



# THE REPUBLIC OF LIBERIA

## Liberia Water & Sewer Corporation (LWSC)



## The Liberia Urban Water Project (P155947) Environmental and Social Impact Assessment

**Final**

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## Abbreviations

ARAP	Abbreviated Resettlement Action Plan
BP	Bank Procedure
ECMU	Environmental Compliance Monitoring Unit
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPML	Environmental Protection and Management Law
ESAP	Environmental and Social Assessment Procedures
ESCA	Environmental and Social Compliance Audit
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
EU	European Union
GPS	Global Positioning System
HDPE	High-density polyethylene
IWRM	Integrated Water Resources Management
LHS	Liberian Hydrological Survey
LWSC	Liberian Water and Sewer Corporation
MCC	Monrovia City Corporation
MDF	Management and Development Foundation
MGD	Million Gallons per Day
MHSW	Ministry of Health & Social Welfare
MIA	Ministry of Internal Affairs
MLME	Ministry of Lands, Mines & Energy
MPEA	Ministry of Planning & Economic Affairs
MPW	Ministry of Public Works
MSDS	Material Safety Data Sheet
NECOLIB	National Environmental Commission of Liberia
NEP	National Environmental Policy
NGO	Non-Governmental Organization
NMR	No Mitigation Necessary
NRW	Non Revenue Water
OBA	Output Based Aid
OP	Operation Policy
OXFAM	Oxford Committee for Famine Relief
PRS	Poverty Reduction Strategy
SESA	Strategic Environmental and Social Assessment
STP	Sewage Treatment Plant
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNMIL	United Nations Mission in Liberia
USD	United States Dollar
WATSAN	Water and Sanitation
WB	World Bank
WHO	World Health Organization
WSS	Water Supply System
WTP	Water Treatment Plant

# 1. Executive Summary

This Environmental and Social Impact Assessment (ESIA) for the Liberia Urban Water Project (“the Project”) has been carried out in accordance with the World Bank’s guidelines for environmental impact assessments.

The Project has been classified as a Category B project according to the World Bank Operational Policy 4.01. Only the standard Environmental Assessment, International Waterways (OP/BP 7.50), Physical Cultural Resources (OP/BP 4.11) and Involuntary Resettlement (OP/BP 4.12) safeguard policies have been triggered by this project.

The purpose of this ESIA is to examine the project’s potential negative and positive environmental impacts in light of the triggered safeguard policies, and to propose an Environmental and Social Management Plan (ESMP) that outlines measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. In line with requirements under OP/BP 4.12, a Resettlement Policy Framework has been prepared as a separate document.

The objective of the proposed Project is to increase access to piped water supply services in the project area in Monrovia and improve the operational efficiency and customer orientation of the Liberia Water and Sewer Corporation (LWSC). The project is expected to include two components:

- **Component 1 - Infrastructure Investments in Monrovia:** The focus of this component is to rehabilitate and expand the piped water distribution network of LWSC in Monrovia, with the aim of a reduction of non-revenue water, an increase in access using the existing reinforced concrete tanks built in the 1960es to balance pressure in the system. Priority undertakings identified in cooperation with the client during a detailed scoping study will include the repair and reconditioning of parts of the main eastern transmission line, the installation of bulk meters, expansion of distribution and branchlines in areas of Monrovia and construction of water kiosks.
- **Component 2 - Institutional Strengthening and Capacity Development:** The objective of the second component is to strengthen LWSC’s capacity to sustain and expand services. The proposed sub-activities include: (a) improving cost recovery and reducing non-revenue water by supporting better metering and leak detection processes as well as the development and maintenance of a network information system, hydraulic model and financial model, and an annual independent audit of the existing performance contract; (b) improving customer services, in particular the rate of new connections and response to grievances; (c) assisting the project implementation unit and other key staff with training and critical equipment.

Cumulatively, the project components have no foreseen major negative environmental impact, as confirmed by this ESIA. The adverse environmental impacts are expected to be moderate, of limited significance and magnitude, and restricted to the construction phase. The ESMP outlined in this document describes how these impacts will be managed and minimized.

No physical displacement of Project Affected People (PAPs) has been identified, nor will land acquisitions be required. There will be minor economic disturbances, mostly related to temporary disruption of entrance ramps, terraces, a fence and stairs during pipe laying. These will be reconstructed by the project in equal or better quality. Given that no form of displacement – economic or physical – will be required, the preparation of a Resettlement Action Plan (RAP) is not necessary at this stage, but if required due to future, unexpected displacement related challenges, will be guided by the outline given in the separate project Resettlement Policy Framework.

## 2. Project Description and Justification

### 2.1 Project Context

Large sections of Liberia's population are dangerously exposed to unsafe water and sanitation. Total improved sanitation remains below 17% and almost half of the population practice open defecation (World Health Organization & UNICEF, 2015). Access to improved water has improved, but less than 3% of the population has access to piped water. Even in the capital city, an estimated 80% of the population relies on point sources such as hand-dug wells which may be "improved" in a technical sense, but unsuitable in dense urban environments. A 2011 water quality study in Monrovia found the majority of "improved" wells to be contaminated and unsafe to drink from (UHL & Associates, 2011). Expanding safe piped water, especially in urban areas, is thus a critical priority.

WASH related diseases remain common due to the lack of access to safe water and sanitation. Diarrhea is widespread among children, with 22% of under-five year olds suffering from diarrhea in the past two-weeks, a value higher than in Haiti or the DR Congo, and more than twice the rate in India (Demographic and Health Survey, 2013). Urban children are affected almost as often (20.1%) as their rural counterparts (23.8%). Cholera remains endemic with 60 registered cases in 2014 (UNICEF, 2015). Moreover, "lack of access to safe water [and] proper hygiene" also "contributed to the propagation of the [Ebola] virus" and was even a "critical factor" in schools, as a recent report on *Recovering from the Ebola Crisis* highlighted (UN / World Bank / EU / AfDB, 2015).

In urban areas, the Liberia Water and Sewer Corporation (LWSC) is responsible for water and sanitation supply. LWSC has gone through a long post-war crisis, but a new management team put in place after a World Bank financed audit in 2011-12 has made significant improvements. LWSC has increased its revenues by 145% between FY11 and FY14, increased customers connected by 20%, and streamlined its staffing.

In spite of institutional reforms, funding for water and sanitation has remained weak. Domestic and donor funding to the sector – currently around US\$ 25 million annually – are low compared to needs estimated at US\$110m in 2014 (Government of Liberia, 2013). While the government has provided LWSC with an annual subsidy to meet operational costs, it has not financed significant infrastructure investments. Capital investments in urban water have been entirely financed by donors. In Monrovia, the AfDB is rehabilitating the White Plains water production plant that supplies the capital's existing water network. Work to restore production from the current 6 mgd to the plant's pre-war capacity of 16 million gallons per day (mgd) has started with an expected completion in late 2016.

The rehabilitation and extension of Monrovia's water distribution network, which is the focus of this Project, is thus a top-priority. The existing network will be a constraint on LWSC's ability to distribute the additional production capacity, and is a major bottleneck in the expansion of the utility's customer- and revenue base. At present, the total network length is merely 231 kilometers and supplies approximately 6,400 active accounts (cities of similar population size in the United States have networks up to 30 times larger). Moreover, large parts of the present network are in a state of disrepair and non-revenue water is in excess of 50% of production. For these reasons, the rehabilitation of Monrovia's distribution network proposed in the appraised project was also a key priority identified in Liberia's Sector Investment Plan (Government of Liberia, 2013, p. 17; p.23).

## 2.2 Project Description

The project development objective (PDO) is to increase access to piped water supply services in the project area in Monrovia and improve the operational efficiency and customer orientation of LWSC.

The main beneficiaries of this project will be the residents of neighborhoods in Monrovia selected by the project who will be benefiting in the form of new connections, more hours of water supply, and fewer interruptions in water service delivery, closer proximity of the water supply or a combination of these.

To achieve its objectives, the project will provide a credit of USD10,000,000 to fund two project components: (1) infrastructure improvements in Monrovia; (2) Capacity Building for LWSC, including the development of improved project management and Monitoring & Evaluation.

### 2.2.1 Component 1 – Infrastructure Investments

The project will invest approx. USD 8 million in infrastructure improvements, of which approx. USD 1.6 million in targeted repairs and rehabilitations of the existing distribution network under sub-component A, USD 5.4 million for the extension of the distribution network to new areas and customers under sub-component B, and approximately USD 1 million to cover construction- and spare-part expenses as well as contingency funds.

Under sub-component 1A, the project will carry out critical rehabilitations and improvements in the existing network. This will include repairs along a critical section of the eastern transmission line to reduce water losses improve water flows to central Monrovia, as well as urgent rehabilitations along Somalia Drive and central Monrovia to restore water supply in the city center. Key transmission lines along Gardnersville road and Robertsfield Highway will be rehabilitated to reduce bottlenecks and create back-up capacity in these areas. Furthermore, the installation of bulk meters across the network will allow LWSC to set up district metering areas to track and address non-revenue water (NRW) more effectively.

Under sub-component 1B, the project will invest in the extension of the transmission and distribution network in order to reach additional customers and improve LWSC's revenue and profits. In the capital's areas of SKD Boulevard, Paynesville, Gardnersville, Barnersville, Johnsonville, Robertsfield Highway, Kakata Highway, Junction Road, Kessely Boulevard, Nizohn and Chicken Factory Community as well as Nicklay Town, the project will fund 70 kilometers of new distribution lines as well as up to 60 new kiosks and standpipes.

Sub-component 1C, will finance site mobilization, maintenance and demobilization costs, as well as key spareparts and a contingency allocation with close to USD 1 million.

The intervention sites were selected on the basis of a pre-feasibility engineering study, in-depth discussions with LWSC management and technical staff, a household survey in selected project areas to confirm interest and ability to pay, as well as guided by the following principles:

- (a) Impact on Achieving project objectives: Sites were selected to maximize the number of households benefiting from improved service (e.g. by restoring supply) or new access.
- (b) Synergy with other projects: The focus on distribution in Monrovia complements the AfDB investment in production capacity, and USAID's work outside the capital.
- (c) Balancing revenue targets with pro-poor aspects: Sites were selected in order to balance improved access in poor areas with acquiring customers that can pay water tariffs;
- (d) Engineering considerations: Most sites are close to the main transmission pipeline which exhibit relatively high pressure, which will ensure high quality supply to new customers.

A number of alternatives to the proposed investments and project sites were considered, but ultimately rejected in favor of the current project. Specifically:

- **Service Extension within Monrovia:** The present design for service extensions focuses on areas that were shown to be densely populated, relatively close to existing infrastructure and/or likely to exhibit high demand for piped water. An earlier design of the proposed project developed in cooperation with the Global Partnership on Output-Based Aid considered a more pronounced focus on household connections to poor areas of Monrovia. However, in-depth household surveys that were carried out (including on willingness and ability to pay) showed that in the poorest areas, sufficient demand for individual connections would depend on substantial connection subsidies. As sufficient financing for such subsidies was judged unavailable, the project instead increased the number of public standpipes/kiosks to be built (to provide a cheaper alternative to household connections), resolved to work with LWSC to develop rate-payment schemes for connections, but also refocused away from some areas where ability to pay for household connections was particularly limited (e.g. New Kru Town, Clara Town).
- **Investments in Secondary Towns:** Pre-feasibility planning has also been carried out for the towns of Harper, Gbarnga and Greenville which are formally under LWSC's mandate, but currently lack functional piped water supply or sewerage systems and are not targeted for improvements by other development partners. Monrovia was preferred as the site of this particular project due to its more concentrated population (i.e. higher number of potential beneficiaries), the clear synergies with the AfDB investment in production capacity at White Plains, and the more established local presence of LWSC management and staff, which will facilitate project implementation and subsequent revenue collection. However, in the medium-term, the World Bank could enter in a second phase of urban water investments that progressively expand beyond Monrovia to smaller urban centres such as Harper, Gbarnga and Greenville.
- **Investments in Rural Areas:** Although the need for investments in water supply in rural areas is also great, the key contextual advantages of the proposed urban project (concentrated need, identified projects with advanced planning, a clear institutional partner and direct project synergies with the AfDB investment in production capacity) are less pronounced. Moreover, the discrete nature of rural interventions (e.g. constructing individual waterpoints; community led total sanitation in villages) means that other actors present in Liberia, such as the NGOs Action Contré la Faim, Concern Worldwide, Oxfam GB, Solidarités and Tearfund can operate relatively effectively in rural areas, while the World Bank is one of few institutions with the scale and resources to invest in urban piped water.
- **Investments in sanitation:** Needs in the sanitation sector are great, however, as a study by JICA noted, unlike the water supply system, "most parts [of] the sewerage system constructed in the 1960s [...] are not operative at present...the Fima sewage treatment plant has been out of use because all the mechanical equipment...[was] stolen during civil conflict". Due to the reduced state of the sewerage system, an investment likely to make a significant impact on improving off-site sanitation in Monrovia would require more resources than the project proposed. A detailed feasibility study and costing for a rehabilitation and extension of the sewerage system in Monrovia, similar to the one already prepared for the water supply system, would be a productive next step and could be supported under the complementary technical assistance of the World Bank's Water and Sanitation Program (P155696).
- **Private Sector Participation:** Private Sector Participation was considered in the scoping study as an alternative to the proposed LWSC-centric implementation. However, the immediate participation of the private sector in the management of water either as a service provider and/or as a shareholder, appears unrealistic mainly due to enduring country risk, the lack of an adequate regulatory framework, and the dilapidated state of the infrastructure. Once LWSC's finances and infrastructure are improved, a solid regulatory framework is established, and a coherent and financially sustainable subsidy strategy is firmly in place to allow the very poor to be served, deeper changes in management and/or asset ownership could be considered.

The Component 1 infrastructure interventions are listed in detail in Table 1 below.



