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EVALUATION

LIBERIA MUNICIPAL WATER PROJECT II MIDTERM AND CAPITAL IMPROVEMENT PROJECT FINAL PERFORMANCE EVALUATION

This publication was produced at the request of the United States Agency for International Development (USAID). It was prepared independently by Social Impact, Inc., under the Liberia Strategic Analysis (LSA) activity.

ABSTRACT

This report presents findings and recommendations from the midterm performance evaluation of the Liberia Municipal Water Project II (LMWP II) and final performance evaluation of the Capital Improvement Project (CIP). LMWP II provides construction oversight and quality assurance for CIP, a separate USAID-funded activity, which involved the construction of water supply systems in three cities: Robertsport, Sanniquellie, and Voinjama. LMWP II also provides capacity building and direct support to the Liberia Water and Sewer Corporation (LWSC) to sustainably operate and manage the three systems.

The evaluation examined infrastructure planning, construction and quality, capacity building, and cost sustainability. It found that the completion of the construction and hand-over to LWSC was delayed, yet the overall quality of the infrastructure generally conforms to design specifications and national standards. Under USAID's accessibility criteria, LMWP II has nearly met its objective of providing access to improved water supply to 90 percent of the three cities' population.

At the midterm, LWSC is unable to take ownership for managing these systems and needs continued LMWP II capacity building and advocacy for buy-in and financial transparency to improve by the end of the activity. The water systems do not appear to be financially sustainable, mainly due to the fact that expected subsidies from the Government of Liberia (GOL), meant to support the LWSC, have not yet been disbursed, as was agreed upon in the Memorandum of Understanding (MOU) between USAID and the GOL. To ensure financial sustainability, USAID should continue advocating for GOL to disburse LWSC's subsidies. The evaluation also recommends looking into funding and network expansion modalities to facilitate household and business connections or increase the distribution networks for improved revenue generation. With continued community awareness of these systems, these next steps will help USAID achieve its overall Development Objective of improving community health through access to clean water.

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The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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ACRONYMS

AfDB	African Development Bank
CDCS	Country Development Cooperation Strategy
CIP	Capital Improvement Project
COS	Cost of Service
DO	Development Objective
EQ	Evaluation Question
FAR	Federal Acquisition Regulation
GOL	Government of Liberia
HH	Household
IR	Intermediate Result
JMP	Joint Monitoring Programme
KII	Key Informant Interview
KVA	Kilovolt-Ampere
LD	Liberian Dollar
LMWP	Liberia Municipal Water Project
LSA	Liberia Strategic Analysis
LWSC	Liberia Water and Sewer Corporation
M&E	Monitoring and Evaluation
MELP	Monitoring, Evaluation, and Learning Plan
MFDP	Ministry of Finance and Development Planning
MOU	Memorandum of Understanding
NTU	Nephelometric Turbidity Units
O&M	Operations and Maintenance
OMC	Outstation Management Contract
PIDS	Performance Indicator Database System
PMT	Project Management Team
PSC	Partial Substantial Completion
PTMC	Pump and Tank Maintenance Company
QA	Quality Assurance
QC	Quality Control
SOP	Standard Operating Procedure
TT	Tetra Tech
UIP	United Infrastructure Projects
USAID	United States Agency for International Development
USD	United States Dollar
UWSSP	Urban Water Supply and Sanitation Project
WASH	Water, Sanitation, and Hygiene
WTP	Water Treatment Plant
WUCBT	Water Utility Capacity Building Tool

I. EXECUTIVE SUMMARY

Social Impact conducted a midterm performance evaluation of the Liberia Municipal Water Project II (LMWP II), and a final performance evaluation of the Capital Improvement Project (CIP), through its Liberia Strategic Analysis (LSA) activity. The primary objective of the evaluation was to provide an in-depth examination of the overall progress of LMWP II in order to:

- Facilitate midcourse correction for LMWP II;
- Capture lessons learned, successes, and defects to be addressed during the defects-liability period; and
- Inform the new United States Agency for International Development (USAID) Country Development Cooperation Strategy (CDCS) by identifying priority areas for future programming in the Liberian urban water supply sector.

BACKGROUND

In September 2016, USAID awarded a \$12.5 million, four-year Task Order contract to Tetra Tech, Inc. for implementation of LMWP II. The objective of LMWP II is to support USAID with construction oversight and quality assurance services for the completion of a separate \$26.5 million, three-year urban CIP infrastructure activity awarded in February 2016. LMWP II provides capacity building and direct support to the Liberia Water and Sewer Corporation (LWSC) and local management entities to sustainably operate and manage the newly constructed systems, located in the three secondary cities of Robertsport, Sanniquellie, and Voinjama. Tetra Tech previously assisted USAID with the design of the CIP infrastructure systems in these cities through the preceding contract, LMWP I. United Infrastructure Projects (UIP) is the contractor executing the construction under CIP. The construction activity is considered an integral part of LMWP II and, therefore, its evaluation cannot be seen in isolation of the evaluation of LMWP II.

EVALUATION METHODOLOGY

LSA used a mixed-methods approach to answer the following evaluation questions:

Infrastructure Planning, Construction, and Quality

1. To what extent has progress been made in the design and implementation of the three water systems (water treatment plants, distribution systems, and kiosks)?
 - Will the design and construction enable improved water supply access to ninety percent of the population and meet LMWP II objectives?
2. To what extent does the infrastructure conform to specifications and standards? Consider quality assurance by LMWP II and quality, timeliness, and cost-effectiveness by UIP.
 - Identify construction defects that need to be rectified during the defects-liability period.

Capacity Building and Cost Sustainability

3. To what extent will LWSC be able to take ownership of the institutional framework for managing the CIP systems as a result of LMWP II capacity building efforts?
 - To what extent has LMWP II mainstreamed an effective Monitoring & Evaluation (M&E) system at LWSC at the national level and site level to monitor progress against targets? Consider production quality, quantity, and revenue.
 - To what extent will the Memorandum of Understanding (MOU) facilitated by LMWP II and signed between USAID and Ministry of Finance and Development Planning (MFDP) support sustainable Government of Liberia (GOL) ownership? To sustain investment required for operating and expanding water supply systems, are the financial projections for cost recovery realistic?

- What are the lessons learned in the implementation of the institutional framework and the capacity-building efforts?

The evaluation methodology was comprised primarily of qualitative methods and supplemented by some quantitative data analysis. The evaluation team carried out a comprehensive document review; key informant interviews (KIs); interviews with consumers and kiosk operators at water vending kiosks; interviews with business owners or administrators at businesses currently, or potentially able to be, connected to the water network; and site visits for direct observations in RobertSPORT, Sanniquellie, and Voinjama. Primary qualitative data is supplemented by secondary quantitative data, inclusive of available performance indicators and monitoring data and, for cost-effectiveness analysis, financial data and cost models.

In addition, to gather data on a selected African Development Bank (AfDB)-funded project as requested by USAID, the team expanded the methodology to include document review of AfDB project reporting, an additional site visit to Kakata, KIs, and interviews with consumers and kiosk operators at water vending kiosks. This provided evidence for cost and quality comparison between LMWP II and a non-USAID-funded project. Data collection took place in-country throughout the month of October 2018.

FINDINGS AND CONCLUSIONS

INFRASTRUCTURE PLANNING, CONSTRUCTION, AND QUALITY

LMWP II/CIP successfully completed the design and implementation of the water treatment plants (WTPs), distribution systems, and kiosks in all three project sites of RobertSPORT, Sanniquellie, and Voinjama by the time of this evaluation. All construction works have been completed, handed over to LWSC, and are operational. The infrastructure is of good quality and largely conforms to the design specifications and national standards. There were no defects or malfunctioning equipment at the time of the site visits in October 2018, only minor deviations in implementation dictated by the realities on the ground, but they do not affect the quality objectives. At the time of the evaluation, there were no unresolved infrastructure quality issues; the only outstanding issues to finalize do not affect quality objectives. Although UIP carried out the construction works, Tetra Tech maintained a prominent advisory role by serving as the quality control contractor and performed well.

All three sites had a ninety-five percent or higher infrastructure completion rate in March 2018, and the construction works were substantially completed on time by April 2018. Because the WTPs only managed to produce water with a turbidity of less than 2 Nephelometric Turbidity Units (NTU), acceptance and hand-over was delayed until July 2018 (RobertSPORT) and September 2018 (Voinjama and Sanniquellie).

Based on qualitative information from the evaluation, the evaluation estimates that LMWP II/CIP made progress toward, but did not reach, the target of ninety percent coverage of the population in Sanniquellie and Voinjama, but likely achieved the target in RobertSPORT. This gap in the first two sites is due to in-migration and expansion of existing communities that increased the amount of the population outside the thirty-minute round-trip threshold for water distribution kiosks. Building a few more kiosks would likely expand access to meet the ninety percent objective; however, expanding household and business connections, rather than building more kiosks, would contribute to increased revenue collection and cost recovery.

Consumers mentioned in all three sites that the water is affordable, and there is high satisfaction with its quality and taste. However, since consumers were selected in a convenience sample from among those already using the kiosks, this finding may not capture a representative picture of intended-user opinion in each of the three sites.

CAPACITY BUILDING AND COST SUSTAINABILITY

Given that LMWP II is only at its midpoint, it is still early to predict to what extent LWSC will be able to take ownership of the institutional framework as a result of LMWP II capacity building efforts. The institutional framework anticipates several financial arrangements and a private contractor operating the CIP systems. There are still two years to implement the institutional framework and build LWSC's capacity in management, operations and maintenance, and M&E.

The recent government transition has had a major effect on the project's progress and performance. LWSC's newly-assigned senior management is hesitant to take full ownership of the institutional framework and resistant to having a private contractor running their facilities. Furthermore, they have not received any subsidies from MFDP so far, hampering the operation, maintenance, and management of the water systems in the three cities. Although it is likely that at the end of the project, LWSC and Pump and Tank Maintenance Company (PTMC) will be capable of managing, monitoring, operating, and maintaining the three water systems as a direct result of LMWP II capacity building and advocacy efforts, LWSC's willingness appears contested at present, and they are unable to do so unless MFDP disburses subsidies per the MOU.

In terms of cost recovery, achieving financial sustainability of the three water systems is highly unlikely under the present circumstances. The absence of sufficient subsidies may soon result in inferior operation and maintenance practices and demotivated operating staff which, in either case, would likely affect service provision to end users.

Even if the water systems keep operating well, it is unlikely that the water sales from the kiosks alone will cover the costs, despite a projected rise in sales in the coming dry season and in the coming years. An increase in household connections would be required to reach full cost recovery, which may not be possible without significant additional investment given household-level barriers to connection and a lack of secondary and tertiary lines. Several obstacles need to be resolved to realize household and business connections, including a lack of funds and the absence of secondary and tertiary distribution networks.¹

RECOMMENDATIONS

The evaluation provides the following recommendations:

1. To promote demand for clean water and use of the kiosks, LMWP II and the Local Steering Committees in each site should continue carrying out various types of outreach, such as raising community awareness about the availability and health benefits of using piped water.
2. LMWP II should define a more accurate method of measuring the main outcome indicator for improved water supply access, and overall, ensure that all Performance Indicator Database System indicators can be effectively measured and reported.
3. LMWP II and USAID should continue lobbying LWSC senior management to gain their buy-in to the institutional framework.
4. To ensure financial sustainability, USAID should continue advocating for GOL to disburse LWSC's subsidies.
5. If revenue collection and cost recovery are priority objectives, USAID could consider options to support GOL efforts to increase household connections.

¹ Tetra Tech's original designs included a denser distribution network, but the networks were reduced upon USAID's request to meet construction budget limitations.

II. INTRODUCTION

CONTEXT

Liberians enjoyed a functioning water supply network prior to its two civil wars, but the destruction that accompanied these wars, ending in 2003, severely damaged the networks.² Humanitarian agencies responded by drilling boreholes around the country, yet with many nonfunctional boreholes today³ and reports of groundwater contamination from untreated human feces and pollution from mining,⁴ Liberians are increasingly in need of potable water from improved sources. Moreover, the spread of and recovery from Ebola, calm since 2015, called greater attention to the need for safe water as infection, prevention, and control and water, sanitation, and hygiene (WASH) efforts require reliable water sources for hygiene and healthcare.⁵ Given this history and current challenges in accessing safe drinking water around the country, the Government of Liberia (GOL) and donor partners⁶ continue working to ensure access to safe, affordable, and sustainable drinking water sources. The GOL's Ministry of Public Works is in charge of rural water supply. The Liberia Water and Sewer Corporation (LWSC), a state-owned enterprise, oversees urban water supply and sanitation.

ACTIVITY BACKGROUND

In this capacity, United States Agency for International Development (USAID) awarded a \$12.5 million, four-year Task Order contract to Tetra Tech, Inc. in September 2016 for implementation of the Liberia Municipal Water Project II (LMWP II). The objective of LMWP II is to support USAID with construction oversight and quality assurance services for the completion of a separate \$26.5 million, three-year urban Capital Improvement Project (CIP) infrastructure activity, awarded in February 2016. United Infrastructure Projects (UIP) is the contractor executing the construction under CIP.

LMWP II provides capacity building and direct support to LWSC and local management entities to sustainably operate and manage the newly-constructed water systems, located in the three secondary cities of Robertsport, Sanniquellie, and Voinjama. During the preceding contract, LMWP I, Tetra Tech assisted USAID with the design of the CIP infrastructure systems in these cities. The three sites of project implementation are:

- **Robertsport**, the capital of Grand Cape Mount County, situated approximately ten miles southeast of the Sierra Leonean border. Robertsport is small, with a population of 4,100 people. Residents' main occupations are in fishing, agriculture, and petty trade.
- **Sanniquellie**, the capital of Nimba County, which is located in the northeastern part of Liberia and borders Ivory Coast to the east and Guinea in the northwest. Sanniquellie has a population of roughly 13,800 people. Their main occupations are in agriculture and petty trade.
- **Voinjama**, the capital of Lofa County in the northwest of Liberia, bordered on the east and north by Guinea and on the west by Sierra Leone. Lofa County is now the second largest County in

² UNICEF. (2003, September 1). *UNICEF appeal for Liberia's children Aug 2003 – Dec 2003*. Retrieved from: <https://reliefweb.int/report/liberia/unicef-appeal-liberias-children-aug-2003-dec-2003>

³ Liberia WASH Consortium. Water point functionality. Retrieved from: <https://wash-liberia.org/water-point-data/water-point-functionality/>

⁴ Front Page Africa. (2018, October 24). "Liberia: Bong community demonstrates over contamination of water by gold mining company." Retrieved from: <https://frontpageafricaonline.com/county-news/liberia-bong-community-demonstrates-over-contamination-of-water-by-gold-mining-company/>

⁵ Abrampah et al. (2017). "Improving water, sanitation and hygiene in health-care facilities, Liberia." *Bulletin World Health Organization* 2017; 95:526–530. Retrieved from: <https://www.washinhc.org/documents/Bulletin-Libiera.pdf>

⁶ Liberia WASH Consortium. (n.d.) Partners. Retrieved from: <https://wash-liberia.org/about/partners/>

Liberia. Larger than Sanniquellie, Voinjama has a population of roughly 16,300 people. Residents' main occupations are also in agriculture and petty trade.

LMWP II is designed to contribute to USAID/Liberia Development Objective (DO) 3 of its Country Development Cooperation Strategy (CDCS): Improved health status of Liberians. The activity-level goal of LMWP II is locally-managed, financially sustainable, and affordable clean water supply access to ninety percent of the population in each of the three cities. This goal is aligned with the USAID/Liberia Intermediate Result (IR) 3.4: Increased access to safe water and sanitation. For more information, refer to the LMWP II Results Framework in Annex A and USAID/Liberia CDCS Results Framework in Annex B.

The Theory of Change driving the design and implementation of LMWP II is that if availability of potable water supply in three county capitals is increased (USAID/Liberia Sub-IR 3.4.1), and if the management capacity of local and national WASH providers is improved (USAID/Liberia Sub-IR 3.4.2), then access to safe water and sanitation will be increased (USAID/Liberia IR 3.4), contributing to the improved health of Liberians (USAID/Liberia DO 3).

