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**PROJECT: MAHE SUSTAINABLE WATER
AUGMENTATION PROJECT**

COUNTRY: REPUBLIC OF SEYCHELLES

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) SUMMARY

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ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) SUMMARY

Project Title: **La Gogue Reservoir Water Security Improvement Project – Phase I**
SAP Code: **P-SC-EA0-004**
Country: **Seychelles**
Department: **OWAS**
Division: **OWAS2**

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1.0 INTRODUCTION

1.1 Water security is one of the most tangible and fastest-growing social, political and economic challenges faced by a lot of countries. Seychelles is no exception. The demand for water in Seychelles has increased significantly in the past ten years due to growing demand from both industrial and domestic sectors. This is as a result of an increase in the consumption of water due to increase in a number of households, increase in the number of tourism establishments and tourist arrivals. The ability of the Seychelles Government to meet the excess demand for potable water is further aggravated by longer periods of drought due to climate change. According to the Water Development Plan, for 2010 the unmet demand for Seychelles is estimated to be at 40%, hence the need for better water storage facility. Should the water situation remain the same, the outlook bears potential for crisis and conflict. This is because water lies at the heart of everything that is important for human life: food, sanitation, energy, and production of goods, transport and the environment. It is important to note that water ensures not only mere survival of humans, but also social wellbeing and economic growth.

2.0 BRIEF PROJECT DESCRIPTION AND KEY COMPONENTS

2.1 Though water supply services in Seychelles is relatively at good level, water restrictions are common during dry season. In order to address water security challenges of the country, Seychelles Water Development Plan 2008–2030 was prepared, and the north of Mahé was identified as the most problematic area.

2.2 The proposed project involves the raising of La Gogue Dam. It is a homogeneous earth fill dam with a maximum height of 35m from the excavated foundation level and a length of 152m at the crest. The total storage capacity is 824,000m³ with a dead storage of 52 000m³. The proposed project intends to raise the existing La Gogue Dam by 6 m and increase the storage capacity by about 600,000 m³.

2.3 The existing condition of the dam, the topography, and the geotechnical conditions at the site easily permit increasing the height of the dam to increase the reservoir capacity and augment the present withdrawals for water supply. La Gogue Dam can be raised by 5 to 6 m easily without involving major abutments hill cutting, with a new spillway and required abutment modifications.

2.4 The main components of the project entails: raising of the earth dam embankment; seepage control of two natural saddles; construction of permanent access road;

construction of new spillway; and raising of existing intake tower, construction of a new and small water treatment plant downstream of the dam embankment; enhancement of PUC's capacity to execute the project through dam engineering and project management technical assistances (TAs); and engagement of an experienced project engineering supervision consultancy firm. In order to prepare for future strategies, a study on the groundwater and small/medium scale storage potential on the islands of Mahé, Praslin and La Digue will be undertaken under this project.

The project components that will be supported under the Bank financing are presented in table 1 below. .

Table 1: Project Components

No.	Component Name	Component Outputs
A	Raising of the La Gogue Dam	<ul style="list-style-type: none"> ▪ Construction of a new spillway; ▪ Raising intake tower; ▪ Grout program for seepage control; ▪ Construction of temporary and permanent access roads; and ▪ Installation of mechanical equipment and instrumentation.
B	La Gogue Water Treatment Plant	<ul style="list-style-type: none"> ▪ Inlet works; buffer tank; ▪ Pressure and granular activated carbon filters of 4,400m³/day; ▪ Chlorination plant; chemical storage facility; ▪ Onsite electricity supply; ▪ Ancillary works; ▪ 2,000m³ service reservoir; ▪ Watchman's post; and ▪ Pump house and power supply infrastructure.
C	Institutional and Capacity Building Support	<ul style="list-style-type: none"> ▪ Groundwater sources and storage potential study covering Mahé, Praslin and La Digue islands; ▪ Project Management TA; and ▪ Dam Engineering Expert TA.
D	Project Management	<ul style="list-style-type: none"> ▪ Project Supervision Consultancy; ▪ Implementation of ESMP and development of emergency plans; ▪ Project audit.