Table 1: Summary of Component I Intervention in Monrovia water supply network

#	COMPONENT 1	EXPECTED IMPACTS	ESTIMATED COST
<b>1A</b>	<b>Existing Network: Targeted Infrastructure Repairs and Improvements</b>		
(a)	Eastern Feeder: Repair of all damaged facilities (e.g. valves)	Improvement of water flows to central monrovia and existing reinforced concrete tanks Reduction of physical losses. Pressure increase. Isolation of branchlines from feeder for easier operation & Maintenance.	\$63,000
(b)	Repairs in Central Monrovia & Somalia Drive Areas <i>Replacement 24" Valve on Gabriel Bridge</i> <i>Replacement of damaged and inaccessible section (under buildings) on King Sao Bosso Street</i> <i>Rehabilitation and reconnection of Ducor tank</i> <i>Laying of 12" pipe on Keng Zulu</i> <i>Replacement of damaged pipes on Somalia Drive's bridges</i> <i>By-pass of the old booster station</i>	Restore Water Flows into Central Monrovia and existing reinforced concrete tanks. Reduction of physical losses.	\$630,000
(c)	Installation of Bulk Meters Throughout the Network	Allow localization of water losses & reduction of non-revenue water	\$800,000
(d)	Rehabilitation of existing 8" pipe on Gardnerville road from SD to Barnersville estate	Reduction of key bottlenecks in transmission & back-up in case of breakdowns . Restoration of water-supply in Barnersville estate. Up to 300 connections possible.	\$52,000
(e)	Rehabilitation of the existing 10" pipe on Robertsfield Highway	Supply of new communities. Up to 450 connections possible	\$100,000
<i>Subtotal</i>			<i>\$1,645,000</i>
<b>1B</b>	<b>New Pipe Extensions and Infrastructure</b>		
(a)	Laying of 16" transmission line on Gardnerville Road	Reduction of key bottlenecks in transmission lines. Back up in case of breakdown in other feeders. Up to 300 connections possible.	\$1,600,000
(b)	Laying of 12" transmission line to SKD Boulevard	Reduction of key transmission bottlenecks. Back up in case of damage in other feeders. Up to 650 connections possible.	\$840,000
(c)	Branchlines along Gardnersville Road	New communities supplied. Up to 900 connections possible.	\$265,000
(d)	Branchlines along Kessely Boulevard, in Nizohn and Chicken Factory Community, and Nicklay Town	New communities supplied. Up to 1,100 connections possible	\$630,000
(e)	Branchlines along SKD Road	New communities supplied. Up to 650 connections possible	\$210,000
(f)	Branchlines along Robertsfield Highway	New community supplied. Up to 2000 connections possible	\$540,000
(g)	Branchline expansions in Paynesville Coca Cola Community along Kakata Highway	New community supplied. Up to 1300 connections possible	\$560,000
(h)	Branchlines in Paynesville Duport Road Area	New community supplied. Up to 1250 connections possible	\$291,000
(i)	Branchlines in New Virginia Community	New community supplied. Up to 1250 connections possible	\$325,000
(j)	Refurbishment and construction of 60 water kiosks / standpipes	Increase in access to safe water for poor population	\$105,000
<i>Subtotal</i>			<i>\$5,366,000</i>
<b>1C</b>	<b>Other Investments</b>		
(a)	Mobilisation, Maintenance & Demobilisation of Construction Sites		\$300,000
(b)	Spareparts for 24" and 36" lines (pipe parts and fittings)		\$150,000
(c)	Miscellaneous / Contingency		\$539,000
<i>Subtotal</i>			<i>\$989,000</i>
<b>GRAND TOTAL</b>			<b>\$8,000,000</b>

Figure 1 : Overview Map of Rehabilitation and extension of water supply service in Monrovia



## 2.2.2 Component 2 – Capacity Building

The project will invest approx. USD 2 million into initiatives to strengthen LWSC's capacity to sustain and expand services. The specific interventions are informed by direct project needs (e.g. the need to increase the rate of new customer connections if access targets are to be met ) as well as longer-term priorities identified by the World Bank's Water Global Practice as part of its technical assistance program to LWSC over the past years:

- (a) **Cost-Recovery:** LWSC is currently incurring NRW in excess of 50% of production. Reducing these losses is a key target of the capacity building efforts and will include the setting-up of District Metered Areas (DMAs), staff training in NRW monitoring, the introduction of device assisted meter reading and associated staff training to replace the current error prone manual process.
- (b) **Improve Customer Service:** LWSC currently struggles to react swiftly to customer complaints and request. This has direct implications for the proposed project, for instance, at present LWSC manages to respond to only approx. 70 requests for new connections per month, barely half the rate required to meet project targets for new accounts. The project will thus review, re-train and re-equip LWSC connection teams in line with an earlier pilot by the World Bank's technical assistance program which managed to double the connection rate. LWSC will also develop a rate-payment scheme to allow poorer households to finance connection fees over a longer period to increase demand. Moreover, the project will open at least two additional customer service centers to provide the bulk of the new customers with a service point closer to their homes. Furthermore, the project will invest in a best-practice grievance redress system to track complaints and their resolution.
- (c) **Public consultations:** The project will provide funding for public consultations (events and media placements) with two particular objectives. Firstly, to continuously inform citizens in intervention areas and provide them with an avenue to raise concerns with management and political stakeholders about the project specifically and LWSC in general. Secondly, to carry out consultations with women groups in project areas, in particular with respect to kiosk/standpipe design and placement.
- (d) **Key Operational Equipment:** The project will procure key operational equipment currently lacking and required for a smooth project implementation, including but not limited to vehicles, small excavators, leak detection equipment and spare meters.
- (e) **Project implementation Unit (PIU):** In order to mitigate institutional capacity risks, the project will support salaries and office equipment for a strong, carefully recruited project implementation unit with five key staff – a PIU Director, a project finance management specialist, a safeguards specialist, procurement specialist and monitoring & evaluation specialist (water and sanitation engineer)

## 2.3 Justification for the Project

There is a strong justification for World Bank involvement in improving Monrovia's distribution network. The project is in line with Bank and government objectives, addresses an urgent need that would not otherwise be funded, has strong synergies with an AfDB investment in production capacity, will complement an ongoing World Bank technical assistance program, has a reforming (if low-capacity) implementation partner in LWSC, and can be rapidly realized due to existing pre-feasibility studies.

The proposed project is aligned with the World Bank's twin-goals of ending extreme poverty and promoting shared prosperity. A reliable and affordable source of clean water is an essential precondition for a healthy population and robust economic activity, especially in Liberia's context of high water and sanitation related disease rates (see Section 2.1). The project will improve access and reduce exposure to unsafe drinking water and hygiene for tens-of-thousands of Liberians.

The intervention reinforces the World Bank's Country Partnership Strategy (CPS) 2013-17, in particular its second pillar on Human Development which seeks to achieve "improved outcomes in [...] health". The proposed project builds on the "technical assistance to increase the commercial capacity of the Liberian Water and Sewage Corporation", which the CPS expects the Water Global Practice to "continue to provide" (World Bank, 2013, p. 28).

The project will contribute to realizing the World Bank's pledge to support an "effective and sustainable recovery" from Ebola epidemic (World Bank, 2015) by funding the goal of Liberia's Ebola Economic Strategic Recovery Plan to expand "access to sustainable water and sanitation services".

The project is in line with Liberia's development strategy, the "Agenda for Transformation", which calls for a "major increase in the share of households, institutions and communities [...] that have access to improved [Water, Sanitation and Hygiene (WASH)] facilities", and forms part of the Government's longer-term vision to transform Liberia into a middle income country with universal access to services such as improved water and sanitation by 2030.

At present, less than 20% of the population of Monrovia has access to convenient and improved piped drinking water. This situation is set to worsen given the rapid growth of the Liberian capital's population, which is project to reach 1.5 million and 2.2 million by 2020 and 2030, respectively.

In 2016-17, the AfDB funded restoration of the White Planes production facility will raise treated water supply in Monrovia from around 5 mgd to 16 mgd. However, this water can only be brought to Monrovia's people effectively if the distribution system is rehabilitated and extended, as envisaged under the project. If this were not done, the risk for further outbreaks of waterborne, water based, or otherwise water related diseases would further increase.

The project is thus expected to: (a) reduce the risk and prevalence of water borne diseases in Liberia's capital; (b) raise the standard of living and economic output of the people of Monrovia; (c) improve the local environment and institutional capacity of LWSC.

### 3. Overview of World Bank Operational Policies and the ESIA

This environmental and social impact assessment (ESIA) has been conducted in line with the World Bank Operation Policies for Environmental and Social Impacts Assessments (OP/BP 4.01) and associated safeguard policies.

For purposes of this policy, the project has been rated as category B i.e. project impacts will be site-specific, and few, if any, will be irreversible; in most cases mitigatory measures can be designed readily. The scope of the ESIA derives from its B rating and is to examine the project's potential negative and positive environmental impacts, and recommend any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. Table 2 provides a list of safeguard policies and explanation of which are triggered by the project, determining the focus and extent of the ESIA and associated documents.

*Table 2: Relevant World Bank's Operational Policies*

<b>Safeguard Policies</b>	<b>Triggered</b>	<b>Explanation</b>
Environmental Assessment OP/BP 4.01	Yes	The proposed intervention will rehabilitate and extend parts of the piped water supply network in Monrovia with a significant net positive social and environmental benefit through enhanced access to safe water and with few if any irreversible negative impacts. However, during construction some site-specific negative impacts may occur temporarily e.g. noise, dust, disturbance of businesses or minor construction related accidents.
Natural Habitats OP/BP 4.04	No	The project is located in urban Monrovia, where the ecosystems' biological communities are not formed largely by native plant and animal species, and human activity has already essentially modified the area's primary ecological functions. Hence, the project area does not affect natural habitats as per the definition thereof in Annex A of OP/BP 4.04 and the policy is not triggered.
Forests OP/BP 4.36	No	The project is located in urban Monrovia and does not entail forest management and is not expected to impact on forests.
Pest Management OP 4.09	No	This policy is not triggered as the project will not be involved in helping the borrower manage pests that affect public health
Physical Cultural Resources OP/BP 4.11	Yes	The project will finance the construction and rehabilitation of pipelines in dense urban areas which may affect physical cultural resources adversely, though this unlikely.
Indigenous Peoples OP/BP 4.10	No	This urban project is located in Monrovia, the capital city of Liberia, no indigenous peoples are expected to be affected.
Involuntary Resettlement OP/BP 4.12	Yes	The construction and rehabilitation of pipelines in urban areas may cause disturbances of communal structures or ancillary structures of private properties and income generating opportunities built onto road reserves.
Safety of Dams OP/BP 4.37	No	The project does not entail construction of dams, nor does it rely on dam structures. Existing reservoirs consist of reinforced concrete tanks (i.e. not dam structures in the sense of OP/BP 4.37).
Projects on International Waterways OP/BP 7.50	Yes	OP 7.50 is applicable to the proposed project since the water supply system to be supported by the project sources water from the St. Paul River shared between the Republic of Liberia and the Republic of Guinea and is therefore an "international waterway" for purposes of the policy. <i>An Exception to Notification Requirements under OP7.50 has been granted by World Bank management.</i>
Projects in Disputed Areas OP/BP 7.60	No	The project is not located in a disputed area.

As outlined in Table 2 above, the project triggers the standard OP/BP 4.01 Environmental Assessment, as well as OP/BP 4.11 Physical Cultural Resources, OP/BP 4.12 Involuntary Resettlement, and OP/BP 7.50 International Waterways.

The precise environmental impacts and risks, and required mitigation measures under OP/BP 4.01 and OP/BP 4.11 are described in the following sections of this ESIA. In particular, the Environmental and Social Management Plan (ESMP) presented in Section 6 will detail mitigation measure and also provides the institutional arrangement for their implementation including monitoring arrangements.

The ESIA and ESMP draw presented here draw on a detailed field study carried out in Monrovia by the consultancy firm Hydroconseil in close cooperation with LWSC technical staff and World Bank water and sanitation and safeguard specialists. Information has been collected on a wide variety of variables required to anticipate and manage project impacts, including socio-economic aspects of the impacted area, expected effects on air and noise, impact of construction (e.g. on traffic and public safety), affected stakeholders and LWSC skill gaps and training needs.

The scope of expected involuntary resettlement is also described in this ESIA and judged to be limited, restricted to minor economic disturbances, and affecting fewer than 200 persons. The detailed mechanisms for managing these limited disruptions will be outlined in a separate Resettlement Policy Framework document.

OP/BP 7.50 will not lead to follow-up actions in the context of this particular project (P155947), because an exception to the policy's notification requirements has been granted by World Bank management. This is because alterations to the existing scheme are minor and will not adversely change the quality or quantity of water available to the other riparian of the St. Paul River, nor be adversely affected by the other riparian's possible water use. The proposed activities therefore qualify for the exception defined in paragraph 7 (a) of OP 7.50.

## **4. Liberia's Policy, Legal & Institutional Framework**

An understanding of Liberia's national environmental policy and legal and institutional framework is critical to put expected project impacts into context and to develop realistic and lawful mitigation measures and an effective Environmental and Social Management Plan (ESMP).

### **4.1 Policy Framework**

#### **4.1.1 National Environmental Policy (NEP)**

Under the auspices of the National Environmental Commission of Liberia (NECOLIB), which was established in 1999 and since been transformed into the Environmental Protection Agency (EPA), a National Environmental Policy approved in 2002.

The objectives of the National Environmental Policy (NEP) of Liberia are to ensure the improvement and maintenance of the integrity of the environment; to improve the quality of life of the Liberian people and all who are resident in Liberia; and to ensure that economic development and growth on the one hand and the sustainable management of natural resources on the other are fully reconciled and coordinated.

