REPUBLIC OF SEYCHELLES

MINISTRY OF ENVIRONMENT, ENERGY AND CLIMATE CHANGE

PUBLIC UTILITIES CORPORATION

PROJECT NEPTUNE
Project Management Unit (PMU)

SEYCHELLES WATER AND SANITATION PROJECT

REHABILITATION OF PROVIDENCE WWTP & SEWERAGE PUMPING STATIONS & RISING MAINS IN GREATER VICTORIA

Environmental and Social Impact Assessment Report

August 2017

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ABBREVIATIONS

ACP	African, Caribbean and Pacific (ACP) Group of States
AFD	French Development Agency
AWF	African Water Facility
BOD_5	Biochemical Oxygen Demand
CBD	Convention on Biological Diversity
dB	Decibels
DI	Ductile Iron
DN	Nominal Diameter
EIA	Environmental Impact Assessment
EO	Environmental Officer
EPA	Environmental Protection Act
ESIA	Environmental and Social Impact Assessment
EDF	European Development Fund
EIB	European Investment Bank
ESMP	Environmental and Social Management Plan
EU	European Union
EUR	Euro
FS	Feasibility Study
GIS	Geographical Information System
GoS	Government of Seychelles
GRM	Grievance Redress Mechanism
HDPE	High Density Poly-Ethylene
ICZM	Integrated Coastal Zone Management
IPPC	International Plant Protection Convention
M	metre
MoEE	Ministry of Environment, Energy and Climate Change
MLUH	Ministry of Land Use and Housing
O&M	Operation and Maintenance
POP	Persistent Organic Pollutants

PE	Person Equivalent
PMU	Project Management Unit
PS	Pumping Station
PUC	Public Utilities Corporation
SWSP	Seychelles Water and Sanitation Project
SIC	Sub-Project Implementation Committee
ToR	Terms of Reference
WHO	World Health Organisation
WWTP	Waste Water Treatment Plant

Executive Summary

As part of the development objective of the "Seychelles Water Development Plan 2008-2030", the Government of Seychelles prepared a 20-year investment plan to meet the water demand in the three main Islands of Mahé, Praslin and La Digue up to the year 2030. This has led to the "Seychelles Water & Sanitation Project (SWSP)", also called "Project Neptune". This ESIA specifically refers to the "Rehabilitation of Providence WWTP and Sewerage Pumping Stations & Rising Mains in Greater Victoria" hereinafter referred to the as the "Project". The Terms of Reference for this ESIA are contained in Annex 1.

This ESIA was carried out under the following legislative and other requirements:

(a) The Seychelles Environment Act 1994;

(b) EIB Environmental and Social Standards

The Seychelles Islands are rich in terms of ecosystems and biodiversity, many species are endemic and many fauna and flora are endangered. The environment of the Seychelles Islands is threatened by:

- Extreme weather events (Natural Disasters), strong winds, landslides, coastal flooding, extended periods of dry weather and tidal surges. These extreme weather conditions are likely to increase in frequency and severity under the influence of climate change, along with pressure for people to move to higher ground to grow food and cash crops;
- Development in catchment areas, leading to habitat destruction and potential for increased soil erosion, landslides and flooding;
- Population growth and good economic growth leading to pressure on the limited land especially on the coastal areas to develop income from tourism, hence further habitat destruction; and
- Interference and degradation at the biodiversity hotspots that are located outside of the protected areas where there is important natural habitat present.

The activities under the Project will be relatively small in scale but may lead to disruptions along the main roads and in Providence along property boundaries where the sewer forcemains are to be built. There may also be localised disruption at the site of the pumping stations to be replaced/rehabilitated. The other main infrastructure is the rehabilitation of the Providence WWTP that will be entirely located on the existing WWTP and disruption is expected to be minimal.

The potential impact of any activity will depend on the nature, location and specific mode of construction by the chosen contractor. In most cases, along the sewer forcemains, adverse environmental impacts are expected to be temporary and limited to the immediate vicinity of the excavated areas at the construction sites. They could include temporary disturbance of drains or streams, noise and dust during construction, small-scale vegetation loss, and pollution from inappropriate construction materials waste disposal.

The monitoring process and the use of standard Environmental Codes of Practice will ensure adequate mitigation of those risks. The civil works contract will include standard clauses to ensure the mitigation of any potentially negative impacts.

Community consultation is also an integral part of the monitoring activities during implementation. PUC and the appointed contractor will participate in public consultation meetings and discussions with district council or administration and representation in the main project committees. Feedback mechanisms and community monitoring of project implementation have also been included under the Project.

No activity within the Project will be permitted that does not flow with this safeguarding process. This includes the social and environmental information, training and monitoring process described in detail in the Environmental and Social Management Plan (ESMP). Facilitators should also be trained on the Project's environmental and social guidelines. Since environmental and social criteria are fully integrated throughout the Project preparation process, stakeholder participation and information disclosure will be assured at every stage of Project implementation.

The ESMP describes in detail and guides the Project implementation which is designed to achieve sound environmental practice and ecologically sustainable outcomes. The ESMP provides the mechanism to allow Project implementation by monitoring specific Project activities that would be unacceptable on the basis of environmental or social criteria. The aim of the ESMP is that all negative impacts will be mitigated. During Project implementation there will be a need to integrate the ESMP to assure its implementation.

Notwithstanding the above, the activities listed below will not be permitted:

- Activities which support the areas named in the exclusion list of the EIB's standards, e.g. political, military/security, religious activities, though the Project will be working closely with church groups; businesses involves addictive materials etc. during normal consultation with the wider public audience.
- Activities within the overall Project that involve the significant conversion or degradation of critical natural habitats and forests;
- Activities that involve the use of toxic chemicals;
- Activities involving Involuntary Resettlement.

All of the above do not exist in the Project.

The ESIA Report contains the following chapters:

- Chapter 1 discusses the context of The Seychelles Water and Sanitation Project and safeguard management requirements of the Seychelles' Islands government and the EIB
- Chapter 2 briefly describes the proposed Project and its components, which has been developed by the Consultant and PUC.
- Chapter 3 discusses the Seychelles' legislations, Institutional Capacity and International Agreements
- Chapter 4 discusses the Seychelles' International Agreements
- Chapter 5 provides an environmental and social overview.
- Chapter 6 describes the potential environmental and social impacts of the proposed Project as well as mitigation measures.
- Chapter 8 provides the ESMP that will guide the Project implementers on

the steps to follow for monitoring activities with potential environmental and social issues, associated mitigation measures, as well as arrangements for implementation.

- Chapter 9 describes activities carried out for stakeholder engagement and public consultation.
- Annexes provide technical tools for Project implementers to use as reference for monitoring and mitigating safeguard issues of Projects and specific procedures to follow under certain special circumstances.
- The Annexes also contains notes of the public meeting.

1 Introduction to the Project

1.1 Project Background

In the "Seychelles Water Development Plan 2008-2030", the Government of Seychelles prepared a 20-year investment plan to meet the water demand in the three main Islands of Mahé, Praslin and La Digue up to the year 2030. This has led to the "Seychelles Water & Sanitation Project (SWSP)", also called "Project Neptune". Funding for investments within this project were sourced through a loan with the European Investment Bank (EIB) and the French Development Agency (AFD) as well as grants from the Government of Seychelles (GoS), the European Development Fund (EDF) and the African Water Facility (AWF).

Project Neptune has been divided into several smaller projects, including this project of this ESIA namely "Rehabilitation of Providence WWTP and Sewerage Pumping Stations & Rising Mains in Greater Victoria" (hereinafter referred to as the "Project"). The Public Utilities Corporation of Seychelles (PUC) is the Promoter of the Project and also acts as the Client in relation to consultants, and Employer and Engineer in relation to contractors, through the Project Management Unit (PMU) for the Project. The Terms of Reference (ToR) for this ESIA which have been issued by the Department of Environment are contained in Annex 1.

1.2 Country Profile

The Republic of Seychelles is an archipelago of 115 islands scattered over 1.3 million square kilometres of sea, in the middle of the Western Indian Ocean, north of Madagascar. The group comprises of 41 granitic islands and 74 coralline islands. The total land area is approximately 455 square kilometres. The capital is Victoria, located on Mahé Island, and it has a harbour sheltered by a small group of islands off shore. The international airport of the republic is also on Mahé and it has the capacity to handle large passenger aircraft.

The Seychelles has a temperate climate. The hottest months are March and April (32 degrees Celsius), the coolest being July and August (23 degrees Celsius). Rainfall varies considerably from island to island and from month to month. December and January are the wettest months and June and July the driest. Mahé Island has a very high rate of rainfall - over 2,200 mm per annum. The rate of humidity is uniformly high, at an average of 80% and the mean temperature ranges from a minimum of 24 degrees Celsius to a maximum of 32 degrees Celsius.

The present population of Seychelles is about 91,000 according to the 2010 census. Mahé is the most populated of the islands with a population of about 79,000 people, followed by Praslin with about 8,600 people and La Digue with about 2,800 people. The annual population growth rate in the Seychelles is approximately 1.2%. About 200,000 tourists now visit Seychelles per year.

The Seychelles economy mainly depends on tourism and fisheries. The government has introduced various activities and incentives to attract local and foreign investors to develop other industries in the Seychelles.

1.3 Profile Greater Victoria

1.3.1 Mahé

Mahé is the largest and most populated island of the Seychelles archipelago. It is about 27 km long and 11 km wide. A range of mountains runs down the whole length, most of which are over 300 m in height, rising to the peak of Morne Seychellois, which is 905 m high. The extent of Mahé Island is 154.7 sq km. There are 169 catchment areas feeding the rivers on Mahé. However, due to the mountainous nature of the terrain and low retention capacity of the soil, the flow in these streams is erratic and falls to extremely low values during times of drought. These droughts have been experienced from April to September over the past three to five years, compared to the average of the same in June to October.

1.3.2 Greater Victoria

Victoria is the capital city of the Seychelles and is situated on the north-eastern side of Mahé island, the archipelago's main island. The city was first established as the seat of the British colonial government. In 2010, the population of Greater Victoria (including the suburbs) was 26,450 out of the country's total population of 90,945. In 2015 the population is estimated at 27,860 out of a total Seychelles population of 95,665.

Victoria proper is composed of parts of three Districts of Seychelles:

- English River (La Riviere Anglaise) (the innermost part)
- Saint Louis
- Mont Fleuri

Greater Victoria encompasses these three Districts plus five more of the 25 Districts of Seychelles as follows:

- Mont Buxton
- Bel Air
- Roche Caiman
- Les Mamelles
- Plaisance

1.4 Institutional Context

1.4.1 Public Utilities Corporation

The Promoter of the Project is the Public Utilities Corporation (PUC), a parastatal institution wholly owned by the Government of Seychelles. It reports to the Ministry of Environment, Energy and Climate Change (MoEE) through its board, and is regulated by the Public Utilities Act of 1st January 1986 and subsequent amendments. PUC is a vertically integrated utility company, which is responsible for:

- the generation, transmission, distribution and sale of electrical energy on the main islands of Seychelles;
- the production, transmission, distribution and supply of potable water to the main islands of Seychelles;
- the treatment and sanitary disposal of waste water to the environment on Mahé Island.

1.4.2 Other Key Institutions

Other key institutions involved in the Project implementation, with their individual roles, are:

- MoEE in relation to the ESIA and requirements on the effluent and sludge of the WWTPs;
- Department of Information Communication Technology, regarding telecommunication requirements and cables;
- Ministry of Tourism and Transport regarding access roads and requirements for road construction / rehabilitation and permits during construction;
- Ministry of Land Use and Housing (MLUH) regarding GIS information (e.g. cadastral, land use), planned construction projects and possibilities for reuse of effluent and sludge;
- National Bureau of Statistics; regarding population numbers; and
- Ministry of Health.

1.5 Financing

The Government of Seychelles has received funding from the European Investment Bank (EIB), the European Union, the African Water Facility, the French Development Agency (AFD) and other funding agencies towards the cost of the Seychelles Water & Sanitation Project.

Project Neptune is funded through GoS financing agreement with the EIB funding 49%, the French Development Agency (AFD) 18%, and other funding agencies and internal sources bringing the total to approximately EUR 54.6 million for the overall Project.

1.6 Objective of the ESIA Report

The purpose of this Environmental and Social Impact Assessment (ESIA) which also includes an Environmental and Social Management Plan (ESMP) is to guide the implementation of the Seychelles Water and Sanitation Project specifically this Project the “Rehabilitation of Providence WWTP and Sewerage Pumping Stations & Rising Mains in Greater Victoria”. Furthermore the aim is also to ensure that the Project has been prepared in accordance with the requirements of the GoS and the EIB Environmental and Social Standards.

1.6.1 Seychelles’ Environmental Legislation

The Seychelles Islands legislation regarding environmental protection is covered mainly by the Environment Act 1994. The Neptune Project requires prior authorisation from the Authority, in this case the Department of Environment of the Ministry of Environment, Energy and Climate Change in accordance with the Environment Protection Act (Act 9 of 1994). The components being proposed in the project have activities that fall in category 10 of Schedule 1 of the Environmental Protection (Impact Assessment) Regulations, 1996, of the Environmental Protection Act (1994). The relevant category and sub-categories for the Project are as follows:

- Category 10 Sewage and waste water:

- 10-1 Sewerage treatment plants.
- 10-2 Sewage networks and outfall.

According to Regulation 3(1), of the Environment Protection (Impact Assessment) Regulations, the Seychelles Water and Sanitation Project (NP07) is considered as a prescribed project. Therefore, an Environmental Impact Assessment (EIA) is required if the project is to be submitted to the authority for approval, comments, or consent. In accordance with Regulation 5(1) of the same Regulations, the Authority has determined that a Class 1 Environmental Impact Assessment (EIA) Study is required for this Project. The preparation of this Environmental Impact Assessment Report is therefore part of the overall Class 1 EIA process involved within this application, implemented in terms of the procedures prescribed in the guidelines prepared by the authority.

1.6.2 The EIB Environmental and Social Standards.

Most of the EIB Environmental and Social Standards are prompted by the Project, namely:

- Assessment and Management of Environmental and Social Impacts and Risks;
- Pollution Prevention and Abatement, Energy and resource efficiency; Emissions to Atmosphere, Water and Soil
- Biodiversity and ecosystem;
- Involuntary resettlement: land acquisition, population displacement and compensation;
- Labour conditions; Migrant workers
- Occupational and Public Health Safety and Security.

In addition, the promoter is required to conform with the performance standards required by international funding agencies - in this instance the EIB - throughout the life of the investment, specifically:

- Assessment and Management of Environmental and Social Risks and Impacts;
- Labour and Working Conditions;
- Resource Efficiency and Pollution Prevention;
- Community Health, Safety, and Security;
- Land Acquisition and Involuntary Resettlement;
- Biodiversity Conservation and Sustainable Management
- Cultural Heritage.

The requirements laid out in the Environmental and Social Handbook of the EIB also apply, namely:

Environmental Assessment

According to EIB guidelines, the Project is not classified as an "Annex I" project (because the associated waste water treatment plant has a capacity not exceeding 150 000 population equivalent as defined in point 6 of Article 2 of Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment). Accordingly (page 121 of EIB's guidelines), Annex II projects are screened out i.e. an E(S)IA is not required.

However, the Project is still subject to the Seychelles national requirements. The Seychelles Government however does not give Environmental Authorization to any projects that may have irreversible adverse environmental Impacts. Therefore this ESIA has been prepared to identify environmental impacts so that these impacts can be avoided, mitigated or compensated.

The type and scale of the proposed physical investments through the Project will be at relatively small scale, site specific, short term and can be mitigated. Some potential negative impacts are associated with the disposal of the effluent, power failures and leaks in the sewer system.

An Environmental and Social Management Plan (ESMP) has been prepared for the Project in this ESIA Report.

Natural Habitats

This operational policy is triggered in the Project. Environmental monitoring will ensure that Project site selection does not affect critical habitats, such as the marine environment and mitigate potential negative impacts on other aquatic areas such as streams, water channels and wetland areas.

Pest Management Inlet

Pest management may be necessary at several locations i.e. pumping stations and WWTP where rodent and pest control will be necessary. The Pesticide Board will continue to be used to control pesticide imports and for overseeing the activities of the appointed pest controller. Enforcement of the regulation is the responsibility of the Ministry of Health and/or the Public Health Agency (PHA). A Pest Management Plan is required to ensure safety for human and the environment associated with the transport, storage, handling and disposal. Given the fact that pest control will be undertaken by an appointed Pest Controller, this ESMP does not include a Pest Management but it can be developed easily during the Project implementation by liaising with the Ministry of Health, which is the Administrator of the Pesticide Control Act.

Physical Cultural Resources

Project siting will avoid known physical cultural resources such as structures of spiritual value to communities, objects and structures having high landscape values etc. Chance Find Procedures will be included in the ESMP to address the cases where objects are found during ground excavation.

Forest

This policy is not triggered in the Project as the sites will be located where development has taken place within existing communities.

Involuntary Resettlement

No involuntary resettlement as a result of the Project is anticipated. Any necessary acquisition of property will be undertaken as per the local regulations, namely Public Utilities Corporation Act (1986) by PUC; By the Ministry of Land Use and Housing (MLUH) as per the Acquisition of Land in the Public Interest Act (1986); Or by mutual consent or agreement between PUC or the GoS and a landowner.

With respect to acquisition of land the relevant sections of the Public Utilities Corporation Act (1986) states:

6. (1) Subject to this Act, the Corporation shall have power to do all the things necessary or convenient to be done for or in connection with, Corporation or incidental to the exercise of its functions.

(2) The Corporation shall not, without the approval of the Minister granted after consultation with the Minister responsible for finance-

(a) acquire any property, right or privilege which exceeds R.500,000 in value;

1.7 Legislative Framework

The key legislation governing this EIA study includes

- Article 30 of the Constitution of the Third Republic (1993), Chapter 42;
- Environmental Protection Act (1994), Chapter 71;
- Environmental Protection (Impact Assessment) Regulations (1996);
- Environmental Protection (Standards) Regulations (1995);
- Land Acquisition Act (1991) - Revised Edition - Chapter 105;
- Town and Country Planning Act (1972) - Revised Edition (1991) - Chapter 237;
- Breadfruit and Other Trees Protection Act (1917) - Revised Edition (1991) - Chapter 18;
- Occupational Safety and Health Decree (1978), Chapter 154;
- Public Utilities Corporation Act (1986); and
- Public Health Act (1960) - Revised Edition (1991) - Chapter 189.

The EIA procedures, as required by the Environmental Protection (Impact Assessment) Regulations (1996) under the Environmental Protection Act 9 (1994), is a pre-requisite for gaining Environmental Authorisation from the Ministry of Environment and Energy for the proposed project.

The steps in the process of preparing an EIA study for Class I projects in Seychelles with the approximate time taken for each step are shown in Table 1 which follows:

Steps	Approximate Time
Scoping meeting with the Department of Environment	2-3 days
Undertake scoping study & prepare report	15-30 days

Steps	Approximate Time
Upon submission of scoping report the ministry provides the detailed Terms of Reference to the EIA Consultant	14 days
EIA Class 1 is undertaken on the basis of the Terms of Reference	1-3 months
Specialist Studies (may or may not be required) depending on the type of project. E.g. Geotechnical survey, Microbiological survey, nutrient survey, bathymetry or topographic survey.	Variable
EIA Class 1 is submitted to the developer for review	14 days
EIA Class 1 is submitted for internal review	21 days
EIA Class 1 is submitted for public review	
EIA Class 1 undergoes final appraisal and client presented with/without environmental authorization	
Total Approximate Time	4-6 months

Table 1: Steps and approximate timelines of the EIA process for Class I projects

Under Schedule 1 of the Environmental Protection (Impact Assessment) Regulations (1996), of the above-mentioned Act (EPA), the desired level of development - its proposed activities and concept - comprises activities, which in accordance with Regulation 3 (1) of the same regulations, are projects or activities requiring Environmental Authorisation.

The process for preparing an EIA study for Class I projects in the Seychelles with its individual steps is shown in the following flow chart in Figure 1 below:

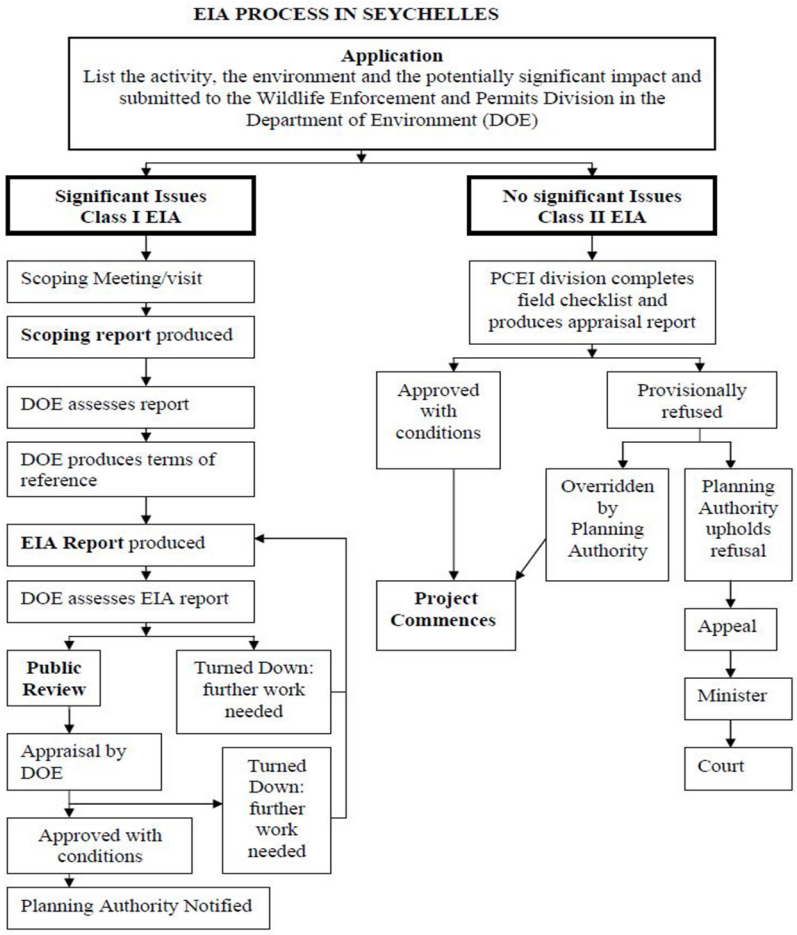

Figure 1: Steps of EIA process in Seychelles

1.8 Report Structure

The Report comprises the following sections:

- Executive Summary
- Chapter 1 Introduction to the Project
- Chapter 2 Description of the Project
- Chapter 3 Seychelles Legislation and Institutional Capacity
- Chapter 4 International Legislation and Agreements
- Chapter 5 Greater Victoria Environment and Social Context
- Chapter 6 Potential Environmental and Social Impacts
- Chapter 7 Social and Environmental Management Plan
- Annexes

2 Description of Project

2.1 Project Location

The Project location is in Greater Victoria on the island of Mahé. There are seven pumping stations, two force mains and the Providence WWTP to be either rehabilitated or reconstructed through the Project.