3.0 MAJOR ENVIRONMENTAL, SOCIAL IMPACTS & CLIMATE CHANGE RISK

3.1 The primary objective in assessing the potential environmental effects of the proposed dam project is essentially to permit planning of actions to avoid or reduce undesirable effects and/or to enhance secondary benefits of the project. These effects have direct impacts on soil, vegetation, habitats, and to a less extend human population within the project area. Main environmental impacts pertain to site clearances and the associated impacts of exotic species overtaking indigenous vegetation; soil erosion due to loose top soil; migration of fauna from the construction areas. Water quality deterioration due to inundation of some of the vegetation and sedimentation. Noise and dust pollution resulting in nuisance and if not controlled posing health risks as well. Nuisance will also emanate from traffic jam since the roads are very narrow and steep. Waste generation from construction, operation activities and camp activities resulting in pollution of soil and ground water. Spoils sites and borrow pits also resulting in pollution and negative aesthetic impacts. While there will be minimum disruption of services, there will be sections of roads that are temporarily affected as machinery is moved to the project site.

3.2 The increase of fresh water as a result of the project interventions will impact positively on men and women of the island. It will reduce the dependency on desalination water, improve the sanitation facilities at schools during the dry seasons, and reduce the households' efforts in getting water and the need to boil water. The project will support the on-going activities of the PUC in terms of sensitizations, on-job training, and regular consultations with communities during the implementation and after the completion through the involvement of the two districts as part of the emergency preparedness.

3.3 Specific Environmental impacts:

3.3.1 Impact on species and habitats - Loss of terrestrial habitat will be inevitable since the raising of the dam is expected to inundate approximately 200m around the existing reservoir. The project area has been subjected to years of human agricultural activities and as such not much wildlife habitat, flora and fauna is left. Therefore this impact will be low, localised and not likely to affect the ecology of the region. Besides, the area has neither species of special concern nor does it have any critical habitats. On the other hand, aquatic life is expected to flourish due to the increased volume of water in the reservoir. The design of the dam, especially the spillway ensures the migration of aquatic species.

3.3.2 Impact on soil erosion - mobilisation of heavy machinery to site for excavation, levelling and compacting of the area around the reservoir which will be inundated is expected to cause disturbance to and instability of the top soil leading to erosion.

3.3.3 Impact on water quality - decaying wood stumps and vegetation will affect the quality of the water as the increased volume of water inundates the immediate vicinity of the reservoir. The decay of inundated terrestrial vegetation will cause a high demand for oxygen, which could potentially affect aquatic life. Other ecological problems that may occur due to the nutrient supply from the decaying of vegetal matter include algal bloom. Use of machinery that is not well-maintained or serviced may lead to leakages or oil spillages thus polluting soils and consequently water resources. Absence of proper sanitation facilities for construction workers may result in human waste entering the water system thus affecting the water quality and posing a health risk to users. Due to construction works, solid waste in the form of litter is expected. If not properly disposed this may pollute soil and water resources.

3.3.4 Impact on the general landscape – the landscape may be affected as part of the river section is inundated. Clearing of the area can also result in soil erosion as mentioned above which would in turn result in the dam easily silting up thus limiting its holding capacity

3.3.5 Impact on water resources - groundwater levels are liable to be impacted by the creation of an impoundment. Raised water levels upstream may result in a localized change to the water table. These changes to water levels may impact on groundwater upstream and downstream, resulting in water logging of soils, and changes to catchment infiltration.

3.3.6 Impact on climatic conditions - the introduction of a large body of water is likely to increase humidity and may have an advantageous effect on forest growth.

3.4 Climate Change:

3.4.1 Changes in Seychelles climate will result in sea-level rise, changes in precipitation and elevated sea-surface temperature and have a potential to affect many physical and biological systems, which have an impact on social and economic systems. It is therefore necessary to take urgent action to address climate change at the global level and to develop robust adaptation strategies such as a need for improved water-resource management to meet the change in the rainfall pattern, protection of coral reefs from bleaching. This project is one such adaptation measure.