The NEP focuses on four key areas: (1) Socio-economic dimensions and cross-cutting issues; (2) Sustainable management of sectoral systems; (3) Working with and through people; and (4) Policy implementation. In conformity with the NEP, the EPA has been established in 2003 and is being overseen by a Board of Directors and Environmental Policy Council. The principal goals of the NEP are to:

- a) Develop and implement systems and guidelines for assessing environmental impacts of development and economic activities;
- b) Increase public education and awareness on issues of environment and development;
- c) Develop national and local environmental management capacity;
- d) Empower communities, through participatory learning and action, to manage their natural resources and environment; and
- e) Ensure the sustained involvement of all stakeholders, including but not limited to the private sector and non-governmental organizations (NGOs), in all aspects of the environment and natural resource management efforts.

The Act creating the EPA also established the National Environment Policy Council as the ultimate policy-making body on the environment. The Council provides policy guidance and formulates and coordinates environmental policies and regulations. The EPA Board of Directors oversees the implementation of the national environment management policy and functions of the EPA.

In order to ensure effective environment management at local level, the EPA Act established county and district environment committees, whose main role is to ensure environmental concerns are included in local government plans and projects and to disseminate environmental information.

This ESIA and ESMP are consistent with the principle goals of the National Environmental Policy, in particular, its requirement to assess environmental impacts for development and economic activities.

#### **4.1.2 Poverty Reduction Strategy (PRS)**

A further national policy of relevance to the proposed project is Liberia's Poverty Reduction Strategy, which is based on four pillars: (I) Consolidating Peace and Security; (II) Revitalization of the Economy; (III) Strengthening Governance and the Rule of Law; and (IV) Rehabilitating Infrastructure and Delivering Basic Social Services.

The project under consideration falls under Pillar IV, of which the water and sanitation sector is a part. The overriding policy goal of the Government of Liberia, with regards to water and sanitation, is to reduce the water and sanitation related disease burden. To achieve this goal, the government plans to address three strategic targets: (a) increasing access to safe drinking water; (b) increasing access to human waste collection and disposal facilities; (c) improving the sustainability of water and sanitation facilities. The Government has prioritized the rehabilitation of damaged facilities for water supply and waste disposal, and the construction of new ones as necessary, among the first lines of action.

The proposed project is thus fully aligned with the priorities defined in the poverty reduction strategy, with the project's development objective addressing targets (a) and (b) explicitly.

#### **4.1.3 National Integrated Water Resource Management Policy**

The WATSAN Sector Working Group and the Inter-Ministerial Technical Committee on Water and Sanitation, under the leadership of Ministry of Lands, Mines and Energy, prepared the National Integrated Water Resources Management (IWRM) Policy and validated it in 2007.

The IWRM Policy promotes a new integrated approach to managing water resources in ways that are sustainable and beneficial. The approach is based on the continued recognition of the social value of water, while at the same time giving due attention to its economic value. Integrated water resource management is a long-term process that promotes the coordinated development and management of water, land and other related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

Although the state is the ultimate custodian of the water resources, the aim of the IWRM Policy is to achieve a public sense of resource ownership, and thus mobilize people at all levels to take responsibility for its management, protection and conservation. The policy is designed as a broad-based charter, which must be recognized by all concerned sector institutions, and taken into account by all projects and programs, including the project under consideration.

A review of the IWRM Policy has shown the proposed project is well aligned with the policy's key principles, including its prioritization of drinking water access, and emphasis on developing capacity along with infrastructure in order to ensure operational efficiency and the financial viability of public utilities can ensure sustainability of access and water resources.

#### **4.1.4 WASH Sector Strategic Plan & Sector Investment Plan (SIP)**

The Government of Liberia has developed a Water, Sanitation and Hygiene Sector Strategic Plan in 2011, which was subsequently operationalized as a more detailed and operational Sector Investment Plan (SIP) that defines specific investment priorities for the period 2012-17. This SIP has identified the rehabilitation of Monrovia's distribution network as a top-priority (Government of Liberia, 2013, p. 17; p.23). The proposed project is thus fully aligned with the key sector investment planning document of the Liberian Government.



## **4.2 Legal Framework**

### **4.2.1 Liberia Water and Sewer Corporation Legislature Act (1973)**

The legal basis for the project is rooted in the provisions of the 1973 National Legislature Act that created the Liberia Water and Sewer Corporation (LWSC) to provide water and sewage services and allowing LWSC to enjoy all the rights and privileges of a public corporation under the Laws of Liberia.

As the project implementation partner, LWSC is legally responsible in Liberia for providing commercialized pipe-borne water supply and sewerage services in urban areas. LWSC's powers include, but are not limited to, the following:

- To engage in the management, development, construction, installation, manufacture, operation, transmission, distribution, sale, and supply to all areas of water and sewage services and of equipment and facilities relating thereto.
- To establish and maintain water and sewer facilities, offices and/or agencies within and everywhere inside Liberia; and to exercise any or all of its corporate powers and rights in Liberia and in any foreign country or countries, if need be.
- To determine fair and reasonable rates, fees, and charges which shall be charged in connection with the provision of water and sewage services.
- To manufacture, import, buy, sell, install, collect, generally deal in water and sewage services and to manufacture, buy, sell and deal in all materials used in connection with the aforesaid services.

The 1973 Act thus provides LWSC with the legal mandate and rights to undertake the investments to be financed under the project.

### **4.2.2 Environmental Protection and Management Law (EPML)**

At national level, the legal basis for this ESIA and follow up assessments and monitoring is provided by the provisions of the Liberia Environmental Protection and Management Law (EPML) of 2002 and its companion Act creating the Environmental Protection Agency, both of which came into effect in 2003.

As far as the conduct of an ESIA study in Liberia is concerned, the legal framework is primarily provided firstly by the Environmental Impact Assessment, Audit and Monitoring part, of the EPML, which makes an environmental impact assessment study mandatory for types of projects and activities such this one.

The EPML includes a list of projects and activities for which an environmental impact assessment is mandatory. The type of activities under which this project falls is the Group "Building and Civil Engineering Industries", which includes the "Construction and expansion/upgrading of roads, harbours, ship yards, fishing harbours, air fields and ports, railways and pipelines" and "Reservoir".

The project and its activities (esp. related to pipeline rehabilitations and extensions) are on the mandatory list and thus subject to Part III of the EPML that details the guidelines and procedures that should be followed in applying for, licensing, implementing, and reporting on this environmental impact assessment as well as managing and monitoring the impacts it has predicted.

This ESIA and ESMP are fully aligned with the EPML and will function as the basis for the local approval process. The full project permission process and environmental impact assessment steps are detailed in Sections 6 through 23 of Part III of the EPML, and include the following:

1. Developer or proponent applies for an EIA License, with submission to the County Environmental Officer, prior to the commencement of activities;
2. Developer or proponent publishes a Notice of Intent;
3. Developer or proponent submits a Project Brief to the EPA; and the Project Brief is submitted to Screening.

Screening is the process whereby the EPA and relevant line ministries and agencies of government jointly or singularly review the Project Brief to determine if the project is subject to a full environmental impact assessment, and what, if any, level of further study is required.

If it is determined that the project will have a significant adverse environmental impact then the Developer or Proponent must conduct a “Scoping Processes”. The scoping process culminates in the compilation of a Scoping Report outlining both the technical and sociological criteria and related environmental aspects considered, and the major issues that the stakeholders feel need to be studied in more detail.

It is expected that this World Bank ESIA will function as the basis and important input for the scoping report and possible full impact assessment, subject to review by EPA and the relevant line ministries and agencies of government, and other stakeholders as deemed necessary. Following its review, EPA will make a decision on the project; which may come as (a) Approved unconditionally; (b) Approved conditionally; with the conditions outlined; (c) Requires further study and/or submission of additional detail; or (d) Rejected.

If the project is approved, the Developer or Proponent will pay the required fee to the EPA; and the EPA will issue the Permit/License within three months of receipt of the Environmental Impact Assessment and associated Environmental Impact Statement.

The procedures outlined in the Environmental Protection and Management Law of Liberia conforms well to the World Bank ESIA and vice versa; both of which are aligned with international standard Environmental Impact Methodology (informed by the UNEP Model impact assessment process).

### 4.3 Institutional framework

Both for project implementation and the environmental impact assessment and mitigation measures, it is critical to understand the institutional framework and distribution of responsibilities in the water sector. Table 3 below presents the institutional framework on Water Supply and Sanitation (WSS) sector in Liberia with the ministries and agencies and their functions within the system.

*Table 3: WSS Institutional Framework & Responsibilities*

	<b>MINISTRY / AGENCY</b>	<b>RELEVANT WSS FUNCTIONS/ RESPONSIBILITIES</b>
1	Ministry of Lands, Mines & Energy (MLME)	Responsible for policy development & land and water resource management through the Department of Mineral and Environmental Research. The Liberian Hydrological Survey (LHS) is one of the two arms of the department.

	<b>MINISTRY / AGENCY</b>	<b>RELEVANT WSS FUNCTIONS/ RESPONSIBILITIES</b>
2	Ministry of Health & Social Welfare (MHSW)	The Division of Environmental and Occupational Health handles matters relating to water and sanitation: food hygiene in public eating places, construction/supervision of water wells and pit latrines. MHSW is mandated to conduct sanitary inspections including drinking water.
3	Ministry of Public Works (MPW)	Responsible for the design, construction and maintenance of roads and highways, bridges, storm sewers, public buildings and other civil works. MPW is responsible for the administration of urban and town planning. Mandated, through its Department of Rural Development & Community Services, to ensure that safe drinking water and adequate sanitation facilities are provided in rural communities.
4	Ministry of Planning & Economic Affairs (MPEA)	Responsible for regional development planning and coordination.
5	Liberia Water & Sewer Corporation (LWSC)	Mandated to provide safe water supply and sanitation services to urban centers including Monrovia and the capital cities of the political sub-divisions in conjunction with the relevant line ministries and agencies of Government.
6	Environmental Protection Agency (EPA)	Mandated to set environmental standards and to ensure environmental compliance. EPA is responsible to provide guidelines for the preparation of ESIA and environmental audits
7	Monrovia City Corporation (MCC) (or other City Corporations)	Responsible for the management of Monrovia, including environmental sanitation. Departments of MCC involved are Waste, Environmental health and Sanitation
8	Ministry of Internal Affairs (MIA) through Office of the Development Superintendents	Responsible for development planning and implementation in their respective counties.

As outlined in section 2.2.1 above, the Liberia Water and Sewer Corporation (LWSC) was formed by an act of the National Legislature as a Public Corporation in 1973. The mandate of LWSC is to provide safe water supply and sanitation services to the urban areas in conjunction with the relevant line ministries and agencies of government including the Ministry of Health and Social Welfare (MHSW), the Ministry of Lands, Mines and Energy (MLME) and the local municipal authorities.

LWSC is the institution that is mandated with meeting the Urban Water Supply and Sanitation (WSS) needs in Liberia. The Corporation is also responsible for the operation and maintenance of the municipal sewage system in Monrovia. In addition, LWSC operated water treatment plants and distribution networks in other urban centers in Liberia including ten (10) county administrative centers.

Finally there are several NGOs and international agencies such as UNESCO, WHO, EU, OXFAM, Save the Children, LIURD, MDF and ACIF.

## 5 Potential Project Impacts and Mitigation Measures

### 5.1 Environmental Impact Identification and Rating

Activities associated with each of the project components were identified and listed in consultation with the project team. Similar project components known to have different activities at other location were grouped together because their impacts would be similar. The socio-economic impacts were however treated as site specific although many similar themes emerged at diverse locations. For example:

- Laying of pipeline for water also consists of a set of generally similar activities; and;
- Construction and operation of boreholes also consist of a similar set of activities
- Rehabilitation of reservoir (cleaning, painting, fencing, apply of rust arrestor and waterproof slab, sealing of a minor and inoperative outlet)

The environmental aspects were later categorized and resources affected by the impacts listed. Based on observations made during the site visits, interviews, specific adverse impacts and / or risks were identified. A detailed description of the project area itself is contained in Annex 1. Unless explicitly mentioned in the section below, no other significant impacts are expected (e.g. no impacts are expected on natural habitats such as Providence Island or End Point, or nearby Du River).

### 5.2 Detailed Identified Project Impacts

#### 5.2.1 Disturbance to traffic and damage to public utilities

The proposed interventions will necessitate road cuttings, excavations of trenches, and in some cases the relocation of existing public utilities resulting in the interruption of the services for a period of time.

The construction activities may necessitate partial or total traffic interruption, and temporary road cuts and vehicle and pedestrian traffic deviations. These could result in traffic congestion and risk of accidents. Also the materials supply and disposal will generate circulation of trucks increasing the traffic load on the various highways.

#### 5.2.2 Impact on buildings (houses, businesses and schools)

Excavations to unearth and replace defective pipelines and to place transmission lines will create temporary difficulties of access to the adjacent buildings and some disturbance of the neighboring residents and users. However, no permanent physical displacement are expected nor will land acquisitions be required.

Minor, temporary economic disruptions will occur - mostly related to temporary disruption of entrances, terraces, a fence and stairs. These will be reconstructed by the project in equal or better quality. Agreements will be reached between LWSC and occupants of affected properties to allow for the temporary disruption and subsequent reconstruction. No expansion of easements is expected to be necessary.

Details of the impact on buildings and temporary economic disruptions are provided in the separate Resettlement Framework and Abbreviate Resettlement Action Plan document.

### **5.2.3 Air quality problems**

Smoke emissions from the use of machines and dust production while grading excavating, could result in annoyance to the site workers, nearby residents and activities and the pedestrians.

### **5.2.4 Noise generation**

The use of excavation machines and construction equipment could potentially impact on workers and neighborhood residents.

### **5.2.5 Storing of fuels and lubricants on site**

The Contractor will need to store some fuel, oils and lubricants on site for the machines and pipe laying activities. This can create a risk of water and soil contamination in case of a spill.

### **5.2.6 Construction Safety**

Excavations and other construction site activities such as the use of cranes and elevated working environments must be effectively managed to prevent injury to workers and disruption of the project;

The excavation of 1.0 m-deep trenches for placement of pipelines and excavation for emplacement of foundations are potential risks to vehicles and workers; the vehicles and machine operations on site and a long pipe alignments can create health and safety risks for both workers and pedestrians.

