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Report No: PAD1695

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PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 7.3 MILLION
(US\$10.0 MILLION EQUIVALENT)

TO THE

REPUBLIC OF LIBERIA

FOR A

LIBERIA URBAN WATER SUPPLY PROJECT

March 1, 2016

Water Global Practice
Africa Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective 01/31/2016)

Currency Unit = Liberian Dollars
LRD 87.50 = US\$1
US\$ 1.380499993 = SDR 1

FISCAL YEAR
July 1 – June 30

ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
DA	Designated Account
DHS	Demographic and Health Survey
DMA	District Metered Area
ESIA	Environmental and Social Impact Assessment
ESMP	Economic and Social Management Plan
ESRP	Economic Stabilization and Recovery Plan
EVD	Ebola Virus Disease
FM	Financial Management
GDP	Gross Domestic Product
GoL	Government of Liberia
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
ICB	International Competitive Bidding
ICR	Implementation Completion and Results Report
IFR	Interim Financial Report
IFRS	International Financial Reporting Standards
IRR	Internal Rate of Return
ISP	Implementation Support Plan
JICA	Japan International Cooperation Agency
JSR	Joint Sector Review
LCS	Least-Cost Selection
LWSC	Liberia Water and Sewer Corporation
mgd	million gallons per day
M&E	Monitoring and Evaluation
MD	Managing Director
MHSW	Ministry of Health and Social Welfare
MPW	Ministry of Public Works

MTR	Midterm Review
NCB	National Competitive Bidding
NGO	Nongovernmental Organization
NIS	Network Information System
NPV	Net Present Value
NRW	Non-Revenue Water
PAP	Project Affected People
PDO	Project Development Objective
PIM	Project Implementation Manual
PIU	Project Implementation Unit
PP	Procurement Plan
PPCA	Public Procurement and Concessions Act
QCBS	Quality- and Cost-Based Selection
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SIP	Sector Investment Plan
SOP	Standard Operating Procedure
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
UWSSP	Urban Water Supply and Sanitation Project
WASH	Water, Sanitation, and Hygiene
WHO	World Health Organization
WSP	Water and Sanitation Program

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REPUBLIC OF LIBERIA
Liberia Urban Water Supply Project (P155947)

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PAD DATA SHEET

Liberia

Liberia Urban Water Supply Project (P155947)

PROJECT APPRAISAL DOCUMENT

AFRICA

GWA07

Report No.: PAD1695

Basic Information			
Project ID P155947	EA Category B - Partial Assessment	Team Leader(s) Deo-Marcel Niyungeko	
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints []		
	Financial Intermediaries []		
	Series of Projects []		
Project Implementation Start Date 24-Mar-2016	Project Implementation End Date 30-Dec-2020		
Expected Effectiveness Date 25-Jun-2016	Expected Closing Date 30-Jun-2021		
Joint IFC No			
Practice Manager/Manager	Senior Global Practice Director	Country Director	Regional Vice President
Alexander E. Bakalian	Jennifer J. Sara	Henry G. R. Kerali	Makhtar Diop
Borrower: Republic of Liberia			
Responsible Agency: Liberia Water and Sewer Corporation			
Contact:	Tulay Hun Bu	Title:	Managing Director
Telephone No.:	231777111032	Email:	tevoma@yahoo.com
Project Financing Data(in USD Million)			
<input type="checkbox"/> Loan	<input type="checkbox"/> IDA Grant	<input type="checkbox"/> Guarantee	
<input checked="" type="checkbox"/> Credit	<input type="checkbox"/> Grant	<input type="checkbox"/> Other	
Total Project Cost:	10.00	Total Bank Financing:	10.00
Financing Gap:	0.00		

Financing Source	Amount
BORROWER/RECIPIENT	0.00
International Development Association (IDA)	10.00
Total	10.00

Expected Disbursements (in USD Million)

Fiscal Year	2017	2018	2019	2020	2021
Annual	2.50	3.50	2.00	1.50	0.50
Cumulative	2.50	6.00	8.00	9.50	10.00

Institutional Data

Practice Area (Lead)

Water

Contributing Practice Areas

Cross Cutting Topics

- Climate Change
- Fragile, Conflict & Violence
- Gender
- Jobs
- Public Private Partnership

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Water, sanitation and flood protection	Water supply	100		
Total		100		

I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes

Theme (Maximum 5 and total % must equal 100)

Major theme	Theme	%
Urban development	Other urban development	100
Total		100

Proposed Development Objective(s)

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

Components		
Component Name	Cost (USD Millions)	
Infrastructure Improvements	8.00	
Capacity Building	2.00	
Systematic Operations Risk- Rating Tool (SORT)		
Risk Category	Rating	
1. Political and Governance	Substantial	
2. Macroeconomic	Substantial	
3. Sector Strategies and Policies	Moderate	
4. Technical Design of Project or Program	Moderate	
5. Institutional Capacity for Implementation and Sustainability	Substantial	
6. Fiduciary	High	
7. Environment and Social	Moderate	
8. Stakeholders	Moderate	
9. Other		
OVERALL	Substantial	
Compliance		
Policy		
Does the project depart from the CAS in content or in other significant respects?	Yes [] No [X]	
Does the project require any waivers of Bank policies?	Yes [] No [X]	
Have these been approved by Bank management?	Yes [] No []	
Is approval for any policy waiver sought from the Board?	Yes [] No [X]	
Does the project meet the Regional criteria for readiness for implementation?	Yes [X] No []	
Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	X	
Natural Habitats OP/BP 4.04		X
Forests OP/BP 4.36		X
Pest Management OP 4.09		X
Physical Cultural Resources OP/BP 4.11	X	
Indigenous Peoples OP/BP 4.10		X
Involuntary Resettlement OP/BP 4.12	X	
Safety of Dams OP/BP 4.37		X

Projects on International Waterways OP/BP 7.50		X	
Projects in Disputed Areas OP/BP 7.60			X
Legal Covenants			
Name	Recurrent	Due Date	Frequency
External Auditor Hired (Section I.A.2 of the Project Agreement Schedule)		25-Oct-2016	
Description of Covenant			
The project implementing entity shall, by not later than four (4) months after the effective date, hire an external auditor with terms of reference and qualifications satisfactory to the Association.			
Name	Recurrent	Due Date	Frequency
Annual Work Plans Prepared (Section I.C of the Project Agreement Schedule)	X		Yearly
Description of Covenant			
The project implementing entity shall prepare and furnish to the Association for its approval, not later than March 31 of each year during the implementation of the project, an annual work plan covering all activities proposed to be carried out in the following calendar year.			
Conditions			
Source Of Fund	Name	Type	
IDA	Subsidiary Agreement Executed (V.5.01 (a) of the Financing Agreement)	Effectiveness	
Description of Condition			
The Subsidiary Agreement has been executed on behalf of the recipient and the project implementing entity.			
Source Of Fund	Name	Type	
IDA	Project Implementation Manual Adopted (V.5.01 (b) of the Financing Agreement)	Effectiveness	
Description of Condition			
The Project Implementation Manual, in form and substance satisfactory to the Association, has been adopted by the project implementing entity.			
Source Of Fund	Name	Type	
IDA	Project Implementation Unit Established (V.5.01 (c) of the Financing Agreement)	Effectiveness	
Description of Condition			
The project implementing entity has established the PIU in a form and with functions, adequate staffing, and resources satisfactory to the Association.			
Source Of Fund	Name	Type	
IDA	Authorization of Subsidiary Agreement (V.5.02 of the Financing Agreement)	Effectiveness	

Description of Condition				
The Subsidiary Agreement has been duly authorized or ratified by the recipient and the project implementing entity and is legally binding upon the recipient and the project implementing entity in accordance with its terms.				
Source Of Fund	Name			Type
IDA	Ratification of Legal Agreements			Effectiveness
Description of Condition				
As required by the General Conditions, the execution and delivery of each Legal Agreement on behalf of the recipient or the project implementing entity, which is a party to such Legal Agreement, have been duly authorized or ratified by all necessary governmental and corporate action.				
Source Of Fund	Name			Type
IDA	Steering Committee in Place (Section I.A.2 of the Financing Agreement Schedule)			Effectiveness
Description of Condition				
Establish and thereafter maintain throughout project implementation a Steering Committee in a form and with functions, membership, and responsibilities satisfactory to the Association.				
Team Composition				
Bank Staff				
Name	Role	Title	Specialization	Unit
Deo-Marcel Niyungeko	Team Leader (ADM Responsible)	Sr Water & Sanitation Spec.	Sr. Water Supply and Sanitation Specialist	GWASA
Richard Olowo	Procurement Specialist (ADM Responsible)	Lead Procurement Specialist	Lead Procurement Specialist	GCFDR
Saidu Dani Goje	Financial Management Specialist	Financial Management Specialist	Financial Management Specialist	GGO31
Demba Balde	Safeguards Specialist	Senior Social Development Specialist	Senior Social Development Specialist	GSU01
Hassan Madu Kida	Team Member	Lead Water and Sanitation Specialist	Lead Water and Sanitation Specialist	GWA07
Josephine Anyango Osea	Team Member	Program Assistant	Program Assistant	GWASA
Julie Rieger	Team Member	Senior Counsel	Senior Legal Counsel	LEGAM
Luis M. Schwarz	Team Member	Senior Finance Officer		WFALA
Maximilian Leo Hirn	Team Member	Economist	Economist	GWASA
Sekou Abou Kamara	Safeguards	Environmental	Environmental	GEN01

	Specialist	Specialist	Specialist		
Sylvie Ngo-Bodog	Team Member	Senior Program Assistant	Sr. Operations Assistant	GWA07	
Wendwosen Feleke	Team Member	Operations Officer	Financial and Economic Project Analysis	GWA07	
Extended Team					
Name	Title	Office Phone	Location		
Locations					
Country	First Administrative Division	Location	Planned	Actual	Comments
Liberia	Montserrado	Montserrado County		X	The City of Monrovia and its environs, as further set forth in the Project Implementation Manual.
Consultants (Will be disclosed in the Monthly Operational Summary)					
Consultants Required ? Consulting services to be determined					

I. STRATEGIC CONTEXT

A. Country Context

1. **In 2013 Liberia celebrated a decade of peace, but the country remains among the world's poorest.** Since the end of the civil war in 2003, a lot has been achieved – two peaceful elections have been held, US\$4.6 billion of debt relief has been negotiated, broad price stability has been achieved and nominal gross domestic product (GDP) per capita has more than doubled to US\$460. However, this remains far below the average GDP per capita in Sub-Saharan Africa of US\$1,774, and leaves Liberia among the world's ten poorest countries. Similarly, while Liberia's Human Development Index has improved, the country is still ranked 175th out of 187 by the United Nations Development Programme.

2. **The majority of Liberia's 4.4 million people lives below the poverty line of US\$1.90 per day.** The population is becoming increasingly urban with 49 percent living in cities, of which the capital Monrovia is the largest with a population of 1.2 million. Unplanned urbanization has resulted in the proliferation of informal settlements. A large part of Monrovia's population lives in overcrowded, underserviced slums, vulnerable to socio-economic ills and disease.

3. **The Ebola Virus Disease (EVD) outbreak of 2013-14 highlighted the continued vulnerability of Liberian society and institutions.** The disease infected over 10,000 Liberians and claimed 4,806 lives. The human impact was aggravated by economic repercussions. The World Bank termed the economic impact on as Liberia 'crippling' and estimated forgone national income at US\$240 million in 2015, over ten percent of its GDP. After a decade of average annual GDP per capita growth of 3.5 percent, EVD caused a contraction of 1.85 percent in 2014 (World Bank, 2015).

4. **The Government of Liberia (GoL) has prepared an Economic Stabilization and Recovery Plan (ESRP) in response to the EVD epidemic.** The ESRP outlines a broad program of measures and investments to overcome the negative impacts of EVD. In particular, the ESRP strongly emphasizes the "urgent need to address the structural deficiencies in the service delivery systems in the water and sanitation sector that the EVD epidemic highlighted." The project appraised in this document is a key step toward achieving this goal.

B. Sectoral and Institutional Context

5. **Large sections of Liberia's population are dangerously exposed to unsafe water and sanitation.** People with access to improved sanitation remains below 17 percent and almost half of the population practice open defecation (WHO and UNICEF, 2015). Access to improved water sources has improved, but less than three percent of Liberians benefit from piped water. Even in the capital city, an estimated 80 percent 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 and Associates, 2011). The 2012 Economics of Sanitation initiative estimated that Liberia loses US\$17.5 million annually to negative effects of poor sanitation alone (World Bank 2012). Expanding safe piped water, especially in urban areas, is thus a critical priority.

6. **Diseases related to water, sanitation, and hygiene (WASH) remain common due to the lack of access to safe water and sanitation.** Diarrhea is widespread among children, with 22 percent of under-five-year-olds suffering from diarrhea in the two weeks before surveying, a value higher than in Haiti or the Democratic Republic of Congo and more than twice the rate in India (Demographic and Health Survey 2013). Urban children are affected almost as often (20.1 percent) as their rural counterparts (23.8 percent). 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). The report went on to recommend improving “access in underserved, urban poor communities and areas affected by epidemics...by expanding the distribution network and installing household connections”.

7. **Liberia’s WASH sector has become better organized, but institutional gaps remain.** Liberia gazetted its WASH policy in 2009, laid out institutional reforms in the 2011 ‘WASH Compact’, and developed a Sector Investment Plan (SIP) in 2013. A National Water Resources and Sanitation Board has been established to oversee policy implementation, complemented by a National Water, Sanitation, and Hygiene Promotion Committee to lead sector coordination. Led by the latter with Bank support, Joint Sector Reviews (JSRs) were held in 2013, 2014, and 2015 to review progress and harmonize interventions. An important remaining gap, however, is the regulator (“Water Supply and Sanitation Commission”) that was planned in the 2011 WASH Compact signed by the President of the Republic of Liberia, but that has not yet been established.

8. **In urban areas, the Liberia Water and Sewer Corporation (LWSC) is responsible for water supply and sanitation services.** The LWSC was established as a Public Statutory Corporation under an act approved in 1973 and revised in 1976 under Chapter 88 of the Public Authorities Law. The LWSC mandate is to provide safe water supply and sanitation services to the urban areas with population above 5,000 inhabitants. These include Monrovia, Buchanan, Kakata, Zwedru, Sanniquellie, Harper, Voinjama, Tubmanbourg, Greenville, and Robertsport. The LWSC has gone through a long post-war crisis. Significant improvements were implemented, however, after a Bank-financed audit and a change in management in 2011–12. The LWSC has increased its revenues by 145 percent between FY11 and FY14, increased customers connected by 20 percent, and streamlined its staffing. The Ebola crisis affected revenues due to the closure of businesses; however, a determined effort saw collection efficiency increase and the LWSC recorded US\$4.1 million in revenue in FY15 (compared to US\$4.7 million in FY14), which was augmented by a US\$2.1 million Government subsidy for a total reported positive result of US\$299,000. In pursuit of further institutional reform, the GoL has entered into a Performance Contract Agreement with the LWSC to provide water supply and sewerage services more efficiently, with clear targets and incentives, and is also aiming to manage its subsidiaries outside Monrovia through performance-based management contracts. The act that established the LWSC in 1973 (revised in 1976) is currently also being revised to reflect these changes, with a target date of June 2016.

9. **In spite of institutional reforms, funding for water and sanitation has remained limited.** Domestic and donor funding to the sector—currently around US\$25 million annually—are low compared to annual needs estimated at US\$110 million in 2014 (GoL 2013). Only US\$2.5 million, or 0.4 percent of the national budget were allocated to the WASH sector in 2013–14,

although the 2015–16 budget intended to double the amount assigned to WASH to US\$5 million as part of the Ebola Response and Recovery WASH Plan. In recent years, an important part of the domestic WASH budget has been an annual subsidy to help the national utility LWSC meet operational costs. The GoL has not, however, financed significant infrastructure investments.

10. **In the rural sector, the Ministry of Public Works (MPW) takes a lead role within the government.** The MPW has spearheaded a number of recent WASH-related initiatives, including the creation of a Water Point Atlas, the SIP, the JSRs, and much of the WASH response to Ebola. However, the budget and implementation capacity of the MPW for WASH has remained low, and infrastructure construction is driven by donors, nongovernmental organizations (NGOs), and private groups such as churches. Moreover, fragmentation persists with some hygiene promotion tasks led by the Ministry of Health and Social Welfare. The Ministry of Lands, Mines, and Energy is in charge of water resource management.

11. **Investments in the sanitation subsector have remained limited relative to the enormous needs.** The African Development Bank (AfDB) and Oxfam are actively supporting two urban projects with the objective of increasing access to on-site sanitation services for Monrovia’s poor. By contrast, piped sewerage networks have not seen significant investments since the war. In rural areas, the AfDB has commissioned a study on the National Rural Water and Sanitation Program (WSP) for FY 16–21. Rural areas have been targeted by a community-led total sanitation program supported by the MPW, the Ministry of Health and Social Welfare, and NGOs, which has achieved open defecation free status in 343 communities (GoL 2015). However, the program remains under-resourced and has not progressed sufficiently to reach the target of 5,000 open defecation free communities. Smaller, more discrete interventions in the sector are carried out by individual NGOs, which are building latrines and handwashing facilities.

12. **In the water sector, donors are funding selected infrastructure improvements.** While investments in rural water supply predominantly consist of small point-source construction efforts led by NGOs, local groups, and churches, the United States Agency for International Development (USAID) and the AfDB have financed larger undertakings in urban areas. Outside the capital Monrovia, USAID is financing the Liberia Municipal Water Project with the objective of increasing access to piped water for the populations of Robertsport, Saniquellie, and Voinjama. The AfDB is also constructing small piped networks in secondary cities (Buchanan, Kakata, and Zwedru) as part of its Urban Water Supply and Sanitation Project (UWSSP). The main effort of the AfDB’s UWSSP, however, is focused on Monrovia, where the project is rehabilitating the White Plains water production plant that supplies the capital’s existing water network. Work to restore production from the current 5 million gallons per day (mgd) to the plant’s prewar capacity of 16 mgd has started, with expected completion in late 2016. The AfDB project will also restore some of the primary transmission lines.

13. **The rehabilitation and extension of Monrovia’s water distribution network is a top priority.** The existing network will otherwise be a constraint on the 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 km, extends to less than 50 percent of the Greater Monrovia area, and supplies only approximately 6,400 active private accounts. This represents barely three percent of the population of Monrovia, with only

five percent more accessing piped water through public standpipes. By comparison, the city of Dakar in Senegal has a piped water network of at least 2,870 km (over 4,000 km if the network in the adjoining city of Rufisque is counted) achieving almost universal access to piped water in a city of similar dimension as Greater Monrovia.