The three-year CIP was awarded in February 2016. Construction work should have been completed and entered into the operation phase in April 2018. However, the latter did not occur until July 2018 for Robertsport and in September 2018 for Sanniquellie and Voinjama. The CIP contractor, UIP, is responsible for the following tasks:

- Undertake construction work of CIP in three cities and complete as per the agreed time schedule i.e. April 2018.
- In compliance with the design and contract documents, provide quality control to ensure that all work adheres to the applicable standards and specifications in the contract document.
- All work must comply with USAID Environmental and Liberian Environmental Protection Agency requirements.
- Provide operational oversight, support, training, and capacity building for LWSC on the new plants constructed by UIP and required for complete operations of the water utility. This is expected to be carried out after construction is completed.

In tandem with and immediately following construction, LMWP II is required to develop local capacity to maintain, manage, and operate USAID-funded water system improvements in the three cities and create conditions favorable for further expansion of such improvements after the end of the activity. The LMWP II contractor is responsible for the following tasks in each of the three cities:

- Oversee the construction process and provide construction supervision.
- Support operation and maintenance of improved water supply infrastructure on a transitional basis.
- Build the capacity of the GOL, LWSC, county governments, municipal authorities, and the selected local water service management to effectively play their role in the agreed institutional framework by the end of the contract period.

The institutional framework, signed between the GOL and USAID in January 2017, defines the roles and inter-relationships of key stakeholders who will ultimately be responsible to manage, maintain, and operate the new water utilities and details the contracts, charters, and Memoranda of Understanding (MOUs) that prescribe each stakeholder's respective responsibilities. As illustrated below in Figure 1, it encompasses the Performance Contract between the GOL's Ministry of Finance and Development Planning (MFDP) and LWSC, the Charter between LWSC and the Local Steering Committees, and the Outstation Management Contract (OMC) between LWSC and the outstation operator. Further, LWSC contracted a private company, Pump and Tank Maintenance Company (PTMC), to operate the new water infrastructure at the three cities' outstations. This OMC is for three years starting in May 2018.

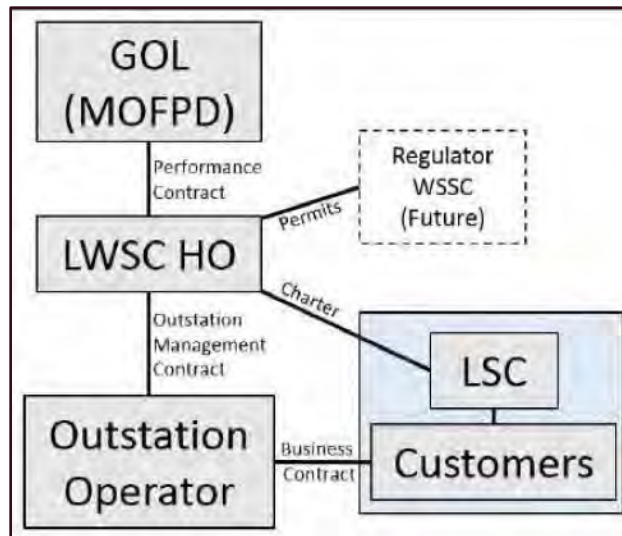


Figure 1: Institutional Framework for Outstation Management

EVALUATION PURPOSE AND AUDIENCE

Through the Liberia Strategic Analysis (LSA) activity, USAID/Liberia has engaged Social Impact, Inc. to conduct an independent midterm evaluation of LMWP II and final evaluation of CIP. The construction activity is considered as an integral part of LMWP II, and therefore, its evaluation cannot be seen in separation of the evaluation of LMWP II.

The primary purpose of the evaluation is to provide an independent and in-depth examination of the overall progress of LMWP II. This evaluation measures the effectiveness of construction, capacity building approaches, and cost sustainability, and provides a detailed analysis of the major accomplishments, strengths, and weaknesses of LMWP II, indicating lessons learned and providing recommended changes in the design, implementation, or overall programming approach to ensure successful completion of urban water improvements by September 2020. This evaluation was also tasked with identifying any defects to be addressed during the twelve-month defects-liability period, starting after the hand-over in each site.

The evaluation was conducted just as CIP completed construction and entered into the operation phase. With LMWP II halfway through implementation, the findings provide an opportunity for midcourse corrections. The evaluation ultimately will inform the new USAID/Liberia CDCS currently under design by identifying priority areas for future programming in the Liberian urban water supply sector.

As such, the scope of this evaluation encompasses the implementation of LMWP II and CIP from their start dates (September 30, 2016 and February 1, 2016 respectively) to date, i.e. midterm for LMWP II and post-construction phase for CIP. The infrastructure works within the scope of the evaluation include:

1. Four mini water yards, two each in the Sanniquellie and Voinjama systems.
2. Water supplies from Fasa Creek (Robertsport), Bee River (Sanniquellie), Zeliba River (Voinjama) and riverbank wells to convey raw water to the water treatment plants.
3. Water treatment plants in Robertsport, Sanniquellie, and Voinjama.
4. Storage tanks or reservoirs.
5. Hybrid solar and diesel power supply system at the water treatment plant sites.
6. Water distribution system through water kiosks (communal water points).

This evaluation engaged a variety of stakeholders at the national and local levels and was designed to inform more strategic USAID investment, with USAID/Liberia being the primary audience. The

implementing partners of LMWP II and CIP—Tetra Tech and UIP, respectively—were also engaged throughout the evaluation process and participated in the debriefing of preliminary results in Liberia.

In addition, this evaluation included actors in the institutional framework who can benefit from its findings—namely LWSC, MFDP, Local Steering Committees, local government or authorities, and the company to which LWSC contracted day-to-day operation of the sites, PTMC.

EVALUATION QUESTIONS

This performance evaluation answers the following specific evaluation questions (EQs).

Infrastructure Planning, Construction, and Quality

1. To what extent has progress been made in the design and implementation of the three water systems (water treatment plants, distribution systems, and kiosks)?
 - Will the design and construction enable improved water supply access to ninety percent of the population and meet LMWP II objectives?⁷
2. To what extent does the infrastructure conform to specifications and standards? Consider quality assurance by LMWP II and quality, timeliness, and cost-effectiveness by UIP.
 - Identify construction defects that need to be rectified during the defects-liability period.

Capacity Building and Cost Sustainability

3. To what extent will LWSC be able to take ownership of the institutional framework for managing the CIP systems as a result of LMWP II capacity building efforts?
 - To what extent has LMWP II mainstreamed an effective Monitoring & Evaluation (M&E) system at LWSC at the national level and site level to monitor progress against targets? Consider production quality, quantity, and revenue.
 - To what extent will the MOU facilitated by LMWP II and signed between USAID and MFDP support sustainable GOL ownership? To sustain investment required for operating and expanding water supply systems, are the financial projections for cost recovery realistic?
 - What are the lessons learned in the implementation of the institutional framework and the capacity building efforts?

During the inception phase of this evaluation, USAID put forward the request to also review a similar construction project funded by the African Development Bank (AfDB) to assess and identify similarities and differences between USAID and AfDB-funded projects with regards to cost-effectiveness and the institutional framework, i.e. the management and operational model. This comparison is provided under EQ3 in Section IV.

The approach to answering each question, including data sources and the analysis plan, is elaborated in Annex C: Evaluation Design Matrix. The full statement of work can be found in Annex D: Evaluation Statement of Work.

⁷ Given that the evaluation scope does not include LMWP I, i.e. the design of the water systems, it is assumed that *if/when* construction follows the design, it *will* meet LMWP II objectives and realize improved water supply access to ninety percent of the population. As such, the evaluation did not review the design and/or re-assess the design parameters used. The evaluation assessed in each municipality if ninety percent of the population has access to safe water provided by the built infrastructure.

III. METHODOLOGY

OVERVIEW

The evaluation methodology primarily involved qualitative methods, with some secondary quantitative data analyzed. Primary data collection is summarized below in Table I and included the following methods: document review; key informant interviews (KIIs); interviews with consumers and kiosk operators at kiosks; interviews with business owners or administrators at businesses currently or potentially able to be connected to the water network; and site visits for direct observations in Robertsport, Sanniquellie, and Voinjama. Primary qualitative data is supplemented by secondary quantitative data to inform EQ1 and 3, inclusive of available performance indicators and monitoring data and, for cost-effectiveness analysis, financial data and cost models.

In addition, to gather data on selected AfDB-funded projects in relation to parts of EQ2 and 3, the team expanded the methodology to include document review of AfDB project reporting, an additional site visit to Kakata, KIIs, and interviews with consumers and kiosk operators at water vending kiosks. Data collection took place in-country throughout the month of October 2018.

TABLE I: DATA COLLECTION AND SOURCES

METHOD	NUMBER	LOCATIONS	STAKEHOLDERS ⁸
Document Review	58 relevant documents	-	54 LMWP I/II/CIP documents, reports, datasets, and contracts; 1 AfDB report; 3 Liberia broader reports
Key Informant Interviews	45 interviews	15 Monrovia 10 Voinjama 12 Sanniquellie 7 Robertsport 1 Kakata	2 USAID 5 LWSC 1 MFDP SOE Unit 10 PTMC 16 Tetra Tech 4 UIP 3 Local government 4 Local Steering Committee 2 AfDB
Infrastructure Site Visits (WTP, Intake, Reservoir, and Distribution Network)	4 sites	1 Voinjama 1 Sanniquellie 1 Robertsport 1 Kakata (AfDB)	
Business Interviews	10 interviews	3 Voinjama 3 Sanniquellie 4 Robertsport	1 Guesthouse 4 Restaurants 1 Restaurant/Guest house 2 Hospitals 1 Fishery 1 School
Kiosk Operator & Consumer Interviews during Kiosk Visits	17 kiosk operators (18 kiosk visits)	6 (7) Voinjama 5 Sanniquellie 4 Robertsport 2 Kakata (AfDB)	15 (16) PTMC 2 LWSC
	22 beneficiaries	7 Voinjama 4 Sanniquellie 10 Robertsport 1 Kakata (AfDB)	18 Consumers 4 Community members

⁸ Some key informant and business interviews included multiple respondents. Most interviews were with a single group of stakeholders and counted as one interview, though one KII was with three different stakeholders; so, the total number of KII stakeholder groups interviewed is forty-seven and the total number of interviews is forty-five.

EVALUATION DESIGN

QUALITATIVE DATA

Document Review

This evaluation began with a preliminary document review of key project documents, including LMWP II and CIP Task Orders, progress and quarterly reports, and the institutional framework, including the underlying MOU and contracts. This preliminary review allowed the evaluation team to familiarize itself with the country context and project background and was instrumental in contextualizing the evaluation questions, scope, and tools. Once in-country, the evaluation team continued with document review, delving into more details about the various components and agreements of the projects and the role of stakeholders, and focusing on trends and information that required further inquiry. During interviews and meetings with key informants, the evaluation team identified, shared, and reviewed additional documents and site plans. Thus, document review continued throughout this evaluation, totaling over fifty-eight documents, concluding with the AfDB site visit and follow-up readings on their project approach. The full list of reports utilized in this evaluation is detailed in Annex E.

Infrastructure Site Visits

The evaluation team conducted three comprehensive site visits of the various infrastructure in Robertsport, Sanniquellie, and Voinjama to assess for conformance and quality, guided by information from KIIs and document review (e.g. using specification sheets, project designs, and other reports). Given that all infrastructure has been completed, tested, and commissioned, and Tetra Tech rigorously monitored UIP's construction, the evaluation team obtained the bulk of the required data on the quality, timeliness, and cost of the construction works from the document review and KIIs. Direct observations of the works served as a spot-check method to verify issues and remedies highlighted from this primary data collection.

With this purpose, infrastructure site visits included a tour of the facilities (water treatment plants, intakes, reservoirs, and distribution networks), direct observations, and photographing key components of the infrastructure relevant to the evaluation, along with on-site KIIs. The evaluation team conducted a fourth site visit to Kakata at USAID's request to obtain an impression of the quality and operations of AfDB's project.

Key Informant Interviews

Data from forty-five KIIs comprised the main body of evidence for this evaluation. The team verified information and further investigated through follow-up KIIs, document review, and direct observations during site visits. KIIs took place in Monrovia, Robertsport, Sanniquellie, Voinjama, and Kakata. Informants include donors, implementing partners, the private contractor, government officials (current and former, from both local and national levels), and the Local Steering Committee members.⁹

An informed consent statement prefaced all interviews and can be found in Annex G: Data Collection Instruments. The statement explained the study objectives, purpose of the interview, respondent selection, confidentiality measures, and other topics. The evaluation team often split into sub-teams of two to complete interviews.

KII questionnaires addressed all the evaluation questions, and based on the respondent's role, the team focused on specific themes and focused the conversation on those areas. Using this approach, KIIs were semi-structured interviews built around the full KII questionnaire. This allowed for flexibility in the discussions, with the option to probe for certain topics while allowing a natural flow to the conversation.

⁹ The full listing of persons interviewed was submitted separately in line with data de-identification policies.

Most interviews were done by two evaluators to facilitate and probe while ensuring complete and correct notetaking.

The evaluation team drafted an initial list of key informants with input from USAID/Liberia and implementing partners. Additional key informants were identified using the snowball sampling method whereby key informants identified other potential interviewees. Some KIIs turned into group interviews where more than one person joined and provided input in the discussion. The evaluation team recorded group interviews as one interview with multiple respondents.

Kiosk Visits: Kiosk Operator and Consumer Interviews

The evaluation team visited eighteen kiosk visits and conducted interviews with eighteen consumers, four community members, and seventeen kiosk operators to capture a diversity of views on the functionality, affordability, and sustainability of the projects as related to the EQs. To recruit respondents, the team visited kiosks during early morning hours (typical water collection time) and interviewed all adult consumers who were purchasing water and willing and able to speak. All consumer feedback received at a kiosk constituted one group interview. During two kiosk visits, the group interview was expanded to include the views of community members living near the kiosks who were not actively collecting water during the time of the visit.

Consumers at the kiosks and other community members living near kiosks were interviewed about the kiosk services and operations, barriers to access, and the water itself (taste, color, odor, affordability, etc.). The evaluation team also engaged kiosk operators of PTMC, inquiring about the kiosk operations, sales trends, and what feedback, if any, they heard from community members and consumers. These kiosk visits and interviews followed a semi-structured consumer interview guide provided in Annex G: Data Collection Instruments.

Consumer and kiosk operator interviews occurred in all four sites (three USAID, one AfDB). The team selected kiosks for the site visits based on the following criteria: if any issues had been reported, its location in the community (central or on the outskirts), and the number of community members served (whether the kiosks are high density, standard, or mini yards).

Business Interviews

Considering cost projections and expansion (mostly concerning EQ 3), the team also collected data from fifteen business owners and managers as either current or potential water customers. As such, the evaluation team conducted ten business interviews across the three USAID sites following a separate, short questionnaire that inquired about current water source and use, knowledge of the new kiosks, and interest and willingness to pay for water from the new water system. The team identified business owners or managers from private and public sites, including hotels, restaurants, schools, and hospitals. The questionnaire is included in Annex G: Data Collection Instruments.

QUANTITATIVE DATA

Performance Monitoring Data

Primary qualitative data was supplemented by secondary quantitative data, as available, to inform EQ 1 and 3. First, the evaluation used LMWP II monitoring data through the USAID/Liberia Performance Indicator Database System (PIDS), though data for only four of ten performance indicators was available at the time of the evaluation. As such, the evaluation incorporated the secondary data with caution into the analysis.

Second, there are nine performance indicators for the OMC, reported by PTMC to LWSC, with LWSC's direct support at the outstations. In theory, LWSC should then report the data to MFDP. LMWP II provides technical support via an M&E Expert seconded to LWSC for this monitoring. LWSC staff are based in Monrovia and travel to the outstations to collect data for these indicators, yet the first round of

data was collected only recently, in July 2018, and the next round of data will not be collected until November 2018. Thus, OMC monitoring data is new, and its baseline indicators have not yet been established.

Finally, related to capacity building, there is quantitative data collected through the Water Utility Capacity Building Tool (WUCBT), which measures the effectiveness of the capacity building and progress toward improved organizational capacity and performance. While well-designed and fitting into a larger diverse capacity building plan, this self-assessment has only been conducted twice: in January 2018 and again recently in October 2018.

