Further, the contractor should make sure that existing drainage system will not be clogged due to discharge of pump out water. The contractor should frequently monitor the existing drainage system and if it is clogged due to construction activities, it is a responsibility of the contractor to rectify the drainage system immediately.

Construction of site offices

The Contractor would construct temporary offices (containers) at suitable locations and at the proposed pumping station sites at Dabare Mawatha and Nawala road.

Excavation and pipe laying along canal banks

According to pipe laying drawing shown in Figure 3.7, both open trench and micro tunneling methods have been proposed to lay sewers along the canal banks. However, according to the SLLRDC canal maintenance work, there is a strict requirement to maintain a reservation of 3 m from the edge of the canal bank without any construction/excavation to protect existing Gabion structures (Annex 2). Hence, trace of the sewer pipes along the canal bank should be located accordingly. Further, it is a responsibility of the contractor to get permission from the SLLRDC before starting any excavation along the canal bank.

3.6.3 Operational and maintenance activities and procedures

Responsible agency for operation for the project

Operation and maintenance of the system will be handed over to the CMC upon the completion of construction works and commissioning the system. CMC already has a division dedicated to operation and maintenance of the sewer system which includes sewer networks and associated structures including pumping stations. Therefore, CMC already has the experience required for operation and maintenance of the system. The personnel required consists of engineers, technical officers, operators, electricians, mechanics and trained staff for the maintenance of sewer network including attending to new connections which will be provided by the CMC.

Operational and maintenance procedures

It is necessary to closely follow the preventive maintenance practices outlined in the pump O&M (operation and maintenance) manual including operational "check-ups". In addition to the pump stations, it is necessary to frequently monitor the pipe network to identify any leakages for necessary maintenance/repair work.

Maintenance activities

Take careful note of any abnormal sound or vibration and act to promptly correct any problems. Check motors and rotating elements of pumps for higher than normal temperature, using a thermometer frequently. Visually inspect pumps and motors for coating failure and oxidation and reapply protective coatings/paint as necessary. The issues related to operational and management of pump stations and sewer network are described in the Chapter 5.

3.7 Resources/ facilities required/ provided

Construction materials should be sourced from the approved quarries and the necessary pipes and fitting should be imported according to the acceptable standards. The contractor should provide basic facilities such as works camps with adequate water supply and sanitation and require PPE. Required manpower should be provided by the contractor and it is suggested to recruit labors from the local area. It is a responsibility of the client (CMC) to provide enough resources for the proper operation of the pump stations and sewer network. Further, it is a responsibility of the CMC to provide sufficient training for the operational staff to have a proper operational management system.

3.8 Work force

Labor requirements, availability of labor and employment of local people as well as migratory workers, etc. are not yet finalized and it is expected that the appointed Contractor would be responsible to address these issues. However, Health and safety of all parties during the construction period including the defects liability period should be addressed in the bidding documents and provisions should be made to compensate the prospective contractor for the effective implementation of all aspects related to the safety and health at all sites where work is going to be carried out. Due consideration would be given for all safety aspects during dewatering, shoring, trench excavation and backfilling including traffic control during the pipe laying along roads. Conditions imposed by the SLLRDC should be strictly followed during the work adjoining the canal banks. Due consideration should be given for the safety of property and people during the construction of pumping stations since secant piling, dewatering and disposal of ground water are required for an extended period specially during the completion of the sub structure works. Method statements for all work should be duly approved before the commencement of any work at the site. Provisions should be made in the Contract to provide a dedicated Health and Safety Officer on full time basis throughout the contract. Also, it should be mandatory to use appropriate PPE (such as dust masks, boots, hard hats, gloves, etc) by the workforce including site personnel such as engineers, supervisors and technical officers. Contractor should be required to obtain necessary insurance to cover the workmen and on workers (third party) against injuries and loss of life. Further, it is a responsibility of the contractor to provide enough Occupational Health and Safety (OHS) training and awareness, and capacity building programs to enhance the labor quality.

4 DESCRIPTION OF THE ENVIRONMENT (BASELINE DATA)

Densely populated Colombo city, the main commercial hub of the country, is located within the Western Province of Sri Lanka with the coast as its western boundary geographically at approximately North latitude 6° 6' 56" and East longitude 79" 19' 51. The Greater Colombo area consists the Colombo city and its immediate suburbs towards the North East and the South with Indian Ocean as the western boundary. Almost the entire area consists of a predominantly flat terrain accompanied with a complex network of interconnected canals and marshy lands that plays a significant role in draining out the excess surface waters to protect built up areas and population masses against excessive flooding.

4.1 Physical Environment

The proposed GCWWIP development activities are focused in the Kirulapona, Pamankada East and Kirula areas located within the south eastern tip of the Colombo city.

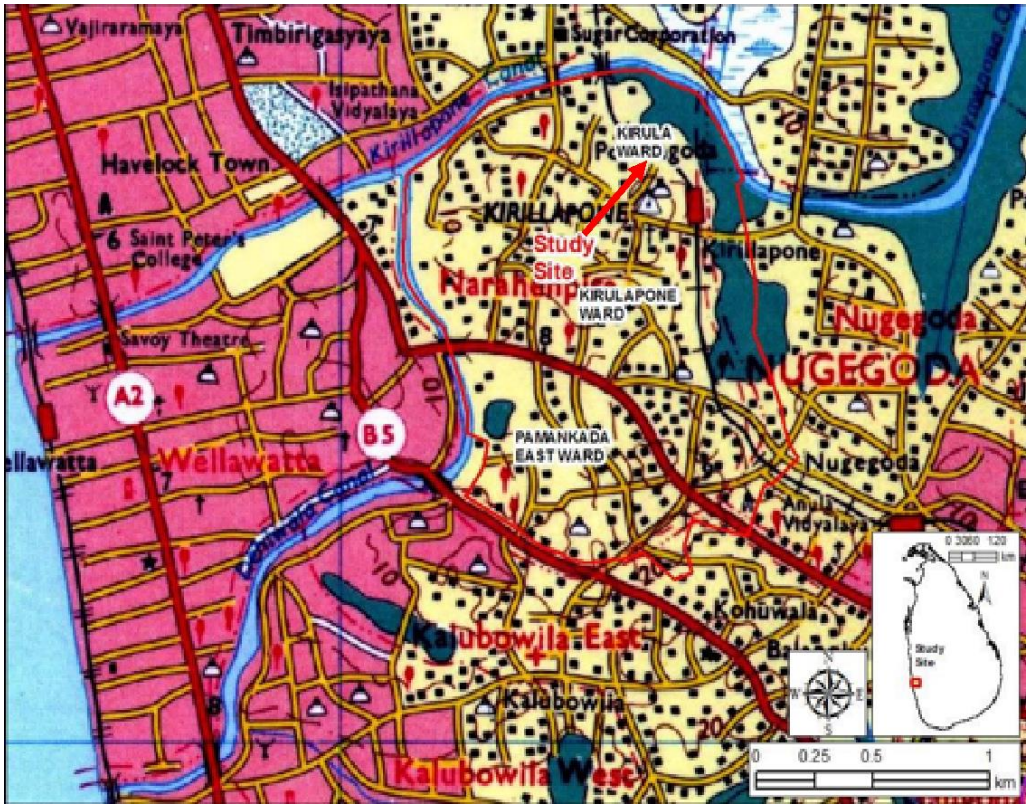


Figure 4.1- Study area map with surrounding land features (1: 50,000 Topographic Map/Survey Dept., Sri Lanka)

The project area is marked by the Kirulapone Canal (Wellawatta Canal) connected to Diyawanna Oya marshland and associated wetland canal system in the upper boundary, Baseline road and Kirulapone-Nugegoda road (Figure. 4.1).

4.1.1 Topography

Sri Lanka's general topography has three clear distinct geographical areas or well-marked peneplains consisting the coastal belt, the plains, and the central highlands. This unique and great topographic diversity is created by long years of faulting and erosion of the landscape. The central mountainous region of the country with the highest elevations covered by virgin forests and grasslands rises to about 2,500 m above mean sea level. The surrounding plains, which rise to about 50 to 100 m above sea level, are largely used for agriculture and homesteads, but still have virgin scrubland where the population distribution is moderate to lower. The project area which situated within the Colombo district falls into the so called lowest peneplain of Sri Lanka (after P.G. Cooray – Geology of Sri Lanka, 1984).

The maximum elevation variation of coastal Colombo district ranges to a 150 m in inland areas from seacoast. The Greater Colombo area terrain largely consists of gently undulating plains and low-lying flatlands accompanied by densely distributed drainage paths resulting a geography that includes a mix of land and water, comprising wetlands/marshes, many canals and water bodies like Beira Lake, Diyawanna Lake, Bolgoda Lake and other waterway features.

4.1.2 Hydrology and Drainage

SRTM data has been used to develop Digital Elevation Model (DEM) followed by derivation of drainage paths based on the flow directions through which the surface drainage pattern in the area is derived. The project area drains towards the sea and Bolgoda Lake system in the south (downstream) and through Kirulapone Canal and Dehiwala Canal open to the sea and Diyawanna/Parliament/ Kolonnawa Lake System connected to the sea via Beire Lake and North Lock/Gate (connected to Kelani River outfall) in the north (upstream) (Figure 4.2).

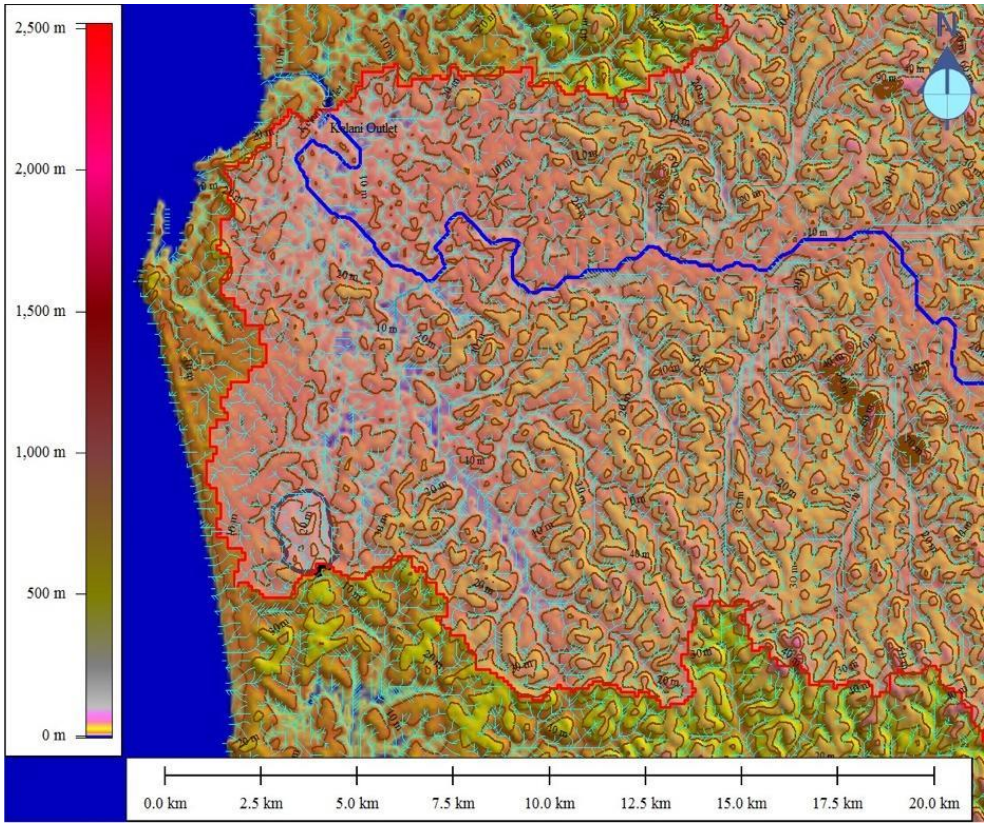


Figure 4.2 - Terrain map in study area with associated drainage paths (SRTM DEM data)

All the water bodies that are connected through the canal system having fluctuating water level during monsoonal and dry periods. Inundating low lying marshes and wetlands in the system is common during monsoonal periods with no major floods except for localized temporary inundation caused due to minor drainage issues recorded within the project area. According to a hydrological analysis performed by Sri Lanka Land Reclamation and Development Corporation (SLRDC), the maximum expected flood levels corresponding to 50-year return period storm are ranging from +2.68 m MSL at Kirullapone canal (At Baseline Road Bridge) to +1.46 m MSL at Dehiwala Canal (Galle Road Bridge). High groundwater levels are recorded during such rainy periods (about 0.4 ~ 0.5 m on average close to the Canal and other low-lying areas) and the water levels drop as low as 3.0 ~ 4.0 m during extended dry periods.

4.1.3 Climatic Conditions

The Greater Colombo climate condition is classified, as tropical monsoon comprises with a bi-modal rainfall mechanism having two wet weather seasons followed by a short dry weather season. The area is located within the country's wet zone, which is also a part of the southern quarter coastal belt of the island. Southwest monsoon from May to September, and northeast monsoon from December to February are the two

dominant climate patterns of the area. Usually, heavy rainfalls are concentrated mainly to southwest monsoon period and sometimes during the two inter-monsoon periods (March-April and October- November). The average annual rainfall of the area is around 2,500–3,000 mm.

The mean daily maximum temperature and mean daily minimum temperature ranges from 31.2 °C in April to 29.4 °C in August and from 25.4 °C in May to 22.5 °C in January respectively. Figure 4.3 illustrates the updated rainfall Intensity-Duration-Frequency (IDF) curves for two (02), five (05), ten (10), fifty (50) and hundred (100) year return period storm events based on Ponrajah (1984) and precipitation data from 1982 ~ 2014 obtained from the Colombo Meteorological Station pluviograph charts recorded at the by the Department of Meteorology for the project area.

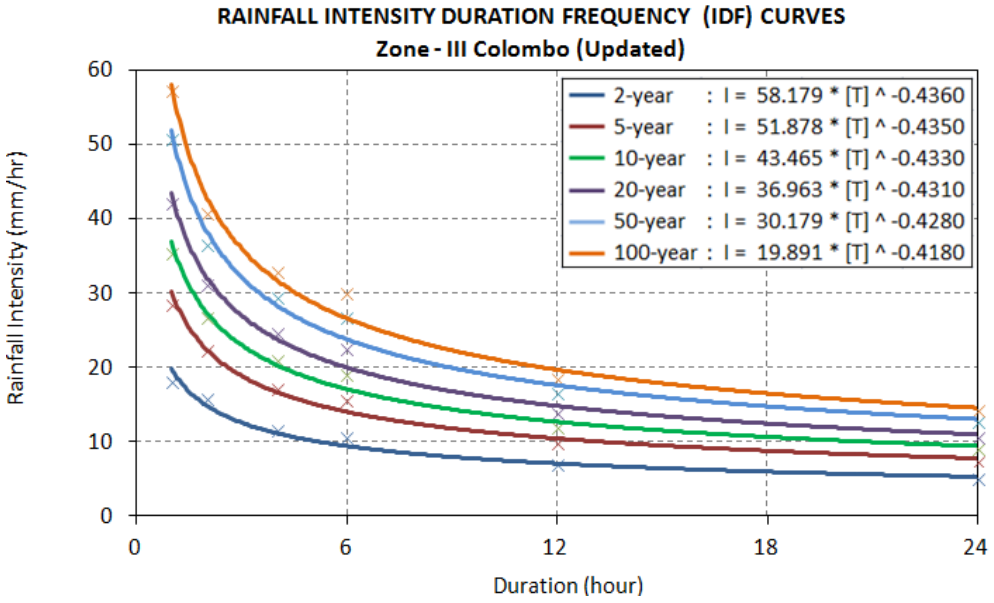


Figure 4.3 - Updated IDF Curves for Colombo Meteorological Station

Table 4.1 presents the monthly mean wind speeds around the proposed project development area, based on the data for the period 2009-2014 (daily from 7 am to 7 pm local time) recorded at the Department of Meteorology, Sri Lanka observation station in Colombo/Rathmalana, which is only 10-15 km south to the proposed site. High wind speeds usually between December ~ January and June ~ September which coincides with the Northeastern and Southwestern monsoon seasons, respectively.

Table 4.1 - Wind data based on observations taken between 11/2009 - 09/2014

Month of year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
	01	02	03	04	05	06	07	08	09	10	11	12	1-12
Dominant Wind dir.													
Wind probability >= 4 Beaufort (%)	6	5	3	0	2	2	4	3	2	0	2	5	3
Average Wind speed (kts)	7	6	5	5	6	6	6	6	5	5	5	6	5

4.1.4 Land Use

Existing Land use

Major land use patterns within the key areas of the project are shown in Figure 4.1 and in the satellite image (Figure 4.2). Project area comprises busy Class A and B roads of the Road Development Authority with commercial, institutional and residential areas (having home gardens). Major Land use type is residential and commercial covering about 0.8 km^2. Surface water drainage system in the project area and suburbs which comprised of number of canals and waterways are shown in Figure 4.3.

Pipe laying in the area will have to be done along main roads and by roads where government department buildings, commercial buildings and residences are located densely. Proposed land for the pumping station in Dabare Mawatha in Narahenpita comprised of home garden type vegetation where few mango trees, coconut trees and jackfruit trees are grown. The land reserved for proposed pump station at Nawala road can be categorized as a bear land.

There are no protected areas, sanctuaries under the Department of Wildlife Conservation and sites having any cultural, historical and/or archaeological significance as per the Antiquities Ordinance No. 9 of 1940 and Amendment Act No. 24 of 1998. Furthermore, the project area is not located within one mile of the boundary of any National Reserves.

Project area mainly belongs to the 'Primary Residential Zone' and 'Mixed Development Zone' in the Urban Development Authority's Zoning Plan 2020 (Figure 4.4).

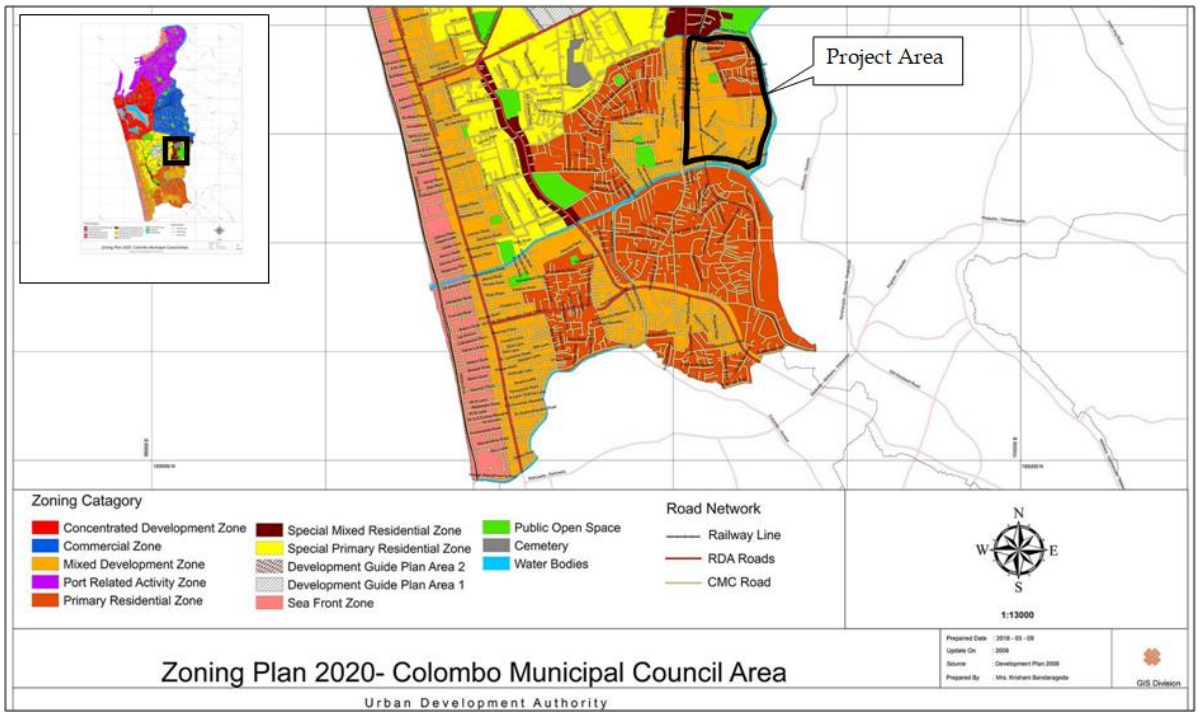


Figure 4.4 - Project area in the UDA Zoning Plan

Figure 4.5 - Existing Land use in the project area

Figure 4.6 - Satellite image of the project area

(Source: Imagery@2019 Digitalglobe, Map, data@2019 Google)

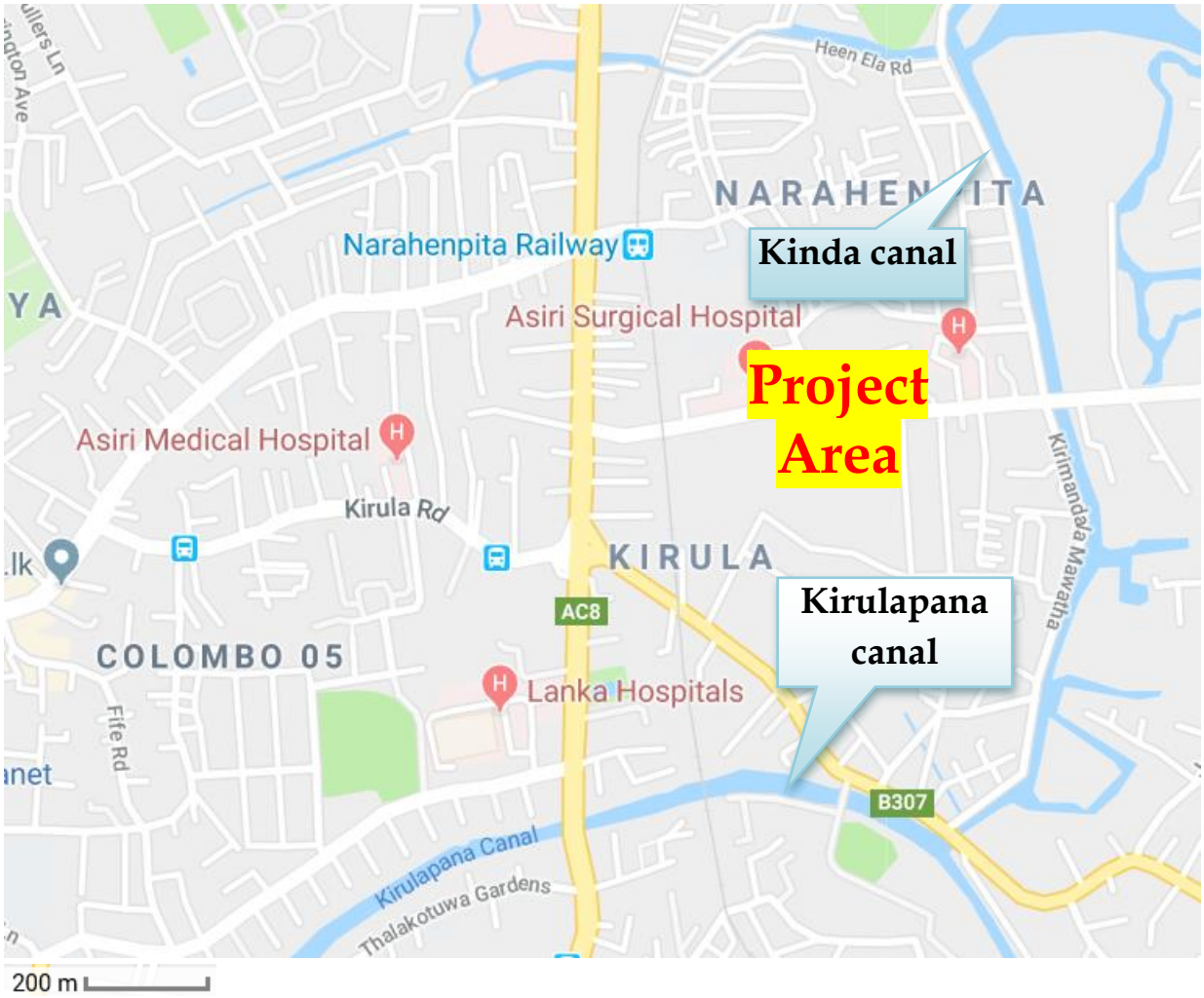


Figure 4.7 - Major canals and waterways in the project area and suburbs

(Source: Map, data@2019 Google)

4.1.5 Air Quality, Noise, Vibration

Air Quality

The surrounding area of the project location can be considered in general as highly urban, having a high population density. Its transportation is mainly concentrated in the town area. As the air quality is not recorded routinely in this project area 1hr average air quality data were measured in 7 locations, including 2 propose pumping stations' locations, as shown in the Figure 4.7. The location A3 and A4 were located on Baseline road. Two pumping stations are marked as P1 and P2. Table 4.3 shows the ambient air quality measurements for baseline study.

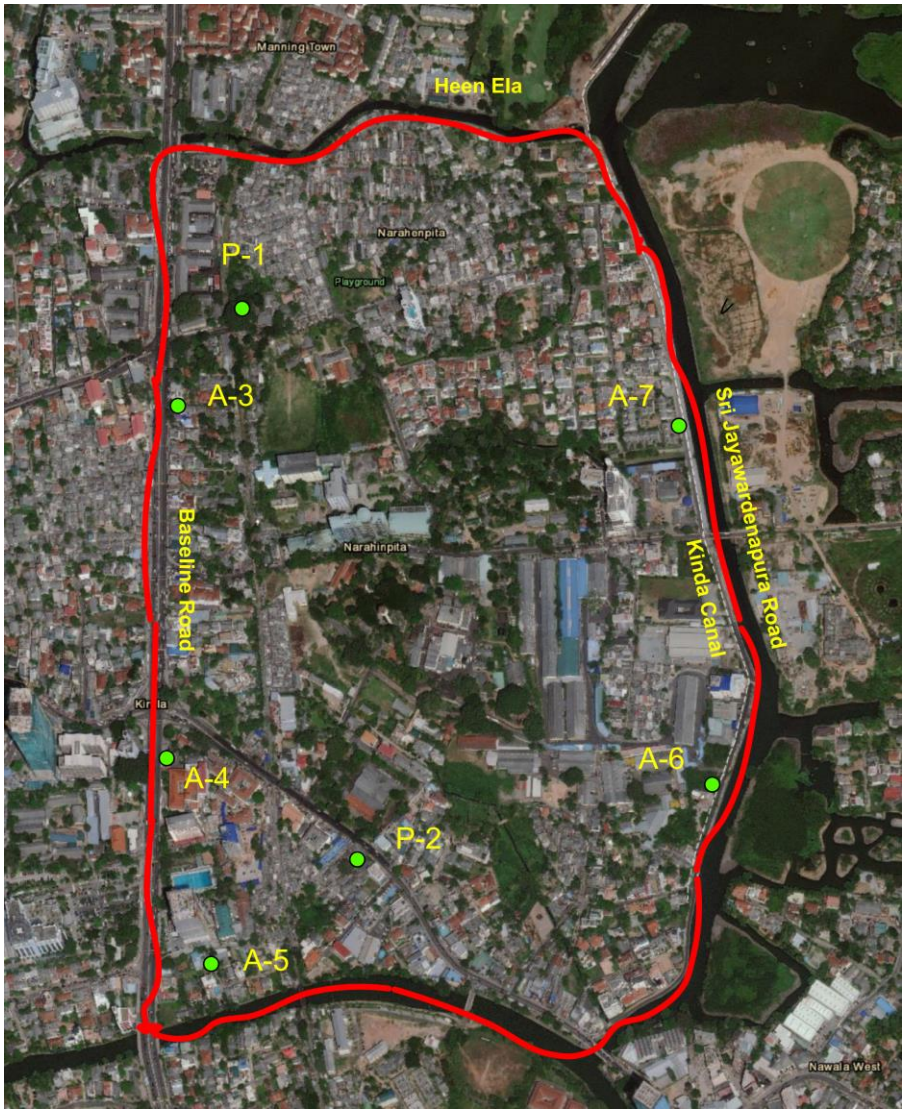


Figure 4.8 - Air quality sample locations

Table 4.2 - Air quality in sampled locations on different times

Location	Sampling Time (1hr Averaging Time	Particle dust (PM 2.5), (µg/m^3)	SO_2 (ppm)	NO_2 (Ppm)	CO_2 (ppm)	CO (ppm)	O_2, %
P-1 (Pumping Stn)	9:15 am to 10.15 am	37	0.02	0.00	353	6.2	20.3
A-3	10:25 am to 11:25 am	38	0.01	0.10	420	7.1	20.3
A-4	11:40 am to 12:40 pm	37	0.01	0.05	597	5.5	20.3
A-5	1:05 pm to 2:05 pm	37	0.09	0.00	693	8.6	20.3

A-6	2:30 pm to 3:30 pm	27	0.04	0.07	572	6.2	20.3
A-7	3:50 pm to 4:50 pm	9	0.01	0.02	358	5.6	20.4
P-2 (Pumping Stn)	5:15 pm to 6:15 pm	8	0.01	0.05	387	5.7	20.2

According to the results, it seems that air quality deterioration is not significant considering the limits enacted under the Environmental (Ambient Air Quality) Regulations, published in 1994 and amended in 2008 though the Baseline Road are often characterized with a high traffic volume including congestions. These findings are compatible with a previous study conducted by the Industrial Training Institute (ITI) as a part of the feasibility study for the proposed elevated highway from Kirulapana to New Kelani Bridge and from New Kelani Bridge to Galle face (Colombo port) over the existing Baseline road and Port accesses road in 2014. It is expected that similar air quality levels shown in Table 4.3 would prevail in similar busy road environments within the Project Area but may be even slightly lower in roads where there are plenty of residential areas. There are no stationary sources of emissions within the Project Area.

Noise and Vibration

Noise is traditionally defined as unwanted sound that interferes with normal activities in a way that reduces the quality of the environment. Sound measurements were carried out at two proposed pumping location locations (P1 and P2 in the Figure 4.8) mainly aiming to measure the existing background noise level.

Table 4.3 - Noise level results at the proposed pumping stations P1 and P2

Date and Time	Pumping Station 1 (P1) (ENL-LAeq, h), Db	Pumping Station 2 (P2) (ENL-LAeq, h), Db
29th Nov 2018, (8:00 am to 9:00 am)	45	61
29th Nov 2018, (3:00 pm to 4:00 pm)	60	64

From the sample noise measurements, it can be noted that at both locations noise levels have exceeded the permitted noise levels of the National Environmental (Noise Control) Regulations No. 1 of 1996 i.e. for urban residential areas daytime is 60dB. Such noise level exceeds are mainly expected due to traffic noise.

In a previous study (IEE Kirulapone, 2015) carried out at the Baseline Road close to the Calvary Church mentioned the vibration levels and the results showed that

existing vibration levels at some points along the route are way below the vibration limits for sensitive structures (made of lightweight materials), set by the CEA. According to this study Peak particle velocities (PPVs) were less than the interim standards on vibration for Category Type 3 structures with reference to the operation of machinery, construction activities and vehicle movement. It is expected that similar or less vibration levels would prevail in similar busy road environments within the Project Area too.

4.2 Biodiversity

4.2.1. Present Status of Fauna and Flora in the Study Area

The proposed project site is located within urban area including Kirula ward and Narahenpita ward. Currently the project site consists of network of roads and poor vegetation on roadsides and home gardens.

A) **B)**

Figure 4.9 - A) Vegetation in the bank-side of Heen ela, B) Vegetation in the land selected for "Dabare Mawatha" pumping station.

Currently the vegetation of the study area consists of native, introduced, exotic and invasive floral species. There are few economically important plants in the study area (Figure 4.9).

4.2.2. Flora and Fauna in the Study Area

To understand potential ecological impacts of the project, it is very important to investigate on key habitat types and biodiversity in the area. In order to identify the species in the proposed project area, a rapid assessment on terrestrial and aquatic ecological resources was carried out within the project area and surrounded area. It was carried out during daytime species encountered were recorded. Line transect method was used to survey the fauna and flora of the project area and different sampling techniques were used to sample different taxon. Terrestrial fauna observed 25m either side of the line transects were recorded. Hand net was used to sample the aquatic fauna present in the shallow water. Point counts were also carried out for birds. A binocular was used to observe birds and butterflies. No live specimen was collected, and night sampling was not conducted during the field studies.

Species identification and nomenclature of the species present was based on the latest literature published on the fauna and flora of Sri Lanka. The conservation status of the species was determined according to the 2012 Red list of Threatened Fauna and Flora of Sri Lanka by IUCN. Further, relevant secondary information was gathered from people living nearby communities. Flora and fauna identified in the project site is presented in Annex 7.

4.2.3 Existing Natural Habitat with the Ecology of the Ecosystems

There are no significant natural habitats for wildlife is identified within the study area, which is primarily because the area is subjected to human settlement. Home gardens with planted vegetation were the major terrestrial habitat type in the area. No any undisturbed natural ecosystems available in the area.

A total of 50 species were observed belonging to 23 families. Majority of plant species recorded in the study site are tree species (27), followed by herb (8), Shrub (7) and climber (5). Among the recorded species 24% are introduced, exotic, and invasive to Sri Lanka. None of the recorded species are endemic, unique or restricted to the project area. None of the plant species recorded in the project site is threatened or near threatened.

Fauna in the Project Site

A total of 37 faunal species were recorded during the survey representing dragonflies, butterflies, freshwater fish, reptiles, birds and mammals. Among them no species are endemic to Sri Lanka while others are native and exotic species.

Sampling of fauna was done in parallel to the floral transacts. Visual Encounter Survey method was used to record the faunal species. Faunal survey was carried out within the proposed project area and 50 m away from the project boundary. Reviewing of published documents and unpublished data was also carried out. In addition, photographic records were used to identify the visual aspect of habitats of proposed project area.

Most of the species that observed in the project area are common residents in such kind of habitats throughout the island. A detailed summery of the faunal species encountered in the project area is given in Annex 7.

Only one species (*Crocidura* sp. – all *Crocidura* species in Sri Lanka are listed under **CR** category) among the fauna recorded in the project area are listed under critically endangered category according to the 2012 Red List of Threatened Fauna and Flora of Sri Lanka by IUCN. All other species are categorized under **LC**- Least concern according to the 2012 Red List of Threatened Fauna and Flora of Sri Lanka by IUCN.

Sri Lankan torque monkey is the only endemic species recorded during the study in the proposed project area. The conservation status is categorized under **LC** in National Conservation Status, but in Global Conservation Status of Sri Lankan torque monkey is categorized under **EN** (Endangered).

One species of Freshwater fish was recorded during the study. *Poecilia reticulate*, Guppy is a Least Concern freshwater fish species commonly found in the water bodies with polluted water due to anthropogenic activities.

Existing Natural Habitat with the Ecology of the Ecosystems

Major terrestrial ecosystem type in the area is home gardens. There are no any undisturbed ecosystems in the area since it is a densely populated area.

4.3 Physical and Cultural Heritage

Important archeological, historical, religious and cultural sites in the Coastal Zone were identified through a survey in 1989 and updated in 2002 by Coast Conservation department (ESAR Kirula-Narahenpita, 2018). However, no identified places are lying in the area.

4.4 Human, Economic and Socio Cultural

The Kirula-Narahenpita subproject area is densely populated. The project implementing area falls under Thimbirigasyaya Divisional Secretariat Division. The population of Thimbirigasyaya DS division can be considered as sub project beneficiaries residing in larger catchment. The population of Thimbirigasyaya DS

division is 264,767. Nearly 80% of the population in this catchment area is Sinhalese and the rest belongs to Tamil and Muslim. The subproject implementing area is located in Narahenpita and Kirula Grama Niladhari (GN) Divisions. The populations in Narahenpita and Kirula GN divisions are 12,229 and 20,330 respectively. Except communities residing in the vicinity of main roads, most of the other communities in this sub project area are living in underserved settlements known as "Watta" in local language. The houses in underserved settlement are close to each other and they appear as Slum and Shanties.

There is direct co- relation between residential areas and economic status in the project implementing area. It was observed that the population close to the main road areas is having good houses. According to our information most of them are involved in high-income employments in private and public institutions but these situations in completely changed in areas where low-income communities are living. Majorities' of the low-income areas are laborers in nearby town centers and involved in various informal sector income generation activities.

The population connected to the sub-project relevant public roads such as Kinda Canal road, Muhandiram Dabare Mawatha, Evergreen Garden Road, Circular Roads A and B, Central Road are comparatively economically well-off community. Most of the persons within employable ages are involved in private and public sector regular income generation employments. The households in underserved settlements such as 21 Watta, 37 Watta, 100 Watta, 26 Watta, Pichchamalwatta, 84 Watta, 80 Watta and Samagi Watta are mainly involved in different types of daily paid labor work in informal sector organizations and also public institutions such as CMC. The table 4.4 includes the percentage of employments of Chief householders of the families in the DSD area.

Table 4.4 - Primary Occupation of Household Heads

Chief householders Primary Occupation	%
Govt/Semi Govt.	10
Unskilled/daily paid/contract labor	18
Self-employed	20
Retired with pension	30
Foreign employment	5
Old	3
Disabled	2
Un employed	-
Not specified	12
Total	100

(Source- Resource profile of Thimbirigasyaya DSD -2012)

Existing infrastructure facilities

The project area has a few private hospitals, churches and temples and a few government offices. The social impact assessment team has been observed the availability of sensitive institutions that may have indirect negative impacts mainly disturbances due to construction activities of proposed sub project. These observations were carried out within about 50 m distance from the boundaries of the project implementing roads and 2 plots of lands demarcated for proposed pumping stations. The results of the observations are presented in Table 4.5.