14. **The network is not only limited in reach but lacks density in areas it nominally supplies.** The network averages below 0.6 m of pipe per person in its coverage area, while a typical range for a fully effective system is 1 to 5 m per person (GoL 2013). Moreover, large parts of the existing network are in a state of disrepair and non-revenue water (NRW) is estimated to be approximately 65 percent of production. For these reasons, the rehabilitation of Monrovia's distribution network proposed in the appraised project was a key priority of Liberia's SIP (GoL 2013, 17, 23). It has been estimated that fully connecting Monrovia's population through private connections would require up to a 20-fold expansion of the current network size (Hydroconseil 2014). The Monrovia Master Plan study by the Japan International Cooperation Agency (JICA), which assumed a more realistic share of public standpipes, still recommended doubling the current network size and increasing production to 32 mgd by 2019 (twice the capacity targeted by the ongoing AfDB intervention). These undertakings would require investments in excess of US\$100 million (JICA 2009).

15. **These estimates indicate that the proposed project will only be a first step.** The project will carry out urgent rehabilitations, build on recent capacity improvements, and begin a long overdue network- and associated access-expansion process. A successful project outcome would alleviate the most binding constraints, demonstrate increased absorption capacity of the LWSC, and lay the basis for additional investments to expand access to safe piped water further.

C. Higher Level Objectives to which the Project Contributes

16. **There is a strong rationale for Bank involvement in improving Monrovia's distribution network.** The project is in line with Bank and GoL objectives, addresses an urgent need that would not otherwise be funded, has strong synergies with an AfDB investment in production capacity, will complement an already ongoing Bank technical assistance program, has a reform-oriented (if still low-capacity) implementation partner in the LWSC, and can be rapidly realized due to existing prefeasibility studies.

17. **The proposed project is aligned with the 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 WASH-related disease rates (see paragraph B.6). The project will reduce exposure to unsafe drinking water and hygiene for close to 50,000 Liberians and lay the technical and institutional foundation for a sustainable future service expansion. This is expected to reduce poverty and boost shared prosperity by reducing health-related costs (direct on treatments and indirect through missed work), as well as reduce negative impacts associated with lower school attendance due to water- and hygiene-related tasks. This is particularly the case for females who are disproportionately responsible for fetching water (LISGIS 2007).

18. **The intervention reinforces the Bank's Country Partnership Strategy 2013–17 for Liberia** (Report No. 74618, July 1, 2013), 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 Sewer Corporation,” which the Country Partnership Strategy expects the Water Global Practice to “continue to provide” (World Bank 2013, 28).

19. **The project will contribute to realizing the Bank’s pledge to support an “effective and sustainable recovery” from the Ebola epidemic** (World Bank 2015) by funding the goal of Liberia’s Post Ebola ESRP to expand “access to sustainable water and sanitation services.”

20. **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] 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.

II. PROJECT DEVELOPMENT OBJECTIVES

A. Project Development Objective (PDO)

21. 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 of LWSC.

B. PDO Level Results Indicators

22. Progress towards this PDO will be measured through the following indicators:

- a. Direct project beneficiaries (number)
 - i. Female Beneficiaries (%)
- b. Number of people in urban areas provided with access to Improved Water Sources under the project (number)
- c. Active connections per length of piping (kilometers)
- d. Metering Ratio - number of active accounts that are metered over the total active accounts (%)
- e. Non-Revenue Water – the ratio of volume of total water losses over total volume produced (%).

C. Project Beneficiaries

23. The main beneficiaries of this project will be the residents of Monrovia and its environs that will be benefiting in the form of new connections, more hours of water supply, fewer interruptions in water service, and closer proximity of the water supply or a combination of these enhancements. Benefits from improved access to services and living conditions will be complemented by job opportunities from construction activities. The LWSC will benefit from support to gradually improve their capacity, provide services to the inhabitants and generate additional revenues. Finally, the construction sector will benefit from contract opportunities.

24. The socioeconomic characteristics of areas targeted for investments have been classified into three categories (‘low’, ‘medium’, and ‘high’) based on observed characteristics of housing

quality (for example, house made of concrete, stone, or bricks, possession of generator). The targeted areas predominantly fall into the ‘medium’ category to balance pro-poor and revenue targets. It should be noted, however, that even areas classified as having a ‘medium’ socioeconomic profile (for example, Duport Road) contain a large percentage of poor households that are unlikely to be able to afford private household connections and will thus be reached by the construction of standpipes or kiosks (Hydroconseil 2014). The LWSC will also develop a rate-payment scheme to allow poorer households to finance connection fees over a longer period.

25. **The expected outcomes from the project** are (a) at least 63,000 direct project beneficiaries (of which 44 percent female); (b) at least 48,500 people in urban areas of Monrovia provided with access to Improved Water Sources under the project; (c) an increase in active connections per kilometer of piping from 28 to at least 43; (d) an improvement in the metering ratio from 49 percent at baseline to at least 72 percent; (e) an improvement in NRW from a baseline value of 65 percent in 2014 to at least 58.8 percent in 2021. As a precise, reliable baseline for NRW is currently not available (production is not yet metered, only estimated), the baseline and expected outcome for NRW may be adjusted at midterm review (MTR) once more reliable data becomes available due to bulk meters installed under the ongoing AfDB financed rehabilitation of White Plains treatment plant, and the proposed project.

III. PROJECT DESCRIPTION

A. Project Components

26. **To achieve the PDO and key results, the project will provide a credit of US\$10,000,000 to fund two project components:** (a) infrastructure improvements in Monrovia and (b) capacity building for the LWSC, including the development of improved project management and monitoring and evaluation (M&E) arrangements.

27. The project components were selected on the basis of (a) the Monrovia Water Master Plan (JICA); (b) the Liberian National SIP; and (c) capacity-building priorities identified during technical support provided by the Bank to the LWSC since 2013 and were further refined by the hydraulic and financial models that were carried out during the project preparation. Furthermore, the feasibility engineering study and the results of a household survey on the demand and ability to pay confirmed the selected project sites.

28. **Component 1 - Infrastructure Improvements.** The project will invest approximately US\$8 million in infrastructure improvements, of which about US\$1.9 million will finance targeted repairs and rehabilitations of the existing distribution network under Subcomponent 1A and US\$6.1 million for the extension of the distribution network to new areas and customers under Subcomponent 1B. Estimated costs for Subcomponents 1A and 1B include allowances for site mobilization, maintenance, and contingencies.

29. Under Subcomponent 1A, the project will carry out critical rehabilitations and improvements in the existing network. This will include repairs along key sections of the Eastern Transmission Line to reduce water losses and 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 Gardnerville Road and Robertsfield Highway will

be rehabilitated to reduce bottlenecks and create backup capacity in these areas. Furthermore, the installation of bulk meters across the network will allow the LWSC to set up district metered areas (DMAs) to track and address NRW more effectively.

30. Under Subcomponent 1B, the project will invest in the extension of the transmission and distribution network to reach additional customers and improve the LWSC's revenue and profits. In the areas of SKD Boulevard, Paynesville, Gardnersville, Barnersville, Johnsonville, Robertsfield Highway, Kakata Highway, Junction Road, Kessely Boulevard, Nizohn and Chicken Factory Community, and Nicklay Town, the project will fund 70 km of new distribution lines as well as up to 60 new kiosks and standpipes. A detailed description and costing of these interventions is given in the Annex 2.

31. **Component 2 - Capacity Building.** The project will invest approximately US\$2 million into initiatives to strengthen the LWSC's capacity to sustain and expand its services. These will include the following activities:

- (a) **Cost Recovery.** The LWSC is currently incurring NRW in excess of 60 percent of production. Reducing these losses is a key target of the capacity-building efforts and will include the setting-up of DMAs, staff training in NRW monitoring, leak detection methods, the introduction of device-assisted meter reading, and associated staff training to replace the error-prone manual process. These activities will directly contribute to meeting the key results indicator on NRW and the metering ratio.
- (b) **Improve Customer Service.** The LWSC currently struggles to react swiftly to customer complaints and requests. This has direct implications for the proposed project, for instance, at present the LWSC manages to respond to barely half of the connection requests required to meet project targets for new accounts. The project will thus review, retrain, and re-equip the LWSC connection teams in line with an earlier pilot which managed to double the connection rate. The 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 customers with a service point closer to their homes. The project will also invest in a best-practice grievance redress system to track complaint resolution. These activities will contribute to meeting targeted results for the PDO indicators on direct project beneficiaries, number of people in urban areas provided with access to improved water, and active connections per length of piping.
- (c) **Public Consultations.** The project will provide funding for public consultations (events and media) with two particular objectives. First, to inform residents in the project area about the project and the LWSC in general and provide them with an avenue to raise concerns with management. Second, to carry out consultations with women groups in project areas, in particular with respect to standpipe design and placement.
- (d) **Key Operational Equipment.** The project will procure key operational equipment that is currently lacking and is required for smooth project implementation, including, but not limited to, vehicles, small excavators, leak detection equipment, and spare meters. The equipment will be critical for expanding metering and reducing physical NRW through leak detection and repairs and thus contribute to meeting key results indicator targets.

- (e) **Project Implementation Unit (PIU).** To mitigate institutional capacity risks, the project will support a strong, carefully recruited PIU with five key staff: a PIU director, a finance management specialist, a safeguards specialist, a procurement specialist, and an M&E specialist. The project will finance the salaries, key office equipment and operational expenses and two vehicles for the project duration, as well as related audits, consultant services, trainings and operating costs. A key goal of the PIU recruitment effort will be to identify competent internal candidates or candidates that would be likely to remain with the LWSC after the end of the project to ensure long-term improvements in financial management (FM), procurement, and M&E.

32. The activities under the proposed Component 2 build on past support provided by the Bank’s WSP and complement a parallel technical assistance project currently being implemented (P155696). Past support that is directly relevant to Component 2 has been documented in a recent field note (World Bank 2015) and includes work undertaken to improve the metering, billing, and collection processes; reduce commercial NRW; and investigate options to expand the utilities’ revenue base by connecting new customers more effectively.

33. Capacity-building support under Component 2 has been focused on tasks that are a direct and integral part of the project implementation process (for example, PIU support and public consultations) or are critically reliant on capital goods purchases (for example, operational equipment, device-assisted meter reading, new customer care centers), which cannot be financed by the complementary technical assistance program due to budget constraints or regulations.

B. Project Financing

34. The lending instrument is an International Development Association (IDA) Investment Project Financing (IPF). The credit is in the amount of SDR 7.3 million (US\$10,000,000 equivalent). The project activities will be financed by the IDA credit at 100 percent. Project costs are provided in Table 1 below by components and sub-components as described above:

Table 1. Project Cost and Financing

Project Components	Project Cost (US\$)	% IDA Financing
1. Component 1 - Infrastructure Improvements	8,000,000	100
(a) Rehabilitations and Repairs	1,900,000	100
(b) Network Extension	6,100,000	100
2. Component 2 - Capacity Building	2,000,000	100
(a) Cost Recovery	300,000	100
(b) Improve Customer Service	400,000	100
(c) Public Consultations	50,000	100
(d) Key Operational Equipment	550,000	100
(e) Project Implementation Unit	700,000	100
Total Project Costs	10,000,000	100
Total Financing Required	10,000,000	100

C. Lessons Learned and Reflected in the Project Design

35. The project is part of a long tradition of Bank investments in water supply in Africa, starting with a loan to Belgian Congo in 1951 (P003006). Specific lessons have been drawn from recent investments in urban water supply services in the region, including in Ghana (P119063, P056256) and Nigeria (P123513, P115658, P071075), as well as a 2006 Liberia Emergency Infrastructure Project (P100160) that included approximately US\$5 million in financing to the urban water sector. The proposed project is also informed by five years of Bank technical support to the Liberian water sector since 2010. The following key lessons have been reflected in the project design:

- **Capacity building requires significant long-term commitments.** The Implementation Completion and Results Report (ICR) of the Liberia Emergency Infrastructure Project prominently highlighted the lesson that “capacity building after a prolonged and severe crisis” must “transcend the span of one project,” a point reiterated in the ICR of the Nigerian National Urban Water Sector Reform Project 1 (P071075) which stated that “reform is a long-term process.” This lesson has been taken into account by closely coordinating the project with the complementary technical assistance provided by the WSP over the past years, thus linking the Capacity Building component of this project to an existing longer-term program. Moreover, to compensate for the short- and medium-term capacity constraints, the project will support a strong, carefully recruited PIU.
- **Coordination with other donors and stakeholders is critical.** This lesson has been particularly clear from the recent Ghana Second Urban Environmental Sanitation Project (P082373) during which planning conflicts with city authorities led to at least one investment site being abandoned. This project’s focus on the distribution network in Monrovia was purposefully designed to complement the activities of other major donors, in particular the AfDB-funded expansion of water production capacity in the capital and USAID’s investments in water supply production and distribution in secondary towns. The Bank’s funding of the annual JSRs since 2013 has further helped to ensure that this and other investments are well aligned. The project has also engaged Monrovia’s Municipal Authority and the MPW to brief these key actors on the proposed intervention sites and rule out any conflicts.
- **Flexibility in procurements.** The ICR of the Liberia Emergency Infrastructure Project further noted that “works contracts in post-conflict environments present a special challenge” and that in addition to regular Bank bidding procedures, the Limited International Bidding approach may be necessary to provide the correct incentives to international contracts/suppliers. While the political and economic situation has steadied since then, the recent EVD outbreak has had a destabilizing effect on the market, which is only slowly recovering. The project team and PIU procurement specialist will closely study the design of successful recent tenders in Liberia to ensure the use of appropriate procurement methods.

36. **Importance of avoiding delays related to the Resettlement Framework.** Past projects (for example, Urban Water Project P056256) have incurred delays related to resettlements and

associated compensation payments. While no resettlements and compensation payments are expected in this project, agreements to rebuild, after pipe laying, those structures that encroach on the right-of-way have to be made with occupants of affected buildings, and such work must be reflected in work orders with contractors to avoid unnecessary delays and disagreements.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

37. **The LWSC will be responsible for the implementation of the IDA project.** To reinforce the existing capacity, a PIU is expected to be established within the LWSC for the daily management of the IDA project. This will be achieved by reinforcing the existing unit that is implementing the UWSSP and supported by the AfDB to accommodate the additional work pertaining to the IDA project. The PIU is expected to be in place in FY16 and before effectiveness.

38. The PIU will conduct the daily tasks of IDA project implementation and periodic assessments of its progress. The PIU staff are expected to consist of a PIU director, a finance management specialist, a safeguards specialist, a procurement specialist, and an M&E specialist. The responsibilities have been defined in close cooperation with the LWSC to avoid overlaps or frictions with existing departments of the utility. It will work closely with all of the relevant departments within the LWSC to ensure the execution of both investment and technical assistance activities. It will have the ability to contract consultants but will rely primarily on in-house staff to build and maintain capacity and institutional memory.

39. The PIU will also be responsible for the Financial Management of the project and for the preparation of the quarterly unaudited interim financial reports (IFRs) regarding the project. It will ensure that all of the project activities are performed and that quarterly IFRs, progress reports, and annual financial audits are submitted on time. The PIU will maintain a fixed assets register for the assets to be generated or created by the project. Such assets will be turned over to the LWSC at the end of the project.

40. The PIU will receive financial support through the project, thus ensuring that it has the technical and management resources necessary to oversee the technical studies as well as the technical, safeguards, and fiduciary aspects of implementation.

41. The LWSC board will be strengthened with technical assistance to oversee utility performance and play the role of an independent auditor to periodically verify the LWSC's compliance with the agreed-upon key performance indicator targets.

42. A Steering Committee will be established to provide overall guidance to the project and ascertain the project results, ensure the coordination of the project with the country's overall water service improvement programs, and ensure that the main beneficiaries' expectations are met. It will include representatives of the following institutions: Ministry of Finance and Development Planning, the MPW, the Environmental Protection Agency, the Ministry of Health, the Monrovia City Corporation, LWSC Managing Director and the LWSC board of directors' chair.

B. Results Monitoring and Evaluation (M&E)

43. Regular M&E will be an integral part of the project. This function will be under the responsibility of the LWSC. The project will benefit from the M&E tools, skills, and processes developed under WSP's technical assistance during FY14–16, including (a) the LWSC Customer Enumeration in Monrovia conducted in May 2015, which will be updated before the launch of project activities; (b) Distribution Network Information System (NIS); (c) DMAs; and (d) Utility Financial Modeling.

44. The PIU will provide quarterly progress reports on the project to the LWSC's management and to the Bank. The PIU will compile the data necessary to monitor progress on intermediate project indicators, and each quarterly report will provide a detailed update on these indicators, including updates to the results framework included in the project appraisal document. For ease of reporting, the format of the report is simple and streamlined, as presented in the Project Operational Manual.

45. A Mid-Term Review will be conducted by November 2018. An assessment of project impacts, including a beneficiary satisfaction survey, will be carried out at project closing.

C. Sustainability

46. Sustainability will hinge on the project's success in strengthening (a) the FM, operational, and commercial capacities of the LWSC; and (b) oversight by the GoL and service users:

- (a) **Sustainability of investments.** The project supports appropriate operations and maintenance practices, including (i) reducing NRW by improving the metering and leak detection system; (ii) increasing the ability of the LWSC to connect new customers; and (iii) support for developing and maintaining a network information system and hydraulic model and improving the billing and collection efficiency.
- (b) **Institutional sustainability.** The project builds capacity within the LWSC on accountability mechanism through (i) improving customer service by opening facilities closer to customers outside Central Monrovia and introducing a modern complaint management system; (ii) providing a citizen engagement channel for consumers to raise wider project- and LWSC-related issues to the GoL; and (iii) annual independent audit of the key performance indicators.
- (c) **Financial sustainability.** The project supports the development of a financial model that includes obligations aimed at ensuring at least the recovery of operations and maintenance costs. Complementing the tariff reform activities by USAID, the project will finance activities for improved billing efficiency and commercial practices.
- (d) **Fiscal sustainability.** The project seeks to ensure that the LWSC will no longer need to rely on budgetary support for its operating expenditures by 2020. By the end of the project cycle, the LWSC is expected to generate enough cash flow from internal sources to fund the investments required to adequately maintain its assets. Nevertheless, public funds through international loans or grants will still be required to fund the bulk of the LWSC's long-term investments necessary to significantly increase the rates of access to water and sewerage services in Monrovia.

V. KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

47. The overall risk rating is Substantial, primarily due to the following key risks:
- (a) Fiduciary risks are currently rated High based on an assessment of financial management and procurement arrangements. While the project meets the minimum financial management requirements in accordance with OP/BP 10.00 and LWSC finance and procurement staff have gained experience in the ongoing AfDB project, overall capacities are low and familiarity with World Bank financed procurement limited. A well-defined set of risk-mitigation measures is outlined in paragraphs 66 and 69, and is expected to reduce financial management- and procurement risks to “Substantial” and “Moderate”, respectively, and the overall fiduciary risk to “Substantial”.
 - (b) Institutional Capacity risks are rated Substantial due to the decline in organizational structure and knowledge, and erosion of management, planning and technical skills during the civil war, which has only been partly reversed. These risk will be mitigated through targeted capacity-building activities and the recruitment of a project PIU.
 - (c) Political and Governance risks are rated Substantial due to the upcoming presidential and parliamentary elections and expected associated changes in the Government.
 - (d) Macroeconomic risks have been rated Substantial as Liberia’s economy remains vulnerable to internal and external shocks as the recent decline in commodity prices and the Ebola epidemic have shown.
48. Environmental and social risks are rated as moderate. Any risks related to project-affected people (PAP) will be limited due to the lack of physical displacements and land acquisitions—the project will involve only minor, temporary disturbances during pipe laying in the right-of-way of major roads. The project was screened for impacts of climate change and geophysical hazards and the result is an overall low risk driven by extreme precipitation and flooding. All project partners have been fully involved in the project’s preparation to ensure the successful start-up of activities. Additional risk- and safeguard-related issues, including the climate change screening, are captured in section VI. The Systematic Operations Risk-Rating Tool (SORT) is provided in Table 2.

Table 2. Systematic Operations Risk-Rating Tool (SORT)

Risks	Rating
Political and Governance	Substantial
Macroeconomic	Substantial
Sector Strategies and Policies	Moderate
Technical Design of Project or Program	Moderate
Institutional Capacity for Implementation and Sustainability	Substantial
Fiduciary	High
Environmental and Social	Moderate
Stakeholders	Moderate
Other	
Overall	Substantial

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

49. As explained in the project description, the proposed project will assist the LWSC to improve the piped distribution network, as well as strengthen its institutional ability to sustain and expand service delivery. As a result, the project is expected to improve the customer and revenue base of the LWSC through its interventions to reduce NRW, improve collection efficiency, and reduce operational expenses. Reducing physical losses will enable the LWSC to make more water available to its existing customers and increase access to previously unreached areas. The project builds on and complements the expected increase in water production from 5 mgd to 16 mgd from the ongoing, AfDB-funded restoration of the White Plains treatment plant and transmission mains.

50. Cost-benefit analysis is used to assess financial and economic viability of the project and its sensitivity to key variables. With- and without-project scenarios are defined to identify the incremental costs and benefits of the project. Benefits and costs are projected over a period of 25 years (2017–2041) starting from the first year of the project in 2017 and including three years construction period. While a discount rate of ten percent is used for the financial analysis, based on the Technical Note on Discounting Costs and Benefits in Economic Analysis of World Bank Projects, cash flows are discounted at six percent.

51. Results of the project economic and financial viability as measured by net present value (NPV) and internal rate of return (IRR) and its sensitivity to changes in key variables (revenue and cost) are summarized in Table 3:

Table 3. Results of Project Economic and Financial Viability

Scenarios	Financial		Economic	
	NPV (US\$)	IRR (%)	NPV (US\$)	IRR (%)
Base case	8,156,000	21.40	21,810,000	26.1
10% increase in cost	3,595,000	14.89	14,971,000	19.4
10% decrease in revenue	2,248,000	13.00	12,336,000	17.4
15% increase in cost	(4,267,000)	3.00	2,760,000	8.9
15% decrease in revenue	(5,186,000)	1.20	1,363,000	7.4

52. The positive NPV and the IRR, which is higher than the discount rate used (financial and economic), show the financial and economic viability of the project.

53. **Sensitivity analysis.** A range of scenarios has been developed to test the sensitivity of NPV and IRR to major elements of the cash flow (cost and revenue). Analysis of the project sensitivity test results at ten percent increase in cost and at ten percent reduction in revenue shows that the IRR and the NPV remain at acceptable levels for both the financial and economic analysis. However, further increases in cost and reduction in revenue will result in a negative financial NPV and a financial IRR lower than the discount rate. In 2015, the LWSC’s operational revenue covers only about 70 percent of its operational expense and the rest is financed by

subsidy from the GoL.¹ The LWSC receives grants from the GoL for buying chemicals, fuel, and lubricants and to carry out plant maintenance. Moreover, grants are given by local governments for the LWSC to carry out their projects.

54. **Rationale for public sector provision/financing.** The LWSC is a public corporation, which at present cannot finance major infrastructure investments such as the one proposed in this appraisal document through commercial lenders. The LWSC has not financed infrastructure through private lenders in the recent past, and consultations during a project scoping study showed that given the LWSC's still precarious financial situation, the corporation would struggle to raise sufficient funds commercially at acceptable interest rates. By contrast, public financing has significantly better terms and is thus more suitable to make critical investments that will help the LWSC improve its performance and revenues. This may then allow the LWSC to access private lending on affordable terms in the future.

55. The proposed project is also of high public interest as it forms a critical element of the Post-Ebola ESRP and an important contribution to building resilience to shocks in the urban context. The investment will also address priorities outlined in the national SIP (2012–2017) and is aligned with the GoL's Agenda for Transformation target for safe water supply improvements.

56. As outlined above, private sector participation was considered as an alternative to the proposed LWSC-centric project, but was rejected due to the current risk profile, lack of appropriate regulatory framework, low capacity and network quality of the LWSC, and the limited presence of capable firms. The case for private sector participation may be strengthened in the future, should these risks and capacity gaps reduce.

57. **Value Added by the World Bank's Support.** The value added by the Bank goes beyond its ability to offer at-scale financing for this project at conditions superior to commercial lenders. The Water Global Practice has the unique advantage of building this operation on detailed knowledge of the utility and strong relationships stemming from years of technical assistance to the LWSC, which will be continued by a complementary program (P155696) led by the Bank's WSP.

58. The Water Global Practice has been an active part of the LWSC's ongoing reform process, funding a review of the billing system before its upgrade, guiding the enumeration of customers, helping to track illegal connections, and piloting an improvement to the customer contracting process. This has allowed the Global Practice to build a strong partnership and obtain detailed knowledge of the LWSC's strengths and weaknesses that put it into a unique position to add value to the infrastructure project.

59. Major donor partners engaged in the water sector are currently prioritizing other aspects. USAID is investing in water supply in secondary cities, and the AfDB is focusing on the rehabilitation of water production capacity, which the proposed investment in the LWSC's ability to distribute water would ideally complement. Other stakeholders in the sector, such as

¹ A financial model developed for the LWSC by a local consultant has estimated billing efficiency at 44 percent, collection efficiency at 88 percent, cash operating ratio at 19 percent, and staff efficiency ratio at 40 per 1,000 connections. The combined effect of these factors has made the LWSC dependent on the GoL subsidy to finance its operation.

local and international NGOs, lack the required financial scale for significant investments in urban areas. The distribution bottleneck is thus unlikely to be addressed on time without the Bank's intervention.

B. Technical

60. The project will support significant rehabilitations and extensions of the piped water supply network in Monrovia. The technical design for these interventions is based on a Masterplan (JICA, 2009) for the city and a detailed feasibility study, which was completed in January 2016 (Hydroconseil, 2016).

61. The technical approach outlined by the feasibility study was informed by a number of key factors, including a full mapping of the existing piped water network and pressure zones carried out in 2015, which has identified specific damages and bottlenecks to be addressed, as well as areas particularly suited for network expansion due to relatively good water pressure and high expected beneficiaries. Furthermore, hydraulic modelling has been carried out to ensure that the planned additional connections can be supplied with sufficient water and pressure. At a consumption rate per capita of house connections of 60 liters per day per person, the 16 million gallon (100 percent) capacity a day (= 22,106,794 m³/year), which will be available after the completion of the AfDB-funded restoration of White Plains, could theoretically supply up to 76 percent of the Monrovia population through household connections. This supply capacity drops to 31 percent with a more realistic assumption of 40 percent of capacity actually being supplied to households due to pumping halts and non-revenue water. An ability to supply up to 31 percent of the population is still more than double the current estimated rate of piped water access in Monrovia, indicating sufficient scope to supply the targeted expansion of connections.

62. The capacity building component is designed to reinforce the impact of infrastructure investments, for instance by training staff to administer district metered areas after bulk-meter installations, the introduction of a device assisted metering system to reduce inefficiencies associated with the present manual approach to household metering and billing, the setting up of additional customer care offices in areas targeted for network expansion and the introduction of a more efficient grievance redress system, and the mainstreaming of an improved connections process successfully piloted under an earlier technical assistance program, which will increase the rate of new connections and help meet project targets.

63. The project's technical approach is thus strongly anchored in empirical data, developed to complement the ongoing rehabilitation of the production plant, and matched by a capacity building program designed to reinforce the infrastructure investments. Operations will be implemented following the methodology and technical standards set by the ongoing AfDB UWSSP, managed by LWSC, and do not entail foreseeable technical difficulties. All investments will be of straightforward design corresponding to local conditions and, when possible, will use labor-intensive methods. Tender documents have already been prepared.

C. Financial Management

64. The LWSC, with support from the PIU, will be responsible for the FM of the project.

65. The LWSC FM arrangement was assessed and overall is judged adequate for ensuring that (a) the project funds will be used for the intended purposes in an efficient and economical way; (b) the financial reports will be prepared in an accurate, reliable, and timely manner; and (c) the project's assets will be safeguarded. The capacity of the Accounts and Finance Unit of the project will be strengthened during project implementation with a view to improving the overall FM systems of the LWSC.

66. The proposed project is the first Bank-financed project to be implemented by the LWSC since 1985. The corporation is currently implementing an AfDB-supported water project. However, the FM systems need improvement in auditing, funds flow, accounting, and quarterly financial reporting. Appropriate mitigation measures have been incorporated in the FM design for the desired improvements. The assessed residual FM risk is assessed as High and reduced to Substantial in view of the articulated mitigation measures to be implemented by the project. The mitigations measures include the following: (a) develop a Project Implementation Manual (PIM); (b) deploy qualified FM staff to the project; (c) submit annual work planning and budget for 'no-objection' by the Bank two months before the commencement of each fiscal year, (d) submit IFRs 45 days after the end of each quarter; and (e) submit audited accounts six months after the end of each fiscal year. The project meets the minimum FM requirement in accordance with OP/BP 10.00.

D. Procurement

67. Procurement will be carried out in accordance with the Bank's 'Guidelines: Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers', published by the Bank in January 2011, revised July 2014; 'Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers', dated January 2011, revised July 2014; and the provisions stipulated in the Loan Agreement. The 'Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants', dated October 15, 2006 and updated January 2011, shall apply to the project. The Public Procurement and Concessions Act (PPCA) of 2005, amended and restated in 2010, will apply to the extent that it is consistent with the Bank's guidelines.

68. A procurement capacity assessment of the LWSC was conducted by Bank procurement staff in October 2015 to determine the risks to procurement and discuss how to enhance the procurement management capacity for the project. The assessment found that (a) the LWSC is generally in compliance with the PPCA of 2005, amended and restated in 2010; (b) the LWSC also has a PIU for the implementation of AfDB-supported interventions operating in parallel to the mainstream procurement function; (c) the LWSC procurement function is staffed with a procurement manager, an assistant procurement manager, a procurement officer, a procurement assistant, and two procurement expeditors, who courier requests for quotations and quotations; (d) the five top managers of the LWSC constitute the procurement committee that adjudicates contracts with the procurement manager as a nonvoting secretary to the committee; and (e) none of the staff involved in the LWSC procurement are familiar with Bank-financed procurement.

69. The overall risk to procurement under the project at the time of assessment is rated High. Among the risk mitigation measures are (a) to recruit a project procurement specialist with

qualifications and experience satisfactory to the Bank for the first 18 months of the project; (b) the project procurement specialist will, among others, help organize the LWSC procurement function and ensure that the LWSC staff undertake basic Bank-financed procurement training offered at the Ghana Institute of Management and Public Administration in Accra and that the mainstream procurement function is equipped to undertake donor-funded procurement; and (c) staff are required to maintain satisfactory procurement records. The satisfactory implementation of the mitigation actions will reasonably bring this overall risk to Moderate.

70. **Procurement Plan (PP) and implementation readiness.** Engineering designs and tender documents for an initial package of investments are at an advanced stage of preparation and safeguards documents are available. A first simplified PP covering the first 18 months of project implementation has been prepared and agreed. It will be available in the project database, and a summary will be disclosed on the Bank website once the Board approves the project. The PP will be updated in agreement with the project team annually, or as required, to reflect actual project progress and implementation needs.

E. Social (including Social Safeguards)

71. **Social and poverty.** The proposed project is expected to deliver significant social benefits by improving the living conditions of the population of Monrovia. The project will contribute to reducing urban poverty by (a) reallocating public funds to more direct and targeted interventions for the urban poor; (b) prioritizing urban infrastructure and services that are key to improving living and health conditions of the poor; (c) improving the involvement of community-based organizations in the management of water kiosks and developing a rate-payment scheme for initial connection costs to allow poor households to pay these off over a longer period; and (d) collaborating closely with the LWSC and donor partners to consider connection subsidies and source funding for poorer households; this may start with exempting poor households from costs of meters bought under the project, which are usually charged by the LWSC. This will also reduce the number of people fetching water from contaminated wells as shown in the Monrovia water point quality study in 2011, by increasing the number of people connected to the piped water system. The project will help generate temporary employment opportunities in labor-intensive public works in the selected poor neighborhoods.

72. **Gender.** The project is classified as gender informed; gender-specific actions are to be undertaken during project implementation and are reflected in the results framework. Women are mostly affected by poor mobility and lack of access to basic services and generally burdened with household services such as buying food, fetching water, disposing of domestic wastewater and solid waste, paying utility bills, and caring for the sick and elderly. Improving access to basic services such as water supply will benefit women by enhancing sanitary conditions and improving productivity, with its associated time and cost savings. Actions to be taken under the project include (a) ensuring women's participation in all aspects of the program and dissemination of information to women, using appropriate media and language; (b) use of gender-sensitive approaches and methods, including public information events targeted at women; (c) recruiting at least 40 percent of female community facilitators; and (d) collection and monitoring of gender-disaggregated data on project beneficiaries.

73. **Participation.** The preparation of the project, including feasibility studies and preparation of safeguards instruments were carried out in consultation with the national government, the city administration, and representatives of civil society.

74. **Social safeguards.** Overall impacts of the project are expected to be positive. The project will not finance civil works with significant resettlement impacts. A Resettlement Policy Framework (RPF) has been prepared, consulted upon in-country, and published in Liberia and in the Bank's InfoShop on February 1, 2016, to address potential resettlement and social issues.

75. No physical displacement of Project Affected People (PAP) has been identified nor will land acquisitions be required. There will be only minor economic disturbances, mostly related to temporary disruption of 14 extended terraces, 1 fence, and 45 entrance ramps and stairs during pipe laying due to encroachments on the rights-of-way. These will be reconstructed by the project in equal or better quality. Due to the minor impacts and small number of less than 100 PAP, the mechanisms for managing these disturbances are outlined in the RPF in line with the requirements under OP/BP 4.12.. As no form of economic or physical displacement is expected, the preparation of a Resettlement Action Plan (RAP) was not necessary. Should unexpected displacement-related challenges occur, the development of an RAP will be guided by the RPF.

76. A citizen engagement and feedback process will be established by the project to ensure that any complaints about the project or the LWSC's performance can be effectively addressed. This process includes not only dedicated public consultation events but the operational grievance redress tool to be set up under the capacity-building program, the benchmarking that is a critical aspect under the performance contract that the LWSC has agreed upon with the GoL, the annual JSRs during which civil society organizations are able to participate and the World Bank Grievance Redress Mechanism outlined in Paragraph 82. The project also includes a budget for (a) training and awareness raising for local authorities, consulting firms, community-based organizations, and relevant ministry staff, with a focus on the implementation of the RPF and the mitigation of environmental impacts; (b) training for the safeguards specialist within the LWSC, with a focus on environmental audit and appraisal; and (c) environmental and social monitoring in the field to ensure that safeguard provisions have been implemented appropriately.

F. Environment (including Safeguards)

77. The project has been classified as a Category B project according to the Bank Operational Policy OP 4.01. The rehabilitation and extension of the distribution network may cause adverse impacts; however, these will be temporary and site specific. Most of the investments will be of simple design and technology.

78. The environmental team of the LWSC will be in charge of all safeguards aspects of the project, including implementation of the instruments. Refresher training in safeguards implementation will be provided during the implementation of the project. Regular supervision by the Bank's safeguards specialists will be used to contribute to strengthen the borrower's safeguards compliance and capacity. During project preparation, an Environmental and Social Impact Assessment (ESIA) and an Economic and Social Management Plan (ESMP) have been prepared, specifying how to identify and mitigate any adverse environmental impacts from known project activities. The integrated document was consulted upon in-country and disclosed in Liberia and in the Bank's InfoShop on February 1, 2016.

G. Other Safeguards Policies Triggered

79. The project also triggers OP/BP 4.11 - Physical Cultural Resources. The works will take place in inhabited areas and will involve excavations and demolitions. There is a possibility of chance finds of physical cultural resources. To mitigate potential adverse impacts, the integrated ESIA and ESMP include guidance and procedures for physical cultural resources management. No separate safeguards instrument is needed.

80. 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. However, the project has obtained exception to notification requirements of riparians from the regional vice president (Africa region) on November 11, 2015, because it meets the exemption criteria defined in paragraph 7(a) of OP 7.50, that is, alterations to the ongoing 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 riparians' possible water use.

H. Climate and Disaster Risk Screening

81. The operation has been screened for short- and long-term climate change and disaster risks. While Liberia in general faces significant exposure to climate-change-related hazards, this exposure does not translate into substantial risks of actual negative climate change impacts for this specific infrastructure project. Thus the project is rated 'low risk' for climate-change-related outcome or service delivery impacts in both the historical/current and future time frame. The overall risk of service delivery impacts from climate change is low due to a number of factors. First, the sector can leverage copious water supply resources in Liberia, which are unlikely to be significantly reduced by climate change. Second, the project focuses on relatively resilient, underground piped infrastructure and the possibility to adapt to the few direct impacts with straightforward measures (for example, move treatment plant intake to counter increased saltwater intrusion into St Paul River). Thus, while climate-change-related risks must be considered in Liberia's overall precarious socioeconomic context, the overall probability of negative climate change effects on the project remains low.