3.4.2 Climate change impacts in the Seychelles are very similar to those on many other small islands in the world. Characteristics such as narrow coastal zones and the concentration of development on the low-lying coastal areas make Seychelles extremely vulnerable to climate change and its associated impacts. There is a possibility that under most climate change scenarios, water resources in small islands are likely to be seriously compromised as per the IPCC 2007 report. Water supply in Seychelles is primarily from river sources, combined with groundwater extraction and desalination plants in some locations. Whilst river water is abundant the steep topography and low retention of the soil and rock, the flow in these streams is erratic and falls to very low values during prolonged periods of drought. Water storage is therefore very important in Seychelles hence the La Gogue Dam project.

3.4.3 Groundwater extractions have not been successful in view of the narrow coastal plateau. Desalination plants have been installed to meet shortfall in demand during the dry season. Water distribution on the three main islands is extensive and as far back as the year 2000, studies showed that Seychelles was going to face serious water shortages primarily due to a lack of adequate appropriate reservoirs and growing demand. Furthermore, recent studies suggest that changes in long-term rainfall patterns and temperature changes will have adverse consequences for the water sector (Payet & Agricole, 2006). Results from four global circulation models, indicate that climate change is expected to increase the severity of water shortages on Mahé, Praslin and La Digue because of the following factors (i) decreases in rainfall during the dry southeast monsoon which will reduce stream flow, groundwater recharge and therefore water supply; (ii) increases in surface air temperatures which will increase rates of evapotranspiration and consequently reduce stream flow, ground water recharge and further exacerbate the water supply problem; and (iii) increases in rainfall intensity which will result in greater surface runoff and reduced water capture in existing storage facilities.

3.4.4 It is also worth noting that a warmer and wetter climate for the Seychelles will not necessarily translate into a greater availability of water. Dry spells are likely to be longer, and precipitation events more intense. These predicted changes will affect water supply adversely because of greater variation in stream flows. The need for water storage cannot be emphasised enough.

4.0 ENHANCEMENT/MITIGATION MEASURES AND COMPLEMENTARY INITIATIVES

4.1 The Seychelles hosts habitat to various types of flora and fauna species: 3775 invertebrates, 1481 vascular plants, 44 land birds, 33 reptiles, 12 amphibians, and 6 mammals (Diamond, 1984; Racey and Nicoll 1984; Stoddart, 1984; Senterre *et al.*, 2010; Silva *et al.*, 2010; Skerrett and Disley, 2011; Townsend *et al.*, 2011; Gerlach, 2011). More are still to be discovered and described. However, the flora and fauna surveyed in the La Gogue catchment area was relatively poor (77 species, most of which were exotic). The quality of forest that will be inundated is not of the highest quality. Based on field surveys, the existing forest that will be lost is secondary forest and shrub of very low value. Habitat destruction and introduction of invasive species since historical times have altered the habitats and species composition resulting in a degraded ecosystem. Hence, the raising of the dam is not expected to lead to any further significant impact onto the biodiversity of the area. Limited loss of some terrestrial wildlife habitat and flora is expected while aquatic life will be enhanced. Nonetheless, the impact though already low, will be minimised through clearing only areas necessary to clear.

4.2 Often, the major factors impacting the environment are those caused by land, water and other resource use in the catchment upstream of the dam (e.g. forest clearing, agriculture, settlement,), which may result in increased sedimentation, and changes in water quality in the reservoir and river downstream. With respect to the La Gogue dam, there is neither agriculture nor settlements upstream of the dam, and hence the only impact will be from the activities of the raising of the dam such as excavation works and forest clearing, however the project through the ESMP implementation will encourage catchment management.

4.3 Erosion will be minimised and biodiversity protected by stockpiling top soil from excavated areas. Application of geotextile membrane after removal and profiling of slope at the borrow sources will also be used to minimise erosion and sedimentation of the dam. Because of the narrow roads and lack of alternatives, no road shall be blocked when the works are in progress as it will cause inconvenience to the residents in the area. Permission shall be sort for moving of machinery and it will be done once the road users have been notified. Any trench excavation bordering the road or in the road shall be done to a maximum distance of 50m at any one time to be able to control the circulation of traffic. No storage of materials are to be done on existing roads. Any diversion shall consist of a two-lane two-way traffic asphalt surface road of minimum width 7m (3.5m per lane).