Table 4.5 - Sensitive Institutions in the area

Names of roads and pumping stations	Sensitive institutions	Distance (m)	Significance
Heen Ela Mawatha	No sensitive institutions located	-	-
Kinda Canal road	SINYO N Lanka Preschool and Cultural Center,	5	Institution functions with the assistance under Japan Friendship program, A preschool and other socio-cultural programs are being carried out
	A.O.G Christian Church	5	Religious activities for Christian community
Kirimandala Road	Sujatha Vidyalaya	8	School with about 2000 student population, girl school
	Auesis Hospital Main Entrance	8	A private hospital with modern facilities
	Nine wiles Private hospital	8	A modern private hospital with gynecological facilities
	Asiri surgical Hospital	6	Most famous private hospital for surgeries
	Sri maha Bodhi Viharaya	5	A new Buddhist temple with about 50-60 religious members regularly visiting for religious activities
Muhandiram Dabare Road	Parakrambahu Vidyalaya	8	A school with about 1200 student population
	Mahawaththa Community hall and dispensary	3	Center conducting child clinics
	Mahawaththa Eksath Sport Ground	3	Place use for holding sports meets specially during new year period
E. Victor Dabare Mawatha	CMC community hall and children park	3	Holding clinics for the pregnant women in the area

			and children use the park for their sports and other recreation activities
	Buddhist shrine and Boo tree	2	New center being developed for religious activities
Evergreen Garden Road	Entrance for Auesis Hospital	8	A private hospital with modern facilities
	Main entrance of Car park of Asiri surgical Hospital	5	Most famous private hospital for surgeries
Circular Road A	Sri Gauthama viharaya	8	Popular religious place in the area with about 100-member ship
Circular Road B	There are no Sensitive institutions	-	-
Central Road	There are no Sensitive institutions	-	-
Nawala Road (Narahenpita Road)	Police Hospital	5	The main hospital managed by the police department
	Office of Coconut Development Board	5	A branch office of the Coconut Development Board and about 200 employees work in this institution
	Access to open University from Nawala Road	8	About 400-500 university students reach the university from this access/a day
Economic center Road	Office of the District Agriculture Director's Office	5	Certification of crop seeds, agriculture extension and other agriculture research related activities
	M.D factory	6	Production of Jam, cordial and other processed fruits, About 500 employees work
	Narahenpita Economic center	5	One of the main economic centers established to wholesale/ retail of vegetables and all other grocery types products
Elvitigala Mawatha	National Blood collection center	8	Main center of the health Department involved in blood collection and storage
	Main administrative building of Colombo	8	Colombo District secretariat and Thimbirigasyaya DS office are located in this premises
Sir Oliver Gunathilaka park	There are no Sensitive institutions	-	-

Sri Sadhdarmarama Mawatha	Sri Sadhdarmaramaya	10	A religious center and the chief priest of the center is involved in indigenous medical practices and about 50 to 60 persons visit the temple for local treatments
Lake drive Road	Public service commission	5	About 200 employees work in this office
Samadhi Wihara Mawatha	Samadhi Viharaya	6	Even though it is not a ancient temple it is famous among local community. About 150 local persons are members in this center
	MILCO Company	8	Head office of MILCO company
Pumping station in SLR Land	6 families in 5 houses within the land plot	-	About 31 affected population in these 6 families
	Mahawaththa Community hall and dispensary	7	Center conducting child clinics
	Narahenpita Railway Station	20	Most congested rail station, about 1000 passengers use the station for transportation per day
The land demarcated for pumping station (in UDA land plot)	A labor camp established by a contractor in the land	-	About 90 labors seconded from Civil defense Department and another about 40 Indian labors stay in this labor camp
	Coconut Development Board office	2	A three-story building adjacent to the land demarcated for the pumping station

The project area has a sound road network linked transport facility with easy access to public places in the project via Kinda canal road, Kirimandala road and Nawala-Narahenpita Road. Almost all the houses have electricity, pipe borne water supply and majority has telephone (land phones) facilities.

4.5 Existing environmental considerations problems or issues prevailing in the area

Degraded Water Quality of the Canals

There are 3 main urban canals; Heen Ela, Kinda Canal, Kirulapana Canal, flowing around the project area. The water table is relatively high in much of the proposed

project area, and a significant factor affecting the options for on-site sanitation. Pollution of urban water bodies by domestic and industrial wastes may cause both environmental problems and health hazards (See Figure 4.10).

Figure 4.10 - Drainage directed to urban canals/streams in project area

It was noted that uncontrolled and illegal dumping of domestic waste origin in waterways, embankments and low-lying lands and discharge of sewage into canal water bodies mainly by informal settlements along canals and around the flood detention areas. These drainages directed to urban canals (as in the Figure 4.10) carry domestic untreated or partially treated domestic wastewater.

Water samples were also collected from these urban canals/streams as part of the baseline surface water program. Five (L1 ~ L5) sampling locations are shown in the map as in Figure 4.10. The primary objective of this baseline study was to analyze the current surface water quality in those urban canals/streams around the proposed project area.

Figure 4.11 - Map showing the sampling location

Analysis of temperature, dissolved oxygen (DO) and pH were performed in-situ with calibrated equipment, while the remainder of the analysis was conducted offsite in standard laboratories. All laboratory analyses were performed in accordance with the relevant test methods set out in the Standard Methods for the Examination of Water and Wastewater. Table 4.6 shows the water quality data of collected samples from small canals and watercourse.

Urban canals/streams in project area had near neutral to slightly alkaline pH (6.7 to 7.2). The presence of high concentration of Coliform bacteria in the canals/streams is a good indication of pollution arising from domestic wastes of humans and solid waste.

Table 4.6 - Water quality data of collected 5 samples from urban canals/streams and a ground water sample

Sampling location description	DO, mg/ L	pH	Turbidity (NTU)	Temp. (℃)	Conductivity (µS/cm)	BOD5 (mg/L)	E-Coli (CFU/ 100ml)	Total Coli (CFU/ 100ml)
L1, Heen Ela	1.9	6.7	10.4	28.2	290	11.5	436000	804000
L2, Sub Canal	2.9	7.1	17.4	28.7	503	15.5	392000	720000
L3, Kinda Canal	2.6	6.8	14.3	28.9	250	12.5	240000	472000
L4, Kinda Canal	3.7	7.0	17.4	29.5	383	12.1	12000	352000
L5, Kirulapone Canal	2.1	7.2	29.3	28.9	328	11.2	525000	950000
G1, Ground water (Open University)	2.8	7.4	2.9	28.7	535	2.2	0	900

Total Coliform of these 5 sample locations in canals varied from 352,000 up 804,000 counts/100 mL. Faecal coliforms are a subset of the total Coliform group and refer to the Coliform bacteria that originate from human feces or other warm-blooded animals. Water quality results indicate high levels of Faecal Coliforms up to 436,000 counts/100 mL, which indicates that raw sewage or partially treated wastewater is entering to these canals/streams. BOD measures the oxygen demand that biological organisms in the water exert in the biological oxidation of organic matter in a sample. Up to 15.5 mg/L of BOD were observed in those canals indicating that there are large populations of microorganisms, and organic matter in the water and compatible with coliform results. As the oxygen demand is high, this usually correlates with low dissolved oxygen levels. Untreated domestic sewage effluents might have resulted in high BOD values. The ratio BOD: COD ratio is a characteristic of a particular wastewater and is a simple and direct measure related to its biodegradability. Especially, with the absence of a proper waste management system and discharge untreated and partially treated sewerage in the area, those canals have victimized to a certain level of pollution (Figure 4.11). Ground water sample collected inside the Open University shows that high level of Total coliform (900 CFU/100 ml) while that sample is free from Ecoli. It is expected that similar ground water quality levels as shown in Table 4.6 would prevail in adjacent environments within the project area.

5 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1 Design Phase

a. Design considerations

Impact due to noise from the pumping stations

Wastewater traveling through the buried pipeline will not emit audible noise above the surface nor their perceptible levels of vibration associated with water movement through the pipeline. Common sources of noise in sewerage works include the pump, generator, or ventilation system. Wet wells are required in pumping stations to store the sewage before it is pumped. However, it is expected that any noise and vibration occur due to the operation of the submersible pumps in the wet well will be negligible due to the dampening effects of the wastewater.

Noise from the emergency generators can also considered as negligible because they would be sound-proof ones with an enclosure fixation within a metal covering and a silencer. However, in view of public concerns on nuisances such as noise, carful design and selection of equipment should be done.

Mitigatory Measures

Detailed design of noise control for these equipment items shall be carried out with reference to the recommendation of the equipment manufacturer. On the other hand, the pumping stations should be designed by the design consultants. The pumping stations should be constructed such that they are fully enclosed infrastructure that provide adequate ventilation systems to provide around adequate O_2 to the workers inside.

- Exhaust silencers may require at the two pumping stations to minimize the low frequency throbbing typically associated with diesel meetings.
- Pump stations should be lined with sound absorptive panels, and particularly noisy items should be enclosed.
- Noise transfer through the building shells should be controlled with improved roof and wall construction, sound rated doors and acoustic louvers.
- Ground-borne vibration should be readily prevented through incorporation of suitable vibration dampers in the equipment mounting.

Impact due to odor from the Pumping stations

Odors from domestic wastewater usually result from bacterial activities in the sewer collection system, sewage pumping stations. Typical compounds which contribute to odors are hydrogen supplied, ammonia, other sulphur containing organic species, amines, other nitrogen containing organic species and organic fatty acids. In many cases, hydrogen sulphide that may emit from anaerobic decomposition of sewage is the dominant gas. Dead zones in the pump chamber encourage settlement of solids and encourage sulphide formation. Proper design consideration is needed to minimize to the odor emissions due to these gases such as these gases may induce an annoyance to the surrounding neighborhood especially in some households or religious places.

Mitigatory measures

The steps in odor control begin with prevention of the formation of odorous compound in sewage. It is very important to design an enclosed structure with enough ventilation systems. Soil filters or dual bed activated carbon filters connected to exhaust fans have to be provided for odor control.

Usage of Concrete sewer pipes and forced mains

Total length of gravity sewer lines would be laid with concrete. However, exact locations are not clear. In the long run (where the concrete sewer lines are laid), there will be groundwater contamination with nutrients and pathogens as H_2S could corrode concrete sewer pipes.

The force mains are underground pipes made of HDPE. The disadvantage is that material is highly flexible (through thick walled).

Mitigatory Measures

Use vitrified clay pipes rather than concrete gravity sewers throughout the entire project but handle with care especially during handling (transporting and laying) since vitrified clay pipes are brittle. Where the HDPE pipes would be laid for the forced mains, use good bedding material such as metal aggregates, sand or quarry dust to prevent any collapsing.

b. Location/Siting considerations

Locations for pumping stations should be carefully selected to minimize impact of inhabitants and environment. Basically, proximity of proposed sewerage infrastructure should be considered while selecting the locations of pump stations. On the other hand, economic and design considerations dictate that the pump station be located. Selecting lands owned by the government might be a feasible option in this regard. Pumping stations and access to pumping stations are to be located above the

flood limits. A one hundred (100) year flood recurrence interval should be considered in the design for protection of structure and electrical and mechanical equipment from physical damage. The station should be easily accessible under all weather conditions and preferably located off the traffic ways of streets and alleys. The Design Engineer shall determine the availability of electric service in the selected location and coordinate the available electrical service with that required for the facility. As the the noise and odor from the pump stations are significant, external factors such as wind direction, topography, and proximity of nearby buildings should be considered while selecting the location. On the other hand, selected sites should have sufficient land available to accommodate the structure, wet well, and ultimate capacity of the pumping station, allow for the connection of incoming sewers at a relatively shallow depth reducing construction costs, and result in less impact to the natural environment and human. Considering those factors, selected two sites can be considered as technically feasible, and identified as the preferred locations for the proposed Pumping Stations.

5.2 Construction Phase

5.2.1 Pre-construction phase

Obtaining necessary Approvals

Obtaining necessary approval is very critical in project implementation. Delay in getting approvals may result in delays in project implementation.

Mitigation measures

Before awarding the contract the IEE should be approved by CEA.

Background noise levels, ambient air quality and surface and ground water quality measurement have been made in this study and those observations can be used as baseline data in obtaining necessary approvals.

5.2.2 Construction phase

a) Hydrology

Impacts

i. Disturbances to natural drainage pattern

The Canal is relatively stagnant (blocked) and has very low flow velocity at present. Further siltation of the Canal will be expected during the rainy periods due to the

entry of sediment-loaded runoff. Also, the risk of flooding of the nearby areas due to water level rising shall not be totally ignored.

ii. Siltation of nearby water bodies, marshes, during construction

The work has been planned within the available buffer zone of 6 m from the edge of the Canal bank and excavations will be limited to the 2 endpoints used for micro-tunneling (for each drive at designated launching (jacking) and receiving pits), which will be ultimately converted to manholes. However, the excavated material from the 2 end points may get easily washed away during the rainy seasons to the canal unless the excavated material is immediately removed from the site or stacked with covering to ensure minimum washing off sediments end up inside the Canal, causing further siltation of this stagnant waterway. On the other hand, the Canal seems to be free of aquatic life and is characterized with nutrient pollution with a bad odor.

iii. Water pollution due to contaminant leakage from machinery, workers sites during construction phase

Mitigation measures

The exposed soil shall be bundled temporarily and the flows from heavy runoff areas that threaten to erode or result in substantial surface runoff to adjacent water bodies shall be redirected. The areas of exposed soil shall be monitored during periods of heavy rainfall throughout the construction phase of the project so as to implement sediment dispersal measures as appropriate.

b) Soil

Impacts

Naturally at the construction stage, the work sites are disturbed and as a result the rate of soil erosion will be enhanced due to the earth movements in the leveling process. Soil erosion along the roads will be enhanced due to cutting and filling on the surface when trenching for pipelines. Moreover, vegetation clearance in pump house construction and excavation works in pipe laying will expose soils in the affected project areas leaving them vulnerable to erosion by surface run-off. Furthermore, the condition will be worsened if excavated earth is left exposed. Soil washed from the trenched roadsides will be a serious problem arising from soil erosion. Some soil erosion from the construction site will occur at least for a short time. In addition, certain volume of earth will be cut for installation of pumps at the pumping stations. All the above-mentioned sources of soil erosion will ultimately threat adjacent water bodies with high turbidity and sediment deposition, a negative consequence

especially during the periods of intense rainfall.

Mitigation measures

Restrain the land clearing and infrastructure demolition works and excavations for the end pipes to be used for micro-tunneling works during the drier seasons to the extent possible, hence, to avoid the generation of TSS, oil and metal laden surface runoff and siltation in water bodies.
Fuel, lubricants and hazardous goods shall be stored at predefined enclosed storage locations (example, elevated containers). Otherwise, storage of oil and fuel whether in large tanks or drums, should be within a concrete bund capable of retaining the entire volume of liquid in the event of leakage or rupture. Storage locations should have good ventilation, but not directly exposed to sunlight, devoid of ignition sources and should not be subjected to floods or close to waterways.

c) Water quality- adjacent water bodies

Impacts

i. Contamination due to unmanaged bentonite slurry

Bentonite mixed with water to form a viscous, shear thinning material often referred to as bentonite slurry is commonly used as drilling fluid in micro tunneling. Some amount of bentonite slurry after the drilling works need to be disposed and rest bentonite slurry is normally recycled and reused during the drilling process. Inadvertent release of bentonite slurry or improper disposal may lead to contamination of the nearby water bodies.

ii. Contamination due to unmanaged excavated soil

There are possibilities of surface water quality degradation during the construction of pump stations which consist of wet wells, pipe laying, etc. Laying of sewers using open cut method consists of dewatering, excavation, placing bedding materials, laying and testing of sewer pipes, manholes backfilling of trenches and reinstatement of roads. Therefore, it is possible to increase water turbidity and alkalinity during the construction stage as the soil may get easily washed during the rainy seasons to the canal (if the excavated material is simply stacked without any covering), causing siltation of adjacent canals; Heen Ela, Kinda Canal, Kirulapana Canal.

iii. Spillage, leak and accidental discharge of fossil oil, waste oil generated from construction

Wastes generated during construction stage will mainly comprise construction wastes (e.g. rubble, wood plants, metals), excavated soil, domestic wastes, and oil wastes. These wastes will be generated during the construction of entire sewerage network. There will be oil spills during refueling and lubricating applications as well as due to leaks from machinery such as cranes and excavators. There is possibility of further contamination of the canal (which seems to be polluted at present) due to the entry of metal (e.g., Pb) and oil-laden surface runoff during the rainy periods from spills, careless stacking / storage of oil drums, etc and due to inappropriate disposal of lubricating oil and fuel, waste oil. On the other hand, lubricant and vehicle/equipment washing effluent and solid waste (fuel filters, oily rags) are likely to be produced from repair and maintenance of machinery and equipment during the construction stage.

iv. Groundwater Quality Degradation during Construction

Insertion of concrete underground during construction of the structures' foundation, wet well may affect the alkalinity (pH) of groundwater. This may occur only when hardening of the cement is done underground because alkaline substances dissolve in the water. For the wet well, solid concrete foundation structures will be installed. Thus, potential impact on groundwater is very limited because alkaline substances will not dissolve in the water. Once built, the foundation structures will have negligible impact on groundwater quality. Sometime, sites may need to be drained to provide suitable conditions for construction works to occur, resulting in temporary changes to ground water flow.

v. Disposal of wastewater generated from workers during construction stage

Since the project area is within an urban area and it is expected that construction workers will commute from their accommodation and hence the domestic wastes generated by construction workers will be minimum during the construction period. However, there may be some laborers who will reside in the site, particularly two pumping sites, and their wastewater and sewage may be diverted to temporary toilets.

Mitigation Measures for Impacts on Surface and Groundwater Quality

The following mitigatory measures should be implemented by the Contractor under the supervision of the Project Proponent (PMU of the GCWMP) and relevant government agencies if needed.

The storage, treatment and recycling of the bentonite slurry (drilling fluid) will only be conducted at the proposed launching site depending on Contractor's proposal and under the proper approval and supervised by GCWMP.

Construction of the wet well structures and micro tunneling work, demolishing work should be strictly limited to dry season and critical monsoon periods such as April-June and September to November will be avoided using the rain forecasts from the Department of Meteorology and other international weather information sources. The construction works should be properly programmed to minimize soil excavation in rainy seasons to prevent soil erosion from exposed soil surfaces.

Remove the excavated soil and other construction/demolishing wastes as soon as possible once it is generated. Provision of earth bunds or sandbags in areas where a large amount of exposed soils exists would be required to avoid wash them into waterways. On the other hand, stockpiles should be well covered with relevant materials such as tarpaulin sheets.

Stockpiles of construction (eg: concrete) and dusty materials should not be placed near the canals, to avoid the release of dusty materials into the water. Suitable locations should be selected on site to place the stockpiles so as to avoid release of materials into the drainage channels.

The risk of spillage, leak and accidental discharge of fuels from construction equipment should be minimized and manage with proper spill prevention measures. Mitigation measures such as good use and maintenance of construction machines and heavy vehicles, install oil and grease traps in the drainage system and establish and implement emergency and contingency plan in case of spills should be be implemented during construction stage.

It is recommended that, the contractor shall provide a list of hazardous chemicals and/or material to be used in the project work to the Engineer of the GCWMP with details pertaining to proposed disposal, prior to commencement of work. Hazardous wastes should be stored separately from other construction material.

The Contractor should prepare a specific Construction Waste Management Plan (outlining methods of segregation of different construction wastes, areas designated for storage, methods of storage) with procedures to document the progress based on their construction schedule and method statements and submitted to the GCWMP for approval.

Water turbidity and alkalinity could increase during construction stage. However, this impact is temporary and limited to the construction stage. Water quality in adjacent canals within project area should be monitored to detect abnormal water quality changes.

The potential impact on groundwater is very limited because alkaline substances will not dissolve in the water. Hence no special mitigation measures are necessary.

However, the groundwater monitoring will be conducted near the two pumping stations area to confirm the potential contamination

There is a possibility of limited number of construction workers may live on the site, particularly at the two pumping stations sites, therefore, adequate sanitary facilities such as temporary toilets should be provided.

d) Air quality

Air Quality Degradation During Construction and operation Stage

Usually air quality could be impacted by dust as well as generators. Air emissions in terms of unburnt HCs, particulates and gases such as NOx, SOx and CO are expected during the operation of the standby generators if the generators have faulty exhaust silencers or not well maintained. The impact on air quality shall be addressed in terms of exhaust emissions and generation of airborne particles and dust. The impact on the air quality due to increased vehicular traffic will have a minor impact on the air quality of the area. Proper maintenance of the vehicles and maintenance of access roads will minimize this effect further.

Any open burning of plastic and polythene wastes (eg; packaging wastes and plastic material, PET bottles) may result in the generation of noxious emissions such as CO, CO_2 and VOCs.

Dust emissions (PM) are limited to the 2 proposed pumping station sites at Dabare Mawatha in Narahenpita and at Nawala Road (due to land clearing, existing building demolition works and foundation excavations activities - from the bare / exposed earth) and where ever open trenches (12 km as a total) would be used for sewer pipe laying during drier, windy hot weather conditions. It is expected that dust may also generate due to demolition of the existing infrastructure at the proposed pumping station site although the impact is temporary and short term. Uncovered soil & other construction and demolished wastes piles could be considered as dust sources during the windy, drier weather conditions.

It is also expected that several vehicles would be employed to remove excavated soil, construction materials such as sand and cement though quantities expected are not yet known. These vehicles may also generate dust and increase the PM level in the air.

Mitigation measures

Several mitigations measures will require to be adopted during the construction phase to reduce dust generation. This includes the water spraying of surfaces which are prone to dust emission. Soil compaction and timely debris removal are also important.

Dust generation from crusher plants should be controlled by covering using wetted fabrics. Wetting the materials (e.g. aggregate) earmarked to be loaded should be practiced, to avoid dust stir.

It is also important to ensure that vehicles transporting construction material such as sand, metal and cement are covered adequately to reduce dust generation. The dust levels should be monitored periodically to ensure that the levels are not too high.

Limiting speed of construction vehicles and display speed limiting sign boards are few more mitigation measures to control dust from moving vehicles.

It is recommended to locate cement mixing places and batching plants away from sensitive receptors and avoid operations during windy conditions.

Dust and emissions should be prevented, suppressed and contain exposure of workers, public or sensitive receptors. A schedule for dust/emission generation activities should be prepared and inform public in the environs regarding such activities

To prevent adverse impacts on air quality from heavy vehicles these vehicles will be maintained in optimum condition always.

e) Noise and Vibration

Noise Impacts due to the construction

Noise impacts from construction activities are generally a function of the type of construction equipment, equipment locations, the sensitivity of nearby land uses, and the timing and duration of the noise-generating activities. Site preparation typically involves the use of a tractor/loader/backhoe and rubber-tired dozer. Demolition typically involves the use of concrete saw, dozer, and tractor/loader/backhoe. Excavation typically involves the use of a drill rig, excavator, tractor/loader/backhoe, grader, rubber-tired dozer, and scraper. Pipe laying typically involves the use of a tractor/loader/backhoe and pump. Pump house construction typically involves the use of cranes, a forklift, tractor/loader/backhoe, welders, a generator set, pump, air compressor, pavement equipment, paver, and roller. Anticipated noise emissions during the construction phase are shown in Table 5.1.

Table 5.1 - Anticipated Noise Emissions during the Construction Phase

Construction equipment	Noise level (dB(A))
Excavator	113
Earth driller	97
Crawler Crane	98
Truck Crane	110
Bulldozer	104
Backhoe	107
Tractor shovel	107
Clamshell	97
Macadam roller	100
Tire roller	94
Asphalt paver	102
Concrete mixer	101
Concrete pump car	105

Source:JICA study team

It is anticipated that during the construction phase, noise levels generated by the machinery, etc. would certainly exceed 75 dB (A) and 50 dB (A), which is the maximum allowable limit during daytime (6 am to 9 pm) and night time (9 pm to 6 am the following day) for construction works, respectively (i.e., at the boundaries of the land in which the noise source is located) as per the National Environmental (Noise Control) Regulations No. 01 of 1996 under the National Environmental Act No. 47 of 1980 (*as amended*). The noise generating from these construction activities are mostly mainly intermittent, with continuous emission of noise within shorter durations at certain locations. Overall, above noise impacts are direct and significant, but short to medium term especially in highly residential areas.

A temporary residual noise impact as a result of road traffic noise from construction vehicles associated with the construction is expected on residents living the project area. This will only occur in the hours when construction workers will be travelling to and from site and transportation of construction materials and equipment.

Pipe jacking or micro-tunneling involves the boring of a tunnel for the proposed sewer pipelines, by a tunneling shield from a launch shaft towards a reception shaft. Construction noise emissions from micro-tunneling would be dominated by stationary equipment. The main noise sources include process noise, hydraulic equipment, electric motors, ventilation equipment, slurry pump

Vibration generated by a tunnel boring machine, either for a large-diameter tunnel or a micro tunnel, would be attenuated by the soil between the tunnel and the ground surface, depending on soil types and distance to sensitive receptors.

Table 5.2 - Interim Standards for vibration of the Operation of Machinery, Construction Activities and Vehicle Movements Traffic

Category of the structure as given in Table 1.1	Type of Vibration	Frequency of Vibration (Hz)	Vibration in PPV (mm/Sec.)
Type 1	Continuous	0 –10	5.0
		10-50	7.5
		Over 50	15.0
	Intermittent	0 –10	10.0
		10 –50	15.0
		Over 50	30.0
Type 2	Continuous	0 -10	2.0
		10-50	4.0
		Over 50	8.0
	Intermittent	0 –10	4.0
		10 –50	8.0
		Over 50	16.0
Type 3	Continuous	0 -10	1.0
		10 - 50	2.0
		Over 50	4.0
	Intermittent	0 - 10	2.0
		10 – 50	4.0
		Over 50	8.0
Type 4	Continuous	0 - 10	0.25
		10 – 50	0.5
		Over 50	1.0
	Intermittent	0 – 10	0.5
		10 - 50	1.0
		Over 50	2.0

There could be some noise during trench excavation for foundations and the placement of steel beams on columns etc. Such noise or vibration will be minimum and limited to the construction stage and such impacts are not continuous but sporadic.

It is expected some pile driving works would produce some impulsive noises around 110-140 dB with significant ground borne vibration to impact neighboring properties around the two pumping stations.

It is important to note that vibration limits stipulated in the Sri Lankan regulation (Table 5.2) is in terms of peak particle velocity (PPV) in the unit mm/s (millimetre per second). This measurement considers movement of particles in the ground and the potential impacts on built structures. According to the USEPA pile driving impact can

be high as 38mm/sec which may exceed the CEA enacted Standards on vibration for the operation of machinery, Construction Activities and vehicle movement of traffic (for built structures), irrespective of the type of structures.

Noise Impacts due to the operation

Noise and vibrations will result from the functions of electrical and mechanical equipment/machinery during the operation of the collection network (pumping at pump stations, standby power generators, flow in piping). Pumping stations will have backup emergency generators, which will only be used at power failure occasions. This noise impact will be infrequent and negligible. It is expected that any noise and vibration occur due to the operation of the submersible pumps in the wet well will be negligible due to the dampening effects of the wastewater and will be limited to the vicinity of the facilities.

Wastewater traveling through the buried pipeline will not emit audible noise above the surface nor will there be perceptible levels of vibration associated with water movement through the pipeline.

Mitigation measures

If necessary, residents shall be given notice of intended noisy activities so as to reduce degree of annoyances. Workers operating equipment that generates noise shall be equipped with noise protection gear. Equipment shall be kept in good condition to keep the noise level within 90 *dBA*. Workers operating equipment generating noise levels greater than 80 *dBA* continuously for 8 hours or more shall use earmuffs. Workers experiencing prolonged noise levels of 70 – 80 *dBA* shall wear earplugs. These protective gears shall continue to be provided to the workers and their use by workers shall be enforced. Proper maintenance of vehicles shall be done to reduce the noise generating due to vehicles. High noise generating equipment, if used, shall be sparingly operated during the night times to minimize any discomfort to the nearby residents. Provision of greenbelt and plantation will further help in attenuating noise. Some mitigatory measures to minimize the construction vibration are highlighted as follows:

a) Heavily loaded trucks shall be routed away from highly residential areas, if possible and streets with less populated areas, if no alternative is available, shall be selected;

b) Earthmoving and ground-impacting operations shall be operated at different times so as not to make a cumulative vibration effect;

c) Construction activities, that produce high noise and vibration, during the night shall be minimized since the human beings are more sensitive to vibration during the night;

d) Scheduling of construction work that cause high noise and vibration must be within authorized construction embodiment times with the least inconvenience to the public

e) All construction equipment will be used in good service condition and low noise/vibration generating construction equipment will be used.

f) The construction site can be separated with corrugated sheets or other suitable material especially at locations near noise sensitive receptors.

g) Carry out a property condition survey (crack survey) of nearby structures and record the present condition of the structure, to accurately assess any damage to these structures during the construction stage

h) Establishing a complaint mechanism and implementing a procedure to effectively deal with any issue raised by the community.

f) Ecology - Flora and fauna

Noise, vibrations, dust generation and other intrusive activities related to construction works such as excavation, cutting, filling and compaction work as well as operation of construction related vehicles will cause disturbances to both humans as well as some animals that inhabit the area. However, the flora and fauna inhabiting in the area already bear many disturbances due to human settlement. Hence the flora and fauna available in the area is adopted for disturbances and the impact by the project activities is short-term and will not have a significant impact, therefore. Hence, no mitigation will be needed.

Couple of plants each, Breadfruit (*Artocarpus altilis*), Jak fruit (*Artocarpus heterophyllus*), Mango (*Mangifera indica*), Teak (*Tectona grandis*), Kenda (*Macaranga peltata*), Coconut (*Cocos nucifera*) and tropical almond (*Terminalia catappa*) were observed in the land allocated for Dabare Mawatha pumping station. In the land allocated for Nawala Road pumping station there were no available trees.

Felling trees should be carried out if unavoidable following the legal procedures in the country. Clearing of the site will impact on the ground cover vegetation. Reinstatement of ground cover/ landscaping the site after construction will mitigate this impact.

g) Traffic and accessibility

The road network in the designated project area is likely to be affected as a result of project related construction activities such as laying of sewer lines, construction of manholes and two numbers of pump stations. Out of all the roads, Elvitigala Road (Baseline Road), Kirimandala Road, Nawala Road and the Muhandiram E. Dabare Road have been identified as most critical road links in terms of traffic congestion as a result of the proposed sewer network construction. In addition to the impact from sewer line construction, Nawala Road and the Muhandidram E. Dabare Road could possibly be affected by the project related logistics to the construction sites of two pumping houses located in each of the aforesaid roads.

It was observed that traffic flow exceeds the capacity and breaking congestion in the Elvitigala Road starting from 6.30 am to 9.30 am and 4.00pm to 8.00pm in weekdays, which could be identified as the morning and evening peaks in the urban region of Colombo metropolitan. Besides, it was also identified a congestion peak during 1.00 pm to 3.00 pm on the same road in weekdays as a result of school traffic. In weekends, the condition is much similar to the weekdays on Saturdays while a mild traffic congestion seldom occurs on Sundays in general. Similarly, traffic congestion was observed on Kirimandala Road, Nawala Road and Muhandiram E. Dabare Road from 7.00 am to 9.00 am in the morning and 4.00 pm to 7.30 pm in the evening on weekdays while mild congestion might be experienced during Saturdays and rarely on Sundays. In contrast, no significant traffic flow or a congestion breakout was observed on minor roads of the project area.

Impacts

The construction activities of the proposed project would require temporary closure of lanes and divert traffic from both direction to one lane with the support of a traffic controller or complete barricading of the road for the laying of pipe network and construction of manholes. This would result reduction of the capacity of the existing road in a situation of unchanged demand. Hence, the road links will instantly become jammed and such gridlock condition could be easily appeared on Elvitigala Road (Baseline Road), Kirimanadala Road, Nawala Road and Muhandiram E. Dabare Road from morning to evening owing to the higher traffic demand.

In addition, disturbing the mobility of lanes could form traffic queues in length and in case if the length of such queue forms beyond a signalized or unsignalized junction creating spill out condition, the entire junction will be grid locked. Consequently, that impact could transfer as a wave to other road links triggering a larger scale urban gridlock. Some possibilities of said phenomena in this project are Police Garage Junction and Narahenapita Junction. If the on traffic from Elvitigala Road (Baseline Road) to the Muhandiram E. Dabare Road and Nawala Road gets significantly

disturbed, a queue might possibly form beyond the junction with a complete blocking of through traffic of Elvitigala Road (Baseline Road).

The Keleni Velly railway line cross the Muhandiram E. Dabare Road, Kirimandala Road and Nawala Road, close to the junctions to Elvitigala Road (Baseline Road) . In case if unmanageable queuing occurs on these roads during peak hours, it would be difficult to barricade the crossings to allow train to pass and hence, could delay the entire schedule on the Kelani Valley line.

Mitigation Measures

In order to mitigate the traffic impact, it is required to prepare a Traffic Management Plan aligning with the construction programme of the project and moreover, with the association of Road Development Authority and Colombo Municipal Council. In the absent of a construction work programme, feasible mitigatory measures are difficult to derive as the impact to the road network as a result of construction could be distinctly different in two locations of the project. However, it is strongly recommended to consider nighttime constructions only on Elvitigala Road (Baseline Road) and Nawala Road. In addition, it is also advice to consider nighttime construction on Kirimandala Road and Muhandiram E. Dabare Road. However, there is a possibility of conducting daytime construction on Kirimandala Road and Muhandiram E. Dabare Road by considering a diversion through Lake Drive Road from Kirimandala Road to Nawala Road. Although the Lake Drive is in the possibility to absorb such traffic, it may be required to ease the bottleneck located at the entrance to Lake Drive Road from Nawala Road.

Furthermore, it is beneficial if the traffic flow from Muhandiram E. Dabare Road to Police Garage Junction could be minimized by barricading the oncoming traffic flow from Kirimandala Road to Evergreen Park Road and encouraged to use Kirimandala Road in order to minimize the traffic impact due to the construction of pump house at Muhandiram E. Dabare Road.

Moreover, adequate sign boards must be installed to guide the traffic flow during construction and in addition, it is recommended to install notice boards informing the possible congestion due to construction on Muhandiram E. Dabare Mawatha, Kirimandala Mawatha and Nawala Road on suitable locations to discourage the inflow traffic to aforesaid roads from Elvitigala Road (Baseline Road), Thimbirigasyaya Road and Kirula Road.

In view of minimizing the impact on minor roads, it is recommended to inform the residents and general public about the road closure schedules on minor roads and private roads well in advance to minimize the chaos.

h) Existing utilities along alignment

During the construction phase, existing service cables and pipelines such as water lines, electric cables may get damaged, thus may temporarily interrupt supplies to consumers during the installation of new subsurface infrastructure. These will create uncomfortable living environment to the people in the city.

There will be temporary obstruction in accessing to the areas in which the construction activities going on and, resident during the construction period and these will be minimal due to minimum excavation work.

Following activities shall mitigate these impacts:

- In order to minimize the number of exposed sites at a given time, a construction sequence of work shall be prepared.
- Residents shall be informed on allocated dates for pipe laying in an area through public announcements.
- Ceylon Electricity Board and Sri Lanka Telecom shall be contacted for removing transmission lines or to have any other mitigatory measure as applicable for their transmission lines during the period of construction.
- Public announcements shall be made on service interruptions well in advance (electricity, water and telecommunication services).
- Train the contractor to adopt methods to minimize the disturbances and inconvenience to the public that are likely to occur.
- Damaged roads shall be repaired immediately after finishing pipe laying.
- Nighttime work may be considered to speed up construction work reducing period of construction to minimize the duration of minute degree of obstruction, disturbances to public utilities and inconveniences to public. However, construction activities that produce high noise and vibration should be avoided during night since the human beings are more sensitive to vibration during the night.

i) Livelihood

Apart from potential impacts during construction phase the sub-project will require resettlement of 6 families residing in 5 houses established in land plot belongs to SLR. The 5 housing structures also have been constructed by the SLR. Therefore, the land and the housing structures are public properties and it's not necessary to pay compensation for the land and the structures. However, these 6 families are to be resettled in alternative locations. CMC has agreed to provide required housing units at the new housing scheme constructed by UDA. The letters sent to the owners of

above 5 households by GCWMP are attached in Annex 2. The SLR has agreed to allocate this land plot for the proposed pumping station of the sub-project.

A total of 421 houses were countered and 94 of them are observed as physically weak houses in Narahenpita GN division. The total houses in Kirula GN division is 158 and 54 are physically weak (Physically weak houses are vulnerable for damages due to vibration during construction period).

Other than the livelihood disturbances to the communities in some areas, road sections will lead to create temporary negative impacts to the livelihood systems of the communities and other public and private institutions. However, temporary access will be provided to the houses and all other public places in all sub-project road sections if their accesses get disturbed due to project activities. In some road sections small and medium scale shops are located, 28 mobile vendors operate their routine business activities and three-wheel operators park their three wheelers (3 three-wheel parks will be disturbed.) (Table 5.3). All these livelihood activities will be disturbed during construction phase of the sub-project.

Table 5.3 - Types of livelihood groups affected and need income restoration assistance

Livelihood group	Assistance need
Small and medium scale shops	Providing information on the construction schedules about 30 days before the project activities are commenced. Steel plates will be provided to use as alternative access to the shops if the access is disturbed. Priority action to complete the construction activities within short period of time in the sub-project road sections of these shops
Mobile venders	These mobile venders also will be provided with construction schedules of the sub-projects 30 days prior to commencement of the construction activities. They can walk on other roads in the vicinity of the sub-project during construction period. If they walk along the sub-roads linked to the project roads, they can reach the same customers.
Three-wheel operators	This group will also be provided with information about the construction program prior to commencement of the construction work. The priority will be given to complete the construction work in the three-wheel parking areas within short period of time. The three-wheel operators themselves mentioned about various

	alternatives possible for them to continue their operations without serious negative impacts on the income (moving to neighboring roads or other areas known to them etc).

j) Community and workers health and safety

Mitigation measure for community health and safety during construction stage

Mitigation measures are required to protect people within the project area and workers from accidents in the work sites. The accidental hazards for the workers as well as general public are considered particularly important because the project will be carried out in a built up, developed areas where there are relatively narrow roads with no pavements for pedestrian movements. The project will take optimum measures to assure the protection of people living, working and moving in the project areas.

- In order to minimize the number of exposed sites at a given time, a construction sequence of work shall be prepared. Residents shall be informed on allocated dates for pipe laying in an area through public announcements.
- Temporary sanitary facilities should be provided at all construction sites, especially for the pumping stations.
- Contractor should provide the workforce (drivers and traffic controllers cum flagmen should be included) involved in handling dust generating material (example, cement, soil, metal aggregates, bricks, etc) with dust masks and goggles or safety glasses.
- Environmental pollution control measures, including watering standard maintenance of machinery will be implemented.
- Arrange construction activities and schedule to minimize the impact on surrounding communities (e.g. prohibit high noise generating activity on nighttime)
- Heavily loaded trucks shall be routed away from highly residential areas, if possible and streets with less populated areas, if no alternative is available, shall be selected
- Limiting speed of construction vehicles and display speed limiting sign boards are few more mitigation measures to control dust from moving vehicles.

- Avoid peak traffic hours with reference to material delivery and taking away the soil or construction wastes. It is advised that appointed contractor could prepare a Traffic Management Plan and implement it accordingly with the support of the project proponent.

- Dust generation from crusher plants should be controlled by covering using wetted fabrics. Wetting the materials (e.g. aggregate) earmarked to be loaded should be practiced, to avoid dust stir.

- It is recommended to sprinkle some water to the cleared and exposed (bare) surfaces frequently when dust plumes are likely to get generated under hot, sunny and windy conditions.
- It is also important to ensure that vehicles transporting construction material such as sand, metal and cement are covered adequately to reduce dust generation. The dust levels should be monitored periodically to ensure that the levels are not too high.

- It is recommended to locate cement mixing places and batching plants away from sensitive receptors and avoid operations during windy conditions.

- If needed, temporary worker camps and the site offices, storage areas etc should be provided with adequate number of well closing bins to collect municipal garbage and the bins should be regularly emptied (Contractor/s should make necessary arrangements with the CMC to remove the collected wastes).

5.2.3 Post-Construction

Impacts

There will be temporary structures, temporary offices and labor huts and cesspits built in the construction phase. These structures may create inconveniences to the general public if remained after finishing construction.

Mitigation measures

Once construction phase is completed all of the above-mentioned structures must be removed and labor huts should be completely backfilled by the appointed Contractor/s to prevent vermin/vector breeding centers (some of the excavated material generated from the trenches or site preparation works and debris from demolition works may be used) to the satisfaction of the Project Proponent.

5.3 Operations and Maintenance Phase

a. Defects Liability Period

Proposal made in the IEE -report for Kirulapone ward (2015), another ward of same project, was adopted for this project too.