I. World Bank Grievance Redress

82. Communities and individuals who believe that they are adversely affected by a Bank-supported project may submit complaints to existing project-level grievance redress mechanisms (GRMs) or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed to address project-related concerns. Project-affected communities and individuals may submit their complaint to the Bank's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of Bank noncompliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the Bank's attention and Bank management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate GRS, visit <http://www.worldbank.org/GRS>. For information on how to submit complaints to the Bank's Inspection Panel, visit www.inspectionpanel.org.

Annex 1: Results Framework and Monitoring

Country: REPUBLIC OF LIBERIA

Liberia Urban Water Supply Project (P155947)

Project Development Objective: 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 of LWSC.

These results are at Project Level

Project Development Objective Indicators

Indicator Name	Type	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source	Responsibility
				Year 1	Year 2	Year 3	Year 4	End Target			
Direct project beneficiaries	Core Indicator	Number	0	0	4,150	20,500	40,900	63,000	Annual	LWSC Customer Database (average household size of 4.73; a kiosk serves 300)	LWSC PIU
Female beneficiaries	Supplemental Core Indicator	%	0	0	44	44	44	44	Annual	LWSC Customer Database	LWSC PIU
Number of people in urban areas provided with access to improved water sources under the project	Core Indicator	Number	0	0	4,150	15,500	30,900	48,500	Annual	LWSC Customer Database	LWSC PIU
Active connections per length of piping (kilometer)	Custom Indicator	Number	28	28	30	33	38	43	Annual	LWSC Customer Database and Network Information system	LWSC PIU
Metering Ratio	Custom Indicator	%	49	49	52	60	66	72	Annual	LWSC Customer Database	LWSC PIU
Non-Revenue Water	Custom Indicator	%	65	63.7	62.4	61.2	59.9	58.8 ²	Annual	LWSC Technical Reports	LWSC PIU

² Since a precise and reliable baseline for NRW is currently not available (production is not yet metered at the White Plains plant, only estimated), the baseline and expected outcome for NRW may be adjusted at the MTR once more reliable data becomes available due to bulk meters installed under the ongoing AfDB financed rehabilitation of White Plains treatment plant, and the proposed project.

Intermediate Results Indicators

Indicator Name	Type	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source	Responsibility
				Year 1	Year 2	Year 3	Year 4	End Target			
Distribution lines constructed or rehabilitated under the project	Custom Indicator	Kilometers	0	0	10	40	60	79	Annual	Project M&E documents	LWSC PIU
Public kiosks/standpipes constructed	Custom Indicator	Number	0	0	10	20	40	60	Annual	LWSC Customer Database	LWSC PIU
Bulk meters installed	Custom Indicator	Number	0	0	0	14	14	14	One-time event	Project M&E documents	LWSC PIU
New piped household water connections that are resulting from the project intervention	Core Indicator	Number	0	0	250	2,000	4,000	6,500	Annual	LWSC Customer Database	LWSC PIU
Piped household water connections that are benefiting from rehabilitation works undertaken by the project	Core Indicator	Number	0	0	0	1,000	2,000	3,000	Annual	LWSC Customer Database & Confirmation of rehabilitations	LWSC PIU
Collection efficiency	Custom Indicator	%	75	75	75	80	85	92	Annual	LWSC Billing System	LWSC PIU
Modern customer care system in place and functional	Custom Indicator	Yes/No	No	No	Yes	Yes	Yes	Yes	One time event	Log-in to system availed	LWSC PIU
Customer Grievances Resolved	Custom Indicator	%	-	-	25	50	75	85	Annual	Customer care system reports	LWSC PIU
Number of DMAs set up	Customer Indicator	Number	0	0	3	6	6	6	Annual	Technical Dept. reports	LWSC PIU
Public consultations carried out	Custom Indicator	Number	0	2	2	4	4	6	Annual	Summary reports	LWSC PIU
LWSC staff trained	Custom Indicator	Yes/No	No	Yes	Yes	Yes	Yes	Yes	Annual	Project M&E documents	LWSC PIU

Indicator Description

Project Development Objective Indicators	
Direct project beneficiaries	Direct beneficiaries are people or groups who directly derive benefits from an intervention. In this project, the indicator is understood to be the number of persons directly benefiting from project interventions either through a new household connection in the project area or through being served by a new kiosk/standpipe constructed by the project. It is assumed that each household connection benefits all household members, which in Monrovia average 4.73 according to the latest 2013 Demographic and Health Survey (DHS). This may be a conservative estimate as it does not count neighbors who may use such connections as well, nor households with existing connections benefiting from rehabilitations. Each new kiosk or standpipe is assumed to serve at least 300 beneficiaries.
Female beneficiaries	This figure is a supplementary core indicator. It is assumed that new private connections and kiosks/stand posts will benefit women in proportion to their ratio among the population of Monrovia (44% as per the 2013 DHS data).
Number of people in urban areas provided with access to improved water sources under the project	<p>This indicator measures the actual number of people in urban areas who benefited from improved water supply services that have been constructed under the project.</p> <p>Guidance on ‘improved water sources’. Improved water sources include piped household connections (house or yard connections), public standpipes, boreholes, protected dug wells, and protected spring and rainwater collection. Hence, ‘improved water sources’ do not include, among others, water provided through tanker truck or vendor; unprotected wells; unprotected springs; surface water (river, pond, dam, lake, stream, irrigation channel); or bottled water. The definition of what is considered an ‘improved water sources’ follows the United Nations Children’s Fund-World Health Organization (UNICEF-WHO) Joint Monitoring Program definition. Note that ‘improved water sources’ does not refer to the question of new versus rehabilitated water sources, but is the standard definition used to track progress on the Millennium Development Goals.</p> <p>Guidance on people with access. The data on the number of people provided with access can be estimated by task team leaders by multiplying (a) the actual number of piped connections with an estimate of the number of people per household connection and/or (b) the actual number of community water points with an estimate of the number of people per community water point. The assumptions made regarding number of people per connection made should be carefully documented in the ‘comments’ section of the indicator when data is entered in the Implementation Status and Results Report.</p> <p>Guidance on urban classification. The classification should follow the official definition used in the country.</p>
Active connections per length of piping	Number of active paying customers (receiving and paying bills) divided by the length of the piped network in kilometers
Metering ratio	The number of active accounts that are metered over the total active accounts.
NRW	The ratio of volume of total water losses over total volume produced (%). NRW comprises three components: physical (or real) losses, commercial (or apparent) losses, and unbilled authorized consumption. Physical losses are leakage from all parts of the system and overflows at utility storage tanks. They are caused by poor operations and maintenance, the lack of active leakage control and poor quality underground assets. Commercial losses are caused by customer meter under registration, data-handling errors, and theft of water in various forms. Unbilled authorized consumption includes water used by the utility for operational purpose, water used for firefighting, and water provided for free to certain consumer groups.

Indicator Description

Intermediate Results Indicators	
Distribution lines constructed or rehabilitated under the project	Kilometers of water pipelines constructed or rehabilitated under the project
Public kiosks/standpipes constructed	Public kiosks or standpipes capable of serving at least 250 persons per day constructed, connected to network, and providing water
Bulk meters installed	Number of bulk meters installed in the LWSC's network and measuring water flow
New piped household water connections that are resulting from the project intervention	Number of new piped household water connections that result from the project intervention. A piped household water connection is defined as a connection that provides piped water to the consumer through either a house or yard connection. Hence, they do not include, among others, standpipes, protected wells, boreholes, protected springs, piped water provided through tanker trucks or vendors, unprotected wells, unprotected spring, rivers, ponds and other surface water bodies, or bottled water.
Piped household water connections that are benefiting from rehabilitation works undertaken by the project	Number of piped household water connections benefiting from rehabilitation works. This indicator is measured as the number of piped household water connections benefiting from rehabilitation works. Rehabilitation works are undertaken so that existing customers see the quantity and/or quality of their water supply services enhanced.
Collection efficiency	The ratio of the amount of water bills collected over the amount of bills issued (US\$). Expressed as percentage.
Modern customer care system in place and functional	The customer care system will be considered 'in place and functional' if the software is used every week by the LWSC's customer care staff consistently for at least three months. Use will be measured by unique log-ins and by the number of complaints recorded.
Customer grievances resolved	The ratio of total customer complaints that have been resolved over total grievances submitted to the LWSC
Number of DMAs set up	The number of District Meter Areas set up within the overall piped water network. DMAs are defined as a discrete areas of a water distribution network, metered and controlled by boundary valves. DMAs allow a more efficient and precise measurement of water distribution and losses by area.
Public consultations carried out	This indicator measures the number of public consultations carried out (including the number of participants).
LWSC staff trained	This indicator measures the total training time provided to the LWSC staff under the proposed project (on leak detection, DMA administration, customer complaint management, and device-assisted meter reading).

Annex 2: Detailed Project Description

REPUBLIC OF LIBERIA: Liberia Urban Water Supply Project (P155947)

1. To achieve the project development objective to “increase access to piped water supply services in the project area in Monrovia and improve the operational efficiency of LWSC”, the proposed IDA Credit of SDR 7.3 million (US\$10 million equivalent) will fund two project components.
2. The first project component will invest US\$8 million in infrastructure improvements, that is, key repairs, improvements, and extensions of the existing network. The second component will invest US\$2 million in specific capacity improvements, project management, and M&E.
3. The two project components were selected on the basis of (a) a professional engineering assessment carried out during the prefeasibility stage; (b) in-depth discussions with the LWSC management and technical staff; (c) a survey of the public in selected project areas to confirm potential customers’ interest in piped connections and ability to pay; and (d) capacity-building priorities identified during technical support provided by the Bank to the LWSC since 2013. The two components are described in detail below.

A. Component 1 – Infrastructure Improvements

4. The core aim of Component 1 is to rehabilitate key parts of the existing distribution network of the LWSC and to extend the distribution network by approximately 30 percent or 70 km. This will help increase access to new customers, reduce water losses, and thus improve service quality as targeted in the PDO.
5. The present network was constructed in the 1950s–1970s, currently measures only around 230 km, and is in a state of disrepair. Reported water losses are estimated at approximately 65 percent of production and only around 6,400 active accounts are supplied. The initial distribution system was more extensive than the network currently in operation and key parts have recently broken down. Water supply to the center of the capital has stopped after damages to critical pipes and the only reservoir in 2014. Thus, at present, the number of people in Monrovia with some form of private or public access to piped water is below 20 percent of the population with the majority relying on point-sources such as wells. A 2011 water quality study in Monrovia found the majority of such wells to be contaminated and unsafe to drink from (UHL and Associates, 2011).
6. Demand for piped water is expected to be high in the project areas. In a 2013 survey of 15,000 households in the Paynesville neighborhood of Monrovia (among the areas targeted in this project), 82 percent of respondents declared themselves dissatisfied with current access to water and over 85 percent stated a definitive interest in obtaining an LWSC piped water connection. The prefeasibility study analyzed willingness and ability to pay and found that “most households can pay regular bills for water supply services” though the “capacity-to-pay...varies greatly depending on area.” A survey in poor neighborhoods of Monrovia concluded that “we can assume that demand for private connections could be as high as at least 50 percent” of households. However, this assessment critically depends on the assumed cost of initial

connection—many poor households struggle to raise the current up-front payment of up to US\$200 or more for connection works and hardware, even if they could afford monthly water bills of around US\$10–20. Thus, it will be important for the project to extend distribution lines deeply into settlements to reduce ‘last mile’ connection fees for customers and to work with the LWSC under the Capacity Building component to develop rate-payment schemes.

7. The Bank’s Water Global Practice has financed a prefeasibility study in 2014–15 to develop a phased rehabilitation and extension plan. This study involved the creation of a full digital network map (see Figure 2.1) to understand the current distribution network characteristics and identify priority interventions areas. The analysis also included a detailed review of the LWSC’s technical and operational capacity, as well as of the socioeconomic profile of intervention areas to assess potential customers’ willingness and ability to pay and examination of likely project risks. Further information was drawn from earlier household surveys in some of the intervention areas, a scoping study financed by the Global Partnership on Output-Based Aid, and subsequent detailed discussions with the LWSC management, which led to a refinement of the study’s conclusions.

8. The specific infrastructure interventions outlined here are based on this detailed preparatory work and consist of targeted infrastructure repairs and improvements to the existing network (Subcomponent 1A) and new pipe extensions and infrastructure to be added to the network (Subcomponent 1B). Estimated costs for Subcomponents 1A and 1B include allowances for site mobilization, maintenance, and contingencies. The principles in selecting interventions were the following:

- (a) **Impact on achieving PDO.** Sites were selected to maximize the number of households benefiting from improved service (for example, by restoring supply to Central Monrovia) or new access (for example, by targeting densely settled Paynesville).
- (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 to balance improved access in poor areas with acquiring customers who can pay water tariffs.
- (d) **Engineering considerations.** Most sites for new extensions are clustered in areas close to the main Eastern Transmission Pipeline from White Plains, which exhibits relatively high pressure (highlighted in blue in Figure 2.2) and will ensure high-quality supply to new customers.

Figure 2.1. Map of the LWSC's Distribution Network in Monrovia (Hydroconseil, 2016)

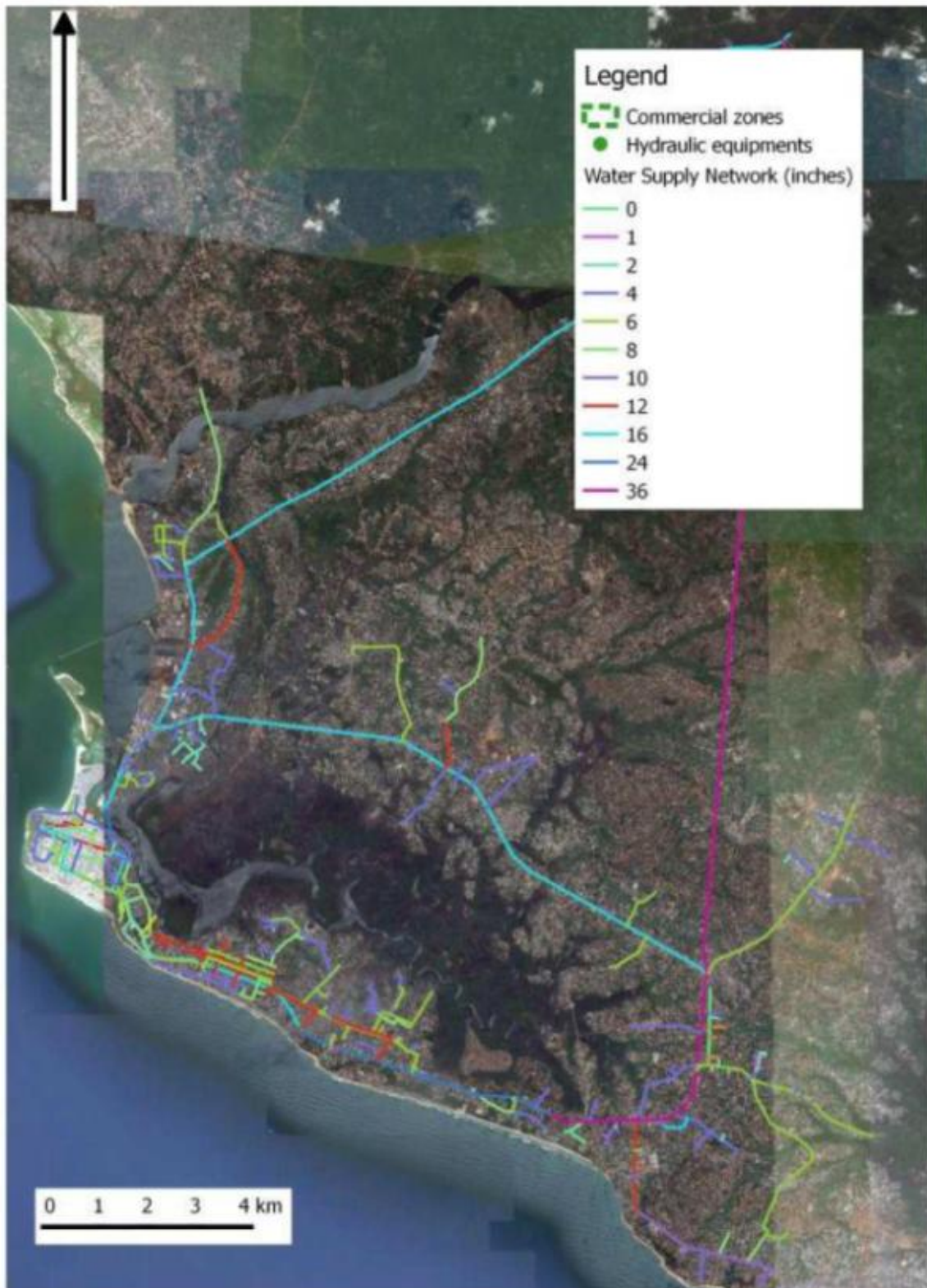
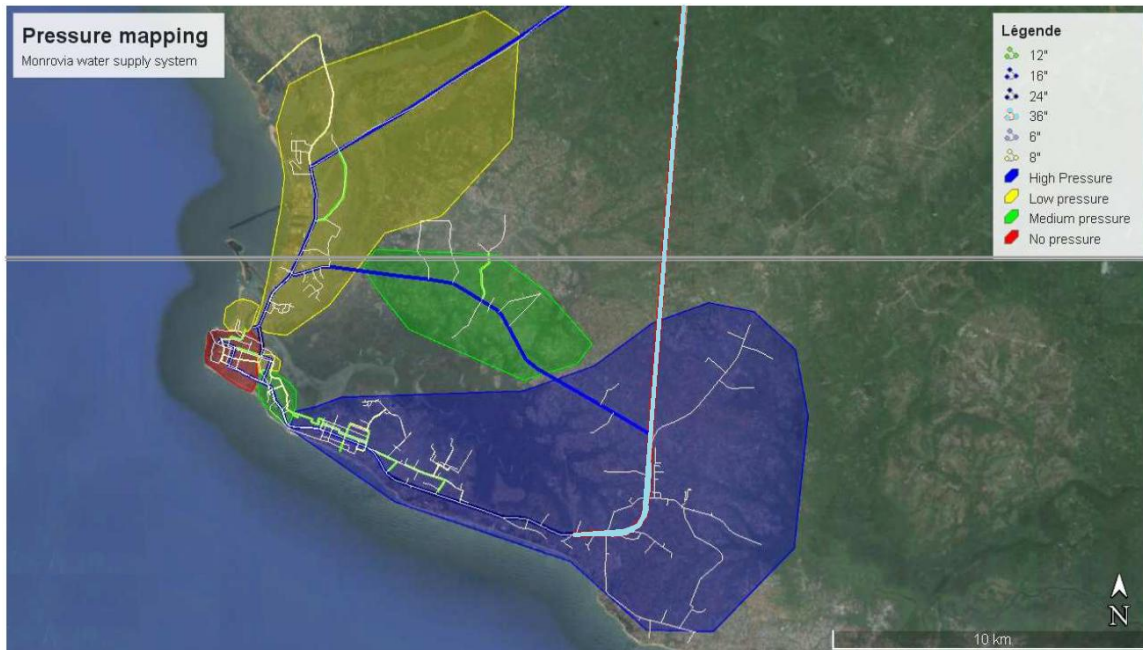