4.4 To avoid sanitation, and other pollution aspects, the contractor will provide its own transportation of workers since no camp site will be allowed on site. Screening of workers for any communicable disease prior to gaining work permits will be done. A site doctor will be hired to take care of the health of the workers

4.5 Regular monitoring of the quality of water in the reservoir will be undertaken during construction and operational phases.

4.6 All the mentioned impacts can be mitigated as detailed in the ESMP. E&S mitigation measures are expected to cost 2 213 500 million Rupees, which are included in the project cost estimates.

5.0 ENVIRONMENTAL AND SOCIAL MONITORING PROGRAM

Table 2: Environmental and Social Management Program	
Issue	Proponent, Contractor(s) and Project Manager/Engineer
Applicable Laws and Standards	<ul style="list-style-type: none"> • Comply with all required laws of Seychelles; • Keep abreast with new laws, regulations, and standards that are applicable to the project.
Organization and Responsibilities	<ul style="list-style-type: none"> • Appointed Environment Officer is responsible for implementing the ESMP; • Implement aspects of the ESMP as instructed.
Records and Documentation	<ul style="list-style-type: none"> • Maintain documents and records as necessary to show compliance and the measures detailed in the ESMP for the prevention and mitigation of the social and environmental impacts of the project.
Training	<ul style="list-style-type: none"> • Regularly communicate and enforce the applicable requirements of the ESMP to employees, workers and contractor via training and signage around the work site.
Worker Code of Conduct	<ul style="list-style-type: none"> • Ensure understanding and compliance by all staff.
Change Management	<ul style="list-style-type: none"> • Update procedures and plans according to changes to the ESMP and communicate changes.
Management Failures	<ul style="list-style-type: none"> • Take the necessary actions to correct any deficiencies within the time specified by the project; • Implement a monitoring and response system to address failings identified by inspections and audits.
Monitoring	<ul style="list-style-type: none"> • As relevant and directed monitor and document the effectiveness of mitigation measures and environmental controls using appropriate measures
ENVIRONMENT	
Air Emissions and Ambient Air Quality	<ul style="list-style-type: none"> • Minimize vehicle emissions dust and stationary source of pollution by properly maintaining vehicles and using dust suppression practices.
Wastewater and Ambient Water Quality	<ul style="list-style-type: none"> • Minimize water pollution and maintain ambient water quality by treating wastewater,

	managing discharges to surface waters, and monitoring water quality in the project area of influence.
Hazardous Materials Management	<ul style="list-style-type: none"> • When possible, the construction contractor(s) should avoid generating or using hazardous materials; • The contractor will be responsible for complying with the authority regarding hazardous waste management including collection, transport and disposal.
Waste Management	<ul style="list-style-type: none"> • The waste contractor will be responsible for complying with the authority regarding waste management including collection, transport and disposal.
Noise	<ul style="list-style-type: none"> • Supervise all equipment and vehicles to ensure that noise are properly managed.
Soil Erosion and Sediment Control	<ul style="list-style-type: none"> • Ensure that erosion control techniques are employed during construction and operation of the project including deployment and installation of erosion control mechanisms such as silt screen, stabilization of slopes, and re-vegetation of cleared areas.
Biodiversity and Natural Resource Management	<ul style="list-style-type: none"> • Ensure close monitoring of biodiversity.
SOCIAL AND COMMUNITY	
Stakeholder Engagement	<ul style="list-style-type: none"> • Avoid direct contact with the community whenever possible. If stakeholder engagement is required, treat stakeholders with respect; • Report any complaints, disputes, or damage caused to the appointed Environment Officer.
Vehicle and Traffic Safety	<ul style="list-style-type: none"> • Restrict vehicles on the construction site; • Inform workers of speed limits and vehicle safety measures; • Install signage to warn vehicle drivers.
Labour	<ul style="list-style-type: none"> • Ensure good labour practices.