Table 5.4 summarizes the issues / impacts and relevant measures to be implemented with reference to the operation and maintenance of the sewer network. Necessary action must be implemented by the CMC / Project Proponent.

Table 5.4 - Issues / potential impacts with reference to the operation and maintenance of the sewer network and remedial measures needed (Source : IEE, Kirulapone, 2015)

Issues / Impacts	Remedial Measures recommended
The workers involved in the - O&M procedures are not given appropriate PPE nor are they willing to wear PPE even if provided	It needs to be made mandatory (punitive action should be imposed on those who are violating the OHS policies) for all workers (including drivers involved in driving the gully bowzers, jet bowsers, etc) to wear hard hats, goggles, strong gum boots and gloves up to the elbow length with full protective clothing. Provide first aid facilities in the vehicles in accordance to the General Register of the Department of Labour & the Factories (First Aid) Regulation No 1 of 1995. Special provisions should be made available in their offices to store the given PPE with toilet facilities for the workers to thoroughly clean themselves. Pre-recruitment and periodic health checkups of the workers has to be initiated by the CMC (example, skin irritation checkups such as dermatitis & rashes, blood tests and lung examinations including breathing / lung functioning's and X-rays) through reputed agencies such as the National Institute of Occupational Safety and Health (NIOSH) with maintenance of records and treatment initiated & compensation where necessary. Other OHS measures with reference to sewer cleaning works are; Slippery algal growths should be scrubbed off and washed away whenever they appear. Check the O_2 levels (should not be < 19.5%) and other gases such as H_2S, NH_3 etc using calibrated multi gas meters before allowing workers to get into the manholes. The gas levels shall be checked continuously until work is over. If O_2 levels are < 19.5, then provide the workers with self-contain breathing apparatus (SCBA) or supplied air respirators.

	Keep all areas clear of spilled oil or grease. Use soap and water, not gasoline or solvents, for cleaning. Wear long-sleeved glows when working with equipment or while in direct contact with wastewater. Do not leave tools, equipment and materials where they could create a safety hazard. Adequate lighting should be provided for night work and in areas with limited existing lighting. Remove only sections of handrails, deck plates or grating necessary for the immediate job. Removed sections should be properly stored out of the way and properly secured against falling into tanks. The area should be barricaded to prevent unauthorized personnel entry and possible injury. Do not walk on top of the sidewalls of structures; to prevent slips and falling into the ditch.
Usage of jetting machines and gully suckers	Ensure that when attending to cleaning any blockages over pump any sewage flowing from the upstream manhole to downstream manhole until completed.
Odor emissions from sewer manholes due to possible blockages, etc	Frequent / daily inspections (morning and evening) should be carried out to see whether odor emanates and attend to any blockages. Ensure that the manholes to be provided are ventilated manholes to minimize odor generation to the surrounding environment
Damaged sewer lines are removed if complaints are received. In this respect, excavations are carried out to remove the damaged lines which are then replaced with 1000 T PVC pipes. The newly laid PVC lines will be connected to the existing undamaged lines	Use "No digging methods" such as glass reinforced plastic for sewer rehabilitation or repairing of damaged manholes wherever possible.
Sewerage leakage from damaged pipes causing contamination	Sewer pipe network should be continuously monitored for leakage and rectify such leakage immediately.

Table 5.5 summarizes the issues / impacts and relevant measures to be implemented with reference to the operation and maintenance of the pumping stations. Necessary

actions as described in Table 5.4 have to be implemented by the CMC / Project Proponent.

Table 5.5 - Issues / potential impacts with reference to the operation and maintenance of the pumping stations and remedial measures needed (Modified after IEE, Kirulapone, 2015)

Issues / Impacts	Remedial Measures recommended
Odor emissions and vermin	The pumping stations should be designed by the Design Consultants and then constructed such that they are fully enclosed infrastructure that will have adequate ventilation systems (mechanical ventilation may be provided with intake ducts fixed with fine mesh to prevent access to vermin such as flies) to provide around 21% of O_2 to the workers inside and either soil filters or dual bed activated carbon filters connected to exhaust fans have to be provided for odor control.
Overflows from the wet well may lead to intense pollution of the nearby canals (if highly concentrated volumes are discharged especially during dry weather conditions) during operational failures (due to mechanical breakdowns of pumping stations and equipment)	Maintain and operation all pumping stations and equipment in and effective condition and keep records of the maintenance Identification of critical components and a system to ensure adequate and timely access to spare parts. Ensure to provide around 4-6 standby pumping equipment and associated controls (they need be alternately operated) and some 5000 L capacity gully suckers at site to attend to emergency needs
Removal of grit materials and sludge	Sewage sludge and grit material may contain organic matter and is rich in macro- and micronutrients, heavy metals and human pathogens which should be considered when it is disposed. The grit materials and sludge removed from the wet well should be collected in proper containers and dewatered at the pumping station. The dewatered materials should be disposed at the suitable/appropriate dumping site. It is also recommended to transport the sludge and grit material that remove from wet well as soon as possible and to dispose appropriately and eliminate possible contamination of surface/groundwater and disposal should be done under the proper approval and supervised by relevant officers.
H_2S related OHS issues	Automated H_2S detectors should be installed in plenty throughout the pumping station. They should be capable of setting up an alarm when dangerous levels are detected. Therefore, the workers should be educated regarding the dangers posed by different levels of H_2S. Also provide portable H_2S meters to those involved in removing grit and repairing and maintenance works in the wet well There needs to be a first aid unit / facilities as per the General Register of the Department of Labour & the Factories (First Aid) Regulation No 1 of 1995 with medically competent persons and

	an ambulance to reach the nearest hospital/s on a 24 hrs. basis. Also provide a stretcher.
Other OHS issues (example, OHS concerns arising during wet cleaning and repairs, grit and screening removal)	Provide suitable PPE. Within the pumping station premises there needs to be special areas allocated to store the given PPE with toilet facilities for the workers to thoroughly clean themselves. Smoking and consumption of food items should be prohibited in the wet well /working areas with displaying of appropriate sign boards. Ladders and railings around the wet well, screening chambers, penstock gate chambers and grit chambers should be hard, well fixed solid structures (example, made of stainless steel). Ladders provided to the wet well and screening removal area should have well fixed railings on both sides with broad footsteps. Ladders leading to the screening removal area should not be placed above ditches such as penstock gate chamber, grit chamber, etc. Pre-recruitment and periodic health checkups of the workers has to be initiated by the CMC (example, skin irritation checkups such as dermatitis & rashes, blood tests and lung examinations including breathing / lung functioning) through reputed agencies such as the NIOSH with maintenance of records and treatment initiated & compensation where necessary. Automated Fire/ smoke detectors with an alarm are mandatory with provision of adequate gear to put off fires. The workers should be thoroughly trained to put off any fires.

b. Operations and Maintenance Period

Defects Liability Period

Table 5.6 - Noise and vibration related impacts in the operation and maintenance of the pumping stations and remedial measures needed (Source : IEE, Kirulapone, 2015)

Impacts	Mitigation Measures
Noise emissions and ground-borne vibration from the pumping stations (due to operation of the electromechanical units) may annoyance to the public in the close vicinity	Doors and windows of Pump stations should be kept closed during the operational time. Ensure the exhaust silencers are in good conditions Emergency generator rooms should be kept closed during the operational Period.
Odor emissions from the pumping stations	Needs to be an enclosed structure with enough ventilation systems

6 INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

6.1 The process

This chapter mainly explained the information and comments received from stakeholder's community including affected people of the project area. It includes their suggestions as mitigation measures. In aiming provide the background to the consultation process, at the beginning this chapter provides a brief socioeconomic profile of the area as well.

6.1.1 Data collection methods

The data obtained for this chapter was collected conducting series of following activities (Table 6.1).

Table 6.1 - Data collection methods for the social impact assessment

Activity	Purpose
Discussion with team leader of design supervision and institutional development consultants (DSIDC)	To gain some knowledge about overall project and proposed sub project in Kirula-Narahenpita area.
Review of social safeguard and environmental guideline of EIB	Understanding the policies and guidelines of EIB about social safeguard aspects of project they are funding.
Meeting with design engineer of DSIDC	Understanding the nature of designs, they introduce for the sub project area.
Visits to sub project area with design engineer of DSIDC	To identify the project implementing area and specifically the roads that will be used for laying new sewerage pipelines.
Consultation with divisional secretary of Thimbirigasyaya and Grama Niladharies of Kirula and Narahenpita.	Document the views of these two types of stakeholder agency personal and to explain the project to these key government officers in the sub project area.
Identification of access roads that may be disturbed due to the implementation of proposed sub project activities.	Identification of potential disturbances and their magnitude due to the proposed project activities.
Consultation of other stakeholders including community leaders in the proposed sub project area.	Documentation of the views of these stakeholders on the impacts and benefit of the proposed sub project.
Focus group discussions with local community members	Documentation of the views of local people on sub project related impact.
Taking photographs of some important features in the sub project implementing area.	To explain the salient features to the users of the social impact assessment report

Preparing manual sketch showing project implementing roads and their vicinity	To explain the nature of project implementing roads and their salient features.
Household questionnaire survey with 5 households (with 6 families) in one of the land plots (SLR land plot) demarcated for pumping station	To prepare the socio-economic profile and document the views of the householders to be resettled

6.1.2 Data analysis methods

The data for the social assessment was analyzed using 6 criteria and relevant indicators that were used for collecting data. The information on these aspects is summarized below (Table 6.2).

Table 6.2 - Data analysis methods used in the social impact assessment

Criteria	Indicators/indices	Relevant data
Existing socio-economic environment	Likelihood impacted households and population (direct/indirect)	Population and families and houses
	Likelihood impacted land(direct/indirect)	Number of plots and land area
	Possible impacts on infrastructure in the area	Number and names of roads that may be disturbed
Possible impacts	Number of families affected	Data on directly affected families with their socio-economic condition.
	Number of business establishments affected	Data on number of business establishments and their owners and operators
Legal and policy related safeguards	Sri Lankan and funding agency related policies and other procedures	Names and descriptions of such policies and procedures
Institutions available	Relevant institutions for planning and implementation of social safeguard	The roles and responsibilities of project executing and implementing agencies about management
Monitoring of the social impacts due to the proposed sub project	Number of households impacted, and number mitigated	Details of impacts and measures implemented for mitigation in each household
	Other complaints of local people related to the construction induced impacts	Details of the persons who complain about potential impacts
Grievances	Institutional mechanisms and grievance redressed procedure	Review of grievance redress institutional mechanisms and procedures already available in the project

The description of the baseline socio-economic condition

6.1.3 Population

The proposed sub project implementing area is in Narahenpita and Kirula GN divisions of Thimbirigasyaya DS Division. The population in these 3 units is considered as beneficiary community of the proposed sub project. The population residing in about 50m radius from the project implementing locations is considered as indirect impacted population due to the proposed sub-project implementation. In the land plot proposed for one of the pumping stations, there are 5 houses constructed by SLR and these 5 houses are presently used by 6 families. These 5 houses with 6 families will be provided with alternative residences in other possible locations (letters are attached in Annex 2). The 6 families agree to resettle in alternative locations provided to them. The population in these sub project implementing areas including beneficiary population are mentioned in Table 6.3.

Table 6.3 - Population in sub-project area

Project implementing area	Population			
	Approximate Road user population in the local area	Families facing the road edge	Population of the households/ business structures facing the road edge	Mobile Population in the roads
Thimbirigasyaya DS	264767	-	-	-
Kirula GN	20330	-	-	-
Narahenpita GN	12229	-	-	-
Heen Ela Mawatha	100	22	82	200
Kinda Canal Road	150	35	112	250
Kirimandala Road	150	28	98	4000
Mohandiram Dabare Mawatha	200	53	174	500
E Victor Dabare Mawatha	600	164	558	800
Evergreen Garden Road	100	20	64	250
Circular Road A	300	82	288	300
Circular Road	200	41	135	200
Central Road	100	28	88	150
Nawala Road (Narahenpita Road)	600	131	420	5000

Economic Center Road	50	1	3	2500
Elvitigala Mawatha	150	0	0	3000
Srimath Oliver Gunathilake Garden	75	17	56	200
Sri Saddharmarama Road	100	26	86	300
Lake Drive Road	50	8	28	100
Samadhivihara Road	150	-	-	350
SLR Land for Pumping Station	31*	-	-	-
UDA Land for Pumping Station	130**	-	-	-

(Source: Resource profile of Thimbirigasyaya DS Office and Socio-economic survey team)

*There are 6 families residing in 5 houses located in SLR land (25 perch) proposed for construction of pumping station in Narahenpita GN Division

**There is a temporary labor camp established in this UDA 40 perch land plot by a private contractor and about 130 labors working in their construction sites are temporary staying in this labor camp.

6.1.4 Diversity of the project relevant population

The project implementing 11 public roads (main roads) and 2 land plots demarcated for construction of pumping stations are in Kirula and Narahenpita GN divisions of Thimbirigasyaya DS division. A larger percentage of sub project relevant population belongs to Sinhalese and communities of other ethnic groups are also living in the same area. The ethnic diversity of the population is shown in Table 6.4

Table 6.4 - Population with ethnic diversity

Project implementing area	Total population	Sinhala		Tamil		Muslim		Burger		Other	
		No	%	No	%	No	%	No	%	No	%
Thimbirigasyaya DS	264767	148567	56	74184	28	33784	13	4362	2	3870	1
Kirula GN	20330	13579	67	5348	26	724	4	142	1	537	2
Narahenpita GN	12229	9989	82	1400	11	560	4	85	1	195	2
Project area	2192 (ethnic diversity of project area population is similar to the ethnic diversity in other units, DSD and GNDs)										

(Source: Resource profile of Thimbirigasyaya DS Office and Socio-economic survey team)

Gender diversity in the project implementing area is somewhat different from the gender composition of population in other GN and DS divisions of the country. According to the data on population in Census and statistics Department (2015) female population is more than male population in most of the GN and DS divisions of the country. However, according to the data available in Thimbirigasyaya DS office and Kirula and Narahenpita GN offices male population is greater than female population in these administrative areas as shown in Table 6.5.

Table 6.5 - Gender Diversity of Population

Project implementing area	Female Population		Male population		Total population
	No	%	No	%	
Thimbirigasyaya DS	126445	48	138322	52	264767
Kirula GN	9970	49	10360	51	20330
Narahenpita GN	5947	49	6282	51	12229
Project area	1074	49	1118	51	2192

(Source: Resource profile of Thimbirigasyaya DS Office and Socio-economic survey team)

6.1.5 Education Diversity

Except population residing close to the main roads the areas close to the interior roads are occupied by low income communities. The low-income communities located within sub project implementing area include 21 Watte, 37 Watte, Dabare lane, 100 Watte, 26 Watte, Pichcha Mal Watte, and 84 Watte, 80 Watte and Samadhi Watte. The education level of the communities residing in the vicinity of main roads is significantly higher than the communities living in all these low-income areas. The data available on education levels in Thimbirigasyaya DS division (percentages of persons under different education levels) indicate the general situation of the education levels of the sub-project relevant area population. The Table 6.6 includes percentages of population studied up to different levels of education.

Table 6.6 - Education levels of population in Thimbirigasyaya DSD

Level of Education	% of persons
Children <5 years (not yet schooling	7
Illiterate with no formal education	4
Can place signature	3
Up to Gr.5	13
Up to GCE(O/L)	50
Passed GCE(O/L)	10
Up to GCE(A/L)	6
Passed GCE(A/L)	4
Voc. Training	-
Diploma	-

Undergraduate	1
Graduate	1
Postgraduate	1
Total	**100**

(Source- profile of Thimbirigasyaya DSD -2012)

6.1.6 Economic activities and employment

There is direct co-relation between residential areas and economic status in the project implementing area. It was observed that the population close to the main road areas is having good houses. According to our information most of them are involved in high income employments in private and public institutions but these situations in completely changed in areas where low income communities are living. Majorities' of the low-income areas are laborers in nearby town centers and involved in various informal sector income generation activities.

The population connected to the sub-project relevant public roads such as Kinda Canal road, Muhandiram Dabare Mawatha, Evergreen Garden Road, Circular Roads A and B, Central Road are comparatively economically well-off community. Most of the persons within employable ages are involved in private and public sector regular income generation employments. The households in Underserved settlements such as 21 Watta, 37 Watta, 100 Watta, 26 Watta, Pichchamalwatta, 84 Watta, 80 Watta and Samagi Watta are mainly involved in different types of daily paid labor work in informal sector organizations and public institutions such as Colombo Municipal council. The Table 4.4 (See Chapter 4) includes the percentage of employments of Chief householders of the families in the DSD area.

6.2 Properties located facing the road edges in sub-project area

The properties located facing to all the main roads and sub roads under each sewer line proposed for installation of pipelines are included in Annex 8. A total of 421 houses were countered and 94 of them are observed as physically weak houses in Narahenpita GN division. The total houses in Kirula GN division is 158 and 54 are physically weak (Physically weak houses are vulnerable for damages due to vibration during construction period).

6.3 Sensitive institutions

The social impact assessment team observed the availability of sensitive institutions that may have indirect negative impacts mainly disturbances due to construction activities of proposed sub project. These observations were carried out within about

50 m distance from the boundaries of the project implementing roads and 2 plots of lands demarcated for proposed pumping stations. The results of the observations are presented in Table 4.5 (See Chapter 4). There were 148 institutions and 32 out of them were sensitive institutions.

6.4 Other observations of the sub-culture of the people living in the project implementing area

Two different communities are observed within proposed sub project implementing area. Comparatively economically better off communities are observed residing in large houses located close to the main roads. The second types of socio-economic groups are living in interior areas and these communities are known as "Watte". They are living in small houses constructed close to each other.

The upper level socio economic groups are living in isolated houses with covered boundaries. They are not keeping close relation with each other. They expressed their willingness for a sewerage improvement project implemented in their locality.

The community living in low income areas known as Watte, have related each other and comparatively significant percentage of them are addicted to liquor and other drugs. They tend to get disturbed even in small incidents. In such incidents they get together and create problems to the external interventionists. In this context, dealing with these low-income communities popularly known as slum and shanty should be carried out carefully and strategically.

6.5 Issues and problems in the existing socio-economic environment

The socio-economic issues common to the 11 main public road areas and 2 pumping areas are observed. Some of the key socio-economic related issues experienced by the project related community are mentioned below:

- The Heen Ela, storm water drainage canal located in the periphery of sub project area is highly polluted due to discharge of sewerage water and all other wastewater from the households. During rainy seasons water level in Heen Ela goes up and this results to increase the water level of sanitary toilets in households.
- Some members of the communities in low income areas known as "Watta" are addicted to alcohol and other drugs and therefore, frequent quarrels and other disturbances are observed. These community members create serious disturbances to the neighboring communities.
- Another problem in the existing environment is sewerage pumping station established in Dabare Watte housing scheme. This was established in 1971 by national housing development authority for about 222 houses. It is managed

by a community base organization, but they are incapable of managing it effectively. Frequent problems such as blockage of dilapidated pipes are observed. Some houses are constructed on berried pipes. Frequent dysfunctions' sewerage system and serious odor spreads in the area.

- Rapid fragmentation of home gardens is a problem experienced by the community. This has resulted in construction of new houses in small pieces of land. In these small land plots, it is difficult to construct septic tank & soakage pits because such sewerage pits cannot be emptied through gully browsers when they are filled. Most of the access roads to these small land plots are extremely narrow and congested.

6.6 Potential social impacts

There will not be need for acquisition of private lands but 6 families in one of the land plots proposed for construction of pumping station need to be resettled. Apart from this involuntary Resettlement impact some construction related disturbances will be expected. The potential positive and negative impacts that might emerge in each sub project implementing location are mentioned in Table 6.7.

Table 6.7 - Potential positive and negative impacts during construction and operation periods

Sub project location	Positive impact	Negative impact
Heen ela	The householders in Heen ela catchment area will have sustainable solution for the existing problem of sewerage disposal (long term impact).	There will be some disturbances to the Sinyo Montessori school and AOG catholic religious center during construction period due to dust, mud, noise and access disturbances. Two sub-roads connected to the Heen Ela road will get disturbed during construction, Access to houses and business establishments located close to the road edges can be expected, (impacts confined to construction phase). This is a narrow road about 4m width and therefore about 22 houses facing to the road edge will have access difficulties, 12 of these 22 houses are vulnerable due to their closeness to the road edge.
	The present pollution of Heen ela will be arrested due to diversion of sewerage to the main sewerage disposal network. (Long term impact). Some households discharge the overflows from the sewerage pits to the Heen Ela during rainy seasons. (Long term impact).	There are 8 sub roads connected to Heen ela road that will be used for sewerage pipe installation. The residence using these sub roads will have access difficulties during construction period. Apart from access difficulties dust, mud and noise during construction period will disturb the people residing close to the road edges (short term impact confined to construction phase)
	The householders will be able to save cost presently incurred for emptying of	-

	frequently filled sewerage pits in home gardens (most of the sewerage pits to be emptied in every six months spending about Rs 2000-3000 for private gully bourses), this is also a long-term impact	
Kinda Canal Road	Ability for householders to connect their sewerage disposal pipes to the main system. The Kinda canal at present is polluted due to the discharge of wastewater overflowing from drainage pits in households. This problem will be permanently arrested by the project. (Long term impact)	The Sinyo Pre-school and AOG Church will have disturbances due to dust, mud and Noise during construction period, the visitors to these institutions also will have difficulties to park the vehicles, about 7 sub-roads connected to Kinda Canal will have traffic related and other disturbances during construction period.
Kirimandala Road	The residents in the road catchment and also larger institutions such as Asiri Surgical Hospital, OASIS hospital, Nine wells hospital and economic center will have opportunity to divert their sewerage to the main system established under the proposed sub project (long term impact).	Even though the road is somewhat wider it is highly congested due to 3 private hospitals and therefore there will be some disturbances to the visitors to the hospitals during construction period. The dust, noise and other construction induced impacts will be there during construction period.
		The main access to one major girls' school known as Sujatha is connected to this road and therefore, there can be disturbances and other potential negative impacts to the school population especially to the school children during construction period.
		A Buddhist temple called Sri Maha Bodhi Viharaya is located facing to this road and therefore religious activities of this temple may get disturbed during construction
		The economic center in Kirimandala road is also connected to this road and its activities will have some disturbances during construction.
		Kalani Valley (KV) rail line runs across this road and there can be some disturbances to the schedules of the rail transportation.
Muhandiram Dabare Road	This project may help to reduce wastewater related difficulties and problems created by haphazard wastewater disposal in the area (mosquito problems)	The visitors of common institutions such as Parakramabahu vidyalaya, Mahawatta community hall and community medical center will have difficulties due to traffic congestion, dust and noise during construction period, KV rail line runs across this road and there can be some disturbances to the rail line operations during construction period.
E Victor Dabare lane	The sewerage management is the most significant problem in Victor Dabare housing scheme. This problem will have sustainable solution due to the proposed sub project	This road is extremely narrow (4m wide) and installation of pipes will lead to create significant access difficulties, sewerage pipe line of existing Dabare housing scheme are installed in these narrow road therefore there can be some damages to such roads(this will be a short term impact because the sewerage system

		of scheme can be connected to the main sewerage system)
Evergreen garden road	The residents in the road command will have long term solutions to their sewerage disposal problem	There will be difficulties for the visitors to Asiri Surgical hospital vehicle park during construction period, one of the access of OASIS hospital is also connected to this road and this also get disturbed during construction period.
Circular road A	The residents in the road command will have long term solutions to their sewerage disposal problem	Six narrow lanes are connected to this road and these lanes are extremely narrow and therefore there can be potential damages to the parapet walls apart from significant access difficulties. (limited to construction period)
Circular road B	The residents in the road command will have long term solutions to their sewerage disposal problem	Seven narrow lanes are connected to this road and these lanes are extremely narrow and therefore there can be potential damages to the parapet walls apart from significant access difficulties. (limited to construction period)
Central Road	Ground water table in this area is at high level and septic tanks frequently overflow. The proposed sub-project is a long-term solution	The area as whole is calm and quiet and this environment will get disturbed during construction period, almost all the houses have at least one vehicle and access to houses will be disturbed.
Nawala Road	The sewerage system in large public institutions such as Police hospital, Coconut cultivation board can be connected to main sewer network	This road is heavily congested, and that congestion will get aggravated during construction period. The Sri Lanka police hospital access is connected to this road and visitors to the hospital might get some difficulties.
Economic center road	The sewerage systems in major institutions such as Narahenpita Economic center, Office of the Director agriculture and MD fruit processing industry can connect their sewer systems to the main sewer network under the sub-project	The entrance to Narahenpita economic center from Navala road will get disturbed, the access to office of the Director agriculture and MD food processing industry will get disturbed during construction
Elvitigala Mawatha	The public institutions such as National blood collection center, Colombo Kachcheri, Thimbirigasyaya DS office will have opportunity to connect their sewer systems to the main sewer network	This is one of the main road sections in the area heavily congested. The congestion will get aggravated during construction period
Sir Oliver Gunathilaka Mawatha	The land in this area is highly fragmented and therefore, it is difficult to construct sewerage pits in such small land plots, it is also difficult to take Gully bourses to interior households due to extremely narrow roads. In this context, the householders in this area will have opportunity to connect their toilets to the main sewer network	The vehicles coming to Colombo Kachcheri office are parked in this road area and this activity will get disturbed during construction period
Sri Saddharma Mawatha	The ground water level in this area is at a high level and therefore, toilet pits/septic tanks frequently overflow. The proposed sub-project is an opportunity for the institutions and householders to connect their septic tanks to the main sewer line	There will be access difficulties to the Sri Sadhdarmaramaya religious center and Asset line leasing company. There also some disturbances to the existing environment when the sewer line is installed across the main storm water canal in this area

Lake drive Road	The public service commission will be able to connect its sewerage system to the main sewer net work	There can be damages to the properly improved surface of the road due to installation of pipelines; The access to public service commission will get disturbed.
Samadhivihara Road	The Milco Institute presently spends considerable cost to maintain its sewerage disposal system. They will be able connect their sewer system to the main sewer network and thereby they can reduce the cost of sewerage management in the institute	The access to Milco and Samadhiviharaya will get disturbed during construction period
Pumping station in SLR land	-	Six families residing in 5 houses will have to be resettled. The affected population in 6 families is 31.
-	-	Mahawatta community hall and medical center are located about 25m away from the land proposed for pumping station there can be some disturbances to the activities of these centers during construction period.
Pumping station in SLR UDA land	-	There will be needed to demolish the temporary constructed labor camp in this land plot. This labor camp is occupied by about 90 persons seconded from Civil Defense Department to a contractor, about 40 Indian laborers also stay in this labor camp. The other infrastructure such as kitchen and toilets of the labor camp will also need to be demolished.
		The office building (3 story building) of Coconut development Board is located on east side of the land. Therefore, there can be some disturbances to the activities of this office during construction and even operation period of the project.
		About 13 houses of Ramasami Watta are located adjacent to the land on western side. These houses may be vulnerable for negative impacts during construction period,
		Another 3 houses belong to Pichchamalwatta Underserved Settlement (USS) on north of the land are located adjacent to the land. These houses may also be vulnerable for possible damages during construction period.

6.6.1 Views of the stakeholders on potential impacts

According to the findings all most all the positive impacts are long term while most of the negative impacts are temporary in nature i.e disturbance for the routine work of the community during construction period.

Positive impact	Negative impact
1. Proposed project will be a sustainable solution for the existing problem of sewerage disposal (long term impact). 2. Small Cannel will be arrested due to diversion of sewerage to the main sewerage disposal network. (Long term impact) 3. The householders will be able to save cost presently incurred for emptying of frequently filled sewerage pits in home gardens (most of the sewerage pits to be emptied in every six months spending about Rs 2000-3000 for private gully bourses (long term impact) 4. Ability for householders to connect their sewerage disposal pipes to the main system 5. Solve the problems of Polluted cannel 6. The residents in the road catchment and larger institutions will have opportunity to divert their sewerage to the main system established under the proposed sub project (long term impact). 7. This project may help to reduce wastewater related difficulties and problems created by haphazard wastewater disposal in the area (mosquito problems) 8. Ground water table in this area is at high level and septic tanks frequently overflow. The proposed sub-project is a long-term solution 9. The land in this area is highly fragmented and therefore, it is difficult to construct sewerage pits in such small land plots, it is also difficult to take Gully bourses to interior households due to extremely narrow roads. In this context, 10. The ground water level in this area is at a high level and therefore, toilet pits/septic tanks frequently overflow. The proposed sub-project is an opportunity for the institutions and householders to connect their septic tanks to the main sewer line	1. some disturbances to the school religious centres, residents of the area during construction period due to dust, mud, noise and access disturbances. 2. sub-roads will get disturbed during construction, 3. Access to houses and business establishments located close to the road edges will have access difficulties. 4. Traffic related and other disturbances during construction period near institutions 5. Access problems to some School during construction period 6. Disturbance to some economic centres during construction period 7. some disturbances to the schedules of the rail transportation. 8. potential damages to the parapet walls apart from significant access difficulties. (limited to construction period) 9. be damages to the properly improved surface of the road due to installation of pipelines 10. some families residing in the project area will have to be resettled.

Mitigation measures: Point of Stakeholders view

- Carry out construction activities in front of Schools during nighttime and weekends. If the access to these public places get blocked alternative arrangement should be provided to reach these institutions.
- Carry out pipe laying activities in section by section without disturbing the entire length of the road. This will help to reduce the disturbances of the entire road. (staggered construction)
- Come up with harmonious and jointly agreed construction program to be carried out in front of people gathering public places such as hospitals
- All the possibilities should be worked out to introduce alternative roads to access affected houses, business locations and other public places during construction period. This intervention should be carried out jointly by contractors, community leaders and PMU staff before construction activities is begun and the list of alternative roads should be informed to the affected parties along with the construction timetable.
- The construction activities in front of public institutions such as schools, religious places, etc should be completed within agreed period without unnecessary delays.
- Pipe laying in narrow roads should be carried out using modern technology and if possible, trenchless technology may be applied depending on the complexity of narrow roads. This may be much relevant to the locations where pipe need to be buried under the rail line.
- Construction activities in front of religious places should be carried out with proper consultation of religious leaders in the place. A program agreeable to both parties should be prepared and carried out within the agreed time period.
- Due attention should be paid by the construction contractors to mitigate dust related problems using water. The road damaged due to pipe laying should be immediately attended with the involvement of CMC and RDA.

Apart from above mentioned measures the following specific measures will also be implemented to mitigate the potential negative impacts.

- Action will be taken to resettle families displaced with the proposed project. They will be resettled prior to commencement of the construction activities in the pumping station.

- According to the Engineer of Coconut Development Board (A T Rathnasiri) three story building adjacent to the proposed land plot is vulnerable due to its poor establishment in a filled wetland. He is of the opinion that there can be some negative impacts on the building due to the construction activities of the pumping station. This situation should be better informed to the contractors of the pumping station to be vigilant during construction period. If any damage to the building occurred such damages will be immediately attended by the project with the involvement of the contractor.

- In addition to the three-story building belongs to coconut development board there are about 15 poorly constructed houses available adjacent to the land proposed for the pumping station. The contractors will be made aware of the vulnerability of these houses during construction period. If any damage occurs, project will attend to such damage through the involvement of the contractors.

- The resettlement study team observed about 148 vulnerable houses adjacent to the road edge that will be used to install wastewater pipelines. There can be incidents of damages to these vulnerable houses during construction period. If such incidents occur the project will attend to repair or replace these damaged houses depending on their degree of damages.

6.6.2 Sub Project's involved involuntary resettlement, impacts on vulnerable groups, Indigenous Peoples

Apart from potential impacts during construction phase the sub-project will require resettlement of 6 families residing in 5 houses established in land plot belongs to SLR. The 5 housing structures also have been constructed by the SLR. Therefore, the land and the housing structures are public properties and not necessary to pay compensation for the land and the structures. However, these families are to be resettled in alternative locations (see Annex-2). The SLR has agreed to allocate this land plot for the proposed pumping station of the sub-project.

Five of 6 families belong to same ethnic and same religious group, Muslim and Islamic. One family is Sinhala Buddhist. All the families are residing as one homogeneous group and they are related to each other. Except one Chief householder (CHH) all others are private sector employees. In all the family's family income is more than the CHH's monthly income. All the CHHs are below 56 in age and all of them have studied only up to G.C.E (O/L) or below. The basic information related to socio-economic condition of the 5 households (the house number 1 is an extended family having sub-family residing in the same house (Annex 8).

6.6.3 The type of affected structures

The material used for the houses are uniform and it is mainly due to construction of these houses by SLR using uniform design for its employees. After retirements of the employees their second and third generation family members are occupying the houses as squatters. The floor areas of the houses were uniform in the original houses, but some householders have expanded the floor areas and therefore, the present floor area is different from house to house. The values of the houses are given by the householders. The details of the houses are shown in Annex 8.

All 5 houses are occupied by the second or third generation family members of the original occupants. The present occupants have been in these houses for the last few decades since their births. They are aware that houses are owned by the SLR and therefore, they are squatters in public properties. The ownership related details of the houses are shown in Annex 8.

6.6.4 Vulnerability related information of the households to be relocated

All 6 families in 5 households are headed by male members. Except 1 family in all other families more than one member is employed. The monthly income of the families ranges from Rs 28,000 to 52,000. The per-capita monthly family income ranges from Rs. 5600 to Rs. 9170 and therefore, all the families are above the below poverty level. The details on income related poverty are mentioned in Table 6.15.

Apart from income data some other indicators were also used to identify the aspects of vulnerability of the households to be resettled. The further information related to such indicators used is summarized in Annex 8.

6.6.5 Willingness for Resettlement

Two of the five householders have heard about the proposed sub-project. They have no objections for the development interventions under the sub-project. Three of them expressed their willingness to connect their toilet system to the proposed main system (this issue is irrelevant because these houses will be demolished and removed for the sub-project activities). They also mentioned that they can afford about Rs 500/= per month for the service provided by the CMC. The views expressed by the 5 householders are mentioned in Table 6.8.

Table 6.8 - Willingness for Resettlement

Details	House 1	House 2	House 3	House 4	House 5
Heard about the proposed project	Yes	Yes	No	No	No
No objections for the project	Yes	Yes	Yes	Yes	Yes
Willingness to resettle in another location	Yes	Yes	Yes	Yes	Yes
Willingness to get toilets connected to main system	Yes	Yes	-	Yes	-
affordable monthly bill for connection (Rs)	500	500	-	500	-
Views on the type of residence	Prefer monitory compensation, Sub family should have an alternative house	Do not like to live in flat houses, all 6 families in this location like to resettle in one area	Do not like flat houses	Do not like flat houses	Do not like flat houses

7 GRIEVANCE REDRESS MECHANISM

7.1 General

This chapter explain grievance redress framework (both informal and channels) setting out the time framework mechanism framework for resolving complaining about environment performance. The possible impact mitigatory measures are mentioned below:

- Possibility should be explored to carry out construction activities in front of SINYO Montessori School and AOG Catholic Church during nighttime and weekends. If the access to these public places get blocked alternative arrangement should be provided to reach these institutions. This measure should be implemented in Heen Ela sub project area. (steel plates may be used to provide alternative access through the open trenches dug on the road)
- If the access to houses, business places, public institutions or any other location get disturbed due to construction of trenches for pipe laying contractors should create alternative access to all the affected places. This is a common recommendation for the entire sub project pipe laying areas.
- Possibility should be explored to carry out pipe laying activities in section by section without disturbing the entire length of the road. This will help to reduce the disturbances of the entire road. (staggered construction)
- During construction period in Kirimandala road and Evergreen garden road the construction schedule should be discussed with management of Asiri, Auesis and NineWells hospitals to come up with harmonious and jointly agreed construction program to be carried out in front of these people gathering public places.
- All the possibilities should be worked out to introduce alternative roads to access affected houses, business locations and other public places during construction period. This intervention should be carried out jointly by contractors, community leaders and PMU staff before construction activities is begun and the list of alternative roads should be informed to the affected parties along with the construction timetable.
- The construction activities in front of public institutions such as schools, religious places etc. should be completed within agreed period without unnecessary delays.
- Pipe laying in narrow roads should be carried out using modern technology and if possible, trenchless technology may be applied depending on the complexity of narrow roads. This may be much relevant to the locations where pipe need to be buried under the Kelani valley rail line.

- Construction activities in front of religious places should be carried out with proper consultation of religious leaders in the particular place. A program agreeable to both parties should be prepared and carried out within the agreed time period.
- During the construction period in front of Narahenpita Economic Center visitors to the economic center should be directed to reach it through the alternative access in Samadhi Vihara Road.
- The construction activities started in each road should be continuously carried out without having intermittent breaks.
- Due attention should be paid by the construction contractors to mitigate dust related problems using water. The road damaged due to pipe laying should be immediately attended with the involvement of CMC and RDA.

Apart from above mentioned measures the following specific measures will also be implemented to mitigate the potential negative impacts.

- Action will be taken to resettle 6 families presently residing in SLR land plot demarcated for pumping station. These 6 families will be resettled in one of the UDA constructed high-rise buildings. Three of six families are not willing to get resettled in high-rise buildings. They will be resettled prior to commencement of the construction activities in the pumping station.
- The UDA will clear the temporary labor camp presently existing in its land plot agreed to provide to the project for construction of the second pumping station. The cost for clearing of the land for the project will be paid to the UDA.
- According to the Engineer of Coconut Development Board (Mr. A.T. Rathnasiri) three story building adjacent to the proposed land plot is vulnerable due to its poor establishment in a filled wetland. He is of the opinion that there can be some negative impacts on the building due to the construction activities of the pumping station. This situation should be better informed to the contractors of the pumping station to be vigilant during construction period. If any damage to the building occurred such damages will be immediately attended by the project with the involvement of the contractor.
- In addition to the three-story building belongs to coconut development board there are about 15 poorly constructed houses available adjacent to the land proposed for the pumping station. The contractors will be made aware of the vulnerability of these houses during construction period. If any damage occurs, project will attend to such damage through the involvement of the contractors.
- The resettlement study team observed about 148 vulnerable houses adjacent to the road edge that will be used to install waste water pipelines. There can be incidents of damages to these vulnerable houses during construction period. If such incidents occur the project will attend to repair or replace these damaged

houses depending on their degree of damages. This will be done with the involvement of the contractors.

7.1 Plan for monitoring impact mitigatory process

The present institutional mechanism available in main project will be used to monitor the construction sites to ensure proper mitigation of potential negative impacts. In this context social safeguard officer of PMU together with resettlement expert in DSIDC will make regular visits to the sub project sites to observe the implications of the sub project implementation activities and the local communities. The local communities will be made aware of the sub projects and its construction program for them to prepare for possible mitigatory measures. The social impact mitigation process will be monitored using specific criteria and indicators to understand the magnitude of the impacts and to work out appropriate solution.

The section below provides the monitoring methods and the reporting system of the sub-project. The PMU-Sociologist will monitor whether social safeguard system implementation is effective, make recommendations for change where necessary, and report to the Project Director. The DSIDC-RS will provide the PMU with training in resettlement and other social safeguard related issues, social survey methods and data analysis and recording, and he will also be supported by the PMU-Sociologist in performing this role. Monitoring data will be collected from PMU, DSIDC, contractors, and individual APs, and will be compared with entitlements and disbursement schedules established in the RP. Various indicators will be used, including those shown in Table 7.1. The PMU-Sociologist will provide donor agency (EIB) with bi-annual monitoring reports.