Figure 2.2. Map of Network Pressure (Hydroconseil, 2016)



9. **Under Subcomponent 1A**, the project will invest approximately US\$1.9 million in targeted rehabilitations of the existing distribution network, including the following:

- (a) **Repair of Eastern Transmission Line.** Rehabilitation of all damaged facilities on the eastern feeder from Red Light Junction to Central Monrovia. The feasibility study has identified 25 intervention sites where the project will replace damaged branch valves, air release valves, and chambers, which will improve water pressure coming into Monrovia from the east. The prefeasibility study estimated costs for this component at approximately US\$70,000.
- (b) **Restoring supply.** Maintenance and replacement of key pipes and facilities to restore supply in Central Monrovia and the Somalia Drive area. These areas are the location of key businesses, organizations, and housing developments and thus an important source of revenue that is currently lost due to the disruption of supply. The project will repair a critical pipeline on Keng-Zulu Bridge and an existing reservoir in Mamba point, which constitute the two critical bottlenecks on supply in Central Monrovia. Moreover, the project will repair a recently broken pipeline on the Somalia Drive Bridge which has interrupted supply to that area. The prefeasibility study estimated costs for this component at US\$720,000.
- (c) **Installation of bulk meters and creation of DMAs.** Installation of bulk meters to create six DMAs and private meters to transition around 1,500 legal customers from nonmetered to metered connections. The key principle behind DMA management is the use of flow to determine the level of leakage within a defined area of the water network. DMAs will enable the current levels of leakage to be determined and to consequently prioritize the leakage location activities. By monitoring flows in the DMAs, it will be possible to identify the presence of new bursts so that leakage can

be maintained at the optimum level. DMA management should therefore be considered as a method to reduce and subsequently maintain a low leakage level in a water distribution network. The prefeasibility study estimated costs for this component at US\$930,000.

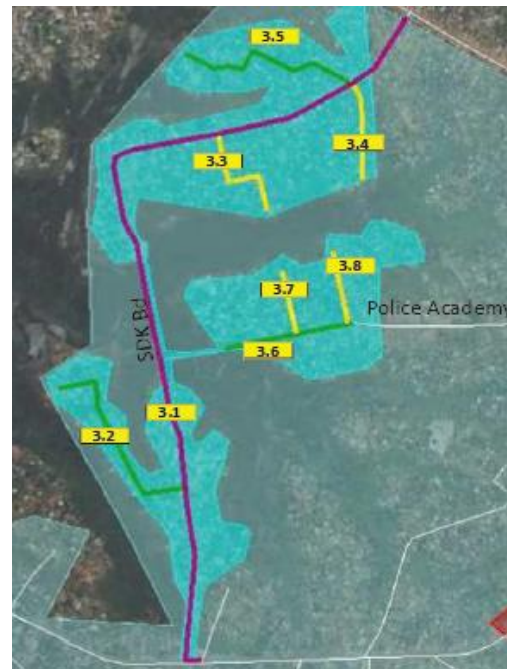
- (d) **Rehabilitation of existing transmission pipe in Gardnerville.** This will reduce an existing bottleneck and create a backup in case of damages to other sections of the pipe and restore water supply in Barnersville estate. The prefeasibility study estimated costs for this component at approximately US\$60,000.
- (e) **Rehabilitation of existing transmission pipe along Robertsfield Highway.** This will improve water pressure and reduce water losses and thus increase supply along the highway leading to the airport, which is a key precondition for the branch line extensions in the area. The prefeasibility study estimated costs for this component at approximately US\$120,000.

10. **Under Subcomponent 1B**, the project will invest approximately US\$6.1 million in the extension of the existing distribution network, specifically the following:

- (a) **Laying of new transmission line on Gardnerville Road (8.2 km).** This will improve the water distribution and network pressure, create backup capacity in the network, and directly lead to up to 300 new connections. The prefeasibility study estimated costs for this component at approximately US\$1.8 million.
- (b) **Laying of new transmission line on SKD Boulevard (5 km).** This will improve the water distribution and network pressure, create backup capacity in the network, and directly lead to up to 650 new connections. The prefeasibility study estimated costs for this component at approximately US\$900,000.
- (c) **Pipeline extensions in Paynesville.** Paynesville is one of the largest neighborhoods of Greater Monrovia and the site of dense settlements and large markets. The project will extend the distribution network in Paynesville by 19.1 km, especially around the highway leading toward the City of Kakata and in the Duport Road area. This will improve supplies in an area of 7.37 km² inhabited by close to 75,000 and create up to 2,500 new connections. The cost of this component has been estimated at approximately US\$950,000 (of which US\$300,000 is in the Duport Road area) in the prefeasibility study, including the costs for meters and multimeter closets.
- (d) **Pipeline extensions in Robertsfield Highway area.** This intervention will target up to 12.6 km of new distribution lines (2–6” diameter) in the fast growing and relatively prosperous neighborhoods along the Robertsfield Highway that runs along the coast toward the international airport of the capital. This will improve supplies in an area of 6.1 km² inhabited by more than 20,000 and create up to 2,000 new connections. Estimated costs for this component are approximately US\$600,000.

(e) **Pipeline extensions in the SKD Boulevard area.** This is a densely populated, underserved area of Monrovia that lies close to the main Eastern Transmission Line coming to Central Monrovia from White Plains. Thus, a relatively large number of people can be reached relatively easily along SKD Boulevard and with good water pressure through the planned 4.8 km of distribution network. This will improve supplies in an area of 2.7 km² inhabited by about 27,000 and create at least 650 new connections. The cost of this component has been estimated at approximately US\$240,000 in the prefeasibility study, including the costs for private meters.

Figure 2.3. SKD Boulevard Distribution Expansion (Hydroconseil, 2016)



- (f) **Branch line extensions in New Virginia community.** This relatively newly settled area northwest of the city center, with a relatively high socioeconomic profile, will be connected through branch lines connected to the western feeder, allowing up to 1,250 new connections. The cost of this component has been estimated at approximately US\$350,000 in the prefeasibility study, including the costs for meters.
- (g) **Pipeline extensions in Gardnersville Road as well as Kessely Boulevard, Nizohn and Chicken Factory Communities, and Nicklay Town.** These areas are increasingly and densely settled neighborhoods in the north and northeast Greater Monrovia. The project will finance the extension of 13.2 km of branch lines (of which 4.8 km is along Gardnersville Road), profiting from the restored supply from the Somalia Drive transmission line and the Gardnersville transmission line under Subcomponent 1A (b)/ (d). This will improve supplies in an area of 2.5 km² inhabited by around 30,000 and create up to 2,000 new connections. The cost of this component has been estimated at US\$1,000,000 in the prefeasibility study (of which US\$300,000 is along Gardnersville Road), including the costs for private meters and multimeter closets.
- (h) **Construction of new kiosks and standpipes.** Across all intervention areas, the project will also finance the construction of up to 60 standpipes, each serving an average of 300 persons in areas judged too poor or otherwise unsuitable for private house connections. The cost has been estimated at US\$100,000.
- (i) A further US\$160,000 has been set aside for essential spare parts (pipes and fittings).

Figure 2.4. Map of All Planned Infrastructure Intervention Areas (Hydroconseil, 2016)

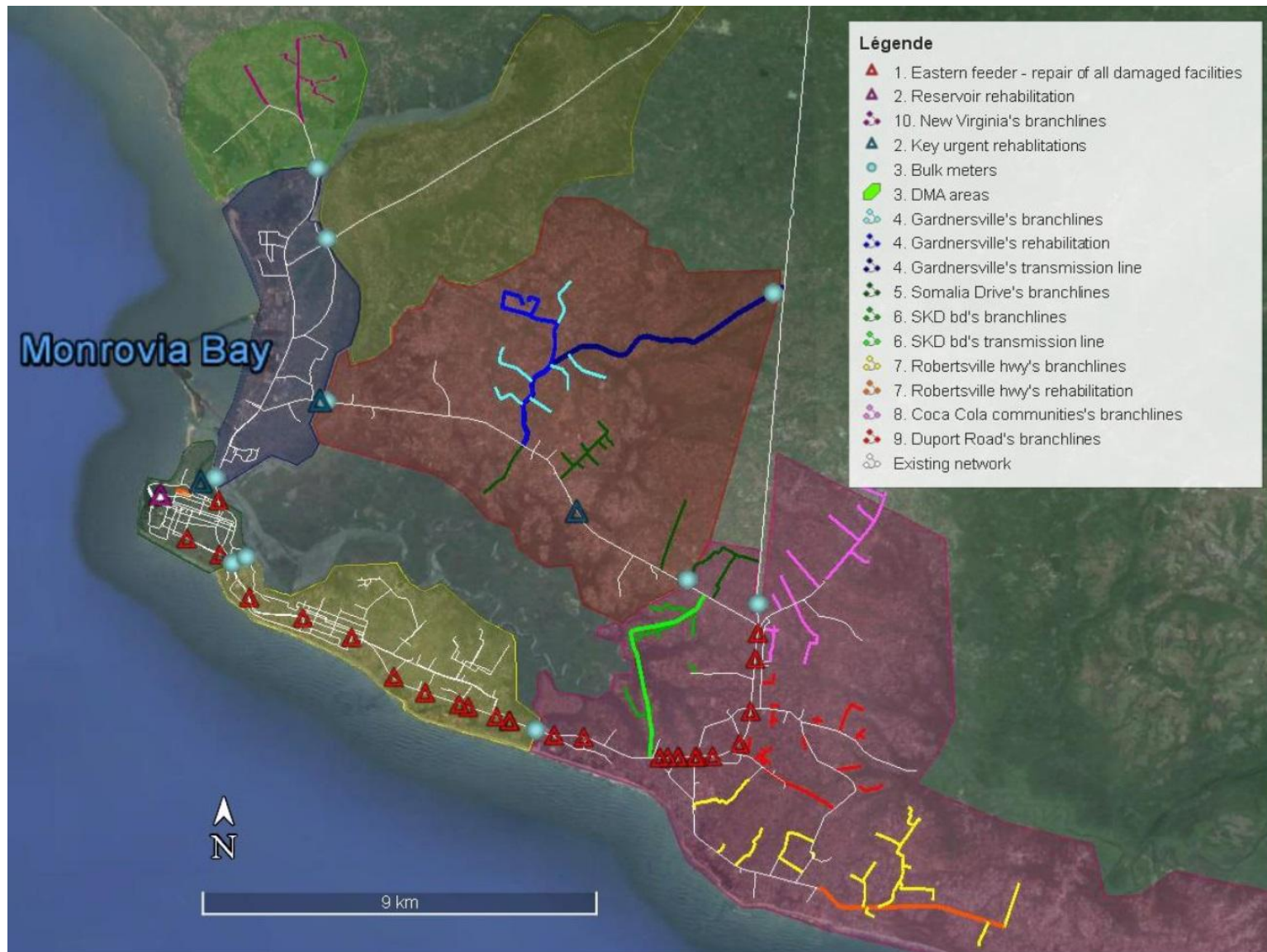


Table 2.1. Project Component 1 (with Subcomponents 1A and 1B)

#	COMPONENT 1	EXPECTED IMPACTS	ESTIMATED COST
1A	Existing Network: Targeted Infrastructure Repairs and Improvement		
(a)	Eastern Feeder: Repair of all damaged facilities (e.g. valves)	Improvement of water flows to Central Monrovia and existing reservoirs. Reduction of physical losses. Pressure increase. Isolation of branchlines from feeder for easier operation & Maintenance	\$70,000
(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 reservoir</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 reservoirs. Reduction of physical losses.	\$720,000
(c)	Installation of Bulk Meters Throughout the Network	Allow localization of water losses & reduction of non-revenue water	\$930,000
(d)	Rehabilitation of existing 8" pipe on Gardnersville 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.	\$60,000
(e.)	Rehabilitation of the existing 10" pipe on Robertsfield Highway	Supply of new communities. Up to 450 connections possible	\$120,000
	<i>Subtotal</i>		<i>\$1,900,000</i>
1B	New Pipe Extensions and Infrastructure		
(a)	Laying of 16" transmission line on Gardnersville Road	Reduction of key bottlenecks in transmission lines. Back up in case of breakdown in other feeders. Up to 300 connections possible.	\$1,800,000
(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.	\$900,000
(c)	Branchlines along Gardnersville Road	New communities supplied. Up to 900 connections possible.	\$300,000
(d)	Branchlines along Kessely Boulevard, in Nizohn and Chicken Factory Community, and Nicklay Town	New communities supplied. Up to 1,100 connections possible	\$700,000

(e)	Branchlines along SKD Road	New communities supplied. Up to 650 connections possible	\$240,000
(f)	Branchlines along Robertsfield Highway	New community supplied. Up to 2000 connections possible	\$600,000
(g)	Branchline expansions in Paynesville Coca Cola Community along Kakata Highway (Paynesville)	New community supplied. Up to 1300 connections possible	\$650,000
(h)	Branchlines Duport Road Area (Paynesville)	New community supplied. Up to 1250 connections possible	\$300,000
(i)	Branchlines in New Virginia Community	New community supplied. Up to 1250 connections possible	\$350,000
(j)	Refurbishment and construction of 60 water kiosks / standpipes	Increase in access to safe water for poor population	\$100,000
(k)	Spareparts for 24" and 36" lines (pipe parts and fittings)	Increase in access to safe water for poor population	\$160,000
<i>Subtotal</i>			<i>\$6,100,000</i>
GRAND TOTAL			\$8,000,000

Table 2.2. Estimated Production/Supply Capacity at Different Levels of Capacity Utilization

Post Rehabilitation Production capacity (% utilization)	16MGD	80%	60%	40%
m3/per annum	22,106,794	17,685,436	13,264,077	8,842,718
Required number of connections	216,296	173,037	129,778	86,519
Required served	1,016,593	813,274	609,956	406,637
Projected population of Monrovia 2015	1,331,254	1,331,254	1,331,254	1,331,254
Percentage potentially served	76%	61%	46%	31%

Table 2.3. Projected Water Demand Relative to Supply Capacity

	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Water delivered at 40% capacity utilization	2,992,707	2,992,707	3,150,218	9,450,655	10,500,727	10,500,727	10,500,727	10,500,727
<i>White Plains Rehabilitated</i>								
Number of Household Connections (high estimate)	6,156	8,656	11,156	12,656	17,656	27,656	37,656	52,656
Consumption per household and year (m3)	629,181	884,696	1,140,211	1,293,520	1,804,550	2,826,611	3,848,672	5,381,763
Biggest five customers	26,517	26,517	26,517	26,517	26,517	26,517	26,517	26,517
Institutional Customers	956,774	956,774	956,774	956,774	956,774	956,774	956,774	956,774
Total annual water demand	1,612,472	1,867,987	2,123,502	2,276,811	2,787,841	3,809,902	4,831,963	6,365,054

B. Component 2 - LWSC Capacity Building

11. The second project component aims to improve the LWSC's operational efficiency and customer orientation. The specific capacity-building interventions are informed by direct project needs (for example, 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 Bank's Water Global Practice as part of its technical assistance program to the LWSC over the past years.

12. The 2011 Bank-financed water quality study in Monrovia remains a key piece of evidence of the inadequacy of point-sources and importance of rehabilitating safe piped water supply as addressed by the appraised project. By supporting a new customer database, the Water Global Practice also helped create a baseline for the access expansion targeted under this project. For capacity building, the WSP's technical assistance program has identified cost recovery and the closely associated customer service functions as the key operational capacity gaps at the LWSC. The Bank's 2013–14 interventions with direct relevance to the proposed capacity-building program include a survey of illegal connections, a study of the LWSC's billing software, a detailed review of the utility's manual metering procedure, and a pilot to improve the LWSC's rate of new customer connections.

13. The Capacity Building component of this project will invest in aspects of cost recovery (Subcomponent 2A) and customer service (Subcomponent 2B) that are particularly relevant for achieving the PDO and key results. In addition, the Capacity Building component will support project-related consultations to meet citizen engagement and gender goals (Subcomponent 2C), the procurement of key operational equipment for the LWSC (Subcomponent 2D) and finance the salaries of the PIU (Subcomponent 2E).

14. Under Subcomponent 2A, the project will invest approximately US\$300,000 to improve the LWSC's cost recovery, primarily by reducing physical and commercial water losses. This will be achieved through the following actions:

- (a) **Reducing physical water losses through capacity building for NRW detection and the administration of the DMAs.** DMAs will be created by the project's investment in bulk meters as part of Component 1. Key staff in a newly created leakage control unit will be given specialized training in hydraulic modelling and, in particular, how to track water losses to specific areas of the network using the new bulk meters and maintain the bulk meters and DMAs in the long term.
- (b) **Reducing physical water losses through capacity building for leak detection.** The project will also finance leak detection equipment to be used by the leakage control unit to find specific physical pipe leaks within the respective DMAs. Moreover, staff will be retrained in leak repair to allow for faster repairs than is currently the case. A well-administered leak-detection and repair program will be critical to reduce physical water losses.
- (c) **Reducing commercial water losses through an improved metering process.** Commercial losses due to illegal connections or wrongly interpreted meters are a

second direct cause for high NRW and low cost recovery. As a WSP-funded review in 2014 has shown, the core weakness of the current LWSC metering process lies in a combination of multiple, manual steps carried out without effective supervision or error checking. The WSP has recommended the adoption of a best-practice device-assisted approach as implemented at other African utilities such as the Nairobi City Water and Sewerage Company. The project will address this by financing the equipment and training for such a device-assisted, semi-automated metering process. This will also increase the effectiveness of investments in more personal meters and multimeter closets under Component 1 of the project.