6.0 PUBLIC CONSULTATIONS AND DISCLOSURE REQUIREMENTS

6.1 DAR Environmental Services was appointed by GIBB Mauritius (the main consultant) to undertake the ESIA which would contribute into the feasibility report. DAR collaborated with the Environmental Assessment and Permit Section (EAPS) of the environment ministry to engage the scoping exercise. Scoping meeting and site visit were undertaken with internal sections of that ministry which resulted in the issuance of the

scoping list for consultation of key stakeholders. The Anse Etoile and Glacis residents will be directly affected by the impacts of the proposed project. For that reason public information meeting were organised through a television advert in the Anse Etoile and Glacis District Administration offices. A turnout of 14 inhabitants attended the Anse Etoile meeting on 18th February and another 14 attended the Glacis meeting on 19th February 2013.

6.2 After the ESIA was completed and the EAPS was satisfied that the report sufficiently covered all the elements referred to in the TOR. The report was then be placed for public inspection in the two district administration offices, the National Library and the ministry’s documentation Centre for inspection by the general public for 2 weeks. People tend to voice their concerns openly in public people and has the space and the ability to express themselves given the socio-economic and political nature of the island. The proposed project did not attract huge crowds as it is by and large believed to be a lifeline.

6.3 Public disclosure - The ESIA report was placed on public display as per the requirement of the Ministry of Environment and Energy. This took place in the Anse Etoile and Glacis district administration offices, the National Library and the ministry’s Documentation Centre, for inspection by the general public for 2 weeks. There were no adverse comments collected. The advert was placed in the “NATION” newspaper on 14th, 16th and 20th May 2013

6.3 Consultation of key stakeholders was undertaken as part of the study for the project. It allows diverse concerns to be taken into consideration during the implementation and operation phases. The objectives of the consultation were to:

- Provide information about the project;
- Allow stakeholders to view their opinion and concerns;
- Identify the potential impacts to interested and affected parties;
- Manage public expectations and misconceptions regarding the project;
- Verify the significance of impacts;
- Help develop appropriate mitigation measures.

Table 3: Consultation Issues

Issues Raised	Response and Plans to Address
Impact on nearby residences	<ul style="list-style-type: none"> • A Resettlement Action Plan was recommended in the TOR, which evaluated the cases of the nearby property owners that are likely to fall in the new La Gogue catchment. •
Cross-contamination of water in the reservoir –	<ul style="list-style-type: none"> • Cross-contamination of water in the reservoir – The reservoir will remain in use whilst construction is on the way. The timing of the raising of the dam in the dry spell, combined with the elimination of all sorts of spillage in its catchment will safeguard the water quality throughout the construction phase. Camping onsite will not be allowed and all temporary infrastructures for the construction phase will be located downstream. A special plan for water

	<p>testing during that period will be implemented, to ensure that the water remains safe at all times. Appropriate restriction should be enforced, to limit contact with the reservoir during construction.</p>
<p>De-silting of the dam to increase its current capacity- Based on preliminary assessments of the dam, no recommendation has been made with regards to de-silting the dam.</p>	<ul style="list-style-type: none"> As such, the scope of work at hand is to assess if it is feasible to raise the dam or not, and this should be accompanied by appropriate recommendation base on the findings.
<p>The new La Gogue Dam catchment</p>	<ul style="list-style-type: none"> The new La Gogue dam is the areas that slope towards the reservoir and where this is less than 100m, a 100m-meter distance is taken from the High Water Mark.
<p>Evaporation of water from the dam</p>	<ul style="list-style-type: none"> The hydrological study has the mandate to evaluate factors associated with the source and availability of water. Taken from existing the situation, the raising of the dam will not significantly influence the evaporation rate
<p>Stability of the Structure of the existing dam</p>	<ul style="list-style-type: none"> Report by the dam expert confirm that the dam is still in perfect condition and can accommodate a 6m raise.
<p>La Gogue and Maldives road network – Maldives road is narrow and will not be able to accommodate extra vehicle above from the existing situation. The La Gogue road is badly eroded and heavy trucks will worsen its present condition, concurrently with the regular SPTC bus flow in this area, and traffic congestion is expected to increase.</p>	<ul style="list-style-type: none"> Heavy tonnage vehicles will be allowed for onsite works only. Appropriate tonnage of vehicles on the La Gogue stretch of road should be enforced.
<p>Traffic Impact – With the program to replace the old pipes in the northern region, traffic congestion is expected to worsen.</p>	<ul style="list-style-type: none"> Traffic control should be undertaken and nuisance eliminated. Repair of excavated road should be done on an agreed term.
<p>Benefit of La Gogue/ Maldives community from the project – This region is presently receiving very poor supply of treated water, especially during drought.</p>	<ul style="list-style-type: none"> The dam project and improved distribution system will enhance reliable supply in the region by installing a new Water Treatment station below the dam, to increase pressure in the area.
<p>Disturbance of private properties by construction work or flooding – with the scheduled pipe works it is inevitable to cross private properties and damage certain structures. As far as possible this should be avoided.</p>	<ul style="list-style-type: none"> Where this cannot be done, a way-leave should be requested from property owners and agreed terms settled for restoration straight after. In view that this project is of national benefit, the responsible authority will apply the necessary procedures to execute the project in a timely manner.
<p>Specific and private consultation with property owners immediately downstream of the Dam</p>	<p>Further consultation with the property owners immediately downstream of the dam will continue during the implementation of the project. The aim of this exercise is to maintain the satisfaction of these owners and ensure preparedness for emergencies.</p>