Table 7.1 - Potential Monitoring Indicators

Monitoring Issues	Monitoring Indicators
Management, budget, and program	PMU has been established and strengthened and trained; management & monitoring systems already established and in functioning PMU Sociologist has been appointed and will continue in monitoring the activities related this sub-project DSIDC Resettlement Specialist also has been appointed and will continue in providing inputs for this sub-project

	DMS for the affected properties in this sub-project has been conducted as planned, completed on time ESMP has been prepared according to schedule Funds for resettlement to be released on schedule Sites to be prepared on time for start of construction
Delivery of AP entitlements	APs to be received entitlements according to amounts and program specified in SEMP Compensation will be provided before loss incurred Arrangements for livelihood to be made to vulnerable APs
Consultation, grievance and other issues	Public meetings held to disclose impacts and entitlements, this will be continued Meetings with individual APs to agree compensation will be held APs aware of entitlements and grievance procedure, further meetings will be held. SC meetings will be held, and grievances resolved depending on the needs
Benefit monitoring	Post-impact meetings will be held with APs to check receipt of entitlements and satisfaction Check of any disproportionate impacts on vulnerable households will be carried out.

The PMU will implement a program with the involvement of UDA to resettle sub-project affected 6 families in new locations, most probably in UDA built high rise buildings. The Monitoring Unit of PMU will assess the resettlement process implemented by UDA. This will be done for compliance monitoring to check that entitlements have been provided as specified in the RP, and social impact evaluations to determine whether the compensation measures have mitigated the effects of the Project and delivered the intended social improvements. Compliance monitoring will focus on: determining whether APs have been provided with the compensation and other entitlements specified in the RP; and assessing the adequacy of the resettlement policies, resettlement management staff and structures, complaints and grievance procedures, and resettlement budgets. Data will be gathered through reviews and audits and unscheduled and unannounced inspections, as well as interviews with APs, PMU and District Office staff, contractors, UDA and others involved in the

process at all levels, and structured direct observations on the ground. A sample monitoring plan is shown in Annex 9.

Social Impact Evaluation (SIE) will be conducted by DSIDC following implementation of the RP, at least six months after completion of the resettlement process. The SIE will assess post-project socioeconomic conditions in affected areas and communities, compared with pre-project baseline levels established by the DMS. The status of groups in relation to vulnerability and other factors will be assessed, together with the gender impacts of the RP.

The DSIDC will produce an annual report that will identify any outstanding issues that need to be addressed, and any departures from Government or EIB policy, together with recommended remedial action. The PMU will allocate required resources for the SIE to be done by DSIDC to have unbiased views of the project. The SIE report will also identify any strategic lessons that need to be learned, so that these can be incorporated into future resettlement activities relevant to the Government or EIB.

7.2 Stakeholders and their views

The proposed project is implemented by Colombo Municipal Council through project management unit established with required number of staffs with relevant skills and experience. The executing agency of the proposed project is Ministry of Provincial Council and Local Government. The construction activities of the project will be carried out by contractors. The Design preparation and construction Supervision (DSIDC) will be handled by a separate consultant working under the supervision of project management unit (Design Preparation, Supervision and Institutional Development Consultants – DSIDC). Apart from these direct actors of the project there are stakeholders having direct and indirect stakes of the project. The details of these stakeholders are mentioned Table 7.2.

Table 7.2 - Types of Stakeholders

Stakeholder	Type of stake
Urban Development Authority (UDA)	Supports in providing alternative housing for 6 affected families and implementation of Resettlement activities with PMU, CMC and DSIDC
National Water supply and Drainage Board (NWSDB)	There can be negative impacts on drinking water pipelines established by NWSDB in the roads used for the sub-project
Colombo District Secretary and Thimbirigasyaya Divisional Secretary	Public agencies having legal power in implementation of resettlement project
Narahenpita and Kirula Grama Niladharis	Project level public officers having authority to support the project for resettlement plan implementation
Road Development Authority (RDA)	The project will use some of RDA managed roads for the installation of pipelines

Electricity board and Sri Lanka Telecom	There can be need for shifting of electricity posts and telecommunication cables
Ministry of Health and Thimibirigasyaya MOH Office	MOH office will have role in public awareness and education campaign of the project.
Members of Colombo Municipal Council	The municipal members in the project area are concerned to establish main sewer system in their jurisdictions
CBOs in the area	The service of CBOs will be required during awareness and education campaign of the project
Community leaders in the area	Community leaders will act as key persons during public awareness and education campaigns
Environmental Organizations in the area	The project will have to seek the support of local level environmental Organizations during implementation of the public awareness and education activities
General Public	General public will be the direct beneficiaries of the proposed project

The social assessment and resettlement study team consulted most relevant stakeholders to document their views on the proposed project. These views are summarized in Annex 10.

7.2.1 The methodology to be used to get stakeholders involved in the project activities

The following sequential steps should be followed in consultation and engagement of the stakeholders relevant to the project.

- Identification of the stakeholders within the proposed project implementing area in Narahenpita and Kirula
- Making the stakeholders aware of the proposed project and its benefits to the community and the area
- Facilitate the stakeholders to discuss about forming a committee at project level to interact with the project during its construction and post construction stages. This committee may be headed by the divisional secretariat of Thimbirigasyaya DSD
- The stakeholders may decide a suitable stakeholder to act as convener of the committee meetings and committee may meet once a month during construction period and when necessary during post construction stage.

7.3 Grievance redress mechanism (GRM)

A grievance redress mechanism (GRM) is a set of arrangements that enable local communities, employees, out growers, and other affected stakeholders from the proposed project to raise grievances when they perceive a negative impact on social and environment arising at all the levels of the project. It is a keyway to mitigate,

manage, and resolve potential or realized negative impacts, as well as fulfill obligations and contribute to positive relations with communities and project proponent. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project. Expected issues from these sub projects are mostly from the construction activities which can be amicably settled by both parties. In the case of grievances that are immediate and urgent in the perception of the complainant, the contractor and supervision personnel from the PMU/DSIDC on site will provide the most easily accessible contact for quick resolution of such grievances. Contact phone numbers and names of the PMU Social Development/Safeguards Officer, DSIDC safeguards specialists, and contractor's site engineer will be posted at all construction sites in visible locations.

Four types of issues may emerge during construction period of the proposed project. If these issues are not properly addressed the affected parties will be interested to reach responsible authority to seek solutions. These four possible issues include:

- Resettlement related issues of the 6 families in Land plot demarcated for the first pumping station (SLR land)
- Issues related to removal of temporary established labor camp in the land plot proposed for the second pumping station (UDA land)
- Disturbances to common service facilities to the people in the project implementing area (electricity, water and telecommunication)
- Disturbances to access facilities to houses, other institutions and sub roads connected to the project roads
- Possible negative impacts on the income generation activities of the mobile vendors in the structures located adjacent to the road edge and three-wheel parks

The Greater Colombo Wastewater Management and Improvement project has already established institutional mechanism to address grievances of the project affected parties. The project affected parties will have different opportunities to meet responsible agencies/officers to solve the grievances. These different layers include:

- Construction contractors
- DSIDC Consultants
- Project Management Unit
- Colombo Municipal Council
- Grievance redress committee established with the leadership of the assistant secretary of the ministry of Provincial councils and local government.
- legal action through the judiciary system of the country (court)

Grievances of APs will first be brought to the attention of the PMU Sociologist within 3 days after complaint/s made by the APs. Grievances not redressed by the PMU Sociologist will be brought to the Project Director (PD) again within 3-4 days. Grievances not addressed by the PD will be brought to the Safeguards Committee (SC) constituted in each Municipal District within one-week time. There is a long history of grievance redress for CMC services through the District Engineer. The community members in CMC areas make their grievances on CMC provided services to the District engineers and the District engineers' offices have made arrangements to inspect the problems of the community members and help to solve the problems in the field itself if possible or otherwise they take actions to forward the grievances of the communities that cannot be solved at their level to the higher authorities of the CMC. This practice will be formalized for resettlement purposes through the SC. The SC will comprise the Additional secretary of the Ministry of provincial councils and local government, District Engineer as chair, a representative from UDA, the PMU Sociologist. The PMU Sociologist will observe and take minutes of the SC meetings held depending on the needs.

- The project (Phase 1) has already established GRM committee with the memberships of officers from CMC and the project. Some of these individual government officers may change due to transfers of work sites or any other reasons but, the positions will remain same in the committee. The details of positions are mentioned below:

Table 7.3 - Members of Grievance redress mechanism

Member	Position	Contact details
1.	Senior Assistant secretary of the Ministry of Provincial Councils and Local Governments	011-2345971
2.	District Engineer of CMC (District 4)	011-2362205
3.	Sociologist attached to PMU	01126665331, No 86, Millennium Center, Ananda Kumaraswamy Mawatha, Colombo
4.	A representative/s from the community in the neighbouring area)	To be mentioned after identification

- The SC will meet when grievances are put forwarded by the Project Director to determine the merit of each grievance and resolve grievances within a month of receiving the complaint. Further grievances will be referred by APs to the Project Steering Committee. Records will be kept of all grievances received including, contact details of complainant, date that the complaint was received, nature of grievance, agreed corrective actions and the date these were affected and outcome. The CMC has already formed the SC for GCWWMIIP for implementation of RPs in other sub-projects and the same SC will serve for this

sub-project too. All costs involved in resolving the complaints will be borne by the PMU. The grievance redress mechanisms will continue to function throughout the project period.

- A project information document (PID) including brief description of the sub-project, likelihood negative impacts and institutions to be contacted and their locations to seek for solutions to the problems and constraints faced during construction phase will be prepared by PMU. This document will be distributed among APs at least one month prior to commencement of the construction work. It is noted that APs in this sub-project area are already aware about the likelihood their evacuation and the types of assistants they will receive from the resettlement survey team of this sub-project.

The focal point of receiving complaints /queries will be social and environmental safeguard division of PMU office and the sociologist of this division is responsible for taking actions to solve the problems with the help of other parties. The PMU sociologist together with DSIDC resettlement expert will make frequent visits to the sub-project sites. The affected communities also can contact the PMU sociologist through the telephone number 0112665331 and make their complaints. They also can post letters with their complaints to the PMU office to its address mentioned below. The communities in the project area can easily access to the social and environmental safeguard division of PMU office located at no 86, Millennium Center, Ananda Kumaraswamy Mawatha, and Colombo. There is well established public transport system for the communities to reach the PMU office within a short period of time. The communities in the sub-project area can also reach the site offices established in the sub-project area during construction period and make their complaints/grievances to the DSIDC engineers. These grievances will be collected by the PMU sociologist to offer solutions through the institutional process established. The Figure 7.1 depicts the complaint handling mechanism during implementation phase of the sub-project.

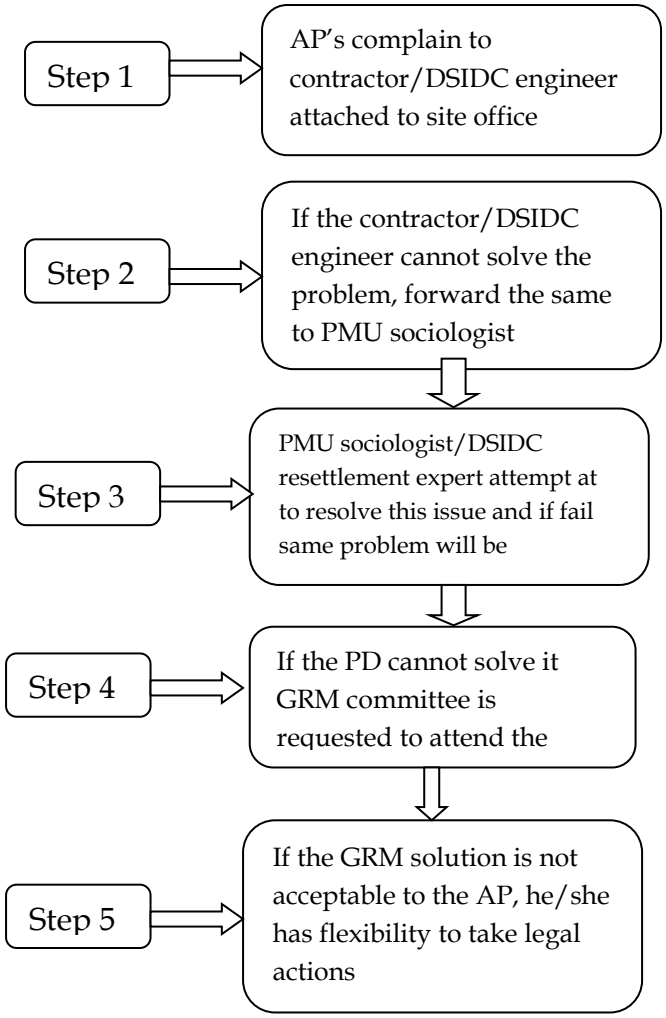


Figure 7.1 - Complaint handling process

A form will be used to register the complaints of the sub-project affected communities in project implementing area (Annex 11). The copies of the form will be given to the site engineers of the contractors, construction supervision engineers of DSIDC attached to the site and the PMU sociologist will also use this form. The registered complaints using this form will be received by the Sociologist attached to PMU and take necessary actions to provide timely solutions.

During resettlement survey period information about the project and likelihood impacts have been conveyed to the community leaders and other key stakeholders. A detailed leaflet with specific details about the sub-project and GRM arrangements will be disbursed to the affected community members prior to commencement of civil work. The PMU sociologist together with the DSIDC resettlement expert will conduct awareness meetings to the affected communities and the construction crew to explain about the GRM arrangements in each sub-project site.

The PMU sociologist and the resettlement expert of DSIDC will play key roles in monitoring of sub-project sites during construction period. These two safeguard officers will educate the APs, community leaders and other stakeholders on the GRM mechanism available. The construction crew also will be made aware about the GRM mechanism by these two safeguard officers. They will be responsible to monitor the social safeguard related activities in the sub-project site during implementation period. The information on the social safeguard implementation will be include

8 ENVIRONMENTAL MANAGEMENT PLAN

8.1 General

These chapter 8 summaries the monitoring to be carried out during the design, construction and operation of the proposed sewage network and two pump houses. As explained in the previous chapters, it was noticed that there are no major impacts, due to the construction and operations of this project. Therefore, it is not essential to have a complex monitoring system. Nevertheless, it is recommended to ensure not to violate the rules and regulations and adhere to national standards and guidelines pertaining to environmental protection and management. Therefore, an experienced and qualified professional should be appointed by the contractor to ensure environmental compliance during the implementation of the project. The local community's satisfaction and their support over the execution is very important for the sustainability of the project. Therefore, the Environmental Monitoring Plan will be executed under the following institutional arrangement. Hence the following monitoring committee has been suggested for the implementation of the project.

8.2 Safeguard Implementation Arrangement

Monitoring committee

Environmental Monitoring Program shall be undertaken by an inter-agency committee compromising the key agencies that have jurisdiction on various entities of the project area. A core monitoring team shall be formed with the representatives of the most relevant organizations mentioned as follows:

a. *Colombo Municipal council (CMC)*
b. *Central Environmental Authority (CEA)*
c. *Marine Environmental Protection Authority*
d. *Road Development Authority (RDA)*
e. *Ministry of fisheries*
f. *National Aquatic Research Agency (NARA)*
g. *Coastal Conservation Department (CCD)*
h. *Sri Lanka Land Reclamation and Development Cooperation (SLLRDC)*
i. *Department of Irrigation*
j. *Department of Archaeology*
k. *Divisional Secretariat Office-Thimbirigasyaya*

The institutional arrangement for monitoring program is shown by Figure 8.1.

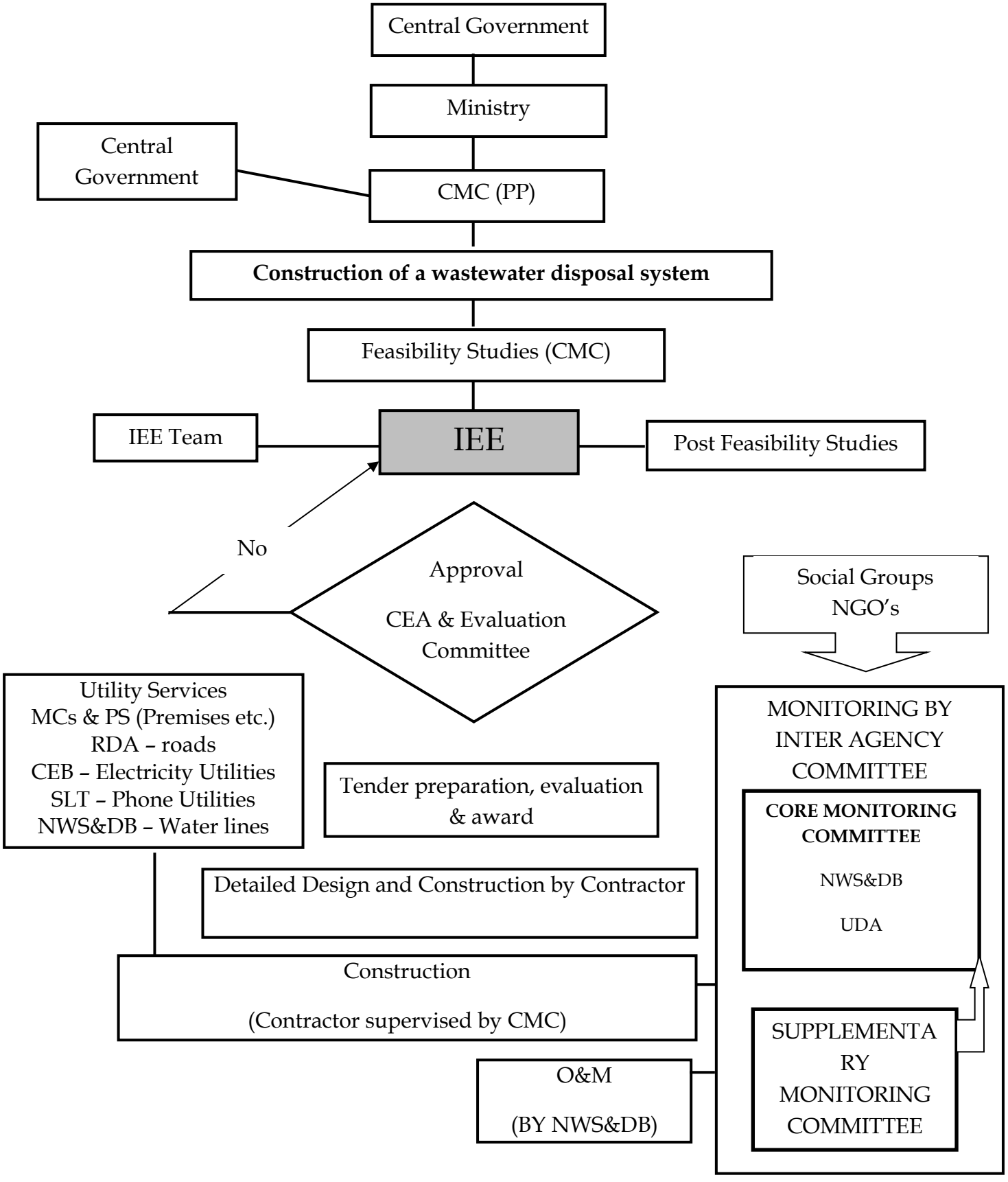


Figure 8.1 - The Institutional arrangement for monitoring program

This monitoring committee brings together key personnel from all stakeholder groups involved with the project and its implementation. The aim of this monitoring program is to achieve a better understanding of cause-effect relationships between the project and its environment and hence, to improve the IEE predictions and mitigatory measures for the purpose of an effective impact management. Project Monitoring Unit (PMU) together with other institutions such as Design Preparation, Construction Supervision, and Institutional Development Consultants (DSIDC) will be responsible for mitigating the negative impacts during construction period.

It is recommended this committee should assemble at least once in a month during the construction period. Any violation of rules, regulations and standard specified by the government agencies should be discussed and problems identified should be sorted out immediately. Any additional plans, guidelines or conditions may be recommended by the relevant government agencies, depend on the situation, to minimize adverse impacts likely to arise from the implementation of the project with the consent of the monitoring committee. Further, any complaints should follow the Grievance Redress proposed elsewhere in the report.

DSIDC will be engaged to work closely with and advise the CMC PMU to build capacity on wastewater management, and to be involved in project supervision, including construction. The DSIDC will have an environment specialist and a resettlement specialist. For environmental related work, the DSIDC environment specialist will work closely with the contractor and relevant agencies mentioned above to ensure the proper implementation of environmental safeguard activities including the implementation environmental management plan. Table 8.1 below shows the level of impact, their significant and the nature and migratory measures during construction period while Table 8.2 show that for post-construction period. Table 8.3 shows the similar interaction matrix for the operational phase of the proposed project.

Table 8.1 - Interaction matrix for the construction phase of the proposed project (During construction)

Environmental factor/Resource	Existing quality/Status	Intensity of the impact/s	Resultant quality/Status	Mitigation measures
Hydrology	The existing canal is relatively stagnant (blocked) and has very low flow velocity	A/M	Siltation during the rainy periods and the risk of flooding in all surface water bodies	The exposed soil shall be bundled temporarily; The flows from heavy runoff areas causing erosion or runoff shall be redirected; Implementing sediment dispersal measures by monitoring areas of exposed soil during periods of heavy rainfall.
Soil	Typical to the area	A/M	Increase in soil erosion	The excavated soil shall not be exposed to rains
Surface water quality	Not in compliance with the ambient water quality standards	A/M	Increase in TSS, oil, metal particles and some other chemicals used for construction	Restrain the activities causing contaminated run-off to only dry periods. Fuel, lubricants and hazardous goods shall be stored at predefined enclosed storage locations (example, elevated containers). Otherwise, storage of oil and fuel whether in large tanks or drums, shall be within a concrete bund capable of retaining the entire volume of liquid in the event of leakage or rupture. Storage locations shall have good ventilation, but shall not be exposed to sunlight directly, devoid of ignition sources and shall not be subjected to floods or close to waterways. The storage, treatment and recycling of the bentonite slurry (drilling fluid) will only be conducted at the proposed launching site under the proper approval and supervision by GCWMP. The excavated and soil materials shall be removed as soon as possible once they are generated. Provision of earth bunds or sandbags in areas having a large amount of exposed soils. Stockpiles shall be well covered with relevant materials such as tarpaulin sheets. Good management practices shall be implemented.

				The contractor shall prepare a construction waste management plan and shall provide a list of hazardous chemicals to be used during construction so that precautionary measures be implemented.
Air quality	In compliance with the air quality standards	a/M	Dust, Airborne particulate matter, CO and NO_x	Water spraying of surfaces being prone to dust emission. Soil compaction and timely removal of debris. Dust generation from crusher plants shall be controlled by covering with wetted fabrics. Wetting the materials (e.g. aggregate) earmarked to be loaded shall be practiced. Vehicles transporting construction materials shall be covered adequately. The dust levels shall be monitored periodically. Limiting speed of construction vehicles and displaying speed limiting sign boards shall be practiced. Cement mixing places and batching plants shall be located away from sensitive receptors and operations shall be avoided during windy conditions. A schedule for dust/emission generation activities shall be prepared and the public shall be informed of such activities. Heavy vehicles shall be maintained in good condition.

Noise and vibration	Not in compliance with the permissible noise levels; Vibration is within the permissible limits.	A/M	Increase in noise and a slight increase in vibration	Heavily loaded trucks shall be routed away from highly residential areas. Earthmoving and ground-impacting operations shall be operated at different times so as not to make a cumulative vibration effect. Construction activities during the night shall be minimized since the human beings are more sensitive to vibration during the night. Scheduling of construction work causing high noise and vibration shall be within the authorized construction embodiment times with the least inconvenience to the public. All construction equipment shall be used in good service condition and low noise/vibration generating construction equipment shall be used. The construction site shall be separated with corrugated sheets or other suitable material. Carrying out a property condition survey (crack survey) of nearby structures and recording the present condition of the structure to accurately assess any damage to these structures during the construction stage

				Establishing a complaint mechanism and implementing a procedure to deal with any issue raised by the community effectively.
Ground water	Satisfactory for the area	a/M	A slight increase in pH	No special mitigation measure shall not be needed because the alkaline substances will not dissolve in the water so that no significant adverse water quality issue will arise. The groundwater monitoring shall be conducted near the two pumping stations area to confirm the potential contamination
Flora and fauna	No exotic and threatened species; Having been adapted to a crowded environment.	a/M	Insignificant additional disturbance compared to the present condition	No mitigation measure is needed.
Land use	Typical to the area	a/M	Small alteration	

Human health	High prevalence of adverse health issues	A/M	Slight increase of risk	
Traffic and accessibility	Typical to the area	A/M	Increase in congestion	A Traffic Management Plan with Colombo Municipal Council and Roads Development Authority (RDA) shall be implemented. Nighttime constructions should be limited only to Elvitigala Road (Baseline Road) and Nawala Road. Nighttime construction shall be implemented on Kirimandala Road and Muhandiram E. Dabare Road. Alternatively, the possibility of conducting daytime construction on Kirimandala Road and Muhandiram E. Dabare Road by considering a diversion through Lake Drive Road from Kirimandala Road to Nawala Road shall be considered. The oncoming traffic flow from Kirimandala Road to Evergreen Park Road shall be barricaded and encouraged to use Kirimandala Road. Adequate sign boards shall be installed to guide the traffic flow during construction. Notice boards displaying the possible congestion due to construction on Muhandiram E. Dabare Mawatha, Kirimandala Mawatha and Nawala Road

				shall be installed at suitable locations to discourage the inflow traffic to aforesaid roads from Elvitigala Road (Baseline Road), Thimbirigasyaya Road and Kirula Road. Residents and general public shall be informed of the road closure schedules on minor and private roads well in advance,

Utilities along alignments	Typical to the area	A/M	May get damaged	In order to minimize the number of exposed sites at a given time, a construction sequence of work shall be prepared. Residents shall be informed of the allocated dates for pipe laying in an area through public announcements. Ceylon Electricity Board and Sri Lanka Telecom shall be contacted for removing transmission lines or to have any other mitigatory measure as applicable for their transmission lines during the period of construction. Public announcements shall be made on service interruptions well in advance (electricity, water and telecommunication services). Training the contractor to adopt methods to minimize the disturbances and inconvenience to the public. Damaged roads shall be repaired immediately after finishing pipe laying. Nighttime work shall be considered to speed up construction work reducing period of construction to minimize the duration of minute degree of obstruction, disturbances to public utilities and inconveniences to public.
Livelihood	Typical to the area	A/M	Small-scale livelihood systems will considerably be affected adversely.	Information on the construction schedules shall be disseminated about 30 days before the commencement of the project activities. Steel plates shall be provided to be used as alternative accesses to the shops if the accesses are disturbed. Actions to complete the construction activities within a short period of time in the sub-project road sections of small-scale shops shall be prioritized. Mobile venders shall be provided with construction schedules of the subprojects 30 days prior to the commencement of the construction activities so that they can walk on other roads in the vicinity of the sub-project during the construction period.

				Three-wheeler drivers shall be informed of the construction program prior to commencement of the construction work. Completion of the construction work in the three-wheel parking areas shall be done within a short period of time.

Community and workers' health and safety	Typical to the area	A/M	Will be adversely affected	In order to minimize the number of exposed sites at a given time, a construction sequence of work shall be prepared. Residents shall be informed on allocated dates for pipe laying in a particular area through public announcements. Temporary sanitary facilities shall be provided at all construction sites, especially for the pumping stations. Contractor shall provide the workforce (drivers and traffic controllers cum flagmen should be included) involved in handling dust generating material (example, cement, soil, metal aggregates, bricks, etc) with dust masks and goggles or safety glasses. Environmental pollution control measures, including watering standard maintenance of machinery shall be implemented. Construction activities shall be scheduled so as to minimize the impact on surrounding communities (e.g. prohibit high noise generating activity on nighttime) Heavily loaded trucks shall be routed away from highly residential areas, if possible and streets with less populated areas, if no alternative is available, shall be selected The speed of construction vehicles shall be limited, and speed limiting sign boards shall be displayed. Peak traffic hours shall be avoided with reference to material delivery and taking away the soilt or construction wastes. It is advised that appointed contractor could prepare a Traffic Management Plan and implement it accordingly with the support of the project proponent. Dust generation from crusher plants shall be controlled by covering wetted fabrics. Wetting the materials (e.g. aggregate) earmarked to be loaded shall be practiced. Water shall be sprinkled to the cleared and exposed (bare) surfaces frequently when dust plumes are likely to get generated under hot, sunny and windy conditions.

				Vehicles transporting construction material such as sand, metal and cement shall be covered adequately to reduce dust generation. The dust levels shall be monitored periodically to ensure that the levels are not too high. Cement mixing places and batching plants shall be located away from sensitive receptors and operations shall be avoided during windy conditions. If needed, temporary worker camps and the site offices, storage areas etc shall be provided with adequate number of well closed bins to collect municipal garbage, and the bins shall be regularly emptied (Contractor/s shall make necessary arrangements with the CMC to remove the collected wastes).

A=Adverse impact; **M**=Mitigation measures planned for adverse impacts; **a** = Small adverse impacts; **O**= No anticipated impact; **NA**=Environmental factor not applicable; **SA**=Significant adverse impacts; **b**=Small beneficial impacts; **B**=Beneficial impacts; **SB**=Significant beneficial impacts

Table 8.2 - Interaction matrix for the construction phase of the proposed project (Post-construction phase)

Environmental factor/Resource	Existing quality/status	Intensity of the impact/s	Resultant quality/status	Mitigation measures
General public	Typical to the area	A/M	Inconvenience caused by temporary structures built during the construction phase.	All temporary structures shall be demolished and cleared away, and necessary ground improvement work shall be applied.

Table 8.3 - Interaction matrix for the operational phase of the proposed project

Environmental factor/Resource	Existing quality/status	Intensity of the impact/s	Resultant quality/status	Mitigation measures
Operational health and safety	-	A/M	Workers' possible reluctance to follow operational health and safety (OHS) measures stipulated and wear personal protection equipment (PPE); Accidents	Punitive action shall be imposed on those violating the OHS policies. Special provisions shall be made available in their offices to store the given PPE with toilet facilities for the workers to thoroughly clean themselves. Pre-recruitment and periodic health check-ups of the workers shall be initiated by the CMC. OHS measures with reference to sewer cleaning works shall be implemented. All areas shall be devoid of spilled oil or grease. Soap and water, not gasoline or solvents, shall be used for cleaning. Long-sleeved glows shall be worn when working with equipment or while in direct contact with wastewater. Tools, equipment and materials shall not be left at places prone to safety hazards. Adequate lighting shall be provided for night work and in areas with limited existing lighting. Only sections of handrails, deck plates or grating necessary for the immediate job shall be removed. Removed sections shall be properly stored out of the way and properly secured against falling into tanks. The area shall be barricaded to prevent unauthorized personnel entry and possible injury. Walk on top of the sidewalls of structures shall be prohibited. Any sewage flowing from the upstream manhole to downstream manhole shall be stopped until the completion of the cleaning work of any blockage. Within the pumping station premises, special areas shall be allocated to store the given PPE with toilet facilities for the workers to thoroughly clean themselves. Smoking and consumption of food items shall be prohibited in the wet well /working areas by displaying appropriate sign boards. Ladders and railings around the wet well, screening chambers, penstock gate chambers and grit chambers shall be hard, well fixed solid structures (example, made of stainless steel).

				Ladders provided to the wet well and screening removal area shall have well fixed railings on both sides with broad footsteps. Ladders leading to the screening removal area shall not be placed above ditches such as penstock gate chamber, grit chamber, etc. Pre-recruitment and periodic health check-ups of the workers shall initiate by the CMC. Automated Fire/ smoke detectors with an alarm shall be made mandatory with provision of adequate gear to put off fires. The workers shall be thoroughly trained to put off any fire. Automated H_2S detectors shall be installed in plenty throughout the pumping station. They should be capable of setting up an alarm when dangerous levels are detected. Therefore, the workers shall be educated regarding the dangers posed by different levels of H_2S. Portable H_2S meters shall be provided to those involved in removing grit and repairing and maintenance works in the wet well. A first aid unit / facilities as per the General Register of the Department of Labor & the Factories (First Aid) Regulation No 1 of 1995 shall be installed with medically competent persons and an ambulance shall be available to reach the nearest hospital/s on a 24 hrs. basis. A stretcher shall also be provided. The grit materials and sludge removed from the wet well shall be collected in proper containers and dewatered at the pumping station. The dewatered materials shall be disposed at suitable/appropriate dumping sites. All pumping stations and equipment shall be maintained and operated in an effective condition and records of the maintenance shall be kept. A system to identify critical components shall be placed, and a system to ensure adequate and timely access to spare parts shall also be placed. Around 4-6 standby pumping equipment shall be provided and associated controls (they need be alternately operated) and some 5000 L capacity gully suckers at site to attend to emergency needs shall also be provided. "No digging methods" such as glass reinforced plastic for sewer rehabilitation or repairing of damaged manholes shall be used wherever possible.

Air quality	In compliance with the air	a/M	Localized odor	Frequent / daily inspections (morning and evening) shall be carried out to see whether odor emanates, and any blockages can immediately be attended.
	quality standards			The manholes to be provided shall be ventilated to minimize odor generation to the surrounding environment. The pumping stations shall be designed by design consultants and then constructed such that they are fully enclosed infrastructure that will have adequate ventilation systems (mechanical ventilation shall be provided with intake ducts fixed with fine mesh to prevent access to vermin such as flies) to provide around 21% of O_2 to the workers inside and either soil filters or dual bed activated carbon filters connected to exhaust fans shall be provided for odor control. Pumping stations shall be enclosed with enough ventilation systems.
Noise and vibration	Typical to the area	a/M (pumps)	The general public will be annoyed by the noise and vibration	Doors and windows of pump stations shall be kept closed during the operational time. The exhaust silencers shall be in good condition. Emergency generator rooms shall be kept closed during the operational period.

A=Adverse impact; **M**=Mitigation measures planned for adverse impacts; **a** = Small adverse impacts; **O**= No anticipated impact; **NA**=Environmental factor not applicable; **SA**=Significant adverse impacts; **b**=Small beneficial impacts; **B**=Beneficial impacts; **SB**=Significant beneficial impacts

8.3 Monitoring and reporting

8.3.1 Background

Monitoring refers to the collection of data through a series of repetitive measurements or other systematic observations of environmental and socio-economic parameters. This usually includes a review of available literature data. The 'effects or impact monitoring' refers to the measurement of environmental parameters in order to detect changes, which are attributable to the project. The 'compliance monitoring' is the periodic or continuous measurement of environmental parameters to ensure that regulatory requirements and environmental quality standards are met. Both types of monitoring permit only reactive impact management, since they detect violations or adverse changes after they have taken place. It is therefore important to respond to the outcomes of monitoring by establishing a linkage to impact management, for example by establishing protocols to be followed and actions to be taken if a certain threshold value is exceeded. Consequently, the implementation of a monitoring programs is imperative.

The aim of a monitoring program is to achieve a better understanding of cause effect relationships between the project and its environment, hence, to improve the EIA predictions and mitigatory measures for the purpose of an effective impact management. Thus, a monitoring program should be targeted at the information that is necessary to manage significant impacts and to review the aspects of EIA practice that are of importance.

Conducting monitoring programs also instills confidence in the project communities, the project proponent and regulatory bodies that the identified impacts are adequately mitigated. Environmental monitoring of the project is therefore advocated in order to ensure that the mitigation processes put in place have adequately taken care of the predicted impacts.

8.3.2 Objectives of Environmental Monitoring Program (EMP)

The objective of the EMP is to provide useful information and help:

a. Assist in detecting the development of any adverse environmental situation, and thus provide opportunities for adopting appropriate control measures;
b. Define the responsibilities of the project proponents, contractors, and environmental monitors and provide means of effectively communicating environmental issues among them;
c. Define a monitoring mechanism and identify monitoring parameters;

d. Evaluate the performance and effectiveness of mitigatory measures proposed in the environment monitoring plan (EMP) and suggest improvements if required.

8.3.3 Salient features of a monitoring program and monitoring plan

If a permit is granted for the proposed project, and before site preparation and construction activities begin, the project developers should submit an Environmental Management and Monitoring Plan to CEA/Urban Development Authority, if this is requested by the agency. The environmental monitoring plan details the monitoring of the proposed mitigatory measures for all the identified significant and potential impacts in all the project activities, throughout the phases of the project from pre-mobilization to decommissioning and abandonment. It also specifies the compliance to any statutory regulations, if any, the monitored parameter, the frequency of the monitoring and the action party responsible for the monitoring. This will enhance project benefits and introduce standards of good practice to be adopted for all project works.

The monitoring program is based on several impact streams. Environmental impacts rendered by the project on physio-chemical, biotic and social environments can be classified as;

a. Negative baseline impacts
b. Positive long-term impacts
c. Negative long-term impacts
d. Negative short-term impacts
e. (Negative) Contingency impacts

The following requirements are addressed in the monitoring plan:

a. Impacts causing environmental element (Physio chemical, biotic or social)
b. Rendered impact
c. Parameters to be measured or monitored
d. Frequency of monitoring
e. Responsible agency/authority
f. Reporting requirements

8.3.4 Monitoring responsibility

The development of a framework for monitoring and evaluation to the extent possible shall be done in consultation with key stakeholders, especially beneficiaries and affected people. Periodic monitoring shall be carried out by an independent monitoring body on behalf of the contractor at the construction stage of the project. In addition, the compliance monitoring of some of the environmental parameters specified by the Environmental Protection License (EPL) shall be carried out by an independent monitoring body on behalf of CMC. The key objectives of compliance monitoring are to adhere to limit conditions such as volume, mass, load and concentration limits for water quality constituents in the discharged effluent, ambient water quality monitoring and ecosystem in receiving waters as a response to the discharge of wastewater. Consequently, key environmental areas, which shall be monitored under periodic monitoring include;

a. Surface water quality;
b. Ground water quality;
c. Ambient air quality;
d. Noise and vibration; and
e. Social impacts

Developing a monitoring culture within an organization is vital to an effective functioning of any project. Hence the understanding of monitoring responsibility is a must. The main organization who takes the overall responsibility for monitoring the mitigatory measures suggested during specific stages of the proposed project is the CMC. The other stakeholders would play a facilitative role to provide information for monitoring the implementation of the mitigatory measures suggested in Chapter 5. Furthermore, active involvement of the local authorities shall be obtained to the monitoring program. It is a responsibility of them to highlight the benefits of the project to community and obtain the active participation of the community in all the project activities. The environmental officer attached to the Divisional Secretariat office shall also play a significant role during the monitoring program. He/she may be the representative of the CEA at the divisional level. It is also recommended to share the water quality monitoring data with relevant authorities such as SLRDC during pre-construction and construction stages.

In terms of monitoring, the environmental issues that may emerge at each pumping station, WWTP and the pipelines; the community leaders also can play a significant role. However, their role shall be limited only to report the problems encountered by the community due to some draw backs in each project component. They shall be properly informed to whom they should provide information and the mechanism of

communication in order to avoid social conflicts.

In consultation with the Environmental Management and Assessment (EM & A) Division of the CEA, the CMC shall finalize the sampling locations for periodic monitoring of the environmental parameters. Once the sampling locations are finalized, the CMC shall establish monitoring data to represent baseline conditions of the existing water quality, and noise levels before the commencement of the construction work of the project.