### **5.2.7 Construction Materials and Waste Management**

Construction materials and waste management: The construction activities will necessitate temporary on-site storage of construction materials and excavated materials; poor management of the stored materials and wastes can result in dispersion of materials in the nearby drainage systems and creeks, streets and adjacent properties. Appropriate disposal of construction wastes could minimize similar issues at the final disposal site.

### **5.2.8 Pumping and discharging of storm water and off-site**

The Contractor may need to extract storm waters from the trenches and other construction works to insure working conditions; the discharge of the pumped water can impact surface waters and drainage systems and cause erosion.

### **5.2.9 Risk of flooding**

The lower elevations and canals, drains and banks of the adjacent rivers are subject to flooding in case of heavy rains in concomitance with high water tide impeding the discharge to outfalls at the rivers and Atlantic Ocean. The flooding can negatively impact the access to the treatment plant and damage the electro-mechanical systems of the treatment plants

### **5.2.10 Risk to physical-cultural resources**

As the project will require excavation, in areas where no excavation has been carried out before, as well as in areas with existing or prior human habitation, there remains a possibility of discovering cultural resources. Therefore, even if this is a remote possibility. The Policy on Cultural Heritage has been triggered as a matter of precaution and the Chance Find Procedure outlined in Annex 4 will be followed during the construction period if necessary.

## 6 Environmental and Social Management Plan (ESMP)

The ESMP describes the key environmental mitigation measure identified during the impact assessment study. In addition to the mitigation measures, the ESMP also provides an overview of the institutional arrangements for the implementation and monitoring of mitigation measures. A detailed description of the exact procedures and processes for implementing the ESMP is contained in the Project Implementation Manual (PIM) which will guide LWSC in general, and the Project Implementation Unit (PIU) in particular. The ESMP is to be read and implemented in association with the World Bank's General and Water and Sanitation specific Environmental, Health, and Safety (EHS) Guidelines.<sup>1</sup>

The objectives of ESMP is to help LWSC and the construction contractor address the environmental impact of the project, enhance project benefits, and introduce standards of good environmental practice. The primary objectives of the plan are to:

- a) Define the responsibilities of the project proponent (in this case LWSC), contractors, the World Bank, and other stakeholders, and effectively communicate environmental issues among them.
- b) Facilitate the implementation of the mitigation measures identified by providing the instructions on how to handle the issues, and providing a Implementation schedule
- c) Define a monitoring mechanism and identify monitoring parameters to ensure that all mitigation measures are completely and effectively implemented.
- d) Identify training requirements at various levels and provide a plan for implementation.
- e) Identify the resources required to implement the ESMP and outline corresponding financing arrangements.

### 6.1 Institutional Requirements and Roles

#### 6.1.1 Liberia Water and Sewer Corporation

Overall implementation and monitoring of the EMSF is LWSC responsibility. LWSC will also be responsible for the preparation of a RAP, should the need arise, though this is currently not expected given the lack of physical or economic displacements. A Project Implementation Unit (PIU) is being proposed, which, when established, will conduct the daily task of project implementation and periodic assessment of its progress. The PIU is expected to be staffed with (a) a project coordinator ("PIU Director"), ideally a hydraulic engineer; (b) Financial management specialist, a certified accountant; (c) Social and Environmental Safeguard Specialist; (d) Procurement specialist; (e) Monitoring & Evaluations specialist. To the extent possible, these staff will be drawn from LWSC's permanent staff, especially those who have experience working on the AfDB project, rather than hired as consultants.

#### 6.1.2 Owner's Engineers (OE)/Construction Supervising Engineer

In addition to the PIU, LWSC will also hire a consultancy firm, usually a group of engineers with appropriate experience in managing installation works of this nature, to oversee the technical due diligence of the construction activities. Principally, the firm will ensure that construction of the infrastructure component is executed as designed and that installed components meet intended functions and operability requirements. As part their responsibility, the OE will be required to ensure the implementation of the environment, health and safety specifications of the installation works. LWSC should ensure that this role is inserted in the OE's scope of work during tendering.

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<sup>1</sup> Available online: [www.ifc.org/ehsguidelines](http://www.ifc.org/ehsguidelines)

For institutional capacity building on safeguard issues, capacity building of project team, especially on environmental and social safeguards issues, can also be included in the OE's responsibilities. Incorporating this in the OE's responsibility could help strengthen the institutional capacity to meet the safeguards requirements as well as enhance positive environmental and social benefits.

### **6.1.3 Construction Contractors**

Actual implementation of the ESMP is the responsibility of the Construction contractors responsible for executing the construction works. LWSC will ensure that all relevant environmental, health and safety specifications and requirements are included in design and contracts to form the basis for contractors' compliance monitoring during the execution of work. For instance, the specifications may include but not limited to the requirement for contract develop detailed Environmental Mitigation Plan (EMP) and Health and Safety Plan (HSP) which must be approved by the client before work can start.

### **6.1.4 World Bank**

Though project implementation is the client's responsibility, the Bank will provide implementation support, ensuring that the loan proceeds are used for the loan purposes with due regard for economy, efficiency, effectiveness and environmental sustainability. The Bank will ensure LWSC's compliance with measures agreed with the Bank, findings of the ESIA and results of the Bank safeguards policies through periodic monitoring of project activities. Other institutions such as the Environmental Protection Agency (EPA) may carry out inspections on their own to verify contractor's compliance with environmental management standards as required

### **6.1.5 Public Consultation**

Public consultation as required by the Bank's policy and Liberian environmental regulations was held on December 08, 2015 in order to inform stakeholders about the proposed project as well as solicit their input on how to maximize the expected benefits of the project while minimizing the potential negative impacts. The result of the consultation has been attached in this report (Annex 5).

Summary of main impacts, mitigation and monitoring arrangements are outlined in Table 4 below. At this stage, the cost of implementation of the ESMP has not been included. However, construction contractor will be required to include this cost in the overall construction cost, and LWSC will be required to verify that the contractor has consider this cost as part their overall cost.

## **6.2 Responsibilities under the Environmental and Social Management Plan**

Table 4 below provides detailed mitigation measures and monitoring arrangements for the main impacts of the project outlined in Section 5 of this report, clearly citing the responsible institutions as per the list above. In addition to the mitigation and control measures themselves, the ESMP also manages the monitoring and verification thereof. The details of this monitoring plan are provided in Annex 2.

The mitigation measures of this ESMP are informed by the World Bank's EHS Guidelines, which contain the Bank's recommended approaches and performance levels, which are generally considered to be achievable in new facilities by existing technology at reasonable costs. LWSC and its contractors are to follow the ESMP as well as more detailed EHS guidance (e.g. on drinking water quality, occupational health and safety, etc.) during project preparation and implementation.

Table 4: Environmental and Social Management Plan

Project Activity, Aspects	Category	Potential Environmental and Social Impacts	Proposed Mitigation / Controls Measures	Responsibilities for Implementation of Mitigation Measures	Cost Estimates USD
<b>Construction phase : Excavation</b>	<b>Disruption of Public Utilities and Service</b> Due to relocation and damage	<p>The proposed interventions will necessitate some road cuts, excavation of trenches which in some cases produces the following:</p> <ul style="list-style-type: none"> <li>- Relocation of existing public utilities (sewer lines and electrical and telephone cables) resulting in the interruption of the services for a period of time.)</li> <li>- Accidental damages to existing services might occur during excavation;</li> </ul>	<p>Consult with the utility companies to demarcate the locations and alignments of electrical cables, water mains and communication cables. As it is not uncommon for plans of utility alignments to differ from the situation on the ground, contractors may use a scan (or similar method to locate utilities prior to excavation), or only hand dig in suspected areas.</p> <ul style="list-style-type: none"> <li>- Inform Utilities prior to excavations within the 100 m of their respective alignments</li> <li>- Prepare a detailed works' planning and construction phasing schedule, and coordinate service interruption with public utilities and public administrations. (Works phasing shall be established in a way to reduce the disruption time).</li> <li>- Advise citizens in advance concerning programmed interruptions in water, and other services.</li> </ul>	<p><u>Implementation:</u> Contractor</p> <p><u>Supervision:</u> LWSC and external supervision team</p> <p><u>Coordination:</u> public utilities</p> <p><u>Information and consultation:</u> citizens, hospitals, schools, institutions and local authorities, traffic police</p>	<p>The cost for relocation of underground services is given as a lump sum depending on the location of works</p> <ul style="list-style-type: none"> <li>- Public Consultation and communication</li> <li>- Coordination with Stakeholders</li> </ul>



Project Activity, Aspects	Category	Potential Environmental and Social Impacts	Proposed Mitigation / Controls Measures	Responsibilities for Implementation of Mitigation Measures	Cost Estimates USD
Construction phase : Excavation	Traffic Concerns	<p><b>-Traffic congestion and temporary road closures</b></p> <p><b>- Increased risk of accidents</b></p> <p>- Also the materials supply and disposal will generate circulation of trucks. The construction activities will necessitate partial or total traffic interruption and vehicle and pedestrian traffic deviations resulting in traffic congestion and risk of accidents. traffic flow may also be impacted by temporary road cuts.</p> <p>There is also the risk of damage to buried archaeology/cultural heritage. The mitigation for this is the implementation of the Chance Finds Procedure set out in Annex 4, which is to be implemented by the contractor and supervised by LWRC/external supervision team.</p>	<p>-Prepare and implement Traffic management Plan</p> <p>- Coordinate all traffic arrangements with Traffic Police and Municipality, and authorities</p> <p>- Delivery and discharge Trucks might be assigned restricted circulation hours (delivery hours must be set a part of planning)</p> <p>-Advise citizens in advance concerning road closures and rerouting of vehicle and pedestrian traffic (Public Communication Plan)</p> <p>-Works will be carried out on lots of limited length, in a way to minimize closure of main streets stretches (Project Planning &amp; Scheduling)</p> <p>-Outside of working hours, especially at night, all barriers and signs will remain at sites, with lighting and / or lighted signs placed as required to warn both vehicular and pedestrian traffic</p> <p>-The Contractor shall restore the project environment to the state to which it was or better, prior to construction.</p>	<p><u>Implementation:</u> Construction Contractor</p> <p><u>Supervision:</u> LWSC and external supervision team</p> <p><u>Coordination:</u> local authorities</p> <p><u>Information and consultation:</u> citizens, hospitals, schools, institutions and local authorities</p>	Included in contractor's costs

Project Activity, Aspects	Category	Potential Environmental and Social Impacts	Proposed Mitigation / Controls Measures	Responsibilities for Implementation of Mitigation Measures	Cost Estimates USD
Excavation of Trenches and Road Cuts for installation of water mains	Access to Homes and Public Places	<p><b>Limitation and disruption of access to homes, businesses and public places:</b></p> <ul style="list-style-type: none"> <li>- The trench excavations will create temporary difficulties of access to the adjacent buildings also on account of the traffic deviation and road cuts leading to some disturbance of the neighboring residents and users;</li> <li>- Impact on Businesses</li> </ul>	<ul style="list-style-type: none"> <li>- Works will be effectuated on lots of limited length, in a way to minimize disturbance (Project Phasing Plan, planning);</li> <li>- Excavated areas and trench crossings shall be clearly marked and temporary fencing, bridges, access routes, signage, etc. shall be constructed to facilitate access and avoid accidental falls into these areas</li> <li>- Prior consultation and notification to the impacted and interested</li> </ul>	<p><u>Implementation:</u> Contractor</p> <p><u>Supervision:</u> LWSC and external supervision team</p> <p><u>Information and consultation:</u> citizens, hospitals, schools, institutions and local authorities</p>	Included in Contractor's costs (Include cost of signs, media costs, printing, etc.)
Construction phases	<p><b>Air Emissions and Air Quality</b></p> <ul style="list-style-type: none"> <li>- Dust generated from earthworks.</li> <li>- Dust generated from materials handling.</li> <li>- Wind-generated dust from exposed areas of soil and mounds of stored soil.</li> <li>- Dust generated from vehicle movements emissions from construction traffic and on-site machinery</li> </ul>	<p><b>Impaired Air quality</b> due to emissions from vehicles and dust generated</p> <ul style="list-style-type: none"> <li>- Respiratory impacts on site workers, nearby residents and pedestrian</li> </ul>	<ul style="list-style-type: none"> <li>- Dust masks and eye protection against dust, splinters, debris etc. (according to approved procedures)</li> <li>- Dust suppression methods such as wetting materials or slowing work should be employed as needed to avoid visible dust</li> <li>- Gas masks / respirators when working in closed areas such as access manholes, etc. (according to approved procedures)</li> <li>- Document requirements and standards in the Contractors</li> </ul>	<p><u>Implementation:</u> Contractor</p> <p><u>Supervision:</u> LWSC and external supervision team</p>	Included in Contractor's costs