15. Under Subcomponent 2B, the project will invest approximately US\$400,000 to improve the LWSC's ability to respond to customer requests and grievances. This is important not only to improve customer satisfaction and payment morale but for management to be able to systematically track and reduce operational inefficiencies such as wrong billings, outages, and leaks. These are primarily reported by customers but at present not systematically recorded and responded to at the LWSC. A further critical aspect of customer service, which is directly linked to the key results of this project, is the ability of the LWSC to respond to connection requests. The current rate of around 70–80 new connections per month will have to be raised significantly if the connection targets of the project are to be achieved. Thus, investments in customer service improvements will focus on the following aspects:

- (a) **Additional customer care offices.** At present, the only location where customers can complain, make payments, or register requests for connections is in Central Monrovia. This is highly inconvenient for thousands of customers—including the majority of new connections planned under the project—who are located in less central neighborhoods and thus have to incur long travel times for every interaction with the utility. The project will finance the construction and equipment of at least two customer care offices in Western Monrovia and the Paynesville area (refurbishment of a walk-in center with basic office and computer equipment) not only to provide local services to existing and new customers during and after the intensive expansion of the network in this area but to relieve pressure on the staff at the central location.
- (b) **Improved GRM.** A key reason why the LWSC struggles to receive and react to customer complaints effectively is the lack of a tool to record, track, and resolve complaints systematically. Complaints are largely processed manually, resolution times are not supervised by management, and no overview statistics of complaints or complaint categories are available. The project will invest in a modern GRM to improve the LWSC's interaction with customers and its understanding of its own weaknesses through a better analysis of common complaints. Instituting a modern GRM will involve the review of current complaint resolution workflows, the procurement of a task-management software, the retraining of customer service staff, and the procurement of 3–5 additional workstations or mobile devices for customer service staff to enter complaints and for key technical staff to respond to common issues. This intervention will build on an assessment planned by the ongoing technical assistance program of the WSP (P155696), which will fund an assessment of the appropriateness of the current IT infrastructure and organization,

recommend improvements required before the adoption of the proposed systems, and review system options to support the LWSC's decision-making process.

- (c) **Improving the rate of new connections.** The present rate of new connections of around 70 per month is below the number requested by customers and falls significantly short of what is needed to meet project access targets. The project will fund the mainstreaming of a successful WSP pilot in 2013 that managed to double connection rates by (i) formalizing a more efficient connection process by supporting up-front identification of targeted customers, allowing direct marketing to customers, local payments at the new customer service center, and a streamlined application and connection process (currently there are more than 25 steps); (ii) abolishing individual procurement of hardware by customers and formalizing buying of high-quality parts at prenegotiated bulk prices; (iii) better equipping and retraining existing connection teams to adhere to engineering standards; and (iv) the LWSC will develop a rate-payment scheme for the initial connection fees—which would otherwise constitute a barrier even to households that can afford the monthly bills—to ensure sufficient demand in poorer neighborhoods.

16. Under Subcomponent 2C, the project will dedicate approximately US\$50,000 to fund public consultations with two primary purposes. First, to ensure that project-related concerns can be clearly voiced by citizens, not just to the LWSC management but also to municipal staff and government representatives in the affected areas. This is an important aspect of citizen engagement that goes beyond operational complaints (for example, about leaks, wrong bills, and so on) addressed through the new GRM. At least three sets of citizen engagement events are planned—before the start of project implementation to inform the public and flag concerns early on; during project implementation to give citizens an opportunity to raise concerns about the implementation while corrective action is still possible; and after project completion to obtain feedback in view of future projects and to address any remaining concerns or dissatisfaction. Second, the project will fund specific events targeted at women living in project areas to give women an opportunity to discuss gender-related concerns. In particular, and in recognition of the fact that women are predominantly responsible for fetching water in households without a private connection, the project will discuss planned standpipe placements and design during these event. Citizen consultation events will be advertised in the local media to obtain sufficient reach. The gender events will be organized in cooperation with local government and civil society groups.

17. Public consultations are part and parcel of a wider citizen engagement and feedback process, which includes not only the targeted operational grievance redress tool (see intermediary results and paragraph 16(b) of this annex) but the Bank grievance redress procedures (see section VI.) and will also be tied closely to benchmarking carried out under the Performance Contract that the LWSC has agreed upon with the GoL as well as the annual JSRs during which civil society organizations are able to participate.

18. Under Subcomponent 2D, the project will invest US\$550,000 to fund the procurement of key operational equipment, including vehicles, excavators, IT equipment, leak detection and repair equipment, digging tools, and spare customer meters.

19. Under Subcomponent 2E, the project will invest approximately US\$700,000 to finance the salaries, key office equipment, and two vehicles of a carefully recruited PIU for the project duration of five years. The PIU is critical to mitigate the remaining institutional capacity risks. The PIU will be responsible for the day-to-day management of project tasks, including fiduciary, safeguard, procurement, and technical responsibilities. The PIU will consist of five key staff: a PIU director, a project finance management specialist, a safeguards specialist, a procurement specialist, and an M&E specialist (water and sanitation engineer). The PIU will be recruited by the LWSC but with substantial inputs by the project team and established before project effectiveness. Roles and responsibilities will be defined in the PIM that has been developed in close cooperation with the LWSC to avoid overlaps or friction with existing departments of the utility.

Table 2.4. Project Component 2

2	Capacity Building Intervention	Description	Estimated Cost
2-A	Cost Recovery	(a) Training and equipment for administration of new district metering areas; (b) Introduction of device assisted metering (training, equipment, software)	\$300,000
2-B	Improve Customer Service	(a) Opening of at least two additional customer care offices (b) Improved grievance redress mechanism (review of workflows, introduction of task management system, training of customer service staff) (c) Improvements in new-connections process (procedure & equipment)	\$400,000
2-C	Public consultations (citizen engagement & gender-sensitive participation)	(a) Project related citizen engagement (events & media placements) (b) Gender sensitive consultations (e.g. on public kiosk locations)	\$50,000
2-D	Key Operational Equipment	(a) Three 4WD Vehicles and one Truck (b) Three small excavators (c) Five computers & internet connection upgrade (d) Maintenance kit / Pipe Accessories (e) Leak detection and repair equipment (f) Appurtenance, Digging Tools (g) Spare customer meters (2000)	\$550,000
2-E	Project Implementation Unit	(a) Salaries for five core PIU staff for project period (b) Office space and equipment	\$700,000
TOTAL			\$2,000,000

C. Alternatives Considered and Reasons for Rejection

21. **Investments outside of Monrovia.** Prefeasibility studies for investments in the secondary cities of Gbarnga, Harper, and Greenville, which are not targeted by USAID or the AfDB, have also been prepared and will allow for a natural second phase of the project. However, it was decided to focus the initial investments on Monrovia for a number of reasons: (a) the concentration of need in Monrovia with up to one million persons without access to piped water; (b) the synergies with the AfDB-financed water production capacity improvement in Monrovia, which will be completed in 2016–17; and (c) the fact that most of the existing network and customers of the LWSC are in Monrovia and improvements in the capital will thus allow a consolidation of the utility’s core business before new expansions to secondary towns.

22. **Conditionality on performance improvements and reforms.** Direct conditionality of the proposed investments on prior performance improvements, as well as institutional reforms was considered. However, a decision was made to work within the existing, reforming institutional structures to improve services for Monrovia’s population without further delay. This is because key performance improvements such as a reduction of NRW require the proposed investments and should thus not be a condition for them. Moreover, in light of the possible change of Government in 2017, remaining institutional reforms such as the creation of a sector regulator need political engagement best pursued through the Bank’s more flexible technical assistance program in Liberia (P155696).

23. **Investments in piped sewerage system.** Access to improved sanitation is low in Liberia and a rehabilitation of the LWSC’s dilapidated piped sewerage network was considered. However, at this time it was rejected in favor of an investment in water supply for three reasons. First, due to the degraded state of the piped sewerage system,³ a sewerage investment would require considerably greater resources than those proposed under this project and thus carry excessive risks given the present capacity constraints at the LWSC. Second, a sewerage investment would lack the synergies currently possible in the water sector with the AfDB investment in Monrovia’s water production capacity. Third, unlike in the water sector, detailed feasibility studies are not available for piped sanitation and a rapid progression to project implementation as desired in the aftermath of Ebola is thus less probable. Preparing such a prefeasibility study would be a productive next step as part of the Bank’s technical assistance program to assess intervention options and required funding.

24. **Private sector participation.** A direct role of the private sector was considered as an alternative to the proposed LWSC-centric implementation. However, the immediate participation of the private sector in the management of water appears unrealistic due to the enduring country risk, the lack of an adequate regulatory framework, the dilapidated state of the utility’s infrastructure, and the lack of local firms experienced with large-scale water supply. Once the LWSC’s finances and infrastructure are considerably improved, a solid regulatory framework is established, and a coherent and financially sustainable subsidy strategy is firmly in place to allow

³ As a 2009 study noted, unlike the water supply system, “most parts [of] the sewerage system [...] are not operative at present...the Fiama sewage treatment plant has been out of use because all the mechanical equipment... [was] stolen during civil conflict.”

the poor to be served, Private Sector Participation could be considered in the medium to long term.

Annex 3: Implementation Arrangements

REPUBLIC OF LIBERIA: Liberia Urban Water Supply Project (P155947)

Project Institutional and Implementation Arrangements

1. The LWSC will be responsible for the implementation of the IDA project. To reinforce the existing capacity gaps, a PIU will be established within the LWSC for the daily management of the project. The IDA PIU will build on the existing unit that is tasked to implement the UWSSP-supported by AfDB, which will be reinforced to accommodate the additional work pertaining to the IDA project.

Project Administration Mechanisms

2. The PIU will conduct the daily tasks of project implementation and periodic assessments of its progress. The unit will report to the LWSC management. The PIU staff are expected to consist of a PIU director, a finance management specialist, a social and environmental specialist, a procurement specialist, and an M&E specialist.

3. The responsibilities have been defined in close cooperation with the LWSC to avoid overlaps or frictions with existing departments of the utility. The PIU will work closely with all of the relevant departments within the LWSC to ensure the execution of both investment and technical assistance activities. It will have the ability to contract consultants but will rely primarily on in-house staff to build and maintain capacity and institutional memory. It will use consultants only when necessary to accomplish certain specific tasks such as technical execution studies, preparation of bidding documents, the receipt of goods and equipment, and the supervision or control and receipt of works.

4. The PIU will oversee the execution of the project components and corresponding contracts for works and services. It will prepare draft quarterly progress reports for IDA and the Steering Committee, including detailed comments on the execution of the project. However, the final progress reports will be sent to IDA by the LWSC management. These will highlight project achievements and also provide a detailed description of any difficulties encountered and how these are being addressed. The PIU will facilitate the coordination between the contractors, consultants, and any public entity or service related to the project.

5. The PIU will also be responsible for the project FM and for the preparation of project financial reports. It will ensure that all project activities are performed and quarterly progress reports and annual financial audits submitted on time. The PIU will maintain a separate accounting of assets generated by the project, which will only be merged with the LWSC's assets at the end of the project.

6. The PIU will receive financial support through the project, thus ensuring that it has the technical and management resources necessary to oversee the technical studies as well as the technical and financial aspects of implementation.

Project Steering Committee

7. A Steering Committee will be established for providing overall guidance to the project and ascertaining the project results, to ensure the coordination of the project with the country's overall water service improvement programs and to ensure that the main beneficiaries' expectations are met. It will include representatives of the following institutions: Ministry of Finance and Development Planning, the MPW, the Environmental Protection Agency, the Ministry of Health, the Monrovia City Corporation, LWSC Managing Director and the LWSC board of directors' chair.

Implementation Arrangements

8. To facilitate the carrying out of the project, the GoL will make the IDA financing available to the LWSC under a subsidiary agreement.

Financial Management and Disbursements

9. An FM risk assessment was conducted for the LWSC to assess the adequacy of the FM arrangement for the corporation to manage the fiduciary services for the Liberia Urban Water Project. The LWSC is currently not implementing any Bank-financed projects in Liberia and this Bank-supported operation will be new to the entity. However, the LWSC is implementing a water project financed by the AfDB.

10. The FM arrangements for the LWSC were assessed with the objective of ensuring that (a) the funds are going to be used for the intended purpose with due regard to efficiency, effectiveness, and economy; (b) the preparation of periodic financial reports would be accurate, reliable, and timely; (c) the entity's assets are safeguarded; and (d) adequate fiduciary assurances are provided through an independent audit of the project.

11. The assessed residual FM risk is assessed as High and reduced to Substantial in view of the articulated mitigation measures to be implemented by the project, including (a) develop a PIM; (b) deploy qualified FM staff to the project; (c) submit annual work planning and budget for no-objection by the Bank two months before the commencement of each fiscal year, (d) submit IFRs 45 days after the end of each quarter; and (e) submit audited accounts six months after the end of each fiscal year. The project meets the minimum FM requirement in accordance with OP/BP 10.00.

Project Financial Management Overview

12. The PDO is to increase access to piped water supply services in the project area in Monrovia and improve the operational efficiency of the LWSC. The project will be implemented through two components: infrastructure improvements in Monrovia and capacity building for the LWSC, which includes a strong focus on project management support and M&E. The overall oversight responsibility of the LWSC lies with the board of directors. The MD/chief executive officer oversees the day-to-day management of the LWSC and is accountable to the board. The project will be implemented by a PIU, to be appointed, and the PIU FM unit will be accountable for the FM services of the project. The deputy MD (Finance) will supervise and provide the overall guidance to the FM unit on the FM arrangements of the project.

13. The project's FM services will be provided by the Finance Department of the LWSC, headed by a deputy general manager (Finance), with support from the PIU. The deputy MD (Finance) is a certified public accountant with overall responsibility of the fiduciary arrangements for the LWSC. A qualified project accountant to be deployed or hired will be in charge of maintaining the books of accounts and financial records of the project. A project internal auditor, who shall be appropriately qualified, will be deployed and made responsible for the internal audit activities of the project. The project accountant, who will report to the project coordinator, will also be supervised by the deputy MD (Finance).

Budgeting

14. The PIU, together with the accountant, will be responsible for preparing the project annual work planning and budget based upon the agreed program to be financed. The key components are already known and these will be included in the project annual work planning and budget. The project will submit the annual work planning and budget to the Bank two months before the commencement of each fiscal year. The annual work planning and budget will be reviewed and a no-objection will be issued by the Bank task team leader for activities agreed upon.

Accounting and Maintenance of Accounting Records

15. Accounting for the use of the project funds, using the International Financial Reporting Standards (IFRS) basis of accounting, will be carried out by the project. The LWSC uses the Peach Tree accounting system for the recording of all accounting transactions for the corporation, at same time using QuickBooks for the accounting for the AfDB-assisted project. Both systems are capable of producing accurate periodic financial reports, including the unaudited IFRs and annual financial statements that would be acceptable to the Bank. Qualified accounting staff will be deployed and assigned to the project by the LWSC. A qualified accountant will be deployed to the project, to be supported by a finance assistant. The LWSC will identify and deploy the accounting systems to be used by the project. The staff to be deployed will be expected to be proficient in the use of the preferred accounting system for the project.

Periodic Financial Reporting

16. The project accountant will be responsible for preparing the quarterly unaudited IFRs. The constituents of the quarterly project IFRs will be submitted to IDA within 45 days after each calendar quarter. The IFR format to be used has been agreed upon during the negotiations. The project will also prepare annual financial statements at the end of each fiscal year in accordance with the IFRS. The IFR will comprise, at a minimum, (a) sources and uses of funds; (b) uses of funds within components; (c) funds disbursement status; (d) schedule of fixed assets; (e) schedule of withdrawal applications; and (f) the bank account reconciliation statement. Similar statements will be prepared on an annual basis and submitted to external auditors for auditing. The LWSC has an accounting and FM procedures and policies manual in place which is tailored toward satisfying the donors' FM architecture. Some weaknesses, such as the limited segregation of duties, are apparent in the financial manual. As the LWSC intends the manual to be applied for the project, it will need to be strengthened through a review and update supervised by the Bank.

Internal Controls and Audit

17. The finance division has Standard Operating Procedures (SOPs) which define internal control procedures and processes to ensure that transactions are approved by appropriate personnel. However, segregation of duties between approval, execution, accounting, and reporting functions need be strengthened in the SOP. The Internal Audit Unit of the LWSC works in collaboration with the Internal Audit Agency and conducts the internal audit reviews of the LWSC. It is noted that no internal auditor is assigned to the AfDB-assisted project.

18. The LWSC will be expected to strengthen the internal controls for the project, including the periodic internal control reviews to be conducted by the deputy general manager (Finance); the deployment of an internal auditor to the project; the review of the SOP and the financial policy manual; and the maintenance of a fixed assets register at all times to correctly reflect assets acquired or created under the project. The LWSC is also to develop a PIM in which the responsibilities and accountabilities for the core project staff would be outlined. The PIM will be finalized and adopted by the LWSC in FY16 and before project effectiveness.

External Audit Arrangements

19. Annual audits will be conducted at the end of each fiscal year by independent and qualified auditors acceptable to the Bank. The auditor would be selected, within four months of project effectiveness, on a competitive basis and in accordance with the Bank's procurement guidelines, and the terms of reference of the auditors will be cleared by the Bank.

20. The project financial statements, including movements in the designated accounts, will be audited in accordance with the International Standards on Auditing and a single opinion will be issued to cover the project financial statements in accordance with the Bank's audit policy. The auditors' report and opinion with respect to the financial statements, including the management letter, would be furnished to the Bank within six months after the end of each fiscal year.

21. The financial statements will comprise, at a minimum, (a) sources and uses of funds (summary of expenditures shown under the main program headings and by main categories of expenditures for the period); and (b) notes to the financial statements, including background information on the project, the accounting policies, detailed analysis, and relevant explanation of the main accounts/major balances, among others. In addition, the project shall provide, as an annex to the financial statements, an inventory of fixed assets acquired according to asset classes, dates of purchase, location, and cost.

Funds Flow and Disbursement Arrangements

22. Funds will be disbursed directly into a designated account that is set up and managed by the project. This account will be established in U.S. dollars at a commercial bank, or the Central Bank of Liberia, acceptable to the World Bank.