The sites of the seven pumping stations to be either reconstructed or rehabilitated are located near the centre of Victoria, adjacent to the inter-island ferry terminal, the Indian Ocean Tuna factory and along the main road from Victoria to Providence. The two force mains to be replaced run mostly along the main road south from the terminal area to Providence. The Providence WWTP is located in the industrial/commercial area of Providence which is south of the centre of Greater Victoria to the south towards the direction of the airport.

The locations of the facilities included under the Project are shown in Figure 2 below.

2.2 Alternatives to the Project

There are no prudent and feasible alternatives to the proposed development, it involves the replacement or rehabilitation of existing infrastructure. There are no feasible alternative locations since the other established sewerage infrastructure will continue to discharge into the facilities to be rehabilitated or replaced.

One of the two treatment trains at the Providence WWTP is currently out of order and the other treatment trains is not operating at full efficiency, the WWTP needs to be rehabilitated if sewage is to be treated to the level required by the relevant Seychelles standards is to be met. Both of the force mains are in poor condition and need to be replaced urgently while the condition of the pump stations is poor requiring either replacement or rehabilitation.

The consequences of not proceeding with the Project could be a significant failure of a part or parts of the critical sewerage infrastructure resulting in the discharge of untreated or inadequately treated sewage to the environment.

2.3 Existing Wastewater Situation Greater Victoria

2.3.1 Overview

Mahé island is divided into four different sewerage catchment areas with distinct sewerage networks and wastewater treatment plants. Currently the waste water collection and treatment network and facilities service less than 20% of the needs. The PUC has not yet developed a sewerage master plan, there has however been a Feasibility Study undertaken (Safege 2011) that has reviewed the system and prepared a cost analysis for system rehabilitation and expansion. It is clearly recognized that there is a need for both the rehabilitation and expansion of the sewerage systems and the wastewater treatment facilities both to service existing needs and to meet future demand.

For this Project, only the catchment area of Greater Victoria with Providence WWTP will be taken into consideration. Several industries such as the Indian Ocean Tuna fish factory (although not industrial sewage), several factories, a brewery (Seybrew), a hospital, commerce, restaurants and private households discharge their sewage into the public sewer network.

2.3.2 Sewer Network

The total length of the sewer network which discharges sewage to the Providence WWTP is approximately 30 km. This is understood to be composed of 22 km of gravity pipes of between DN100 and DN400, and 6.5 km of pressure pipes with diameters between DN100 and DN600.

The sewer network is designed as a separate system but significant amounts of both storm water and sea water clearly discharge into the pipes. Both of these factors unnecessarily increase the hydraulic load on the sewer network, the pumping stations and the Providence WWTP.

The Water and Sewerage Division of PUC has expanded over the last few years with the sewerage service connections now at 4,465 connections (as of June 2015) for the island of Mahé. By way of comparison the total number of customers i.e. bills issued for water supply on Mahé in June 2015 was 24,077.

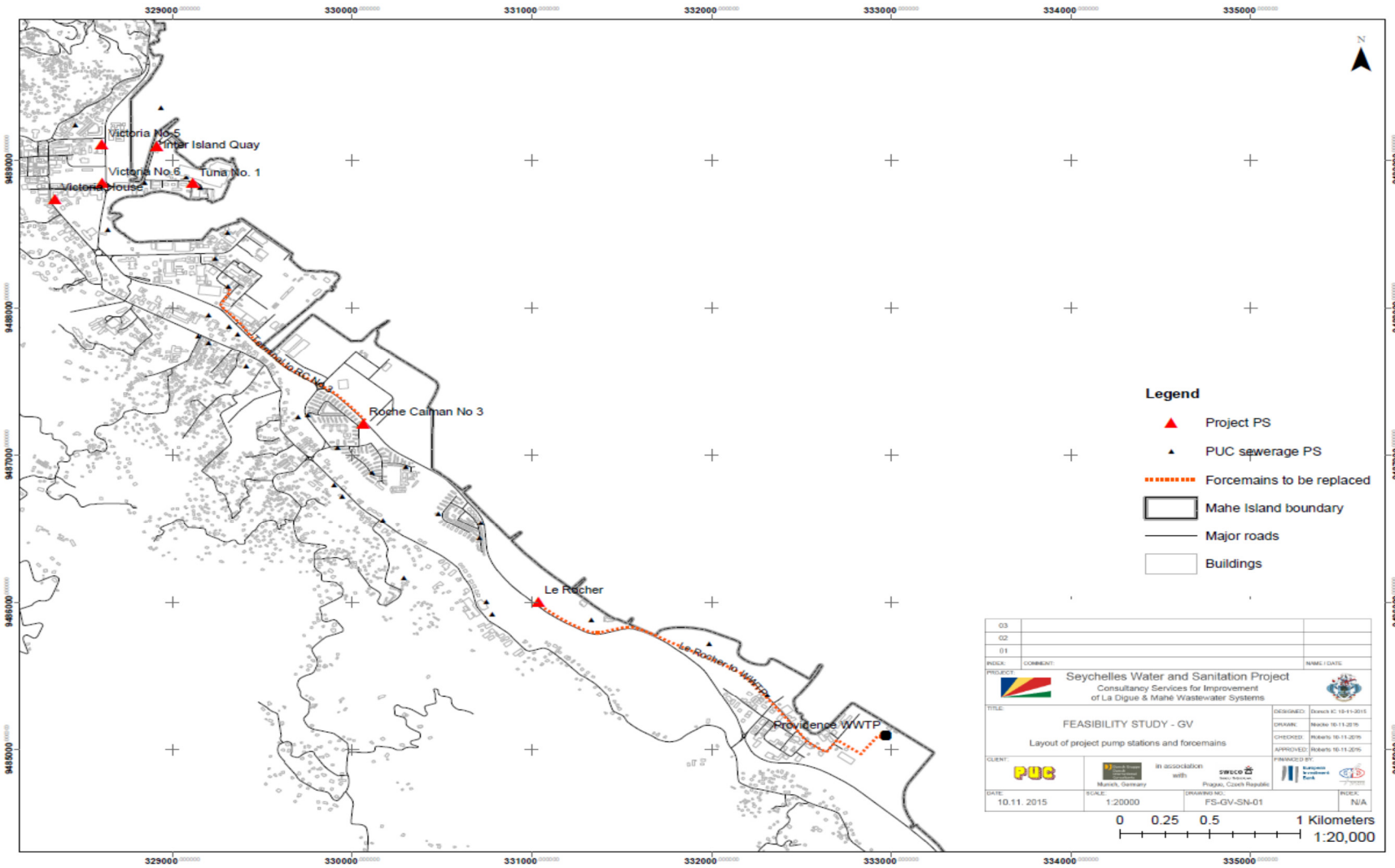

Figure 2: Plan of Project pumping stations and force mains

The billing data was analysed by the Consultant to determine which customers in Mahé are located in the Greater Victoria catchment area which discharges to Providence WWTP. The total number of sewerage service connections in the Greater Victoria system i.e. which discharge to Providence WWTP - as of June 2015 – has been determined to be 3,908 in total. This represents approximately 87.5% of the sewer connections on Mahé.

2.3.3 Pumping Stations and Force Mains

In the sewage system of Greater Victoria there are 33 no. pumping stations of which 5 no. PSs are regarded as main PSs. From upstream to downstream these are: Victoria PS N°6; Central PS; Terminal PS; Roche Caiman PS N°3; and Le Rocher PS.

All the PSs are equipped with submersible pumps. There are in general no screens the pumping stations as pre-treatment. In some PSs there is significant corrosion of both the concrete and the equipment.

To meet the required capacity and to assure safe operation it was considered that 2 no. PSs need rehabilitation and a further 5 no. PSs will need to be renewed, due to problems of ageing, heavy corrosion, too small capacity, no standby pump etc.

Rising mains between the main PSs up to Providence WWTP with a total length of about 4,780 m, and diameters ranging from DN400 to DN500 have problems of ageing, heavy corrosion and bad physical status, and partly overcapacity. It was proposed that these rising mains should be replaced.

2.3.4 Providence WWTP

The design capacity of Providence WWTP is currently given as being 35,000 PE, with an organic load of 2070 kg BOD_5/d day and a hydraulic load of 7000 m^3/d and an hourly peak factor of 3.5.

The WWTP is in poor condition even though it was only commissioned in 2001. Parts of the mechanical and electrical equipment are in need of replacement, this mainly appears to have been the original equipment installed which is now beyond the end of its useful life. At the present time one treatment line is out of order and is unable to be operated. Attempts have already been made to replace badly corroded fittings - such as handrails and grates - with HDPE/GRP fittings. There are strong odours which occur, for example, at the Terminal pumping station. There is no buffer at the septic sludge discharge station meaning that peak loading may occur which may destabilize the biological treatment.

The entire inlet works (screens and grit and grease chambers) are out of order and are bypassed. Consequently frequent blockages of the sludge pipes are reported and abrasion of the mechanical equipment is most probable.

The activated sludge tanks are equipped with surface aerators which have high levels of energy consumption and low oxygen production since they do not appear to have been placed properly. The one biological treatment line which is in operation is reported to be overloaded both in terms of hydraulic and organic load. There is no dissolved oxygen level control.

The chemical removal of phosphate is also not in operation.

There is no thickener at the plant, the waste activated sludge is therefore quite liquid. This increases the hydraulic load on the belt filter presses and the polymer consumption. There seem to be a lot of sludge being recirculated, this would be an indication that too less WAS sludge is removed from the system. The final settler which is in operation is totally overloaded.

At the present time there is no possibility to store the dewatered sludge neither are there sludge drying beds which would increase the dry solids content and thus minimize the costs for sludge disposal.

The condition of the reinforced concrete structures is relatively good with only limited examples of spalled concrete and corroded reinforcement. In some places the flow of sewage has eroded the surface of the concrete although not so much as to expose the reinforcement. There is however some cracking in the reinforced concrete columns adjacent to the aerators. Overall the concrete structures do not show signs of major corrosion damage and should be able to be retained with relatively minor repairs.

There is a laboratory at the PUC compound where the normal daily analysis can take place so as to be able to monitor the plant properly. Only heavy metals cannot be analysed but this is not required for the daily routine plant operation.

The treated effluent from Providence WWTP is discharged to a sea outfall located at the WWTP.

2.4 Project Works Sewage Collection System

2.4.1 Summary of Proposed Pumping Station Works

The proposals for rehabilitation of the pumping stations have been based on site inspections and discussions with the PUC. These proposals are summarised in the following table:

Name of Pump Station	Proposed Measures
Victoria PS No.6	Rehabilitation only, mainly M&E works. Replace pumps, valves, meters, internal pipework, electrical panels etc. To remain a PS with submersible pumps since only refurbishment. Construct a separate valve chamber at the side of the PS to allow for easy maintenance. Provide discharge flow metering (electromagnetic type) either separately or, preferably, within the new valve chamber. Construct a new building for panels away from the pump sump to prevent sewer gas affecting the panels. Provide odour control utilising the package already purchased by PUC. Repair concrete works as necessary
Victoria PS No.5	Rehabilitation only, mainly M&E works. Replace pumps, valves, meters, internal pipework, electrical panels etc. To remain a PS with submersible pumps since only refurbishment. Construct a separate valve chamber at the side of the PS to allow for easy maintenance. Provide discharge flow metering (electromagnetic type) either separately or, preferably, within the new valve chamber. Construct a new building for panels away from the pump sump to prevent sewer gas affecting the panels.

Name of Pump Station	Proposed Measures
	Provide odour control utilising the package already purchased by PUC. Repair concrete works as necessary
Inter Island Quay PS	Replace and reconstruct the existing PS, the existing PS is too small with only one duty pump and no standby pump. Provide discharge flow metering (electromagnetic type). There is potential for further development in the catchment area. To remain a PS using submersible pumps, install 1 duty and 1 standby pump
Tuna No.1 PS	Replace and reconstruct the existing PS on a nearby site outside of the Indian Ocean Tuna factory. The existing PS is inside of the Indian Ocean Tuna factory site and is not readily accessible for maintenance. Provide discharge flow metering (electromagnetic type). It is not expected to be necessary to expand the capacity of the existing PS. To remain a PS using submersible pumps to minimise land requirements, install 1 duty and 1 standby pump Connecting pipework as necessary
Victoria House (Shell)	Replace and reconstruct on an immediately adjacent site in front of the existing PS. Options for new sites are extremely limited. Use submersible pumps to minimise land requirements, install 1 duty and 1 standby pump. Provide discharge flow metering (electromagnetic type).
Roche Caiman No.3 PS	Replace and reconstruct immediately adjacent to the existing PS. Although it would be possible to use a wet well/dry well approach, maintain submersible pumps to ensure compatibility with other PSs Provide discharge flow metering (electromagnetic type) on the common discharge from both wet wells either separately or, preferably, within the new valve chamber. The existing pump sump to be retained as an emergency overflow to reduce emergency discharges to the lagoon. Utilise existing new control building to house electrical controls. Provide odour control utilising the package already purchased by PUC, since it is close to houses.
Le Rocher PS	Replace and reconstruct, it is confirmed that the PS needs to shift from current site across the road to a site next to lagoon. Because of the space constraints maintain the system of submersible pumps. Also maintain submersible pumps to ensure compatibility with other PSs Construct new control building to house electrical controls. Provide discharge flow metering (electromagnetic type) on the common discharge from both wet wells either separately or, preferably, within the new valve chamber. Provide odour control utilising the package already purchased by PUC.

Table 2: Summary of Works at Pumping Stations

2.4.2 Summary of Proposed Forcemain Works

Forcemain PS Terminal to PS Roche Caiman No.3

The forcemain will be a DN450 DI pipe which meets the specified requirements for sewage. The DI pipe and fittings will have a bituminous sealed cement lining and a bituminous coating suitable for buried pipes. The length of the pipeline is 1,301 m.

The pipe will be laid immediately adjacent to the existing forcemain to the left hand side of the road facing the direction to Providence. The pipe will be laid in the space between the edge of the road and the property boundaries.

The forcemain will be laid on a 10 cm thick granular bedding and the will be backfilled initially with granular material up to 10 cm above the crown of the pipe. Thereafter the trench will be backfilled with selected excavated material. The depth of cover to the pipe will vary with the detailed design but in general will be at least 0.7 metre.

Air valves will be installed at high points along the pipe route, in addition washouts will be constructed at suitable places where there are low points.

Forcemain PS Le Rocher to Providence WWTP

The forcemain will be a DN500 DI pipe which meets the specified requirements for sewage. The DI pipe and fittings will have a bituminous sealed cement lining and a bituminous coating suitable for buried pipes. The length of the pipeline is 2,450 m.

The pipe will be laid immediately adjacent to the existing forcemain to the left hand side of the road facing the direction to Providence. The pipe will be laid in the space between the edge of the road and the property boundaries. From the new Le Rocher PS the pipe will immediately cross the road. The road crossing will use pipe jacking to avoid disrupting road traffic.

The forcemain will be laid on a 10 cm thick granular bedding and the will be backfilled initially with granular material up to 10 cm above the crown of the pipe. Thereafter the trench will be backfilled with selected excavated material. The depth of cover to the pipe will vary with the detailed design but in general will be at least 0.7 metre.

Air valves will be installed at high points along the pipe route, in addition washouts will be constructed at suitable places where there are low points.

2.5 Project Works Providence WWTP

2.5.1 WWTP

Under the Project the following works will be constructed:

- Replacement of all damaged M&E equipment, including screens, grit chamber, flow measurement, wastewater and sludge pumps, mixers, belt presses, dosing equipment etc.
- Rehabilitation of civil works
- Improvement of septage acceptance station
- Replacement of aeration system
- Replacement of the UV disinfection system
- Covering for sludge hoppers

The proposed layout drawing for the proposed works is shown and a more detailed description of the new units follows in Figure 3 below.

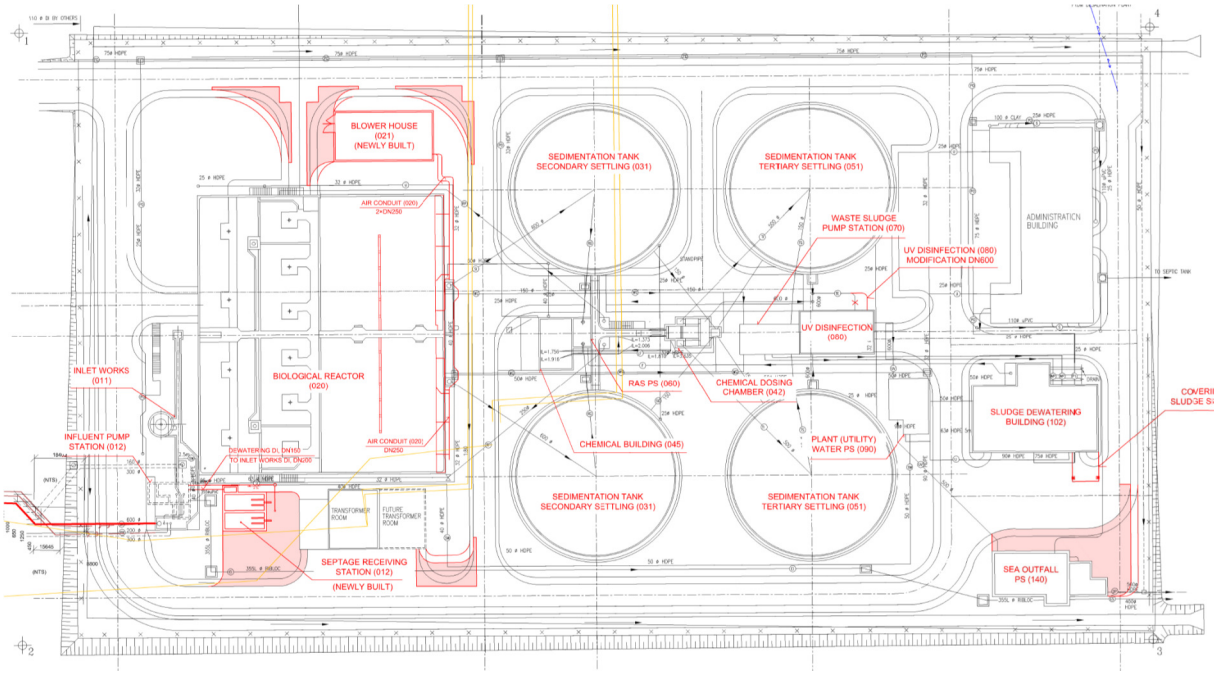

Figure 3: Layout for proposed works at Providence WWTP

2.5.2 Disposal of WWTP Effluent

At the present time the treated sewage effluent is discharged through a sea outfall at Providence WWTP. It is understood that there are two lines – one DN560 and the other DN400 - both HDPE (Class 6 Type 4) discharging to the sea. The DN560 pipe is the main treated effluent discharge pipeline whereas the DN400 is the emergency bypass from the WWTP influent pumping station. Based on the information obtained the existing sea outfall is 1000 m long.

2.6 Construction Activities

2.6.1 Working Hours

The regular working hours for the site will be from 07:00 hours to 17:00 hours Monday to Saturday excluding Public Holidays. Work outside of these hours will be subject to the approval of the Engineer and will not be automatically allowed.

2.6.2 Site Offices and Contractor's Storage

It is anticipated that the contractor's site offices will be located at the site of the Providence WWTP. This is of course subject to approval by the PUC. Arrangements will be made for parking of equipment overnight. This may be at the Providence WWTP site or at the sites of the Le Rocher and/or Roche Caiman No.3 pumping stations.

The main materials to be stored will DN600 and DN450 pipes required for the two forcemains. Delivery to site will be staged to avoid large lengths of pipe being delivered and then left laying along the pipeline routes.

2.6.3 Construction Materials

Construction materials will mainly be the WWTP process equipment and the DN600 and DN450 pipes for the forcemains. These will have to be imported through the Victoria port. Other imported material such at cement and reinforcement bar will also need to be imported through the Victoria port. The port is close to the site of the Project works and transport of materials is not expected to cause major disruption to traffic. Where the works are located at pump stations are closer to the centre of Greater Victoria it may be necessary to transport materials at night.

With respect to concrete batching it is not known at the present time whether the contractor will choose to set up their own concrete batching plant or whether they would use ready mix concrete which is produced in Providence.

2.6.4 Excavation and Backfill

Excavation for the pumping stations will take place on sites adjacent to the existing pumping stations where traffic will not be disrupted. For the pipelines excavations will in general be in verges or road shoulders. Where possible pipes will not be laid directly under roads. Some temporary speed restrictions or lane closures may be necessary in limited sections of roads as pipelaying proceeds. There is provision for pipe jacking at major road crossings to avoid road closures. It will not be necessary to close the main road from Victoria to Providence. Refer to Section 6.2 later in this Report.