Therefore, given the limited availability and quality of these sources, the evaluation team reduced its reliance on these datasets to answer some of the evaluation topics, and included a number of key informants in discussions to gain a deeper understanding of the work done thus far and future action plans.

Financial Data

For the cost-effectiveness analysis, the evaluation team compared the relative costs of achieving the same outcome (providing clean water to three municipalities) using different interventions (USAID and AfDB-funded infrastructure). The analysis standardized costs and outcome measurement for the two different interventions, allowing the evaluation to indicate the 'per-capita-cost' for both interventions. This process included looking at available financial datasets and reports from both donors and interviewing key informants.

DATA ANALYSIS

The data analysis plan was built around the EQs and themes, ensuring that the data collected could be effectively assessed against the EQs. The data analysis plan is detailed in Annex C: Evaluation Design Matrix. During data collection, the evaluation team maintained a database in Excel to register, by source, important findings, conclusions, and notes for follow-up. This database included information from the document review, site visits, and full transcripts of all interviews.

After each site visit, the evaluation team discussed the information in the database to synthesize implications and meaning. The team charted these as preliminary findings, conclusions, and recommendations into a matrix organized by EQs. This ongoing process helped to uncover remaining gaps in knowledge, identify trends, and highlight areas for further investigation.

With qualitative and quantitative data organized by source and EQ, the team was able to triangulate and verify findings, feeding into verifiable conclusions and realistic recommendations. Qualitative data presented in this report was de-identified to ensure respondent confidentiality. It was aggregated but not quantified.

LIMITATIONS

The evaluation team encountered the following limitations and risks during this evaluation, listed in the table below with the mitigation strategy employed to ensure data quality and a holistic evaluation design.

TABLE 2: EVALUATION LIMITATIONS

LIMITATION	RISK	MITIGATION STRATEGY
Transition of government, followed by a period of 'no decision-making,' a halting of any public procurement, and the replacement of key staff impacted the level of familiarity/knowledge of a number of key informants.	New government staff in place will not have historical knowledge of the intervention.	The team identified and interviewed former government staff from LWSC who were involved with the activity (and met with new LWSC staff).
Limited availability and quality of M&E data (e.g. PIDS, WUCBT).	Progress to date is challenging to assess, especially in relation to the capacity building plan.	The team interviewed key informants involved in these processes to gain a deeper understanding of the work done to date.
Limited AfDB data available for cost comparison purposes, namely for EQ 3.	Examination of cost-effectiveness between the AfDB and USAID models cannot be as in-depth as initially planned.	The team interviewed a variety of key informants involved in AfDB project implementation and carried out a site visit to better understand cost-effectiveness on paper and the realities on the ground.
Primary collection of quantitative data and structured surveys are beyond the scope of this evaluation, but the beneficiary perspective is still relevant to answering the EQs.	The beneficiary perspective would not be represented in the evaluation.	Qualitative consumer interviews were conducted by convenience sample (e.g. who is available at the kiosk) to capture consumer perspectives. The sample is not representative of the communities; thus, results provide a glimpse of the situation and are not meant to be scalable across entire communities.
Water treatment plants (WTPs) are only recently operational; thus, water production and sales were only ongoing for a few weeks (Sanniquellie) or a few days (Voinjama) at the time of the site visits.	This may result in limited customers found at the kiosks.	The team also spoke with kiosk operators (who are from the communities) to gain an understanding of community awareness, sales trends, and triggers/barriers for people to buy water.
This evaluation took place during the rainy season, a time when free alternative water sources are common.	This may result in low demand of the new water source and fewer customers present at the kiosks.	Via consumer and business interviews, the team worked to understand the use of alternative water sources, triggers/barriers for purchasing water, and the potential for more customers in the dry season. This helped to better understand demand and cost projections.

IV. FINDINGS AND CONCLUSIONS

INFRASTRUCTURE PLANNING, CONSTRUCTION, AND QUALITY

EQ 1: To what extent has progress been made in the design and implementation of the three water systems (WTP, distribution systems, and kiosks)?

FINDINGS

This question addressed the outputs of CIP's Task Order Award Section C.2.2 of Construction & Performance Requirements, whereby USAID contracted UIP to execute the construction. LMWP II and CIP successfully completed the implementation of the WTPs, distribution systems, and kiosks in all three project cities of Robertsport, Sanniquellie, and Voinjama.¹⁰ Despite delays in construction and current outstanding issues (both covered in more depth in EQ 2), all construction works have been completed and handed over to LWSC, and infrastructure in all three sites is operational. In 2018, completed works were handed over in Robertsport (July 5), followed by Sanniquellie (September 6) and Voinjama (September 27).

As further discussed in EQ 2, poor road conditions during the rainy season, delayed material delivery from the Liberia Port Authority, and a lack of mitigation for these challenges during procurement were the main causes of late completion after April 2018. Initially, LMWP II and CIP planned to use locally-produced filter media for all three sites, but the quantity was not sufficient, so all the local materials for filter media intended for the three sites were installed in Robertsport. As Robertsport's WTP is smaller and needed fewer materials, testing and commissioning was able to start on schedule while Sanniquellie and Voinjama waited for the imported materials. Moreover, the evaluation found that improper installation of filter media in the slow sand filters in all three sites resulted in high water turbidity levels that needed to be rectified, which contributed to additional delays in Voinjama and Sanniquellie. Due to its smaller capacity and better raw water¹¹ turbidity – thus needing less time to meet the required turbidity limit – Robertsport was the first project city to receive safe water supply.

The completed works include twenty constructed kiosks in Sanniquellie (fifteen standard, three high density, and two mini yards), seventeen in Voinjama (eight standard, seven high density, and two mini yards) and ten standard kiosks in Robertsport.¹² There are three constructed and fully functional WTPs in the projects sites that supply water from Fasa Creek (Robertsport), Bee River (Sanniquellie), and Zeliba River (Voinjama). In addition, the water transmission, treatment, storage, and distribution network convey the treated water by pumping to the storage tanks (reservoirs)¹³ and distributing water to the kiosks for consumer access. This network includes the main distribution pipes and all associated valves, hydrants, concrete public metered kiosks, and appurtenances.

¹⁰ The design of the water systems was completed under LMWP I.

¹¹ The WTP in Robertsport uses water from a creek flowing out of rocks from the top of a mountain.

¹² Standard kiosks contain three water taps, whereas high density kiosks have ten taps (five taps on the backside and another five taps on the front). While kiosks provide an area to distribute water treated at the WTP, a mini yard consists of a borehole and the treatment and distribution process for this water.

¹³ One each in Voinjama and Sanniquellie and two reservoirs in Robertsport.

EQ IA: Will the design and construction enable improved water supply access to 90 percent of the population and meet LMWP II objectives?

FINDINGS

The evaluation findings suggest that LMWP II and CIP did not fully achieve the target of this objective, mainly because of population growth in the three sites. In examining the population with improved water supply access in all three sites, the evaluation also noted other potential factors related to kiosk locations, M&E data, and community views.

According to the LMWP II Monitoring, Evaluation, and Learning Plan (MELP), the main outcome indicator for demonstrating progress towards the goal is “percent of the population with access to basic or safely managed drinking water services which provides potable water as a result of United States Government funding.”¹⁴ However, PIDS currently offers no data on this indicator except specifying a forty-four percent baseline in Robertsport. Thus, this evaluation assessed coverage by reviewing available quantitative data¹⁵ and discussing with key informants on the ground.

According to the MELP,¹⁶ this indicator is calculated using four variables from satellite imagery and population data:

- a) Estimates of the total number of households within 500 meters of a water kiosk per latest available satellite imagery (e.g. “basic” access);
- b) Utility records of household connections (e.g. “safely managed” access);
- c) The average number of persons per household according to a baseline survey conducted in each target city; and
- d) The total population of each city.¹⁷

Though not included in the calculation, according to the MELP, this indicator also considers water production and quality. If the kiosk water does not meet GOL quality standards¹⁸ and/or a kiosk is not producing enough water,¹⁹ then the indicator (percent access) would be misleading.

Satellite imagery – the first household figure needed in the above calculation – has value in highlighting areas with or without coverage, especially over time, and is useful for planning pipeline extensions (e.g. for household connections), but cannot be used exclusively to determine coverage. However, given the satellite mapping estimates as well as the assumptions associated with population growth, a numeric value for the variability/uncertainty of improved water supply access to ninety percent of the population cannot be determined easily. By considering this information and weighing qualitative evidence (e.g. discussions about coverage; site visits and kiosk visits), the evaluation infers that given the geographical location of

¹⁴ LMWP II MELP, Revised January 5, 2018.

¹⁵ Data included the 2012 Master Plans, 2018 MELP, and 2014 Baseline Survey as referenced in cost-related assumptions made for the MOU (August 2015).

¹⁶ LMWP II MELP, Revised January 5, 2018; LMWP II plans to validate their satellite imagery through household surveys in March 2019.

¹⁷ Projections based on “Liberia’s 2008 Population and Housing Census. It is not possible for LMWP II to verify the accuracy of the 2008 Census report, which includes a disclaimer that ‘Census data are prone to content errors’” (MELP, 2018).

¹⁸ “The water source must have been provided by LMWP II / CIP and it must provide water that is ‘potable.’ For this indicator, ‘potable’ is defined as a water source that is free from fecal coliform and arsenic contamination as verified by regular water quality testing at the point of distribution per LWSC/LMWP proposed water quality assurance sampling plan, including utilization of chlorine residual testing as proxy for fecal coliform testing” (MELP, 2018).

¹⁹ “The service must be able to consistently (i.e. year-round) produce 20 liters per day for each person counted as ‘gaining access.’ This amount is considered the daily minimum required to effectively meet a person’s drinking, sanitation, and hygiene needs” (MELP, 2018).

kiosks, only Robertsport's kiosk distribution network meets ninety percent access, while Sanniquellie and Voinjama are slightly short of ninety percent.

LMWP II and CIP did not fully achieve the target of this objective mainly because of population growth in the three sites. This evaluation considers three types of population growth, as described below in relation to the three sites: creation of new communities, expansion of existing communities, and natural population growth within existing communities. Only natural population growth was taken into account in initial coverage mapping plans to decide kiosk locations, yet there were fewer and/or smaller communities during design than now, which puts some residents out of reach of kiosks, thereby lowering the coverage rate. Types of population growth that occurred in these three sites include:

- **Creation of new communities:** Respondents reported that after the design of CIP, families moved from other areas to these sites, establishing new communities. The fact that these communities did not exist at the time of the design reflects why they are therefore not captured in this project's coverage. This was particularly noticed in Voinjama, where some new communities were located more than 500 meters from the nearest kiosk.
- **Expansion of existing communities:** As common in many residential areas, the evaluation realized that some communities captured in the CIP design have grown into a larger geographical size (e.g. outward expansion). This expansion has placed many residents out of the targeted thirty-minute round-trip to the kiosks. This is the case in all three sites. Expansion of existing communities away from kiosk locations was reported in Sanniquellie and Voinjama, while in Robertsport, expansion of existing communities (e.g. Kru Town) spread outwards along the water, but residents are still within thirty minutes round-trip. October 2018 survey mapping results of all three sites clearly show communities that are on/off the main distribution lines or near kiosks, highlighting these gaps.²⁰
- **Natural population growth within existing communities:** Only this third type of growth was accounted for in project design and cost recovery projections. LMWP II used data from the 2008 Liberian census²¹ to calculate the expected population of the three cities over time, based on natural growth, to feed into water supply-demand and coverage calculations.

On top of this, pre-existing communities in Sanniquellie were reportedly not included at the time of project design on the grounds that the main water distribution lines would not pass in their direction. There are at least five communities in Sanniquellie²² that are not on the main distribution line, and kiosks are only constructed where main water distribution lines are available. Thus, the evaluation found these communities remain without access.

Additionally, USAID cut some portions of the budget from the original plan, which may have negatively impacted the extent of the distribution network and reduced the number and coverage of kiosks constructed as compared to what was initially anticipated. Lack of access for some residents in the sites is also because some kiosks are thirty to forty-five minutes round-trip. Some residents believe that thirty minutes round-trip still represents a long distance to cover to collect safe water for household use. Jerry cans and other containers are heavy when full, and the terrain can be hilly in some cases, like in Voinjama.

²⁰ Tetra Tech, Inc. (2018, October). Individual Connection Survey Report (maps and data).

²¹ Liberia Institute of Statistics and Geo-information Services (LISGIS). (2009, May). Republic of Liberia 2008 National Population and Housing Census Final Results.

²² College View, Farongolo Street, Nenpa, Dahnlopa, Peace Community

The opinions of community members heard during data collection²³ suggest that they would prefer coverage to ensure a distance of less than twenty minutes. However, it is important to note that the WHO Joint Monitoring Programme (JMP) drinking water ladder²⁴ sets a threshold of thirty minutes round-trip collection time including queuing, so this portion of the GOL threshold is in line with global indicators as well as with project targets.

Consumers mentioned in all three sites that the water is affordable, and there is high satisfaction with its quality/taste. Yet during kiosk visits, the evaluation team observed that only few people collect water from the kiosks compared to the population size. This can be attributed to the fact that alternative water sources are available particularly during the rainy season, such as full creeks and wells, which residents have become accustomed to using for many years without cost. In this case, households might purchase only drinking water from the new kiosks and rely on free water from creeks and wells for other purposes like cleaning, thus resulting in lower revenue for providers of piped water. However, some consumers met at the kiosks bought the kiosk water for all household needs, including drinking, cooking, and bathing.

Since Robertsport began operations sooner, trends in kiosk utilization and revenue generation appear to be improving over time. There, the expanding community of Kru Town does not have its own kiosk (though kiosk visits showed that at least some Kru Town residents live ten to twenty minutes round-trip from a kiosk). Kru Town has significant fishing and commercial activities based on bartering. One informant shared a story of someone in Robertsport who buys water from the kiosks, then trades it in Kru Town for fish from the fishermen, who keep the water with them and take it out on the boats for drinking while they fish.

To promote demand for clean water and use of the kiosks, the Local Steering Committees in each site and LMWP II carry out various types of outreach, such as radio talk shows and awareness sessions with the communities. This ongoing community outreach has led to community awareness and interest in the kiosk water, as illustrated during evaluation site visits and data collection. Moreover, based on KIs and documents reviewed (e.g. 2018 survey data²⁵), community demand for household connections is high – taking access a step further beyond communal kiosks. The recent survey shows high interest in but low ability to pay the upfront cost of installing the household (HH) connections.

Businesses are also interested in direct water connections, but ability and willingness to pay depends on whether the business is privately owned or government owned. The former may generate enough revenue to cover their costs, whereas government-owned businesses may expect costs to be fully covered or at least subsidized. It is worth noting that there are government-owned businesses interested in improved water supply and access, as schools in Sanniquellie and Voinjama are not connected to any water supply network, and the government hospitals in all three sites reported inconsistent water supply during the dry season. In Robertsport, at the time of the evaluation, a private school was paying PTMC to lay pipes to connect the school to the LWSC water network. Individual (household and business) connections in the three sites are an ideal way to further expand this activity to generate more revenue while providing clean water directly to families and facilities for their use.

To achieve household and business connections, all stakeholders involved must prioritize and plan how to realize household connections. Without densifying the existing piped network by providing secondary and tertiary distribution lines, it will be costly for consumers to singlehandedly fund household connections. This leaves high uncertainty as to whether or not household connections are possible for houses far from

²³ These consumer interviews were not collected using a representative sample of community members in the three sites, so results should be interpreted with caution. Also, available literature presents evidence of mis-estimation in self-reported collection times.

²⁴ World Health Organization (WHO) / UNICEF / Joint Monitoring Programme (JMP). (2018). Drinking water. Retrieved from: <https://washdata.org/monitoring/drinking-water>

²⁵ Tetra Tech, Inc. (2018, October). Individual Connection Survey Report (maps and data).

the current main distribution lines without densification of the existing network. Presently, many homes that are not around the main distribution line will not be able to easily achieve HH connections due to such distance. To get many homes connected without secondary distribution lines makes HH connection difficult and expensive for residents. Under this condition, a household seeking connection will have to shoulder added cost based on their HH's distance.