Specific and private consultation with Anse Etoile School/Ministry of Education	The staff of Anse Etoile School and the Ministry of Education will be consulted further to reinforce assurance of safety measures at the dam. Schools in the country already have emergency preparedness plans and it will be updated in line with the dam's plan to cater for the unlikely event of dam failure. NB: The school is not in the immediate vicinity of the dam but due to topography, it is lower than the dam hence the extra precaution.
Public Inspection	A copy of the ESMP will be placed in the two districts, National Library, Ministry of Environment and Energy Documentation Centre and other suitable location for review by the public throughout the implementation phase. This is to allow them the opportunity to follow progress and evaluate if the ESMP is being adhere to. A grievance procedure will be annexed to the ESMP. Regular contacts or meetings should be will be undertaken to respond or remediate grievances

7.0 INSTITUTIONAL ARRANGEMENTS & CAPACITY BUILDING:

The roles and responsibilities of the key parties involved in the implementation of the ESMP (in particular, the management actions and monitoring requirements), include Proponent or Promoters, the Engineer or Project Manager, the Principal Contractors (direct appointments including civil works contractor, building contractor), the Environmental Officer, representatives of the Department of Environment.

Table 4: Roles and Responsibilities	
Organization	Responsibilities
Department of Environment	The Department of Environment is the competent authority responsible for environmental issues and that of the ESMP and has the overall responsibility to ensure that the proponent complies with the conditions of its environmental authorization as well as the ESMP. Any alterations to the ESMP are subject to the approval by the Department of Environment.
Public Utilities Corporation	<p>The PUC is ultimately responsible for the implementation and compliance with all conditions of approval of the development or any aspect thereof by any authority. With respect to this development, the developer is:</p> <ul style="list-style-type: none"> • Responsible for attaining all necessary approvals and permits prior to the start of the construction activities on the site; • Ensure, that the ESMP has been approved by the Department of Environment prior to initiating construction; • Appointing the Environment Officer prior to the start of construction on the site and for the duration of the construction phase; • Provide all principal contractors on the site with a copy of the ESMP as part of the tender contract documentation to allow the contractors to cost for its requirements within their respective construction contracts;