Where possible excavated material – both from pumping stations and pipelines - will be used as backfill to minimise the amount of the spoil produced. It is anticipated that all excavated material – being granular in nature – will be suitable to use as backfill. Any surplus spoil would be suitable for use in other land reclamation activities and therefore should not need to be dumped.

2.6.5 Construction Equipment

The exact mix of construction equipment used will be at the discretion of the contractor. It is however anticipated that the types of equipment used would include the following, among others:

- 2 no. excavators (bucket min. 1.0 m^3)
- 1 no. loader (tracked or wheeled, min. capacity 10 tonne)
- 3 no. trucks (min. capacity 10 tonne)
- 1 no. vibrating compacting roller (min. 5 tonnes)
- 5 no. dewatering pumps (min. capacity 5 l/s)
- 1 no. crane (min. capacity 10 tonne)
- 1 no. pneumatic jack-hammer

Equipment of this type is commonly used on Mahé and in Greater Victoria on construction projects and its use on the Project is not expected to cause a problem.

2.6.6 Construction Environmental Management Plan

The Contractor will be issued with the Employer's Environmental and Social Impact Assessment Report (ESIA). The ESIA will represent the minimum standard to be achieved but will not relieve the Contractor of any statutory duty.

The conditions of the Contract will require the Contractor to take all reasonable precautions to avoid any nuisance arising from the execution of the Works. This should be accomplished where at all possible by suppression of the nuisance at source rather than abatement of the nuisance once generated.

The conditions of the Contract will require the Contractor to employ appropriate construction methods and carry out the Works in a manner as to minimize any adverse impacts on air, noise and water quality and the existing environment within or outside any construction sites during the Contract.

The conditions of the Contract will require the Contractor to submit an Environmental Management Plan indicating how they will comply with the Contract requirements. Compliance with this plan by the Contractor will be monitored during the Contract.

2.6.7 Construction Schedules and Planning

The overall schedule for the contract is shown in **Error! Reference source not found.** above. The conditions of the Contract will require the Contractor to plan in detail the full scope of the Contract taking into account the complex nature and different phases and aspects of the Contract and should provide programmes which reflect the detailed planning undertaken and which are realistic, achievable and are accompanied by supporting information. Compliance with this will be monitored.

2.7 Decommissioning

2.7.1 Pumping Stations

In the case of PS no.5 and PS No.6 only rehabilitation is proposed therefore no decommissioning will be required.

In the case Victoria House (Shell), Inter-Island Quay and Tuna No.1 pumping stations, a new pumping station will be constructed either immediately adjacent to or in the vicinity (Tuna No.1) and commissioned. The original pumping stations with then be decommissioned and demolished.

In the case of the Roche Caiman No. 3 pumping station, a new pumping station will be constructed abutting the existing. The existing sump of the present PS will be retained as an emergency storage chamber in the case of breakdowns and overflows to the lagoon. The new PS will be constructed and commissioned the existing PS will then be decommissioned but only partly demolished.

A completely new Le Rocher PS will be constructed across the other side of the road. This will be commissioned and the existing PS decommissioned and completed demolished.

The construction waste generated from the decommissioning will be disposed of to landfill. There should be some metallic waste from the M&E equipment which could be sold for scrap otherwise it could be disposed of to landfill.

2.7.2 Forcemains

In the case of both of the forcemains to be constructed the new forcemains will be constructed and commissioned while the existing forcemains remain in operation. Following this both of the existing forcemains will be decommissioned.

The issue of the recovery of the existing pipelines for the two forcemains has been discussed with PUC. Ordinarily the old pipeline would be removed and salvaged after being decommissioned. The PUC confirmed that they did not intend to remove and salvage the old pipelines once they were decommissioned, they will instead be left in place. The cost of reinstatement after removal would be too great and there is also the problem of disposing of approximately 3.8 km of old pipeline on Mahé once it has been removed.

The construction waste generated from the decommissioning will be disposed of to landfill. There will be some metallic waste from any pipes which are removed which could be sold for scrap.

2.7.3 Providence WWTP

One of two treatment trains in the Providence WWTP is currently not operational. This would be brought back into operation first and then commissioned allowing the other treatment train to be shut down, rehabilitated and then commissioned.

There should be some metallic waste from the M&E equipment which could be sold for scrap otherwise it could be disposed of to landfill.

3 Seychelles Legislation and Institutional Capacity

This chapter looks briefly at the acts, regulations and policies that have direct relevance to the Project.

3.1 Environment Act (Act 9 of 1994)

The principal object of this act is to provide protection improvement and preservation of the environment and for the prevention, control and abatement of environmental pollution.

3.2 The Environmental (Impact Assessment) Regulation, 1996

In Schedule 1 of the Environmental Protection (Impact Assessment) Regulations, 1996, of the Environmental Protection Act (1994), the categories of projects that fall under prescribed projects (Refer to Regulation 3(1)) requires and an Environmental Impact Assessment is required if the project is to be submitted to the authority for approval, comments, or consent.

In accordance with Regulation 6(1) of the Environment Protection (Impact Assessment) Regulations, 1996, the Authority undertakes a scoping exercise, where the Proponent (and the Proponent's Consultant if applicable) first meets with the Authority to discuss the project and the list of stakeholders to be consulted during the scoping activity. This is followed by a process where stakeholders are consulted on the issues that need to be taken into account in the EIA. The EIA Report will be subjected to public inspection as required for Class I studies that need to be so in order to be in accordance with Regulation 8(1).

3.3 Main Environmental Requirements

Apart from the Environmental Authorisation that is provided simultaneously or shortly after Planning Authority Approval, the EPA Act states that a proponent may need authorisation from Ministry of Environment for the following:

- Discharge or burying any polluting or hazardous substance or waste
- Discharge of any effluent or otherwise dispose of any polluting or hazardous substance into any water course or the ocean
- Emit any air pollution, or establish or operate an industrial plant in an air pollution control area
- Emit noise in excess of the noise emission standards
- Dispose, transport or export any hazardous waste

3.4 The Environment Protection (Miscellaneous) Regulations, 1995

This Act sets the standard for Pollution Control. Section 6 of the EPA mentions that the Minister may prescribe standards for:

- Quality of air, water or soil for various areas and purposes;
- Effluent limitations for existing and new point sources;
- Emissions of air pollutants from mobile and stationary sources;

- Noise emissions from various sources including construction sites, plants, machinery, industrial and commercial activities;
- Odours as are required to preserve and maintain public health and the environment.

3.4.1 Environmental Protection (Noise Emission Standards and Regulation 1999)

Emission standards have been published under the EPA for noise, the Environment Protection (Noise Emission Standards) Regulations, SI 49 of 1999 as shown in Table 3 which sets out the limits of sound pressure in dB (A) that should be maintained in a residential, industrial and pristine area. A limit of Leq 75dB (A) is the maximum that should be reached at the boundary of an industrial area. Note that "Leq" is defined as the continuous sound level which gives the same total energy as the varying sound level.

Description Area	Time	Limits in Decibels, dB(A)
Residential	06h00 – 23h00	60 Leq
	23h00 – 06h00	55 Leq
Industrial	At all times	75 Leq (measured at the boundary of the industrial site)
Audible intrusion in pristine acoustic environment	At all times	60 Leq

Table 3: Noise Emission Standards

3.5 Public Health Act, Chapter 189, 1991 Edition

This Act sets the framework for the highest standards of cleanliness, sanitation, disease prevention, and the maintenance and improvement of public health.

Part II mentions that health officers have the right to undertake practical measures to protect and improve the health of the general public.

Part V gives medical officers the power to make a decision as to whether unhealthy dwellings are either repaired or evacuated if proposals to remedy the defects are unsatisfactory.

Part VI states that medical officers will investigate the following:

- Establishment that have poor ventilation
- Establishments that have inadequate provisions grease traps, waste water that are offensive to health
- Locations where noxious emissions is occurring.

3.6 Occupational Safety and Health Decree 54/1978

The decree states the basic precautions than an employer must take in order to protect its employees. It mentions the duties of the employer to ensure that the working environment is safe and that employees are well trained and informed about their safety. Employees should have regular medical examinations before and throughout the period that they are employed in such environment. The decree also clearly states that dust and other dangerous gases that are emitted should be controlled. It also mentions the fact that employees working in a hazardous area should not be exposed to factors that can put their health and safety at risk. In the 1999 amended act, there are the forms and the procedures that should be followed upon an injury or accident to an employee. The classes and particulars are given in part II and III. It is advisable that the proponent encourages its supervisors and workers to be familiar with the act.

3.7 The PUC Act, 1986 & the PUC (Water Supply) Regulations 1988

The Act mentions that damage or breakage of any part of a water system that leads to leakage or contamination of the treated water is unlawful.

3.8 The Water Supply (Abstraction License) Regulations, 1984 and the Public Utilities Corporation (Miscellaneous) (Amendment) Regulations, 1999

These regulations are specifically for the abstraction of surface, ground and seawater for private use. The Rivers' Committee that is chaired by the Water and Sewerage Division of the PUC is responsible for managing requests made for abstraction.

3.9 State Land and River Reserves Act, 1903

During the development of the site, consideration should be made on to the stream and any underground water sources that are found near the proposed Project area. Part IV states that the removal or planting of trees should be done only with the necessary authorisation.

3.10 The Road Transport Act, 1936, revised 1991

This Act and the 1996, 1998 and 2000 amendments, specifies the dimensions and weight of vehicles that can use public roads and restricts the use of specified roads for a particular period of the day.

It gives specifications for speed, installation of traffic lights, traffics signs and crossings. It also mentions that authorisation is required for vehicles exceeding laden or unladed weights over 10,000 kilograms. In the 1998 amendment it is stated that the load on each axle should be of a maximum of 10,000 kilograms. In the 1999 amendment (No. 3) it is stated that special purpose vehicles (e.g. trailers, excavators) should have a maximum driving speed of 50 km/hour. Special authorisation may be necessary for large vehicles, those carrying heavy loads and any activity, such as dewatering and compaction, that may affect the road infrastructures.

3.11 The Town and Country Planning Act, 1972

This Act provides the primary instrument for land, infrastructure and physical development control. No person shall carry out any building operations without a planning permission issued by the Town and Country Planning Authority under the provisions of Section 3. Building operations must comply with the rules and codes of practice laid out in Sections 7 to 83 of the Regulations.

3.12 The Pesticide Control Act, 1996

This outdated Act regulates the manufacture, distribution, use, storage and disposal of pesticides for the protection of public health and the environment. This act makes provisions for an approval process for the use of new types of pesticides. A list of approved pesticides is available from the Pesticide Control Board, at the Department of Health, presently referred to as the Public Health Agency (PHA) or the Ministry of Health. Pest control is recommended at lifting stations and treatment plants in order to prevent damage to the equipment.

3.13 Removal of Sand and Gravel Act

This Act controls the extraction of sand and gravel. The current status is that it is prohibited to extract sand from the beaches and plateaux. This Act makes provision for an extraction licence and applicable to a property owner who wish to undertake sand extraction.

3.14 Breadfruit and Other Trees Protection Act (1917)

This Act provides for the protection of various plant species. A permit is necessary before any tree felling or trimming.

3.15 Land Tenure Issues

The Project will be undertaken on a number of parcels, which are either government or private or being leased. A list of the land parcels affected is attached as an Annex to this Report. The list should be referred to and the land owners informed on the construction activities that may potentially disrupt their livelihoods and businesses.

3.16 Seychelles Sustainable Development Strategy 2012 - 2020

The Sustainable Development Strategy of Seychelles is composed of an institutional document (Volume 1) and a detailed action plan (Volume 2). The detailed action plan brings together the thirteen thematic areas identified to implement the strategy. It is envisaged, as suggested in the strategy, that the resource forecasts are revised every two years in order to take into consideration these factors. Water, Sanitation and Waste Management programs are expected to cost 179.5 million USD.

3.17 Integrated Coastal Zone Management in Seychelles

Integrated Coastal Zone Management (ICZM) is considered a priority in Seychelles given the fact that the whole archipelago is considered a coastal zone. The objective is to promote ICZM and at the same time implement ICZM programmes taking climate change concerns into consideration. Given the fact that almost 95% of all socio-economic activities and other forms of development are located on the coastal plateaux, the detrimental effect of a slight rise in sea level to the main sectors of the economy is of concern. These plateaux are also susceptible to landslides from the steep slopes that rise up to almost a thousand metres (or almost 3000 feet). The sensitivity of construction to the coastal zone is highlighted during the planning process.

3.18 The National Climate Change Strategy (2009)

The Report addresses the priorities for addressing climate change impacts in Seychelles, including biodiversity and forestry sectors. The fact that the project lies in a low lying location and could be affected by the effects of climate change should be considered.

4 International Legislation and Agreements

The Seychelles is party to many Multilateral Environmental Agreements (MEAs) that commit the country to numerous obligations for safeguarding the environment and the sustainable utilization of the resources therein. Some of the major MEAs which are signed and ratified or acceded to by the Seychelles Islands and are relevant to the project are referred to below.

4.1 Convention on Biological Diversity (CBD)

The Seychelles was the second country to sign the CBD in 1992 and became a Party that same year. The Seychelles is recognized as a biodiversity hotspot by Conservation International and a centre of plant biodiversity by the International Union for the Conservation of Nature (IUCN) and the World Wildlife Fund (WWF). Endemism is high at 50-85% for different animal groups in general and approximately 45% for plants. Only one or two endemic species have agricultural applications (e.g. *Deckenia nobilis*) and mainstream agricultural production is centred entirely on introduced species.

4.2 The Stockholm Convention on Persistent Organic Pollutants

The Republic of Seychelles signed the Stockholm Convention on 25th March 2002 and acceded on 3rd June 2008 and has carried out some inventories of persistent organic pollutants prior to the adoption of the convention, as part of a region wide assessment programme. The Stockholm Convention on POP is a chemicals convention that addresses production, use import and export of POPs chemical at the global level. It opened for signature on 23rd May 2001 and came into force on 17th May 2004. In 2007, the Seychelles completed its National Implementation Plan (NIP) with support from UNIDO. This “previous” NIP is being reviewed in view of recent additions of 11 as mentioned new chemicals to the convention. The new chemicals are pesticides and industrial chemicals that are flame retardants.

4.3 International Conventions Pertaining to the Control of IAS 33.

The applicable international agreement that relates to plant quarantine, the International Plant Protection Convention (IPPC), and standards agreed there under, now expands coverage to include control and management of alien invasive species. The Seychelles is a signatory to the IPPC, having ratified the Convention on 31 October 1996. The international standard-setting system under the IPPC is the International Standard for Phytosanitary Measures (ISPM) set by the Commission on Phytosanitary Measures.

5 The Greater Victoria Environment and Social Context

Historical records show that Victoria was founded in 1778 and expanded from a simple settlement around the 'Establissement du Roi' to a centre of trade and commerce around its harbour.

The estimated population of Greater Victoria is estimated to be about 33,180. This accounts for inhabitants from the following districts: Bel Air, English River, Les Mamelles, Mont Buxton, Mont Fleuri, Plasiance, Roche Caiman, Saint Louis, Eden Island, Ile Aurore and Ile Perseverance. The number of commuters travelling to Victoria causes an influx of a greater number of inhabitants during the day time for office works or visits to private and government offices. This causes additional discharge of sewage into sewage system which decreases during the night time when the town is more or less deserted. It can also be estimated that a large number of the 19,198 registered vehicles on Mahé passes through the East Coast and thus may be affected by the implementation of the work along the sewer line.

The Greater Victoria area also has a number of educational institutions, namely five primary schools (La Rosiere, Bel Eau, Mont Fleuri, Roche Caiman and Perseverance), four secondary schools (English River, Belonie, Mont Fleuri and Roche Caiman) as well as creches and day cares. It also has a central Victoria Hospital and three health centres (English River, Mont Fleuri and Les Mamelles).

The Project area is located in the East Coast of the main Island Mahé. The areas has been mainly reclaimed during past projects (East Coast Phases 1, 2 and 3). The river channels have been placed downstream of natural river outlets to allow water to reach the Victoria basin where incidentally is connected to the Ste Anne Marine National Park. Wetland areas have been formed as a result of the reclamation projects which has attracted a number of migrating and sea birds as well as variety of marine creatures.

Some of the main infrastructure found along the East Coast are the two power stations (Station B at New Port and Station C at Roche Caiman), the Sepec fuel depot at New Port, the landfill Phases I and II at Providence and the Desalination plants at Providence. There is also a sports complex at Roche Caiman and well as marina at Eden Island and the Wharf Hotel. Fishing vehicles are moored at three locations namely the Commercial (Old) Port, Roche Caiman and at Perseverance (Zone 3).

Other notable industries are the Indian Ocean Tuna Ltd., Dobi Pty. Ltd. (laundry), Ferox Abbatoir , Foodpro Seychelles Ltd. (food processing), Sea Harvest Co. Pty Ltd., Oceana Fisheries Co. Ltd., and the Seychelles Breweries and several small businesses at the Providence Industrial Estate.

6 The Potential Environmental and Social Impacts

It is expected that the implementation of the Project will give rise to some negative and positive impacts some of which will be monitored after the onset of the works and some of which will become apparent after the commissioning of the rehabilitated works. Sensitization and consultations have been held at early stages of the Project, meaning the design stage, and will continue throughout the Project implementation (construction and operation) stages.

The impacts that are foreseeable are as follows:

- Land Ownership regarding the location of the infrastructure
- Conflicts with road users
- Pollution control
- Potential impacts to land use
- Potential Social Impacts

6.1 Potential Land Ownership Issues

The centralised sewerage system serves both the public and private establishments. The main components of the sewerage system, namely the sewer mains, the lifting stations and the sewage treatment plant are located mainly on government land.

In order to be in conformity with EIB policies and local legislation, the locations of these components have been identified and will be secured so that works can progress as planned. Property owners will be notified in a manner that is appropriate and legal so as to prevent any dispute or damages. Properties that will be affected have been identified during the design stage and confirmed by PUC with MLUH.

The use of media and effective forms of communication should be maximised to ensure that the community is aware and participates in the process. The land parcels that will be affected by the components are provided in the **Annex 6**.

6.2 Potential Impacts with Road Users

The main area that will be affected during the Project implementation is undoubtedly the roads. This will be primarily during the construction of the two forcemains.

Given the type of machinery that will be employed (such as excavators) and the type of works that will be involved (such as excavation, dewatering) the active areas during the construction of the sewage force mains and the pumping stations will have to be secured. As a result it will be necessary for short sections of roads to be closed off and diverted for health and safety reasons or to allow the works to progress uninterrupted. Where crossings of the main north south road are necessary at the sites of both the Roche Caiman No. 3 PS and the Le Rocher PS, it is proposed to use pipe jacking. This will avoid the need to close the main road and significantly reduce disruption from the Project.

It is possible that temporary roads or footpaths may have to be created although the extent of this is expected to be limited. Any damages to the existing roads and infrastructures will be repaired or re-instated. Similar to other construction in areas used by the general public, notices will have to be placed in the media. It is possible for further sensitization be made on the undesirable construction impacts (e.g. disruption on the motor way) but also highlighting the long term benefits of the Project.

6.3 Potential Impacts on Pollution Control

6.3.1 General

Centralised sewerage systems ensure that the impacts of discharging raw or partly treated sewage in the environment are mitigated. The treated effluent is then discharged at an acceptable location and disposed of in a convenient manner. The operation of the sewer system and level of treatment is maintained so that the number of locations that were being affected in the absence of a centralised sewer system is maintained at an acceptable manner. The frequency of pollution by the proposed centralised system will be kept to the minimum.

The main improvements to environment as a result of the Project are as follows:

- Improvement of the effluent quality discharged at Providence WWTP sea outfall;
- Reductions in odour;
- Reductions in breakdowns and discharge of untreated sewage into the environment; and
- Reductions in the amount of sludge to landfill.

These are discussed in more detail in the following sections.

6.3.2 Improvement in Effluent Quality Discharged at Sea Outfall

The rehabilitation measures to be undertaken at the Providence WWTP will result in an improvement in the quality of treated effluent being discharged through the sea outfall. In particular the second treatment train will be brought back into operation significantly reducing the likelihood of WWTP overloading.

Frequent sampling of the effluent from Providence WWTP are currently being made and any adjustments or modifications to the treatment will be considered and implemented so as to ensure compliance. The PUC must ensure that biochemical parameters are monitored and sufficient data is collected and analysed.

Application for a Permit to Discharge must be done on an annual basis with the Environment Department. The procedure involves submitting laboratory reports from a National Laboratory and submitting specifications of the WWTP and any chemicals used during its operation. For Providence WWTP this procedure is currently in place.

6.3.3 Improvement in Disinfection of Quality Discharged at Sea Outfall

The implementation of the Project will include measures to upgrade the reliability of the disinfection of the WWTP effluent for final disposal. The existing UV equipment – which is currently not operational – will be replaced. This also will involve the installation of an additional stand-by UV disinfection unit to ensure that UV disinfection is available at all times. The installation of a standby UV unit will improve the sustainable maintenance of the UV disinfection units during normal operational situations.

The Project will also implement additional measures to safeguard the reliability of the disinfection of the WWTP effluent for final disposal. In particular this will include the installation of a back-up disinfection facility using hypochlorite solution to provide effluent disinfection in the absence of any UV disinfection during emergency situations.

6.3.4 Reduction in Odour

New odour control units will be installed at the following pumping stations, in the case of Victoria No. 5 and Victoria No 6 PSs previously there were no odour control units:

- Victoria No. 5 PS;
- Victoria No 6 PS;
- Roche Caiman No.3 PS; and
- Le Rocher PS

These will significantly reduce localised problem from odour especially at Roche Caiman No. 3 PS which is located close to housing.