Finally, regarding water quality, there is a routine water quality monitoring system in place, conducted by the water laboratory technicians in the three cities with LMWP II support. Water is tested twice daily checking for turbidity and chlorine levels.²⁶ Samples of water are collected from the treatment plant and the kiosks every morning – and again from the WTP every evening – for testing in the on-site laboratory. This process serves as a means of monitoring the turbidity level and overall quality of the water in an effort to ensure distribution of potable water. Through this rigorous process, partners ensure that when 'safe' kiosk water is marketed and sold, it is in fact clean and safe for drinking and all other purposes.

CONCLUSIONS

LMWP II and CIP successfully completed the design and implementation of the WTPs, distribution systems, and kiosks in all three project sites of RobertSPORT, Sanniquellie, and Voinjama by the time of this evaluation. All construction works have been completed under CIP, handed over to LWSC, and the three sites are operational with continuous LMWP II support.

The activities did not fully achieve the target of ninety percent coverage of the population in Sanniquellie and Voinjama, but likely achieved the target in RobertSPORT. The lag in coverage for the first two sites is potentially due to in-migration and expansion of existing communities that increase the amount of the population outside the thirty-minute roundtrip threshold for kiosks. Building a few more kiosks in the two sites that are not likely to have achieved the target could expand access to meet the ninety percent objective. However, it is worth noting that in all sites, expanding household connections rather than kiosks would contribute to better revenue collection by providers, assuming the availability of infrastructure and willingness and ability of consumers to pay. Revenue collection and cost recovery can also be enhanced by further increasing demand for kiosk water. This can partly be done by continuing and increasing community outreach efforts that have already been put in place to raise awareness about promoting health through consumption of safe drinking water from kiosks.

EQ 2: To what extent does the infrastructure conform to specifications and standards? Consider quality assurance by LMWP II and quality control, timeliness, and cost-effectiveness by UIP. Identify construction defects that need to be rectified during the defects-liability period.

FINDINGS

The infrastructure at Voinjama, Sanniquellie, and RobertSPORT is of good quality and largely conforms to the design specifications and standards outlined in the construction documents.²⁷ There are no defects or malfunctioning equipment, only minor deviations in implementation dictated by the realities on the ground, but they do not affect the quality objectives. At the time of the evaluation, there were no unresolved infrastructure quality issues, only outstanding issues to finalize that also do not affect quality objectives.

One deviation from the design included laying of the distribution pipes. Obstacles such as tree trunks, large boulders, or unresolved land property issues required deviation from the original pipe trajectory. In

²⁶ Utilization of chlorine residual testing as proxy for fecal coliform testing.

²⁷ CIP Task Order Award: “[A]”all works [should] adhere[s] to the applicable standards and specifications detailed in Attachment J.1 Technical Specifications, and J.2 Drawings, for all construction methods, materials labor, equipment, and testing.”

Robertsport, land-property issues meant that one or two water vending kiosks had to be built in slightly different locations from where they were planned in the design. The most significant deviation took place in Sanniquellie, where the pipeline crosses the railway twice. In the original design, the pipes were to be drilled through the embankment underneath the railway. The railway authorities did not allow this so UIP routed the pipes through sleeves through existing culverts.²⁸ Tetra Tech carried out additional calculations to verify that the pipes will not negatively affect the culverts' storm water drainage capacity.

Although UIP carried out the construction works, Tetra Tech maintained a prominent advisory role by serving as the quality control (QC) contractor and performed well by ensuring that all CIP activities fulfilled the requirements for quality and conformed to the design technical specifications.²⁹ Part of QC included daily progress reports, weekly meetings and reports, and monthly reports to ensure regular monitoring and follow-up.

As stipulated in the United States Federal Acquisition Regulation (FAR), the QA/QC contractor does not have formal authority to order changes or a "stop work."³⁰ Thus, Tetra Tech had no direct management over UIP and both partners coordinated through USAID to resolve issues. Tetra Tech recognized that this arrangement delayed work. However, USAID must adhere to the FAR and has been responsive to partner needs and implementation progress through quick follow-up.

Nonetheless, the management structure presented a few challenges. The design of the three water systems were prepared by Tetra Tech under LMWP I and the evaluation did not find evidence that the water systems have been reviewed and verified by an independent, third party. As a result, UIP and Tetra Tech key informants agreed that the design was not detailed enough and left too much room that could potentially allow for a contractor to cut corners. UIP further indicated that Tetra Tech did not provide enough clarity and guidance, and UIP had to proactively seek more information and specifications from them. UIP sees that this situation overall created avoidable confusion, especially related to the slow sand filters.

Regarding timeliness, the construction works were substantially completed on time by April 2018. All three sites had a ninety-five percent or higher infrastructure completion rate in March 2018, but ultimately, aside from outstanding issues, the supply and quality of the filter sand and gravel delayed acceptance, or hand-over, of all three sites. Procurement, importation, and delivery delays regarding acquiring gravels from Egypt (e.g. supply chain issues and bad roads) led to significant delays in hand-over, particularly in Sanniquellie and Voinjama. Moreover, during testing and commissioning of the slow sand filters, GOL water quality standards in all three sites were not initially met. The rectification process took several months of flushing the filters to achieve water quality parameters.

In Robertsport, testing and commissioning took place in February 2018, but the site only met water quality requirements (including producing water with a turbidity of less than 2 NTU) after 103 days of flushing.³¹ Following a successful final test in May 2018, LWSC provided a certification in June 2018 that the water

²⁸ See, "Drawings Issued for Construction nos. LMWP-C-SI 10 and LMWP-C-SI 16," for details.

²⁹ Quality Assurance (QA) is the assurance system or mechanisms to control, check for and/or manage quality. Here the evaluators discuss Tetra Tech's role in Quality Control, which is the act of controlling or enforcing the QA system/mechanism.

³⁰ As is, for example, the case when working according to FIDIC contracts and terms.

³¹ According to one key informant, "The turbidity level for a municipal water system for major size town should be under 1 NTU. It was not cost effective in our setting in the three cities to set the turbidity at 1 NTU. Designing a system for 2 NTU was determined to be a good compromise."

filtered through Robertsport WTP meets national standards.³² USAID provided the Partial Substantial Completion (PSC) certificate to UIP for Robertsport WTP shortly afterward, and PTMC started operating the facility in July 2018.

In Sanniquellie, testing and commissioning was carried out in March 2018 with only two of the three sand filter basins completed. Completion of the third basin was pending the delivery of the bottom gravel layer from Egypt. Since the sand media in two basins was installed without properly cleaning it beforehand, additional flushing was required in Sanniquellie to meet water quality requirements. As a result, the PSC certificate was issued and the facility handed over in September 2018.

In Voinjama, testing and commissioning of the major infrastructure works was performed in May 2018. The delayed delivery of gravel from Egypt and installation of dirty sand media also affected the Voinjama WTP. This required extended flushing and delayed the final hand-over, which took place in September 2018, following the issuance of the PSC and LWSC certificates.

As mentioned, there are no defects in the infrastructure works, but there were outstanding issues at the time of the evaluation that, according to UIP, have since been resolved. As of November 2018, issues included:

- In Voinjama, external painting, Epoxy painting and other quality issues listed in the operations and maintenance (O&M) activity tracker;
- In Sanniquellie, Epoxy painting, delivery of more sand filter media and materials for leak repairs, planting of grass around the site to control soil erosion, proper backfilling and compaction of eroded areas along the pipe lines, and various repairing of leakages; and
- In Robertsport, repairing leakages and procurement and delivery of additional filter media materials for the O&M phase.

A more detailed list of these outstanding issues is presented in Annex H.

CONCLUSIONS

The infrastructure largely conforms to specifications and national standards with only minor deviations from the design and outstanding issues to finalize, neither of which currently affect the infrastructure quality objectives.

Lack of mitigation for procurement, importation, clearing processes, and poor road conditions led to delayed arrival of materials on-site. Combined with the fact that water turbidity only reached acceptable levels after prolonged flushing and testing, this ultimately led to a delay in the hand-over of the facilities.

CAPACITY BUILDING AND COST SUSTAINABILITY

EQ 3: To what extent will LWSC be able to take ownership of the institutional framework for managing the CIP systems as a result of the LMWP II capacity building efforts?

³² According to one key informant, “The GOL has been relying on World Health Organization (WHO) standards and the 1987 Liberia Drinking Water Quality Standards (prepared for the GOL by the UN Department of Technical Cooperation for UNDP) as the benchmark for drinking water quality guidelines in Liberia. Since 2015, the GOL has initiated a process of defining specific standards for key parameters of interest for regular testing and monitoring within public utilities and for drinking water service providers. So far, the process has not produced any definite results.”

FINDINGS

Given the set-up of the institutional framework, whereby a private contractor (PTMC) is operating the CIP systems, LMWP II's capacity building efforts have been to both LWSC and PTMC, tailored to their respective roles and responsibilities. PTMC receives heavy support in day-to-day management of the facilities, while LWSC receives capacity building on a broader scale. Ultimately, LWSC is currently unable to take ownership of the institutional framework for managing the CIP systems, but this can improve with continued capacity building efforts and advocacy towards LWSC leadership for buy-in and financial transparency

LWSC has a prominent, central position in the institutional framework, as this state-owned enterprise owns and manages the urban water and sanitation systems in Liberia. Accordingly, all three LMWP II outstations have been handed over to LWSC after completion. Notably, the institutional framework includes a private, commercial outstation operator.³³ This operator is contracted by LWSC (with LMWP II support) through an OMC. The intention was to have one different operator for each outstation, as this would encourage competition, but at present, one operator (PTMC) manages all three outstations. PTMC thus manages the sites on a day-to-day basis, whereas LWSC's role is more as a contract manager at the national level.

Based on this set-up, in terms of capacity building at the outstations, LMWP II provides essential daily mentoring, training, and support to PTMC, including developing O&M manuals with standard operating procedures (SOPs) and training and supporting the operator to implement these SOPs. PTMC staff at the outstations (both at the WTP and kiosks) have received training in solar plant operational maintenance; health, safety, and environment at water utilities; and water quality management, among others.

To LWSC, LMWP II has, according to its Capacity Building Plan,³⁴ provided support to establish institutional tools and procedures to increase cost recovery at the three project cities' utilities, conducted capacity building training to increase the knowledge and skills within LWSC to manage and operate utilities, supported the LWSC M&E department, and arranged for a Twinning program between LWSC and the National Water and Sewer Corporation of Uganda. In fact, in October 2018, Uganda's National Water and Sewer Corporation staff visited the three outstations and participated in a learning event in Monrovia.

The LMWP II Capacity Building Plan outlines all the steps that they plan to take, and it is clear from key informants, site visits (both USAID and AfDB), and the latest Robertsport WUCBT report³⁵ that more work needs to be done to achieve this objective of ownership. At the outstation level, organizational capacity gaps include lack of understanding by PTMC staff on SOPs, roles, and responsibilities regarding technical, commercial, and administrative services. Regarding organizational performance, Robertsport – the first site handed over – showed average progress towards achieving targets at just thirty-five to fifty-four percent. The next round of WUCBT monitoring will reveal progress from late 2018, and should be applied, as necessary, to readjust the Capacity Building Plan.

However, capacity building efforts have been met with challenges at both national and outstation levels. With the change of government administration, LWSC's senior management was replaced in the first half of 2018. This new leadership is resistant to the institutional framework because it feels bypassed by the installation of the private contractor. As a result, capacity building efforts at central level were stalled for almost nine months (last quarter 2017, and first and second quarters 2018). The new LWSC leadership has little experience in the sector and are unaware of the discussion, negotiations, and achievements

³³ This is different from the set up in Monrovia and the three AfDB project-sites which don't use a private contractor. LWSC manages those sites directly.

³⁴ Tetra Tech, Inc. (2017, September 7). LMWP II Capacity Building Plan.

³⁵ Tetra Tech, Inc. (2018, October 30). Water Utility Capacity Building Tool Report: Robertsport Aug 1 – Sep 30 (draft).

surrounding the institutional framework. Therefore, the question is not so much to what extent LWSC will be *able* to take ownership of the institutional framework, but to what extent are they *willing* to take ownership given the scepticism of the new leadership.

This transition resulted in a period of several months in which progress was hampered and no decisions were made because old management staff had been removed and new staff not yet appointed. For example, the private operator had already been selected in January 2018, yet the OMC was only attested by the Minister of Finance and the Minister of Justice in June 2018. Also, LWSC's Board of Directors has not endorsed the proposed tariff structure in part because there is not yet a new Board appointed. Moreover, key experts from LWSC and even MFDP are detached from those very organizations, viewing themselves as consultants or technical experts. This creates friction within LWSC that may also make ownership – with a unified front – challenging.

Furthermore, the institutional framework foresees that the Local Steering Committee serves as a liaison between LWSC, the local government, and the community (as consumers). During construction, the three Local Steering Committees took their responsibilities seriously and generally performed well. They informed communities about the project and dealt with or transferred customers' concerns and complaints to the appropriate stakeholders. Most of the time, they liaised with LMWP II rather than with LWSC during the construction phase.

With the project now transitioning into operation, maintenance, and management of the new systems, the position of the Local Steering Committees has become somewhat unclear to them. They still have a relevant role to play – for consumer-representation and advocacy – but at this stage, they seem to be struggling to define and/or take on this role. Apart from representing the consumers, Local Steering Committees can also have a significant role in supporting LWSC in contract management and monitoring the performance of the operator. However, at the moment, this capacity is not being utilized, and there is little interaction between LWSC and the Local Steering Committees largely because LWSC, with whom they formally have the Charter, is not present at the outstations.

According to LWSC's agreement with the AfDB for their projects, AfDB handed over all completed water supply sites directly to LWSC without a private contractor. The operational model used to manage those completed AfDB sites is different than the model presented under the USAID institutional framework. This comparison is further discussed under EQ 3C. However, a key point about costing is relevant to this EQ. Kiosk operators at the AfDB sites are not employed by LWSC and do not receive salaries; rather, the kiosks were built on private land, and the land owners are manning the kiosks, selling water at a profit. They pay a fixed rate of one Liberian Dollar (LD) per jerry can to LWSC and are supposed to sell for five LD per jerry can, similar to the USAID-funded kiosks. However, some kiosk operators charge up to twenty LD per jerry can, pocketing the profit. LWSC's inability thus far to protect consumers in this market also brings into question their ability to effectively manage the CIP systems.

Ultimately, PTMC is operating the facilities but with poor working hours that risk burnout.³⁶ In Voinjama, the kiosks had just opened at the time of the evaluation visit in October 2018, though both Voinjama and Sanniquellie are following the same schedule: kiosks are open Monday through Saturday from 7am-7pm and closed for a lunch break since most consumers collect water in the early morning or late evening. On Sundays, kiosk operators said they open from 7am until about 9 or 10am (before church).³⁷

In Robertsport, the kiosk operators have had several months to adapt and adjust to an improved schedule: kiosks are open Monday through Friday from 7am-7pm and closed 11am-2pm. On Saturday and Sunday,

³⁶ After the evaluation took place, LMWP II noted that they have revised the kiosk operators' working hours and will be aligned with the Liberian labor law starting in January 2019.

³⁷ This information could not be verified in Voinjama, where operations started directly after the evaluation site visit took place.

the kiosk operators work from 7am-1pm only, taking a half day. These hours allow the kiosk operators time off to rest and do other things, yet the model currently being used in the other sites puts strain on the PTMC staff. Nonetheless, these long working weeks are reportedly in violation of the Liberian Labor Law, and without full days off, kiosk operators and other PTMC staff, such as kiosk supervisors, risk overworking.

EQ 3A: To what extent has LMWP II mainstreamed an effective M&E system at LWSC at the national level and site level to monitor progress against targets? Consider production quality, quantity, and revenue.

FINDINGS

Accurately evaluating LWSC's M&E system is hindered for two reasons: 1) LWSC only carried out one round of monitoring in July 2018 at the national level, so the LMWP II-specific findings are slim, and the evaluation cannot examine the quality or effectiveness of the M&E data; and 2) day-to-day monitoring that concerns production quality, quantity and revenue are led by PTMC, not LWSC, at this time.