The EMP shall be prepared by the CMC based on the proposed mitigatory measures of the EIA and conditions of the EIA approval letter issued by the CEA at the detailed design phase of the project. The environmental management plan shall be incorporated into the contract as part of the contractual documents. The contractor shall prepare his environmental management action plan based on the EMP. The implementation strategy shall conform to all relevant regulations for the project. The project manager shall be responsible for the implementation of the EMP and performance monitoring until after commissioning.

Moreover, it is imperative to establish organizational mechanisms to carry out monitoring activities systematically. Therefore, the NWS&DB shall establish a committee to create an organization for monitoring. The stakeholder agencies and the community leaders will be the community. The divisional secretary office may be the venue for holding meeting of the monitoring committee. During the construction stage of the project, this committee may decide to meet more frequently. During the operation period, minimum of two meetings per year shall be held as a routine practice, but there must be flexibility to hold meetings if there are problems to be discussed.

8.3.5 Monitoring methodology

Sampling techniques and equipment

The accuracy of water quality data is closely linked with the way in which the water samples are collected and handled. While analytical errors can occur, most variability in water quality data is a function of errors in sample collection, preservation or storage. Minimizing these errors requires careful consideration of where to sample, what equipment to use to obtain the sample and appropriate means of storage and transport. A sample field data sheet is attached at the end of this chapter.

Field measurements and observations

Field measurements, which are carried out under the water quality monitoring

program include pH, dissolved oxygen, turbidity, temperature and conductivity. There are numerous factors that influence water quality at a site, and these must be documented to assist the interpretation of the water quality sampling results. This is especially important when management decisions are made based on the results of one or two sampling rounds. The sorts of things that need to be documented include:

a. Sampling location/position (e.g., bankside or midstream), especially if it differs from the usual location;
b. Weather conditions, especially rainfall;
c. River flow, including tidal state if the site is saline;
d. Sample appearance (e.g., colored or turbid);
e. Presence of any fish and/or plant growth, especially unusual or extensive periphyton growth;
f. Bank erosion or point source discharges.

Sample collection

In order to assess water quality in nearby water bodies through the collection of water samples, samples must be representative of the water body being monitored. As an example, water quality of the main surface water bodies and areas in the immediate vicinity of the sea outfall shall be monitored carefully. Prior to the sample collection, appropriate sampling locations shall be selected. In addition, both upstream and downstream samples shall be collected in the affected water body. To provide the most useful data, water quality samples shall be taken as often as possible at regular time intervals. Preferably samples shall be collected weekly to better capture concentration variability.

Sample preservation, storage, transport and testing

All the collected water samples must be preserved, stored and transported to the laboratory in accordance with standard, nationally approved procedures to ensure that they remain representative of the canal, from which they are collected. Ideally samples shall be analyzed within 6 hours if possible. All the samples must be kept cool and out of direct sunlight. All the collected samples shall be preserved and stored according to the standards (For an example APHA 2007). Testing of all the collected samples shall be carried out complying to the standard methods. Typical water quality monitoring parameters at both construction and operational stages include; Total Suspended solids/Total dissolved solids, Nitrogen and Phosphorus, Heavy metals and coliform. Figure 8.4 shows a chemical sampling program for key environmental sectors.

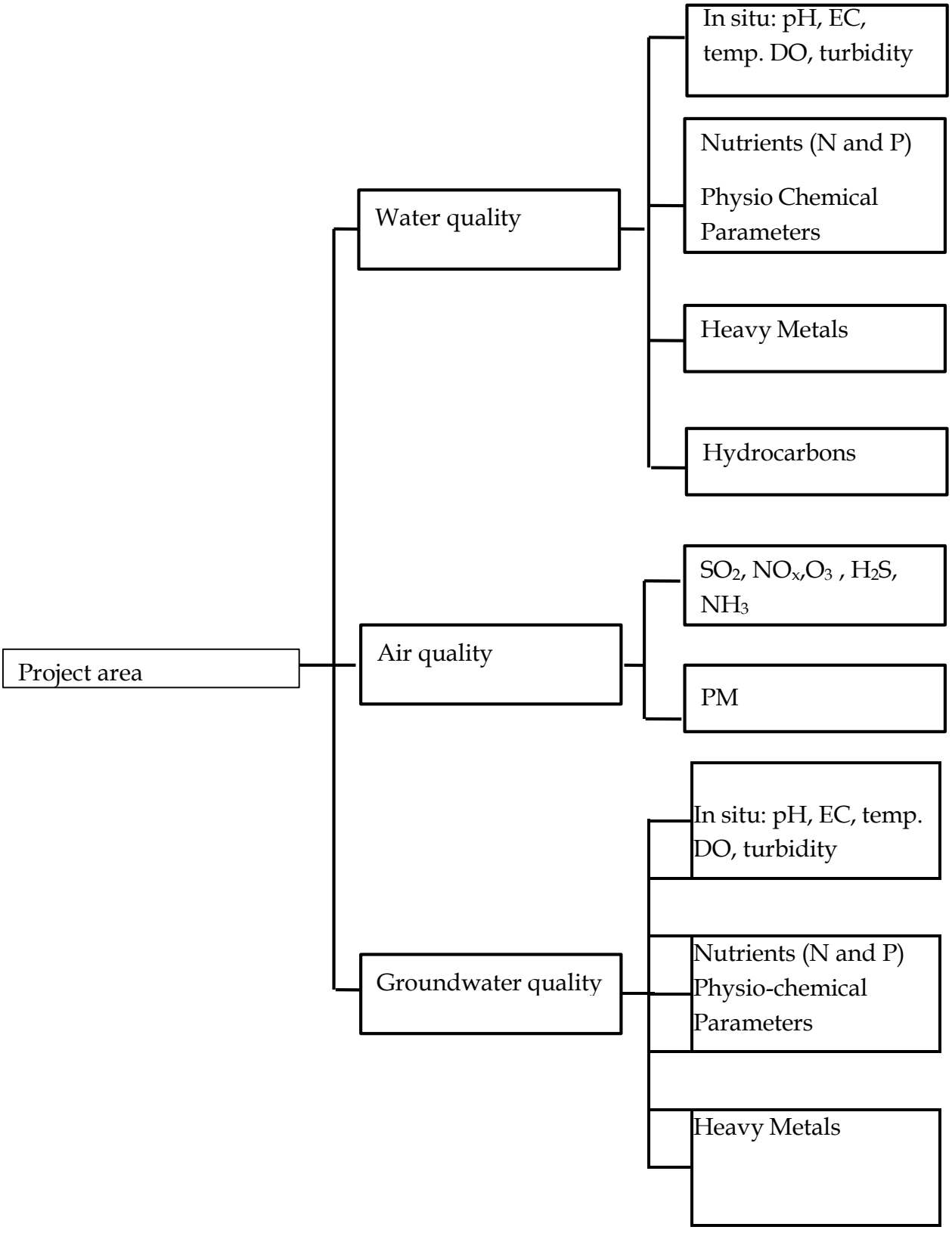


Figure 8.2 - Chemical sampling program for key environmental sectors

8.3.6 The monitoring plan recommended for the proposed project

The detailed monitoring plan to monitor the effectiveness of the recommended mitigatory measures for the proposed WWTP system are provided in Table 8.4 and Table 8.5 for construction phase and operation phase, respectively.

Monitoring social impacts

It is imperative to monitor social impacts of the project in order to ensure the minimal disturbance to the people in the vicinity of the project area. The objective of this monitoring is to ensure that the public complaints are investigated, and their social concerns are addressed effectively and hence to enhance the beneficial social impacts from the project. The items to be monitored are adverse effects on social infrastructure, impacts on infrastructure and potential conflict situations and payment of compensation if required. Monitoring social impacts will commence as soon as the pre-construction phase starts and continues until all the construction works are completed and until all the operations of the project are smoothly carried out.

Reporting mechanism and frequency

Reporting mechanism will determine the successfulness of all project activities. For this purpose, the contractor shall maintain log entries on the management of environment, mitigation of environmental and social impacts and monitoring the project activities. The key objective of reporting is to inform the consultants, CMC, funding agency and the CEA of the contractor's commitment to carry out the project in an environmentally friendly and socially acceptable manner. Hence the contractor shall prepare monthly monitoring reports and quarterly monitoring reports on an agreed format approved by the Environmental Consultant and CMC. The reviewed version of the report shall be submitted to the CEA through the CMC.

Table 8.4 - Environmental Monitoring program during construction phase

Field	**Impacts**	**Mitigation measures**	**Responsible for implementation**	**Monitoring indicator**	**Frequency of monitoring**	**Cost (LKR Mn) and source of funds**
Construction Phase **(Water bodies)**	Siltation in surrounding surface water, mainly including the existing canal	The exposed soil shall be bundled temporarily; The flows from heavy runoff areas causing erosion or runoff shall be redirected; Implementing sediment dispersal measures by monitoring areas of exposed soil during periods of heavy rainfall. Sediment must be filtered as much as possible during the pumping and not allowed to enter pumps Sedimentation tanks shall be fixed to trap sediments	CMC[PP]; Contractor	Water quality parameters	Every fortnight. The locations for the monitoring should be implemented where the particular parameters have been measured in the pre-constructio n phase OR	8.16
	Contamination of surface water bodies by construction materials	Restrain the activities causing contaminated run-off to only dry periods. Fuel, lubricants and hazardous goods shall be stored at predefined enclosed storage locations (example, elevated containers). Otherwise, storage of oil and fuel whether in large tanks or drums, shall be within				2.88

		a concrete bund capable of retaining the entire volume of liquid in the event of leakage or rupture. Storage locations shall have good ventilation, but shall not be exposed to sunlight directly, devoid of ignition sources and shall not be subjected to floods or close to waterways. The storage, treatment and recycling of the bentonite slurry (drilling fluid) will only be conducted at the proposed launching site under the proper approval and supervision by GCWMP. The excavated and soilt materials shall be removed as soon as possible once they are generated. Provision of earth bunds or sandbags in areas having a large amount of exposed soils. Stockpiles shall be well covered with relevant materials such as tarpaulin sheets. Good management practices shall be implemented. The contractor shall prepare a construction waste management plan and shall provide a list of hazardous chemicals to be used during construction so that precautionary measures be implemented.			As directed by the Engineer	
Construction Phase (Roads)	Siltation and soil erosion along the site and roads due to excavation and construction works	Restrain the activities causing contaminated run-off to only dry periods. The exposed soil shall be bundled temporarily; The flows from heavy runoff areas causing erosion or runoff shall be redirected; Implementing sediment dispersal measures by monitoring areas of exposed soil during periods of heavy rainfall.	CMC[PP], Contractor, RDA	Topographic levels, status of erosion protection measures	As directed by the Engineer	0.51

Construction Phase (Atmosphere)	Air quality deterioration such as Dust, Airborne particulate matter, CO and NO_x	Water spraying of surfaces being prone to dust emission. Soil compaction and timely removal of debris. Dust generation from crusher plants shall be controlled by covering with wetted fabrics. Wetting the materials (e.g. aggregate) earmarked to be loaded shall be practiced. Vehicles transporting construction materials shall be covered adequately. The dust levels shall be monitored periodically. Limiting speed of construction vehicles and displaying speed limiting sign boards shall be practiced. Cement mixing places and batching plants shall be located away from sensitive receptors and operations shall be avoided during windy conditions. A schedule for dust/emission generation activities shall be prepared and the public shall be informed of such activities. Heavy vehicles shall be maintained in good condition.	CMC [PP], Contractor	Monitoring NOx, SO_2, CO etc., Dust level	Twice a day at dry weather condition or as directed or on complaint (when and where necessary)	5.62

	Increase in noise and a slight increase in vibration	Heavily loaded trucks shall be routed away from highly residential areas. Earthmoving and ground-impacting operations shall be operated at different times so as not to make a cumulative vibration effect. Construction activities during the night shall be minimized since the human beings are more sensitive to vibration during the night. Scheduling of construction work causing high noise and vibration shall be within the authorized construction embodiment times with the least inconvenience to the public. All construction equipment shall be used in good service condition and low noise/vibration generating construction equipment shall be used. The construction site shall be separated with corrugated sheets or other suitable material. Carrying out a property condition survey (crack survey) of nearby structures and recording the present condition of the structure to accurately assess any damage to these structures during the construction stage. Establishing a complaint mechanism and implementing a procedure to deal with any issue raised by the community effectively.	CMC [PP], Contractor	Noise level	Twice a day or as directed or on complaint (when and where necessary)	1.12
Construction Phase (Groundwater)	A slight increase in pH in groundwater	No special mitigation measure shall not be needed because the alkaline substances will not dissolve in the water so that no significant adverse water quality issue will arise. The groundwater monitoring shall be conducted near the two pumping stations area to confirm the potential contamination	CMC [PP], Contractor	pH in groundwater	Once a month	0.05

Construction Phase (Utilities)	Utilities along alignments may get damaged	In order to minimize the number of exposed sites at a given time, a construction sequence of work shall be prepared. Residents shall be informed of the allocated dates for pipe laying in a particular area through public announcements. Ceylon Electricity Board and Sri Lanka Telecom shall be contacted for removing transmission lines or to have any other mitigatory measure as applicable for their transmission lines during the period of construction. Public announcements shall be made on service interruptions well in advance (electricity, water and telecommunication services). Training the contractor to adopt methods to minimize the disturbances and inconvenience to the public. Damaged roads shall be repaired immediately after finishing pipe laying. Nighttime work shall be considered to speed up construction work reducing period of construction to minimize the duration of minute degree of obstruction, disturbances to public utilities and inconveniences to public.	CMC[PP] and Contractor for electrical lines, water and wastewater lines, and roads and drains CEB for electrical lines; LA for roads and drains	Liaising activities with CEB, NWS&DB, RDA and LA for electrical lines, water and wastewater lines, and roads and drains, respectively.	As directed by the Engineer	10.0

Construction Phase (Traffic)	Increase in traffic congestion	A Traffic Management Plan with Colombo Municipal Council and Roads Development Authority (RDA) shall be implemented. Nighttime constructions should be limited only to Elvitigala Road (Baseline Road) and Nawala Road. Nighttime construction shall be implemented on Kirimandala Road and Muhandiram E. Dabare Road. Alternatively, the possibility of conducting daytime construction on Kirimandala Road and Muhandiram E. Dabare Road by considering a diversion through Lake Drive Road from Kirimandala Road to Nawala Road shall be considered. The oncoming traffic flow from Kirimandala Road to Evergreen Park Road shall be barricaded and encouraged to use Kirimandala Road. Adequate sign boards shall be installed to guide the traffic flow during construction. Notice boards displaying the possible congestion due to construction on Muhandiram E. Dabare Mawatha, Kirimandala Mawatha and Nawala Road shall be installed at suitable locations to discourage the inflow traffic to aforesaid roads from Elvitigala Road (Baseline Road), Thimbirigasyaya Road and Kirula Road. Residents and general public shall be informed of the road closure schedules on minor and private roads well in advance.	CMC [PP], Contractor, RDA, LA	Traffic congestion, hindrance level, number of accidents	While construction in progress	14.2

Construction Phase (Social)	Small-scale livelihood systems will considerably be affected adversely.	Information on the construction schedules shall be disseminated about 30 days before the commencement of the project activities. Steel plates shall be provided to be used as alternative accesses to the shops if the accesses are disturbed. Actions to complete the construction activities within a short period of time in the sub-project road sections of small-scale shops shall be prioritized. Mobile venders shall be provided with construction schedules of the subprojects 30 days prior to the commencement of the construction activities so that they can walk on other roads in the vicinity of the sub-project during the construction period. Three-wheeler drivers shall be informed of the construction program prior to commencement of the construction work. Completion of the construction work in the three-wheel parking areas shall be done within a short period of time.	CMC [PP], Contractor, LA	Social response, eg. Protests or complaints	Continually	1.2

	Community and workers' health and safety will be adversely affected	In order to minimize the number of exposed sites at a given time, a construction sequence of work shall be prepared. Residents shall be informed on allocated dates for pipe laying in a particular area through public announcements. Temporary sanitary facilities shall be provided at all construction sites, especially for the pumping stations. Contractor shall provide the workforce (drivers and traffic controllers cum flagmen should be included) involved in handling dust generating material (example, cement, soil, metal aggregates, bricks, etc) with dust masks and goggles or safety glasses. Environmental pollution control measures, including watering standard maintenance of machinery shall be implemented. Construction activities shall be scheduled so as to minimize the impact on surrounding communities (e.g. prohibit high noise generating activity on nighttime) Heavily loaded trucks shall be routed away from highly residential areas, if possible and streets with less populated areas, if no alternative is available, shall be selected The speed of construction vehicles shall be limited, and speed limiting sign boards shall be displayed. Peak traffic hours shall be avoided with reference to material delivery and taking away the soil or construction wastes. It is advised that appointed contractor could prepare a Traffic Management Plan and implement it accordingly with the support of the project proponent. Dust generation from crusher plants shall be controlled by covering wetted fabrics. Wetting the materials (e.g. aggregate) earmarked to be loaded shall be practiced. Water shall be sprinkled to the cleared and exposed (bare) surfaces frequently when dust plumes are likely to get generated under hot, sunny and windy conditions. Vehicles transporting construction material such as sand, metal and cement shall be covered adequately to reduce dust generation. The dust levels shall be monitored periodically to ensure that the levels are not too high. Cement mixing places and batching plants shall be located away from sensitive receptors and operations shall be avoided during windy conditions. If needed, temporary worker camps and the site offices, storage areas etc shall be provided with adequate number of well closed bins to collect municipal garbage, and the bins shall be regularly emptied (Contractor/s shall make necessary arrangements with the CMC to remove the collected wastes). 141	CMC[PP], Contractor, LA, PHI	Social response, eg. Protests or complaints	Continuall y	12.2

Post-construction phase	Inconvenience caused by temporary structures built during the construction phase on general public.	All temporary structures shall be demolished and cleared away, and necessary ground improvement work shall be applied.	CMC[PP], Contractor	Social response, eg. protests or complaints	Continually	0.5

Operational Phase (Health and Safety)	Operational health and safety- Workers' possible reluctance to follow operational health and safety (OHS) measures stipulated and wear personal protection equipment (PPE); Accidents	Punitive action shall be imposed on those violating the OHS policies. Special provisions shall be made available in their offices to store the given PPE with toilet facilities for the workers to thoroughly clean themselves. Pre-recruitment and periodic health check-ups of the workers shall be initiated by the CMC. OHS measures with reference to sewer cleaning works shall be implemented. All areas shall be devoid of spilled oil or grease. Soap and water, not gasoline or solvents, shall be used for cleaning. Long-sleeved glows shall be worn when working with equipment or while in direct contact with wastewater. Tools, equipment and materials shall not be left at places prone to safety hazards. Adequate lighting shall be provided for night work and in areas with limited existing lighting. Only sections of handrails, deck plates or grating necessary for the immediate job shall be removed. Removed sections shall be properly stored out of the way and properly secured against falling into tanks. The area shall be barricaded to prevent unauthorized personnel entry and possible injury. Walk on top of the sidewalls of structures shall be prohibited. Any sewage flowing from the upstream manhole to downstream manhole shall be stopped until the completion of the cleaning work of any blockage. Within the pumping station premises, special areas shall be allocated to store the given PPE with toilet facilities for the workers to thoroughly clean themselves. Smoking and consumption of food items shall be prohibited in the wet well /working areas by displaying appropriate sign boards. Ladders and railings around the wet well, screening chambers, penstock gate chambers and grit chambers shall be hard, well fixed solid structures (example, made of stainless steel). Ladders provided to the wet well and screening removal area shall have well fixed railings on both sides with broad footsteps. Ladders leading to the screening removal area shall not be placed above ditches such as penstock gate chamber, grit chamber, etc. Pre-recruitment and periodic health check-ups of the workers shall be initiated by the CMC. Automated Fire/ smoke detectors with an alarm shall be made mandatory with provision of adequate gear to put off fires. The workers shall be thoroughly trained to put off any fire. Automated H_2S detectors shall be installed in plenty throughout the pumping station. They should be capable of setting up an alarm when dangerous levels are detected. Therefore, the workers shall be educated regarding the dangers posed by different levels of H_2S. Portable H_2S meters shall be provided to those involved in removing grit and repairing and maintenance works in the wet well. A first aid unit / facilities as per the General Register of the Department of Labor & the Factories (First Aid) Regulation No 1 of 1995 shall be installed with medically competent persons and an ambulance shall be available to reach the nearest hospital/s on a 24 hrs. basis. A stretcher shall also be provided. The grit materials and sludge removed from the wet well shall be collected in proper containers and dewatered at the pumping station. The dewatered materials shall be disposed at suitable/appropriate dumping sites. All pumping stations and equipment shall be maintained and operated in an effective condition and records of the maintenance shall be kept. A system to identify critical components shall be placed, and a system to ensure adequate and timely access to spare parts shall also be placed. Around 4-6 standby pumping equipment shall be provided and associated controls (they need be alternately operated) and some 5000 L capacity gully suckers at site to attend to emergency needs shall also be provided. "No digging methods" such as glass reinforced plastic for sewer rehabilitation or repairing of damaged manholes shall be used wherever possible.	CMC[PP], LA[PHI]	Social response, eg. Protests or complaints	Regularly	0.06

Operational Phase (Air Quality)	Air quality deterioration (Localized odor)	Frequent / daily inspections (morning and evening) shall be carried out to see whether odor emanates, and any blockages can immediately be attended. The manholes to be provided shall be ventilated to minimize odor generation to the surrounding environment. The pumping stations shall be designed by design consultants and then constructed such that they are fully enclosed infrastructure that will have adequate ventilation systems (mechanical ventilation shall be provided with intake ducts fixed with fine mesh to prevent access to vermin such as flies) to provide around 21% of O_2 to the workers inside and either soil filters or dual bed activated carbon filters connected to exhaust fans shall be provided for odor control. Pumping stations shall be enclosed with enough ventilation systems.	CMC [PP]	Monitoring	Twice a week for 24 hours, Ad Hoc	0.05
Operational Phase (Social)	The general public will be annoyed by the noise and vibration	Doors and windows of pump stations shall be kept closed during the operational time. The exhaust silencers shall be in good condition. Emergency generator rooms shall be kept closed during the operational period.	CMC [PP], Contractor, LA	Social response, eg. Protests or complaints	Continually	

Note: 1 CMC= Colombo Municipal Council, LA= Local Authority, CEB= Ceylon Electricity Board, PHI= Public Health Inspector, CEA= Central Environmental Authority, RDA= Road Development authority

9 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The improvement of sewerage system has been a long felt need in Kirula-Narahenpita urban area where no pipe borne wastewater collection system exists presently. Therefore, the proposed Greater Colombo Wastewater Management Project (GCWMP) will enhance the environmental quality in the Kirula-Narahenpita area by protecting ground and surface water bodies, which are the recipients of the untreated sewage at present. The aesthetic appearance of the CMC area will be improved by the elimination of nuisance odor and unpleasant sight at surface water bodies upon the discharge of untreated sewage.

The IEE team concludes that anticipated environmental impacts were identified as moderate and to occur during both the construction and operational phases. Proper design consideration is needed to minimize the emissions of odor causes gases which may induce an annoyance to the surrounding neighborhood. During the construction phase, soil erosion and siltation in nearby water bodies may happen. The natural drainage pattern in the construction area may be disturbed with the discharge of construction debris, solid waste and any run-off carrying construction debris. It is also expected that generated noise and vibration due to the construction activities may affect the residents in the project area. It is expected that dust may also generate due to demolition, exaction and trenching work although the impact is temporary and short term. The existing public utilities may be disturbed by the construction activities of the sewerage network and two pumping stations. The proposed project will hardly affect the archeologically interested sites and on flora and fauna. Traffic congestion may be envisaged especially at the construction work sites of collection system and two pumping stations. In general, it is unlikely that there would be any significant adverse or negative socio-cultural impacts affect to the community, residents and both commercial and public establishments. However, during construction phase the sub-project will require resettlement of 6 families residing in 5 houses established in land plot belongs to Sri Lanka Railways. Further, proposed project is likely to have significant positive impacts on groundwater and inland surface waters by minimizing bad odor, improve public health, and institutional development. On the other hand, the citizens of project area in Thibirigasyaya DS in Greater Colombo will be the major beneficiaries of the new sewerage system. This would improve the environment of the Kirula-Narahenpita and adjacent areas, and in conjunction with the development of other infrastructure water supply and sanitation. If all aspects are considered aiming at benefiting the environment, it can be concluded that the proposed project with the

proposed mitigatory measurements will not give any adverse impacts but enhance the environment with many social benefits.

Recommendation

It is strongly recommended to strictly follow the proposed construction activities, mitigatory measures, and monitoring plan proposed by this IEE report. In summary, the measures described below are recommended to minimize the impacts at the various stage of the proposed project and to be considered by the Project Proponent during the designing, construction and operation phase.

Proper design consideration is needed to minimize the emissions of odor causes gases which may induce an annoyance to the surrounding neighborhood. It is recommended to design an enclosed structure with enough ventilation systems.

Most of the anticipated impacts during the construction phase can be mitigated by the construction measures decided to be followed for the proposed project. It is recommended to carry out construction of the wet well structures and micro tunneling work, demolishing work only during dry season. It is also recommended to remove the excavated soil and other construction/demolishing wastes as soon as possible and to storage, treatment and recycling of the bentonite slurry (drilling fluid) under the proper approval and supervised by relevant officers.

IEE team recommend minimizing construction activities during the night and scheduling construction work that cause high noise and vibration within authorized construction embodiment times with the least inconvenience to the public.

It is also highly recommended to ensure that vehicles transporting construction material such as sand, metal and cement are covered adequately to reduce dust generation. The dust levels should be monitored periodically to ensure that the levels are not too high. It is further suggested for limiting speed of construction vehicles and display speed limiting sign boards are few more mitigation measures to control dust from moving vehicles.

IEE team further suggested that a schedule for dust/emission generation activities should be prepared and inform public in the environs regarding such activities.

In view of minimizing the impact on minor roads, it is recommended to inform the residents and general public about the road closure schedules on minor roads and private roads well in advance to minimize the chaos. Carry out a property condition survey (crack survey) of nearby structures and record the present condition of the

structure, to accurately assess any damage to these structures during the construction stage. It is better to establishing a complaint mechanism and implementing a procedure to effectively deal with any issue raised by the community

Moreover, the conduct of public awareness and education program to raise public awareness of sanitation, hygiene, and solid wastes issues so the health of the community would also likely to improve. It is also recommended to transport the sludge and grit material that remove from wet well as soon as possible and to dispose appropriately under the proper approval and supervised by relevant officers. Furthermore, it is recommended to have a Contingency Management Plan and to have a standby, experienced and qualified technical staff with proper equipment to attend to emergencies promptly.

The Project Monitoring Unit (PMU) should be responsible for implementing and monitoring safeguards compliance activities, public relations activities and community participation activities in the project areas covered by CMC. It is highly recommended PMU to have an environment specialist, who is responsible for safeguards functions.

10 REFERENCES

ADB, Asian Development Bank, Environmental Assessment Guidelines, 2003

Environmental and social assessment report on provision of new gravity sewers, force mains and pump stations for Kirula/narahenpita sewerage network development, June 2018.

Initial Environmental Examination (IEE) for Kirulapone sewer network development work, final report, December 2015.

Ponrajah, A.J.P. Design of irrigation headworks for small catchments, 1984
Cooray, P.G. , Geology of Sri Lanka, 1984

USEPA, Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, 1971

11 ANNEXES

Annex 1- Terms of Reference issued by the CEA

TERMS OF REFERENCE (TOR) FOR THE INITIAL ENVIRONMENTAL EXAMINATION REPORT FOR THE PROPOSED GREATER COLOMBO WASTEWATER MANAGEMENT IMPROVEMENT INVESTMENT PROGRAMME, PROJECT -02 FOR NARAHENPITA AND KIRULA-NARAHENPITA AREAS.

This TOR is valid only for one and half years from the date of issue. The IEE report should be submitted within the validity period.

Project Title: Proposed Colombo wastewater management improvement investment project.
Project Proponent: Colombo Municipal Council.
Project Approving Agency: Central Environmental Authority
Date of Issue: 16/01/2016
Objective: Specify purpose of TOR
Outline of the IEE Report:

Executive Summary
Chapter 1 - Introduction
Chapter 2 - Policy, Legal and Administrative Framework
Chapter 3 - Description of the proposed project
Chapter 4 - Description of the existing environment
Chapter 5 - Environmental impacts and mitigation measures
Chapter 6 - Information disclosure, consultation, and participation
Chapter 7 - Grievance redress mechanism
Chapter 8 - Environmental Management Plan
Chapter 9 - Conclusions and recommendations

Annexures
I - Terms of Reference (TOR)
II - Source of data and information

III - References

IV - List of preparers including their work allocation (report should be authenticated by the preparers)

V - List of persons and organizations contacted

VI - Complete set of relevant maps, charts, tables, layout plans

Note: This TOR is only a guideline document. Any additional information, impacts, mitigation measures etc. which will be useful in decision making could be incorporated in the IEE report based on the finding of the IEE study.

Executive Summary

This section can be very brief (should not be more than 3 pages) and need not summarize each chapter of the report. Summary information on the following is recommended:

Project proponent, need, components and location;

Exactly what national legislation will apply and what approval/permits are required (if any) and how is it meeting ADB SPS 2009; A very brief outline of the status of current environment, what significant impact (excluding all routine ones) is anticipated and what measure has been proposed. A one-page summary table indicating the significant impacts and mitigation measures should also be presented. Highlight any special measure that may have been proposed to enhance institutional capacity, offsetting biodiversity impacts etc.

CHAPTER 1: INTRODUCTION

This chapter should include the following;

Background of the proposed project

Objectives and justification of the project (summarize the need or problem being addressed by the project)

Objectives of the IEE report (specify the objectives of the assessment and the relationship of the results to project design and implementation)

Compatibility with other projects/ programs/ plans in the area

CHAPTER 2: POLICY, LEGAL AND LEGISLATIVE FRAMEWORK

Identify zoning (where appropriate) and all approving authorities for the project and legislative (national) and policy (both ADB and national) requirements including requirements for IEE and EIA;

Identify any international agreements, national and/or local environmental planning instruments that may apply to the project and how the project design meet those requirements;

Advise on any strategies being developed by the government which may affect the proposal, yet may not be reflected in any formal planning documents;
A matrix of any gap analysis between national/local and ADB requirements should be provided;
Approvals needed for the project from other state agencies and any conditions laid down by Government agencies for implementation of the project (e.g., Road Development Authority for use of roads). Status of any approval (where appropriate) from relevant authority; Consent Letters from Land Reform Commission (LRC) and Ministry of Megapolis and Western Development
Search result of all national and local database (including any archeological Society) to identify environmentally significant zones/species/heritage structures.

CHAPTER 3: DESCRIPTION OF THE PROPOSED PROJECT

3.1 The Study Area/Project Location

Location of the project site
Province, District, Local Authority, DS Division
It is essential to provide **exact boundaries** (with good legible maps and colored indicating sensitive areas) of the area where impacts are presumed and have been studied. **A description of the overall study area in relation to the project site should be made**.

3.2 Location maps/ photographs

A location map of the project area
Adequate photographic coverage is essential
Should illustrate the location of the proposed activity within the context of the area.
Captions, identifying key items within each photograph should be indicated. A map indicating where the photographs were taken, and the direction of their view should also be provided.
References to relevant photos should be made throughout the IEE.

3.3 Existing Condition of Sewer Collection System

Provide in detail the 'need for the project' – establish the 'fit' of the proposed activity with strategic issues as well as why is it needed now.

3.4 Proposed Components

Give description on following.

Number and types (domestic/ non-domestic, commercial, residential, industrial or hospital based etc) of service connections.

Anticipated quality and quantity of their effluent (average) flow (present and future)

Collection system from individual service connections

Piped sewer collection system including dimensions

Details of pumping stations

(No. of pumping stations and locations)

Provide Layout of project components indicating all project components (site of the pumping stations, sewer pipelines, site offices etc) at a reasonable scale.

Ownership and survey plan of pumping station sites etc.

3.5 Implementation Schedule

3.6 Project implementation

(i) Pre-construction activities

All relevant associated activities, such as batching plant, site compound, stockpiles, geotechnical and surveying investigations, borrow and soil/waste disposal sites should be included. If the sites are not likely to be determined until closer to construction, the activities can still be included and assessed by indicating the most likely sites for these activities, as well as the areas where they would not be established.

permits/clearances required

designation of contractor's focal person for safeguard

identification of suitable sources of materials, disposal site/s, work camps (if required), storage areas, etc. Environmental Management Plan (EMP) implementation orientation prior to commencement of civil works details of signages, information boards, barricades, etc.

(ii) Construction activities

Each step in the **construction methodology and activities** (as per construction staging) will be elaborated including type of plant and equipment to be used, working hours and the approximate duration at each stage of the construction period

Details of land preparation activities (land clearing/ cutting/ filling/ any other)

Excavation of roads, Method of laying pipelines, depth etc.

Construction details of pumping stations

Mobilization heavy machinery

Disposal of excavated material and other solid waste

Trench backfilling and compaction

Techniques and equipment to be used

- Discharge of dewatered water
- Construction of site offices
- Excavation and pipe laying along canal banks (if any)

(iii) Operational and maintenance activities and procedures

- Responsible agency for operation of the project
- Operational and maintenance procedures
- Maintenance activities

3.7 Resources/ facilities required/ provided

3.8 Work force

Labor requirements, availability of labour, employment of local people, migratory workers, occupational health and safety facilities required/ provided.

CHAPTER 4 : DESCRIPTION OF THE ENVIRONMENT (BASELINE DATA)

The study area for the assessment shall include the following

a. Sites of pumping stations

b. Service area to be served by the project

c. Area for disposal of excavated materials

d. Area beyond the project sites where there is potential for environmental impacts

Assemble, evaluate and present baseline data on the following environmental characteristics of the study area.

4.1 Physical Environment

General description for the overall study area and possible details for the land application sites of the following sectors.

4.1.1 Topography

Topography (recent topographical data including reserve areas, water bodies, rivers/ streams tanks and drainage channels)

4.1.2 Hydrology and Drainage

Surface drainage pattern

Occurrence of flooding and inundation levels

Height of ground water table

4.1.3 Climatic Conditions

Features that need consideration are:

Rainfall (seasonal intensity and annual distribution)

Winds (average velocity, duration and prevailing direction)

Annual and daily temperature range, evaporation characteristics

4.1.4 Land Use

Existing land use (Maps, photographs or satellite images to be provided)

Zoning (if any)

4.1.5 Air Quality, Noise, Vibration

Baseline information an air quality, noise, vibration levels

4.2 Biodiversity

The most important criterion for establishing the significance of flora and fauna in an area is to identify the species that occur there and their habitat. **A thorough search of information (all known local and international database search) and field surveys should be undertaken**

by a competent qualified person. The nature and scale of the proposed activity will no doubt determine the depth and detail required however, all flora and fauna assessments of the existing environment should include:

A list of plant and animals occurring in the area (i.e. the construction site and within the study area). Marine species is to be included where relevant;

A list of aquatic and terrestrial species and its communities occurring in the study area;

A list of threatened, vulnerable and endangered species in the study area, if any;

A map of the study area indicating the distribution;

Information indicating if there is a corridor of vegetated area that links or joins to larger areas of natural habitat?

4.3 Physical and Cultural Heritage

Any building, sites or items of heritage significance listed by the local and/or national authority and/or internationally (UNESCO) and that occur within or adjacent to the proposed activity should be identified and indicated on a locality map. A statement on the heritage significance should be provided. Any matters of cultural heritage in addition to archeological relics should also be discussed if these are identified.

4.4 Human, Economic and Socio Cultural

Existing residential, commercial or administrative buildings which will be affected or benefited by the project. Existing infrastructure facilities which will be affected such as transportation, communications, power supply, health care (Hospitals), schools, water supply etc.

4.5 Existing environmental considerations problems or issues prevailing in the area.

CHAPTER 5 : ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This chapter should evaluate the anticipated environmental impacts due to the project at all stages of site development and operation on the component of the environment. The assessment should focus on following principle areas.

5.1 Design Phase

a. Design considerations

- Describe design considerations to avoid, or if unavoidable, mitigate potential impacts

- Provide specific mitigation measures for impacts that cannot be avoided thru design change.

b. Location/siting considerations

- Describe location/siting criteria considered or to be considered to avoid potential impacts (alignment of sewer network, sources of materials, sites for work camp if required, storage area, disposal sites for excess soil, construction-related materials, etc).
- Provide specific mitigation measures for impacts that cannot be avoided due to location of components or associated facilities

5.2 Construction Phase

5.2.1 Pre-construction

Identify all requirements prior to commencement of construction work, example clearance/permits, baseline surveys, development of plans (soils handling, waste management, health and safety, traffic management, etc), putting up of signages, consultations with project-affected people, etc.

5.2.2 Construction

a. Hydrology

impacts

Disturbances to natural drainage pattern

Siltation of nearby water bodies, marshes, during construction

Water pollution due to contaminant leakage from machinery, workers sites during constructional phase

Include others as per assessment of sites and design

mitigation measures

identify mitigation measures and any residual negative mitigation measures and any residual negative impacts that cannot be mitigated; explores opportunities for enhancement

b. Soil

impacts

Land degradation due to excavated material disposal

Slope failures due to extensive earth work
Include others as per assessment of sites and design

mitigation measures
identify mitigation measures and any residual negative mitigation measures and any residual negative impacts that cannot be mitigated; explores opportunities for enhancement

c. Water Quality - Adjacent Water Bodies
impacts
degradation due to unmanaged excavated materials
contamination due to improper storage of fuels, oils and other chemicals
Include others as per assessment of sites and design

mitigation measures
identify mitigation measures and any residual negative mitigation measures and any residual negative impacts that cannot be mitigated; explores opportunities for enhancement
include soils management plan
include waste management plan

d. Air Quality
impacts
-increase in dust due to transport of materials
- air emissions from power generators
- air pollution due to increased vehicle trips within the vicinity of the sites
- fugitive emissions from open burning of wastes
- Include others as per assessment of sites and design

mitigation measures
identify mitigation measures and any residual negative mitigation measures and any residual negative impacts that cannot be mitigated; explores opportunities for enhancement

e. Noise and vibrations
impacts

- increase in noise level and vibrations within vicinity of sites (use of jackhammers, excavators, workers, vehicles, etc.)
- increase in noise level due to use of power generators for night works (delete if not applicable)
- Include others as per assessment of sites and design, identify any specific sensitive receptors

mitigation measures

identify mitigation measures and any residual negative mitigation measures and any residual negative impacts that cannot be mitigated; explores opportunities for enhancement

f. Ecology - Flora and fauna

impacts

- tree cutting
- vegetation clearing
- include others as per assessment of sites and design

mitigation measures

identify mitigation measures and any residual negative mitigation measures and any residual negative impacts that cannot be mitigated; explores opportunities for enhancement

g. Traffic and accessibility

impacts

- road closures
- partial blocking of roads
- re-routing of vehicles
- increased vehicular movement
- Include others as per assessment of sites and design

mitigation measures

- identify mitigation measures and any residual negative mitigation measures and any residual negative impacts that cannot be mitigated; explores opportunities for enhancement

- include traffic management plan as per CMC regulations

h. Existing utilities along alignment

impacts

- disruption of services due to shifting
- damage to underground utilities (water pipes, electricity and communication cables, etc.)
- include others as per assessment of sites and design

mitigation measures

- identify mitigation measures and any residual negative mitigation measures and any residual negative impacts that cannot be mitigated; explores opportunities for enhancement
- include contingency plan in case of services disruption

i. Livelihood

impacts

- involuntary resettlement impacts due to road closures
- loss of access to business due to open trenching
- include others as per assessment of sites and design

mitigation measures

- identify mitigation measures and any residual negative mitigation measures and any residual negative impacts that cannot be mitigated; explores opportunities for enhancement

j. Operations and Maintenance Period

impacts

- identify as per O&M manual and commissioning activities of sites and design

mitigation measures

- identify mitigation measures and any residual negative mitigation measures and any residual negative impacts that cannot be mitigated; explores opportunities for enhancement

5.2.3 Post-construction

Identify post-construction activities to (i) ensure sites (work camps, storage areas, etc) are restored to pre-construction period; and (ii) materials not required for O&M are dismantled/removed.