6.3.5 Reductions in Breakdowns and Discharge of Untreated Sewage

The reconstruction/rehabilitation of the seven pumping stations and two forcemains should significantly reduce the number and duration of breakdowns and outages. This will reduce the number of occasions when raw sewage is discharged into the environment. The redesign of Roche Caiman No.3 PS will keep the existing pump sump for it to act as emergency storage in the case of breakdowns.

The re-design of Tuna No. PS, InterIsland Quay PS and Victoria House (Shell) PS will now all incorporate a second standby pump. This will also reduce the likelihood of breakdowns.

6.3.6 Reductions in Volume of Sludge to Landfill

The area where the hoppers for dewatered sludge are stored will be covered to prevent dewatered sludge getting wet again. This will reduce the volume of sludge going to landfill and make it easier to handle.

6.4 Potential Impacts to Land Use

With the availability of a better functioning centralised sewerage system, land owners and developers will have better confidence and may implement their own development knowing that in sewered areas they are more or less obliged to connect to the centralised system rather than being permitted to install a stand-alone sewerage and treatment system as in the case in the suburbs. The number of units and population density is expected to increase as more development is carried out in project sewerage catchment area and this may add pressure on other services, infrastructures (such as roads) and the utilities (such as water supply).

6.5 Potential Health and Safety Issues

With respect to the employment of expatriate labour, all members of the expatriate workforce will be required to obtain a Gainful Occupation Permit (GOP). Obtaining this involves a prescribed medical examination prior to being issued. Adherence to this procedure involves screening for communicable diseases which could trigger an epidemic.

The conditions of the Contract will require the Contractor to devise and implement a Project specific Health and Safety Plan to fully comply with the requirements of the Contract, all relevant Enactments, Code of Practice, safety guidelines, the requirements of the independent risk assessment, project conditions, proposed work activities and relevant international standards. This Health and Safety plan will be subject to the approval of the Engineer and compliance with it provisions will be monitored throughout the Contract.

6.6 Air/Noise

6.6.1 Air Pollution

Impacts during Construction

The major impacts with respect to air pollution will occur during construction. These will primarily be air pollution generated from the operation of construction plant and equipment. The construction at Providence WWTP and the Tuna No.1 PS will both take place in industrial areas while the construction of most pumping stations and the forcemains will take place adjacent to major roads. The impacts of air pollution from construction activities in these locations will be minimal.

The most critical site which will have to be closely monitored will be the Roche Caiman No.3 pumping station. Where necessary, restrictions may be necessary on the use or the hours of use of certain types of plant and equipment. Refer to Section 2.6.6 above, provision exists to control this in the technical specifications.

Impacts during Operation

The impacts on air pollution during operation of the pumping stations and the Providence WWTP are considered to be minimal since the pumps and treatment plant equipment are electrically powered.

The pumps and treatment equipment installed should be at least as efficient as that presently installed. The change from surface aerators to fine-bubble, compressed air aeration in the biological reactor should be more energy efficient. Therefore overall energy consumption should not increase thereby avoiding an increase in air pollution from the main electrical power generators on Mahé.

The issues relating to reduction in odour, which could also be considered as contributing to air pollution, are dealt with Section 6.3.4 above.

6.6.2 Noise Pollution

Impacts during Construction

Significant impacts with respect to noise will occur during construction. These will primarily be noise generated from the operation of construction plant and equipment. The construction at Providence WWTP and the Tuna No.1 PS will both take place in industrial areas while the construction of most pumping stations and the forcemains will take place adjacent to major roads. There will already be impacts from traffic noise and the noise from industrial activities in these locations, the additional temporary noise generated from construction should therefore be acceptable.

A critical site will be the Roche Caiman No. 3 pumping station which is adjacent to houses. Limitations to working hours especially at night will need to be strictly enforced to avoid disturbance to the neighbouring residents. Provisions exist for this in the technical specifications.

Impacts during Operation

At the Providence WWTP most of the treatment which is replaced or rehabilitated is the same as was installed previously. There should therefore be no increase in noise from these facilities. At the Providence WWTP the most probable cause of noise would be the blowers which are to be installed. The blowers will be housed in an acoustic enclosure to mitigate noise but it would be normal practice for all persons entering a blower room to wear ear defenders. Appropriate warning signs will have to be displayed at the entrance to the building and form part of the O & M Manual to be prepared for the Providence WWTP.

In the case of the pumping stations new pumps will be installed to replace the existing pumps. There should therefore be no increase in noise overall. Most of the pumping stations will be rehabilitated or replaced at the same locations. In the case of Tuna 1 PS this will be moved out the Indian Ocean Tuna Factory to a traffic roundabout where any noise should be less of a problem. In the case of Le Rocher PS this will be shifted across the road away from potential development sites to a new site adjacent to the lagoon. Any noise should represent less of a problem at the new site.

6.7 Potential Social Impacts

Some of the issues related to the Project and the associated wastewater management are as follows:

6.7.1 Impacts by Construction Activities

Interference with accesses and roads may affect the livelihoods of the ordinary citizen travelling to and from Victoria and those residing or running businesses near the project areas. In addition to the common nuisances such as noise caused by machinery and dewatering pumps, dust, potential structural damage to property, disposal of pumped water, these may create tensions and conflicts between the population, the Project Management Unit and the Contractor.

The mitigation of such possible conflicts requires good publicity and personal relations with the public. The media and placement of notices at public spaces (e.g. PUC counters and District Administration) and Project sign boards at the Project area should be made. The quality of work should be at a high standard so as to avoid or minimise re-works and further interference.

6.7.2 Impacts of Waste Water Recycling

The availability of treated recyclable effluent will benefit businesses at the Providence Industrial Estate and reduce reliance on fresh water consumption or abstraction.

6.7.3 Impact on Employment

As a direct or indirect result of the Project there will be employment opportunities for participating in the construction activities, the operation of the sewerage system, associated development such as construction of new establishments, and growth in the agricultural sector. As a result of new employment opportunities, the youth would have an opportunity to practice a trade and refrain from anti-social behaviours, committing crime offences, and alcohol and drug abuse.

6.7.4 Other Social Impacts and Issues

- The reduction of breakdowns and odour emissions along the sewer forcemains and especially at the pumping stations will allow the residents, businesses and the general public to have a better quality of environment and reduce the number of.
- The employment opportunities will enhance the community basic skills and people will be able to benefit from the outputs and outcomes of the projects. The skilled population will improve the development of the country and assist in reaching its sustainability goals.
- The Project will be inclusive for women and youth. Both groups will participate in the Project implementation, in the representation and decision making and obtain Project benefits.
- The Project will contribute in keeping the country's unemployment rate at very low levels (4%) while providing opportunities for the youth in particular employment and greater opportunities to develop their entrepreneurial potential.

- A lack of transparency during the Project implementation may have a negative social impact and the participants may be skeptical and untruthful. In the absence of proper information, the participant will be unaware of the sequences of the activities, and may not be proactive, and may lose interest and become demotivated. The Project will not achieve its objective in the assigned time. The proposed mitigation measure will be to use the communication unit, build a good network among all the stakeholders, update the players about the progress of the implementation and get their maximum commitment for the successful implementation of the Project.

6.8 Type of Interventions

The potential impacts and risks of a Project activity depends on the kind of physical interventions caused to the existing environment during both construction and operation phases. The types of structures that the Project will construct or rehabilitate include:

- Rehabilitation of two pumping stations i.e. the Victoria No. 5 PS and Victoria No. 6 PS; Replacement of 5 existing PSs i.e. Inter Island Quay, Tuna No.1, Victoria House (Shell), Roche Caiman No.3 and Le Rocher PSs;
- Replacement of two forcemains from Terminal PS to Roche Caiman No. 3 PS and from Le Rocher PS to Providence WWTP;
- Rehabilitation of the Providence WWTP;
- Temporary facilities such as footpaths, roads, foot bridges, drains, culverts;
- Fencing, hoardings; and
- Worker facilities such as work sheds, mobile toilets,

The source /the causes of the impacts are the physical activities to be carried out during construction and operation phases. These are listed below in Table 4:

Activity	Scope of Work	Physical Activities	Operations
Rehabilitation of 2 nos. pumping stations, Construction of 5 nos. pumping stations, Replacement of 1.3 km pipeline forcemains with dia DN450, 2.45 km force mains with dia. DN500). Reinstatement of roads, 6 km	Better reliability of the conveyance system along public roads and adjacent to housing estates, tourism establishments, private residential areas and commercial area.	Mobilisation of construction tools, equipment, vehicles, plants, materials, workers Site clearance Removal of old road surfaces Excavation Compaction Pipe Laying Levelling Concrete mixing, materials preparation Concrete works Excavation, back fill Building, construction Road and infrastructure re-instatement	Sourcing of materials. Use of water for concrete mixing, Use of fuel for concrete mixing and for machinery. Waste oil and lubricants and cement. Old surface may need to be disposed of or used as fill material Natural resources such as water is used Energy/fuel supply is needed There is safety risk during operation Waste and wastewater will be generated
Improvement of treatment system. Better quality in recycled wastewater	Project to be undertaken at Providence Industrial Estate. Improvement in sewage treatment.	Excavations Drilling Pipe fitting Mobilisation of construction tools, equipment, vehicles, plants, materials, workers Concrete mixing, materials preparation Excavation, back filling Building, construction	Same as above.
Sludge storage & disposal	Better treatment of sludge.		Same as above

Table 4: The Types of Physical Activities Financed by the Project

6.9 Potential Impacts and Risks

The potential impacts and risks are summarized in Table 5 which follows. It is expected that the scale of the activities to be undertaken during the Project will be relatively small scale and the impacts that will be created will be easily contained and managed. Liaising with the Planning Authority and the respective agencies are crucial to ensuring inconveniences and avoid stop notices from being issued. To minimise inconveniences to the general public, it is recommended that notices are placed in the media and road signs should be placed along the roads or near the Project areas.

The positive impacts of the Project are as follows:

- Improved environmental benefits and protection of ecosystems including reduction of dead de-oxygenated zones in the marine environment
- Lower risks of disease and parasitic infections
- Reductions in local nuisance caused by odour
- Employment opportunities for the locals and skills acquisition

Beside the positive impacts, construction and operations of the proposed facilities will have some potential negative socio-environmental impacts and risks. The objects that may be affected by construction or operational activities:

- The air environment: dust, noise, odour, vibration
- Water bodies: changes in turbidity, sediment, dissolved and undissolved pollutants coming into water
- Soil, land: erosion and wastewater contamination of soil
- Biological resources: grass/vegetation cover, shrubs, trees, plants, animals, insects, pest, forest, etc.
- Existing facilities in Project area, such as residences, roads, water supply, drains, etc.
- Human beings with social settings, economic/production activities etc.

	Potential Impacts / Risks	**Description of the issues/risks**	**Typical activities that cause the potential impacts/risks**
CONSTRUCTION PHASE			
C1	Damages or loss of vegetation cover and trees	Vegetation cover and/or trees at the Project areas may be removed or disturbed during construction phase. This impact can be avoided, minimised or mitigated.	site clearance for construction site, workers' site office & camps, construction material exploitation and/or storage
C2	Loss or degradation of valuable natural/ ecological resources	Coral should be protected, not extracted as this is a valuable marine resource. It grows very slowly and it takes a long time to recover from damages. Coral reefs protect the shoreline from wave actions and storms, it is habitat from great variety of fish and marine life, is breeding ground for marine creatures. If sand, gravel and stones from river bed is extracted, river flow pattern may be seriously affected. The river may scour around bridge, culverts and abutments and endanger their stability. The river may erode other sections of the river beds and banks and thereby cause serious problems elsewhere Protected areas, wetland, mangrove area,	Site clearance Construction Extraction natural resource for construction materials at important sites particularly corals from sea, trees from protected area, gravel from river beds etc.

	Potential Impacts / Risks	Description of the issues/risks	Typical activities that cause the potential impacts/risks
		swamp, and bird sanctuary, sea grass beds are important to biodiversity and earth and may also have valuable landscape. If construction takes place at or nearby such sensitive socio-environmental features, threats or serious/ permanent damages may be caused to such sites. Human access to undisturbed area may cause damages to (from plant collection/removal, wildlife catching, hunting, fire setting, littering etc.) damage to vegetation cover as habitats of wildlife or cause fire risks Such potential high impacts should be identified in early stage of sub-project planning and avoided.	
C3	Degrade existing landscape	This impacts may occur when vegetation cover/top soil is removed, or a man-made structures are introduced into least disturbed nature, or when new structures obstruct view to existing beautiful landscape	Site clearance Construction of new facilities in areas with beautiful/valuable landscape
C4	Solid Waste generation	Excavation works generate waste. Removal of all road surfaces. Waste is also be generated from unused materials: timber/glass/metal, packaging materials or by the workers: lunch containers, leftover food etc.	Excavation Construction Workers daily domestic activities
C5	Wastewater generation	Wastewater generated by workers from washing and toileting. Uncontrolled generation of wastewater may cause environmental pollution, nuisance, and health concerns to workers and the public	Excavation Use of construction materials Workers domestic activities at the sites
C6	Chemicals, hazardous wastes generation	Used oil, paints, lubricant, batteries, and asbestos-containing materials are toxic. Some of the solid waste may be cross-contaminated with oil, paints etc. that may be toxic and pose public health risk	Site clearance Vehicle maintenance Painting Illegal dumping
7	Dust, air pollution	Exposure to high level of dust and smoke may have health impact: affect respiratory system, eyes	Site clearance Excavation Running engine Machinery Construction material loading and unloading
C8	Noise and Vibration	Noise disturbance affects tranquillity and hearing/listening activities and may cause stress/headaches Vibration may cause cracks /damages to existing	Pile driving Soil compaction Drilling

	Potential Impacts / Risks	Description of the issues/risks	Typical activities that cause the potential impacts/risks
		structures	
C9	Increased erosion risks/siltation/ sedimentation	Water stagnation can occur due to changes in soil profile or gradient. Stockpiling of excavated soil Washing away of soil by rainfall or stormwater causing highly turbid water and siltation/sedimentation of river bed/stream	Site clearance excavation activities create unsealed/barren area without vegetation cover during and after construction Construction works carried out in depressions in the plateau
C10	Water quality degradation, salinity intrusion risks	- Waste and wastewater, construction materials from construction may leak or be disposed of into water sources nearby construction sites or downstream of construction sites. - Water quality in streams and rivers may also be degraded if soil from slopes in the catchment run into water bodies due to erosion/landslide initiated by earthworks at the sites. - Careless water use activities by workers, for example washing working tools directly at water sources. - Oil, fuel or any other liquid substance used during construction, including on-site machinery maintenance, may be leaked or spilled into the soil. Then rainwater may wash such contaminant to nearby water bodies	- Construction of bridges, pier on streams, river beds - Construction waste and waste water discharge - Tools and machinery washing and maintenance
		During dewatering localised water level drawdown will occur. If the salt-fresh water interfere is located in vicinity, saline water intrusion may occur.	Groundwater extraction and dewatering during construction phase
C11	Increase localised flooding risk	The area surrounding the area disturbed by construction activities may be subjected to increased flooding risk if there is blockage of natural or fabricated or drainage	Construction solid materials and waste loading, dumping
C12	Impacts cultural sites such as church, historical site, grave yard, etc.	Cultural sites may be affected with dust, noise from material and waste loading/disposals Some artefacts may expose during execution of earthworks at the sites	Dust and noise generated activities Loading/unloading construction materials and wastes
C13	Social disturbance to local	If the works are carried out on or near existing road, construction activities may disturb or disrupt	Site clearance Excavation

	Potential Impacts / Risks	Description of the issues/risks	Typical activities that cause the potential impacts/risks
	community: - traffic/ transportation - water supply - irrigation - farming - Community meetings events/ etc.	traffic and pedestrian movement Excavation may also cause loss to vegetation cover or disturbance to the ground Excavation works may disrupt the operations thus the services provided by local existing facilities such as water supply, drainage, power supply etc. if the pipes/lines cross excavated areas Stockpiles formed from excavated materials If construction activities takes place near farming area, access to farm land may be interrupted; materials, waste, and wastewater from construction sites may enter farms causing productivity reduction and social conflicts If a construction site is located near community centre of church, material loads or noise from material cutting, drilling, welding, may block access to community centres or disturb hearings in public meetings.	Machinery operation Temporary blockage of rivers/streams/ existing irrigation canal for construction Temporary block of road for construction of connection section to new alignment
C14	Health/ sanitation /hygiene in local community	Stagnant water formed from disturbed area at construction site is favour for mosquito breeding, which is a vector of water-borne diseases Waste generated from workers staying at the site may attract vermin and insects Wastewater generation may cause nuisance and health risks to human	Excavation create holes or low laying spots
C15	Safety risk to community	Construction-related activities may cause safety risks for local community, particularly children if they access to open holes or present at the site during materials transports/loading/unloading.	Transportation of materials/wastes Materials loading/unloading Excavated holes Machinery operations
C16	Workers health and safety	Some toxic materials such as paint, oil, battery may be used during construction. Some construction materials may contain asbestos. If workers are in contacts such materials without proper protection, health hazard may be resulted from the handling, breathing from such materials. Unprotected holes at the sites, exposure to traffic at road side, improperly installed electrical wires, operating and handling of construction plants, machinery and tools may cause safety risks to workers	General construction activities, operations of tools and plants in contact with hazardous substances such as paints etc.
OPERATION PHASE			

	Potential Impacts / Risks	Description of the issues/risks	Typical activities that cause the potential impacts/risks
OP1	Water/soil pollution	Leakage or discharge of wastes and wastewater generated from the facilities provided	Water use activities taking place at buildings/ shelters
OP2	Water/soil pollution	Effluent from septic tank can pollute groundwater or surface water, particularly if piped to an open drain Partly treated effluent from septic tank can easily pollute the groundwater in the dug well, even after many years; Polluted surface water from around the septic tank may percolate into the groundwater	Sanitation facility
OP3	Visual impacts	In the event that the facility dominates landscape in public area and degrade the surrounding landscape value	Construction in areas visible from other establishments. May give rise to complaints despite sufficient buffer.
OP4	Nuisance, odour, unhygienic condition, public health risks	Emission from septic tank during its decommissioning and connection to sewer and from centralised sewerage system. Septage services to decommissioned septic tanks, manholes, lifting stations. Septic tank effluent is only partially treated thus can spread infection and disease thus pose health risk. Lack of proper drain around taps used for cleaning, and servicing of sewers create muddy conditions and stagnant water. Stagnant water become potential mosquito breeding ground and contamination by vectors and harmful microorganisms. Becomes an inconvenience for water users Open or missing facet can spill a lot of water in a day. Wastage of treated water	Sanitation
OP5	Pollution caused by hazardous wastes	The operation of WWTP generate hazardous sludge (biological and/or chemical).	Sludge storage and disposal
OP6	Unhygienic condition, public health risks	Muddy condition/siltation at water points used by contractor and operator lead to unhygienic conditions and/or mosquitoes breeding	Water used during construction and operation

Table 5: Potential Negative Impacts of the Works under the Project

The main social and environmental concerns of the Project would relate to the construction activities, wastewater generated and collection from establishments, wastewater disposal and water recycling and sludge disposal. PUC will, as a result of the Project, improve in its capacity to convey wastewater in a safer manner and improve the treatment facilities and disposal of sludge and the effluent.

With the availability of a higher quality of effluent this will encourage businesses in using recycled waste water.

The impacts and risks associated with the Project will be addressed through the procedures described in Chapter 7 of this ESIA.

6.10 Classification of Potential Impacts and Risks

The above Section 6.9 identifies, describes and distinguishes between impacts during construction and operation phases.

In this Section 6.10, a standard classification of these impacts according to their intensity (strong, medium, low), extent (punctual, local, regional), duration (brief, temporary, permanent) based on which the impact's importance is determined (low, medium, high) is provided in Table 6 below.

	Potential Impacts/ Risks	**Intensity**	**Extent**	**Duration**	**Importance**
	CONSTRUCTION PHASE				
C1	Damages or loss of vegetation cover and trees	Medium	Punctual	Temporary	Low
C2	Loss or degradation of valuable natural/ ecological resources	Low	Punctual	Brief	Low
C3	Degrade existing landscape	Low	Punctual	Brief	Low
C4	Solid Waste generation	Low	Punctual	Brief	Low
C5	Wastewater generation	Low	Punctual	Brief	Low
C6	Chemicals, hazardous wastes generation	Low	Punctual	Brief	Low
C7	Dust, air pollution	Low	Punctual	Brief	Low
C8	Noise and Vibration	Low	Punctual	Brief	Low
C9	Increased erosion risks/siltation/ sedimentation	Low	Punctual	Brief	Low
C10	Water quality degradation, salinity intrusion risks	Low	Punctual	Brief	Low
C11	Increase localised flooding risk	Low	Punctual	Brief	Low
C12	Impacts Cultural sites such as church, historical site, grave yard, etc.	Low	Punctual	Brief	Low
C13	Social disturbance to local	Low	Punctual	Brief	Low

	Potential Impacts/ Risks	Intensity	Extent	Duration	Importance
	community: - traffic/ transportation - water supply - irrigation - farming - Community events/ etc.				
C14	Health/ sanitation /hygiene in local community	Low	Punctual	Brief	Low
C15	Safety risk to community	Low	Punctual	Brief	Low
C16	Workers health and safety	Low	Punctual	Brief	Low
	OPERATION PHASE	Low	Punctual	Brief	Low
OP1	Water/soil pollution	Low	Punctual	Brief	Low
OP2	Water/soil pollution	Low	Punctual	Brief	Low
OP3	Visual impacts	Low	Punctual	Brief	Low
OP4	Nuisance, odour, unhygienic condition, public health risks	Low	Punctual	Brief	Low
OP5	Pollution caused by hazardous wastes	Low	Punctual	Brief	Low
OP6	Unhygienic condition, public health risks	Low	Punctual	Brief	Low

Table 6: Classification of Impacts of the Works under the Project

As classified in Table 6 above: Almost all of the impacts during construction and operation phases will have low intensity, punctual extent and brief duration, and thus low importance. All of these impacts will also be strictly supervised by the Engineer during construction, and thereafter managed by the Promoter during operation as part of the Promoter's routine operations.