Project Activity, Aspects	Category	Potential Environmental and Social Impacts	Proposed Mitigation / Controls Measures	Responsibilities for Implementation of Mitigation Measures	Cost Estimates USD
<b>Construction phases</b>	<b>Noise generation</b> (from the use of excavation machines and construction equipment)	Noise generation from the use of excavation machines and construction equipment with its impact on workers and neighborhood	<ul style="list-style-type: none"> <li>-Hearing protection for working around machinery where the noise exceeds 60 dB (according to approved procedures)</li> <li>-Limiting working hours according to the EPA requirements</li> <li>-Maintain vehicles and machinery according maintenance requirements</li> <li>-Consider noise suppression capability in the procurement of vehicle and equipment.</li> <li>-The location of noisy machinery (including generators) can also be considered such that they are positioned away from sensitive sites such as schools hospitals, residential areas etc.</li> </ul>	<p><u>Main responsibility:</u> Contractor</p> <p><u>Supervision :</u> LWSC and external supervision team</p>	Included in Contractor's costs
<b>Construction phases</b>	<b>Handling and Storage of Construction Materials and Wastes</b>	<p><b>Environmental Degradation</b> due to dispersion of materials of materials in the nearby canals, streets and adjacent properties</p> <ul style="list-style-type: none"> <li>-Poor or improper management of the stored materials and wastes can result in dispersion of materials in the nearby canals, streets and adjacent properties;</li> <li>-The construction activities will necessitate temporary on site storage of construction materials and excavated materials, poor management of the stored materials and wastes can result in dispersion of materials in the nearby canals, streets and adjacent properties</li> </ul>	<ul style="list-style-type: none"> <li>-The contractor shall handle construction materials and waste in accordance with approved procedures.</li> <li>-Sites for temporary piles should be agreed with LWSC and local authorities</li> <li>- The community should be made aware of constraints imposed on the contractor for waste collection, storage and disposal</li> <li>-Where possible the contract should coordinate with the Municipality, and administrations, to deposit construction waste in areas that are to be filled or reclaimed</li> <li>-The contractor shall contain excavated materials in the vicinity of the worksite within berms to prevent dispersion and sedimentation of drains, creeks, streets and adjacent properties</li> <li>-In case of accidental waste dispersion, EPA shall be informed and restoration measures shall be applied.</li> <li>- Waste materials are to be disposed at official, properly secured landfill sites.</li> </ul>	<p><u>Main responsibility:</u> Contractor</p> <p><u>Supervision:</u> LWSC and external supervision team</p> <p><u>Information and consultation :</u> EPA and Ministry of Labor</p>	In the preliminary cost estimate the cost for disposal of excavation material is included in pipe laying unit rate (per meter ) or excavation costs (per cubic meter)

Project Activity, Aspects	Category	Potential Environmental and Social Impacts	Proposed Mitigation / Controls Measures	Responsibilities for Implementation of Mitigation Measures	Cost Estimates USD
Use of storage of fuel and hazardous materials	Hazardous material	<p><b>Environmental Degradation (soil, surface water)</b></p> <ul style="list-style-type: none"> <li>-Risk of water and soil contamination in case of spills or leaks</li> <li>-Mobilization of pollutants or sediments from contaminated soils</li> <li>-Cross-contamination of previously non-contaminated soils.</li> <li>-Import of potentially contaminated materials.</li> <li>-Increased fire risk and the resulting mobilization of hazardous smoke or air r-borne materials</li> <li>-Storing of lubricants on site:</li> </ul>	<ul style="list-style-type: none"> <li>-Secondary containment for fuels to avoid spill contamination and inspection during operation</li> <li>-Some training in fuel and waste handling should be part of the orientation for workers</li> <li>-Maintain the MSDS Sheets for hazardous materials on site</li> <li>-Prepare a H&amp;S Plan</li> <li>-Materials Handling Plan</li> <li>-Use of an official landfill for waste generated on the construction site</li> <li>-Emergency Response Plan</li> </ul>	<p><u>Main responsibility:</u> Contractor</p> <p><u>Supervision :</u> LWSC and external supervision team</p>	Included in Contractor's mobilization cost
Construction phases –open excavations	Worker and Public Safety	<p><b>Safety risks due to open excavations</b></p> <p>The excavation of 2.1 to 3.0 m deep trenches, the open trenches and manholes can create health and safety risks for both workers and pedestrians in case of instable excavation sections, inadequate shoring, fencing and signage</p>	<ul style="list-style-type: none"> <li>-Safety conditions in the trenches during construction phase shall be ensured through the use of appropriate shoring systems and dewatering</li> <li>-Workers should not enter a trench more than waist deep without appropriate safety precautions such as shoring</li> <li>-Safe access and thoroughfare must be provided on site at all times. Dangerous areas shall be clearly identified with appropriate signs</li> <li>-Excavated areas and trench crossings shall be clearly marked and temporary fencing, bridges, access routes, signage, etc. shall be constructed to facilitate access and avoid accidental falls into these areas</li> <li>-Legible warning signs, barriers and signals shall be placed at strategic locations in sufficient number and spacing for all prominent access ways to the sites. Warning signs and other protective barriers shall be erected to prevent accidents to citizens due to open ditches, heavy machinery and construction vehicles etc.</li> </ul>	<p><u>Main responsibility:</u> Contractor</p> <p><u>Supervision:</u> LWSC and external supervision team</p>	Shoring and dewatering costs are included in the unit price for the trench excavation / pipe laying

Project Activity, Aspects	Category	Potential Environmental and Social Impacts	Proposed Mitigation / Controls Measures	Responsibilities for Implementation of Mitigation Measures	Cost Estimates USD
Construction phases	Water Quality	<p><b>Environmental Degradation (water sources) due</b> Pumping and discharging of storm water and ground water off-site:</p> <p><b>Risks of Flooding</b></p>	<p>-Storm water will be pumped from pipe trenches and foundations to the ditches, waterways and creeks existing beside the roads. These are the natural recipients currently used for rain-water drainage (Drainage control)</p> <p>-The Contractor shall temporarily stop dewatering and discharging water into the drainage canals/creeks when there is heavy rainfall or a threat of flooding;</p> <p>-The Contractor shall temporary stop all construction activities</p> <p>-Ensure that the workers, the excavations and all on site materials are well protected</p>	<p><u>Main responsibility:</u> Contractor</p> <p><u>Supervision:</u> LWSC and external supervision team</p>	Included in Contractor's cost

## **Annex 1: Description of the Project Area**

### **A. Location**

Liberia is located on the West Coast of Africa and it lies between longitudes 7°30' and 11°30' west and latitudes 4°18' and 8°30' north. The country is bordered on the west by Sierra Leone, on the north by Guinea, on the east by Côte d'Ivoire and on the south by the Atlantic Ocean; and it covers a surface area of approximately 111,370 km<sup>2</sup> (or approx. 43,506 square miles).

### **B. Climate**

The climate of the country is tropical with two seasons: rainy from May to October and dry season from November to April. The average rainfall is to be the highest along the coast and it generally decreasing northwards. Overall the country's mean annual temperature ranges between 24°C and 30°C, with a lower range in the coastal areas. These temperatures and humidity conditions are linked to the rainfall pattern. During the rainy season, cloud reduces temperature as well as reducing the diurnal temperature range.

### **C. Geology and Geomorphology**

The geology of Liberia is dominantly characterized by metamorphic rock basement of granitic gneisses and schists that are widely intruded by swarms of igneous rocks (Dolerite dikes); which dictate the rolling hill topography for much of the terrain. The occurrence of sedimentary rocks is limited to two relatively small and isolated basins along the western section of the coastline, primarily in the areas of Monrovia, Marshall, and Buchanan.

The basement rocks are deeply weathered and show themselves on the surface as lateritic type regoliths or saprolites, with thickness being of the order of a few tens of meters. They have remained in-situ for millions of years. The rocks have recorded several episodes of deformation (folding and faulting etc.) and the dominant structural grain is aligned northeast/southwest, as can be seen from the linear orientation of colours shown on the geologic map in Figure below. This structural grain is generally oriented in the same direction as the major rivers, and this suggests structural controls in the formation of the water courses.

### **D. Hydrology**

Liberia is blessed with a system of rivers both large and small, as shown in the drainage map. The six major rivers of the country are, from east to west, Cavalla River, Cestos River, St. John River, St Paul River, Lofa River and Mano River; and some of the smaller ones include the Du, Farmington, Timbo, Sehnkwehn, Sinoe, Duobe and Dubo. While the larger rivers drain from the Northern Highlands most of the smaller ones drain from the steep escarpment that separates the Rolling Hills from the Dissected Plateau.

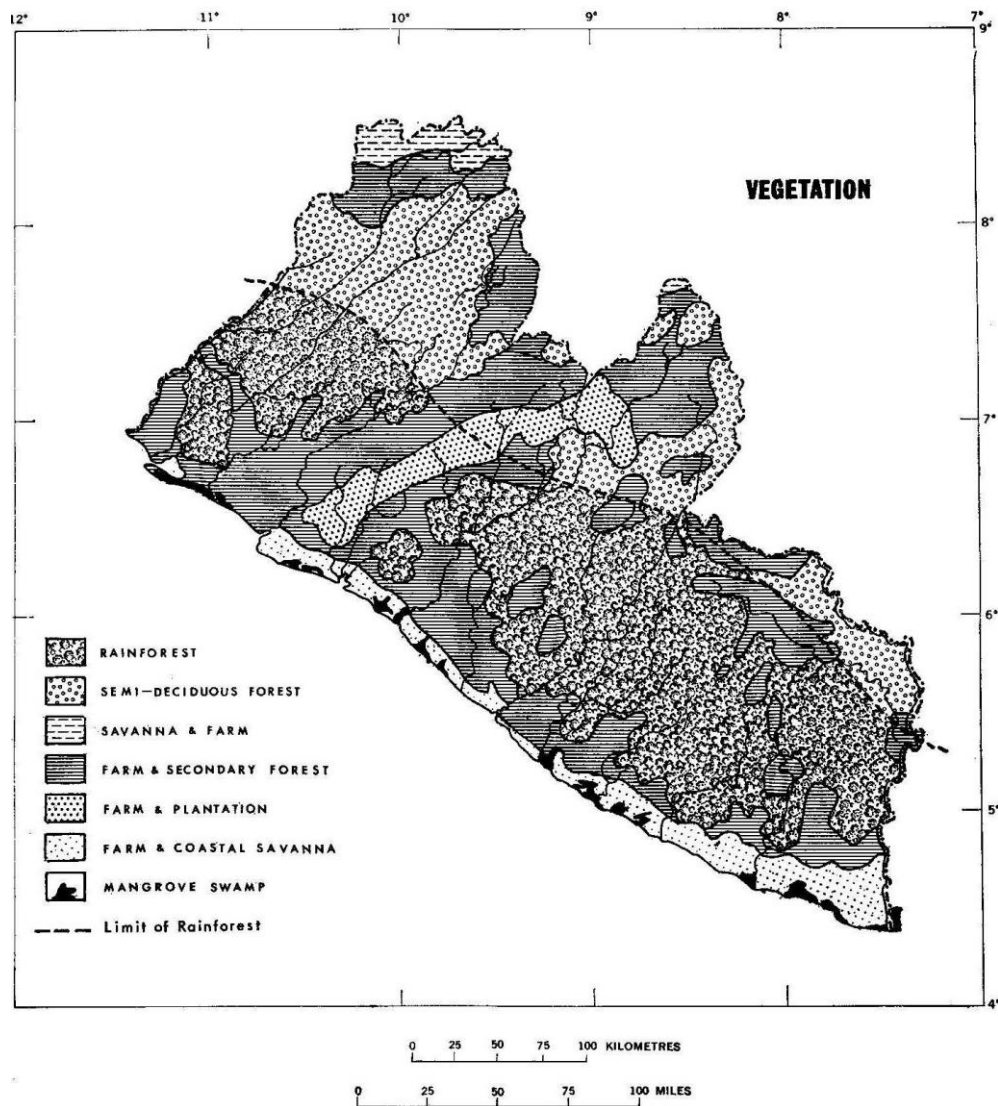
A characteristic of rivers in crystalline basement rocks as well as relatively small watersheds is that they hardly form any well-developed valleys with flood plains, and flow almost entirely over bed rocks and rapids. Consequently, the major rivers of Liberia are also only navigable by canoes and only for short stretches between rapids.

## E. Ecology and Biodiversity

Liberia generally has a tropical rainforest ecology that extends eastward from eastern Sierra Leone, to Cote d'Ivoire, Western Ghana and Nigeria; with marked breaks around eastern Ghana, Togo and Benin. The country's type vegetation is shown in Figure 2.

Biodiversity in Liberia is represented by the variety of wildlife in its forests, wetlands, mountains, rivers, mangroves, beaches, estuaries and open sea, and the attendant ecosystems. The Liberia forest ecosystem, a major component of the Upper Guinea Forest hotspot identified globally by Conservation International is divided into four classes: a) primary dense forest, b) climax secondary forest, c) secondary forest, which has not reached its climax, and d) other mixed vegetation.