5.3 Operations and Maintenance Phase

a. Defects Liability Period

impacts

- identify as per O&M manual and commissioning activities of sites and design

mitigation measures

- identify mitigation measures and any residual negative mitigation measures and any residual negative impacts that cannot be mitigated; explores opportunities for enhancement

5.4 Any other impacts not listed here but may be significant in view of the project proponent

CHAPTER 6: INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

Describe the process undertaken during project design and preparation for engaging stakeholders, including information disclosure and consultation with affected people and other stakeholders;

Summarize comments and concerns received from affected people and other stakeholders and how these comments have been addressed in project design and mitigation measures, with special attention paid to the needs and concerns of vulnerable groups, including women, the poor, and Indigenous Peoples; and

Describe the planned information disclosure measures (including the type of information to be disseminated and the method of dissemination) and the process for carrying out

consultation with affected people and facilitating their participation during project implementation.

CHAPTER 7: GRIEVANCE REDRESS MECHANISM

Describe the grievance redress framework (both informal and formal channels), setting out the time frame and mechanisms for resolving complaints about environmental performance.

CHAPTER 8: ENVIRONMENTAL MANAGEMENT PLAN

This section will mainly describe the **process** by which it is proposed to ensure that the safeguard measures detailed in the IEE would be **implemented**.

Prescribe the arrangement to transfer environmental safeguard requirements as contract specifications.

8.1 Safeguard Implementation Arrangement

Specify implementation schedule showing phasing and coordination with overall project implementation

Include the structure of project management for the specific project with reference to environmental responsibilities on and off site

Describe institutional or organizational arrangements, namely, who is responsible for carrying out the mitigation and monitoring measures, which may include one or more of the following additional topics to strengthen environmental management capability: technical assistance programs, training programs, procurement of equipment and supplies related to environmental management and monitoring, and organizational changes.

8.2 Summary of significant environmental impacts together with mitigation measures

Identify and summarize anticipated significant adverse environmental impacts and risks;

Describe each mitigation measure with technical details, including the type of impact to which it relates and the conditions under which it is required (for instance, continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate; and

Provides link to any other mitigation plans (for example, for involuntary resettlement, Indigenous Peoples, or emergency response) required for the project.

8.3 Monitoring and reporting

Describe monitoring measures with technical details, including parameters to be measured, methods to be used, sampling locations, frequency of measurements, detection limits and definition of thresholds that will signal the need for corrective actions; and
Describe monitoring and reporting procedures to ensure early detection of conditions that necessitate mitigation measures and
Document the progress and results of mitigation.
Table below should be completed as per discussion in the main text.

Table XXX: Environmental Management and Monitoring Plan **Field**	**Impacts**	**Mitigation Measures**	**Responsible for Implementation**	**Monitoring Indicator**	**Frequency of Monitoring**	**Cost and Source of Funds**
1. Pre-Construction Activities						
2. Construction Phase						
3. Post-Construction Activities						
4. Defects Liability Period						
5. O&M						

Annex 2 - Approvals from state agencies

Consent letters / Clearance for pumping stations –Sri Lanka Railways.

දුම්රිය / புகையிரதம் / Railway — G.M.F.35a (සහ මධ්‍යම)

දුරකථන අංකය / தொலைபேசி / Telephone No. — 2421281-570

ෆැක්ස් අංකය / தொலைநகல் / Fax No. — 2446490

ඊමේල් / மின்னஞ்சல் / E-mail — gmr-slr@sltnet.lk

ශ්‍රී ලංකා දුම්රිය සේවය
இலங்கை புகையிரத சேவை
SRI LANKA RAILWAYS

මගේ අංකය / எனது இல / My No. — රේල්01/තව බදු ඉද 2017/iv(8)

දුම්රිය සාමාන්‍යාධිකාරී කාර්යාලය,
තැ. පෙ. 355, කොළඹ 10.
பொது முகாமையாளர் அலுவலகம், த.பெ. இல. 355, கொழும்பு 10
GENERAL MANAGER'S OFFICE,
P.O. Box No. 355, Colombo 10.

දිනය / திகதி / Date — 2017.08. 21

RECEIVED
278
12 SEP 2017
Greater Colombo Wastewater Management Project

ව්‍යාපෘති අධ්‍යක්ෂක,
පළාත් සභා සහ පළාත් පාලන අමාත්‍යාංශය,
මහ කොළඹ ජල හා අපජල කළමනාකරණ වැඩි දියුණු කිරීම ආයෝජන වැඩසටහන,
නො.86, සහශ්‍ර මධ්‍යස්ථානය,
ආනන්ද කුමාරස්වාමි මාවත,
කොළඹ 07.

මහත්මයාණෙනි ,

ADB ASSISTED GREATER COLOMBO WATER & WASTEWATER MANAGEMENT INVESTMENT IMPROVEMENT PROGRAMME (GCWWMIP).
SUB : KIRULA – NARAHENPITA PUMP STATION SITE.

උක්ත කරුණ සම්බන්ධයෙන් ඔබේ අංක CCWWMIP – P2/ADB/SSS/DSIDC/01/2014 හා 2017.07.03 දිනැති ලිපිය හා බැඳේ.

02. ඒ අනුව උක්ත ව්‍යාපෘතිය සඳහා අවශ්‍ය දුම්රිය රක්ෂිත ඉඩම, දෙපාර්තමේන්තු කොන්දේසි වලට යටත්ව බදු පදනම මත ඔබ වෙත ලබා දීමට ප්‍රවාහන හා සිවිල් ගුවන්සේවා අමාත්‍යාංශ ලේකම්ගේ අනුමැතිය ලැබී ඇති බව දැනුම් දෙන අතර, මෙම රක්ෂිතයට අදාළ ස්ථානීය සැලසුම ඉඩම් නිලධාරී වෙතින් ලබා ගැනීමට කටයුතු කර ඇති බැවින් එම සැලසුම ලද වහාම තක්සේරු වාර්තාව කැඳවා බදු ලබා දීමට ඉදිරි කටයුතු සිදු කරන බව කාරුණිකව දැනුම් දෙමි.

J. Uthayakumar
අතිරේක දුම්රිය සාමාන්‍යාධිකාරී(යටිතල පහසුකම්)

J. UTHAYAKUMAR
Additional General Manager (Infrastructure)
Sri Lanka Railways
General Manager's Office
Colombo 10

RECEIVED
485
18 SEP 2017
GCWWMII P-2
DSIDC
Consultant

T.L – DSIDC
pls [illegible]
13/9

[illegible]
pls find a copy [illegible]
13/9

ප්‍රවාහන හා සිවිල් ගුවන් සේවා අමාත්‍යාංශය
போக்குவரத்து மற்றும் சிவில் விமான சேவைகள் அமைச்சு
MINISTRY OF TRANSPORT & CIVIL AVIATION

07 වෙනි මහල, සෙත්සිරිපාය, අදියර II, බත්තරමුල්ල
07 ஆவது மாடி, செத்சிரிபாய, II ஆம் கட்டம், பத்தரமுல்லை
7th Floor, Sethsiripaya, Stage II, Battaramulla

වෙබ් අඩවිය / இணையத்தளம் / Website: www.transport.gov.lk

දුරකථන தொலைபேசி Telephone

අමාත්‍ය / அமைச்சர் / Minister: 2187225
ලේකම් / செயலாளர் / Secretary: 2187233
කාර්යාලය / அலுவலகம் / Office: 2187200, 2187201
ෆැක්ස් / பெக்ஸ் / Fax: 2865093, 2187226
විද්‍යුත් තැපැල් / மின்னஞ்சல் / E-Mail: mintransport@sltnet.lk

මගේ අංකය / எனது இல. / My No.: MT/02/02/01/01/12-V
Case 285

ඔබේ අංකය / உமது இல. / Your No.:

දිනය / திகதி / Date: 2017.08..08

RECEIVED 11 AUG 2017

1244 11 AUG 2017 U.D.A.

දුම්රිය සාමාන්‍යාධිකාරී,
දුම්රිය දෙපාර්තමේන්තුව

Release of Land for the construction of Pumping Station.

උක්ත කරුණට අදාළව මා වෙත යොමුකළ ඇති ඔබේ අංක එල් 01/නව බදු ඉල්ලීම්/2017/iv/08 හා 2017.07.20 දිනැති ලිපිය හා බැඳේ.

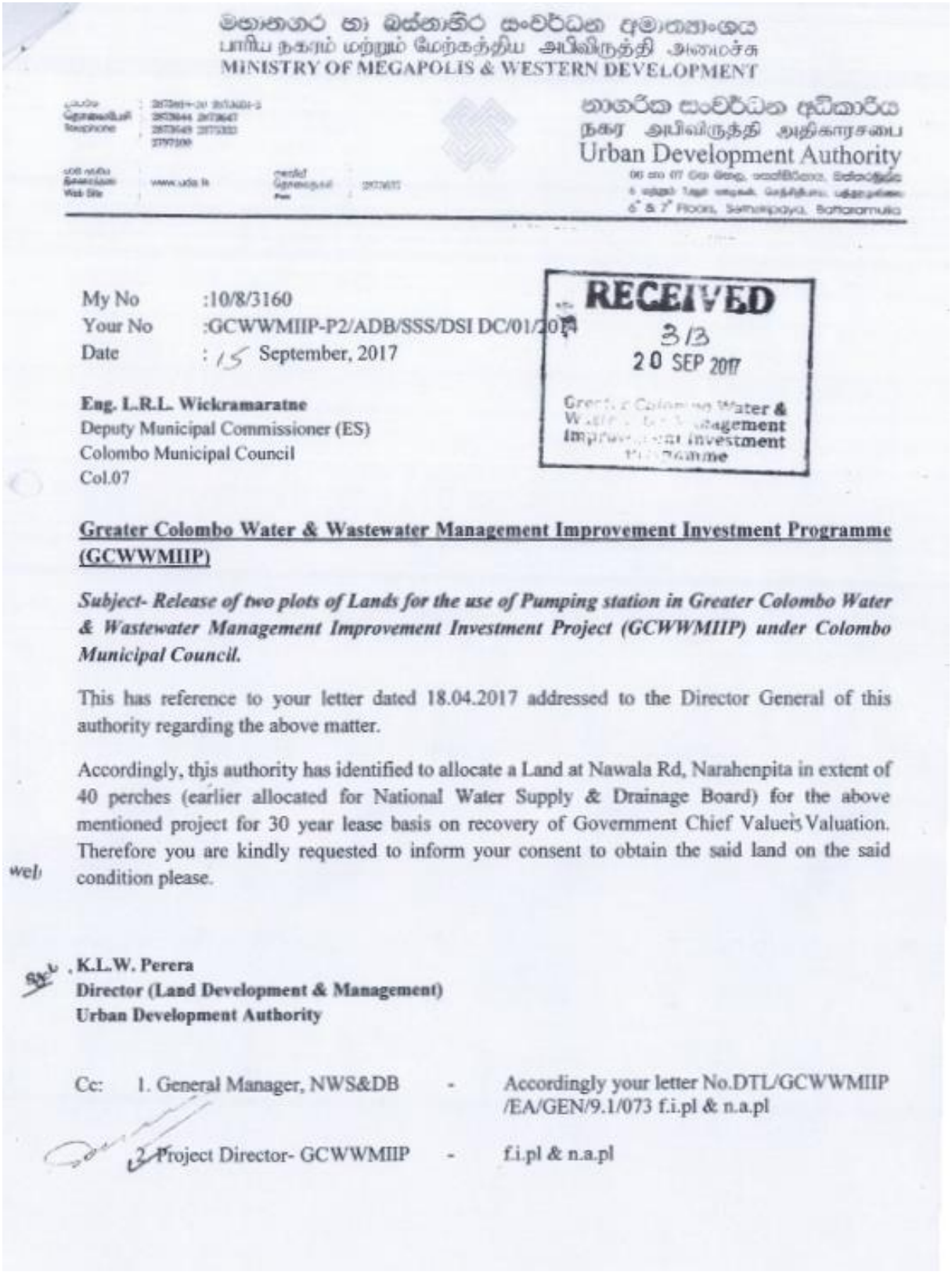
02.එම ලිපියේ අවසන් ඡේදයේ සඳහන් පරිදි අදාළ දුම්රිය රක්ෂිත දෙපාර්තමේන්තු කොන්දේසි වලට යටත්ව සැලසුම් අනුව රජයේ තක්සේරුව කැඳවා මුදල් අයකරගෙන බදු පදනම මත ලබාදීම සඳහා අනුමැතිය ලබාදෙමි.

එම්.එම්.රේණුකා රත්නායක
සහකාර ලේකම් (ඉඩම්)

අත්/කළේ - නිහාල් සෝමවීර
ලේකම්
ප්‍රවාහන හා සිවිල් ගුවන් සේවා අමාත්‍යාංශය

පිටපත් - අධ්‍යක්ෂ (බස්නාහිර පළාත) නාගරික සංවර්ධන අධිකාරිය -කාරුණික දැනගැනීම පිණිස

Consent letter/ Clearance for pumping stations – UDA.



මහානගර හා බස්නාහිර සංවර්ධන අමාත්‍යාංශය
பாரிய நகரம் மற்றும் மேற்கத்திய அபிவிருத்தி அமைச்சு
MINISTRY OF MEGAPOLIS & WESTERN DEVELOPMENT

නාගරික සංවර්ධන අධිකාරිය
நகர அபிவிருத்தி அதிகாரசபை
Urban Development Authority

6th & 7th Floors, Sethsiripaya, Battaramulla

My No :10/8/3160
Your No :GCWWMIIP-P2/ADB/SSS/DSI DC/01/20
Date : 15 September, 2017

RECEIVED
3/3
20 SEP 2017
Greater Colombo Water & Wastewater Management Improvement Investment Programme

Eng. L.R.L. Wickramaratne
Deputy Municipal Commissioner (ES)
Colombo Municipal Council
Col.07

Greater Colombo Water & Wastewater Management Improvement Investment Programme (GCWWMIIP)

Subject- Release of two plots of Lands for the use of Pumping station in Greater Colombo Water & Wastewater Management Improvement Investment Project (GCWWMIIP) under Colombo Municipal Council.

This has reference to your letter dated 18.04.2017 addressed to the Director General of this authority regarding the above matter.

Accordingly, this authority has identified to allocate a Land at Nawala Rd, Narahenpita in extent of 40 perches (earlier allocated for National Water Supply & Drainage Board) for the above mentioned project for 30 year lease basis on recovery of Government Chief Valuer's Valuation. Therefore you are kindly requested to inform your consent to obtain the said land on the said condition please.

K.L.W. Perera
Director (Land Development & Management)
Urban Development Authority

Cc: 1. General Manager, NWS&DB - Accordingly your letter No.DTL/GCWWMIIP /EA/GEN/9.1/073 f.i.pl & n.a.pl

2. Project Director- GCWWMIIP - f.i.pl & n.a.pl

Consent letter / Clearance for sewer pipe laying –SLLRC&DC

මහානගර හා බස්නාහිර සංවර්ධන අමාත්‍යාංශය
ශ්‍රී ලංකා ඉඩම් ගොඩකිරීමේ සහ සංවර්ධනය කිරීමේ සංස්ථාව

மாநகர மற்றும் மேல் மாகாண
அபிவிருத்தி அமைச்சு
இலங்கை காணி மீட்பு மற்றும்
அபிவிருத்திக் கூட்டுத்தாபனம்

MINISTRY OF MEGAPOLIS & WESTERN DEVELOPMENT
SRI LANKA LAND RECLAMATION AND DEVELOPMENT CORPORATION

த.பெ.56, இல.03, ஸ்ரீ ஜயவர்தனபுர மாவத்தை, வெலிகட, ராஜகிரிய.
තැ.ඉප.56, අංක 03, ශ්‍රී ජයවර්ධනපුර මාවත, වැලිකඩ, රාජගිරිය.
P.O. Box 56, No. 03, Sri Jayawardenepura Mawatha, Welikada, Rajagiriya.

D&R/2016/HO/12/03 Vol 02

10th May 2018

RECEIVED
1037
14 MAY 2018
Greater Colombo Water & Wastewater Management Improvement Investment Programme

EngA.G.Irshadh
Project Director
GCWWMIIP
No 86,
Millennium Center,
AnandaCoomaraswamy Mw.
Colombo -07

Dear Sir,

Colombo Water and Wastewater Management Improvement Investment Program
Proposed Kirula –Narahenpita Sewerage Network-Approval for Pipe Laying Along Canal Roads

This refers to your letterdated 29thMarch 2018 regarding the above.
Based on the provided drawings andthe inspection carried out at site, following observations were made accordingly

- As per the provided details, sewer pipes will not be laid on canal reservationHoweverthe prior approval should be obtained from SLLRDC Regional Engineer for pipe line trace before excavation adjacent to the O&M roads.
- Allowing the vehicle movement of the road, sufficient cover should be maintained when laying pipes underneath the O&M road(cover is not indicated in provided drawing)
  If any damage occurred to pipelines while the transportation of heavy vehicles for canal maintenance activities , SLLRDC will not be liable for the damages.
- The canal maintenance activities and vehicle movement on the O&M Road should not be disturbed during the construction phase.
- O&M Road, Canal bank, Gabions or sheet piles should not be damaged or disturbed due to the proposed construction work and the site should be rectified to its original state after the construction work.
- This document cannot be used as an approval for pipe laying in the canal reservation. If it is required to lay pipes in the canal reservation or across the canal, a separate approval should be obtained from SLLRDC submitting the relevant drawings and proposals.

Accordingly, we have no objections for sewer pipe layingalong the mentioned road maintained by SLLRDC, with subject to aforementioned conditions

Our Regional Engineer Mr.JanakaBandara (Moblile No. 070-2592495) can be contacted for any co-ordination work under this implementation.

Yours faithfully,
Sri Lanka Land Reclamation & Development Corporation

RECEIVED
838
15 MAY 2018
GCWWMII P-2
DSIDC
Consultant

Pre-1
1) pre file
2) provide a Copy to RE, DSIDC

Eng. K.Rajapakse
Actg.General Manager

දුරකථනය / தொலைபேசி / Telephone 2867369, 2889485, 2863705, 2889486, 2867533, 2889487
සභාපති / தலைவர் / Chairman 2863696
ෆැක්ස් / பெக்ஸ் / Fax 2862457, 2868001
Website : www.landreclamation.lk
E-mail: sllrdc@sltnet.lk

1415

Consent letter- Land Reform Commission

ඉඩම් ප්‍රතිසංස්කරණ කොමිෂන් සභාව
காணிச் சீர்திருத்த ஆணைக்குழு
LAND REFORM COMMISSION

අංක 475, කඩුවෙල පාර, බත්තරමුල්ල.
இல. 475, கடுவெல வீதி, பத்தரமுல்ல.
No. 475, Kaduwela Road, Battaramulla.

විද්‍යුත් තැපෑල / ஈ - மெயில் / E - Mail: chairmanlrc@sltnet.lk

මගේ අංකය / எனது இல. / My No.: 15/6/Project/ Gen

ඔබේ අංකය / உமது இல. / Your No.: PL /16/1/2 – T3

දිනය / திகதி / Date: 21/03/2018

H.T.Kamal Pathmasiri
Secretary,
Ministry of Provincial Councils and Local Government
No.330,
Dr.Colvin R.De Silva Mawatha (Union Place),
Colombo 02.

ADB and EIB Assisted Greater Colombo Water and Wastewater Management Important Investment Program (GEWWMIIP)

We refer to your letter PL/16/1/2-T3 dated 11.01.2018 and hereby recommend to carry out the above mention projects in Narahenpita and Kirula as you have described by your project plan.

Chairman
Land Reform Commission

Sampath Subasinghe Arachchi
Chairman
Land Reform Commission
No. 475, Kaduwela Road,
Battaramulla.

Original Ltr. handed over to Ms. Priyanthi on 27/03/2018

සභාපති / தவிசாளர் / Chairman: 011-2878076
විධායක අධ්‍යක්ෂ / நிறைவேற்று இயக்குனர் / Executive Director: 011-2878005
ෆැක්ස් අංකය / பெக்ஸ் இல. / Fax No.: 011-2878052

Consent Letter – Ministry of Megapolis & Western Development

මහානගර හා බස්නාහිර සංවර්ධන අමාත්‍යාංශය
பெருநகரம் மற்றும் மேல் மாகாண அபிவிருத்தி அமைச்சு
MINISTRY OF MEGAPOLIS & WESTERN DEVELOPMENT

මගේ අංකය / எமது இல / My Ref: MMWD/D/UD/GCWWMIIP
ඔබේ අංකය / உமது இல / Your Ref:
දිනය / திகதி / Date: 24.01.2018

Secretary
Ministry of Provincial Council and Local Government
Union Place
Colombo 02

Ref : ADB & EIB Assisted Greater Colombo Water & Waste Water Mangement Improvement Investment Programme (GCWWMIIP)

Subject : Request for Consent – For (1) Narahenpita & (11) Kirula - Narahenpita Projects

This has reference to your letter no. PL/16/1/2-T3 dated 11.01.2018 on the above subject.

Please note that MMWD fully aware of this development project to be implemented as ADB & EIB Assisted Greater Colombo Water & Waste Water Management Improvement Investment Programme (GCWWMIIP)

Ministry of Megapolis & western Development is closely coordinating with all stakeholders of this project and we hereby express our consent for implementation of the project, since it comply with the Western Region Megapolis plan.

o/c

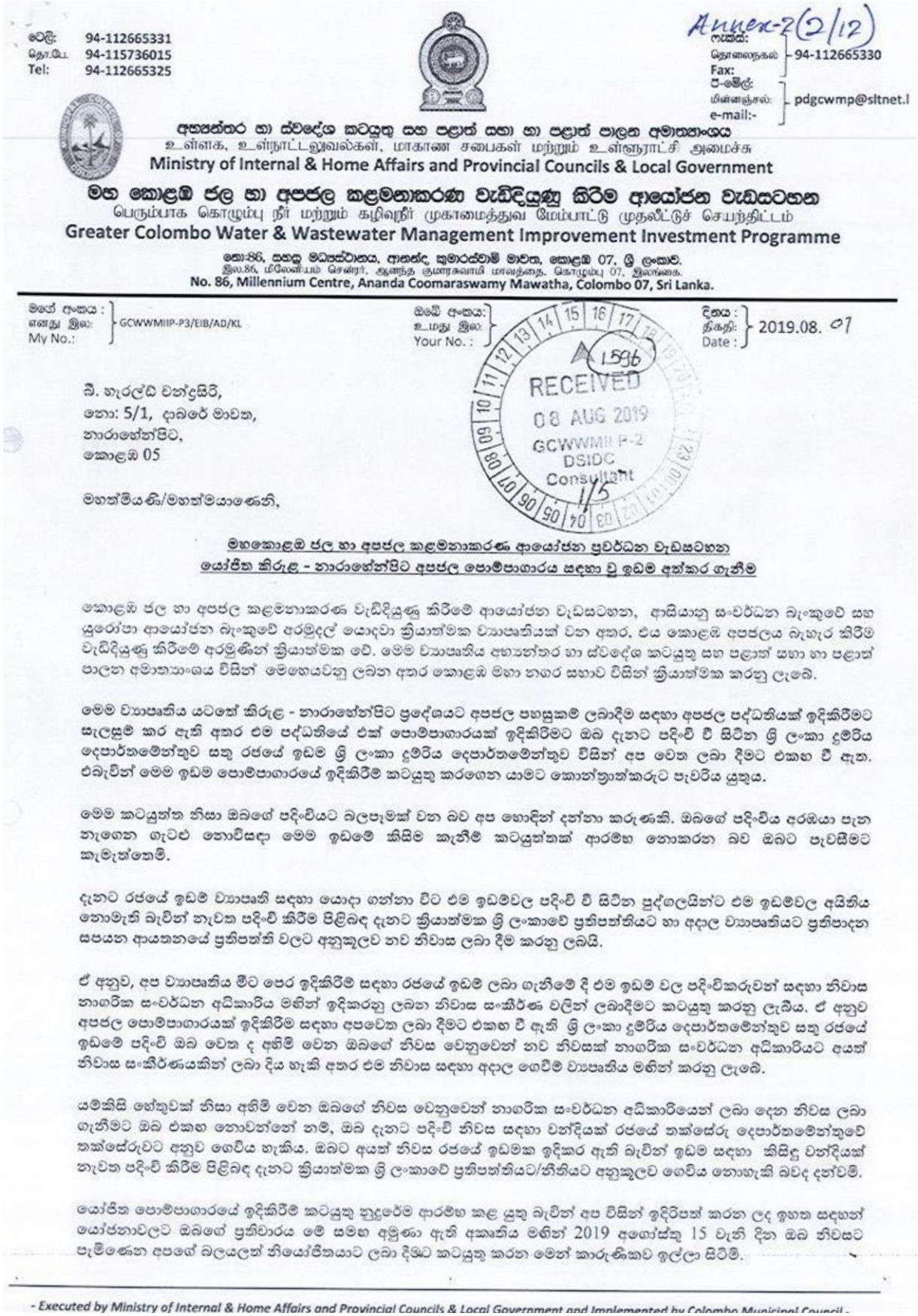
Eng. N. Rupasinghe
Secretary
Ministry of Megapolis and Western Development

Copies:
Secretary - Ministry of City planning & Water supply – fipl
General Manager - National Water Supply & Drainage Board
Director (Land) - Urban Development Authority – fipl
Mr. Shantha Fernando - Team Leader, GCWWMIIP

PD
Forwarded a copy for your personal ref.

සුහුරුපාය, 17 වන මහල, බත්තරමුල්ල
சுහුරුபாய, 17ம் மாடி, பத்தரமுல்லை.
Suhurupaya, 17th Floor, Battaramulla.
දුරකථන / தொலை பேசி / Telephone: 0112864770, 0112864479
ෆැක්ස් / தொலை நகல் / Fax: 0112871394
E-mail:
Web :

Letter 1-Resettling households located in the land belongs Sri Lanka Railways



Annex-2(2/12)

දුර: 94-112665331
தொ.பே 94-115736015
Tel: 94-112665325

தொலைநகல் 94-112665330
Fax:
மின்னஞ்சல் pdgcwmp@sltnet.l
e-mail:-

අභ්‍යන්තර හා ස්වදේශ කටයුතු සහ පළාත් සභා හා පළාත් පාලන අමාත්‍යාංශය
உள்ளக, உள்நாட்டலுவல்கள், மாகாண சபைகள் மற்றும் உள்ளூராட்சி அமைச்சு
Ministry of Internal & Home Affairs and Provincial Councils & Local Government

මහ කොළඹ ජල හා අපජල කළමනාකරණ වැඩිදියුණු කිරීම ආයෝජන වැඩසටහන
பெரும்பாக கொழும்பு நீர் மற்றும் கழிவுநீர் முகாமைத்துவ மேம்பாட்டு முதலீட்டுச் செயற்திட்டம்
Greater Colombo Water & Wastewater Management Improvement Investment Programme

නො.86, සහස්‍ර මධ්‍යස්ථානය, ආනන්ද කුමාරස්වාමී මාවත, කොළඹ 07, ශ්‍රී ලංකාව.
இல.86, மில்லேனியம் சென்ரர், ஆனந்த குமாரசுவாமி மாவத்தை, கொழும்பு 07, இலங்கை.
No. 86, Millennium Centre, Ananda Coomaraswamy Mawatha, Colombo 07, Sri Lanka.

මගේ අංකය : எனது இல: My No.: GCWWMIIP-P3/EIB/AD/KL

ඔබේ අංකය: உமது இல: Your No. :

දිනය : திகதி: Date : 2019.08. 07

RECEIVED
08 AUG 2019
GCWWMII P-2
DSIDC
Consultant

ඩී. හැරල්ඩ් චන්ද්‍රසිරි,
නො: 5/1, දාබරේ මාවත,
නාරාහේන්පිට,
කොළඹ 05

මහත්මයනි/මහත්මයාණෙනි,

මහකොළඹ ජල හා අපජල කළමනාකරණ ආයෝජන ප්‍රවර්ධන වැඩසටහන
යෝජිත කිරුළ - නාරාහේන්පිට අපජල පොම්පාගාරය සඳහා වූ ඉඩම අත්කර ගැනීම

කොළඹ ජල හා අපජල කළමනාකරණ වැඩිදියුණු කිරීමේ ආයෝජන වැඩසටහන, ආසියානු සංවර්ධන බැංකුවේ සහ යුරෝපා ආයෝජන බැංකුවේ අරමුදල් යොදවා ක්‍රියාත්මක ව්‍යාපෘතියක් වන අතර, එය කොළඹ අපජලය බැහැර කිරීම වැඩිදියුණු කිරීමේ අරමුණින් ක්‍රියාත්මක වේ. මෙම ව්‍යාපෘතිය අභ්‍යන්තර හා ස්වදේශ කටයුතු සහ පළාත් සභා හා පළාත් පාලන අමාත්‍යාංශය විසින් මෙහෙයවනු ලබන අතර කොළඹ මහා නගර සභාව විසින් ක්‍රියාත්මක කරනු ලැබේ.

මෙම ව්‍යාපෘතිය යටතේ කිරුළ - නාරාහේන්පිට ප්‍රදේශයට අපජල පහසුකම් ලබාදීම සඳහා අපජල පද්ධතියක් ඉදිකිරීමට සැලසුම් කර ඇති අතර එම පද්ධතියේ එක් පොම්පාගාරයක් ඉදිකිරීමට ඔබ දැනට පදිංචි වී සිටින ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව සතු රජයේ ඉඩම ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව විසින් අප වෙත ලබා දීමට එකඟ වී ඇත. එබැවින් මෙම ඉඩම් පොම්පාගාරයේ ඉදිකිරීම් කටයුතු කරගෙන යාමට කොන්ත්‍රාත්කරුට පැවරිය යුතුය.

මෙම කටයුත්ත නිසා ඔබගේ පදිංචියට බලපෑමක් වන බව අප හොඳින් දන්නා කරුණකි. ඔබගේ පදිංචිය අරඹයා පැන නැගෙන ගැටළු නොවිසඳා මෙම ඉඩමේ කිසිම කැනීම් කටයුත්තක් ආරම්භ නොකරන බව ඔබට පැවසීමට කැමැත්තෙමි.

දැනට රජයේ ඉඩම් ව්‍යාපෘති සඳහා යොදා ගන්නා විට එම ඉඩම්වල පදිංචි වී සිටින පුද්ගලයින්ට එම ඉඩම්වල අයිතිය නොමැති බැවින් නැවත පදිංචි කිරීම පිළිබඳ දැනට ක්‍රියාත්මක ශ්‍රී ලංකාවේ ප්‍රතිපත්තියට හා අදාල ව්‍යාපෘතියට ප්‍රතිපාදන සපයන ආයතනයේ ප්‍රතිපත්ති වලට අනුකූලව නව නිවාස ලබා දීම් කරනු ලබයි.

ඒ අනුව, අප ව්‍යාපෘතිය මීට පෙර ඉදිකිරීම් සඳහා රජයේ ඉඩම් ලබා ගැනීමේ දී එම ඉඩම් වල පදිංචිකරුවන් සඳහා නිවාස නාගරික සංවර්ධන අධිකාරිය මඟින් ඉදිකරනු ලබන නිවාස සංකීර්ණ වලින් ලබාදීමට කටයුතු කරනු ලැබිය. ඒ අනුව අපජල පොම්පාගාරයක් ඉදිකිරීම් සඳහා අපවෙත ලබා දීමට එකඟ වී ඇති ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව සතු රජයේ ඉඩමේ පදිංචි ඔබ වෙත ද අහිමි වෙන ඔබගේ නිවස වෙනුවෙන් නව නිවසක් නාගරික සංවර්ධන අධිකාරියට අයත් නිවාස සංකීර්ණයකින් ලබා දිය හැකි අතර එම නිවාස සඳහා අදාල ගෙවීම් ව්‍යාපෘතිය මඟින් කරනු ලැබේ.

යම්කිසි හේතුවක් නිසා අහිමි වෙන ඔබගේ නිවස වෙනුවෙන් නාගරික සංවර්ධන අධිකාරියෙන් ලබා දෙන නිවස ලබා ගැනීමට ඔබ එකඟ නොවන්නේ නම්, ඔබ දැනට පදිංචි නිවස සඳහා වන්දියක් රජයේ තක්සේරු දෙපාර්තමේන්තුවේ තක්සේරුවට අනුව ගෙවිය හැකිය. ඔබට අයත් නිවස රජයේ ඉඩමක ඉදිකර ඇති බැවින් ඉඩම් සඳහා කිසිදු වන්දියක් නැවත පදිංචි කිරීම පිළිබඳ දැනට ක්‍රියාත්මක ශ්‍රී ලංකාවේ ප්‍රතිපත්තියට/නීතියට අනුකූලව ගෙවිය නොහැකි බවද දන්වමි.

යෝජිත පොම්පාගාරයේ ඉදිකිරීම් කටයුතු නුදුරේම ආරම්භ කළ යුතු බැවින් අප විසින් ඉදිරිපත් කරන ලද ඉහත සඳහන් යෝජනාවලට ඔබගේ ප්‍රතිචාරය මේ සමඟ අමුණා ඇති අකෘතිය මඟින් 2019 අගෝස්තු 15 වැනි දින ඔබ නිවසට පැමිණෙන අපගේ බලයලත් නියෝජිතයාට ලබා දීමට කටයුතු කරන මෙන් කාරුණිකව ඉල්ලා සිටිමි.

Annex-2 (3/12)

එමෙන්ම ඔබගේ පදිංචිය තහවුරු කිරීම සඳහා ප්‍රදේශයේ ග්‍රාම නිලධාරියාගෙන් ලබාගත් සහතිකයක්ද ඉහත අයදුම්පත සමඟ ඉදිරිපත් කරන මෙන් ද කාරුණිකව දන්වමි.

ඔබ හා ඔබගේ මිතු පරපුරේ සෞඛ්‍ය හා සනීපාරක්ෂාව තහවුරු වෙනුවෙන් සිදු කෙරෙන මෙම සංවර්ධන කාර්යයට ඔබ දක්වන සහයෝගය ඉතා අගේ කොට සලකමි.

මෙය විශ්වාසී

ඉංජි. ඒ. ජී. ඉර්ෂාඩ්
ව්‍යාපෘති අධ්‍යක්ෂ
මහ කොළඹ ජල හා අපජල කළමණාකරණ වැඩිදියුණු කිරීම ආයෝජන වැඩසටහන

පිටපත්:
1. නාගරික කොමසාරිස්, කොළඹ මහා නගර සභාව කා.දැ.පි.
2. ඉංජි. ශාන්ත ප්‍රනාන්දු, කණ්ඩායම් නායක, නිර්මාණ අධීක්ෂණ ආයතන සංවර්ධන උපදේශක- දැ.පි. හා අ.ක.ස

Letter 2-Resettling households located in land belongs Sri Lanka Railways

දුරකථන: 94-112665331
தொ.பே. 94-115736015
Tel: 94-112665325

Annex-2 (4/12)

தொலைநகல் 94-112665330
Fax:
மின்னஞ்சல் pdgcwmp@sltnet.l
e-mail:-

අභ්‍යන්තර හා ස්වදේශ කටයුතු සහ පළාත් සභා හා පළාත් පාලන අමාත්‍යාංශය
உள்ளக, உள்நாட்டலுவல்கள், மாகாண சபைகள் மற்றும் உள்ளூராட்சி அமைச்சு
Ministry of Internal & Home Affairs and Provincial Councils & Local Government

මහ කොළඹ ජල හා අපජල කළමනාකරණ වැඩිදියුණු කිරීම ආයෝජන වැඩසටහන
பெரும்பாக கொழும்பு நீர் மற்றும் கழிவுநீர் முகாமைத்துவ மேம்பாட்டு முதலீட்டுச் செயற்திட்டம்
Greater Colombo Water & Wastewater Management Improvement Investment Programme

අංක:86, සහස්‍ර මධ්‍යස්ථානය, ආනන්ද කුමාරස්වාමී මාවත, කොළඹ 07, ශ්‍රී ලංකාව.
இல.86, மில்லேனியம் செனரர், ஆனந்த குமாரசுவாமி மாவத்தை, கொழும்பு 07, இலங்கை.
No. 86, Millennium Centre, Ananda Coomaraswamy Mawatha, Colombo 07, Sri Lanka.

මගේ අංකය : எனது இல: My No.: GCWWMIIP-P3/EIB/AO/KL

ඔබේ අංකය: உமது இல: Your No. :

දිනය : திகதி: Date : 2019.08. 07

1596
RECEIVED
08 AUG 2019
GCWWMII P-2
DSIDC
Consultant
2/5

එම්.ජී.එම් නවුෂර්,
නෝ: 5/2, දාබරේ මාවත,
නාරාහේන්පිට,
කොළඹ 05

මහත්මයනි/මහත්මියනි,

මහකොළඹ ජල හා අපජල කළමනාකරණ ආයෝජන ප්‍රවර්ධන වැඩසටහන
යෝජිත කිරුළ - නාරාහේන්පිට අපජල පොම්පාගාරය සඳහා වූ ඉඩම අත්කර ගැනීම

කොළඹ ජල හා අපජල කළමනාකරණ වැඩිදියුණු කිරීමේ ආයෝජන වැඩසටහන, ආසියානු සංවර්ධන බැංකුවේ සහ යුරෝපා ආයෝජන බැංකුවේ අරමුදල් යොදවා ක්‍රියාත්මක ව්‍යාපෘතියක් වන අතර, එය කොළඹ අපජලය බැහැර කිරීම වැඩිදියුණු කිරීමේ අරමුණින් ක්‍රියාත්මක වේ. මෙම ව්‍යාපෘතිය අභ්‍යන්තර හා ස්වදේශ කටයුතු සහ පළාත් සභා හා පළාත් පාලන අමාත්‍යාංශය විසින් මෙහෙයවනු ලබන අතර කොළඹ මහා නගර සභාව විසින් ක්‍රියාත්මක කරනු ලැබේ.