For Impact C1 with medium intensity: Site clearance for the DN450 forcemain from pump station PS Terminal to PS Roche Caiman No. 3, as well as for the DN600 forcemain from pump station PS Le Rocher to Providence WWTP will require clearance of trees that are located along the route of the forcemain. Upon reinstatement, new trees can be planted to replace those trees permanently removed, although not necessarily in the same location, but to restore the natural appearance before construction. Overall, the importance of this impact is still low, even for the possibility that the existing public road along the routes of these forcemains would be widened and thus occupy the locations where the trees are to be removed under this Project.

7 Environmental and Social Management Plan

7.1 Overview

The Project has been designed for the construction of infrastructure intended for wastewater collection, treatment and disposal. The Project is classified as Environmental Class I as per the Seychelles EIA Regulations.

However, the Project is not subject to an Environmental Impact Assessment per Directive 2011/92/EU, because the associated waste water treatment plant does not have a capacity exceeding 150,000 population equivalent as defined in Point 6 of Article 2 of Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment. Most of the Project activities will be small scale and the associated potential negative socio-environmental impacts and risks would be small and localised and manageable.

In reference to Chapter B.2.8 of Volume II of EIB's Environmental and Social Handbook (version 9.0 of 02/12/2013): Underlying projects that do not require an EIA/ESIA may not have a stand-alone ESMP. In these cases, specific actions will be included in the environmental approvals and/or as stand-alone conditions in the finance contract and agreements.

In reference to Annex 11 of Volume II of EIB's Environmental and Social Handbook (version 9.0 of 02/12/2013): Among the aims and objectives of the ESMP are:

- To provide goals and targets for environmental control;
- To provide a basis on which the prospective contractor can accurately price for environmental management in the tender document;
- To specify particular roles, responsibilities and time scales;
- To provide a basis for monitoring compliance; and
- To provide a site management tool.

Among others, the ESMP includes environmental and social requirements: that are incorporated into the tender and contract documents; and that shall be complied by the construction Contractor and supervised by the supervising Engineer. These environmental and social requirements are provided in Section 7.2 that follows.

7.2 Requirements of Contract Documents

7.2.1 General Provisions

The Contractor shall take all reasonable precautions to avoid any nuisance arising from the execution of the Works. This should be accomplished where at all possible by suppression of the nuisance at source rather than abatement of the nuisance once generated.

The provision listed herein regarding environmental protection shall apply to and be binding upon the Contractor for any part of the Works on the Site and the subcontractors. The Contractor shall ensure that proper and adequate provisions to this end are included in all subcontracts.

The Contractor shall employ appropriate construction methods and carry out the Works in a manner as to minimize any adverse impacts on air, noise and water quality and the existing environment within or outside any construction sites during the Contract.

The Contractor shall submit an Environmental Compliance Plan for the Engineer's approval indicating how the Contractor will comply with the Contract requirements for execution of the Works. The Environmental Compliance Plan shall be properly implemented by the Contractor during the Contract.

7.2.2 Contractor's Obligations

The Contractor shall comply with the environmental requirements contained in the Contract. In particular, the Contractor shall:

- Ensure environmental awareness among his personnel, suppliers and sub-contractors so that they are fully aware of, and understand, these environmental requirements;
- Notify the Engineer immediately in the event of any accidental infringements of these environmental requirements to enable appropriate remedial action to be taken immediately by the Contractor;
- Notify the Engineer, at least ten working days in advance, of any activity it has reason to believe may have significant negative impacts, so that mitigative measures may be implemented in a timely manner;
- Undertake rehabilitation of all areas affected by his works and to restore them to their original states, as determined by the Engineer; and
- Undertake the required works within the designated working areas.

7.2.3 Engineer's Role and Duties

The Engineer will designate all working areas, and monitor and enforce the Contractor's compliance with these environmental requirements. In particular, the Engineer will:

- Communicate to the Employer, at least ten working days in advance, any proposed actions which may have negative impacts on the environment;
- Maintain a record of complaints from the public, and communicate these complaints to the Contractor and Employer; and
- Facilitate communication between all role players in the interest of effective environmental management.

7.2.4 Employer's Arrangements

The Employer will appoint an Environmental Officer, who will monitor and liaise with the Engineer to ensure that the Contractor's activities under the Contract complies with the environmental requirements of the Contract.

Among others, the Contractor shall be obligated to attend a meeting to be arranged by the Employer prior to commencing any works under the Contract. This meeting shall be held with the Ministry of Environment, Energy & Climate Change during which all stakeholders involved in the implementation of the works under the Contract will be present. Among others, the purpose of this meeting is to ensure that the Contractor shall be fully aware of the provisions and mitigating measures of the environmental requirements of the Contract in order to minimize adverse negative impacts on the environment.

Where possible, the Employer shall facilitate the issuing of the relevant permits, approvals etc. from the Relevant Authorities. Such assistance shall not however relieve the Contractor of his responsibilities under the Contract to obtain such approvals.

7.2.5 Environmental Compliance Plan

The Contractor shall prepare an Environmental Compliance Plan which shall be submitted to the Engineer for approval within 60 days after the Commencement Date. This Contractor's Document shall represent the Contractor's environmental management plan for complying with the environmental requirements under the Contract.

In this Environmental Compliance Plan, the Contractor shall elaborate its methods and procedures to mitigate any negative environmental impacts of its contract activities, among which shall include the following as minimum:

- Soil contamination from the storage of fuel and chemicals and from wastewater flows or leaks when performing the work;
- Environmental pollution from the all forms of construction and hazardous waste generated when performing the work;
- Increased erosion of the excavated topsoil and growth of alien plant vegetation;
- Surface and/or groundwater contamination when performing the work;
- Occupation health hazards to employees when performing the work;
- Social disruption amongst concerned individuals and communities;
- Health problems and nuisance including possible dust, odour and noise emissions from any excavations and the transportation of waste and other materials; and
- Protection of natural resources including flora, fauna and habitats.

The Environmental Compliance Plan shall include a Waste Management Plan for the proper disposal of all forms of waste and the prevention of any environmental pollution as a result of the Contractor's activities.

The Environmental Compliance Plan shall also include an Emergency Plan for all possible hazards to people and property as a result of the Contractors activities, including the prevention against accidents and injuries to workers, with consideration also given to local communities within the vicinity of the working areas.

The Environmental Compliance Plan shall also provide a detailed Containment Plan for emergencies during the construction period of the Contract which shall clearly define locations of discharge points of raw sewage during emergency.

7.2.6 Protection of Natural Resources and Cultural Sites

Mitigation of Effects on Natural and Ecological Resources

The Contractor shall be fully aware and materially respect that the natural and ecological sensitivity of Greater Victoria requires the implementation of protective measures. They shall include as follows:

- Erect temporary fences to protect the preserved trees before commencement of any works within the site.
- Only use local native species of vegetation for planting and restoration of natural landforms.
- Avoid disturbance of marine environment, especially breeding ground of fishery resources such as swamp/lagoon/sea grass bed, mangrove areas, or grassland seasonally inundated, or any area that is protected as a green space (e.g. catching, shooting, poisoning, littering).
- All rock boulders shall be secured. Rock blasting shall not be allowed on site.
- Avoid the extraction of excessive amounts of sand, gravel or rocks from rivers for construction.
- Avoid extraction of materials from live coral reef for construction materials.
- Note that dead coral play an important role in the restoration cycle of coral ecosystems and protection of the shoreline).

Mitigation of Disruption of Vegetative Cover and Tree Cutting

As a matter of principle there shall be minimal clearing of vegetation so as not to affect stability of the sites and reduce the chances of erosion as well as the visual impacts. Among others, the Contractor's obligations under the Contract shall include the following requirements as minimum:

- Store topsoil from excavated area for vegetation planting / reinstatement at the end of construction. Removed vegetation cover shall be restored on barren soil at the end of construction.
- The loading and/or covering of pipes, timbers, construction tools on vegetated areas shall be avoided.
- Trees which are to be retained or which are not required to be removed in order to carry out the Works shall be protected from damage at all times.
- Removed trees are to be replanted with native species.

If any trees or other similar obstructions are required to be removed during the Execution of the Works, the Contractor shall draw the attention of the Engineer to them and shall not remove them without approval of the Relevant Authority.

Among other requirements, the Contractor shall notify the Engineer – in prompt and timely manner to prevent any delay in the progress of carrying out the Works – about the possible need for any felling of Protected Trees prior to any such clearance of Protected Trees. The Contractor shall not take any such actions unless and until the Engineer gives approval accordingly. For this purpose, the Contractor shall make himself fully aware of what types of trees are Protected Trees as determined by the Relevant Authority in Seychelles.

For this purpose, the Contractor shall liaise with the Forestry, Conservation Sections and the Climate Change Division within the Ministry of Environment, Energy & Climate Charge, prior to any clearance, and to obtain the necessary permission for any felling of Protected Trees.

Mitigation of Effects on Cultural Sites

The Contractor shall avoid any and all disturbance to relevant cultural sites such as community centres and or religious facilities shall be avoided. Cultural sites may be affected with dust, noise from material and waste loading/disposals. In this context, unloading materials, parking vehicles/construction plants within 20 m of any cultural site shall not be allowed. If this is unavoidable, the unloading/parking should be finished within due time.

7.2.7 Protection of Landscapes

Prevention of Soil Pollution

The Contractor shall prevent the occurrence of soil pollution both through his construction activities and through the disposal of construction waste.

The Contractor shall though proper operation, storage and containment measures ensure that oil, grease, diesel and petrol are not allowed to pollute the soil. The Contractor shall ensure that wastewater, solid wastes, sludge wastes, chemical wastes and hazardous wastes are disposed of properly to prevent pollution of the soil, in total compliance with the Contract, and also according to any additional procedures and methods, as elaborated in the Contractor's Environmental Compliance Plan, and as approved by the Engineer.

Conservation of Topsoil

The Contractor shall not excavate topsoil prior to, and not longer than five days, before the start of such work, such as:

- All areas to be excavated for the construction of the permanent works;
- Areas to be occupied by roads, including temporary roads;
- Areas for the storage of fuels and oils;
- Areas to be used for batching/mixing of concrete;
- Areas for stockpiling of construction materials; and
- Areas for the Contractor's site camps.

The Contractor shall store topsoil from excavated area for vegetation planting / reinstatement at the end of construction. Topsoil shall be stored in piles less than one meter in height. Grass shall not be removed prior to stripping of topsoil. Topsoil shall not be mixed with any other material, and erosion of topsoil stockpiles shall be prevented.

Control of Flooding

The Contractor shall ensure that the area surrounding the area disturbed by construction activities shall not be subject to increased flooding risk as a result of blockage of natural or fabricated or drainage caused the Contractor's activities. Among others, the Contractor's obligations under the Contract shall include the following requirements as minimum:

- Maintain existing drainage if possible;
- Create drains surrounding material loads stored at the work site; and
- Periodically clean up drains at the site.

Where necessary, as determined by the Engineer, the Contractor shall provide roadside drains, culverts and cross drains as Temporary Works, which shall be well maintained at all times by the Contractor. When such Temporary Works are not anymore needed, as determined by the Engineer, then the Contractor shall remove such Temporary Works and reinstate the original site conditions, to the full satisfaction of the Engineer, and at no extra cost to the Employer.

Control of Soil Erosion

The Contractor shall take all reasonable measures to prevent soil erosion resulting from a diversion, restriction or increase in the flow of storm water or stream flow caused by the presence of temporary or permanent works, and activities. Acceptable measures to control soil erosion shall be implemented by the Contractor to the full satisfaction of the Engineer.

All storm water run-off shall be adequately controlled and disposed. No erosion will be tolerated at the work sites. Areas affected by construction related activities shall be monitored regularly by the Contractor for evidence of erosion. Areas particularly susceptible to erosion are areas stripped of topsoil, soil stockpiles and earth slopes of steep gradient.

Among others, the Contractor's obligations under the Contract shall include the following requirements:

- Where soil erosion does occur, the Contractor shall reinstate such areas and any other areas damaged by the erosion, all to the satisfaction of the Engineer;
- The Contractor shall design slope stabilisation solutions if the works are to be built on slopes; also provide a permanent drainage structure if the works is on a slope;
- All rock boulders shall be secured; Rock blasting shall not be allowed on site; Should there be a need to remove any rocks, it shall be done by use of wedge / jack hammer so as to minimize land destabilization;
- As far as appropriate, the Contractor has to include energy-dispersion structures in drainage system;

- Excavation works during wet season shall be avoided;
- Ground clearance areas shall be kept to minimal levels as possible;
- Reinstate vegetation cover at earliest opportunity;
- Carry out shaping and re-profiling cutting of slopes to minimise erosion potential;
- Replant trees on exposed land and slopes to prevent or reduce land collapse and keep the stability of slopes; and
- Maintain drainage system to ensure they are free of mud and other obstructions.

Stockpiling of Materials

All stockpiling sites shall be subject to the approval of the Engineer. The stockpiles shall be located in designated sites, or areas such as exhausted borrow pits or quarries. Material stockpiled shall be done so in such a way as to minimize the spread of materials and the impact on the natural vegetation. The Contractor shall provide permanent reinstatement of areas used for stockpiling upon completion of the works.

The Contractor shall be responsible for making all arrangements for the disposal of all surplus material from any excavation or stockpile, which is material extra-over the selected excavated material needed for use in the backfilling, grading or other purpose.

The location and size of stockpiled material including excavated material within the Site shall be submitted to the Engineer for his approval. All stockpiles shall be maintained in a stable condition at all times.

Among other requirements, areas shall be designated on Site for the collection of all spoil materials. These stockpiles shall be properly located so as not to block any land accesses and water courses. For this purpose, the Contractor shall notify the Engineer – in prompt and timely manner to prevent delay in the progress of carrying out the Works – about possible and acceptable locations of such spoil sites. The Contractor shall not take any associated actions unless and until the Engineer gives approval accordingly. For this purpose, the Contractor shall also liaise with the Environment Department in order to obtain prior approval about the locations of such spoil sites.

Disposal of Materials

Among other requirements, unless instructed otherwise by the Engineer, the Contractor shall dispose of surplus excavated material generated from the Works to the dumping areas designated by the Relevant Authority within 5 km (not along the road) from the Site. In addition, unless instructed otherwise by the Engineer, the Contractor shall dispose of contaminated material generated from the Works to the dumping areas designated by the Relevant Authority as being suitable to receive this contaminated material within 5 km (not along the road) from the Site.

Potential storage / dumping capacity is available at the Providence landfill adjacent to Providence WWTP. It shall be the responsibility of the Contractor to verify this, obtain the necessary permits and pay the appropriate fees, all of which shall be deemed covered by the Contractor within the rates and prices of the Contract.

7.2.8 Protection of Air Quality

Prevention of Air Pollution

The Contractor shall ensure that all vehicles used at Site comply with the local Seychelles regulations on allowable emission limits of exhaust gases. In addition, the Contractor shall ensure that drivers and operators turn the engine off if the vehicle is idle for more than five minutes. The Contractor shall also ensure that construction and other wastes are not burnt on-site.

If after commencement of the Works that the Contractor's Equipment and/or method of working are found to be causing serious air pollution impacts, they shall be inspected and remedial proposals shall be drawn up by the Contractor. In developing these remedial measures, the Contractor shall be required to inspect and review all dust sources that may be contributing to the pollution impacts. The proposed remedial measures shall be subject to the approval of the Engineer.

Control of Odours

The Contractor shall take reasonable measures to control nuisance odour whenever such odours arise. The Contractor shall maintain the work sites free of trash, garbage, and debris as part of its activities to control nuisance odour, and shall fully cover and secure haul truck cargos during material transport on public roadways.

The Contractor shall clean-up and properly dispose of excavated material that is deemed odourous. If odourous material is located on public roadways or walkways, clean-up methods shall consist of wet spray sweeping or vacuuming.

Other control measures may include reducing the amount of time that excavated material is exposed to the open atmosphere, or covering such stockpiles of excavated material with polyethylene sheeting and securing with sandbags or an equivalent method to prevent the cover from being dislodged by the wind. Permission of the Engineer must be obtained prior to the use of any chemical application for controlling odour. This method shall be used only when other methods are impractical.

The Contractor shall locate combustion engines away from sensitive receptors such as fresh air intakes, air conditioners, and windows. The Contractor shall establish a staging zone for trucks that are waiting to load or unload material at the work site, in a location where the diesel emissions from the trucks will not be noticeable to the public.

The Contractor shall control nuisance odours associated with diesel emissions by turning off diesel combustion engines on its equipment not in active use and on dump trucks that are idling while waiting to load or unload material for five minutes or more.

The Contractor shall also establish communication platforms for complaints and compliments measures as part of its odour control activities.

With respect to the control of odour, the Contractor shall be aware that the Roche Caiman No. 3 PS – which is to be reconstructed - is in close proximity to houses. Special care shall be taken while working on this pumping station to minimize and avoid odours during the construction works.

The Contractor shall also be aware that the rehabilitation of the Victoria No.5 and Victoria No. 6 pumping stations will take place in the vicinity of the main commercial area of Victoria. Special care shall be taken while working on the rehabilitation of these pumping stations to minimize and avoid odours during the construction works.

Control of Dust

As a result of the Contractor's activities under the Contract, exposure to high level of dust and smoke may directly impact the health conditions of persons exposed to such dust and smoke, especially the respiratory system and the eyes of such persons. The Contractor shall then ensure that dust generated from construction activities is minimal and at acceptable level. Among others, the Contractor's obligations under the Contract shall include the following requirements as minimum:

- During dry weather periods and in areas where dust generation is likely water spraying shall be applied (as far as appropriate several times per day);
- Materials including earthwork material from which dust may be generated when being transported to or from the Site shall be sprayed with water or covered;
- Trucks carrying granular material shall be covered;
- Screens, dust sheets, tarpaulins shall be used to prevent generation of dust;
- Stop construction and spray the site when there are complaints about dust;
- Vehicles used shall comply with the Relevant Authority's regulations on allowable emission limits of exhaust gases;
- There shall be no burning of any type of waste on-site; and
- Drivers must turn engines off if the vehicle is idle for more than five minutes.

7.2.9 Protection of Surface and Ground Waters

Prevention of Water Pollution

The Contractor shall take all necessary precautions to secure the efficient protection of all waterways against pollution including spillage of oil or concrete mixer wastes, site drainage or any other deleterious materials. The Contractor shall seek the Engineer's approval for discharging any matter that may impair the groundwater quality. If, nevertheless, such spillage occurs, the Contractor shall clean the waterway at his own expense, and keep the Employer indemnified against any claim arising from such pollution during the execution of the Works.

Natural streams or rivers within the Site where no work is being carried out shall be kept clean and free of any floating debris. All equipment and working methods to be used in or near the natural streams or rivers shall be planned to reduce disturbance. No material storing and no parking of the Contractor's Equipment or other vehicles near the streams or rivers shall be allowed.

The Contractor shall not discharge directly or indirectly (by runoff) or cause or permit or suffer to be discharged into any public sewer, storm water drain channel, stream course or river, any effluent or foul or contaminated water or cooling or hot water without a valid discharge license. The Contractor shall provide, operate and maintain within the premises or otherwise, suitable works for the treatment and disposal of such effluent or foul or contaminated or cooling or hot water.

The Contractor shall prevent pollution of drains and watercourses by sanitary wastes, sediment, debris and other substances resulting from construction activities. No wastes shall be permitted to enter any drain or watercourse or any sanitary sewer, unless satisfactorily treated to the approval of the Engineer.

The Contractor shall use appropriate sludge management measures, including the re-use of the sludge, whenever its activities require such measures, which shall be subject to the Engineer's approval prior to performing such measures. Such measures shall include the use of vacuum trucks to remove impounding sewage and other contaminants spillages.

Among others, the Contractor's obligations under the Contract shall include the following requirements as minimum:

- Ground disturbance near water sources shall be avoided;
- Sediment traps to collect sediment from rainwater before surface flow enters water bodies shall be installed;
- Washing of tools or any type of machinery in streams, rivers or lakes shall not be allowed;
- Avoid disposing of construction materials and waste in water bodies; and
- Chemical management instructions to prevent chemical leaks into water bodies shall be followed.

Mitigation of Effects on Surface Water

The Contractor shall provide for the drainage of storm water and such water as may be applied or discharged on the site in performance of the work at his own cost.

Drainage facilities shall be adequate to prevent damage to the work, the site, and adjacent property. Dikes shall be constructed as necessary to divert increased runoff from entering adjacent property (except in natural channels) to protect property owner's facilities and the works and to direct water to drainage channels or conduits. Stilling pools shall be provided as necessary to prevent downstream flooding.

Mitigation of Effects on Ground Water

The Contractor shall prevent the occurrence of the pollution of ground water both through his construction activities and through the incorrect disposal of construction waste.

The Contractor shall though proper operation, storage and containment measures ensure that oil, grease, diesel and petrol are not allowed to pollute the groundwater. The Contractor shall ensure that wastewater, solid wastes, sludge wastes, chemical wastes and hazardous wastes are disposed of properly to prevent pollution of the groundwater, in total compliance with the Contract, and also according to any additional procedures and methods, as elaborated in the Contractor's Environmental Compliance Plan, and as approved by the Engineer.

Control of Water Siltation

The Contractor shall take all reasonable measures to prevent siltation of surface water bodies resulting from a diversion, restriction or increase in the flow of storm water or stream flow caused by the presence of temporary or permanent works, and activities. Acceptable measures to control water siltation shall be implemented by the Contractor to the full satisfaction of the Engineer.