Figure 2: Vegetation in Liberia

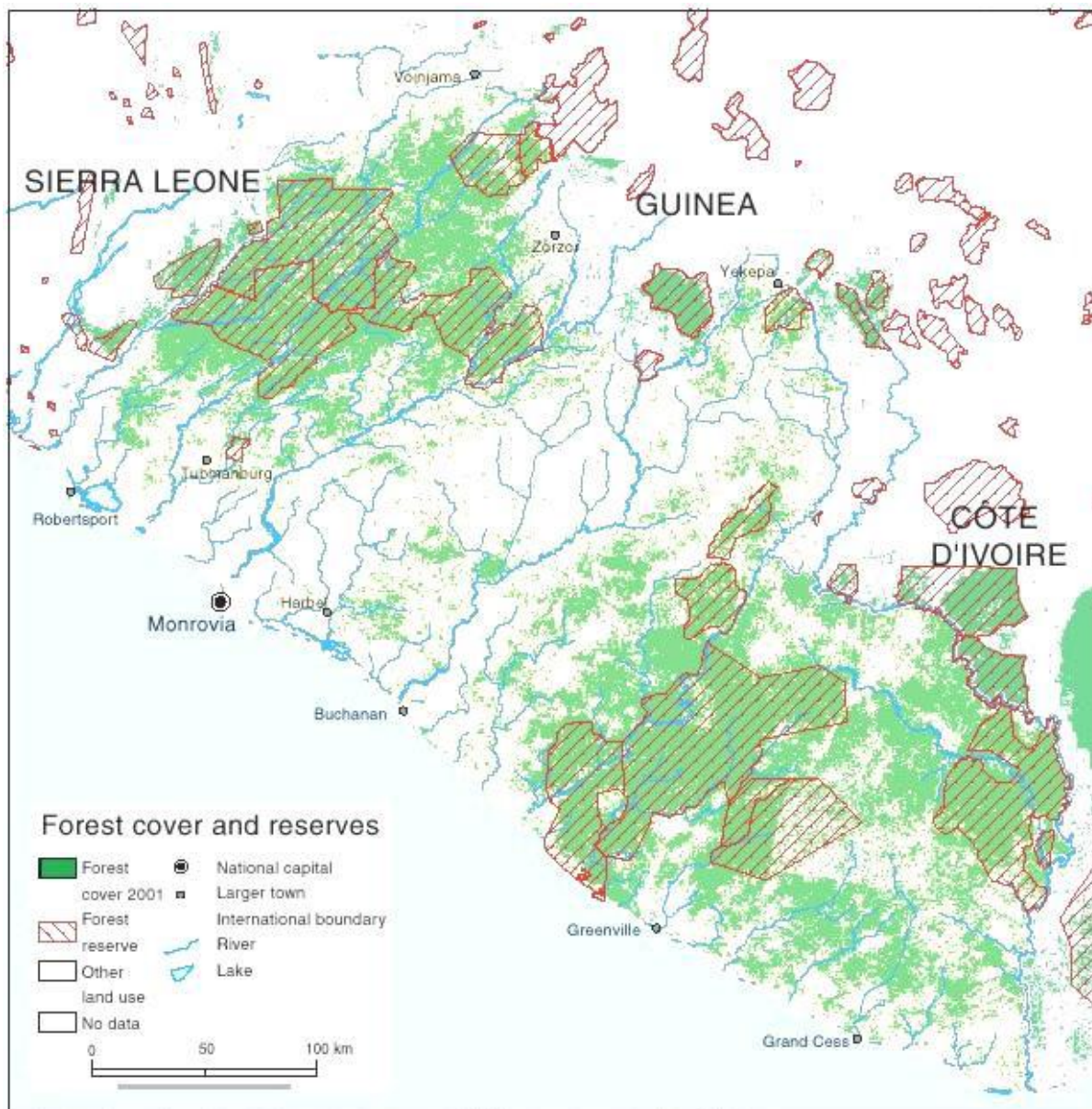


According to Liberia EPA (State of Environment Report 2006) Mount Nimba, the Cestos-Senkwen watershed, and Lofa-Mano and Sapo National Park areas contain many endemic species; and these four areas are among 14 other centers of plant endemism within the upper Guinea hotspot of West Africa. The forests of Liberia are home to many species of fauna and flora. There are over 2,000 flow-

ering plant species, with 59 of them endemic to the country and one endemic genus. Among the plant species are about 240 timber species, of which 30 have been exploited.

The forests also contain many of the regions endangered fauna species, including the pygmy hippopotamus, forest elephant, Diana monkey, and Jentink's and zebra duikers. However, the consumption of bush meat is a threat to biodiversity while commercial logging, shifting cultivation and other activities are threatening the forest cover; with up to about 480,000 acres (192,000 hectares) of forestland being lost annually. The map below (Figure 3) shows the forest cover in Liberia.

Figure 3: Forest cover and reserves in Liberia



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.



## F. Description of the environment of project sites

### i. Population

Population data for Monrovia is estimated at 1,02 million inhabitants. The base year is 2008, from which population is projected for each year from 2010 to 2030, covering the project milestones; which projections were made taking into consideration recent events in the last decade in Liberia, and growth rates of 3.5, 3.6, 3.7, 3.8 and 3.9% were adopted for Monrovia.

### ii. Water Resources

The water resources of Monrovia and its environs (Greater Monrovia as it is commonly called) are the St. Paul River on the western side, the Mesurado River in the central part, and the Du River on the eastern side; coupled with a locally extensive system of aquifers in a fluvial-marine sedimentary basin, a series of coastal lagoons and abundant rainfall. The average annual rainfall in the city is about 4,642mm.

The city's principal source of water supply is the St. Paul River; on the bank of which the White Plains Water Treatment Plant is located. The average total annual flow of the St. Paul River, at Walker Bridge, is about  $8.1 \times 10^{10}$  m<sup>3</sup>; and the computed average discharge of the river is 215m<sup>3</sup>/s. Groundwater flow contribution to the total discharge, using baseflow separation estimation technique, is about 30%.

Flow and/or discharge data are not available for the Mesurado River and Du River. However, the Mesurado River known to be the primary sink for the city's wastes is visibly contaminated, if not highly polluted in its central section, while the Du River is more or less pristine. The project design outlined in the main section of this assessment will not impact the Du River, nor the natural habitats of Providence Island and End Point in the Greater Monrovia area.

In terms of ground water occurrence, Monrovia is situated in the Roberts Sedimentary Basin; which stratigraphy is represented by the following formations in order upwards from the granitic gneiss basement: Unconsolidated sand, silts and mud; Paynesville Sandstone; Edina Sandstone; and Farmington River Formation. The basement gneiss and Paynesville Sandstone are intruded by a swarm of igneous (Dolerite or Diabase) dikes and sills.

Most recent data from pumping tests at Soul Clinic and Barnersville - proposed sites for groundwater satellite stations show minimal yield insufficient to meet the expected design volume of 2.5mgd. As a result the proposed locations have been modified to serve as community water schemes pending the expansion of major waterworks at White Plains.

### iii. Water Demand

The present and projected water demand for Monrovia is estimated as per Table below:

*Table 5: Estimated water demand*

Year	Daily Water Demand	
	Cubic meter	MGD
2015	124,316	32.80
2020	150,091	39.60
2025	182,964	48.27
2030	225,191	59.41

### iv. Water Infrastructure

The basic source of potable water supply in Monrovia is the White Plains Water Treatment Plant (WTP) distributed through a North-Southerly transmission mains and distribution network.

The Water Treatment Plant is in a state of disrepair. The Plant is going to be entirely rehabilitated in 2015 and its capacity will increase to 16 MGD. With a lot of determined efforts, LWSC has managed to keep the plant running against all odds, albeit at a fraction of its original design capacity.

The source is complemented by two LWSC operated Deep Wells in Paynesville and a plethora of not less than 1,500 manually operated Shallow Wells commonly managed by the communities where they are installed. Other sources include private wells, boreholes and rainwater.

#### **v. The issue of shallow wells**

In the case of shallow wells, the majority has been found to be contaminated with unsafe levels of E. Coli in Monrovia in a 2011 water quality study. The potential for contamination comes from the shallowness of the hand-dug borehole, which ranges between 20 – 40 feet. But they are easy to construct with prices ranging from US\$850 to US\$2,100. Most of these hand pumps were donated and installed across the country by donors who usually involve local contractors to build them. To keep the hand pumps working, two people in the community are usually trained to maintain the pumps and spare parts are supplied to last for about two years. Problem arises when the spares run out and the community is unable to raise funds to procure the spares for maintenance. When this happens the community reverts to status quo - fetching water from the creeks for household use. The quality of such water from the creeks cannot be guaranteed and thus heightens the threat of spreading waterborne disease in the community.

With about 1,500 hand pumps in Monrovia, the need for constant monitoring of the source's water quality cannot be overemphasized. This exercise is often performed across the country by LHS under the Ministry of Lands and Mines and Energy; although the Ministry of Health and the Public Works department also claim to have the responsibility for it. There is need for government to place the responsibility of monitoring water quality in the hands of one Agency to avoid inefficiency arising from duplication of functions. This will lead to enhanced public health standards.

#### **vi. Land use**

Over its 187 years of existence, the City of Monrovia has grown from what is now known as Central Monrovia built on a series of four hills that comprise the headland of the Mesurado Peninsula. Firstly, the city expanded eastward into Sinkor and then, with construction of the Old Bridge across Mesurado River it spreads out northwards into Bushrod Island which, with the opening of the Free Port flourished with commercial and industrial activities.

The operation of the Free Port of Monrovia naturally compelled construction of complementary infrastructures such as railroads, highways etc. to facilitate export promotion commodities. Accompanying these infrastructures are bridges built across the St. Paul River and Stockton Creek, which connected and facilitated the city spread northwest from Bushrod Island to Brewerville, Caldwell, New Georgia and; eastwards into Gardnersville.

The urban spread is currently about 12 miles radius from Central Monrovia including Sinkor eastward, and townships of Congo Town and Paynesville and other peripheral townships, commonly referred to as Greater Monrovia. In 1980, LWSC stratified the land areas in Monrovia according to their uses. Based on the table, it is estimated that Monrovia spans a land area of approximately 3,129ha, made up of:

- Central Monrovia – 498ha;
- Sinkor – 1,286ha; and
- Bushrod Island – 1,343ha.

The suburbs of Paynesville City to the east, Brewersville City to the northwest and the Townships of Gardnersville, Barnersville, New Georgia and Caldwell to the northeast are legally outside the jurisdiction of the Monrovia City Corporation, but along with central Monrovia they are generally considered part of Monrovia city. This is the context in which the name (Monrovia) is being used.

#### **vii. Waste Water generation and infrastructure**

As a result of the increase of water supply, it is expected that wastewater will increase proportionally.

The existing but dilapidated wastewater infrastructure includes the Fiamah Sewage Treatment Plant (STP), nine (9) lift stations and a network of sewer pipes. The most critical of these facilities is the STP, which is presently discharging raw sewage into the environment without treatment.

Because of the non-functional state of the Fiamah plant and the threat to public health standards this could bring to overall public health, authorities adopted intermediate intervention using communal toilets for Greater Monrovia and its environs.

The Fiamah STP is located along the southern bank of 'Sinkor, which is a stream with an extensive tract of swamp that extends from the Airfield to the 12th Street area. It runs from Lakpazee and Wroto Town and passes between Fiamah/ICA Camp and Matadi; and is an area of rapidly spreading human settlement. Its characteristic swamp has particularly been „invaded“ for construction of dwellings, which are now more of a cluster of slums; with the area immediately north and east of the STP not exempt.

During the operational period of the STP, the effluent from the treatment process was discharged into constructed lagoons (ponds) in the northeast corner of the facility, from where it was released into the natural stream. The facility is however dilapidated and non-operational, and has been so for the last 15 years or more.

Consequently, the plant is still receiving raw sewage through daily discharges from vacuum trucks from LWSC, UNMIL and other private sewer operators. Raw sewage, including sludge, is simply being discharged on land and the wastewater left to either flow overland or infiltrate through the soil.

## Annex 2: ESMP Monitoring and Verification Arrangements

	Potential Environmental Impacts	Specific Mitigation Measure/ Response or Description of Mitigation Measure	Party Responsible for Mitigation	Monitoring/Verification Method			Estimated Cost/ Budget notes
				Party Responsible for Monitoring	Monitoring Method	Frequency	
<b>ACTIVITY 1. Site Clearing/Preparation for Construction activities</b>							
1	<p><b>1A-Site clearing and preparation may lead to erosion/sedimentation and destruction of sensitive ecosystems and biodiversity loss</b></p> <p><b>1B-Noise pollution and dust emission, causing health hazards and discomfort for communities</b></p>	<p><b>1A-1</b> Pipelines should be routed to avoid all sensitive ecosystems</p> <p><b>1A-2</b> Vegetation clearance should be limited to only areas where construction is meant to be carried out</p> <p><b>1A-3</b> Disturbed areas should be restored/revegetated after construction works</p> <p><b>1A-4</b> Silt traps and other sediment control measures should put in place before clearing vegetation in areas where the potential for sedimentation exist.</p> <p><b>1B-1</b> Construction equipment should be regularly serviced and kept in good working condition</p> <p><b>1B-2</b> Ensure that equipment are shutdown when they are not in use</p> <p><b>1B-3</b> Use appropriate dust suppression methods such as sprinkling in areas that are expected to handle vehicle traffic</p> <p><b>1B-4</b> Plan construction activities to avoid or minimise disruption in sensitive community areas such as schools, health facilities, mosque, churches, etc,</p>	<b>Construction Contractor</b>	Contractor/LWSC/WB Representative	Visual inspection of construction sites and activities	During mobilization, site preparation and construction activities.	