	<ul style="list-style-type: none"> Responsible for ensuring ongoing liaison with key players to ensure effective implementation of the ESMP; Also has the authority to deduct environmental penalties.
The Contractor	<p>The word contractor refers to any directly appointed company or individual undertaking on-site implementation (by the Proponent/Promoters).</p> <p>The Contractor shall have the following responsibilities:</p> <ul style="list-style-type: none"> Prepare the required Method of Statements; Ensure implementation of all provisions of the ESMP, including all additional requirements related to the approved method of statements, during all works on site; Ensure that all sub-contractors, employees, suppliers, agents or servants etc.... are familiar with the ESMP; Liaise closely with the Engineers and Environmental Officer and ensure that all works on site are conducted in an environmentally sensitive manner; Report any incidents of non-compliance (dumping, littering, pollution) with the ESMP to the Engineer/Promoter and Environmental Officer; Carry out instructions issued by the Engineer/Promoter, on request of the Environmental Officers, required to fulfil his/her compliance with the ESMP.
Members of National Assembly	<p>The La Gogue dam is found in between the Glacis and the Anse Etoile districts, the MNAs of the two districts will have to play a key role regarding this project acceptability. One of the greatest concerns that arise frequently is the inconsistency supply of treated drinking water during the drought period. The La project will consist of a new water treatment work, which will guarantee a more reliable supply in the La Gogue zone.</p>
The Project Manager/Engineer	<p>The Engineer or Project Manager (or any such person such as the architect/project manager/principal agent authorized by the Developer) shall oversee all the technical and contractual implementation and act as the on-site implementing agent.</p> <p>The responsibilities of the Engineer/Project Manager are to:</p> <ul style="list-style-type: none"> Ensure that the requirements as set out in this ESMP and by the relevant authorities are adhered to and implemented; Assist the Environmental Officer in ensuring that the conditions of the ESMP are being adhered to and promptly issuing instructions requested by the Environmental Officer, to the Contractor. All site instructions pertaining to environmental matters issued by the Engineers are to be copied to the Environmental Officer; Assist the Environmental Officer in making decisions and finding solutions to environmental problems that may arise during the project works; Reviewing and approving construction method statements with input from the Environmental Officer; <p>Ordering the removal of person(s) and/or equipment not complying with the specifications or issuing a stop works order (as required by the Environmental Officer or otherwise);</p> <ul style="list-style-type: none"> Issuing of penalties for transgressions of environmental site specifications;

	<ul style="list-style-type: none"> • Providing input into the Environmental Officer’s ongoing internal review of the ESMP • Additional support to be requested for capacity building in order to allow smooth implementation of the project.
<p>The Environmental Officer</p>	<p>The Environmental Officer’s duties, <i>inter alia</i>, must be to ensure compliance with the ESMP through monitoring and proactive and open communication channels with the project/site management and, when necessary, enforce the environmental requirements.</p> <p>The Environmental Officer’s responsibilities shall include the following:</p> <ul style="list-style-type: none"> • The identification of potential environmental impacts, prior to the onset of construction, using the Environmental Impact Assessment Report and where deemed necessary, a site visit. This would be carried out in consultation with the Contractor. • Ensuring that the ESMP and conditions of approval are adhered to at all times and taking action (via the Contractor) where the specifications are not followed. • Ensuring that environmental impacts are kept to a minimum. • Reviewing and approving construction Method of Statements in consultation with the Contractor. • Briefing session with the contractors and personnel prior to construction activities. • Advising the Engineer and Contractor on environmental issues and assisting in developing environmentally responsible solutions to problems. • Attending the site meetings (when necessary) and giving a report back on the environmental issues at these meetings and other meetings that may be called regarding environmental matters. • Inspecting the site and surrounding areas regularly (i.e. on a weekly basis). • Requesting the removal of person(s) and/or equipment not complying with the specifications. • Keeping both a written and photographic record of progress on Site from an environmental perspective, and an ad hoc record of all incidents or events on Site with environmental ramifications. • These records should be updated on a monthly basis, be dated and accurately catalogued. <p>Undertaking continual internal review of the ESMP and submitting post construction audit report, which evaluates overall compliance with the ESMP at the end of the project. The report should contain the monthly progress reports and photographic record.</p> <ul style="list-style-type: none"> • The EO will submit all written instructions and verbal requests to the Contractor via the Promoter. <p>Keeping a register of complaints on site and recording community comments and issues, and the actions taken in response to those complaints</p>
<p>The Bank/Donor Organization</p>	<p>The bank or donor shall ensure:</p> <ul style="list-style-type: none"> • Disbursement of fund are done according to the approve terms

	<ul style="list-style-type: none"> • Monitor and ensure effective use the fund • Keep track of the progress of the project through the borrower's reporting mechanism and mission visits • Summon explanation for discrepancies
Ministry of Education	The Ministry of Education has a key role to play with regard to safety of the students. The dam is stable and meets internationally established safety standards, but in the unlikely event of dam failure, loss of life and/or economic failure are anticipated. It is worth noting though that as part of the design, the dam has devices to monitor stability to a point that the risk of loss of life is eliminated.
District Administration	The DA can play an important role when having to group the people to discuss on the project or any issues related to that. The infrastructure in the district is good and there is good staffing in the two districts to assist. Already the districts in its mandate conduct monthly meeting with communities to discuss developmental issues.
Ministry of Health	The role of MOH is to provide health services to the population. PUC is an authorized laboratory under the Environmental Protection Act 1994, as such all tests for the Drinking Water Quality can be made in-house.
Ministry of Land Use and Housing	MLUH is the ministry responsible for land and development control. Their key role towards the project is to assist with implementation of the proposed project.