මෙම ව්‍යාපෘතිය යටතේ කිරුළ - නාරාහේන්පිට ප්‍රදේශයට අපජල පහසුකම් ලබාදීම සඳහා අපජල පද්ධතියක් ඉදිකිරීමට සැලසුම් කර ඇති අතර එම පද්ධතියේ එක් පොම්පාගාරයක් ඉදිකිරීමට ඔබ දැනට පදිංචි වී සිටින ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව සතු රජයේ ඉඩම ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව විසින් අප වෙත ලබා දීමට එකඟ වී ඇත. එබැවින් මෙම ඉඩම පොම්පාගාරයේ ඉදිකිරීම් කටයුතු කරගෙන යාමට කොන්ත්‍රාත්කරුට පැවරිය යුතුය.

මෙම කටයුත්ත නිසා ඔබගේ පදිංචියට බලපෑමක් වන බව අප හොඳින් දන්නා කරුණකි. ඔබගේ පදිංචිය අරඹයා පැන නැගෙන ගැටළු නොවිසඳා මෙම ඉඩමේ කිසිම කැනීම් කටයුත්තක් ආරම්භ නොකරන බව ඔබට පැවසීමට කැමැත්තෙමි.

දැනට රජයේ ඉඩම් ව්‍යාපෘති සඳහා යොදා ගන්නා විට එම ඉඩම්වල පදිංචි වී සිටින පුද්ගලයින්ට එම ඉඩම්වල අයිතිය නොමැති බැවින් නැවත පදිංචි කිරීම පිළිබඳ දැනට ක්‍රියාත්මක ශ්‍රී ලංකාවේ ප්‍රතිපත්තියට හා අදාල ව්‍යාපෘතියට ප්‍රතිපාදන සපයන ආයතනයේ ප්‍රතිපත්ති වලට අනුකූලව නව නිවාස ලබා දීම කරනු ලබයි.

ඒ අනුව, අප ව්‍යාපෘතිය මීට පෙර ඉදිකිරීම් සඳහා රජයේ ඉඩම් ලබා ගැනීමේ දී එම ඉඩම් වල පදිංචිකරුවන් සඳහා නිවාස නාගරික සංවර්ධන අධිකාරිය මඟින් ඉදිකරනු ලබන නිවාස සංකීර්ණ වලින් ලබාදීමට කටයුතු කරනු ලැබිය. ඒ අනුව අපජල පොම්පාගාරයක් ඉදිකිරීම සඳහා අපවෙත ලබා දීමට එකඟ වී ඇති ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව සතු රජයේ ඉඩමේ පදිංචි ඔබ වෙත ද අහිමි වෙන ඔබගේ නිවස වෙනුවෙන් නව නිවසක් නාගරික සංවර්ධන අධිකාරියට අයත් නිවාස සංකීර්ණයකින් ලබා දිය හැකි අතර එම නිවාස සඳහා අදාල ගෙවීම් ව්‍යාපෘතිය මඟින් කරනු ලැබේ.

යම්කිසි හේතුවක් නිසා අහිමි වෙන ඔබගේ නිවස වෙනුවෙන් නාගරික සංවර්ධන අධිකාරියෙන් ලබා දෙන නිවස ලබා ගැනීමට ඔබ එකඟ නොවන්නේ නම්, ඔබ දැනට පදිංචි නිවස සඳහා වන්දියක් රජයේ තක්සේරු දෙපාර්තමේන්තුවේ තක්සේරුවට අනුව ගෙවිය හැකිය. ඔබට අයත් නිවස රජයේ ඉඩමක ඉදිකර ඇති බැවින් ඉඩම සඳහා කිසිදු වන්දියක් නැවත පදිංචි කිරීම පිළිබඳ දැනට ක්‍රියාත්මක ශ්‍රී ලංකාවේ ප්‍රතිපත්තියට/නීතියට අනුකූලව ගෙවිය නොහැකි බවද දන්වමි.

යෝජිත පොම්පාගාරයේ ඉදිකිරීම් කටයුතු නුදුරේම ආරම්භ කළ යුතු බැවින් අප විසින් ඉදිරිපත් කරන ලද ඉහත සඳහන් යෝජනාවලට ඔබගේ ප්‍රතිචාරය මේ සමඟ අමුණා ඇති අකෘතිය මඟින් 2019 අගෝස්තු 15 වැනි දින ඔබ නිවසට පැමිණෙන අපගේ බලයලත් නියෝජිතයාට ලබා දීමට කටයුතු කරන මෙන් කාරුණිකව ඉල්ලා සිටිමි.

Annex-2 (5/12)

එමෙන්ම ඔබගේ පදිංචිය තහවුරු කිරීම සඳහා ප්‍රදේශයේ ග්‍රාම නිලධාරියාගෙන් ලබාගත් සහතිකයක්ද ඉහත අකෘතිය සමඟ ඉදිරිපත් කරන මෙන් ද කාරුණිකව දන්වමි.

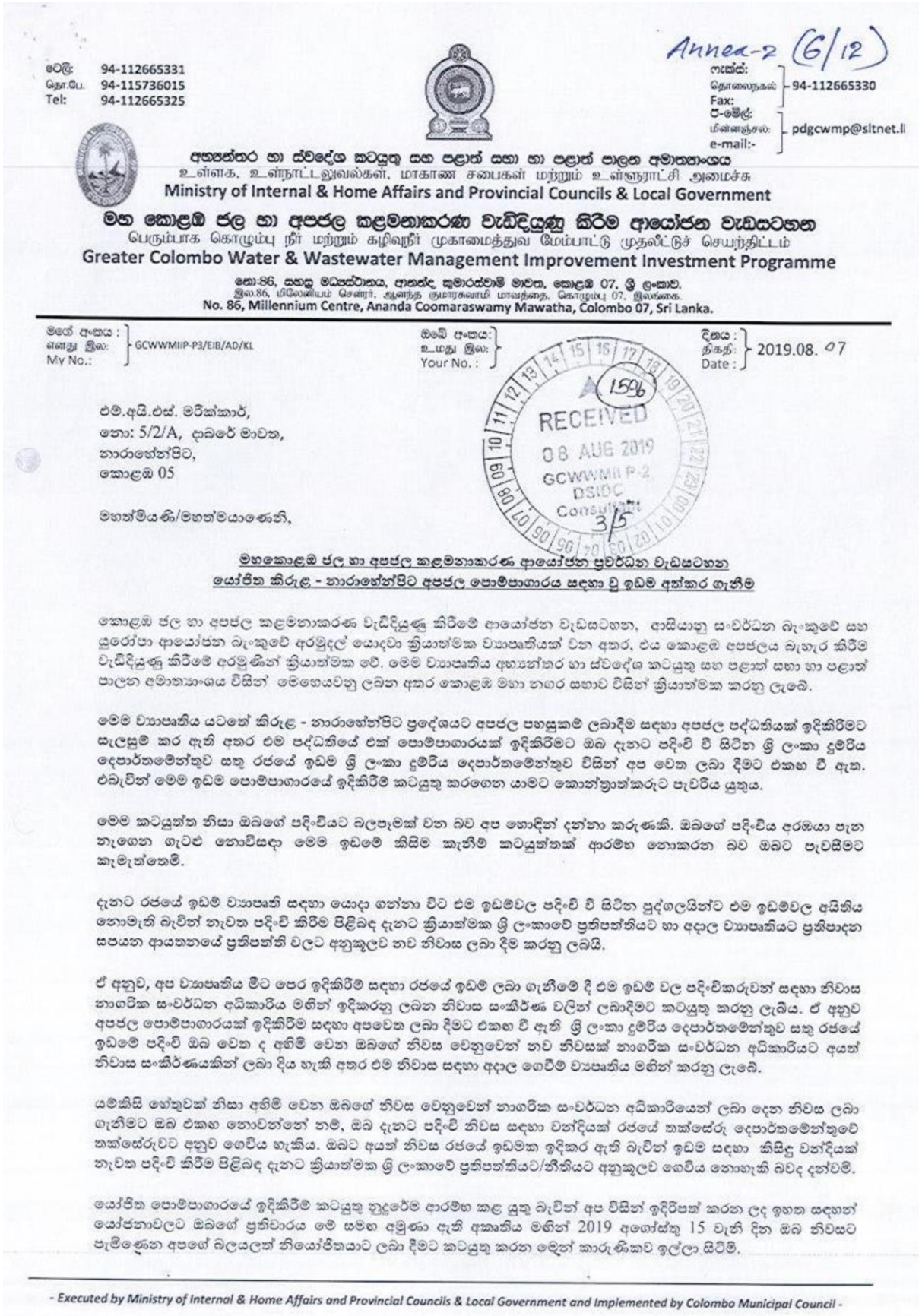
ඔබ හා ඔබගේ මතු පරපුරේ සෞඛ්‍ය හා සනීපාරක්ෂාව තහවුරු වෙනුවෙන් සිදු කෙරෙන මෙම සංවර්ධන කාර්යයට ඔබ දක්වන සහයෝගය ඉතා අගේ කොට සලකමි.

මෙය විශ්වාසී

ඉංජි. ඒ. පී. ඉර්ෂාඩ්
ව්‍යාපෘති අධ්‍යක්ෂ
මහ කොළඹ ජල හා අපජල කළමණාකරණ වැඩිදියුණු කිරීම ආයෝජන වැඩසටහන

පිටපත්:
1. නාගරික කොමසාරිස්, කොළඹ මහා නගර සභාව කා.දැ.පි.
2. ඉංජි. ශාන්ත ප්‍රනාන්දු, කණ්ඩායම් නායක, නිර්මාණ අධීක්ෂණ ආයතන සංවර්ධන උපදේශක- දැ.පි. හා අ.ක.ස

Letter 3-Resettling households located in land belongs Sri Lanka Railways



Annex-2 (6/12)

ටෙලි: 94-112665331
தொ.பே. 94-115736015
Tel: 94-112665325

ෆැක්ස්:
தொலைநகல்: 94-112665330
Fax:

ඊ-මේල්:
மின்னஞ்சல்: pdgcwmp@sltnet.lk
e-mail:-

අභ්‍යන්තර හා ස්වදේශ කටයුතු සහ පළාත් සභා හා පළාත් පාලන අමාත්‍යාංශය
உள்ளக, உள்நாட்டலுவல்கள், மாகாண சபைகள் மற்றும் உள்ளூராட்சி அமைச்சு
Ministry of Internal & Home Affairs and Provincial Councils & Local Government

මහ කොළඹ ජල හා අපජල කළමනාකරණ වැඩිදියුණු කිරීම ආයෝජන වැඩසටහන
பெரும்பாக கொழும்பு நீர் மற்றும் கழிவுநீர் முகாமைத்துவ மேம்பாட்டு முதலீட்டுச் செயற்திட்டம்
Greater Colombo Water & Wastewater Management Improvement Investment Programme

නො:86, සහස්‍ර මධ්‍යස්ථානය, ආනන්ද කුමාරස්වාමී මාවත, කොළඹ 07, ශ්‍රී ලංකාව.
இல.86, மில்லேனியம் சென்ரர், ஆனந்த குமாரசுவாமி மாவத்தை, கொழும்பு 07, இலங்கை.
No. 86, Millennium Centre, Ananda Coomaraswamy Mawatha, Colombo 07, Sri Lanka.

මගේ අංකය : / எனது இல: / My No.: GCWWMIIP-P3/EIB/AD/KL

ඔබේ අංකය: / உமது இல: / Your No. :

දිනය : / திகதி: / Date : 2019.08.07

RECEIVED
08 AUG 2019
GCWWMII P-2
DSIDC
Consultant

එම්.අයි.එස්. මරික්කාර්,
නො: 5/2/A, දාබරේ මාවත,
නාරාහේන්පිට,
කොළඹ 05

මහත්මයනි/මහත්මයාණෙනි,

මහකොළඹ ජල හා අපජල කළමනාකරණ ආයෝජන ප්‍රවර්ධන වැඩසටහන
යෝජිත කිරුළ - නාරාහේන්පිට අපජල පොම්පාගාරය සඳහා වූ ඉඩම අත්කර ගැනීම

කොළඹ ජල හා අපජල කළමනාකරණ වැඩිදියුණු කිරීමේ ආයෝජන වැඩසටහන, ආසියානු සංවර්ධන බැංකුවේ සහ යුරෝපා ආයෝජන බැංකුවේ අරමුදල් යොදවා ක්‍රියාත්මක ව්‍යාපෘතියක් වන අතර, එය කොළඹ අපජලය බැහැර කිරීම වැඩිදියුණු කිරීමේ අරමුණින් ක්‍රියාත්මක වේ. මෙම ව්‍යාපෘතිය අභ්‍යන්තර හා ස්වදේශ කටයුතු සහ පළාත් සභා හා පළාත් පාලන අමාත්‍යාංශය විසින් මෙහෙයවනු ලබන අතර කොළඹ මහා නගර සභාව විසින් ක්‍රියාත්මක කරනු ලැබේ.

මෙම ව්‍යාපෘතිය යටතේ කිරුළ - නාරාහේන්පිට ප්‍රදේශයට අපජල පහසුකම් ලබාදීම සඳහා අපජල පද්ධතියක් ඉදිකිරීමට සැලසුම් කර ඇති අතර එම පද්ධතියේ එක් පොම්පාගාරයක් ඉදිකිරීමට ඔබ දැනට පදිංචි වී සිටින ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව සතු රජයේ ඉඩම ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව විසින් අප වෙත ලබා දීමට එකඟ වී ඇත. එබැවින් මෙම ඉඩම පොම්පාගාරයේ ඉදිකිරීම් කටයුතු කරගෙන යාමට කොන්ත්‍රාත්කරුට පැවරිය යුතුය.

මෙම කටයුත්ත නිසා ඔබගේ පදිංචියට බලපෑමක් වන බව අප හොඳින් දන්නා කරුණකි. ඔබගේ පදිංචිය අරඹයා පැන නැගෙන ගැටළු නොවිසඳා මෙම ඉඩමේ කිසිම කැනීම් කටයුත්තක් ආරම්භ නොකරන බව ඔබට පැවසීමට කැමැත්තෙමි.

දැනට රජයේ ඉඩම් ව්‍යාපෘති සඳහා යොදා ගන්නා විට එම ඉඩම්වල පදිංචි වී සිටින පුද්ගලයින්ට එම ඉඩම්වල අයිතිය නොමැති බැවින් නැවත පදිංචි කිරීම පිළිබඳ දැනට ක්‍රියාත්මක ශ්‍රී ලංකාවේ ප්‍රතිපත්තියට හා අදාල ව්‍යාපෘතියට ප්‍රතිපාදන සපයන ආයතනයේ ප්‍රතිපත්ති වලට අනුකූලව නව නිවාස ලබා දීම කරනු ලබයි.

ඒ අනුව, අප ව්‍යාපෘතිය මීට පෙර ඉදිකිරීම් සඳහා රජයේ ඉඩම් ලබා ගැනීමේ දී එම ඉඩම් වල පදිංචිකරුවන් සඳහා නිවාස නාගරික සංවර්ධන අධිකාරිය මඟින් ඉදිකරනු ලබන නිවාස සංකීර්ණ වලින් ලබාදීමට කටයුතු කරනු ලැබිය. ඒ අනුව අපජල පොම්පාගාරයක් ඉදිකිරීම සඳහා අපවෙත ලබා දීමට එකඟ වී ඇති ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව සතු රජයේ ඉඩමේ පදිංචි ඔබ වෙත ද අහිමි වෙන ඔබගේ නිවස වෙනුවෙන් නව නිවසක් නාගරික සංවර්ධන අධිකාරියට අයත් නිවාස සංකීර්ණයකින් ලබා දිය හැකි අතර එම නිවාස සඳහා අදාල ගෙවීම් ව්‍යාපෘතිය මඟින් කරනු ලැබේ.

යම්කිසි හේතුවක් නිසා අහිමි වෙන ඔබගේ නිවස වෙනුවෙන් නාගරික සංවර්ධන අධිකාරියෙන් ලබා දෙන නිවස ලබා ගැනීමට ඔබ එකඟ නොවන්නේ නම්, ඔබ දැනට පදිංචි නිවස සඳහා වන්දියක් රජයේ නක්සේරු දෙපාර්තමේන්තුවේ නක්සේරුවට අනුව ගෙවිය හැකිය. ඔබට අයත් නිවස රජයේ ඉඩමක ඉදිකර ඇති බැවින් ඉඩම සඳහා කිසිදු වන්දියක් නැවත පදිංචි කිරීම පිළිබඳ දැනට ක්‍රියාත්මක ශ්‍රී ලංකාවේ ප්‍රතිපත්තියට/නීතියට අනුකූලව ගෙවිය නොහැකි බවද දන්වමි.

යෝජිත පොම්පාගාරයේ ඉදිකිරීම් කටයුතු නුදුරේම ආරම්භ කළ යුතු බැවින් අප විසින් ඉදිරිපත් කරන ලද ඉහත සඳහන් යෝජනාවලට ඔබගේ ප්‍රතිචාරය මේ සමඟ අමුණා ඇති අකෘතිය මඟින් 2019 අගෝස්තු 15 වැනි දින ඔබ නිවසට පැමිණෙන අපගේ බලයලත් නියෝජිතයාට ලබා දීමට කටයුතු කරන මෙන් කාරුණිකව ඉල්ලා සිටිමි.

Annex-2 (7/12)

එමෙන්ම ඔබගේ පදිංචිය තහවුරු කිරීම සඳහා ප්‍රදේශයේ ග්‍රාම නිලධාරියාගෙන් ලබාගත් සහතිකයක්ද ඉහත අයෙනිය සමඟ ඉදිරිපත් කරන මෙන් ද කාරුණිකව දන්වමි.

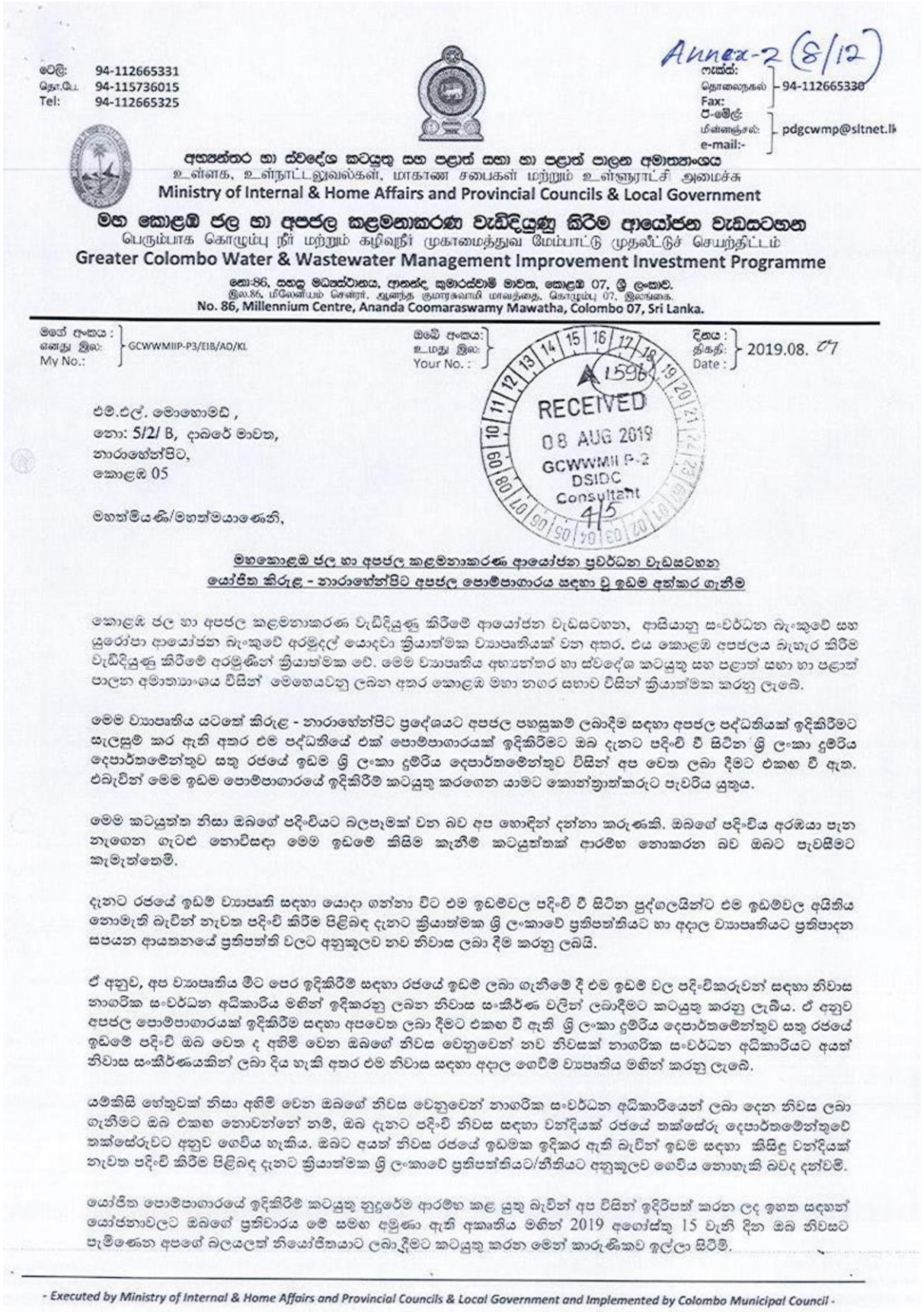
ඔබ හා ඔබගේ මතු පරපුරේ සෞඛ්‍ය හා සනීපාරක්ෂාව තහවුරු වෙනුවෙන් සිදු කෙරෙන මෙම සංවර්ධන කාර්යයට ඔබ දක්වන සහයෝගය ඉතා අගේ කොට සලකමි.

මෙය විශ්වාසී

ඉංජි. ඒ. ජී. ඉර්ෂාඩ්
ව්‍යාපෘති අධ්‍යක්ෂ
මහ කොළඹ ජල හා අපජල කළමණාකරණ වැඩිදියුණු කිරීම ආයෝජන වැඩසටහන

පිටපත්:
1. නාගරික කොමසාරිස්, කොළඹ මහා නගර සභාව කා.දැ.පි.
2. ඉංජි. ශාන්ත ප්‍රනාන්දු, කණ්ඩායම් නායක, නිර්මාණ අධීක්ෂණ ආයතන සංවර්ධන උපදේශක- දැ.පි. හා අ.ක.ස

Letter 4-Resettling households located in land belongs Sri Lanka Railways



Annex-2 (8/12)

දුරකථන: 94-112665331
தொ.பே: 94-115736015
Tel: 94-112665325

ෆැක්ස්: 94-112665330
தொலைநகல்:
Fax:

ඊ-මේල්: pdgcwmp@sltnet.lk
மின்னஞ்சல்:
e-mail:-

අභ්‍යන්තර හා ස්වදේශ කටයුතු සහ පළාත් සභා හා පළාත් පාලන අමාත්‍යාංශය
உள்ளக, உள்நாட்டலுவல்கள், மாகாண சபைகள் மற்றும் உள்ளூராட்சி அமைச்சு
Ministry of Internal & Home Affairs and Provincial Councils & Local Government

මහ කොළඹ ජල හා අපජල කළමනාකරණ වැඩිදියුණු කිරීම ආයෝජන වැඩසටහන
பெரும்பாக கொழும்பு நீர் மற்றும் கழிவுநீர் முகாமைத்துவ மேம்பாட்டு முதலீட்டுச் செயற்திட்டம்
Greater Colombo Water & Wastewater Management Improvement Investment Programme

අංක-86, සහස්‍ර මධ්‍යස්ථානය, ආනන්ද කුමාරස්වාමී මාවත, කොළඹ 07, ශ්‍රී ලංකාව.
இல.86, மிலேனியம் சென்ரர், ஆனந்த குமாரஸ்வாமி மாவத்தை, கொழும்பு 07, இலங்கை.
No. 86, Millennium Centre, Ananda Coomaraswamy Mawatha, Colombo 07, Sri Lanka.

මගේ අංකය / எனது இல. / My No.: GCWWMIIP-P3/EIB/AD/KL

ඔබේ අංකය / உமது இல. / Your No.: 1596

දිනය / திகதி / Date: 2019.08. 07

RECEIVED
08 AUG 2019
GCWWMII P-3
DSIDC
Consultant
4/5

එම්.එල්. මොහොමඩ්,
නො: 5/2/ B, දාබරේ මාවත,
නාරාහේන්පිට,
කොළඹ 05

මහත්මයනි/මහත්මයාණෙනි,

මහකොළඹ ජල හා අපජල කළමනාකරණ ආයෝජන ප්‍රවර්ධන වැඩසටහන
යෝජිත කිරුළ - නාරාහේන්පිට අපජල පොම්පාගාරය සඳහා වූ ඉඩම අත්කර ගැනීම

කොළඹ ජල හා අපජල කළමනාකරණ වැඩිදියුණු කිරීමේ ආයෝජන වැඩසටහන, ආසියානු සංවර්ධන බැංකුවේ සහ යුරෝපා ආයෝජන බැංකුවේ අරමුදල් යොදවා ක්‍රියාත්මක ව්‍යාපෘතියක් වන අතර, එය කොළඹ අපජලය බැහැර කිරීම වැඩිදියුණු කිරීමේ අරමුණින් ක්‍රියාත්මක වේ. මෙම ව්‍යාපෘතිය අභ්‍යන්තර හා ස්වදේශ කටයුතු සහ පළාත් සභා හා පළාත් පාලන අමාත්‍යාංශය විසින් මෙහෙයවනු ලබන අතර කොළඹ මහා නගර සභාව විසින් ක්‍රියාත්මක කරනු ලැබේ.

මෙම ව්‍යාපෘතිය යටතේ කිරුළ - නාරාහේන්පිට ප්‍රදේශයට අපජල පහසුකම් ලබාදීම සඳහා අපජල පද්ධතියක් ඉදිකිරීමට සැලසුම් කර ඇති අතර එම පද්ධතියේ එක් පොම්පාගාරයක් ඉදිකිරීමට ඔබ දැනට පදිංචි වී සිටින ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව සතු රජයේ ඉඩම ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව විසින් අප වෙත ලබා දීමට එකඟ වී ඇත. එබැවින් මෙම ඉඩම පොම්පාගාරයේ ඉදිකිරීම් කටයුතු කරගෙන යාමට කොන්ත්‍රාත්කරුට පැවරිය යුතුය.

මෙම කටයුත්ත නිසා ඔබගේ පදිංචියට බලපෑමක් වන බව අප හොඳින් දන්නා කරුණකි. ඔබගේ පදිංචිය අරඹයා පැන නැගෙන ගැටළු නොවිසඳා මෙම ඉඩමේ කිසිම කැනීම් කටයුත්තක් ආරම්භ නොකරන බව ඔබට පැවසීමට කැමැත්තෙමි.

දැනට රජයේ ඉඩම් ව්‍යාපෘති සඳහා යොදා ගන්නා විට එම ඉඩම්වල පදිංචි වී සිටින පුද්ගලයින්ට එම ඉඩම්වල අයිතිය නොමැති බැවින් නැවත පදිංචි කිරීම පිළිබඳ දැනට ක්‍රියාත්මක ශ්‍රී ලංකාවේ ප්‍රතිපත්තියට හා අදාල ව්‍යාපෘතියට ප්‍රතිපාදන සපයන ආයතනයේ ප්‍රතිපත්ති වලට අනුකූලව නව නිවාස ලබා දීම කරනු ලබයි.

ඒ අනුව, අප ව්‍යාපෘතිය මීට පෙර ඉදිකිරීම් සඳහා රජයේ ඉඩම් ලබා ගැනීමේ දී එම ඉඩම් වල පදිංචිකරුවන් සඳහා නිවාස නාගරික සංවර්ධන අධිකාරිය මඟින් ඉදිකරනු ලබන නිවාස සංකීර්ණ වලින් ලබාදීමට කටයුතු කරනු ලැබීය. ඒ අනුව අපජල පොම්පාගාරයක් ඉදිකිරීම සඳහා අපවෙත ලබා දීමට එකඟ වී ඇති ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව සතු රජයේ ඉඩමේ පදිංචි ඔබ වෙත ද අභිමි වෙන ඔබගේ නිවස වෙනුවෙන් නව නිවසක් නාගරික සංවර්ධන අධිකාරියට අයත් නිවාස සංකීර්ණයකින් ලබා දිය හැකි අතර එම නිවාස සඳහා අදාල ගෙවීම් ව්‍යාපෘතිය මඟින් කරනු ලැබේ.

යම්කිසි හේතුවක් නිසා අභිමි වෙන ඔබගේ නිවස වෙනුවෙන් නාගරික සංවර්ධන අධිකාරියෙන් ලබා දෙන නිවස ලබා ගැනීමට ඔබ එකඟ නොවන්නේ නම්, ඔබ දැනට පදිංචි නිවස සඳහා වන්දියක් රජයේ නක්සේරු දෙපාර්තමේන්තුවේ නක්සේරුවට අනුව ගෙවිය හැකිය. ඔබට අයත් නිවස රජයේ ඉඩමක ඉදිකර ඇති බැවින් ඉඩම් සඳහා කිසිදු වන්දියක් නැවත පදිංචි කිරීම පිළිබඳ දැනට ක්‍රියාත්මක ශ්‍රී ලංකාවේ ප්‍රතිපත්තියට/නීතියට අනුකූලව ගෙවිය නොහැකි බවද දන්වමි.

යෝජිත පොම්පාගාරයේ ඉදිකිරීම් කටයුතු නුදුරේම ආරම්භ කළ යුතු බැවින් අප විසින් ඉදිරිපත් කරන ලද ඉහත සඳහන් යෝජනාවලට ඔබගේ ප්‍රතිචාරය මේ සමඟ අමුණා ඇති අකෘතිය මඟින් 2019 අගෝස්තු 15 වැනි දින ඔබ නිවසට පැමිණෙන අපගේ බලයලත් නියෝජිතයාට ලබාදීමට කටයුතු කරන මෙන් කාරුණිකව ඉල්ලා සිටිමි.

Annex-2 (9/12)

එමෙන්ම ඔබගේ පදිංචිය තහවුරු කිරීම සඳහා ප්‍රදේශයේ ග්‍රාම නිලධාරියාගෙන් ලබාගත් සහතිකයක්ද ඉහත අකෘතිය සමඟ ඉදිරිපත් කරන මෙන් ද කාරුණිකව දන්වමි.

ඔබ හා ඔබගේ මිතු පරපුරේ සෞඛ්‍ය හා සනීපාරක්ෂාව තහවුරු වෙනුවෙන් සිදු කෙරෙන මෙම සංවර්ධන කාර්යයට ඔබ දක්වන සහයෝගය ඉතා අගේ කොට සලකමි.

මෙය විශ්වාසී

ඉංජි. ඒ. පී. ඉර්ෂාඩ
ව්‍යාපෘති අධ්‍යක්ෂ
මහ කොළඹ ජල හා අපජල කළමණාකරණ වැඩිදියුණු කිරීම ආයෝජන වැඩසටහන

පිටපත්:
1. නාගරික කොමිසාරිස්, කොළඹ මහා නගර සභාව කා.දැ.පි.
2. ඉංජි. ශාන්ත ප්‍රනාන්දු, කණ්ඩායම් නායක, නිර්මාණ අධීක්ෂණ ආයතන සංවර්ධන උපදේශක- දැ.පි. හා අ.ක.ස

Letter 5-Resettling households located in land belongs Sri Lanka Railways

Annex-2(10/12)

ටෙලි: 94-112665331
தொ.பே. 94-115736015
Tel: 94-112665325

ෆැක්ස්:
தொலைநகல் 94-112665330
Fax:
ඊ-මේල්:
மின்னஞ்சல் pdgcwmp@sltnet.lk
e-mail:-

අභ්‍යන්තර හා ස්වදේශ කටයුතු සහ පළාත් සභා හා පළාත් පාලන අමාත්‍යාංශය
உள்ளக, உள்நாட்டலுவல்கள், மாகாண சபைகள் மற்றும் உள்ளூராட்சி அமைச்சு
Ministry of Internal & Home Affairs and Provincial Councils & Local Government

මහ කොළඹ ජල හා අපජල කළමනාකරණ වැඩිදියුණු කිරීම ආයෝජන වැඩසටහන
பெரும்பாக கொழும்பு நீர் மற்றும் கழிவுநீர் முகாமைத்துவ மேம்பாட்டு முதலீட்டுச் செயற்திட்டம்
Greater Colombo Water & Wastewater Management Improvement Investment Programme

අංක:86, සහස්‍ර මධ්‍යස්ථානය, ආනන්ද කුමාරස්වාමි මාවත, කොළඹ 07, ශ්‍රී ලංකාව.
இல.86, மிலேனியம் சென்ரர், ஆனந்த குமாரசுவாமி மாவத்தை, கொழும்பு 07, இலங்கை.
No. 86, Millennium Centre, Ananda Coomaraswamy Mawatha, Colombo 07, Sri Lanka.

මගේ අංකය : / எனது இல: / My No.: GCWWMIIP-P3/EIB/AD/KL

ඔබේ අංකය: / உமது இல: / Your No. :

දිනය : / திகதி: / Date : 2019.08.07

RECEIVED
08 AUG 2019
GCWWMII P-3
DSIDC
Consultant
595
5/5

ඊ. ටුවැන් අමිජාන්,
නො: 5/2/1, දාබරේ මාවත,
නාරාහේන්පිට,
කොළඹ 05

මහත්මියණි/මහත්මයාණෙනි,

මහකොළඹ ජල හා අපජල කළමනාකරණ ආයෝජන ප්‍රවර්ධන වැඩසටහන
යෝජිත කිරුළ - නාරාහේන්පිට අපජල පොම්පාගාරය සඳහා වූ ඉඩම අත්කර ගැනීම

කොළඹ ජල හා අපජල කළමනාකරණ වැඩිදියුණු කිරීමේ ආයෝජන වැඩසටහන, ආසියානු සංවර්ධන බැංකුවේ සහ යුරෝපා ආයෝජන බැංකුවේ අරමුදල් යොදවා ක්‍රියාත්මක ව්‍යාපෘතියක් වන අතර, එය කොළඹ අපජලය බැහැර කිරීම වැඩිදියුණු කිරීමේ අරමුණින් ක්‍රියාත්මක වේ. මෙම ව්‍යාපෘතිය අභ්‍යන්තර හා ස්වදේශ කටයුතු සහ පළාත් සභා හා පළාත් පාලන අමාත්‍යාංශය විසින් මෙහෙයවනු ලබන අතර කොළඹ මහා නගර සභාව විසින් ක්‍රියාත්මක කරනු ලැබේ.

මෙම ව්‍යාපෘතිය යටතේ කිරුළ - නාරාහේන්පිට ප්‍රදේශයට අපජල පහසුකම් ලබාදීම සඳහා අපජල පද්ධතියක් ඉදිකිරීමට සැලසුම් කර ඇති අතර එම පද්ධතියේ එක් පොම්පාගාරයක් ඉදිකිරීමට ඔබ දැනට පදිංචි වී සිටින ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව සතු රජයේ ඉඩම ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව විසින් අප වෙත ලබා දීමට එකඟ වී ඇත. එබැවින් මෙම ඉඩම පොම්පාගාරයේ ඉදිකිරීම් කටයුතු කරගෙන යාමට කොන්ත්‍රාත්කරුට පැවරිය යුතුය.

මෙම කටයුත්ත නිසා ඔබගේ පදිංචියට බලපෑමක් වන බව අප හොඳින් දන්නා කරුණකි. ඔබගේ පදිංචිය අරඹයා පැන නැගෙන ගැටළු නොවිසඳා මෙම ඉඩමේ කිසිම කැනීම් කටයුත්තක් ආරම්භ නොකරන බව ඔබට පැවසීමට කැමැත්තෙමි.

දැනට රජයේ ඉඩම් ව්‍යාපෘති සඳහා යොදා ගන්නා විට එම ඉඩම්වල පදිංචි වී සිටින පුද්ගලයින්ට එම ඉඩම්වල අයිතිය නොමැති බැවින් නැවත පදිංචි කිරීම පිළිබඳ දැනට ක්‍රියාත්මක ශ්‍රී ලංකාවේ ප්‍රතිපත්තියට හා අදාල ව්‍යාපෘතියට ප්‍රතිපාදන සපයන ආයතනයේ ප්‍රතිපත්ති වලට අනුකූලව නව නිවාස ලබා දීම් කරනු ලබයි.

ඒ අනුව, අප ව්‍යාපෘතිය මීට පෙර ඉදිකිරීම් සඳහා රජයේ ඉඩම් ලබා ගැනීමේ දී එම ඉඩම් වල පදිංචිකරුවන් සඳහා නිවාස නාගරික සංවර්ධන අධිකාරිය මඟින් ඉදිකරනු ලබන නිවාස සංකීර්ණ වලින් ලබාදීමට කටයුතු කරනු ලැබිය. ඒ අනුව අපජල පොම්පාගාරයක් ඉදිකිරීම සඳහා අපවෙත ලබා දීමට එකඟ වී ඇති ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව සතු රජයේ ඉඩමේ පදිංචි ඔබ වෙත ද අහිමි වෙන ඔබගේ නිවස වෙනුවෙන් නව නිවසක් නාගරික සංවර්ධන අධිකාරියට අයත් නිවාස සංකීර්ණයකින් ලබා දිය හැකි අතර එම නිවාස සඳහා අදාල ගෙවීම් ව්‍යාපෘතිය මඟින් කරනු ලැබේ.

යම්කිසි හේතුවක් නිසා අහිමි වෙන ඔබගේ නිවස වෙනුවෙන් නාගරික සංවර්ධන අධිකාරියෙන් ලබා දෙන නිවස ලබා ගැනීමට ඔබ එකඟ නොවන්නේ නම්, ඔබ දැනට පදිංචි නිවස සඳහා වන්දියක් රජයේ තක්සේරු දෙපාර්තමේන්තුවේ තක්සේරුවට අනුව ගෙවිය හැකිය. ඔබට අයත් නිවස රජයේ ඉඩමක ඉදිකර ඇති බැවින් ඉඩම් සඳහා කිසිදු වන්දියක් නැවත පදිංචි කිරීම පිළිබඳ දැනට ක්‍රියාත්මක ශ්‍රී ලංකාවේ ප්‍රතිපත්තියට/නීතියට අනුකූලව ගෙවිය නොහැකි බවද දන්වමි.

යෝජිත පොම්පාගාරයේ ඉදිකිරීම් කටයුතු නුදුරේම ආරම්භ කළ යුතු බැවින් අප විසින් ඉදිරිපත් කරන ලද ඉහත සඳහන් යෝජනාවලට ඔබගේ ප්‍රතිචාරය මේ සමඟ අමුණා ඇති අකෘතිය මඟින් 2019 අගෝස්තු 15 වැනි දින ඔබ නිවසට පැමිණෙන අපගේ බලයලත් නියෝජිතයාට ලබා දීමට කටයුතු කරන මෙන් කාරුණිකව ඉල්ලා සිටිමි.

Annex-2 (11/12)

එමෙන්ම ඔබගේ පදිංචිය තහවුරු කිරීම සඳහා ප්‍රදේශයේ ග්‍රාම නිලධාරියාගෙන් ලබාගත් සහතිකයක්ද ඉහත අකෘතිය සමඟ ඉදිරිපත් කරන මෙන් ද කාරුණිකව දන්වමි.

ඔබ හා ඔබගේ මතු පරපුරේ සෞඛ්‍ය හා සනීපාරක්ෂාව තහවුරු වෙනුවෙන් සිදු කෙරෙන මෙම සංවර්ධන කාර්යයට ඔබ දක්වන සහයෝගය ඉතා අගේ කොට සලකමි.