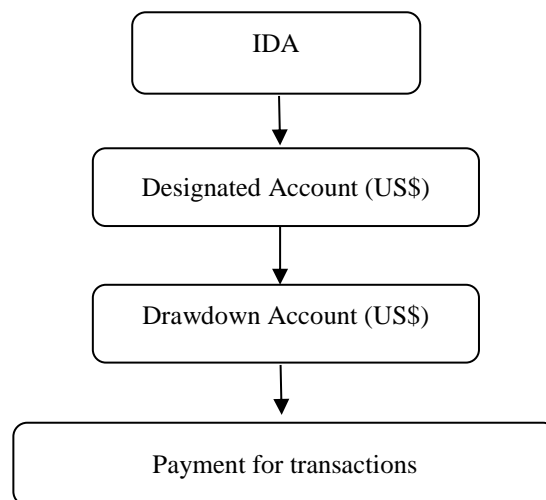
23. The Statement of Expenditure disbursement method will be used as the basis for the withdrawal of loan proceeds. The project provides for the use of 'advances, reimbursements, special commitments, and direct payments' as applicable disbursement methods, and these will be specified in the Disbursement Letter. The accountant will submit a withdrawal application for

the initial deposit and an initial advance in line with Disbursement Letter will be provided to the project.

24. Replenishments, through fresh withdrawal applications to the Bank, into the designated accounts will be made subsequently, at a minimum of monthly intervals, but such withdrawals will equally be based upon documentation of prior funds received in the designated account through Statements of Expenditure. The project would also establish a Drawdown Account into which the monies would flow from the designated account for the payment of project expenses. These accounts will be reconciled, at the minimum, on a monthly basis.

25. Supporting documentation will be retained by the implementing agency for review purposes by Bank missions and external auditors. Any advances made for contracts will be secured by a bank guarantee or performance-based bonds and a retention amount withheld. The disbursement flow diagram is as follows:

Figure 3.1. Disbursement Flow



Supervision Plan

26. Consistent with the risk rating, an annual FM implementation support mission will be carried out at the LWSC for the project. The FM supervision missions’ objectives will include reviewing the adequacy of the FM systems for the project.

27. Expected Disbursements by year are outlined in Table 3.1 below

Table 3.1. Project Disbursement Table

Expected Disbursements (in USD Million)					
Fiscal Year	2017	2018	2019	2020	2021
Annual	2.50	3.50	2.00	1.50	0.50
Cumulative	2.50	6.00	8.00	9.50	10.00

Conclusion

28. The description of the project's FM arrangements indicates that they satisfy the Bank's minimum requirements under OP/BP 10.00. The overall FM risk is assessed as High, reduced to Substantial based on the set of risk mitigation measures outlined in Section VI.C.

Procurement

29. Procurement of goods and works and the selection of consultants will be carried out in accordance with (a) Guidelines: Procurement of Goods, Works, and Non-Consulting Services Under IBRD Loans and IDA Credits and Grants by World Bank Borrowers, dated January 2011 and revised in July 2014; (b) Guidelines: Selection and Employment of Consultants Under IBRD Loans and IDA Credits and Grants by World Bank Borrowers, dated January 2011 and revised in July 2014; (c) Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants, dated October 15, 2006, and revised in January 2011; and (d) provisions stipulated in the Credit Agreement, including the exceptions to National Competitive Bidding (NCB) procedures.

30. A PP, acceptable to the Bank, covering at least the first 18 months has been agreed. For each contract to be financed by the Credit, the different procurement methods or consultant selection methods, the need for prequalification, estimated costs, prior review requirements, and time frame have been agreed by the borrower and the Bank in the PP. The PP will be updated at least annually, or as required, to reflect the actual project implementation needs and improvements in institutional capacity.

31. A General Procurement Notice will be prepared and submitted to the Bank for publication in the United Nations Development Business (UNDB) online and on the Bank's external website and shall also be published in at least one national newspaper after completion of appraisal of the project. Specific procurement notices for all goods and works to be procured under International Competitive Bidding (ICB) and expressions of interest for all consulting services to cost the equivalent of US\$200,000 and above will also be published in the United Nations Development Business (UNDB) online, the Bank's external website, and the national press. For works and goods using NCB procedures, the Specific Procurement Notice may be published only nationally in at least one newspaper of wide circulation within Liberia and a web portal that is publically accessible.

32. Procurement under the project will involve the following items:

- (a) **Consulting services.** The consulting services under this project are likely to include preparation of detailed designs for the rehabilitation and mains extensions works and also to supervise the contracts on behalf of LWSC. Hiring of the PIU key staff will include the PIU director, a project finance management specialist, a safeguards specialist, a procurement specialist, and an M&E specialist (water and sanitation engineer) and capacity building and training of the LWSC staff. These contracting needs will be identified and included in the PP. Contracts for consulting services, each estimated to cost US\$200,000 equivalent or more, will be awarded following the procedure of Quality- and Cost-Based Selection (QCBS). Consulting services

estimated to cost US\$100,000 but less than US\$200,000 per contract under this project will be procured following the procedures of Quality-Based Selection, Selection under a Fixed Budget, Least-Cost Selection (LCS), Selection Based on Consultants' Qualifications (CQS) and will apply to the circumstances as described in paragraphs 3.2 and 3.7 of the Consultant Guidelines. Assignments for selecting financial auditors will use the LCS method. For all contracts to be awarded following QCBS, Quality-Based Selection, Selection under a Fixed Budget, and LCS, the Bank's Standard Request for Proposals will be used. Procedures of Selection of Individual Consultants (IC) will be followed for assignments that meet the requirements of paragraphs 5.1 to 5.5 of the Consultant Guidelines. Procedure of Single-Source Selection (SSS) will be followed for assignments that meet the requirements of paragraphs 3.8 to 3.11 (for firms) and paragraph 5.6 (for Individual Consultants) of the Consultant Guidelines and will always require the Bank's prior review regardless of the amount. Short lists of consultants for services estimated to cost less than US\$200,000 equivalent per contract may be composed entirely of national consultants, in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines, if in-country capacity exists. Consultancy services estimated to cost above US\$100,000 per contract for firms and contracts for individuals for assignments estimated to cost above US\$50,000 and SSS of consultants (firms and individuals) will be subject to prior review by the Bank.

- (b) **Procurement of goods.** Goods to be procured under this project are likely to include contracts for pipework. Appurtenances, including valves, bulk water meters, air release valves, and private meters, will be procured for maintenance and water mains extension works. Leak detection equipment and repair materials and tools will also be procured for creating DMAs for leakage control. Furniture, IT and office equipment, excavators, and vehicles will also be procured to build the capacity of the LWSC to operate efficiently. The procurement of goods will be done using the Bank's Standard Bidding Documents when using the ICB or Limited International Bidding methods, which will apply for contracts valued at more than US\$500,000 equivalent and be subject to prior review by the Bank. National Standard Bidding Documents agreed with or satisfactory to the Bank may be used when other procurement methods are used. Contracts valued at less than US\$500,000 and more than US\$50,000 equivalent per contract may be procured under NCB procedures modified according to the exceptions. Irrespective of this, NCB contracts deemed complex or subject to risks will be identified in the PPs and will be prior reviewed. Contracts estimated to cost less than US\$50,000 equivalent per contract will be procured using shopping procedures, based on a model request for quotations satisfactory to the Bank. Procurement from United Nations Agencies and Force Account may be used where appropriate. Direct contracting may also be used where necessary, subject to the Bank's no-objection.
- (c) **Non-consulting services.** Mapping of DMAs and the network will be undertaken as part of non-consulting services under the project.
- (d) **Procurement of works.** Civil works to be procured under the project are likely to include the rehabilitation of reservoirs (these consist of existing, reinforced concrete

tanks, that is, not dam structures in the sense of OP/BP 4.37) and water mains as well as the laying of water mains extensions and installation of water meters. Works under this project will include ICB for contracts valued at more than US\$5,000,000 equivalent and be subject to prior review by the Bank. Contracts valued at less than US\$5,000,000 and more than US\$200,000 equivalent per contract may be procured under NCB procedures modified according to the exceptions. Small-value works estimated to cost less than US\$200,000 per contract may be procured under the shopping procedures based on comparing price quotations obtained from a minimum of three contractors to ensure competitive prices.

- (e) **Training, conferences, and workshops** are expected for the promotion of the accompanying measures and overall capacity building of stakeholders of the project. Training workshops (including training material and support), conference attendance, and study tours will be carried out based on approved annual training and allied activities plan. A detailed training and workshops' plan giving the nature of training/workshop, number of trainees/participants, duration, staff months, timing, and estimated cost will be submitted to the Bank for review and approval before initiating the process. The selection methods will derive from the activity requirement, schedule, and circumstance. After the training, the beneficiaries will be requested to submit a brief report indicating what skills have been acquired and how these skills will contribute to enhance their performance and contribute to the attainment of the PDO.
- (f) **Operating costs.** Incremental recurrent expenditures during project implementation, including maintenance of vehicles, fuel, equipment, office supplies, utilities, consumables, banking charges, advertising expenses, Internet service, car insurance, travel, per diems, and accommodations, but excluding salaries of civil and public servants, will be procured using the implementing agency's administrative procedures reviewed and found acceptable by the Bank.

Procurement Capacity Assessment

33. An assessment of procurement risks was carried out in October 2015 for the LWSC. Public procurement in Liberia is governed by the PPCA 2005 as amended and restated in September 2010. The PPCA established the Public Procurement and Concessions Commission as the oversight authority. The commission has published national bidding documents and is also mandated to prior review public contracts above set thresholds though it faces capacity constraints that affect its role for post review public contracts. National procurement procedures of Liberia are generally adequate except for some areas of the national regulations that are inconsistent with Bank procurement policy like the use of vendor registration and the preference of small and medium enterprises. In compliance with the PPCA, the LWSC is a procurement entity with a procurement unit and procurement committee. Procurement at the LWSC is headed by a qualified procurement manager leading a team of six other procurement staff, all of whom have no experience with Bank-financed procurement. Procurement record management will also require improvement. NCB practices include advertising invitations and public bid opening while other procurement procedures require competition, including the comparison of proposals/quotations. However, regulation 22(3) restricts bidding to only domestic businesses.

34. The overall risk for procurement (before mitigation measures) is considered High since (a) the existing procurement staff of LWSC have no prior experience with Bank-financed procurement; (b) the procurement staff of the LWSC may not be able to focus adequately on the project procurement management; (c) record keeping needs improvement; and (d) there is inadequate physical space and equipment for the Procurement Unit to operate efficiently.

Procurement Risk Mitigation Measures

35. Under the project, the LWSC will be responsible for procurement planning and implementation for all activities. The following procurement risk mitigations measures are proposed under the project: (a) a project procurement specialist position has been established in the LWSC for at least the first 18 months of the project; the qualifications and experience of the procurement specialist to be hired will have to be satisfactory to the Bank; (b) a project procurement procedures manual satisfactory to the Bank will be prepared for use by staff working on the project; (c) the LWSC staff involved with project procurement will undertake basic training in Bank-financed procurement in the Ghana Institute of Management and Public Administration, Accra within the first 18 months of the project; (d) the project will designate a specific staff responsible for procurement data management; and (e) the Procurement Unit will be adequately equipped to produce procurement documents on time and file documents decently.

Implementation Support for Procurement

36. Bank procurement specialists will regularly participate in implementation support missions to assist in monitoring procurement procedures and plans. The PP indicates those contracts which are subject to prior review. All other contracts are subject to post review. During the regular implementation support missions, the PPs will be updated at least once each year (or more often, as required, to reflect the actual project implementation needs). During every implementation support mission, the Bank procurement specialist will conduct strategic inspections and ex post review of procurement contracts. The statutory post procurement reviews will be carried out annually.

Exceptions to NCB Procedures

37. The following provisions will apply to the procurement of goods, works, and non-consulting services under NCB procedures: (a) foreign bidders shall be allowed to participate in NCB procedures; (b) bidders shall be given adequate time but not less than four weeks to prepare and submit bids from the date of the invitation to bid or the date of availability of bidding documents, whichever is later; (c) no domestic preference shall be given for domestic bidders and for domestically manufactured goods; and (d) in accordance with paragraph 1.16(e) of the Procurement Guidelines, each bidding document and contract financed out of the proceeds of the credit shall provide that (i) the bidders, suppliers, contractors, and subcontractors shall permit the Bank, at its request, to inspect their accounts and records relating to the bid submission and performance of the contract and to have these accounts and records audited by auditors appointed by the Bank and (ii) the deliberate and material violation by the bidder, supplier, contractor, or subcontractor of the provision may amount to an obstructive practice as defined in paragraph 1.16(a)(v) of the Procurement Guidelines.

Summary Procurement Plan

38. The main works, goods, and non-consulting services to be procured in the project are listed in Table 3.2.

Table 3.2. Works, Goods, and Non-consulting Service Contracts to Be Procured

Ref. No.	Description	Estimated Cost (US\$, millions)	Procurement Method	Domestic Preference (Yes/No)	Review by World Bank (Prior/Post)	Comments / Completion Date
To be procured the first 18 months of the project						
1.	Rehabilitation and extension of Monrovia water supply distribution system	7.800	ICB	No	Prior	July 30, 2016
2.	Supply of Water Operation and Maintenance equipment	0.300	NCB	No	Prior	July 30, 2016
3.	Supply of leak detection equipment	0.200	NCB	No	Prior	July 30, 2016

39. **Prior review thresholds for works, goods, and non-consultant services.** Contracts estimated to cost more than US\$3 million for works and US\$0.3 million for goods per contract, the first ICB and NCB contracts for works and goods, eventually others as identified in the PP, and direct contracting above US\$100,000 will be subject to prior review by the Bank.

40. The main consulting assignments of the project are listed in Table 3.3:

Table 3.3. Consulting Assignments with Selection Methods and Time Schedules

Ref. No.	Description of Assignment	Estimated Cost (US\$, million)	Selection Method	Review by World Bank (Prior/Post)	Comments/ Completion Date
To be procured the first 18 months of the project					
1.	Supervision of rehabilitation and extension of Monrovia water supply distribution system	0.35	QCBS	Prior	June 30, 2016
2.	Technical assistance for GRM (license and setup costs)	0.15	QCBS	Prior	September 30, 2016
3.	Technical assistance for Device Assisted Meter Reading System (License and setup)	0.15	QCBS	Prior	September 30, 2016
4.	Recruitment of a safeguards specialist	0.10	IC	Prior	March 30, 2016
5.	Recruitment of the external auditor	0.05	LCS	Prior	Audit mission
6.	Recruitment of a procurement specialist	0.10	IC	Prior	May 30, 2016
7.	Recruitment of project engineer (M&E)	0.10	IC	Prior	May 30, 2016
7.	Recruitment of an FM specialist	0.10	IC	Prior	May 30, 2016
8.	Recruitment of PIU director	0.10	IC	Prior	May 30, 2016

41. **Prior review thresholds for consultant services.** Contracts estimated to cost above or equal to US\$100,000 for firms and US\$50,000 for individuals per contract and SSS of consultants (firms) will be subject to prior review by the Bank. Similarly, all audit contracts will be subject to prior review as will be any other contract identified in the PP.

Environmental and Social (including safeguards)

42. The project has been classified as a Category B project according to the Bank's Operational Policy OP 4.01. The following safeguard policies have been triggered by this project: Environmental Assessment (OP/BP 4.01), Projects on International Waterways (OP/BP 7.50), Physical Cultural Resources (OP/BP 4.11), and Involuntary Resettlement (OP/BP 4.12).

43. **Social and poverty impacts.** The proposed project is expected to deliver significant social benefits by improving the living conditions of the population of Monrovia. The project will contribute to reducing urban poverty by (a) reallocating public funds to more direct and targeted interventions for the urban poor; (b) prioritizing urban infrastructure and services that are key to improving living and health conditions of the poor; and (c) improving the involvement of community-based organizations in the management of water kiosks and the private sector in the execution of targeted operations. This will also reduce the number of people fetching water from contaminated wells as shown in the Monrovia water point quality study in 2011 by increasing the number of people connected to the piped water system. The project will help generate temporary employment opportunities in labor-intensive public works and support local economic development in these areas, which will benefit the local residents in the selected poor neighborhoods.

44. **Gender impacts.** The project is classified as gender informed; gender-specific actions are to be undertaken during project implementation and are reflected in the results framework. Women are mostly affected by poor mobility and lack of access to basic services and generally burdened with household services such as buying food, fetching water, disposing of domestic wastewater and solid waste, paying utility bills, and caring for the sick and elderly. Improving access to basic services such as water supply will benefit women by enhancing sanitary conditions and improving productivity, with its associated time and cost savings. Women's participation in the selection of water kiosk sites and in the daily management of the kiosk is a key factor in establishing organizations that truly represent all people in the community. It is also important for providing services that respond not only to the community at large but also to specific needs that women may have. Actions to be taken under the project include (a) ensuring women's participation in all aspects of the program and dissemination of information to women, using appropriate media and language; (b) using gender-sensitive approaches and methods, including public information events targeted at women; (c) recruiting at least 40 percent of female community facilitators; and (d) collection and monitoring of gender-disaggregated data on project beneficiaries.

45. **Participation.** The preparation of the project, including feasibility studies and preparation of safeguards instruments were carried out in consultations with the national government, the city administration, and representatives of civil society.

46. **Social safeguards.** Overall impacts of the project are expected to be positive. The project will not finance civil works with significant resettlement impacts. An RPF has been prepared, consulted upon in-country, and published in Liberia and in the Bank's InfoShop on February 1, 2016.

47. No physical displacement of PAP has been identified nor will land acquisitions be required. There will only be minor economic disturbances, mostly related to temporary disruption during pipe laying of entrance ramps, terraces, fences, and stairs which are encroaching on the rights-of-way. The total number of affected structures is below 70, and these are listed in detail in the separate RPF document. Affected structures will be reconstructed by the project in equal or better quality. Given that no physical or economic displacement will be required, the preparation of an RAP is not necessary at this stage but will be guided by this RPF if required due to future, unexpected displacement-related challenges.

48. A complaints mechanism will be established by the project, whereby beneficiaries and stakeholders can express their concerns regarding the project. The project includes a budget for (a) training and awareness raising for local authorities, consulting firms, small and medium enterprises, community-based organizations, and relevant ministry staff, with a focus on the implementation of the RPF, the Abbreviated Resettlement Action Plan, and the mitigation of environmental impacts; (b) training for the safeguards specialist within the LWSC, with a focus on environmental audit and appraisal; and (c) environmental and social monitoring in the field to ensure that the provisions of the RPF have been implemented appropriately.