	Potential Environmental Impacts	Specific Mitigation Measure/ Response or Description of Mitigation Measure	Party Responsible for Mitigation	Monitoring/Verification Method			Estimated Cost/ Budget notes
				Party Responsible for Monitoring	Monitoring Method	Frequency	
<b>ACTIVITY 2. Refurbishing existing networks and construction of new extension lines</b>							
2	<b>2A-Noise pollution and dust emission</b>	2A-1 See suggested mitigation measures above	<b>Construction Contractor</b>	Same as indicated above  LWSC/Contractor/Bank's Representative	Visual site inspection & inspection of records	Daily during construction work	
	<b>2B-Solid wastes generation and possible contamination of soil, surface and ground water from hazardous substances such as used oil fuel, cement waste, etc.</b>	2B-1 Minimise waste generation and ensure that wastes are promptly collected and properly disposed of. Recycling and reuse of materials should be encouraged. 2B-2 Store hazardous wastes such as used oil and fuel in secure container 2B-3 Ensure that storage areas are bunded and provided with impervious surface 2B-4 Ensure that hazardous wastes are disposed of through certified waste service providers or at approved wastes disposal sites. 2B-4 Develop spill management plan	<b>Construction Contractor</b>	LWSC/Contractor/Bank's Representative	Construction site inspection	Regular site inspection	

	Potential Environmental Impacts	Specific Mitigation Measure/ Response or Description of Mitigation Measure	Party Responsible for Mitigation	Monitoring/Verification Method			Estimated Cost/ Budget notes
				Party Responsible for Monitoring	Monitoring Method	Frequency	
3	<p><b>3A-Occupational Health and Safety concerns -injury to workers during construction activities</b></p> <p><b>3B-Work-ers/community members getting injure in open trenches</b></p> <p><b>3C-Increased Risk of accidents on roads and working sites due to increase as a result of construction activities.</b></p> <p><b>3D-The construction will be carried out in very congested communities and therefore the possibility for involuntary resettlement</b></p>	<p>3A-1 Develop and implement appropriate occupational health safety measures during construction. The contractor will be required to detail these control measures in a Health and Safety Management Plan</p> <p>3A-2 Provide workers with appropriate personal protective equipment and ensure that they are used as intended.</p> <p>3A-3 Maintain qualified first aid staff and first facility on site</p> <p>3A-4 Ensure that staff are properly trained</p> <p>3A-5 Ensure that construction equipment are kept maintained and regularly checked for defect</p> <p><b>3A-6</b> Provide temporary sanitary and welfare facilities on site for staff.</p> <p><b>3B-1</b> Ensure that all open trenches are marked and appropriately barricaded where possible</p> <p><b>3B-2</b> Where trenches cross pedestrian access, suitable walkways should be established to permit pedestrian access</p> <p><b>3B-3</b> Measures should be taken to have trenches backfilled as quickly as possible</p> <p><b>3C-1</b> Control access to working site and implement appropriate traffic management system including use of appropriate signages, flag men, mandatory site speed limit, etc.</p> <p>3D-1 Routing of pipe to be done to avoid involuntary resettlement</p> <p>3D-2 Where involuntary resettlement unavoidable, affected persons to be compensated in line with the World Bank policy.</p> <p>A Resettlement Action Framework and Abbreviated Resettlement Action Plan has been developed that should be</p>	Contractor	LWSC/Construction Contractor	Visual inspection of site and records	Regular site inspection	

	Potential Environmental Impacts	Specific Mitigation Measure/ Response or Description of Mitigation Measure		Party Responsible for Mitigation	Monitoring/Verification Method			Estimated Cost/ Budget notes
					Party Responsible for Monitoring	Monitoring Method	Frequency	
		activated in case of involuntary resettlement						
<b>Activity 3: Operation phase of refurbished networks, new extension lines and public standpipes</b>								
4	<b>Water System leaks and loss of pressure</b> Water system leaks does not only reduce the pressure of the water, it also compromises the quality of the water by allowing contaminated water to leak into the system	4A-1 Ensure that construction meets Best Industry Standards (BIS), and include BIS in Technical design specifications in Tender documents	Design Team (LWSC & World Bank), Contractor	LWSC	Visual Inspection	Regular field visit		
		4A-2 Conduct regular inspection and maintenance including a leak detection and repair program						

# **Annex 3: Terms of Reference for the Environmental and Social Impact Assessment (ESIA) & Abbreviated Resettlement Action Plan (ARAP)**

## **OF THE NETWORK REHABILITATION & EXTENSION OF MONROVIA WATER DISTRIBUTION SYSTEM**

### **1. INTRODUCTION**

The Liberia Urban Water Project (LUWP) will provide a credit of US\$10,000,000 in Investment Project Financing to improve the Monrovia piped distribution network operated by LWSC, the Liberia Water and Sewer Corporation (LWSC), the public utility responsible for water and sewer services in urban cities of above 5,000 inhabitants. The financing will also support the LWSC institutional ability to provide efficient services and cover its costs. The project will leverage the existing investment program by the African Development Bank (AfDB) focusing on production increases and will allow LWSC to at least double its current customer base, supplying at least an additional 50,000 people with safe water, while improving services to existing customers. The project concept review meeting is scheduled on September 03, 2015, the decision review on November 17, 2015 and board date on March 24, 2015.

Installation of the civil works will be governed by a construction contract containing comprehensive specifications for ensuring public safety and routine environmental protection. Most relevant are general requirements on use of land, safety precautions, and environmental control.

The Monrovia infrastructure sub-component will consist of the following components:

#### **Component 1-Infrastructure Investments**

The project will invest approx. USD 8.2 million in infrastructure, of which approx. USD 4.1 million in targeted improvements and rehabilitations of the existing distribution network under sub-component A, approx. USD 3 million in the extension of the distribution network to new areas and customers under sub-component B, and approx. USD 1.1m into the construction of water kiosks, spare parts miscellaneous expenses and contingency funds under sub-component C.

Sub-component 1A, the project will carry out critical rehabilitations and improvements in the existing network. This will include installing bulk meters across the network in order to set-up six district metering areas that will enable LWSC to track and address non-revenue water (NRW) more effectively; moreover, a key section of the eastern main transmission line between Red Light and Central Monrovia will be repaired and urgent rehabilitations and transmission line ex-tensions will be carried out in the areas of Gardnerville, Robertsville and SKD Boulevard to re-duce key bottlenecks in the network, as well as in central Monrovia, to restore regular piped water supply in the city center.

Under sub-component 1B, the project will invest in the extension of branchlines in seven strategic areas of Monrovia in order to reach additional customers and improve LWSC's revenue and profits. In the areas of SKD Boulevard, Paynesville, Gardnersville, Barnersville, Johnsonville, Robertsville Highway and Junction Road, the project will fund approx. 80 kilometers of new branchlines.



Under sub-component 1C, the project will cover not only up to 60 new kiosks and standpipes, but mobilization- and construction site costs for the infrastructure works, as well as finance the procurement of key spare-parts (pipes and fittings).

## **Component 2-Capacity Building**

The project will invest approx. USD 1.8 million into initiatives to strengthen LWSC's capacity to sustain and expand services. The specific interventions are informed by direct project needs (e.g. the need to increase the rate of new customer connections if access targets are to be met ) as well as longer-term priorities identified by the World Bank's Water Global Practice as part of its technical assistance program to LWSC over the past years.

(a) **Cost-Recovery:** LWSC is currently incurring non-revenue water (NRW) in excess of 50% of production. Reducing these losses is a key target of the capacity building efforts and will include the setting-up of District Metered Areas, staff training in NRW monitoring, the introduction of device assisted meter reading to replace the error prone manual process.

(b) **Improve Customer Service:** LWSC currently struggles to react swiftly to customer complaints and request. This has direct implications for the proposed project, for instance, at present LWSC does not manage to connect sufficient new customers per year to meet project targets. The project will thus review, retrain and re-equip LWSC connection teams in line with an earlier pilot. LWSC will also develop a rate-payment scheme to allow poorer households to finance connection fees over a longer period. Moreover, the project will open a second customer service center to provide new customers with a service point closer to their homes. Furthermore, the project will invest in a best-practice grievance redress system.

(c) **Key Operational Equipment:** The project will procure key operational equipment currently lacking and required for a smooth project implementation, including but not limited to vehicles, small excavators, leak detection equipment and spare meters.

(d) **Project implementation Unit (PIU):** In order to mitigate institutional capacity risks, the project will fund a strong, carefully recruited project implementation unit with five key staff – a PIU Director, a project finance management specialist, a safeguards specialist, procurement specialist and monitoring & evaluation specialist (water and sanitation engineer).

These terms of reference are for the preparation of an Environmental and Social Impacts Assessment (ESIA). The ESIA will take the form of an Environmental and Social Management Plan (ESMP) that identifies, and specifies mitigation measures for, potential adverse impacts that would not be adequately avoided, mitigated or compensated through implementation of the contract specifications mentioned above. Given the nature of the planned works, it is expected that few, if any, such additional mitigation measures will be required. In fact, LWSC has developed an Environmental and Social Management Plan (ESMP) including the Resettlement Plan Framework (RPF) for the ongoing AfDB project that need to be adapted to this project and thus has existing documentation and experience.

## **2. SCOPE OF WORK**

The Consultant will:

a) Review the existing ESMP and RPF, get familiar with their objectives, content and procedures and provide comments for their improvements if any.

- b) Review the engineering designs and tender documents for the planned investments, and familiarize with the scope, locations and details of the planned works.
- c) Identify any potential negative environmental and social impacts, including residual impacts that may not be adequately avoided, mitigated or compensated through implementation of the construction contract requirements referred to in (b) above, and may be significant. These potential impacts include unanticipated permanent land acquisition. The potential environmental and social impacts should be classified for both the construction and operational phases of the project, where applicable. In addition to identifying adverse potential impacts on the natural environment (air, water, and land), the Consultant is expected to identify occupational health and safety concerns associated with the project which are likely to arise during the civil works and ancillary project activities during construction and operation phases of the project.
- d) For any significant residual impacts identified in (c) above, develop detailed, practical mitigation measures to avoid these adverse impacts or manage them within acceptable limits according to standards established in the ESMF and RPF, and a plan for managing and monitoring the implementation of these measures.

3. The consultant's work will be viewed in the overall context of LWSC's obligations to the International Development Association (IDA) as reflected in the appropriate section of the Credit Agreement for the LUWP namely;

- i. to undertake the acquisition of all necessary land and other property, compensation therefore and resettlement for such works in accordance with the principles and institutional procedures established in the Resettlement Policy;
- ii. to ensure that Affected Persons from such works shall be compensated, resettled and rehabilitated in accordance with the Resettlement Policy;
- iii. to prepare and furnish to the Association, a detailed resettlement action plan acceptable to the Association documenting the implementation arrangements for resettlement arising from such works, including compensation, relocation and rehabilitation of Affected Persons;
- iv. to complete the implementation of such resettlement action plan in a manner satisfactory to the Association; and
- v. to prepare and furnish to the Association, an Environmental Management Plan satisfactory to the Association, and thereafter implement such Plan accordingly

#### **4. SCOPE OF WORK FOR ARAP**

The Consultant will:

- a) Review the engineering designs and tender documents for the planned investments, and familiarize with the scope, locations and details of the planned works.
  - c) Describe and evaluate the current environmental and social situation of Monrovia
- Identify sub-project sites that would be impacted as a result of the civil works;  
Undertake a survey of the various sites for the planned civil works and identify potential areas and persons affected by project activities;  
Summary of census and socio-economic survey of displaced persons and assets;  
Description and quantification of compensation and other resettlement assistance to be provided;  
Development of an entitlement matrix  
Description of institutional responsibility for implementation and procedures for grievance mechanism.

## **5. SERVICE, FACILITIES AND MATERIALS TO BE PROVIDED BY THE CLIENT**

The Liberia Water and Sewer Corporation will provide the Consultant with:

- a) Copies of the existing ESMF, RPF for AfDB project and construction contract documents; and

## **7. EXPECTED DELIVERABLES**

Prepare an ESMP and ARAP report on the construction works:

- i) The report will document the nature of the planned works, and the field survey work and results.
- ii) If no additional mitigation measures will be required, the report will document that conclusion.
- iii) If additional social mitigation measures are required according to the terms of the RPF, the report will include an ARAP as called for in the RPF.
- iv) If additional environmental, including health and safety, mitigation measures are required, the report will document the specific situations where adverse impacts are anticipated, and detailed, practical measures for avoiding or mitigating those impacts to acceptable levels. Such measures must be specified in enough detail that construction contractors can estimate their cost (if any) for inclusion in their bid documents and the supervising engineer can ensure their implementation.

Monitor the construction works in collaboration with the supervising engineer to ensure that the policy recommendations are efficiently implemented.

## **8. DELIVERABLE FORMATS AND QUANTITIES**

### **Inception Report**

Within 2 weeks of commencement, an inception report shall be required which documents the Consultant's appreciation of the proposed assignment and how the consultant proposes to carry out the assignment (3 Copies and 1 electronic Copy)

### **Draft Final Report**

Within 2 weeks to the closure of the assignment, the Consultant shall submit a draft final report documenting how the assignment was carried out, highlighting all environmental mitigations required, communities and areas affected and details of monitoring of civil works in the affected areas. (5 Copies and 1 electronic)

### **Final Report**

After review of the draft report by LWSC, the Consultant shall prepare and submit a final report which incorporates LWSC's comments on the draft into the final report (7 Copies and 1 electronic).

## **Annex 4: Cultural Resources and Chance Find Procedures**

Liberia is party to the Convention for the Protection of the World Cultural and Natural Heritage of 1972 that calls for the recognition and protect cultural and natural heritage for future generations. The Bank's EIA requirements also requires borrower to identify physical cultural resources likely to be affected by the project and assesses the project's potential impacts on these resources as an integral part of the EIA process.

Detailed field assessments were performed along the routes where excavation will be carried out, and the findings of these assessment show that there is no reason to expect any significant impacts on cultural resources, especially physical cultural resources. However, the project will require excavation, in areas where no excavation has been carried out before as well as in areas with existing or prior human habitation.

Thus there remains a possibility of discovering cultural resources, even if this is a remote possibility. Therefore the Policy on Cultural Heritage has been triggered as a matter of precaution and the following Chance Find Procedure will be followed during the construction period:

### Chance Find Procedure

- In the event of an unanticipated discovery of cultural heritage, archaeological materials or human remains, the following procedure will be followed:
- Work will be stopped in the immediate area and the “find” will be protected;
- The Contractor or Subcontractor will immediately notify the LWSC's Resident Project Representative/Environmental Officer;
- LWCS will be required to inform the relevant government agencies for identification and custody of the find;
- Construction will be directed elsewhere along the transmission line route while identification is being carried out;
- Based on identification results, the relevant government institutions in charge will give notification if work can continue in the area or not;
- Where it is determined that work cannot continue in that area, the line will be rerouted so as to avoid any impact on the resources.

## Annex 5: Public Consultation Minute of the ESIA

### LIBERIA WATER & SEWER CORPORATION (LWSC)

#### Meeting Minutes

#### Liberia Urban Water Supply Project

#### Consultative Meeting on Environmental & Social Impacts Assessment

#### held at the Paynesville City Hall, Liberia

#### Tuesday, December 8, 2015

On December 8, 2015, The Liberia Water & Sewer Corporation (LWSC), under the leadership of Mr. N. Hun-Bu Tulay, Managing Director convened a consultative and participatory meeting, to discuss the **Environmental & Social Impacts Assessment** of the Liberia Urban Water Supply Project. The interactive meeting, which was held at the famous Paynesville City Hall, near Monrovia included Organizations' such as the UN Agencies, Local and International NGOs, Government Agencies, Donor Institutions, Community Leaders and individual citizens. The program commenced at 1:30 pm, with an initial 30 registered individuals and representatives in attendance.