Based on the set-up from the institutional framework, PTMC staff, trained by UIP, carry out day-to-day management and monitoring of the water quality, quantity, and revenue, whilst LWSC's M&E responsibilities focus more on managing data at the national level. Thus, LMWP II's efforts to streamline an effective M&E system have been at the national level with LWSC. In Monrovia, LMWP II is supporting an M&E Specialist seconded to LWSC, who is responsible for reporting on the Performance Contract indicators (based on the OMC) and supporting/training LWSC's M&E Unit. This M&E Unit has grown but is still limited in human capacity, financial, and logistical resources needed to visit the outstations as often as needed. With LWSC no longer present at the outstations,³⁸ day-to-day work and monitoring is left to PTMC.

This missing presence could indicate little interest or commitment from LWSC, but limited financial resources also plays a significant role. Both factors enforce the other: the fact that the new leadership of LWSC is not fully convinced about the institutional framework and feels somewhat bypassed by the engagement of a private operator makes them reluctant to supply resources to these three outstations, especially given that resources are scarce.

On the other hand, given that the envisioned M&E system foresees a thorough verification by LWSC of the day-to-day monitoring data provided by PTMC at the end of every quarter, ongoing LWSC presence may be unnecessary. As part of verification of the monitoring data, LWSC M&E staff verifies the provided data and bank statements and then travels to the three outstations to discuss findings and deviations with the operator.³⁹ This process seems to produce verifiable data; however, the outstations have only been operational since July (Robertsport) and September (Voinjama and Sanniquellie), so monitoring and evaluating their operational performance (including water quality, quantity, and revenue) has only just started. LWSC carried out the first round of quarterly monitoring in July 2018, and the next round is planned for November 2018.

EQ 3B: To what extent will the MOU facilitated by LMWP II and signed between USAID and MFDP support sustainable GOL ownership?

³⁸ During construction, LWSC engineers were present at the three outstations, but they have since been called to Monrovia either for training or to undertake new jobs; thus, until now, LWSC staff has not returned to the outstations.

³⁹ In addition, Local Steering Committees are part of the monthly sustainability monitoring meetings.

FINDINGS

The MOU between USAID and the GOL, signed in August 2015, describes the intended responsibilities of USAID, LWSC, and MFDP. The MOU itself is a potentially beneficial document if it had the weight to keep all parties liable to their commitments, yet so far, MFDP is not following through on paying their portion of the agreed subsidies. Since signing the MOU, two of the three signatories are no longer in their position and have been replaced: the Minister of Finance and Development Planning and LWSC's Managing Director. These issues with payment and ownership challenge GOL's transition into sustainable ownership.

Apart from the functional, operational, and managerial responsibilities, the MOU stipulates the financial arrangements, i.e. subsidies for the operation of the three water systems until revenues equal or exceed O&M costs. This break-even point is estimated to take from three to seven years from the start of the operations; however, the timing highly depends on the actual growth in the sales volume and on the tariff rates and efficiency of collections (see also EQ 3C). According to the MOU, subsidies will be shared between USAID and GOL, as follows:

- One-hundred percent of System Based Operating Expenses⁴⁰ subsidized by USAID in year one and year three;
- Shortfall of Operator Based Expenses⁴¹ minus revenues subsidized by USAID at fifty percent in year one and twenty-five percent in year two; and
- One-hundred percent of both Shortfall of Operator Based Expenses minus revenues and System Based Operating Expenses subsidized by GOL from year three onwards.

At the time of the evaluation, a few months into year one of operation, the GOL has not disbursed any subsidies. As a result, LWSC has not been forthcoming⁴² in paying the operator for its services. This has created a situation whereby PTMC is not capable of paying all its staff (at the WTP, and kiosk operators and supervisors), and not capable of providing support facilities to the sites, such as desks, chairs, and motorcycles to facilitate the work. PTMC staff in Robertsport waited several months until the PTMC Monrovia office payed salaries and provided support facilities, while the recently-opened outstations (Sanniquellie and Voinjama) are beginning to face the same problems. This situation presents a major concern: if it continues for long, PTMC staff may become demotivated. Potential low performance or turnover resulting from that may mean that LMWP II, both Tetra Tech and UIP in this case, would need to repeatedly train new PTMC staff.

Moreover, the subsidy arrangements in the MOU only cover the first two years of operation. From year three onwards, all subsidies required to manage, operate, and maintain the three outstations will need to come from GOL. Given that they are not meeting the current commitment to pay half the subsidies, it is likely they will not be able to cover the full amount from year three, creating a rift in sustainability, despite that the overall subsidy amount should decline over the years.

In addition, the OMC is only for three years; it is unclear how the outstations will be managed after. With LWSC presently discontent with the institutional framework and the involvement of a private operator, it is uncertain if they intend to extend or renew the contract after the initial three years. If this will not

⁴⁰ System Based Operating Expenses are expenses for operating the water system, such as for repair and maintenance and for water treatment chemicals. Details are available in the Outstation Management Contract.

⁴¹ Operator Based Expenses are (fixed) expenses for the operator to operate, such as salaries and office equipment. Details are available in the Outstation Management Contract.

⁴² The evaluators consciously do not state that "LWSC is not able to pay the operator" as LWSC could possibly re-allocate available budget, i.e. modify budget-lines in their books, to pay the OMC. The malcontent of LWSC senior management with this operational model, i.e. having a private operator at the outstations, may also play a role here.

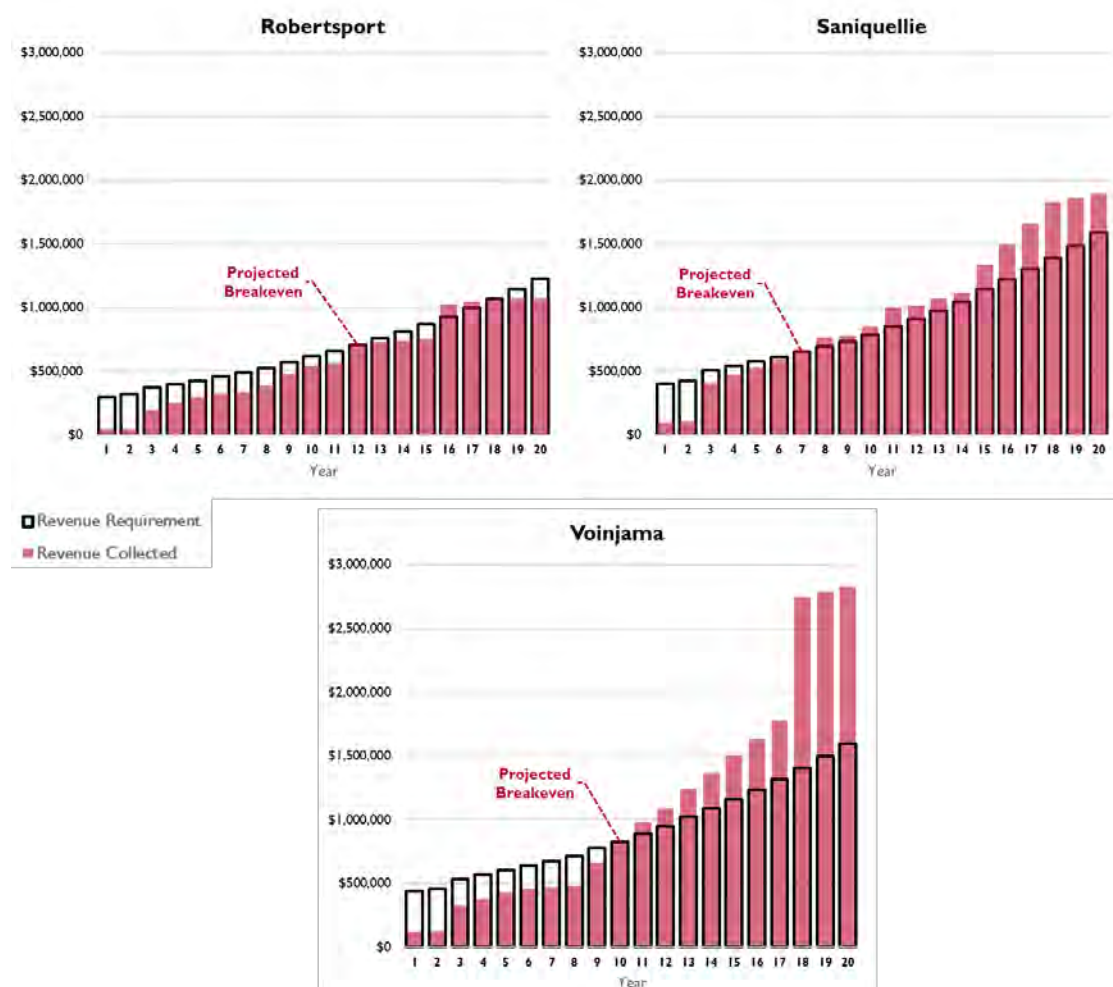
be the case, it would be good to have, at least, PTMC staff—who have been trained and by then would be experienced in operating the water systems—absorbed by LWSC as staff to leverage the benefits of capacity building efforts during LMWP II by hiring capable staff at the end of the OMC. LWSC could also consider adopting the Ugandan model of an internally delegated management contract with its own ring fencing.

EQ 3C: To sustain investment required for operating and expanding water supply systems, are the financial projections for cost recovery realistic?

FINDINGS

LMWP II developed a Cost of Service (COS) model to provide estimates of the cost recovery period and consequently the subsidies required. The model is iterative, and its outcome depends on the input, i.e. the assumptions and variables that are entered into the model dictate its projections. The assumptions made for the MOU (August 2015) are listed in Annex I. They include a residential water demand of fifty liters per capita per day and a one-hundred percent coverage in year two. Based on these optimistic assumptions, cost recovery projections are not realistic. The break-even point for O&M costs is estimated to be achieved in year seven (Sanniquellie), year ten (Voinjama) and year twelve (Robertsport). The projections for the COS model are presented in Figure 2.

Figure 2: COS Model with Projected Revenue Requirements and Collection, through Year Twenty



With alternative inputs in the COS model in 2018, the break-even point for O&M is brought down to just two years in Sanniquellie and Voinjama, yet never in RobertSPORT.⁴³ However, according to the model, the deficit in RobertSPORT is compensated by the profits in Sanniquellie and Voinjama, so the three outstations will overall reach cost recovery. In this revised COS model, household connections are projected to have already been established for approximately one-third of the population in the three cities by the end of year one, steadily rising to seventy percent by year 2037. This input is based on the household surveys carried out in the three cities, assessing interest, willingness, and capacity to pay for household connections.⁴⁴ Survey results indicate a high level of interest for household connections but low ability to bear the connection cost. The COS model is based on the assumption that household connections will lead to a considerable increase in per capita water usage, as water will be more easily available and used for all household purposes, not only drinking.

However, for household connections, the reality is that the process and pricing for establishing a household connection is not yet final, and thus, does not define who will pay for connection costs, how, and how much. LWSC rules and regulations⁴⁵ describe three cost-sharing scenarios for establishing HH connections, whereby:

- i) LWSC pays one-hundred percent of the costs for the connection upfront;
- ii) The customer pays one-hundred percent of the costs upfront, but gets fully reimbursed by LWSC (through an amortization scheme); or
- iii) The customer pays one-hundred percent of the costs upfront but gets only partly reimbursed by LWSC (with various sharing ratios, depending on the distance, i.e. length of pipe required).

In theory, this seems reasonable to encourage household connections, regardless of whether customers can pay the full amount upfront or not, and eventually all costs are covered by the service provider, LWSC (scenario one or two). Considering scenario three, the customer ends up paying for part of the connection, although the further away and the costlier the connection, the lower the ratio. No scenario has been implemented yet, and thus no household connections have been realized.

Given that LWSC does not have the funds to pay for any of these household connections, the options are reduced to scenario one and three, whereby the customer needs to pay for the connection upfront.⁴⁶ This is already a major hurdle for many with the added uncertainty of whether they will actually receive full or partial reimbursement. Additionally, the distribution network in the three cities only consists of main lines⁴⁷ and most households require a comprehensive and, thus, expensive household connection. This means that only few customers who are interested and able to pay the connection costs upfront can realize such a connection in the short term. These households do not make up the anticipated thirty-three percent used in the COS model, hence even the revised cost recovery projections are likely overly optimistic.⁴⁸ Additionally, more practical obstacles to realizing household connections for some HHs, let

⁴³ 'Never' meaning not before 2037, the end of the COS model.

⁴⁴ Tetra Tech, Inc. (2018, October). Individual Connection Survey Report (maps and data).

⁴⁵ LWSC Rules and Regulations for RobertSPORT, Voinjama and Sanniquellie Outstations, January 2018

⁴⁶ Since the time of the evaluation, USAID issued an RFP to expand the systems and install direct connections. LMWP II provided USAID with a memorandum detailing a suggested methodology for subsidizing connections, including establishment of a revolving fund for future connections.

⁴⁷ The distribution network consists of only mains, or primary lines. Secondary and tertiary – smaller and denser – networks spreading throughout the communities have not been laid.

⁴⁸ Although the majority of the respondents from the latest (Sept. 2018) household survey did indicate they are willing to pay (upfront) for a household connection, the average maximum amount they are willing to pay upfront

alone to one-third of the population, include the facts that LWSC has to approve all household connection applications and certified, LWSC-approved water meters are unavailable in Liberia and need to be imported.

Finally, the COS model works with a tariff structure that affects the break-even point. These tariffs⁴⁹ are higher than those presently used in the three cities, meaning that the revenues collected are less, and the cost recovery period will take longer. LMWP II has discussed the tariff structure from the COS model with LWSC, and they understand and recognize the effect it has on the projected cost recovery period. However, the tariffs currently applied in the three cities, endorsed by LWSC in July 2018 and based on those applied in Monrovia, Kakata, Zwedru, and Buchanan have been adopted “after careful deliberation and because of the present economic situation in the three counties.”⁵⁰ LWSC argues that the better approach is to first increase the number of household connections in the three cities and only then increase the tariffs in-line with the COS model. Therefore, the tariffs used in the three cities are lower than used in the COS model, meaning cost recovery periods will in reality be longer than those projected in the model.

INSTITUTIONAL FRAMEWORK VERSUS THE AfDB MODEL

To compare cost-effectiveness and the institutional framework (operational model) between LMWP II and another similar project, the evaluation examined the AfDB-funded Urban Water Supply and Sanitation Project (UWSSP). UWSSP also includes construction or rehabilitation of water supply systems in three secondary cities: Buchanan, Kakata, and Zwedru. Apart from this, the two projects are distinct in that:

1. The USAID project strictly focuses on safe water provision, while the AfDB project includes safe water provision and sanitation (construction of latrines).
2. The USAID project included construction of water treatment plants and construction/laying of new primary distribution lines, while the AfDB project largely rehabilitated works.
3. The USAID-funded outstations use surface water as the water source, requiring more comprehensive treatment works, whereas the AfDB-funded outstations use groundwater from boreholes that only need chlorination. See Figures 3 and 4.
4. The USAID-funded WTPs are powered by solar panels which are more expensive in initial investment, yet cheaper in operation and maintenance, while the AfDB-funded systems run on small diesel-powered generators (i.e. forty-five kilovolt-amperes [KVA] in Kakata).

was just 10.7 Liberian Dollars (approximately 0.07 USD according to www.xe.com in November 2018), whilst the cost for only a water meter is already around 50 USD. Furthermore, the average household income reported is 133 USD. The costs for realizing a household connection may vary a lot, depending largely on the distance of the household from the main network, but it is estimated to cost at least 75 USD including water meter, materials and labor costs.

⁴⁹ The model uses two tariffs (USD/gallon), one for household connections and one for water collected at the kiosks.

⁵⁰ Liberia Water and Sewer Corporation. (2018, July 17). Notice of Water Tariff and Fees in Robertsport, Sanniquellie and Voinjama.



Figure 3: Slow Sand Filter at USAID's WTP in Sanniquellie.



Figure 42: AfDB Water Treatment Station in Kakata.

This makes the cost-comparison of the two projects superficial.⁵¹ Illustratively, the comparison of per-capita costs are provided in Table 3 below.

⁵¹ This is further compounded by the differences in technical and socioeconomic conditions in the USAID and AfDB-supported cities. The AfDB-supported cities have cost advantages due to higher populations and population densities offering economies of scale and more favorable topography to reduce pumping cost and complexity.