49. **Environment.** From an environmental perspective, the investment program includes the rehabilitation and extension of the distribution network, which may cause adverse impacts; however, these will be temporary and site specific. Most of the investments will be of simple design and technology.

50. The environmental team of the LWSC will be in charge of all safeguards aspects of the project, including implementation of the instruments. Refresher training in safeguards implementation will be provided during the implementation of the project. Regular supervision by the Bank's safeguards specialists will be used to contribute to strengthen the borrower's safeguards compliance and capacity.

51. During project preparation, an ESIA has been prepared, specifying how to identify and mitigate any adverse environmental and social impacts from project activities. The document was consulted upon in-country and published in Liberia and disclosed in the Bank's InfoShop on February 1, 2016.

Other Safeguards Policies Triggered

52. The project also triggers OP/BP 4.11 – Physical Cultural Resources. The works will take place in inhabited areas and will involve excavations and demolitions. There is a possibility of chance finds of physical cultural resources. To mitigate potential adverse impacts, the ESIA and associated ESMP include guidance and procedures for physical cultural resources management. No separate safeguards instrument is needed.

53. 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. However, the project has obtained exception to notification requirements of riparians from the Regional Vice President (AFRVP) on November 11, 2015, because it meets the exemption criteria defined in paragraph 7(a) of OP 7.50, that is, alterations to the ongoing scheme are minor and will not adversely change the quality or quantity of water available to the other riparians of the St. Paul River nor be adversely affected by the other riparians’ possible water use

Partnership with the AfDB

54. The project has been prepared in coordination with the AfDB, which is implementing the restoration of the White Plains production facility to raise treated water supply in Monrovia from around 5 mgd to 16 mgd and rehabilitate the pumping mains up to Red Light area in Paynesville.

55. The IDA project intends to efficiently distribute this added capacity to Monrovia’s population through rehabilitation of a critical section of the main transmission line from Red Light to Central Monrovia, by restoring supply to the main elevated concrete tanks in the city, balancing and regulating the flows in the system, and reducing water losses. Further, the project will invest in about 70 km to extend the distribution network to reach additional customers within Monrovia and thus also improve the LWSC’s revenue.

Annex 4: Implementation Support Plan

REPUBLIC OF LIBERIA: Liberia Urban Water Supply Project (P155947)

Strategy and Approach for Implementation Support

1. The project will be implemented by the LWSC. The Implementation Support Plan (ISP) takes into account the experience of the LWSC in project management from the ongoing AfDB-supported urban water and sanitation project. The LWSC will be reinforced with additional specialists forming the PIU and use engineering consultants to supervise construction activities.
2. The ISP aims to focus implementation support in the areas where the implementation arrangement and staff are less experienced (that is, utility performance monitoring based on key management tools) and where these need to be strengthened further, such as fiduciary and safeguard aspects. The Bank will play an active role during implementation to support the capacity-building activities through a complementary technical assistance program for the Liberian water and sanitation sector (P155696). Furthermore, the Bank team will continue to support good coordination among development partners working in the sector, for instance through the annual JSRs.
3. The LWSC will ensure overall quality assurance and control and M&E. Focused operations training in safeguards, procurement, FM, utility financial modelling, hydraulic modelling, and NIS update is included in the project for the implementation arrangement.

Implementation Support Plan

4. The ISP is built around formal semiannual missions, participation in the bimonthly coordination meetings between the LWSC and its development partners, regular videoconference calls between the task team and the LWSC, regular visits to all project sites, and fiduciary compliance reviews. An MTR will be held after approximately 30 months of implementation to review performance in depth, based on progress and studies commissioned for the MTR, and make necessary adjustments to project substance and schedule.
5. The use of an existing and tested structure setup for the implementation of the ongoing AfDB investments minimizes risks. The ISP lays out the necessary activities for the Bank to meet its fiduciary obligations in this context. The Bank will devote at least 40 staff weeks per year and a total of about 233 staff weeks through FY21 to help the GoL implement the project and supervise progress. The ISP highlights the Bank's support to implement adequate risk mitigation and to facilitate achieving the PDO. The risk categories rated substantial relate to weak institutional capacity for implementation and sustainability.
6. The following are particularly important elements of the ISP:
 - Monitoring respect of safeguards instruments through including safeguards specialists in semiannual missions. These specialists will also assure knowledge transfer and the development of an adequate training program for PIU staff to be recruited to monitor safeguards aspects. Additionally, local consultative forums in project sites will play a key role in supervising project activities. Civil society

organizations representing the local populations will receive support to monitor project implementation, in particular respect of safeguards instruments and hygiene promotion, including gender consideration, and will be able to draw attention to any problematic areas.

- Strong implementation support will be provided in sector reform, including utility operational efficiency monitoring using key performance indicators. The senior water and sanitation specialist, the M&E specialist, and environmental specialist on the task team will provide hands-on support (based in Nairobi and Monrovia Office).
- Support to developing and regular monitoring of a communication strategy and implementing responsive feedback mechanisms (spot checks, dedicated safeguards compliance support, environmental and social management training for contractors, and so on) for quality assurance and M&E.
- The Bank will support the establishment of smooth working relationships between the implementing agency and other government agencies such as the MPW and Environmental Protection Agency to ensure interventions coordination.
- Fiduciary missions will focus on the implementing agency’s performance in managing contracts, procurement, and financial matters as well as completing agreed implementation plans.
- The LWSC will receive technical assistance on NRW monitoring and training to address both commercial and physical water losses combining the institution of DMAs and South-South learning programs.

7. The following skills mix and resource needs are expected:

Table 4.1. Main Focus for Support to Implementation

Time	Focus	Skills Needed	Resource Estimate (US\$)
First twelve months	Start-up phase, procurement of investment contractor, preparation of implementation of capacity-building activities, including safeguards	WASH, institutional development, procurement, FM, safeguards, gender, M&E, communication	150,000
Until MTR (year 2–3)	Capacity building and start of subproject construction, capacity building, and studies	WASH, institutional development, procurement, FM	100,000/year 200,000 total
MTR (year 3)	MTR institutional	Infrastructure, institutional development, procurement, FM, environmental, social development, gender, M&E, communication, economic analysis	150,000

Following MTR (year 4–5)	Continued project implementation, implementation of study recommendations, capacity building	Infrastructure, institutional development, procurement, FM, social development, M&E, environmental	100,000/year 200,000 total
Total (5 years)	–	–	700,000

Table 4.2. Skills Mix Required

Skills Needed	Number of Staff Weeks (FY17–21)	Number of Trips	Comments
Task team leader (Water and Sanitation) Co-task team leader (Economist/Institutional expert)	100	15	Regular implementation support to the client, twice-yearly implementation support missions
Procurement	20	10	Twice-yearly missions
Financial management	15	8	Twice-yearly missions for start-up phase, then yearly
Institutional aspects (utility financial/commercial modelling)	15	5	Start-up (3), MTR, closing
M&E of NRW	15	5	Start-up (3), MTR, closing
Social development/gender	12	5	Annual mission and team support
Communication specialist	6	Country-office based	To participate in mission planning and communication strategy
Environmental safeguards	12	Country-office based	Regular implementation support to the client, twice-yearly implementation support missions
Program assistant	18	Country-office based	Ongoing team support
Language program assistant	6	HQ based	Ongoing team support
Social safeguards	12	10	Participate in yearly implementation support missions and MTR
Legal	1	0	Staff weeks for any restructuring
Disbursement	1	0	Staff weeks for any restructuring or as the need arises during implementation
Total	233	–	–

Annex 5: Economic and Financial Analysis

REPUBLIC OF LIBERIA: Liberia Urban Water Supply Project (P155947)

1. **Introduction.** As explained in the project description, the proposed project will assist the LWSC to improve the piped distribution network, as well as to strengthen its institutional ability to sustain and expand service delivery. As a result, the project is expected to improve the customer and revenue base of the LWSC through its interventions to reduce NRW, improve collection efficiency, and reduce operational expenses. Reducing the physical loss will enable the LWSC to make more water available to its existing customers and increase access to previously unreached areas. The project builds on and complements the expected increase in water production from 5 mgd to 16 mgd from the ongoing, AfDB-funded restoration of the White Plains treatment plant and transmission mains.

2. **Methodology.** Cost-benefit analysis is used to assess the financial and economic viability of the project and its sensitivity to key variables. With- and without-project scenarios are defined to identify the incremental costs and benefits of the project. Benefits and costs are projected over a period of 25 years (2017–2041) starting from the first year of the project in 2017 and including three years construction period. While a discount rate of ten percent is used for the financial analysis, based on the Technical Note on Discounting Costs and Benefits in Economic Analysis of World Bank Projects, cash flows are discounted at six percent.⁴

3. **Beneficiaries.** As stated in the Results Framework the project is expected to benefit about 63,000 residents of Monrovia through 6,500 new household connections, 60 new kiosks constructed, and 3,000 existing household connections positively affected by rehabilitation works. While customers other than household connections could also benefit from expansion of branches and enhanced water supply services in existing connections, the economic analysis only covers benefits accruing to households.

4. **Cost estimation.** Both investment cost and operational cost are included in the cost stream: (a) the total investment cost of the project (US\$10 million) is assumed to be spent over five years period, and AfDB finance for the restoration of the White Plains treatment plant and transmission mains, which is expected to increase the daily water production from the current 5 mgd to 16 mgd, is included in the analysis without which the current project will not be realized and (b) operational cost (production, distribution, sells, and depreciation allowances) is estimated based on a unit cost calculated from the 2014 audited utility report, which is estimated to be US\$0.002616 per gallon. It is also assumed that due to the project intervention, the unit operational cost will decline at a rate of 0.1 percent every year during the project period.

5. **Benefit estimation.** In the financial analysis, only the operational revenue from the sales of water and connection fee are considered. The analysis calculated the difference in revenues between the with-project and without-project scenarios. The additional with-project revenues were assumed to be generated from additional household connections, sales from new kiosk users, and sales of additional water from household connections affected by the rehabilitation

⁴ In the note, it is suggested that in a situation where country-specific growth projections are not available, use 3 percent as a rough estimate for expected long-term growth rate in developing countries. Given reasonable parameters for the other variables in the standard Ramsey formula, this yields a discount rate of 6 percent.

work. NRW is assumed to be 65 percent at the base year and expected to decline at an average rate of 2 percent per year during the project to reach at least 58.8 percent in 2021. As a precise, reliable baseline for NRW is currently not available (production is not yet metered at the White Plains plant, only estimated), the baseline and expected outcome for NRW may be adjusted at the MTR.

6. In the economic analysis, after subsidy, transfers and taxes are omitted, the operational revenue from the sales of water and connection fee, the following economic benefits expected to accrue from the project and which can be quantified are included in the analysis:

- (a) Increased household income due to time saved from fetching water. It is assumed that about 1 hour spent on fetching water, including waiting time without project, will reduce to half hour with the project,
- (b) Increased income gained as a result of reduced absenteeism of the working age population and caretakers due to reductions in diarrheal illness for children and adults. It is assumed that only 50 percent of the saved time will be used productively and a minimum wage rate of US\$6 per day (US\$0.75 per hour)⁵ is used to calculate income gained due to the project.
- (c) Reduced household health and health-related expenditure resulting from minimized prevalence of diarrheal disease.

7. Liberia’s 2013 DHS found that diarrheal disease is more prevalent among children whose families do not have access to improved sources of drinking water (26 percent) compared to children whose families have access to improved sources of drinking water (20 percent). This proportion is used to estimate diarrheal cases avoided due to the project.⁶ However, the health benefits of improved water supply is more significant when it is complemented with improved sanitation services and hygienic practices.

8. **NPV and IRR.** Results of the project economic and financial viability as measured by NPV and IRR and its sensitivity to changes in keys variables (revenue and cost) are summarized in table 5.1.

Table 5.1. Summary of NPV and IRR

Scenarios	Financial		Economic	
	NPV (US\$)	IRR (%)	NPV (US\$)	IRR (%)
Base case	8,156,000	21.40	21,810,000	26.1
10% increase in cost	3,595,000	14.89	14,971,000	19.4
10% decrease in revenue	2,248,000	13.00	12,336,000	17.4
15% increase in cost	(4,267,000)	3.00	2,760,000	8.9
15% decrease in revenue	(5,186,000)	1.20	1,363,000	7.4

⁵ On September 10, 2013, the Liberian Senate passed the Decent Work Bill, setting a minimum wage of US\$6/day.

⁶ According to Guy Hutton’s Water and Sanitation Assessment on Benefits and Costs of the Water and Sanitation Targets for the post-2015 development agenda (January 2015), access to improved community water source, basic piped water, and piped water of high quality have an impact of reducing diarrheal disease by 34 percent, 45 percent, and 79 percent, respectively.

9. The positive NPV and the IRR, which is higher than the discount rate used (financial and economic) estimated for the base case show the financial and economic viability of the project.

10. **Sensitivity analysis.** A range of scenarios have been developed to test the sensitivity of NPV and IRR to major elements of the cash flow (cost and revenue). Analysis of the project sensitivity test results at ten percent increase in cost and at ten percent reduction in revenue shows that the IRR and the NPV remain at acceptable levels for both the financial and economic analysis. However, further increase in cost and reduction in revenue will result in a negative financial NPV and financial IRR, which is lower than the discount rate. In 2015, the LWSC's operational revenue covers only about 70 percent of its operational expense and the rest is financed by subsidy from the GoL.⁷ The LWSC receive grants from the GoL for buying chemicals, fuel, and lubricants and to carry out plant maintenance. Moreover, grants are given by local governments for the LWSC to carry out their projects.

11. Based on detailed study, raising the tariff to an affordable level, improving operational efficiency of the LWSC, and putting in place appropriate mechanisms to protect the poor are critical to ensure and sustain the financial and economic benefits of the project. Furthermore, complementary interventions, including increase of access to improved sanitation and promotion of healthy hygienic practices, are essential to maximize the economic benefits of the project.

12. There are several other potential benefits that are not factored into the cost-benefit analysis described above because of lack of reliable data. Some of these include opportunity cost of school absenteeism among the targeted school-age population; estimated value of loss of life avoided as a result of improvements in water;⁸ reduced coping cost that households would otherwise spend to fill the service gap from alternative sources; reduction in girls' school dropout rates; women's empowerment; and positive impact on tourism and business. Therefore, the estimated benefits from the project can be considered conservative, and it can reasonably be assumed that the actual benefits will be much higher than this.

13. The wider economic impacts of the project beyond the sector (health, education, labor productivity, poverty reduction, women empowerment, and so on) and the current financial position of the LWSC make the project relevant for public finance. In addition, the project is expected to have a positive fiscal impact on GoL finances by reducing the GoL annual subsidy to the LWSC and promoting enhanced cost recovery over time.

⁷ A financial model developed for the LWSC by a consultant estimated billing efficiency at 44 percent, collection efficiency at 88 percent, cash operating ratio at 19 percent, and staff efficiency ratio at 40 per 1,000 connections. The combined effect of these factors made the LWSC dependent on a government subsidy to finance its operation.

⁸ The WHO estimates that diarrheal diseases caused the deaths of around 2,300 children under five years of age in Liberia in 2008. The indirect effects of malnutrition—to which poor water and sanitation contribute 50 percent according to the WHO—cost a further 230 lives. Similarly the Global Burden of Disease study (2010) found out that diarrheal disease, accounting for 13.5 percent of all Years of Life Lost (YLL) due to premature death in Liberia, is the second among the major causes of premature death.

Annex 6: Major Related Projects

REPUBLIC OF LIBERIA: Liberia Urban Water Supply Project (P155947)

Project	Financed By	Amount	Description	Location
Emergency Infrastructure Project (2006–2012, Completed)	World Bank	US\$54.7 million (of which 10% for water)	This grant financed a variety of infrastructure and capacity improvements in Liberia, including roads, energy, and water supply. The key water supply investment (~10% of total grant) was the rehabilitation of the White Plains production plant from 1.2 mgd to 5 mgd.	Monrovia (for water supply)
Emergency Monrovia Urban Sanitation Project (2009–2016)	World Bank	US\$17.6 million	The project is assisting the Monrovia City Corporation to provide solid waste services and increase the volume of collected and disposed waste from approximately 30% of daily generated waste to 45%.	Monrovia
Fostering Innovation and Hygiene (2013–16)	AfDB	US\$1.5 million	The project focuses on the construction of public toilets, awareness campaigns, and support of fecal sludge management to increase access to improved, sustainable, and affordable sanitation services for the urban poor.	Monrovia
Rural Water, Sanitation and Hygiene Program Development Study (2010–16)	AfDB	US\$0.85 million	The outputs of the study will include (a) the National Program and Operational Plan for rural water, sanitation, and hygiene services for the rural areas of Liberia; (b) Program Implementation Manual; (c) M&E framework; and (d) Operational and Maintenance Plan for rural WASH.	Rural Liberia
Urban Water Supply and Sanitation Project (2010–16)	AfDB	US\$40.4 million	The project will rehabilitate the White Plains production plant to its prewar capacity of 16 mgd, rehabilitate the Eastern Transmission Pipeline in part., and construct small networks in the cities of Buchanan, Kakata, and Zwedru.	Monrovia, Buchanan, Kakata, Zwedru
Liberia Municipal Water Project (2012–16)	USAID	US\$30 million	Extend access to improved drinking water to 90% of the population the target cities of Robertsport, Sanniquellie, and Voinjama.	Sanniquelle, Robertsport, Voinjama
Access to safe water in schools	European Union	US\$0.6 million	Extend access to safe water in 529 schools.	9 out of 15 counties
Improving sanitation and hygiene in urban and peri-urban Monrovia	European Union	US\$3.5 million	The project will extend access to appropriate sanitation facilities to 50,000 and benefit a further 250,000 through solid waste and drainage improvements in the poor neighborhoods of Clara Town, Logan Town, New Kru Town, and West Point.	Monrovia
Improved Primary Solid Waste Collection in Poor Communities of Monrovia (IMPAC)	Bill and Melinda Gates Foundation	US\$5 million	Improve solid waste collection in the communities of Bushrod Island, Central Monrovia, Freeway, and Sinkor.	Monrovia
Water, Sanitation, and Hygiene (WASH) Project	Irish Aid	US\$1.3 million	Improve water and sanitation access for 50,000 residents.	Grand Cape Mount, Lofa, Rivercess, Sinoe, and Rural Montserrado