7.2.10 Management of Waste Disposal

Disposal of Wastewater

The Contractor shall ensure that wastewater from construction activities shall not leak or be disposed of into water sources nearby construction sites or downstream of construction sites. Among others, the Contractor's obligations under the Contract shall include the following requirements as minimum:

- The Contractor shall ensure accessibility to toilets for workers;
- Discharge of wastewater from toilets directly into any water body is not allowed;
- Cover and seal off all water collection tanks and septic tanks at the end of construction works;
- Runoff from the Site shall be controlled to ensure that adjacent areas are not affected and disturbance to the public is to minimum; and
- The Contractor shall ensure that under no circumstances foul sewage flow can be diverted into a storm water drains and vice versa.

Both Victoria No. 5 and Victoria No. 6 pumping stations shall be rehabilitated while they are still in operation. The Contractor shall maintain the sewage flows temporarily during rehabilitation of both of these pumping stations. During these rehabilitation works the Contractor shall take particular care to ensure that there is no spillage of sewage into the environment.

For the other 4 no. pumping stations which are to be reconstructed the Contractor shall take to ensure that there is no spillage of sewage into the environment when sewers are disconnected from the existing pumping stations and reconnected to the new pumping stations.

Disposal of Solid Wastes

The Contractor is expected to generate solid waste during excavation works and also the removal of all road surface, structural and building demolition waste and disused pipelines. Another waste source is referring to unused materials such as timber/glass/metal, packaging materials or generated by the workers including lunch containers, leftover food etc. Among others, the Contractor's obligations under the Contract shall include the following requirements as minimum:

- The Contractor shall provide waste bins for litter/garbage and refuse collection; These waste bins shall be covered, tip-proof, weatherproof and scavenger proof;
- Burning of any type of waste on-site is not allowed;
- Storage of solid waste temporarily on site shall be in a designated area which shall be subject to the approval of the Engineer;
- Disposal of construction waste shall only be allowed in areas approved by the Relevant Authorities;
- Disposal of any material in environmentally sensitive areas such as swamp / lagoon / sea grass bed, mangrove areas, or grassland seasonally inundated, or any area that is protected as a green space in watercourses is not allowed; and
- The Contractor shall maximise the reuse of recyclable materials where possible. Materials such as wooden plates, steel, scaffolding material, site holding, packaging material shall be collected and separated on-site from other waste sources for reuse, for use as fill or provided to recycling vendors.

With respect to the disposal of waste in environmental sensitive areas, referred to above, the Contractor shall not dispose of waste in the lagoon which is adjacent to the new Le Rocher PS.

Potential storage / dumping capacity is available at the Providence landfill facility adjacent to Providence WWTP. It shall be the responsibility of the Contractor to verify this, obtain the necessary permits and pay the appropriate fees, all of which shall be deemed covered by the Contractor within the rates and prices of the Contract.

With respect to the disposal of construction waste the Contractor shall note that the Employer has decided not to remove and salvage the existing forcemains after they are decommissioned. Therefore it will not be necessary the Contractor to remove and dispose of either approx. 1.3 km of DN450 DI pipeline from the existing Terminal PS to Roche Caiman No.3 PS or approx. 2.5 km of DN600 DN pipeline from the existing Le Rocher PS to the Providence WWTP.

At Roche Caiman No.3 PS the amount of demolition waste generated will be minimised by retained the existing pumping station sump as an emergency overflow chamber.

Disposal of Sludge Wastes

The Contractor shall use appropriate sludge management measures, including the re-use of the sludge, whenever its activities require such measures, which shall be subject to the Engineer's approval prior to performing such measures. Such measures shall include the use of vacuum trucks to remove impounding sewage and other contaminants spillages.

Depending on the nature and condition of the sludge collected, the Contractor shall either dispose of the sludge at the Providence WWTP or at the Providence landfill. The location for sludge disposal shall in each instance be subject to the approval of the Engineer.

Disposal of Chemical Wastes

For the purpose of the Contract, all chemical wastes shall be considered to be hazardous wastes.

Disposal of Hazardous Wastes

As a result of the Contractor's activities under the Contract, generation of chemical and/or hazardous waste may include used oil, paints, lubricant, batteries, and asbestos-containing materials are toxic.

Some of the solid waste may be cross-contaminated with oil, paints etc. that may be toxic and pose public health risk. Among others, the Contractor's obligations under the Contract shall include the following requirements as minimum:

- Handling of hazardous materials and other toxic substances shall only be carried out by specially trained and certified workers;
- Materials containing asbestos for construction shall not be used;
- All chemicals or potentially hazardous substances shall be stored in a designated site (fenced, locked); used oil, lubricants, cleaning materials, filters etc.shall be collected in holding tanks; and
- The Contractor shall ensure the correct storage of chemicals with appropriate labelling and signboards.

7.2.11 Mitigation of Construction Activities

Management of Site Camps

Where site camps are to be established, the need for removing topsoil from the site, before site establishment, shall be investigated by the Contractor. Removed topsoil shall then be stockpiled by the Contractor for use in rehabilitation of the site camp.

The Contractor shall not locate any site camp in an environmentally sensitive area. Runoff from site shall be prevented from entering any water bodies; all water requiring discharge shall be discharged in a manner approved by the Engineer.

The Contractor shall maintain all site camps and surrounding areas in a clean, tidy and orderly condition at all times.

Temporary living accommodation only for the use of watchmen and a limited number of emergency personnel may be provided by the Contractor within the Site in accordance with the number of persons to be accommodated. The accommodation shall be maintained in clean and sanitary condition at all times.

Management of Working Areas

Working Areas are those areas which are required by the Contractor to perform the works, and shall be subject to the Engineer's approval. Working Areas include areas associated with permanent and temporary works at the sites of the associated facilities, and areas outside the sites of the associated facilities, such as burrow areas and haul roads between the sites and burrow areas.

The Contractor shall not be permitted beyond the Working Areas, except for temporary or exceptional cases, subject to the Engineer's approval.

Working Areas shall be designated by the Engineer according to proposals submitted by the Contractor in his Programme, Working Drawings, Method Statements and other documents and notices.

The Contractor shall keep all work sites clean and litter free. The Contractor shall provide refuse bins at the work sites and shall be responsible for the disposal of all litter generated by all his staff and his sub-contractors in an approved manner.

Erection and Removal of Fences

All existing fences affected by the works shall be maintained by the Contractor until completion of the works at no additional cost to the Employer. Where construction activities require the removal of fences from around private land, the Contractor shall inform occupants at least three days in advance to obtain their prior permission.

Fences which interfere with construction operations shall not be relocated or dismantled until written permission is obtained from the owner of the fence and the period the fence may be left relocated or dismantled has been agreed upon.

Where fences must be maintained across the construction easement, adequate gates shall be installed. Gates shall be kept closed and locked at all times when not in use.

On completion of any work across any tract of land, the Contractor shall restore all fences and/or boundary markers to their original or to a better condition and at their original location without any additional cost to the Employer.

The Contractor shall be responsible for the design, installation, maintenance and removal of all hoardings, fences, gates and signboards including protective measures necessary to provide security of the Site and to protect public from the construction activities and hazards associated with the Works.

Among other requirements, the Contractor shall notify the Engineer – in prompt and timely manner to prevent delay in the progress of carrying out the Works – about the possible need to undertake any earthworks for the erection of fences or construction of gates. The Contractor shall not take any such actions unless and until the Engineer gives approval accordingly. For this purpose, the Contractor shall also liaise with the Planning Authority for advice.

Provision of Temporary Drainage

With respect to the temporary diversion of existing watercourses and drainage systems, the Contractor shall provide temporary drainage works. The proposed diversion plans shall be acceptable to the Relevant Authorities and shall be subject to the approval of the Engineer.

Runoff from the Site shall be controlled to ensure that adjacent areas are not affected and disturbance to the public is to minimum. Under no circumstances shall foul sewage flow be diverted into a storm water drains and vice versa. In this respect, the Contractor shall exercise particular care in the vicinity of the new Le Rocher PS which is immediately adjacent to a lagoon. In addition the particular care shall also be exercised by the Contractor at the places where the both the DN450 and DN600 forcemains cross water courses.

Control of Vehicles and Machinery

The Contractor shall obtain the relevant approvals and permits from the Road Transport Authority and other Relevant Authorities before – moving heavy vehicles and construction equipment and machinery on public roads. The Contractor shall be aware that traffic is frequently heavy in the vicinity of the pumping stations to be rehabilitated or reconstructed and along the routes of both forcemains.

Control of Oil and Fuel Spills

The Contractor shall take all measures necessary to protect surface and groundwater from contamination by fuels and lubricants. This shall include:

- Bund all tanks for fuels, oils etc. to contain any possible spills;
- Provide spill mitigation equipment including absorbents; and
- Take immediate actions according to approved methods in case of spills.

Control of Fire Hazards

The Contractor shall take all the necessary precautions to ensure that uncontrolled fires are not started as a consequence of his activities on site. The Contractor, his subcontractors and all his employees are expected to be conscious of fire risks.

The Contractor shall hold fire prevention talks with his staff to create an awareness of the risks of fire. Regular reminders to his staff on this issue are required.

The Contractor shall ensure that there is adequate fire-fighting equipment on site.

The Contractor shall be liable for any expenses incurred by any organization called to assist with fighting fires and for costs involved in the rehabilitation of burnt areas, property and/or persons, should the fire be the result of the activities of the Contractor.

7.2.12 Mitigation of Social Impacts

As a result of the Contractor's activities under the Contract, interference with access and roads may affect the livelihoods of the ordinary citizen travelling to and from Victoria and those residing or running businesses near the project areas. In addition to the common nuisances such as noise caused by machinery, dust, potential structural damage to property, disposal of pumped (waste) water, these may create tensions and conflicts between the affected individuals, the concerned communities and the Contractor. For this purpose, the Contractor shall fully comply with the requirements for controlling both odour and dust, particularly in the vicinity of pumping stations.

Protection of Public Health

The Contractor shall be responsible for the protection of the public health, and public and private property, from any dangers associated with construction activities, and for the safe and easy passage of pedestrians and traffic in areas affected by his activities.

The Contractor shall provide an Occupational Health and Safety (OHSMS) Plan prior to the commencement of works.

The Contractor shall install fences, barriers, dangerous warning/prohibition signs around the construction area. Traffic control measures shall be implemented including road/rivers/canal signs and the use of flag persons to warn of dangerous conditions. The Contractor shall also ensure that no children allowed to be around construction activities in particular during excavation and the installation of structures.

Any excavations, material dumps, or other obstructions likely to cause injury to any person or thing shall be suitably fenced off and at night marked by red warning lights.

Protection of Worker Safety and Health

As a result of the Contractor's activities under the Contract, health risks at the workplace, such as heat, noise, dust, hazardous chemicals, unsafe machines and psychological stress, cause occupational diseases and can aggravate other health problems. Conditions of employment, occupation and the position in the workplace hierarchy also affect health.

The Contractor shall ensure that all workers have access to protective measures, particularly (as minimum):

- Workers shall be briefed regularly on occupational health and safety regulations;
- Prior to the commencement of works the Contractor shall prepare an Occupational Health and Safety Management System (OHSMS) for approval by the Engineer;
- Workers exposure shall be reduced with the use of and proper care of protective clothing and equipment;
- Traffic control measures, including road/rivers/canal signs and flag persons to warn of dangerous conditions shall be implemented; and

- The Contractor shall install fences, barriers, dangerous warning/prohibition signs around the construction area in order to protect the workers.

Protection of Public and Private Property

The Contractor shall obtain permission from property owners prior to entering any private property.

The Contractor shall protect, shore, brace, support, and maintain all structures, underground pipes, conduits, drains and other underground constructions uncovered or otherwise affected by his construction operations. All pavement, surfacing, driveways, curbs, walks, buildings, utility poles, guy wires, fences and other surface structures affected by construction operations, together with all sod and shrubs in yards and parking, shall be restored to their original condition, whether within or outside the easement. All replacements shall be made with new materials, at no additional cost to the Employer.

The Contractor shall be responsible for all damage to structures, streets, roads, highways, shoulders, ditches, embankments, culverts, bridges, and any other public or private property, regardless of location or character, which may be caused by transporting equipment, materials, or men to or from the works, or any part or site thereof, whether by him or his sub-contractors. The Contractor shall make satisfactory and acceptable arrangements with the owner of, or the agency or authority having jurisdiction thereupon, the damaged property concerning its repair or replacement or payment of costs incurred in connection with the damage, at no additional cost to the Employer.

In the event of any claims for damage or alleged damage to property as a result of work under the Contract, the Contractor shall be responsible for all costs in connection with the settlement of or defence against such claims. Before the Performance Certificate will be issued, the Contractor shall furnish satisfactory evidence to the Engineer that all claims for damage have been legally settled.

The Contractor shall minimize the cutting and removal of trees and other vegetation. All cutting and removal shall be with the approval of the Engineer, and if necessary with the approval of the Relevant Authority.

Among other requirements, the Contractor shall liaise and conduct discussions to obtain agreements between private landowners and other public utilities companies to have necessary way leaves for carrying out the Works under the Contract.

Mitigation of Social Disturbances

As a result of the Contractor's activities under the Contract, the construction works have the potential to impact the community life, particularly rights and interests of vulnerable (population) groups. Here the Contractor shall implement protective measures as follows (as minimum):

- The Contractor shall maintain open communications with the local government and concerned communities (erect notification boards in local language/s at construction sites providing information about the project and contact numbers).
- Concerned community(ies) shall be informed at least one week before site clearance is started.

- The Contractor shall coordinate with local authorities (leaders of local wards or communities) for agreed schedules of construction activities at areas near sensitive places or at sensitive times (e.g. religious and/or festival days).
- Local residents shall be informed about construction and work schedules, interruption of services and demolition, where applicable.
- Community concerns and information requirements shall be monitored in line with the project progresses.
- Contractor shall provide warning signs at the start and end of any trench when excavating and laying pipes for the new force mains.
- If approriate, the Contractor shall mitigate disturbance to cultural sites (e.g. church, temple, mosque, community) by avoiding unloading materials, parking vehicles/construction plants within 20 m of any cultural site. If this is unavoidable, the unloading/parking shall be finished within 3 hours.
- Water shall be sprayed regularly if construction is near any cultural structure or complaints will be raised by individuals or community leaders.
- The Contractor shall carry out consultation with those affected as early as possible if it is not avoidable to use these sites.
- The Contractor shall respond to telephone inquiries and written correspondence in a timely and accurate manner.

The Contractor shall carry out construction of the works while avoiding inconvenience as far as possible to the owners and occupants of properties adjacent to the works. Any costs for any measures provided in this regard shall be borne by the Contractor.

The Contractor's staff shall in no way be a nuisance to nearby residents. Any complaints received by the Engineer will be addressed and the relevant persons shall be removed from the work site.

The Contractor shall ensure that access to property is not unreasonably disrupted. When it is necessary to temporarily deny access to owners or tenants to their property or when any utility service connection must be interrupted, the Contractor shall give written notice as prescribed herein or by the Relevant Authority sufficiently in advance to enable the affected persons to provide for their needs. Notices shall include appropriate information concerning the interruption and instructions on how to limit their inconvenience.

Control of Traffic at Work Sites

The Contractor shall comply with all the Applicable Laws with regard to road safety and transport. The Contractor shall instruct its drivers and equipment operators that vehicles shall comply with all road ordinances, such as speed limits, roadworthiness, load securing and covering.

The Contractor's vehicles shall be permitted only within the designated work sites or on existing roads, as would be required to complete their specific tasks. Vehicles are not permitted on re-vegetated areas, and site traffic shall be limited to prevent unnecessary damage to the natural environment.

The Contractor shall not enter for any deliveries or occupy for any other purpose with men, tools, equipment, construction materials, or with materials excavated from any trench or pit in any private property outside the designated way-leaves, without written permission from the owner and/or tenant of the property.

The Contractor shall arrange with property owners to establish and maintain temporary access roads to various parts of his site as required to complete the works at his own cost.

Such roads shall be available for the use of all others performing work or furnishing services in connection with the Contract.

Existing public access roads used by the Contractor in connection with the execution of the Contract shall also be maintained by the Contractor.

The Contractor shall not keep the trenches open for a long time in the built up areas in the town centre or in the places where it affects the traffic except as otherwise instructed by the Engineer.

Noise Control

The Contractor shall take reasonable measures to avoid unnecessary noise. Such measures shall be appropriate to maintain the legal noise levels applicable to each area.

All construction machinery and vehicles shall be equipped with practical sound muffling devices and shall be operated in a manner to cause the least noise consistent with scheduled performance of the work. The Contractor shall install silencers/mufflers on exhaust of noisy machines in acoustically protected areas.

During construction activities on or adjacent to occupied buildings and when appropriate, the Contractor shall erect screens or barriers effective in reducing noise in the building, and shall conduct his operations to avoid unnecessary noise which might interfere with the activities of building occupants.

The Contractor shall where possible avoid construction activities outside of normal working hours i.e. 07:00 hours to 17:00 hours Monday to Saturday excluding Public Holidays. Where this is unavoidable the Contractor shall inform local communities at least two days before construction takes place during early morning and/or late at night. Any proposal by the Contractor to work outside of normal working hours shall be subject to the approval of the Engineer.

The Contractor shall also establish communication platforms for complaints and compliments measures as part of its noise control activities.

Vibration Control

All mechanical equipment and construction processes on or off the Site shall not cause excessive vibration which may disturb any occupant of any nearby dwellings, schools, hospitals or premises with similar sensitivity to vibration. Vibration caused by any construction activities, including movement of construction equipment, shall be in accordance with the relevant local laws and regulations, the requirements of the Relevant Authorities and any other statutory approvals issued for the Works.

7.2.13 Liaison with Engineer and Third Parties

Liaison with Relevant Authorities

The Contractor shall make all necessary arrangements with and obtain all necessary approvals, permits and consents from the Relevant Authorities, utility companies and other government departments for the design, execution, commissioning and hand over of the Works. The Contractor shall be deemed to be fully aware of the requirements and procedures of all Relevant Authorities, utility companies and other government departments. All correspondence, meeting notes and submissions made pursuant to this Clause shall be submitted to the Engineer for information.

The Contractor shall maintain close liaison with utility companies and contractors employed by the other organizations who are carrying out works on or adjacent to the Site. The Contractor shall ensure that the progress of the Works is not adversely affected by the activities of such other parties and vice versa. The Contractor shall inform the Engineer – in prompt and timely manner to prevent delay in the progress of carrying out the Works – when the potential disruptions due to the other parties are anticipated.

Liaison with Private Persons

The Contractor shall be responsible for liaising with and obtaining permission from all owners and/or occupiers of private lands and properties in order to gain access to such properties for the execution of the Works and the purpose of carrying out survey works, monitoring works, investigation works, utilities connection works, materials and plant storage and the like. No access to private lands shall be permitted at any time without the private agreement of the landowner, occupiers or other users and the approval of the Engineer.

7.2.14 Other Requirements

Containment Plan for Sewage Spills during Construction

In order to control and remedy sewage spills during construction the Contractor shall provide a detailed Containment Plan for emergencies during the construction period of the Contract which shall clearly define locations of discharge points of raw sewage during emergency.

Maintenance Plan of Forcemains Constructed under the Contract

The Contractor shall provide a detailed Maintenance Plan for the force mains constructed under the Contract, as part of the O&M Manuals to be provided prior to Taking-Over, and subject to the Engineer's approval. This Maintenance Plan shall meet the requirements of the Environment Department and Environmental Health Department of Seychelles.

Right of Engineer to Suspend Work

The Engineer shall have the right to suspend work in the event of significant infringements of any of the Environmental Requirements of the Contract, until the situation is rectified. In this event, the Contractor shall not be entitled to claim for delays or any incurred expenses.

7.3 Feedback Acceptance, Grievance Redress Mechanism

The Project will include a Grievance Redress Mechanism (GRM) that is designed to facilitate feedback from any Project participant or stakeholder regarding project operations, management, use of resources and impacts of activities, intentionally or otherwise, and resolution of the same by project management, Government and/or the EIB. In the event that any Project stakeholder feels that the principles or processes of the project have not been adhered to or followed, or that resources have been misused or any person or persons have abused the process for personal gain, or that the Project is seen as harming households or community groups, then those stakeholders have the right to raise their concerns and to seek satisfactory acknowledgement and resolution of their grievances. This right is essential to ensure transparency and accountability. Stakeholders will be informed of the Project GRM through community meetings, Project documentation and through the local media. The Project Grievance Resolution Mechanism uses a three stage approach:

Stage 1: If the source of the concern is located within a community itself, then the first attempt to resolve the problem will be made through traditional methods and mechanisms at village level (relying District Representatives) to report and resolve the issue if possible. Otherwise, a public meeting may be called to help resolve the problem.

Stage 2: If local methods cannot solve the problem to the satisfaction of the concerned stakeholders, the stakeholders may then take the matter to the District Administration or PUC, who will endeavour to propose a satisfactory solution.

Stage 3: Should neither the District Administrator nor PUC be able to offer a satisfactory solution, the matter may then be referred to the District Grievance Committee. If there is currently no such committee, the District Administration/Council, with District Administration/Council endorsement will appoint such a committee. The Committee will consider whether the grievance is genuine and, if so, will suggest an appropriate course of action to resolve the matter. If, however, either the aggrieved party or the party at fault does not accept the suggested solution, the Grievance Committee may then direct that the matter be forwarded to the District Administration or an arbitration system for resolution.

If, for any reason, stakeholders feel that the local institutions cannot assist in the resolution of grievances because they include an individual or individuals who have themselves abused the process, then they may take their grievance to the PUC, either directly, or through any other third party such as an NGO, a faith-based group, or a women's network, etc.