TABLE 3: COST COMPARISON USAID VS. AFDB PROJECT

	USAID	AFDB ⁵²
Overall cost	LMWP II: USD 12.5 million CIP: USD 26.5 million TOTAL: USD 39 million	TOTAL: USD 40.4 million ⁵³
Costs for water systems in three outstations: ⁵⁴	a) USD 26.5 million b) USD 12.5 million ⁵⁵ TOTAL: USD 39 million	a) USD 5 million ⁵⁶ b) USD 4.7 million ⁵⁷ TOTAL: USD 9.7 million
a) Construction		
b) QA/QC, supervision, project management		
Total population of three cities ⁵⁸	30,500	109,500
Target population	27,500 (90%)	82,000 (75%)
Per-capita cost	USD 39 million / 27,500 = USD 1,420	USD 9.7 million / 82,000 = USD 118

In the AfDB project, LWSC is more involved: they oversaw the construction activities⁵⁹ and are operating the systems themselves as opposed to a private operator. The rationale for this is that LWSC remains involved and builds capacity throughout, from construction to management, operation, and maintenance of the systems.

Although this model seems ideal in theory, the reality is that the Project Management Team (PMT) remains disconnected from LWSC and is perceived as an external entity by the PMT staff themselves and by other LWSC staff. This is largely due to the PMT receiving a salary or fringe and dedicated vehicles from AfDB during the construction phase of the project. As a result, it is uncertain whether LWSC will retain the PMT staff by the end of the project in November 2018.

⁵² African Development Bank Group. (2010, April). UWSSP Liberia Project Appraisal Report.

⁵³ 26.09 million Unit of Account; 1 Unit of Account = 1.55 United States Dollar (USD).

⁵⁴ The UWSSP also includes sanitation infrastructure, environment, hygiene and sanitation sensitization components, and water and sanitation infrastructure in Monrovia. From the total project cost of USD 40.4 million, USD 9.7 million is estimated to be the cost for the water systems in three outstations. This figure is used in this cost comparison.

⁵⁵ LMWP II costs, which also includes capacity building, etc.

⁵⁶ Rough estimate, from cost estimates per project components from the UWSSP Appraisal Report (by ratio for the three outstations).

⁵⁷ Rough estimate for construction supervision, institutional support and capacity building components from the UWSSP Appraisal Report (by ratio for the three outstations). In the AfDB project, this was done through a Project Management Team embedded in LWSC.

⁵⁸ Liberia Institute of Statistics and Geo-information Services (LISGIS). 2009. Republic of Liberia 2008 National Population and Housing Census Final Results, May 2009.

⁵⁹ A Project Management Team was established from LWSC staff with additional support from external consultants to oversee the construction.

Operation and maintenance of the three outstations of the AfDB project (Buchanan, Kakata, and Zwedru) is done by LWSC rather than PTMC in Robertsport, Sanniquellie, and Voinjama. Although it is too soon to identify the most successful approach, the evaluation found the Kakata site, which has been operational since July 2015, to be an under-performing system. Water-vending kiosks were few in number and consisted of basic communal tap stands with several malfunctioning taps, whereas the kiosks in Robertsport, Sanniquellie, and Voinjama are proper, roofed structures (see Figures 5 and 6). Kiosk operators are not employed by LWSC and do not receive salaries, but they are selling water at a profit. As mentioned previously, they pay a fixed rate of one LD per jerry can to LWSC and are supposed to sell for five LD per jerry can. However, some charge up to twenty LD per jerry can. There are around 250 household connections, but customers are reluctant to pay their bills. Although the system does not involve comprehensive water treatment as it is fed by groundwater, operating expenses include fuel for abstracting and pumping the water to the tower. In conclusion, the revenues collected in Kakata are also far from covering the system's operation and maintenance costs. This means that cost recovery of the AfDB-funded systems is unlikely to be reached soon, if at all.



Figure 5: Standard USAID Water Vending Kiosk in Voinjama.



Figure 3: AfDB Water Vending Kiosk in Kakata.

Based on this evidence, the evaluation anticipates that USAID's approach through the institutional framework will be more sustainable than the AfDB model. The involvement of a private operator may risk lesser commitment from LWSC, but several key informants and observation in Kakata led to the impression that LWSC generally has less capacity, motivation, and transparent or accountable practices.⁶⁰ A commercial, private operator, on the other hand, is both intrinsically and extrinsically motivated to perform well.

CONCLUSIONS

It is still early to predict to what extent LWSC will be able to take ownership of the institutional framework for managing the three outstations. LMWP II has two remaining years to implement the institutional framework and build LWSC's capacity in management, O&M, and M&E. The LMWP II Capacity Building Plan, though delayed, is robust and includes components to address these areas. In terms of

⁶⁰ In addition to kiosk operators selling water for higher rates and pocketing the difference, one respondent shared the example of the Social Connection Fund of \$350,000 USD, which should be managed by MFDP, because in their experience, LWSC already showed it misuses it. \$100,000 USD were taken from the fund and used for other purposes; however, this money has since been retrieved.

approach, the illustrative per-capita cost of USAID support to water utility systems is much higher than AfDB per-capita cost, but this has allowed for higher quality access and more sustainable management.

The recent government transition has had a major effect on the project's progress and performance. Since the completion and hand-over of water works, LWSC has had no presence at the outstations, and LWSC's newly-appointed senior management is hesitant to take full ownership of the institutional framework. Several members of the new LWSC leadership are resistant to having a private contractor running their facilities. Yet the motivation of a private contractor to run a facility based on a performance contract is more likely to produce better results than LWSC who is adopting a 'laissez-faire' attitude in running its other sites, e.g. AfDB. This risks fraud and lost trust from community members.

Apart from issues with LWSC's commitment to take ownership of the institutional framework to effectively manage the sites, they have not yet received any subsidies from MFDP, thereby hampering the operation, maintenance, and management of the water systems in the three cities. This is irrespective of the operational model, i.e. whether the systems are being operated and maintained by LWSC themselves or through the OMC. Without money, the systems cannot be operated and maintained, and this is impacting PTMC's ability to effectively manage the sites and pay its staff. Thus, there is a risk of OMC staff quitting or performing badly because of lost motivation. Capacity building efforts from LMWP II would be lost, as PTMC would need to hire and train new staff.

While the evaluation expects that at the end of the project, LWSC and PTMC will be capable of managing, monitoring, operating, and maintaining the three water systems as a direct result of LMWP II capacity building and advocacy efforts, they will be unable to do so unless MFDP disburses its subsidies.

Regarding a mainstreamed M&E system, it is too early in the process to provide in-depth analysis of the situation. Moving forward, data quality is key. All monitoring systems and data need to hold the highest data quality standards, meaning they should be clear, uniformly measured and verifiable.

In terms of cost recovery, achieving financial sustainability of the three water systems is highly unlikely under the present circumstances. The absence of a significant proportion⁶¹ of the required subsidies will soon result in inferior operation and maintenance practices. This could affect service provision, meaning that no water, insufficient water, or unsafe water is being provided in the three cities.

If the water systems keep operating well, it is unlikely that the water sales from the kiosks alone will cover the costs despite a projected rise in sales in the dry season and the coming years.⁶² Given these considerations, the cost recovery projections are unrealistic in the timeframe provided.

⁶¹ The proportion that MFDP is supposed to be providing, according to the MOU: 50 percent and 75 percent of the shortfall of Operator Based Expenses minus revenues in year 1 and year 2 respectively, followed by 100 percent of both the shortfall of Operator Based Expenses minus revenues, and the System Based Operating Expenses from year 3 onwards.

⁶² This anticipated rise in water consumption from the three systems is the result of i) a 'natural' increase in demand in the dry season (when less alternative water sources are available) and through time as more people get familiar with the water system, and ii) marketing and community outreach carried out by LMWP. Although the evaluation team found the majority of the community is already familiar with the water systems and the advantages of using safe water as a result of the marketing and community outreach activities, it is recommended to continue with these activities for the remainder of LMWP II, as planned.

V. RECOMMENDATIONS

EQ1

If USAID determines the need to increase coverage to meet the objective of providing access to ninety percent of the populations in project sites, then LMWP II should first update the coverage plan to reflect the October 2018 survey mapping results. Then, LMWP II could consider building a few additional kiosks in Sanniquellie and Voinjama to cover the new and/or higher density communities. This approach is cheaper than the installation of household connections discussed below under EQ3 but would result in lower O&M cost recovery.

LMWP II and partners should continue raising community awareness about the availability and health benefits of safe water through outreach activities to further increase water demand and use. Stakeholders need to keep working to increase community awareness of safe drinking water, thus leading to increasing demand and use. Overall, this will further work to improve community health. LMWP II, local authorities, and Local Steering Committees need to continue their current outreach activities, such as via radio talk shows, even doing drama shows, distributing print media, and displaying promotional signs at the kiosks.

LMWP II should define a more accurate method of measuring the main outcome indicator for improved water supply access, and overall, ensure that all PIDS indicators can be effectively measured and reported. The MELP indicator for LMWP II's key outcome to supply access to 90 percent of the population can be improved by being measured through more precisely calculated variables. Again, satellite imagery in activity design and in the identification of coverage gaps provides a strong basis but needs to be supplemented with more rigor. LMWP II should work with LSA through an MELP revision to update its household and population numbers in each site with more accurate figures (e.g. fewer assumptions in projections). In the absence of robust quantitative population data, LMWP II should also work with LWSC and its M&E system to proactively identify where measurements and targets should be updated once Liberia undergoes a new national census.

EQ3

LMWP II and USAID should continue lobbying LWSC senior management to gain their buy-in to the institutional framework. LWSC's newly assigned senior management is not fully committed to taking ownership of the institutional framework. Further, the management model for the infrastructure after three years, when the OMC expires, will directly affect LWSC capacity building efforts during the duration of LMWP II. To address limitations in LWSC's capacity, ability, and willingness, LMWP II should consider ways to ensure that PTMC's capacity to operate and manage the sites is not lost (e.g. to absorb PTMC staff into LWSC, or simply renew the OMC contract). Further, LMWP II and USAID will need to carefully review 2018-2019 monitoring and progress reports to determine adjustments, as needed, to LMWP II capacity building efforts. Ultimately, none of this is possible without LWSC buy-in, first and foremost.

To ensure financial sustainability, USAID should continue advocating for GOL to disburse LWSC's subsidies, among other responsibilities outlined in the MOU. Without sufficient funding and financial transparency, the activities cannot succeed. Not only does this require GOL to respect its responsibilities, it requires LWSC to impose accountable and transparent financial tracking systems to manage its revenue and operators, whether OMC staff (USAID model) or non-LWSC kiosk operators (AfDB model). There is a risk of fraud, and the community may lose trust in their service provider. To counter these risks, LWSC may consider placing signs at its kiosks and mini yards – both old (Robertsport) and new – to advertise the kiosk name, its working hours, and set water price, once confirmed.

It is also necessary to revise the cost recovery projections and their assumptions to create a more realistic, achievable breakeven point. Likewise, LMWP II and USAID should continue seeking ways to reasonably increase revenue to increase the likelihood of sustaining this project financially.

To improve O&M cost recovery, USAID could consider options to support GOL efforts to increase household connections. This would require higher capital investment than the option of additional kiosks offered under EQI recommendations, but it would create the opportunity to provide access to new communities as the population grows. USAID must remain mindful of the potential trade-offs considering unknown willingness to pay. A rapid and significant increase in household connections could ensure financial sustainability through cost recovery by, first, supporting LWSC to clarify the process and payment model to realize household connections. Then, USAID could consider providing grants or loans to LWSC and/or customers to pay for household connections. Other options include densifying the distribution network to facilitate and reduce costs for household connections and extending the distribution network to reach unserved communities. The extent to which each of these is appropriate in the current context needs to be further assessed before action is taken.

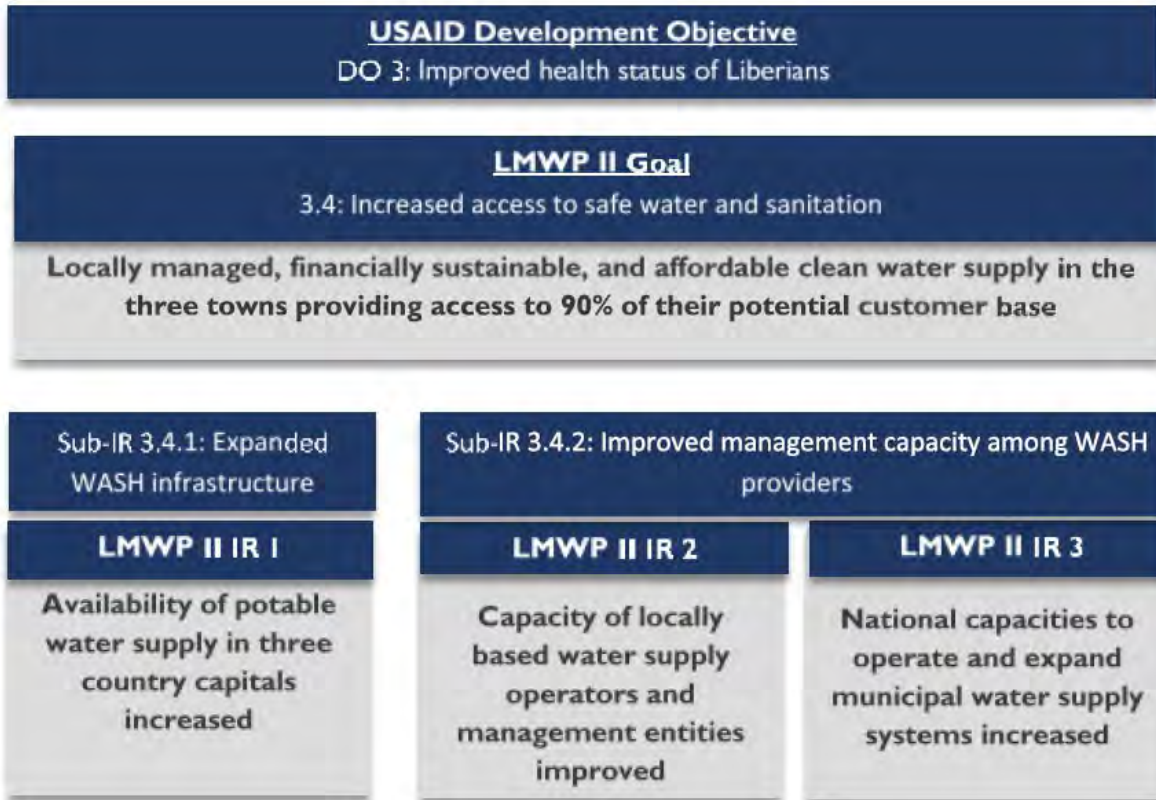
VI. UTILIZATION PLAN

To maximize results in the remaining years of implementation, USAID should hold high-level meetings and negotiations with both MFDP and LWSC to regain commitment on the MOU and their respective intended responsibilities. This should be done as soon as possible, because if the private operator is not paid according to its contract, operation and maintenance of the three outstations may be halted.