Welcome Remark was delivered by **Mr. Philip Beah, Director** of Environmental Health and Safety, who also served as proxy for the Paynesville City Mayor. The opening statement was made by **Mr. John K. Kpakolo, Deputy Managing Director/Technical Services**, Liberia Water & Sewer Corporation. These were followed by self-Introduction of those present.

**Mr. Francis Adzanu, Technical Assistant/MD**, of LWSC made the Power Point Presentation on the Environmental & Social Impact Assessment. The Presentation was then followed by a full session of interactive discussions as stated below:

- ❖ **Mr. David G.Foday, Sr.** of the WASH-NETWORK, Comment/ Question:  
He welcomed the project and requested what is put in place to avoid water outage during construction. Further, he asked why do we experience water outage from LWSC these days, instead of the constant supply as doing pre-war? Why does the piped water sometimes appear dirty? What is the LWSC doing at the newly constructed Caldwell Bridge?
- ❖ **Mr. Leroy N. Pennue**, of the Thinkers village Community/Question:  
**When will the LWSC provide pipe water to the Rock Hill, ELWA and Roberts field Highway communities?** If no piped water, does the LWSC has any alternative mean of water supply, such as setting-up public water kiosk to be supplied by trucks, cleaning / disinfecting existing community wells for use by our people?
- ❖ **Mr. Yeagban, of the Ministry of Health**, Comment/Question:  
He welcomed the project and noticed that the project will improve the standards of living of Monrovia population while highlighted the importance of inter-agency coordination and collaboration, particularly between the Ministry of Public Works and the Public Utilities. Most often when the LWSC is transferring pipes to the other side of the road they cut across the asphalt on the motor road. LWSC does not repair the damage asphalt and will leave the opened for a very long time thus affecting the motor road. Does the LWSC have any mechanism in place to repair these roads in general and for this project in particular?
- ❖ **Mr. C. Mike Doryen, of the Monrovia City Corporation**, Comment/Question:  
Commented on the Economic & Social benefits of the proposed Distribution Rehabilitation Project, he highly welcome the move by World Bank through the Government of Liberia, apart from providing water, the project will also provide jobs for the citizens, particularly those in the affected communities and improve their conditions of living of the population of

Monrovia. He also welcomed the ESIA conclusions confirming that structures to be affected will be reconstructed by the project in equal or better quality. The report has highlighted that in case of any required physical resettlement caused by the project, the mechanisms for managing these disruptions have been outlined in a separate Resettlement Framework. On the issue of coordination, Mr. Doryan highlighted the MCC preparedness to work with the LWSC to provide more public awareness and encourage population for cooperation and to effect solid waste disposal in the project affected areas.

- ❖ **Mr. George N.Z Kamara, Youth Coordinator Chocolate City, Comment/Question:**  
**He welcomed the project and questioned the level of collaboration between** the Liberia Water & Sewer Corporation and the Ministry of Public Works. With the expected increase of Water Supply, he stressed that the LWSC create frequent awareness campaign and encouragement for the affected project areas population for cooperation with the project and to protect the Networks/Pipe system in these areas. He further mentioned that LWSC is absent in the whole of the Gardnerville area. There is a need to establish LWSC sub office on the Somalia Drive to enhance it works and for coordination purpose he said. Only water wells are seen popularly around the entire Gardnerville, Somalia Drive, there is certainly a need to extend pipe borne water in the area he mentioned in his closing statement.
  
- ❖ **Madam Lovesta A. Brehun of the Ministry of Public Works, Comment/Question:**  
She welcomed the project and emphasized the importance of coordination among the various stakeholders, particularly during the execution of Projects. She wondered what mechanism has the LWSC in place to avoid existing pipe burst and other associated problems. Is the targeted 300,000 beneficiaries related only to the proposed project or other future projects inclusively?
  
- ❖ **Mr. Philip Zeya, of GSA Road, Comment/Question:**  
He welcomed the project and also complained that the kiosks system put in place by LWSC in his area is not effective in terms of management. Operators are pocketing the money from the sales. What can LWSC do to help sustain water in this community?

**Answering to the comments and questions from the participants, Mr. John K. Kpakolo, LWSC Deputy Managing Director for Technical Services, responded as follows:**

As we said earlier, the reason for the water outage being experienced today is generally due to inadequate supply from the source, the White Plains Treatment Plant. Prior to the civil crisis, the plant produced and transmitted 18 million gallons of treated water daily to Monrovia and its environs. Today, the plant can do only about 3 to 4 million gallons. Another reason is the old age of the system (over 50 years, without proper maintenance), which accounts for frequent breakdowns and subsequent water outages. What you saw happening at the newly installed Caldwell Bridge is simply one of the many breakdowns in the water supply and distribution network that we continue to attend to.

- ❖ The issue of Coordination among Stakeholders is very crucial and will be aggressively followed in the execution of this Project. We have seen how the absence of such efforts has posed serious difficulties for the maintenance and operation of our water distribution system. Most of the distribution controls in Monrovia, such as valves, are now buried beneath asphalt pavements, following the road rehabilitation works in the city. In such cases, pipe locator and leak detection equipment are most needed. The LWSC is currently engaged with the concerned authorities in order to protect the 16” water pipeline along the Gardnerville, Somalia Drive Road, where a Japanese Funded road rehabilitation and improvement Project is ongoing.
  
- ❖ Indeed, public Awareness will be taken very seriously, and will continue throughout the project period. Today consultative meeting is just the beginning of such awareness. LWSC will

do all it can to make her presence felt in every community by staying close to the customers in the supply zones. We have done so by maintaining sub-offices in some of these areas, and will continue same in other areas as required.

- ❖ On the issue of how soon the Distribution Rehabilitation Project will commence and the duration, let me inform you that the review of the design has been concluded. This will be followed by the preparation of Tenders and then the Tendering. The rehabilitation works will commence immediately upon the identification and selection of a suitable contracting firm. We cannot give precise dates for these actions, but we have put mechanisms in place to fast track the whole process. As I said earlier, rehabilitation works at the White Plains Treatment Plant is already in progress. The distribution must be ready in time to receive the quantity of water from the source.
- ❖ As explained during the power point presentation, this project will be implemented with no physical displacement of people or structures at all. Of course there will be minor disturbances to structures or terraces, such as entrances, porches and few other structural extensions. However, these disturbances will be only temporary. For example, if a paved entrance to a shop or residence is broken to allow the pipeline to pass through, this will be immediately replaced as soon as the pipeline is buried. Preferably, such replacement will be even better than it originally was.
- ❖ The Liberia Urban Water Supply Project is funded by a World Bank/IDA loan, at a total cost of a little over ten Million United States Dollars (US\$10,000,000). An amount of US\$8.2 million for infrastructure investments and 1.8 million for institutional strengthening and capacity building.
- ❖ The LWSC statutory mandate is to provide pipe-borne water supply. However, there are other agencies involved with providing and sustaining water services through other means. People living in communities where our pipe water supply has not been extended yet, will have to make use of such other alternatives for now. As the Corporation continues to expand and improve its services, overtime, every community will benefit from pipe-borne water supply.
- ❖ For those communities having water kiosks that are not in use, damaged or perhaps disconnected because of financial arrears, LWSC is prepared to reestablish and continue business with you. You only need to convince us that you now have a sound and responsible community leadership or organization that is prepared to manage the facility. Come to our Sales and Marketing office, and we can work out a reasonable payment plan for you.
- ❖ LWSC is not in the business of road construction but will continue to coordinate with MoPW. But in areas where our water lines are exposed due to erosions or other bad road conditions, the Corporation will relay the pipe section outside of the bad road area or simply rebury it to prevent any damage that will lead to leaks in the network.
- ❖ **Mr. N. Hun-Bu Tulay, Managing Director of LWSC**, in further response to the participants informed the gathering that come March 2016, the project will be submitted to the Bank for financing. And by June or July 2016, physical works are expected to commence. Several donor institutions are currently involved with the general rehabilitation of the LWSC facilities. The AfDB is funding the rehabilitation of the White Plains Water Treatment Plant and three Rural/Outstation cities to pre-war status. The World Bank is involved with the Monrovia distribution. And USAID, through Tetra-Tech is engaged in three other Outstation cities: Sanniquellie, Voinjaman and Robertsport.

### **Closing Remarks from the Participants:**

- ❖ **Mr. Leroy N. Pennue**, who spoke on behalf of the various communities, extended thanks and appreciation to the organizers of the meeting and to the World Bank for wanting to fund the proposed Project. He added that the meeting was good and a vital first step to create awareness for the Project was important. We are ready and will be available to fully corporate and participate in the execution of the works.
- ❖ **Mr. Alioune Fall, Chief of Party of TETRA-TECH, Implementor of the USAID LMWP PROJECT** spoke for the International NGOs present; he commended the broad based participation of stakeholders at the meeting and extended thanks and appreciation to all for participating in the interactive discussions.
- ❖ **Mr. Edwin Rogers of UNICEF-LIBRIA** spoke for the UN Organizations. He pointed out that Monrovia's population before the war was estimated at 600,000, now it stands at over a million. He pledged his organization's commitment to support the water sector of Liberia, through kiosks construction and water wells, for communities where direct pipe connections are not extended. He stressed the importance of such a consultative meeting and thanked all for attending.
- ❖ **Mr. Sekou A. Kamara, of the WORLD BANK**, extended thanks to the LWSC for organizing the meeting and the manner in which it was conducted. He re-assured of the Bank's support, adding that the Managing Director in his statement was right on the starting of the Project; if all goes well, the Project will commence by June or July, 2016. He said that the Bank will appreciate more Public Consultations and community awareness.
- ❖ **The Closing Remarks was delivered by Mr. Tulay, the Managing Director** of the LWSC. He extended the Corporation's thanks and appreciation to all for showing up at this all important program. He told the gathering that the project has a research package of USD\$625,000.00 and assure that residents of communities, particularly those in the project areas will have the opportunity to benefit from this assistance package. He mentioned that LWSC is spending so much money on fuel to run generators and other activities to ensure that pipe-borne water supply is sustained.

#### ***Meeting Minutes***

##### ***Prepared and submitted by:***

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**\*\*1\*\***

Cross section of participants' from the **WASH SECTOR** and the Communities gathering for the Conference on the **Liberia Urban Water and Supply Project** held at the Paynesville City Corporation , under the auspices of the **Liberia Water & Sewer Corporation ,LWSC**, held 12/8/15 .



**\*\*2\*\***

**This Pictorial represents a collective focus mind carefully follow-up on a Power Point Presentation as the Mr. N. Hun-Bu Tulay, Managing Director of the LWSC, Mr. Aliou Fall, Chief of Party, LMWP USAID ----- Project and Mr. John K. Kpakolo, Deputy Managing Director/Technical Services at the LWSC all in a listen and watchful attendance during the Liberia Urban Water Supply Project Conference**



**\*\*3 \*\***

Focus person, **Mr. Francis K. Adzanu, Technical Assistant/MD at LWSC** who delivered an elaborate Power Point Presentation for the **Liberia Urban Water Supply Project** held at the Paynesville City Corporation December 8, 2015





**\*\*4\*\***

**A pictorial calling the attention of the participants** to full readiness as LWSC prepares to commence this all importance Conference as the Secretariat passes on the Meeting attendance, **Mr.C.Mike Doryan, Project Officer of the Monrovia City Corporation, MCC.** Looks on; the Head of the LWSC Secretariat, Mr.J.Amos Swaray,Adm.Resh.Officer/MD handle the Microphone and Secretariat functions, 12/8/15.



\*\*5\*\*

As a **Consultant of WASH Secretariat** deliberates a clear picture of **Madam Lovesta A.Brehun, of the Ministry of Public Works** and other organizations' Stalwarts look on, it is a working session at the Paynesville City Corporation Hall, discussion on the **Liberia Urban Water Supply Project** Officially organized and conducted by the **Liberia Water & Sewer Corporation**, Government of Liberia. 12/8/15



**\*\*6\*\***

Conference Preparatory Stage show the arrival of delegates championing the quest for the provisions of Safe drinking water through dialogue **Mr. J. Amos Swaray, Head of the Conference Secretariat takes pictures ‘ for LWSC Report.**





**\*\*7\*\***

**Answering to the comments and questions from the participants, Mr. John K. Kpakolo, LWSC  
Deputy Managing Director for Technical Services**



**\*\*8\*\***

**Mr. N. Hun-Bu Tulay, Managing Director of LWSC, responds to the participants**





**The Closing Remarks was delivered by Mr. Tulay**

**\*\*9\*\***



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**(LWSC)**

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Reference:

# LWSC

In collaboration with the World Bank

Consultative Meeting

Tuesday December 8, 2015

## Attendance

No.	Name	Min/Org	Email address	Contact No.
1.	EDWIN ROGERS	UNICEF	erogers@unicef.org	0770267468
2	C. Mike Doryen	MCC	mikedoryen@yahoo.com	0777111434
3.	Philip J. Beah	PCC	philipjbeah47@gmail.com	0555123126 0886837151 0770372632
4	Sekou A. Kamara	World Bank	skamara1@worldbank.org	0775574717 0886689505
5	Alexander Zinnah	SEA VICKI Community	Zinnah3@gmail.com	0777516631

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3	Amanda Thomas	C.C.C.		0777580740
4	Loche m. Larmie	C.C.C.		0777-53-888
5	Natasha C. Payne	LWSC		0880884377

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4	Michael Francis Parv	Thinkers Village	tanmichaelfrancis@gmail.com	0886-977-627 0770-664473
5	Henrique B. Fayray	President's Delivery Unit	henrique.fayray@gmail.com	0886529102

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3	Francis K. Adzanu	LWSC	fadzanu@yahoo.com	077578470
4	Aloune Fall	LMWP	afall@fchated-lmwp.com	077332712
5	Jeremiah Jee	LWSC	jee2009.jj@gmail.com	0886 220 545

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5	J Anos Suamy	LWSC	jasoct8@yahoo.com	0816-311-477

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