The District Administration would be responsible for recording the grievance or complaint using **FORM 1**, below (or something similar), and for reporting to the PUC on grievances recorded through his/her progress report. If, due to its nature, the grievance requires immediate attention, the Community Helper would inform the PUC without waiting for quarterly report submission. The summary report of grievances/complaints from the CHs would be captured in the project's management information system (MIS) at the by the District Administrator/Council Chairperson. The MIS would track the date and type of comment or complaint (informational, regarding sub-project process, project staff behaviour, use of sub-project financial resources, etc.), how and when the comment or complaint was resolved. The District Administrator will consult each other on all complaints received on at least a quarterly basis to respond to any systematic issues or problems. The PUC (M&E Officer) would track and report on the overall project grievance resolution process to the EIB Bank for discussion and action as required during their implementation support missions.

FORM 1 : COMMUNITY FEEDBACK/COMPLAINTS RECORDS

Name of District Representative:

For the period from: . . . . . / . . . . /. . . . . to . . . . / . . . . / . . . . .

Date	Name	Nature of Complaints	Actions taken to follow up and Outcomes	Complaints addressed completely?

7.4 Implementation Responsibilities

Responsibilities of Project key stakeholders in implementing the ESMP are allocated in the table below.

Responsibilities of Project key stake holders in implementing the ESMP

Stake holder	Key Responsibility
PUC/PMU	Facilitate information disclosure process
PUC/PMU	• Provide inputs to activity Environmental Codes of Practices (ECOPs) as and when required • Incorporate relevant mitigation measures proposed in activity ECOPs into detail engineering design of the activity • Incorporate ECOPs and relevant Mitigation measures into bidding documents and construction contract • Oversee the implementation of mitigation by the communities/contractors • Provide guidance to communities/contractors to address arisen socio-environmental issues during construction phase of the work • Provide technical guidance to benefited community to promote safe and environmental sound maintenance of the works provided
District Administration	• Attend safeguard training organised by the Project • Facilitate project activities related to community consultation and information dissemination • Collect local information to provide inputs for socio-environmental eligibility and impacts monitoring • Facilitate community in monitoring of relevant activities during community meeting and follow up till finalisation • Facilitate community, particularly assist SIC, in monitoring socio-environmental impacts of activities and follow up till finalisation • Facilitate community participatory monitoring during the construction phase of relevant activities
Community SIC	With the assistance of District Administration and the Community and the guidance of SIC, members of the benefited communities will:: • Participate in environmental monitoring process, • Propose alternative options to ensure that activities are eligible and/or have minimal negative socio-environmental impacts • Actively participate in environmental monitoring during construction • Undertake mitigation measures during the construction phase of the works provided by the Project

Stake holder	Key Responsibility
	• Arrange and implement proper maintenance of the works to ensure potential impact during operation phase are mitigated
Contractors	• Implement the mitigation measures specified in construction contract • Monitor environmental conditions in areas disturbed by the contractor and report to the work supervisor/the Engineer. • When socio-environmental issues arise, report the issues to the Work Supervisor/the Engineer to obtain guidance on actions. Make records of such issues and follow up

7.5 Promoter's Responsibilities of the Finance Contract

In addition to the implementation responsibilities of Section 7.4 above, PUC as the Promoter of the Project is also responsible that the associated requirements of the Finance Contract between the Government of Seychelles and the European Investment Bank are adhered during Project implementation.

For these, the Promoter must comply with the following obligations:

(a) Implement and operate the Project in compliance with Environmental Law;
(b) Obtain and maintain requisite Environmental Approvals for the Project; and
(c) Comply with any such Environmental Approvals.

For the above obligations, "Environment" means the following, in so far as they affect human health and social well-being:

- Fauna and flora;
- Soil, water, air, climate and the landscape;
- Cultural heritage and the built environment;
- And includes, without limitation, occupational and community health and safety matters and working conditions.

For the above obligations, "Environmental Claim" means any claim, proceeding, formal notice or investigation by any person in respect of any Environmental Law.

For the above obligations, "Environmental Law" means:

- EU law, standards and principles as specified by the EIB;
- The Republic of Seychelles' national laws and regulations; and Applicable international treaties;
- Of which a principal objective is the preservation, protection or improvement of the Environment.

For these, EIB funds will not be used by the Promoter prior to completion of Environmental and Social Impact Assessment and stake-holders participation as required by the national legislation and satisfactory to the EIB.

7.6 Borrower's Responsibilities of the Finance Contract

In addition to the implementation responsibilities of Section 7.4 above, the Government of Seychelles as the Borrower of the Project is also responsible that the associated requirements of the Finance Contract between the Government of Seychelles and the European Investment Bank are adhered during Project implementation.

For these, the Borrower must procure that the Promoter promptly informs the EIB of:

- Any action or protest initiated or any objection raised by any third party or any genuine complaint received by the Borrower or any material Environmental Claim that is to its knowledge commenced, pending or threatened against it with regard to environmental or other matters affecting the Project; and
- Any fact or event known to the Borrower, which may substantially prejudice or affect the conditions of execution or operation of the Project;
- Any non-compliance by it with any applicable Environmental Law; and
- Any suspension, revocation or modification of any Environmental Approval, and set out the action to be taken with respect to such matters.

For the above, "Environment" and "Environmental Law" and "Environmental Claim" mean the same as the definitions of Section 7.5 above.

8 Stakeholder Engagement and Public Consultation

8.1 Overview

In reference to Chapter 10 of Volume I of EIB's Environmental and Social Handbook (version 9.0 of 02/12/2013): The specific objectives of stakeholder engagement and public consultation include the following:

- Establish and maintain a constructive dialogue between promoter, affected communities and other interested parties throughout the project life cycle;
- Ensure that all stakeholders are properly identified and engaged;
- Engage stakeholders in the disclosure process, engagement and consultations in an appropriate and effective manner throughout the project lifecycle, in line with the principles of public participation, non-discrimination and transparency;
- Ensure that the relevant stakeholders, including commonly marginalised groups on account of gender, poverty, educational profile and other elements of social vulnerability, are given equal opportunity and possibility to voice their opinions and concerns, and that these are accounted for in the project decision-making.

The above is consistent with Regulation 6(1) of the Environment Protection (Impact Assessment) Regulations, 1996, of Seychelles, in which the Authority undertakes a scoping exercise, where the Proponent first meets with the Authority to discuss the project and the list of stakeholders to be consulted during the scoping activity. This is followed by a process where stakeholders are consulted on the issues that need to be taken into account in the ESIA. The ESIA Report is then subjected to public inspection as required for Class I studies that need to be so in order to be in accordance with Regulation 8(1) of same regulations.

8.2 Scoping Meetings with Relevant Authorities

As part of the consultative process, the Ministry of Environment, Energy and Climate Change, which is the Relevant Authority of the EIA process in Seychelles, was consulted. This resulted in scoping meetings with internal stakeholders of that ministry, in which no serious concerns were raised towards the Project.

Other stakeholders such as the Planning Authority and the Ministry of Natural Resources and the District Authorities were also consulted. These stakeholders also did not raise any serious concerns towards the Project.

8.3 Consultation Meetings with the Public

As associated with this ESIA Report: The Promoter reached out to communities and people that are likely, or may be adversely impacted from the Project. This process of consultation was undertaken in a meaningful manner that provided the affected parties with opportunities to identify and express their views on project risks, impacts and mitigation measures, and engaged in a collaborative process with the Project in responding to, and addressing considerations raised.

A public meeting was advertised and was held on Saturday 7th May 2016 at 13.00 hours. The venue was the Roche Caiman Community Centre nearby the new sewerage pump station to be constructed. After a period of 40 minutes elapsed there were no members of the public who had arrived to attend the meeting and therefore the meeting was closed.

The notices of this public meeting are provided in Annex 7.

Nonetheless, it should be recognized that all of the Project activities involve either: the refurbishment of existing sewerage facilities; or the construction of new sewerage works and facilities to replace existing sewerage works and facilities in the same areas adjacent to the existing sewerage works and facilities.

Accordingly, peoples and communities that are likely impacted from the Project would not be impacted in an adverse manner. Instead these peoples and communities will be impacted in a positive manner, since the new works and facilities have been designed to provide environmental improvements and additional safeguards upon completion.

Accordingly, any adverse impacts to peoples and communities would be associated with the activities of the construction Contractor during implementation. These impacts have been mitigated to the greatest extent possible, by environmental and social requirements: that are incorporated into the tender and contract documents; and that shall be complied by the construction Contractor and supervised by the supervising Engineer. These environmental and social requirements are provided in Section 7.2 above.

8.4 Environmental Approval of the Project

In reference to the Finance Contract between the Government of Seychelles and the EIB: The Promoter has an obligation to obtain the requisite Environmental Approval for the Project.

For this purpose, the following steps of the process of preparing an EIA study for Class I projects in Seychelles were carried out:

(1) Scoping meeting with the Department of Environment,
(2) Undertake scoping study & prepare scoping report,
(3) Upon submission of scoping report the ministry provides the detailed Terms of Reference to carry out the ESIA Report,
(4) ESIA Report is undertaken on the basis of the Terms of Reference,
(5) ESIA Report is submitted to the promoter for review,
(6) ESIA Report is submitted for internal review,
(7) ESIA Report is submitted for public review,
(8) ESIA Report undergoes final appraisal for environmental approval.

As associated with this ESIA Report: Stakeholders were satisfactorily engaged on environmental and social issues that could potentially affect them through a public participation process comprising both information disclosure and public consultation. People and communities were also identified that are or could be affected by the Project, as well as other interested parties.

For Project implementation: Safeguards and mechanisms have been satisfactorily established that will maintain a constructive relationship with stakeholders on an ongoing basis through adequate engagement throughout implementation of the Project. These include the environmental and social requirements: that are incorporated into the tender and contract documents; and that shall be complied by the construction Contractor and supervised by the supervising Engineer.

As a result of the above: Environmental Approval was dispatched to the Promoter by the Relevant Authority on 3rd March 2017 which is provided in Annex 9.

9 Conclusions

This ESIA Report has been prepared to fully meet the requirements of the Environment Protection Act of the Government of Seychelles, among which are true statements and descriptions of:

- The location, size and scope of the project or activity and description of the original state of the environment prior to implementation of the project or activity;
- The principle, concept and the purpose of the project or the activity;
- Technical aspects relating to the project or the activity;
- The direct or indirect effects that the activity is likely to have on the population, flora and fauna, soil, air, water, landscape, and other physical assets including historical, artistic and archeological;
- Any actions or measures which may avoid, prevent, change, mitigate or remedy the likely effects of the activity or the project on the environment;
- The inevitable adverse effects that the project or the activity is likely to have on the environment if it is implemented in the manner proposed by the proponent;
- The irreversible and irretrievable impact on the commitments of resources which will be involved by the project or the activity;
- The actions or measures proposed for compensating physically or financially for any resulting loss or damage to the environment;
- A study of the feasible alternatives considered, including a summary of all the expected impacts;
- An environmental monitoring programme;
- Such other information as may be necessary to a proper review of the potential environmental impact of the project or the activity.

This ESIA Report has also been prepared to fully meet the requirements of the EIB, among which attention was given to the following:

- The physical characteristics of the whole project and, where relevant, its area of influence, during the construction and operational phases;
- The location of the major works, with particular regard to the environmental sensitivity of the geographical area likely to be affected and social aspects;
- The impacts on human rights, likely to be significantly affected by the proposed works;
- The communities likely to be impacted by the project, and of other relevant stakeholders;
- The likely significant effects of the proposed project on the environment, population and human health resulting from: the expected residues, emissions and the production of waste; the use of natural resources, in particular soil, land, water, and biodiversity; and any expropriation, land acquisition and easements and/or involuntary resettlement of people and likely restrictions on access to land, shelter and/or livelihood;

- The measures foreseen to avoid, prevent or reduce any significant adverse effects on the environment, human health and well-being.

All of the above has been taken into account in this ESIA Report.

Otherwise, the Project is not subject to Environmental Impact Assessment per Directive 2011/92/EU under EU Law, because the associated waste water treatment plant does not have a capacity exceeding 150,000 population equivalent as defined in Point 6 of Article 2 of Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment.

Regardless, the Promoter has complied with its obligations under the Finance Contract between the Government of Seychelles and the EIB to obtain the requisite Environmental Approval for the Project from the Relevant Authority in Seychelles, as evident by the Environmental Approval that was dispatched to the Promoter by the Relevant Authority on 3rd March 2017 and provided in Annex 9.

This ESIA Report concludes that the proposed Project poses no serious impact on the environment as well as on the livelihood of the people in the vicinity of the Project sites. The expected negative effects can be satisfactorily monitored and mitigated, and are mostly limited to the Project implementation phase only.

Annex 1: Terms of Reference

TERMS OF REFERENCE FOR THE PREPARATION OF AN

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STATEMENT UNDER THE ENVIRONMENT PROTECTION (IMPACT ASSESSMENT) REGULATIONS, 1996

REHABILITATION OF PROVIDENCE WWTP, SEWERAGE PUMPING STATIONS & RISING OF VICTORIA MAINS & CONSTRUCTION OF LA DIGUE WASTEWATER SYSTEM.

MINISTRY OF ENVIRONMENT ENERGYAND CLIMATE CHANGE
ENVIRONMENTAL ASSESSMENT AND PERMITS SECTION
WASTE, ENFORCEMENT & PERMITS DIVISION
BOTANICAL GARDENS
P. O. BOX 445
VICTORIA

Terms of Reference for the preparation of an Environmental Impact Assessment (EIA) Statement For sewerage treatment network project

APPLICANT:

PROPOSED DEVELOPMENT: SEWERAGE NETWORK PROJECT

LOCATION: MAHE & LA DIGUE

PREAMBLE

Pursuant to Schedule 1, Regulation 3(1) (b) of the Environment Protection (Impact Assessment) Regulations, 1996, Schedule 1, hotels, restaurants, tourism, residential are prescribed project under Section 15(1) of the Environment Protection Act, 1994 the preparation of an Environmental Impact Assessment (EIA) statement is required when an application is made to the Authority for Environmental Authorization.

DEGREE OF DETAIL

In preparing the EIA, it is the applicants' responsibility to address the impacts of the proposal to the degree necessary to enable the Authority to be informed of all relevant impacts of the proposal. The level and nature of investigations should reflect the type and scale of impacts.

***It should be noted that the preparation of Terms of Reference for an EIA does not indicate approval or support in any way, nor does it indicate approval in principle*.**

CONTENTS

The EIA produced to accompany the application is to address the issues set out below and should generally follow the format as suggested in this document.

1. Executive Summary

An executive summary of no more than five pages must be included. This should be written as a non-technical summary which provides an overview of the EIA report in simplified layman's terms. The aim of the Executive Summary is the listing of key Impacts, strategies to be employed to manage the impacts and performance indications for auditing purposes.

A section of the Executive summary should include a **Socio-Economic Impact Assessment;**
As a result of the findings of the ESIA and addressing issues raised in the stakeholder consultation in the preparation of the Scoping Report, all the measures to be taken by the developer to mitigate impacts that will have **direct bearings on the existing residents** should be summarized in this section. This should include detailed scheduling of works so as to have minimal disturbances to the livelihoods of the community.

2. Alternatives to the project

Describe any prudent and feasible alternatives to the proposed development investigated during the planning process, including alternative locations for such a development, with an overview of the consequences in each case. Discussion should include the reason for choice of the preferred option, and the likely situation and use of the site if the project does not proceed.

3. Terms of Reference

The Terms of Reference and accompanying letter of transmission provided by the Ministry of Environment, Energy and Climate Change must be included in the EIA documentation.

4. Scoping comments

A list of all the stakeholders consulted (scoped) for the project including copies of all their comments and concerns (scoping verification forms) should be attached in the EIA Report.

5. Policy, Legal and Administrative Framework

Outline the pertinent regulations standards and policies governing environmental quality, health and safety, protection of sensitive areas, protection of endangered or threatened species as well as infrastructure development and land use control at the national and local levels in relation to the proposed project.

6. Description of the Proposal

State the objectives of the proposal and why it is needed, the type of development proposed, including information on:

- Location of the site (including map) and a site plan (that is the nominated positions or areas for the development, and the location and identification of all facilities on the site;
- Details of existing sewage systems in the area.
- Detail storm water management to show all the networks and pathways for the whole development;
- Service requirements for electricity, potable water supply and drainage, including volume of water needed for the whole development and **assurance from service provider that this additional demand can be met;**
- Area of land required for the various types of development; describe land tenure; present tenure, land uses, right of ways, ownership and encumbrances of the proposed site.
- The impacts of the proposed on other projects of National importance (such as drainage management projects);
- Land acquisition information if need be to accommodate the proposal;
- Impacts on site of cultural/heritage significance;
- Describe town planning provisions affecting the land;
- Number of residential units, allotment size, and resultant population size if required for the project;

- Distances to boundaries.

Provide details of the development including:

- Construction timetable including the working hours;
- Quantities, nature and sources of materials required for fill, aggregate for construction, and transport routes and methods;
- Extent and methods of excavation, extent of earthmoving and methods, sites of spoil disposal and containment, machinery and equipment to be used;
- Machineries and equipment to be used;
- Project implementation plan which shall include a communication plan to be adopted during the construction phase; the plan is to also include how the work will be implemented and its impacts on other activities;
- Landing areas for unloading and loading of construction materials;
- Assess the impacts of transportation of all the construction materials to the site;
- Building design limitations and standards (e.g. height, elevations, materials, architectural criteria, buildings design on pillars or stilts, structural improvement to discourage entry of birds, climate change, aesthetic value and buffer/set back distances from water bodies);
- Details of the manner in which the proponent proposes to accommodate the workforce during construction;
- A detailed Construction Environmental Management Plan -CEMP for the project must be submitted once the contractor for the project has been identified. The plan must include established mitigative measures, systems and procedures to be employed during the construction phase of the development. The CEMP must indicate which component of the project will be implemented first and last with the associated time frame.
- Key milestones (including assigned responsibilities) will have to be indicated. A project implementation plan has to be submitted prior to the commencement of construction works.

State and discuss pollution management strategies and control measures to be used, including:

- Measures to be taken to prevent any spillage of oil and diesel onto the access road during the construction and operational phases; remedial measures to be taken should there be any spillage; and
- Control measures to be taken during construction to minimize dust, noise, and air as well as water pollution.

The following details relevant to the proposed site and surrounding area should also be described:

- Past and current usage of the site and its surrounding area;
- Approvals required for the project and expected program for approval applications.

7. Description of Environment and Assessment of Potential Impacts

Topography

- Describe of the proposed site in relation to the catchments system, watersheds and any waterways on or near the site; calculate the approximate areas and their estimated discharge; table showing the various channels draining these watersheds with their discharge capacities must be included; including gullies, depressions, valley, cliffs, and rocky reliefs.
- Describe the area surrounding the proposed site including information on: buffer distances; aesthetic and landscape values; structures or archaeological areas of cultural, historical, religious, heritage or social importance; and
- Provide details on the overall environmental protection measures incorporated in the design, siting, layout, landscaping, and rehabilitation and associated works to minimize impacts on the environment.

Hydrology

- Provide a description of existing surface drainage patterns, flows, likelihood of flooding and present water uses;
- All existing flow paths, water retention and buffer zones should be mapped and presented on a comprehensive site map;
- A detailed hydrological assessment of the parcel must be carried out;
- Details of the generated runoff and discharge potentials must also be provided;
- A master plan showing all existing watersheds influencing the area of interest and proposed drainage alignment, location of conduits, culverts etc. (drainage network)., as well as analysis on amount of water generated on site and from these watersheds and proposed techniques to effectively drain excess water;
- Describe impacts on water quality associated with storm water runoff and other critical conditions taking account the measures proposed to mitigate such impacts; Specific references should be given to the processes of siltation and the effects of these on the marine environment and the littoral zone;
- Assess the impacts that will be generated by erosion induced by storm water run-off and sediment wash down, existing water courses, and propose mitigative measures for those;
- Provide an erosion and sedimentation control plan as part of the management plan;
- Discuss anticipated flows of water to and from the project area under critical conditions, including the consequences of failure (under such conditions) of proposed pollution control works;
- Details of temporary drainage and sediment control measures during the construction phase must be provided;

Climate

- Describe the existing climatic conditions of the area including average rainfall per year, prevailing wind patterns, and susceptibility to disaster caused by natural events pressure levels.

Soils and Geology

- A description of the areas to be disturbed; and
- Likely influences of the geological features on water quality in the area, particularly if disturbed during construction.

Visual Impact

- Predict the visual impacts (particularly of the hillside from the coastal areas) that might be generated by the development and propose ways to minimize such impact;

Flora

The degree of disturbance to the landscape and stage of regeneration should be outlined along with the following:

- Major species and communities present in all habitat types within the area;
- The extent of disturbance to the natural vegetation as well as existing infrastructure;
- Any rare or endangered species, their habitats requirements and sensitivity to changes;
- A Vegetation Management and Rehabilitation Plan should be submitted to be endorsed by the Department of Environment and other relevant agencies prior to implementation of the plan. This should also include a landscaping plan incorporating a list of proposed indigenous plants to be used in the program.

Fauna

- **A description of fauna present in the area**, and at a regional scale, and a statement of the potential impacts of the proposal on the terrestrial and aquatic fauna; a description of other fauna present or likely to be present in the area;
- Any rare or endangered species, their habitat requirements and sensitivity to changes;
- Occurrence, distribution and requirements of migratory species;
- Highlight the measures to be taken in order to improve the habitat value of the site.

Transportation

Road network

- Any adverse effect of the development on the road network and the costs of measures to minimize those effects.
- Information is required on traffic generated by private and commercial movement during both the construction and operational phases of the development (including details of any staging);
- Should the movement of any very heavy and/or over-dimension loads be proposed, details about the intended routes to be used shall be given.
- Methodology that will be implied to carry the materials on site.

- Details relating to road access and parking facilities must in accord with the requirement of the Department of Transport and the Seychelles Land Transport Agency.

Health and Safety Issues

- State the procedures required for expatriate if they will be working on the project, like screening for any illnesses such as typhoid and other communicable illnesses that could trigger an epidemic;
- Define health and safety measures that should be put into place by contractors on site; and
- Develop a disaster and emergency contingency plan for the construction and operational stage for the development.