මෙය විශ්වාසී

ඉංජි. ඒ. පී. ඉර්ෂාඩ්
ව්‍යාපෘති අධ්‍යක්ෂ
මහ කොළඹ ජල හා අපජල කළමණාකරණ වැඩිදියුණු කිරීම ආයෝජන වැඩසටහන

පිටපත්:
1. නාගරික කොමසාරිස්, කොළඹ මහා නගර සභාව කා.දැ.පි.
2. ඉංජි. ශාන්ත ප්‍රනාන්දු, කණ්ඩායම් නායක, නිර්මාණ අධීක්ෂණ ආයතන සංවර්ධන උපදේශක- දැ.පි. හා අ.ක.ස

Annex 3 – ADB Rapid Environmental Assessment Checklist – Sewage treatment

Rapid Environmental Assessment (REA) Checklist

SEWAGE TREATMENT

Instructions:

- This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department.
- This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoples planning, (iii) poverty reduction, (iv) participation, and (v) gender and development.
- Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

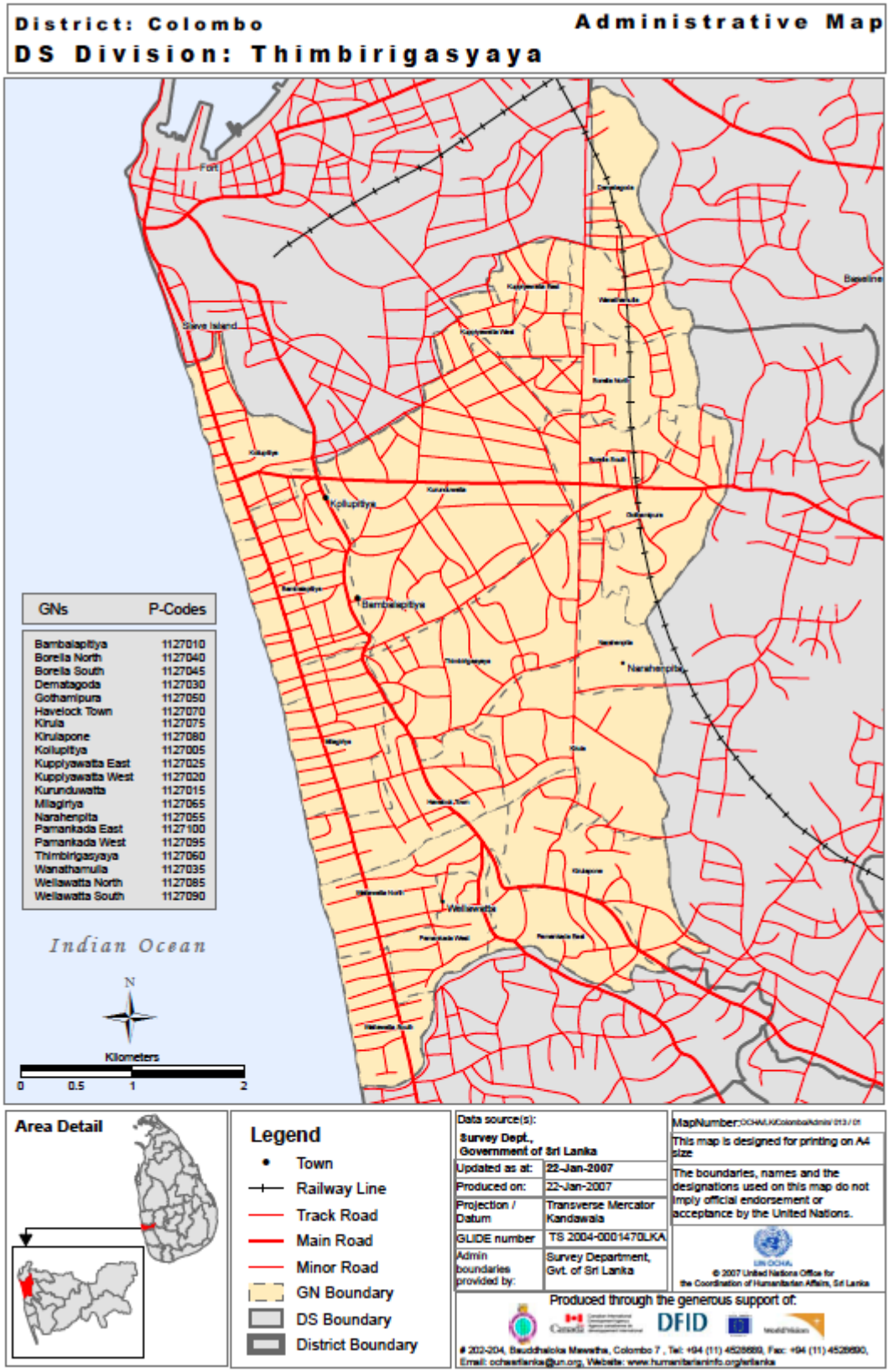
Country/Project Title:

Sector Division:

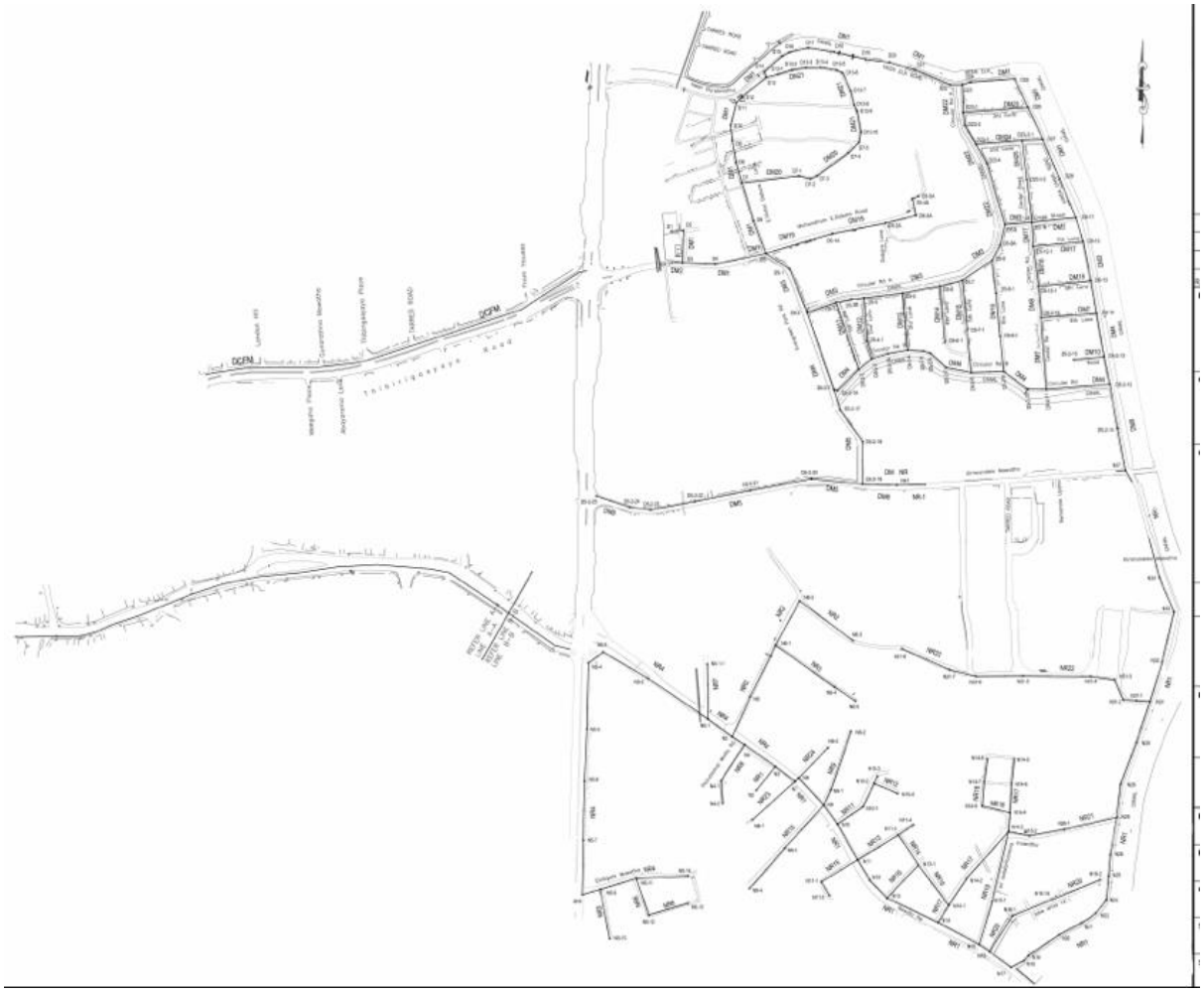
SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the project area…			
• Densely populated?	☐	☐	
• Heavy with development activities?	☐	☐	
• Adjacent to or within any environmentally sensitive areas?	☐	☐	
• Cultural heritage site	☐	☐	
• Protected Area	☐	☐	
• Wetland	☐	☐	
• Mangrove	☐	☐	
• Estuarine	☐	☐	
• Buffer zone of protected area	☐	☐	
• Special area for protecting biodiversity	☐	☐	
• Bay	☐	☐	

SCREENING QUESTIONS	Yes	No	REMARKS
B. Potential Environmental Impacts Will the Project cause…			
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?	☐	☐	
▪ interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?	☐	☐	
▪ dislocation or involuntary resettlement of people	☐	☐	
▪ impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?	☐	☐	
▪ overflows and flooding of neighboring properties with raw sewage?	☐	☐	
▪ environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?	☐	☐	
▪ noise and vibration due to blasting and other civil works?	☐	☐	
▪ discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?	☐	☐	
▪ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?	☐	☐	
▪ social conflicts between construction workers from other areas and community workers?	☐	☐	
▪ road blocking and temporary flooding due to land excavation during the rainy season?	☐	☐	
▪ noise and dust from construction activities?	☐	☐	
▪ traffic disturbances due to construction material transport and wastes?	☐	☐	
▪ temporary silt runoff due to construction?	☐	☐	
▪ hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?	☐	☐	
▪ deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?	☐	☐	
▪ contamination of surface and ground waters due to sludge disposal on land?	☐	☐	
▪ health and safety hazards to workers from toxic gases and hazardous materials which maybe contained in sewage flow and exposure to pathogens in sewage and sludge?	☐	☐	

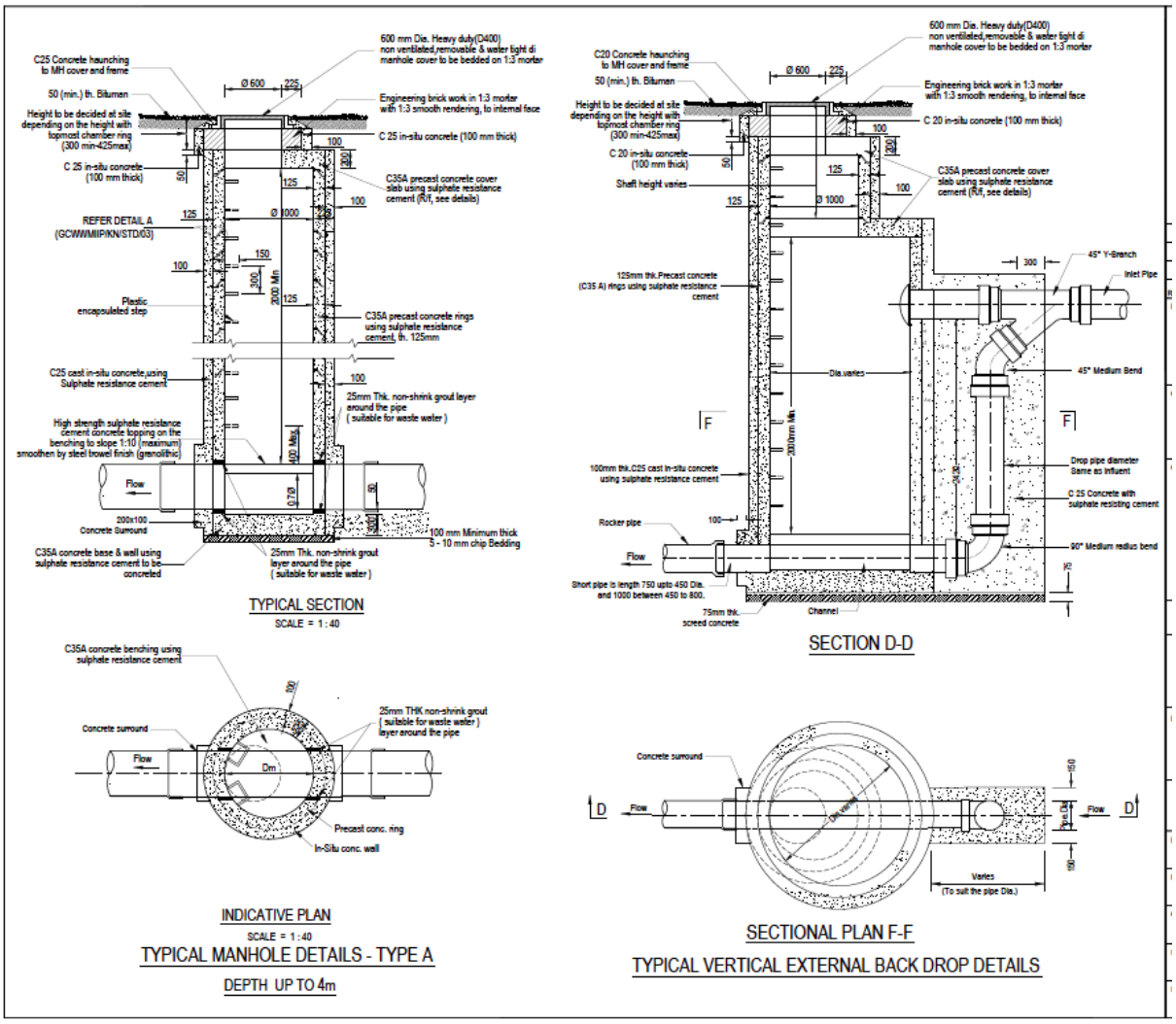
Annex 4 - Thimbirigasyaya DSD

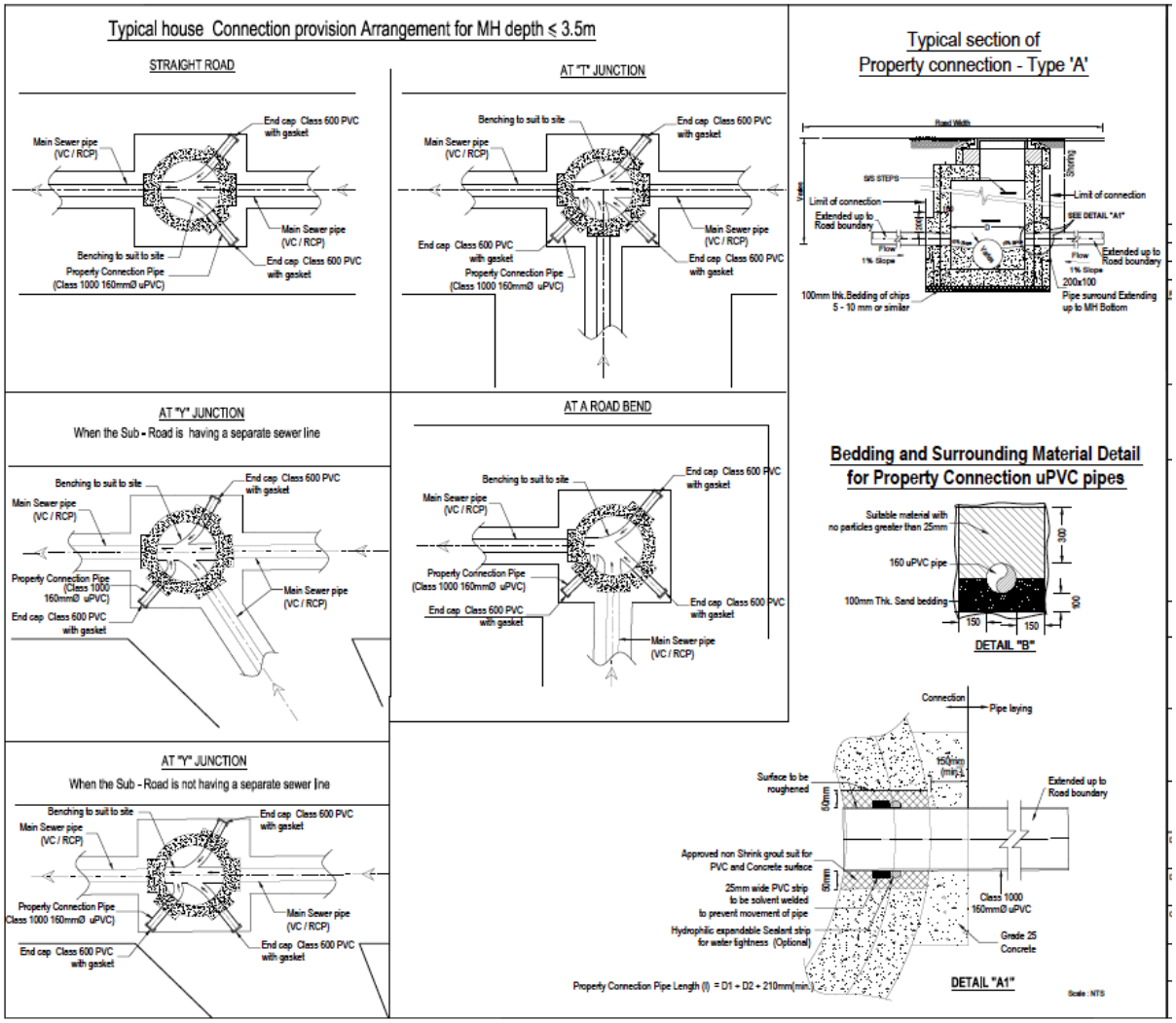


Annex 5 - Kirula- Narahenpita sewer network key map



Annex 6 - Types of Manholes




Typical house Connection provision Arrangement for MH depth ≤ 3.5m
STRAIGHT ROAD
AT "T" JUNCTION
Main Sewer pipe (VC / RCP)
End cap Class 600 PVC with gasket
Benching to suit to site
Property Connection Pipe (Class 1000 160mmØ uPVC)
AT "Y" JUNCTION
When the Sub - Road is having a separate sewer line
When the Sub - Road is not having a separate sewer line
AT A ROAD BEND
Typical section of Property connection - Type 'A'
Road Width
Limit of connection
Extended up to Road boundary
SEE DETAIL "A1"
100mm thk.Bedding of chips 5 - 10 mm or similer
200x100 Pipe surround Extending up to MH Bottom
Bedding and Surrounding Material Detail for Property Connection uPVC pipes
Suitable material with no particles greater than 25mm
160 uPVC pipe
100mm Thk. Sand bedding
DETAIL "B"
Connection
Pipe laying
Surface to be roughened
Approved non Shrink grout suit for PVC and Concrete surface
25mm wide PVC strip to be solvent welded to prevent movement of pipe
Hydrophilic expandable Sealant strip for water tightness (Optional)
Class 1000 160mmØ uPVC
Grade 25 Concrete
Property Connection Pipe Length (l) = D1 + D2 + 210mm(min.)
DETAIL "A1"

Annex 7 – List of flora and fauna recorded in the study area

List of Flora Recorded in the Study area - None of the species are threatened or endangered species.

Scientific Name	**Common Name**
Amaranthus viridis	Koora thampala
Mangifera indica	Amba
Annona muricata	Katu anoda
Allamanda cathartica	Wel Rukattana
Alstonia scholaris	Rukattana
Dragia volubilis	Aguna
Tabernaemontana divaricata	Wathusudda
Alocasia macrorrhizos	Habarala
Cocos nucifera	Pol
Mikania micrantha	Wathu paalu
Cleome viscosa	Wal aba
Terminalia arjuna	Kumbuk
Terminalia catappa	Kottamba
Ipomea sp.	
Elaeocarpus serratus	Weralu
Flueggea leucopyrus	Katu pila
Ricinus communis	Endaru
Acasia melanoxylon	Acasia
Calopogonium mucunoides	
Clitoria ternatea	Katarolu
Crotalaria sp.	
Delenox regia	Mai mara
Gliricidia sepium	Watahiriya
Leucaena leucocephala	Ipil
Pithecellobium dulce	Andara
Senna alata	Eth-thora
Senna occidentalis	Pani thora
Senna sophera	
Tamarindus indica	Siyambala
Tectona grandis	Thekka
Taxillus sp.	Pilila
Ceiba pentandra	Pulun imbul
Grewia sp.	Jam
Urena lobata	Epala
Artocarpus heterophyllus	Kos

Artocarpus altilis	Del
Ficus pumila	
Ficus racemosa	Attikka
Ficus sp.	Nuga
Psidium guajava	Pera
Syzygium cumini	Maa-dan
Nyctanthes arbor-tristis	Sepalika
Averrhoa bilimbi	Bilin
Ixora macrothyrsa	Rath-mal
Morinda citrifolia	Ahu
Macaranga peltata	Kenda
Filicium decipines	Pihimbiya
Pouteria campechiana	Rata lawulu
Scheleichera oleosa	koan
Citrus grandis	Jambola
Vitex trifolia	Nika

List of Terrestrial and Aquatic Fauna Recorded in the Study area - None of the species are endangered or threatened species.

Reptiles

Family	Scientific Name	Common Name (English)
Agamidae	*Calotes*	Garden lizard
Agamidae	*Calotes versicolor*	Common garden lizard
Geckonidae	*Hemidactylus parvimaculatus*	Spotted house gecko
Varanidae	*Varanus bengalensis*	Land monitor
Varanidae	*Varanus salvator*	Water monitor

Birds

Family	Scientific Name	Common Name (English)
Alcedinidae	*Halcyon smyrnensis*	White breasted kingfisher
Ardeidae	*Ardeola grayii*	Indian Pond heron
Ardeidae	*Egretta garzetta*	Little egret
Columbidae	*Columba livia domestica*	Domestic pigeon
Columbidae	*Stigmatopelia chinensis*	Spotted dove
Corvidae	*Corvus splendens*	House crow
Cuculidae	*Centropus sinensis*	Greater coucal
Dicruridae	*Dicrurus caerulescens*	White bellied drongo
Muscicapidae	*Copsychus saularis*	Oriental magpie-robin
Nectariniidae	*Nectarinia zeylonica*	Purple rumped sunbird
Rallidae	*Amaurornis phoenicurus*	White breasted waterhen
Sturnidae	*Acridotheres tristis*	Common Myna
Timaliidae	*Turdoides affinis*	Yellow bellied babbler

Mammels

Family	Scientific Name	Common Name (English)
Canidae	*Canis lupus familiaris*	Domestic dog
Cercopithecidae	*Macaca sinica*	Sri Lankan torque monkey (Endemic species)
Felidae	*Felis catus*	Domestic cat
Muridae	*Bandicuta indica*	Malabar bandicoot
Muridae	*Rattus*	Common rat
Sciuridae	*Funambulus palmarum*	Palm squirrel

Butterflies

Family	Scientific Name	Common Name (English)
Hesperiidae	*Taractrocera maevius*	Common grass dart
Lycanidae	*Spalgis epeus*	Ape fly
Nymphalidae	*Elymnias hypermnestra*	Common palm fly
Nymphalidae	*Mycalesis perseus*	Common bush-brown
Nymphalidae	*Ypthima ceylonica*	White four ring
Pieridae	*Catopsilia pyranthe*	Mottled emigrant
Pieridae	*Delias eucharis*	Common Jezebel
Pieridae	*Leptosia nina*	Psyche

Freshwater fish

Family	Scientific Name	Common Name (English)
Poeciliidae	*Poecilia reticulata*	Guppy

Dragonflies

Family	Scientific Name	Common Name (English)
Libellulidae	*Orthetrum sabina*	Green skimmer
Libellulidae	*Potamarcha congener*	Blue Pursuer
Libellulidae	*Trithemis aurora*	Crimson Dropwing

Annex 8 – Additional data for Chapter 6

Properties located facing the road edges in sub-project-Kirula area

Sewer Name	Road name	Number of houses	No of vulnerable houses	Number of public institutions	Number of business establishments	Number of mobile vendors	No of three wheel parks
DM1	Kinda Canal road	6	-	1	-	-	-
	Heen Ela road	22	12	-	-	2	-
	E.Victor Dabare road	39	17	-	2	3	-
	Muhandiram E.Dabare road	7	2	2	11	2	-
DM2	Muhandiram E.Dabare road	7	-	-	4	2	-
DM3	Kinda Canal road	4	-	-	-	-	-
	1st cross street	16	-	-	-	-	-
	circular road A	16	-	-	-	-	-
	Evergreen Park road	4	-	1	-	-	-
DM4	Kinda Canal road	6	-	-	-	-	-

	circular road B	13	-	1	-	-	-
	Evergreen Park road	8	-	2	-	-	-
DM5	Kirimandala road	9	-	4	12	-	1
	Evergreen Park road	8	6	3	3	-	-
DM6	Kirimandala road	-	-	2	-	-	-
DM7	9th lane	6	-	-	-	-	-
	Center road	11	-	-	-	-	-
DM8	Center road	4	-	-	-	-	-
DM9	Kinda Canal road	-	-	1	-	-	-
DM10	D5-2-15 to D5-2-13	10	-	-	-	-	-
DM11	1st lane	12	-	-	-	-	-
DM12	2nd lane	6	-	-	-	-	-
DM13	3rd lane	6	-	-	-	-	-
DM14	4th lane	6	-	-	-	-	-
DM15	5th lane	9	-	-	-	-	-

DM16	6th lane	15	-	-	-	-	-
DM17	Center road	2	-	-	-	-	-
	7th lane	4	-	-	-	-	-
DM18	Center road	5	-	-	-	-	-
	8th lane	4	-	-	-	-	-
DM19	Muhandiram E.Dabare road	25	-	4	5	3	1
DM20	D7-5 to D7-4, D7-1 to D7	56	28	1	2	3	-
DM21	D7-5 toD13-11	58	29	-	2	3	-
DM22	Circular Road A	7	-	-	-	-	-
DM23	3rd lane	5	-	-	-	-	-
DM24	2nd lane	5	-	-	-	-	-
DM25	Center road	6	-	-	-	-	-
	Total	421	94	22	41	18	2

Source : Socio-economic survey Team

Properties located facing the road edges in sub-project-Narahenpita area

Sewer Name	Road Name	Number of houses	No of vulnerable houses	Number of public institutions	Number of business establishments	Number of mobile vendors	No of three wheel parks
NR1	Kirimandala mawatha	1	-	5	6	-	-
	Kinda Canal Road	6	-	11	3	-	-
	Nawala Road	1	-	22	9	-	-
	N8 - N3	-	-	1	1	-	-
	N3 - N2	-	-	-	-	-	-
NR2	N6-3 To N6-2	-	-	2	-	-	-
	N6-2 to N5	-	-	6	-	-	-
NR3	N6-5 to N6-1	-	-	7	-	-	-
NR4	N5-14 to N5-8	-	-	7	-	-	-
	Elvitigala mawatha	-	-	5	-	-	-

	Nawala Road	-	-	8	8	2	1
NR5	N5-10 to N5-9	4	-	1	-	-	-
NR6	N5-13 to N5-11	12	-	-	1	-	-
NR7	N51-1 to N5-1	-	-	2	-	-	-
NR8	Pichchamal watte road	13	13	1	2	3	-
NR23	N8-1 to N7	32	32	-	1	3	-
NR24	N8-2 to N8	-	-	3	-	-	-
NR9	N9-2 to N9	2	-	9	-	-	-
NR10	N9-4 to N9-3	5	-	2	-	-	-
	N-3 to N9	4	-	3	-	-	-
NR11	N10-3 to N10	1	-	2	-	-	--
NR12	N10-4 to N10-2	2	-	2	-	-	-
NR13	N11-4 to N11	6	-	1	2	-	-
NR14	N13-1 to N11-3	3	-	-	-	-	-
NR15	N11-2 to N11	5	-	5	-	-	-

NR16	N14-1 to N13	6	-	3	-	-	-
NR17	N14-9 to N 15	21	-	6	2	-	-
NR18	N14-8 to N14-4	17	9	-	-	2	-
NR19	Sri Saddarmarama Mawatha	2	-	2	-	-	-
NR20	Lake drive road	8	-	3	-	-	-
NR21	Sri Saddarmarama Mawatha	6	-	3	1	-	-
NR22	Economic Center road	1	-	4	-	-	-
	Total	158	54	126	36	10	1

Source : Socio-economic survey Team

Basic socio-economic profile of households (HH) to be resettled

Detail	HH1	HH2	HH3	HH4	HH5

Name	M I S Marikkar	M L Mohommad	E Tuan Amjan	B. Harrel Chandrasiri Perera	M. G. M. Nausser
Address	5/2/A. Dabare Mawatha, Narahenpita, Colombo 5	No 5/2/B, E D Dabare Mawatha, Narahenpita, Colombo 5	5/2/1, Dabare Mawatha, Narahenpita, Colombo 5	5/1,Daabare Mawatha, Narahenpita, Colombo 5	5/2, Dabare Mawatha, Narahenpita, Colombo 5
NIC no	621682890V	661691786V	681782745V	710612439V	742742156V
Tel no	0777717278	0755539716	0712338120	0715484761	0718015368
Employment	Mechanic	Labor	Private Sector	Government -Office Assistant	Private Sector
Monthly income (Rs)	25000	25000	28000	20000	24000
Ethnicity	Muslim	Muslim	Muslim	Sinhala	Muslim
Religion	Islam	Islam	Islam	Buddhist	Islam
Age	56	52	49	46	44
Education	Grade 8	Grade 6	O/L	O/L	Grade 10

Details of the affected house and other properties

Detail	HH1	HH2	HH3	HH4	HH5
Affected property	Entire house	Entire House	Entire House	Entire House	Entire House
Area of the property (sq.feet)	874	450	570	825	570
Roof type	Asbestos	Asbestos	Asbestos	Asbestos	Asbestos
Wall type	Concrete Block	Concrete Block	Concrete Block	Concrete Block	Concrete Block
Floor type	Cement	Cement	Cement	Cement	Cement and tile
Approximate value	0.5 mil	0.5 mil	0.5 mil	0.5 mil	0.5 mil

Legal status of the property

Legal status and other details	HH1	HH2	HH3	HH4	HH5
Ownership	Encroacher	Encroacher	Encroacher	Encroacher	Encroacher
Tenure	Owner	Owner	Owner	Owner	Owner
History of occupancy	48 years	52 years	47 years	46 years	42 years
Present user	Owner	Owner	Owner	Owner	Owner

Note – House hold (HH1) belongs Mr.M.I.S Marikkar is also occupied by a sub family in which information is provided in Table 6.19.

Household income

Detail	HH1	HH2	HH3	HH4	HH5
Household size	6	6	5	7	7
Gender of chief householder	Male	Male	Male	Male	Male
Household type	Extended (one sub family)	Nuclear Family	Nuclear Family	Nuclear Family	Nuclear Family
Number of employed persons	2	2	1	3	2
Income of chief householder	25000	25000	28000	20000	24000
Family income	45000	55000	28000	52000	42000
Per capita monthly income	7500	9170	5600	7430	6000

Other information identifies the vulnerability status

Vulnerability Details	HH1	HH2	HH3	HH4	HH5
Has alternative house	No	No	No	No	No
Has alternative land	No	No	No	No	No
Received samurdhi benefits	No	Yes	No	No	No
Received other government subsidies	No	No	No	No	No
Disabled	No	Yes	No	No	No
Widow with employment	No	No	No	No	No
Widow without employment	No	No	No	No	No
Chief householder above 61 years	No	No	No	No	No
Household income below poverty line	No	No	No	No	No
Chief house holder chronically ill	Yes	No	No	No	No

Annex 9 – Sample Monitoring Template

S. N.	Resettlement Plan Activities	Completed Y/N	Remarks
A. Pre-Construction Activities and Resettlement Plan Activities			
1	Approval of final Resettlement Plan by ADB prior to contract award		
2	Disclosure of final Resettlement Plan on ADB and EA websites		
3	Circulation of summary RP in the three local languages to all stakeholders		
B. Resettlement Plan Implementation			
1	Grievance Redress Committee and telephone hotlines established		
2	Entitlements and grievance redress procedure disclosed		
3	Finalization of list of APs and compensation/assistance/allowances due		
4	Affected persons received entitlements as per amounts and program specified in RP		
5	Payment of compensation, allowances and assistance (No. of APs)		
6	Additional assistance for vulnerable households given (No. of vulnerable APs)		
7	Livelihood arrangements provided to vulnerable APs		

8	**Reinstallation of affected common facilities**		
9	**Grievances** **No. of grievances registered** **No. of grievances redressed** **Outstanding complaints** **Disclosure of grievance redress statistics**		
10	**Consultation, participation and disclosure as per Plan**		
C. Monitoring			
1	**Survey on socio-economic status of APs (including vulnerable APs) completed and compared with baseline survey results**		
2	**Survey on satisfaction levels of APs with RP implementation completed**		
D. Labor			
1	**Implementation of all statutory provisions on labor like health, safety, welfare, sanitation, and working conditions by Contractors**		
2	**Equal pay for equal work for men and women**		

NOTE: Where applicable, the information provided in the table should be supported by detailed explanatory report, receipts and other details.

Annex 10 – Views of the Stakeholders

Date	Stakeholder	Views
8/5/2017	Thimbirigasyaya DS and Kirula and Narahenpita GNs	This is a development need for the Kirula and Narahenpita area, With the increased population managing sewerage within the home garden is becoming a social and serious environmental problem, it is an essential need to educate the general public and operators of all public and private institutions within the project area on the details of the proposed project, the maintenance activities of the sewer system established should be handled by CMC..
9/5/2017	Officers and owners of private and public institutions located in the vicinity of the roads to be used for the project	Most of the institutions are facing difficulties to manage their sewerage disposal system within the premises due to some problems with the limitation of land extents and high level of ground water, all the relevant public and private institutions should be made aware of the proposed project before its construction phase is begun. The institutions must be facilitated to find alternative access to their places during construction phase.
12/5/2017	Religious Leaders	The communities in underserved settlements frequently discharged their overflowing wastewater from the septic tanks to the storm water drainage canals in the area; this behaviour has created critical environmental and social problems to the area as whole. The proposed project area is highly populated and therefore establishment of main sewer network is an appropriate intervention.
14/5/2017	Community leaders	This is going to be an essential project for the communities specially residing in underserved settlements such as 21watte, 37watte, 100watte, 26watte, 84watte, Pichchamalwatte and 80watte. This project will address the existing social, environment and public health related issues such as odour, wastewater stagnation and water borne diseases. At present the septic tanks or soakage pits in small home gardens overflow frequently and therefore householders are compelled to hire gully bowsers spending Rs. 2000-3000 at every 5-6-month interval
15/5/2017	Members of General Public	It is difficult to take gully bowsers into interior locations of the settlements due to extremely narrow roads. The proposed project should be implemented even in the interior areas as far as possible where low income households are located in narrow lanes.

Annex 11 - Sample Grievance Registration Form (To be available in Sinhala, Tamil and English)

The Greater Colombo Wastewater Management Improvement Investment Program 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. Should 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.

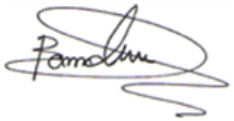
<table>
<tr><td colspan="3">Date</td><td colspan="4">Place of registration</td></tr>
<tr><td colspan="7">Contact Information/Personal Details</td></tr>
<tr><td>Name</td><td colspan="2"></td><td>Gender</td><td>* Male
* Female</td><td>Age</td><td></td></tr>
<tr><td>Home Address</td><td colspan="6"></td></tr>
<tr><td>Place</td><td colspan="6"></td></tr>
<tr><td>Phone no.</td><td colspan="6"></td></tr>
<tr><td>E-mail</td><td colspan="6"></td></tr>
<tr><td colspan="7">Complaint/Suggestion/Comment/Question Please provide the details (who, what, where and how) of your grievance below:

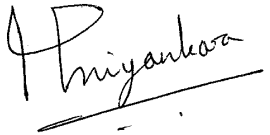
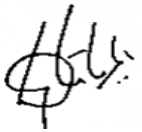
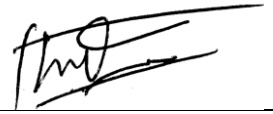
If included as attachment/note/letter, please tick here:</td></tr>
<tr><td colspan="7">How do you want us to reach you for feedback or update on your comment/grievance?</td></tr>
</table>

FOR OFFICIAL USE ONLY

Registered by: (Name of Official registering grievance)	
Mode of communication: **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:	

Annex 12 - List of Preparers

Name of Consultant	Designation	Position in IEE Program	Qualifications	Signature
Dr (Eng). G.G. Tushara Chaminda	Senior Lecturer /DCEE/ FoE / UoR	Team Leader and EIA Specialist	PhD (Kyoto) MEng. (AIT), BSc-Eng. (Hons) (Peradeniya), C.Eng, MIE (SL)	
Dr (Eng). W. K. C. Neetha Dayanthi	Senior Lecturer /DCEE/ FoE/ UoR	Water and Wastewater Engineer	Ph.D (Tokyo), M.Eng (AIT), B.Sc-Eng. (Hons) (Peradeniya) AMIE (SL)	
Dr (Eng). W.M.K.R.T.W. Bandara	Senior Lecturer /DCEE/ FoE / UoR	Environmental Engineer and Environmental Economist	PhD (Hokkaido, Japan) BSc-Eng. (Hons) (Peradeniya) AMIE (SL)	
Dr (Eng). Champika Ellawala	Senior Lecturer /DCEE/ FoE / UoR	Environmental and Ecological Engineer	PhD (Saitama), MSc (Moratuwa), BSc-Eng (Hons)(Moratuwa) AMIE (SL)	
Dr (Eng). T.N. Wickramaarachchi	Senior Lecturer /DCEE/FoE/ UoR	Hydro-Environmental Engineer	Ph.D. (Yamanashi), M.Phil. (Moratuwa), B.Sc-Eng. (Hons) (Moratuwa) AMIE (SL)	
Dr (Eng). G.H.A.C. Silva	Senior Lecturer /DCEE/ FoE/ UoR	Hydrologist	Ph.D. (Tokyo), M.Eng. (Tokyo), B.Sc-Eng. (Hons) (Moratuwa) C.Eng, MIE (SL)	

Dr (Eng). N.H. Priyankara	Senior Lecturer /DCEE/ FoE/ UoR	Geologist	PhD (Tohoku), MEng. (AIT), BSc-Eng (Hons) (Moratuwa) C.Eng, MIE (SL)	
Prof. T.P.D. Gamage	Professor /Dept of Limnology /Faculty of Marine Science & Technology/ UoR	Biologist and Ecologist	PhD (Saitama, Japan), BSc –Biology (Hons) (Ruhuna)	
Prof. Mallika Pinnawala	Professor (Sociology)/ Department of Sociology/University of Peradeniya	Sociologist	BA (Sociology-Hon), MA (By Research), PhD (The Netherlands)	
Eng. Kasun Wimalasena	Lecturer/DCEE/ FoE/ UoR	Traffic and Transportation Engineer	MSc. (Tokyo, Japan), BSc-Eng. (Hons) (Moratuwa)	

UoR – University of Ruhuna;

FoE – Faculty of Engineering

DCEE – Department of Civil and Environmental Engineering