Capacity Building

PUC's environmental unit is made of only two staff, considering the number of works that unit is currently undertaking, the capacity to deal with the La Gogue dam project may be too overwhelming for them to work effectively. The need for both the contractor and the supervising consultants to have environmental officers will be included in the loan Conditions.

8.0 ESTIMATED COSTS

8.1 The estimated cost associated with the various proposed measures (enhancement and mitigation), the monitoring program, consultations, complementary initiatives and institutional arrangements are presented in the table 5:

Table 5: Cost Estimates for Implementation of the ESMP				
Measures	Qty	Unit	Rate	Amount (SR)
Erosion control measures using water sprinklers to suppress dust at excavated sites	50	m3	5000	250000
Re-vegetate land (borrow sites) with native species to stabilize the soil	50	m2	2500	125000
Allow prior clearance of all deadwood/vegetation prior to dam filling to minimize the impact of decaying wood material on water quality	50	m2	2000	100000
Application of slope stabilisation measures at to earth embankments	300	m3	340	102000

Monitor water quality both within the reservoir and downstream of the dam.	36	No.	2000	72000
Dispose any used oil at a designated place in accordance with the law	50	No.	50	2500
Collect and dispose all solid waste at designated places.	100	No.	1500	150000
Replanting of grass at Borrow site to prevent soil Erosion	50	m2	1000	50000
Replanting of grass at the dam embankment	30	m2	1000	30000
Provision for training	36	No.	1500	54000
Provision for capacity building to implement the ESMP	36	No.	30000	1080000
Provision for Monitoring of project	36	No.	2500	90000
Provision for allowing continuous consultation with key stakeholders	36	No.	3000	108000
			Total	2213500

9.0 IMPLEMENTATION SCHEDULE AND REPORTING

Copies of the ESMP shall be kept at the site office(s) during the construction phase and shall be distributed to the Environmental Officer and all other senior contract personnel. All senior personnel shall be required to familiarize themselves with the contents of the ESMP. Amendments to the ESMP document must be approved by the Ministry of Environment and Energy before the ESMP is revised. The Environmental Officer shall be responsible for the implementation and distribution of any approved amendments to the ESMP during the construction phase. The Promoter/Proponent may order the Contractor to suspend part or all of the works during the construction phase if the Contractor fails to comply with the specifications set out in the ESMP and Method of Statements supplied by the Contractor and any Sub-contractors. Such suspension will be enforced until compliance is achieved.

Table 6: ESMP Schedule	
Planning Phase	
Feasibility Study	18 months
ESMP Drafting	4 weeks
<i>Bank Loan Approval</i>	<i>3-4 months</i>
Capacity Building	
Training	3 months
Technical Assistance	1 month
Additional Studies	1 month
ESMP Implementation	
Contractor management plans	Throughout Construction phase
Environment Unit Management plan	Throughout construction and Operation phases
Supervision and Monitoring	
Construction Supervision	Throughout the construction phase
Environmental Monitoring	Environment Ministry
ESMP Evaluation	Annually
ESMP Evaluation	Construction phases

10.0 CONCLUSIONS

10.1 The proposed raising of La Gogue dam and improving the la Gogue distribution system is one of the major projects happening in the country. Consultation with affected and interested parties was undertaken and the results suggest a “No Objection” to the project. Through the environmental and social impact assessment, an acceptable degree of manageable impacts during the implementation phase is expected, whilst on the social dimension promising results is expected in the La Gogue supply zone in the operational phase of the project. In order to achieve this target the ESMP will have to be adhered to during the implementation phase.

11) CONTACTS

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