Air/Noise

- Noise - Define the areas of impact and measure and discuss ambient noise levels in all areas likely to be affected by the development. Indicate nearby land uses, dwellings which could be affected by the proposal. Where nearby residents are potentially affected by the proposal, list all noise sources and describe areas where noisy activity could be expected to occur as a result of the proposal. Provide details of proposed mitigation measures to be undertaken to minimize noise impacts on the surrounding environment;
- Air - Information on existing air quality should be provided for those air pollutants expected to be emitted by the proposed development, in particular, the impacts of dust nuisance, should be detailed. Provide details of proposed mitigation measures to be undertaken to minimize dust emissions during the construction phase and operation phase; and
- Burning - Define the site for the burning activities taking into account the proximity to residential areas, scale of burning required, materials to be burned, measures to ensure containment, emergency measures to be in place.

Socio-Economic

Discuss the following;

- A Land Use survey needs to be carried out in the area of influence to determine potential impacts on the different uses;
- Visual intrusion of the proposal upon the existing appearance and views of surrounding areas;
- The effects of the proposal on other property owners, including developments in the area; effects of the proposal on the population growth rate of the region; implications of the proposed development future development in the local area.

8. Environmental Management

In respect of impacts identified which need to be controlled, an environmental management program incorporating an **Environmental Management Plan,** whereby, Monitoring and Reporting is included. Where practicable the costs of monitoring programs should be estimated and responsibility for monitoring programs specified. References should be made to relevant legislation and standards.

An Environmental management plan should detail any:

- Habitat enhancement projects or rehabilitation measures;
- maintenance schedules;
- erosion and sediment management as well as flood management strategies;
- pollution control and waste management methods;

Monitoring programs should; ensure safeguards are being effectively applied; identify any unpredicted impacts requiring remedial measures; and measure any differences between predicted and actual impacts.

The reporting program should detail; steps to be taken to correct detrimental effects identified by monitoring; and procedures for reporting on monitoring programs and proposed recipients of reports.

The Environment Management Plan (EMP) should cover for the construction and operation phases of the resort. It should specifically detail all proposed environment monitoring to be undertaken in liaison with respective authorities.

The EMP must be included in the contractual clauses of the main contract and related sub- contract.

The EMP should make provision for the monitoring process to be conducted on a regular basis and should provide the necessary **auditing methods/template of forms** for this as part of the Environment Impact reporting of monitoring to be done.

It is stipulated that an Environment Officer (EO) should be appointed, with consent of the Department of Environment for the duration of the Planning and Construction period that will inspect and ensure compliance with the EMP on a daily basis. The EO must liaise on a regular basis with the responsible Authorities and provide a monthly monitoring report to the Authority.

Monthly environmental audits (entailing site inspection, review of monitoring records, reports, plans and other records) should be undertaken and submitted in monthly meetings with proponent/agent, developer, contractor and responsible authorities in the form of a monitoring report.

9. Conclusions and Recommendations

As a result of the findings of the EIA, present a balanced overview of the proposal's net impact and provide recommendations on the proposal. This should include the identification of any alterations to the proposal considered to further mitigate environmental impacts.

10. Consultation

In preparing the EIA, the applicant/consultant should consult affected and interest groups. The EIA should detail any public comment sought from and any consultation conducted with any affected groups (e.g. community, environmental, industry) in developing the proposal and preparing the EIA. **Issues as raised during the scoping phase for the EIA should be addressed in the report and satisfactorily dealt with.**

Early consultation is beneficial in helping to ensure that a development will cause a minimum of undesirable effects and in reducing delays in the latter stages of planning and design.

11. Copies of Report

Upon completion of the environmental impact assessment statement, a total of **three (3) hard copies and one (1) digital copy (preferably in Acrobat PDF format)** of the report are to be submitted to the Authority – Waste Enforcement and Permits Division, as part of any application.

Annex 2: Chance Find Procedures

In the event that artefacts, objects are exposed during construction phase, the contractor and relevant stakeholders will follow the procedures described below:

a. Stop the construction activities in the area of the chance find.

b. Delineate the discovered site or area.

c. Notify District Administration and secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard or other relevant protection shall be present.

d. Notify the District Administration, who in turn would notify PUC (within 72 hours).

e. Contact the responsible local authorities who would be in charge of protecting and preserving the site before deciding on the proper procedures to be carried out. This would require a preliminary evaluation of the findings to be performed by the National Museum or National Archives. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage, including the aesthetic, historic, scientific or research, social and economic values.

f. Ensure that decisions on how to handle the finding be taken by the responsible authorities. This could include changes in the layout (such as when the finding is an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage

g. Implementation for the authority decision concerning the management of the finding shall be communicated in writing; and

h. Construction work will resume only after authorization is given by the responsible local authorities concerning the safeguard of the heritage.

During project supervision, the Environment Officer shall monitor the above regulations relating to the treatment of any chance find encountered are observed.

Relevant findings will be recorded by the EIB in its regular supervision mission and through regular progress reports. If deemed appropriate, the Project's Implementation Completion Reports (ICRs) will also assess the overall effectiveness of the project's cultural property mitigation, management, and activities, as appropriate.

Annex 3: Land Commitment Letter Template

PUC Representative ----------

District Administration ----------

Dear Sir/Madam,

Re: LAND AVAILABILITY FOR THE PROJECT

This letter serves to confirm our commitment that land is available for the project. This land is given for the use of the _____.

The owners of the land in our community are Mr/Mrs. _____ who with a second family/family member confirm our commitment by putting their hand hereto;

This piece of land (_____) is confirmed to be free from dispute and the Project Committee and subsequent committees appointed by the District Authority to administrate the infrastructure are free to use the said land to provide/improve/expand the provision of the services directly provided by the infrastructure. The land owners fully agree that this commitment is irrevocable.

1. Resource owner (Name) 2. Resource owner representative

   _____

2. Signature

   _____
   _____

3. Date

   _____ _____

4. Verified by Project Chairman and Secretary

   _____
   _____

   Chairman Secretary

Annex 4: List of Chemicals under Stockholm and Rotterdam Conventions

Stockholm Convention	Rotterdam Convention
Annex A	Pesticides
aldrin	2,4,5-T
chlordane	aldrin
dieldrin	captafol
endrin	chlordane
heptachlor	chlordimeform
hexachlorobenzene	chlorobenzilate
mirex	DDT
toxaphene	dieldrin
polychlorinated biphenyls (PCB)	dinoseb and dinoseb salts
	1,2-dibromoethane (EDB)
	fluroacetamide
	HCH (mixed isomers)
	heptachlor
	hexachlorobenzene
	lindane
	certain mercury compounds
	pentachlorophenol
	certain hazardous pesticide formulations of methamidophos
	methyl-parathion
	monocrotophos
	phosphamidon
	parathion
	Industrial chemicals
	asbestos (crocidolite)
	polybrominated biphenyls (PBBs)
	polychlorinated byphenyls (PCBs)
	polychlorinated terphenyls (PCTs)
	tris (2,3-dibromopropyl) phosphate recently added include pesticides
	binapacryl
	toxaphene
	ethylene dichloride
	ethylene oxide
	DNOC and its salts

Annex 5: List of WHO Classification of Commercial Formulations of Pesticides Available in Seychelles

Pesticide formulations	Common Names	WHO classification of hazards	Main Use
Abamectin 0.15%EC	Abamectin	U	Insecticide
Bacillus thuringiensis	Bacillus thuringiensis	U	Insecticide
Bayticol Dip	Flumethrin	U	Insecticide for ticks
Carbaryl	Carbaryl	II	Insecticide
Carbofuran	Carbofuran	IB	Insecticide
Cartap	Cartap	II	Insecticide
Chlorpyrifos	Chlorpyrifos	II	Insecticide
Deltamethrin	Deltamethrin	II	Insecticide
Fenitrothion	Fenitrothion	II	Insecticide
Fipronil	Fipronil	II	Insecticide
ICON	Lambda-cyhalothrin	II	Insecticide/ mosquitoes
Karate	Lambda-cyhalothrin	II	Insecticide
Lambda 2.5%EC	Lambda-cyhalothrin	II	Insecticide
Malathion	Malathion	III	Insecticide
Mavrik	Tau-fluvalinate	II	Insecticide
Mustang	Imidacloprid	II	Insecticide for TB
Natrasoap	Potassium salts	UN	Insecticide/Miticide
Orthene/Otin	Acephate	III	Insecticide
Perkill 250 EC	Permethrin	II	Insecticide
Pyrethrum	Pyrethrin	II	Insecticide
Silafluofen	Silafluofen	II	Insecticide
Success	Spinosad	U	Insecticide
Target	Permethrin-pirimiphos-methyl	II	Insecticide
Tebufenozide	Tebufenozide	III	Insecticide
Termidor	Fipronil	II	Insecticide /termites
Yates Baysol	Methiocarb	1B	Molluscide
Yates Blitzem	Metaldehyde	II	Molluscide
Axiom	Mancozeb	U	Fungicide
Borrek	Chlorothalonil	U	Fungicide
Fos-Jet 60	Phosphite	U	Fungicide
Leaf curl	Copper oxychloride	III	Fungicide
Pesticide	**Common Names**	**WHO classification of**	**Main Use**

formulations		hazards	
Tricyclazole	Tricyclazole	II	Fungicide
Amine 720	2,4.D	III	Herbicide
Butachlor	Butachlor	U	Herbicide
Glyphosate	Glyphosate	U	Herbicide
Gramoxone	Paraquat	II	Herbicide
Grasskill	Glyphosate	U	Herbicide
Boracol	Ethylene glycol +	II	Timber treatment
Eco-Bor	Disodium Octaborate Tetrahydrate	U	Timber treatment
Cockroach gel bait	Boric acid	U	Cockroach bait
Invicta	Abamectin	U	Cockroach bait
Contrac	Bromadiolone	1A	Rat bait
Rat tracking powder	Diphacinone	1A	Rat bait
Talon pillet	Brodifacoum	1A	Rat bait
Scarecrow bird repellent	Polybutene	U	Bird repellent
Quick Bayt	Imidacloprid	II	Fly bait
Mortein	Allethrin, Resmethrin	III	Household pests

8. 1A – extremely hazardous
9. 1B – highly hazardous
10. II – moderately hazardous
11. III – slightly hazardous
12. U – unclassified (not hazardous in normal use)

Annex 6: List of Land Parcels Affected by the Project

Pump Station	Land Parcel No.	Forcemain	Land Parcel No.	Forcemain	Land Parcel No.
PS Victoria No. 5	V1615	FM	V8988	FM	V10739
PS Victoria No. 6	V12169	FM	V3491	FM	V10740
PS Victoria House	V87	FM	V10733	FM	V9090
PS InterIslandQuay	V17346/V17363	FM	S7566	FM	V3489
PS Tuna1	V6363	FM	S5067	FM	V10735
PS Roche Caiman No.3	V10251	FM	S5012	FM	V10741
PS Le Rocher	N/A	FM	V18953	FM	V10652
		FM	V10707	FM	V16963
		FM	V10251		

Annex 7: Notices of Public Meeting

PUC PUBLIC UTILITIES CORPORATION
HEAD OFFICE: ELECTRICITY HOUSE, ROCHE CAIMAN, MAHE, SEYCHELLES|PO BOX 174|TEL:4678000

Our Ref:	PUC/PROJ/PMU/DM/28042016
Enquiries To:	D. MARIE
Telephone Ext:	4678000
Date:	28TH APRIL 2016

Chief Executive Officer
National Information Services Agency
P.O.B ox 800, Victoria
Attn: Sales officer
Mrs Doris Renaud

Dear Madam

Please publish the following notice on Monday 2nd to Wednesday 4th of May 2016 as a 1/8th of a page in black and white.

PUC

Notice: Public Meeting - Saturday 7th May 2016

"The Public Utilities Corporation (PUC) is inviting members of the public to a attend a public consultative meeting which will be held on **Saturday 7th May 2016 at the Roche Caiman Administration Office from 1.00pm to 4.00pm** to discuss the proposed ***"Rehabilitation of Providence Waste Water Treatment Plant (WTP) and Sewerage Pumping Stations".*** This project involves the Greater Victoria area, Roche Caiman, up to Providence.

All residents and the public in general are invited to attend.

Thanking you

J. Valmont (Mr)
Deputy Chief Executive Officer

PUC PUBLIC UTILITIES CORPORATION
HEAD OFFICE: ELECTRICITY HOUSE, ROCHE CAIMAN, MAHE, SEYCHELLES|PO BOX 174|TEL:4678000

Our Ref: PUC/PROJ/PMU/DM/28042016
Enquiries To: D. MARIE
Telephone Ext: 4678000
Date: 28TH APRIL 2016

Chief Executive Officer
Seychelles Broadcasting Corporation
Hermitage
Att: Marketing Manager
Ms Wirtz

Dear Madam

SCREEN ANNOUNCEMENT

RE: PUBLIC MEETING

Grateful if the following could broadcasted on SBC Television text in English and reading in creole on alternate peak hours **DURING** the 8 o'clock news on Thursday 5th and Friday 6th of May 2016.

TEXT IN ENGLISH

"The Public Utilities Corporation (PUC) is inviting members of the public to a attend a public consultative meeting which will be held on Saturday 7th May 2016 at the Roche Caiman Administration Office from 1.00pm to 4.00pm to discuss the proposed "Rehabilitation of Providence Waste water Treatment Plant and sewerage pumping stations". This project involves the Greater Victoria area, Roche Caiman, up to Providence.

All residents and the public in general are invited to attend".

READING IN CREOLE

"Korporasyon Litilite Piblik (PUC) pe envit manm piblik pour asiste en miting ki pou fer Sanmdi le 7 Me 2016 kot biro ladministrasyon distrik Roche Caiman depi 1.00er apremidi ziska 4.00er apremidi, pou diskit proze sistem treatman delo desaz ki sitie dan rezyon Roche Caiman ziska Providence.

Tou rezidan e manm piblik an zeneral i ganny envite pour asiste."

Thanking you

J. Valmont (Mr)
Deputy Chief Executive Officer

Annex 8: References and Citations

Government of Seychelles (2011) Fourth National Report to the United Nations Convention on Biological Diversity. Environment Department, P.O. Box 445, Botanical Gardens, Mont Fleuri, Victoria, Republic of Seychelles.

Commentary on the Development of the Republic of Seychelles Access to Genetic Resources and

Benefit Sharing Bill (2005); IPGRI ; Robert J. Lewis-Lettington and Didier Dogley

Department of Environment / Biodiversity website

Economic Assessment of Seychelles Biodiversity; Lucy Emerton 1997

European Investment Bank, *Environmental and Social Handbook, Version 9.0 of 02/12/2013*

Genetic Resources Bill – Draft 2010; Ministry of Environment

Global Forest Resources Assessment Country report Seychelles for FAO; Ester B (2005)

Inclusive Private Sector Development and Competitiveness Programme (IPSCDCP) Country: Seychelles Appraisal Report OSGE Department November 2013

Mainstreaming Biodiversity into Production Sectors Activities: Project Document

Mainstreaming Prevention and Control Measures for Invasive Alien Species into Trade, Transport and Travel across the Production Landscape; (Mainstreaming Bio-security Project) Document

National Report on Alien Invasive Species to the Convention on Biological Diversity (Neville, J., 2000)

National Strategy for Plant Conservation PCA-BG (2005)

News Update 14; 2008-03-24 “Heritage Gardens Spans the Generations” Nature Seychelles

Review of EMPS 2000-2010; Thematic Report- Biodiversity, Forestry and Agriculture (Matatiken, D., 2009)

Seychelles First National Report to the Convention on Biological Diversity

Seychelles Fourth National Report to the Convention on Biological Diversity, 2011

Seychelles National Biodiversity Strategy & Action Plan-Republic of Seychelles 1997

Seychelles National Climate Change Strategy, November 2009

Seychelles National Implementation Plan-POPS

Seychelles National Wetland Policy 10/8/2003

Seychelles Third National Report to the Convention on Biological Diversity, 2010

Annex 9: Environmental Approval of the Project

MINISTRY OF ENVIRONMENT, ENERGY AND CLIMATE CHANGE
ENVIRONMENT DEPARTMENT
Botanical Gardens, Mont Fleuri
P.O. Box 445 Victoria, Mahe, Republic of Seychelles
Tel. No. (248) 670500 Telefax No. (248) 610648

Please address all correspondence to the Principal Secretary

Your Ref:
Our Ref.: MEECC/WEP/EAPS/ CLASS 1/REHABILITATION OF PROVIDENCE WWTP & SEWERAGE PUMPING STATIONS & RISING MAINS IN GREATER VICTORIA
Enquiries to: A. Sorry
Extension No: 576
Date: 02nd March 2017

Mr. Ian Charlette
EIA Consultant
P.O.Box 631,
Victoria, Mahe

ENVIRONMENT DEPARTMENT
EAP SECTION
07 MAR 2017
DISPATCH
WEP DIVISION

Dear Sir,

RE: NOTICE OF ACCEPTANCE OF ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT FOR PROPOSED REHABILITATION OF PROVIDENCE WWTP & SEWERAGE PUMPING STATIONS & RISING MAINS IN GREATER VICTORIA.

Reference is made to the EIA report regarding the above project proposal that was submitted to the Authority for our consideration for the issuance of Environmental Authorization.

Following public inspection, internal review and further instructions the authority hereby accepts the Environmental & Social Impact Assessment report subject to the following conditions which should be strictly adhered to prior and during the implementation of the project:

Environmental Authorization is being issued with the following conditions:

1. Upon approval of the project at the planning stage, the Environment Department shall be provided with the name of the Environment Officer for the project; this should be formally communicated to the Environment Department through the Principal Secretary.
2. There should be minimal clearing of vegetation so as not to affect stability of the sites and reduce the chances of erosion as well as the visual impact the development might bring about; this also applies to the coastal vegetation. Proponent should liaise with the Forestry, Conservation sections and the Coastal

Adaptation and Management Section within the Ministry of Environment, Energy & Climate Change prior to any clearance and obtain the necessary permission for the felling of Protected trees.

3. Onus is on the proponent to ensure that all rock boulders are secure. Rock blasting will not be allowed on site. Should there be a need to remove any rocks, it should only be done by use of wedge/jack hammer so as to minimize land destabilization.
4. Onus is on the developer to minimize nuisance by reasons of noise, smell, dirt, dust and fumes to any adjoining properties.
5. Proponent should ensure that measures are taken to prevent erosion on site and sedimentation of the nearby marine environment. Sediment/silt trap should be established prior to construction or mechanical intervention on the site.
6. Discussion and agreement between private landowners/utilities companies should be conducted to have the necessary way leave for the projects where applicable.
7. There should be minimal damage to existing water courses (drains, sea, marsh and rivers) during and after construction.
8. Details of the containment plan for emergencies should be clearly defined with locations of discharge points of raw sewage during emergency.
9. Installation methods should be discussed to ensure that all infrastructures are reinstated.
10. Roadside drains, culverts and cross drain should be provided and well maintained at all times.
11. Should there be a need to undertake any earthworks, for the erection of fences or construction of gates, the PUC/contractor must liaise with Planning Authority for advice.
12. There should be close liaison with the Department of Transport as regards to the crossing of sewer pipes across the main roads.
13. All plastics, rubber, glassware, synthetic or any other inorganic waste, construction debris, demolition waste should not be dumped into sea and wet land but should be sorted out at source prior to disposal at appropriate site.
14. An area is to be designated on the site for the collection of all spoil materials. These stockpiles should be properly located so as not to block any accesses and water courses. The location is to obtain prior approval from the Environment Department.
15. Proponent should submit a Project implementation plan,which will provide the methodology options with their different time lines and detail explanations of the chosen method to be adopted in order through which the sequential targets for the implementation of each component of the project is expected to be implemented. The details of the chosen method should also provide analysis of the advantages and disadvantages of each phase and the expected measure in mitigating the impact vis-à-vis the existing infrastructures such as road, houses and other buildings within each specific location. This project implementation plan should be submitted to the Ministry of Environment, Energy & Climate Change for monitoring purposes.
16. A detailed maintenance plan for the sewer lines should be provided for the operational phase of the project. This should be reviewed in close consultation with the Environment Department and Environmental Health Department.
17. All monitoring exercises are to be undertaken in close liaison with the Environment Assessment and Permits Section of the Ministry of Environment, Energy & Climate Change.
18. The exact positions for the proposed pumping stations for the project shall be determined 'upon the planning stage of the project through a detailed planning application.
19. Prior to commencing any works, the proponent will ensure that a meeting is held with the Ministry of Environment, Energy & Climate Change during which all

stakeholders involved in the implementation of the project has to be present. This will generally involve the environmental officer for the project, the project architect, the civil work contractors, a representative of the proponent and officers from the Department of Environment. The appointed environmental officer for the project will ensure this coordination and advise the Environment Department of the availability of all the mentioned stakeholders above, at the earliest, to limit any further delay in the implementation of the project for the meeting. This is necessary to ensure that all stakeholders of the project are fully aware of the recommendations, provisions and mitigating measures as outlined in the EIA Report submitted for the project to minimize adverse negative impacts on the environment.

20. At this juncture the Ministry of Environment, Energy & Climate Change would like to inform the proponent that heavy fines will be imposed on them for non-compliance to directives from our ministry for works undertaken contrary to agreements between our two parties and works carried out without the necessary approvals from this Authority. As such it is in the interest of the proponent to ensure that all the necessary approvals are sought well in advance for any works undertaking and that they wish to implement as part of the project.

Please be reminded that other more specific conditions will be imposed upon the submission of the detailed plans for the project.

Should you have any queries regarding the conditions set our above please do not hesitate to contact the undersigned for clarification.

Muzungaile

Marie-May Muzungaile (Mrs.)
FOR: DIRECTOR GENERAL (WEP)