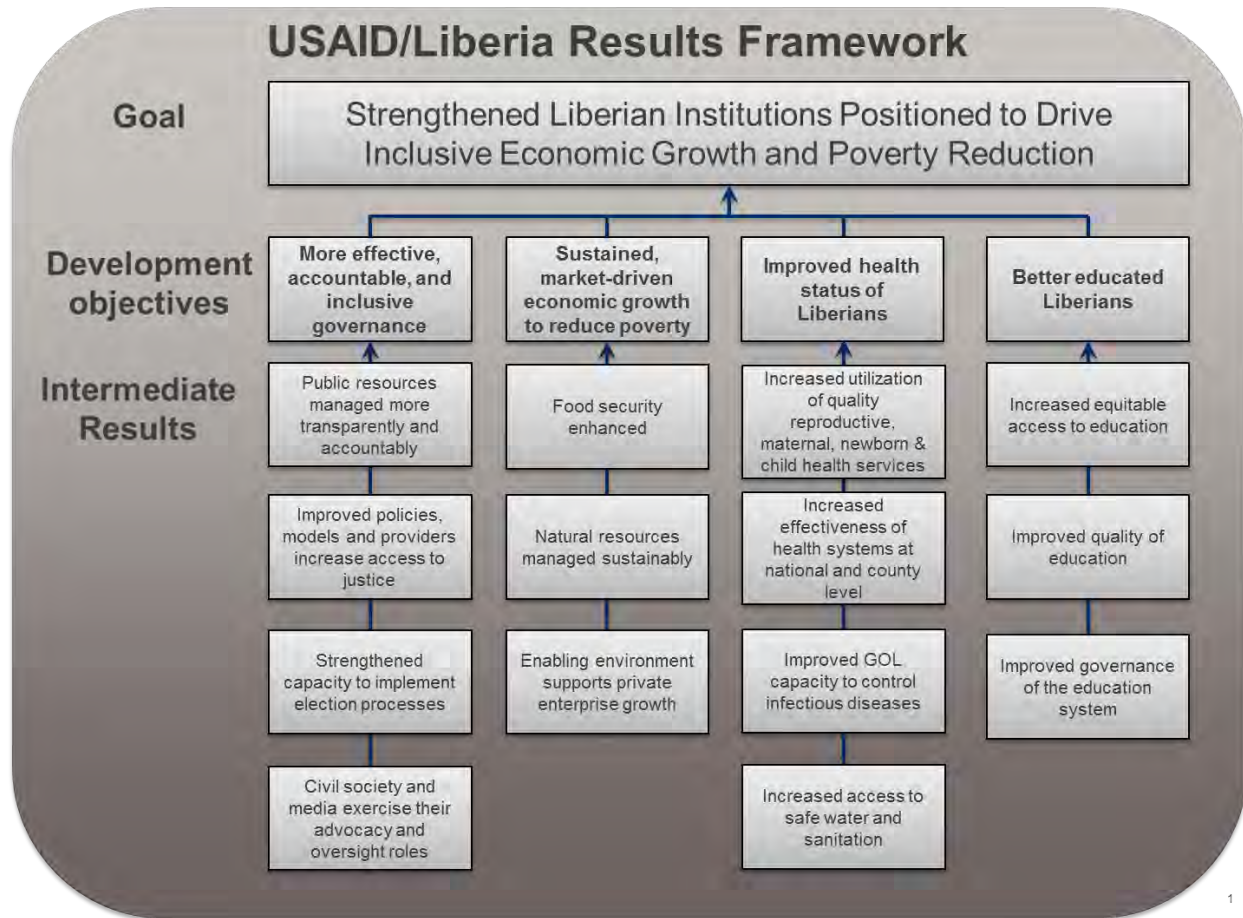
LSA plans to facilitate a learning event between one to three months after submission of the final evaluation report with USAID, LMWP II Implementing Partners, and other stakeholders. This will provide an opportunity to apply findings and lessons learned directly to decision-making and facilitate midcourse corrections for LMWP II. The workshop will be a one-day session with the aim of ensuring that the findings of the performance evaluation are being used and that the appropriate stakeholders are taking the different recommendations forward.

Ultimately, the results of this evaluation and its recommendations should be used not only to help LMWP II and CIP achieve financial sustainability, but to help USAID achieve its overall Development Objective of improving community health through access to clean water.

ANNEX A: LMWP II RESULTS FRAMEWORK – JANUARY 2018



ANNEX B: USAID/LIBERIA CDCS RESULTS FRAMEWORK 2011-2017



ANNEX C: EVALUATION DESIGN MATRIX

Evaluation Question	Data Sources ⁶³	Data Collection Methods	Data Analysis Methods/Themes
Infrastructure Planning, Construction, and Quality			
<p>EQ 1. To what extent has progress been made in the design and implementation of the three water systems (water treatment plants, distribution systems, and kiosks)?</p> <p>Will the design and construction enable improved water supply access to 90 percent of the population and meet LMWP II objectives?</p>	<ul style="list-style-type: none"> - LMWP II Proposal, Progress and monitoring reports, Performance Indicator Database System (PIDS), any assessment data, e.g. baseline, and any LWSC M&E datasets if measuring for outcomes, etc. - Partners (TT, UIP, LWSC) - Community leaders, Health focal points, Community-level monitoring committees (Local Steering Committees) 	<ul style="list-style-type: none"> - Document review - Site visits - Key Informant Interviews - Kiosk Operator and Consumer Interviews 	<p><i>Document review and Site visits:</i> Status vs. plan, quantifiable progress; Challenges and mitigation measures; Achievements</p> <p><i>Key Informant Interviews:</i> Progress and impact within the Theory of Change model for LMWP II; Impact and challenges</p> <p><i>Kiosk Operator and Consumer Interviews:</i> Consumer views (access, distance to taps, affordability, perceptions of quality of service and water quality) and kiosk operator views (service provision, challenges, successes, overall demand and trends)</p>
<p>EQ 2. To what extent does the infrastructure conform to specifications and standards? Consider quality assurance by LMWP II and quality, timeliness, and cost-effectiveness by UIP.</p> <p>Identify construction defects that need to be rectified during the defects-liability period.</p>	<ul style="list-style-type: none"> - Bill of Quantities, progress and monitoring reports, Drawings and Technical Specifications, site quality assurance books and tests results, inspection results, incident and weather reports, major faults or deviations, contractor’s QC, and Punch list - Partners (TT, UIP) - Station management contractor, other contractors, Local Steering Committees 	<ul style="list-style-type: none"> - Document review - Site visits - Key Informant Interviews 	<p><i>Document review and Site visits:</i> Plans vs. reality, cost is quantifiable; Standards to follow; Risk Mitigation procedures; Challenges and documentation of defects (e.g. if conforming to specifications and standards; checking any defects and action plan needed)</p> <p><i>Key Informant Interviews:</i> Progress, delays, challenges and lessons learned regarding quality and cost</p>
Capacity Building and Cost Sustainability			

⁶³ Non-exhaustive list
USAID.GOV

<p>EQ 3. To what extent will LWSC be able to take ownership of the institutional framework for managing the CIP systems as a result of LMWP II capacity building efforts?</p> <p>To what extent has LMWP II mainstreamed an effective M&E system at LWSC at the national level and site level to monitor progress against targets? Consider production quality, quantity, and revenue.</p> <p>To what extent will the MOU facilitated by LMWP II and signed between USAID and Ministry of Finance and Development Planning (MFD) support sustainable Government of Liberia (GOL) ownership? To sustain investment required for operating and expanding water supply systems, are the financial projections for cost recovery realistic?</p> <p>What are the lessons learned in the implementation of the institutional framework and the capacity building efforts?</p>	<ul style="list-style-type: none"> - Partners (LWSC, MFD, TT, PTMC) - Water Utility Capacity Building Tool (WUCBT) - Progress and activity reports, M&E datasets (LWSC), MoU, institutional framework, etc. - Community-level monitoring committees (Local Steering Committees), M&E staff, Community leaders - Review of documents, approach and project outcomes of external stakeholders (African Development Bank) 	<ul style="list-style-type: none"> - Document review - Site visits - Key Informant Interviews - External stakeholder interviews (African Development Bank) - Kiosk Operator and Consumer Interviews - Business interviews 	<p><i>Document review and Site visits:</i> Assessing presence and effectiveness of M&E systems; Looking at cost projections; How capacity building feeds into the institutional framework; Documentation of learning; Application of this approach on-the-ground; Challenges and risks</p> <p><i>Key Informant Interviews:</i> Uncovering views towards local capacity, M&E and cost; Looking at the impact of capacity-building on actual capacity (outcomes, challenges and risks)</p> <p><i>External stakeholder interviews:</i> Uncovering the AfDB model in terms of capacity-building, partnerships and cost sustainability</p> <p><i>Kiosk Operator and Consumer Interviews:</i> Kiosk operator views on cost and experience in capacity building</p> <p><i>Business interviews:</i> Potential to expand water network (demand) and generate additional revenue</p>
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ANNEX D: EVALUATION STATEMENT OF WORK

LMWP II MIDTERM AND CIP FINAL PERFORMANCE EVALUATION

STATEMENT OF WORK

I. Background

This Statement of Work (SOW) describes the terms of reference for an external evaluation of USAID's Liberia Municipal Water Project II (LMWP II) at its midpoint and Capital Improvement Project (CIP) at its endpoint. In September 2016, USAID awarded a \$12.5 million, four-year Task Order contract to Tetra Tech, Inc. for implementation of LMWP II. The objective of LMWP II is to support USAID with construction oversight and quality assurance services for completion of a separate \$26.5 million, three-year urban CIP infrastructure activity, awarded in February 2016. LMWP II provides capacity-building and direct support to the Liberia Water and Sewer Corporation (LWSC) and local management entities, to sustainably operate and manage the newly constructed systems, located in three secondary cities of Robertsport, Sanniquellie, and Voinjama. During LMWP I, Tetra Tech assisted USAID with the design of the CIP infrastructure systems in the three cities. United Infrastructure Projects (UIP) is the contractor executing the construction under CIP. The construction activity is considered as an integral part of LMWP II and, therefore, its evaluation cannot be seen in isolation of the evaluation of LMWP II.

The evaluation will measure the effectiveness of construction, capacity building approaches, and cost sustainability. The Mission will use findings from the evaluation to inform more strategic USAID investment in the sector.

Overview of LMWP II

Activity: Liberia Municipal Water Project II

Task Order Number: AID-669-TO-16-00008

Activity Dates: September 30, 2016 – September 29, 2020

Funding: \$12.5 Million

Implementing Partner: Tetra Tech, Inc.

Contracting Officer's Representative: Wondwossen Teffera

Alternate Contracting Officer's Representative: Maxime Bainduah

Results Framework: Annex I

Geographical focus: Robertsport, Sanniquellie, and Voinjama

LMWP II is responsible to assist LWSC in introducing and building the necessary capabilities, business processes, and systems to ensure that improved infrastructure will be handed over to locally-based management entities immediately upon completion, which will occur in phases. Years three and four of this task order will be fully devoted to supporting LWSC and its local management entities to maintain, manage, operate, and continue to expand the systems to reach cost recovery by the end of the Task Order.

LMWP II is designed to contribute to USAID/Liberia Development Objective (DO) 3: Improved health status of Liberians. The activity-level goal of LMWP II is locally managed, financially sustainable, and affordable clean water supply access to 90 percent of the population in each of the three cities. This goal is aligned with the USAID/Liberia Intermediate Result (IR) 3.4: Increased access to safe water and

sanitation. See the LMWP II Results Framework in Annex I and Country Development Cooperation Strategy (CDCS) Results Framework in Annex II for further linkages.

The Theory of Change driving the design and implementation of LMWP II is that *if* availability of potable water supply in three country capitals is increased (USAID/Liberia Sub-IR 3.4.1), and *if* the management capacity of local and national WASH providers is improved (USAID/Liberia Sub-IR 3.4.2), *then* access to safe water and sanitation will be increased (USAID/Liberia IR 3.4), contributing to the improved health of Liberians (USAID/Liberia DO 3).

Thus, in tandem with and immediately following construction, LMWP II is required to develop local capacity to maintain, manage, and operate USAID-funded water system improvements in the three cities and create conditions favorable for further expansion of such improvements after the end of the activity.

In Summary, the LMWP II Contractor is responsible for the following tasks in each of the three cities:

- Oversee the construction process and provide construction supervision.
- Support operation and maintenance of improved water supply infrastructure on a transitional basis.
- Build the capacity of the GOL, LWSC, county governments, municipal authorities, and the selected local water service management to effectively play their role in the agreed institutional framework by the end of the contract period.

Overview of CIP

Activity: Capital Improvement Project

Task Order Number: AID-669-TO-16-00003

Activity Dates: February 1, 2016 – January 31, 2019

Funding: \$26.5 Million

Implementing Partner: United Infrastructure Projects

Subcontractors: SSF, Private Operator TBD

Contracting Officer's Representative: Maxime Bainduah

Alternate Contracting Officer's Representative: Wondwossen Teffera

Geographical focus: Robertsport, Sanniquellie, and Voinjama

In summary, the construction Contractor, UIP, is responsible for the following tasks:

- Undertake construction work of CIP in three cities and complete as per the agreed time schedule i.e. April 2018
- In compliance with the design and contract documents, provide quality control to ensure that all work adheres to the applicable standards and specifications in the contract document.
- All work must comply with USAID Environmental and the Liberian Environmental Protection Agency requirements.
- Provide operational oversight, support, training and capacity building for LWSC on the new plants constructed by UIP and required for complete operations of the water utility. This is expected to be carried out after construction is completed.

2. Purpose of Evaluation

The primary purpose of the evaluation is to provide an independent and in-depth examination of the overall progress of LMWP II. The evaluation will measure the effectiveness of construction, capacity building approaches, and cost sustainability. To ensure that LMWP II's activities are strategically contributing to USAID outcomes in the most effective way, the evaluation should provide a detailed analysis of the major accomplishments, strengths, and weaknesses of LMWP II, indicating any

recommended changes in the design, programming, or implementation approach to ensure successful completion of urban water improvements by September 2020.

The evaluation timing is opportune for several reasons. First, LMWP II is halfway through implementation, allowing for midcourse correction. Second, CIP completed construction by April 2018 and entered into the operation phase. The evaluation will identify lessons learned, successes, and defects to be addressed during the defects-liability period. Finally, the evaluation will inform the new USAID CDCS currently under design by identifying priority areas for future programming in the Liberian urban water supply sector. Evaluation findings and recommendations will be shared and discussed with USAID, the implementing partner, and relevant stakeholders.

3. Evaluation Questions

Infrastructure Planning, Construction, and Quality

1. To what extent has progress been made in the design and implementation of the three water systems (water treatment plans, distribution systems, and kiosks)?
 - Will the design and construction enable improved water supply access to 90 percent of the population and meet LMWP II objectives?
2. To what extent does the infrastructure conform to specifications and standards? Consider quality assurance by LMWP II and quality control, timeliness, and cost-effectiveness by UIP.
 - Identify construction defects that need to be rectified during the defects-liability period.

Capacity Building and Cost Sustainability

3. To what extent will LWSC be able to take ownership of the institutional framework for managing the CIP systems as a result of LMWP II capacity building efforts?
 - To what extent has LMWP II mainstreamed an effective M&E system at LWSC at the national level and site level to monitor progress against targets? Consider production quality, quantity, and revenue.
 - To what extent will the MOU facilitated by LMWP II and signed between USAID and Ministry of Finance and Development Planning (MFDP) support sustainable Government of Liberia (GOL) ownership? To sustain investment required for operating and expanding water supply systems, are the financial projections for cost recovery realistic?
 - What are the lessons learned in the implementation of the institutional framework and the capacity building efforts?

4. Evaluation Methods

The evaluation is expected to apply both quantitative and qualitative methods for data collection and analysis. The evaluation team will conduct a desk review of available literature including activity documents and sectoral assessments that were used to determine interventions. Visits to implementation sites and relevant partners will provide qualitative data for analysis through methods such as in-depth and key informant interviews, focus groups, and direct observation. The qualitative data collection will be supplemented through secondary quantitative data, such as data provided by the implementing partner in the Performance Indicator Database System (PIDS). To answer questions related to capacity building, the evaluation should refer to quantitative data collected through the Water Utility Capacity Building Tool (WUCBT), which measures effectiveness of the capacity building and progress toward improved organizational capacity and performance. To answer questions related to the quality of the infrastructure,

the evaluation will examine conformance to the design as articulated in the CIP contract and the Drawings and Technical Specifications documents. More detail is provided in Annex III. Overall, the team will also draw on datasets from the Monitoring and Evaluation Unit at LWSC. Primary collection of quantitative data and large-scale structured surveys are beyond the scope of this evaluation.

The evaluation team is expected to visit and conduct consultations and data collection visits in Monrovia, Robertsport, Sanniquellie, and Voinjama. Targeted respondents should include Tetra Tech, UIP, station management contractor, LWSC, MFDP, and community-level monitoring committees known as the Local Steering Committee. Donors who can provide insight include the World Bank and African Development Bank. USAID and the Implementing Partner can assist in providing contact information.

The USAID/Liberia Health team will provide documents for the desk review, as well as contact information for prospective interviewees. The evaluation team will be responsible for identifying and reviewing additional materials relevant to the evaluation, as well as additional contacts. Illustrative data sources include but are not limited to:

1. LMWP II Task Order
2. CIP Contract/Award
3. Technical Specifications: Construction Services for Water System Improvements
4. Drawings: Liberia Municipal Water Project, Three City Capital Improvements, Robertsport, Sanniquellie, and Voinjama
5. Annual Work Plans
6. Activity Monitoring and Evaluation Plan
7. Quarterly and annual progress reports
8. Performance Indicator Database System data
9. DQA report (August 2018)
10. Baseline assessment
11. LMWP I Midterm Evaluation
12. LMWP II Capacity Building Plan 2017
13. Water Utility Capacity Building Tool
14. LMWP II Quality Assurance reports
15. CIP Quality Control Program document
16. CIP Tracking of Construction Deficiencies document
17. CIP Operation and Maintenance Plans
18. CIP Operational Oversight, Support, Training and Capacity Building Plan
19. CIP Construction Risk Management Plan
20. CIP Health and Safety Plan
21. Other organizational assessments
22. Construction photographs
23. USAID/Liberia CDCS
24. LWSC datasets
25. Agenda for Transformation
26. GOL WASH Sector Strategic Plan 2011-2017
27. Other related national data and reports

5. Deliverables and Timeline

Evaluation deliverables include:

- a. Evaluation Team Planning Meetings
- b. Inbrief with USAID/Liberia, Implementing Partner, and GOL
- c. Inception Report with work plan and data collection instruments

- d. Debrief with USAID/Liberia, Implementing Partner, and GOL
- e. Draft Evaluation Report - A draft report should be submitted to LSA for review, and LSA must submit the draft report to USAID/Liberia within three weeks after the in-country work is conducted. The written report should clearly describe findings, conclusions, and recommendations and conform to USAID requirements outlined below. USAID will provide comments on the draft report within five working days of submission. Then, LSA will submit the draft report to the Implementing Partner for another five working days to provide comments and disclose a statement of difference, if applicable.
- f. Final Report – LSA will submit a final report that incorporates USAID and Implementing Partner comments no later than ten days after final, written comments on the team’s draft report have been submitted by all parties.
- g. Learning Event – LSA will facilitate a learning event one to two months after the report has been finalized to engage USAID/Liberia, the Implementing Partner, GOL, and other relevant stakeholders in the utilization of recommendations. This will be combined with an After-Action Review, prescribed as good learning practice per ADS 201, to support USAID in the incorporation of recommendations into work plans, project or activity design, and the next CDCS.

The draft evaluation report should meet the following criteria:

- i. The report should be in line with USAID Evaluation Policy (see Appendix I – Criteria to Ensure the Quality of the Evaluation Report) and USAID Secretariat Style guide.
- ii. The report should be no longer than 30 pages, excluding executive summary, table of contents, and annexes.
- iii. The report should include a three to five page Executive Summary highlighting findings and recommendations.
- iv. The report should represent a thoughtful and well-organized effort to objectively respond to the evaluation questions.
- v. The report shall address all evaluation questions included in the SOW.
- vi. Evaluation methodology shall be explained in detail and all tools used in conducting the evaluation such as questionnaires, checklists and discussion guides shall be included in an Annex in the final report.
- vii. Limitations to the evaluation shall be disclosed in the report, with particular attention to the limitations associated with the evaluation methodology (selection bias, recall bias, etc.).
- viii. Evaluation findings should be specific, concise, and supported by strong quantitative or qualitative evidence.
- ix. Recommendations should be action-oriented, practical, specific, and evidence-based.
- x. The final report should be edited and formatted.
- xi. Liberia Strategic Analysis must submit the final evaluation to the Development Experience Clearinghouse.

The report will be submitted electronically. The final report will be edited/formatted by the contractor and provided to USAID/Liberia five working days after the Mission has reviewed the content and approved the final revised version of the report. The final evaluation report must be 508 compliant and comply with the USAID Evaluation Policy: <http://www.usaid.gov/sites/default/files/documents/1868/USAIDEvaluationPolicy.pdf>

Timeline

The evaluation should follow the timeline for producing deliverables outlined in the Gantt chart below. The evaluation field work is estimated to begin September 2018.

Performance Evaluation Gantt Chart

Activity	# of days	Week 1-2	Week 3-5	Week 6-7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14-15	Week 16	Week 17
USAID shares SOW with LSA	1												
LSA publishes call for CVs	14												
LSA recruits and onboards team members	21												
Desk Review	6												
Team travels to Liberia	1												
Team planning meeting - internal	1												
Planning Meetings with USAID and IP	1.5												
Submit draft Inception Report to USAID													
Inbrief with USAID, IP, and GOL	1												
Prepare for field work	2.5												
Submit final Inception Report to USAID													
Field Work	23												
Preliminary analysis	1												
Debrief with USAID, IP, and GOL	1												
Travel from Liberia	1												
Analysis and report drafting	12												
LSA quality control and revisions	5												
LSA submits Draft Report to USAID													
USAID and IP review the draft report	10												
Evaluation team incorporates comments and feedback	5												
LSA quality control	5												
LSA submits Final Report to USAID													
LSA facilitates Learning Event with USAID, IP, GOL, and other stakeholders	1												
Prep work by Team Leader and national consultant	1												1-2 months after PE

6. Team Composition

The evaluation team will be composed of four individuals: team leader, two technical experts, and an evaluation specialist.

1. **Team Leader/Water Utility Expert:** S/he will be responsible for coordinating the overall activities of the evaluation team. The Team Leader will approve the final evaluation design, oversee the development of evaluation instruments, integrate the findings of different team members, and coordinate the preparation of the final reports. The Team Leader should have at least ten years of experience in the administration and/or evaluation of urban water supply interventions in developing countries. Knowledge of water utility, human and institutional capacity building, and key engineering and construction issues related to the construction of municipal scale waterworks is required. S/he should have experience in managing multi-disciplinary teams and developing and conducting qualitative evaluations. It is essential that the candidate has the ability to conceptualize and structure evaluation activities and produce high quality evaluation reports in English. A post graduate degree in Civil Engineering, Construction Management, research, or related field is required.
2. **Financial Analyst:** S/he should be an economist with at least 8 years of financial or costing expertise related to infrastructure and urban water supply interventions in developing countries. S/he must have demonstrated experience in the design of cost-effectiveness analysis, methodology determinations, and data collection instruments. Analysis will include budgets, M&E data, costing by outputs, and sector report data. The candidate must have exceptional organizational, analytical, writing, and presentation skills. Knowledge of USAID rules, regulations, and procedures in this sector is highly desirable. S/he will contribute to the overall drafting of the evaluation framework and participate in the desk study, interviews, and other data collection; and analyze the data with input from team members and USAID/Liberia to draft the evaluation report.
3. **Civil Engineer:** S/he must have at least 8 years of professional field experience in the engineering and construction of civil works, water works, and/or power supply construction projects. The candidate must have knowledge and technical experience implementing site plans, reinforced concrete work, and mechanical and electrical installations. The candidate must also be able to evaluate quality assurance and whether the engineering systems, materials, equipment, products, and supporting processes conform to technical, safety, work load and customer requirements. Knowledge of USAID rules, regulations, and procedures in this sector is highly desirable. The incumbent must be able to conduct interviews and focus group discussion and analyze the resulting data. Strong American English language speaking and writing skills are required. The candidate should have Professional Engineer registration and hold a BSc degree in Civil Engineering, Construction Technology, or related construction field.
4. **Evaluation Specialist:** The candidate should have at least five years relevant experience in qualitative and quantitative data collection methods. The specialist must have experience evaluating urban water supply interventions, specifically analyzing quantitative data, and have demonstrated logistics and planning skills. S/he will serve as the main logistical coordinator for the performance evaluation, and work with local partners to plan travel, data collection, interviews and assessment activities as required.

Collectively the team members must have experience in conducting both quantitative and qualitative data collection and analysis. Prior to their arrival in Liberia, all team members are required to familiarize themselves with USAID's Evaluation Policy, with USAID's publication outlining a good evaluation report, and with USAID's checklist for assessing an evaluation report. Additionally, all team members should possess a strong familiarity with the political, economic, policy and educational context in Liberia.

7. Logistics and Level of Effort

LSA is responsible for making meeting and logistical arrangements for the evaluation team including hotel, air travel, and local transportation arrangements. For planning purposes, contractors should be aware of Liberian and US holidays during the evaluation time frame.

Evaluation team members are authorized and expected to work a six-day week. Travel over weekends may be necessary. Work should commence as soon as practicable, but no later than September 2018.

The evaluation should follow the illustrative level of effort given below.

Task/Deliverable	Estimated time (Days)		
	Team Leader	Int'l Team Member	Lib Team Member
Review background documents & preparatory work (offshore)	6	6	4
Travel to Liberia	2	2	0
Team Planning Meetings in Monrovia with USAID/Liberia and IP	2		
Inbrief with USAID/Liberia, IP, and GOL and prepare for field work Submit Inception Report	4		
Field work: Data collection and on-going data analysis	23 (including field travel)		
Debrief presentation with USAID/Liberia, GOL, and IPs	1		
Analysis and report drafting	12	10	8
LSA performs quality assurance check and edits draft report	5		
LSA submits draft report to USAID/Liberia	1		
USAID/Liberia and IP provide comments on draft report	10		
Team Leader revises draft report to incorporate comments and submit final report	5	2	0
LSA performs quality assurance check and submits final report	5		
LSA facilitates learning event	1	0	2
Total time required	73		
Working days for consultants	56	50	44

ANNEX E: FULL LISTING OF REFERENCES AND REPORTS UTILIZED

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ANNEX F: FULL LISTING OF PERSONS INTERVIEWED

The full listing of persons interviewed was submitted separately in line with data de-identification policies. Please contact Carla Trippe (at ctrippe@socialimpact.com) to request the list.

ANNEX G: DATA COLLECTION INSTRUMENTS

The data collection instruments used in this evaluation are presented here.

Verbal Informed Consent Statement for Interviews

Hello. Thank you for taking time from your day to meet with us. My name is _____. I work on behalf of the Liberia Strategic Analysis (LSA). LSA has been engaged by USAID to conduct an independent performance evaluation of the Liberia Municipal Water Project II (LMWP II) and Capital Improvement Project (CIP), implemented by Tetra Tech and UIP. We are conducting some interviews with key actors, stakeholders and consumers in Monrovia/this area to provide an independent review of the overall progress of the LMWP II/ CIP activity in Liberia.

We are kindly inviting you to participate in an interview as a key informant for this evaluation based on your knowledge of _____. This interview will include discussions on the infrastructure and construction, quality, cost, and capacity-building efforts that were part of the LMWP II/ CIP activity. We anticipate that our conversation will last about 45-60 minutes. There are no risks to participating in this interview, and there are no direct benefits, although your participation will provide useful information that USAID, the GoL and others will be able to use to improve programming in the future.

We hope that you will feel free to share your information and opinions with us. We will take notes of our discussion for our own analytical purposes. Your opinions are important to us, and we will synthesize the information you provide during this interview with information provided by others and present our aggregated findings in a report to USAID/Liberia, and eventually publicly shared. Your name, contact information, and other identifiers will not be published in the report. We will keep your identifying information confidential. No personal quotes or reflections will be linked to you. Your personal information will be recorded on a separate sheet of paper from the rest of the interview notes and will be kept separately. Only LSA and USAID will receive a list of persons interviewed to ensure the evaluation spoke to the appropriate stakeholders, but this will not be published nor tied to any information shared by you.

While we hope you will participate and value your perspective, your participation is voluntary, and you are under no obligation to participate in this interview. You are free to decline to participate, to end the interview at any time for any reason, or to refuse to answer any question without penalty. To withdraw from or refuse to participate in this interview, just inform me of your decision.

Questions: If you have any questions about this study, you may contact our supervisor in Monrovia, Carla Trippe: +231-888-106151; ctrippe@socialimpact.com; or the Social Impact Institutional Review Board (IRB) in the USA: +1-240-938-6655; irb@socialimpact.com.

Agreement to Participate:

Do you have any questions?

Do you agree to participate?

Record consent: 1. Yes 2. No

Key Informant Interview Tool

Semi-structured Questionnaire

Read the Interview Protocol.

Consent given for this interview (circle one): Yes No (if no, stop the interview)

Interviewer's Name: _____

Note-taker's Name: _____

Respondent's Name: _____

Organization: _____

Role/ Position: _____

Location: _____

Date: _____

Q1. Can you tell me what your role entails with regards to LMWP II and/or CIP?

- What are your tasks and responsibilities?
- Who do you report to?
- Who reports to you?
- In what geographical areas do you work?

EQ1 and EQ2: Infrastructure Planning, Construction, and Quality

Q2. To what extent has progress been made in the construction of the water system (water treatment plant, distribution system, water kiosks, etc.)?

- How were challenges or delays managed?

Q3. How would you describe the construction phase of the water system (February 2016 to date)? Was it mostly according to plan or were there (many) delays? If the latter, what were the causes of these delays?

- What planning/tracking tools were used by the contractor (UIP)?

Q4. To what extent does the infrastructure conform to the design? Are there (m)any variances? If so, what is the process to apply for variation? Do you have any opinion about the project design, i.e. anything you would have done differently?

Q5. What quality control systems/mechanisms were in place?

- By UIP and Tetra Tech

Q6. What risk management systems/mechanisms were in place?

- By UIP and Tetra Tech

Q7. What financial tracking systems are/were in place?

- By UIP and Tetra Tech

Q8. What are the remaining construction defects that need to be rectified during the defects-liability period? How were previous defects managed?

Q9. What steps were taken to ensure geographical coverage to 90 percent of community members? How is this measured and followed-up? To what extent is the water production (at the treatment plants) able to meet consumer needs?

- Have you heard of any issues from the consumer level, e.g. kiosks are too far, water is too expensive, taste is poor?

- Have you or your team noticed any changes in health outcomes that are directly related to this water activity?

Q10. To what extent was the activity consistent with the national water supply and sanitation sector policies, strategies and priorities of the USAID and GOL? To what extent was the activity relevant to the needs of the target population?

Q11. What do you see as the key accomplishments to date? What are the key weaknesses of the activity?

- Is there any other information regarding the Infrastructure Planning, Construction and Quality you feel would be useful for this evaluation?

EQ3: Capacity Building and Cost Sustainability

Q12. What are your views on the institutional framework and the underlying contracts/MoUs?

- What are the strengths? What are the weaknesses/limitations?
- Do you have any recommendations to improve the (current or similar, future) framework and/or underlying contracts/MoUs?

Q13. To what extent will the institutional framework and the underlying contracts and MoUs facilitate financial sustainability of the capital investments?

- Are the revenues sufficient (or will they be in the long-term) to fully cover operation & maintenance costs of the water systems? (i.e. full O&M cost recovery)
- If not, does the institutional framework and the underlying contracts and MoUs provide sufficient guidance (and legality) to facilitate financial sustainability – and expansion – of the water systems? (i.e. is MFDP committed to continue subsidizing the water systems through LWSC?)

Q14. To what extent is LWSC at the national level and site capable (i.e. having knowledge, skills, systems, procedures and resources) to monitor progress against targets? Consider production quality, quantity and revenue.

- To what extent was LMWP II / Tetra Tech instrumental in that? (How appropriate and effective was capacity-building?)

Q15. What Monitoring and Evaluation systems are/were in place? Measuring what?

- By LWSC
- By Tetra Tech

Q16. To what extent is Pump and Tank Maintenance Company (PTMC / OMC) able to operate and maintain the water systems?

- To what extent was LMWP II / Tetra Tech / UIP instrumental in that? (How appropriate and effective was capacity-building?)

Q17. Given your experience with the project, do you have suggestions for improving its performance and/or for future similar projects? What are the lessons learned to date?

Closing

Is there any other information you feel would be useful for this evaluation?

Is there any other person you recommend us to interview?

Are there any additional documents you recommend us to look at?

Summary of the discussion, key findings, and thoughts to move forward:

Adapted Key Informant Interview Tool for AfDB-related interviews

Semi-structured Questionnaire

Read the Interview Protocol.

Consent given for this interview (circle one): Yes No (if no, stop the interview)

Interviewer's Name: _____

Note-taker's Name: _____

Respondent's Name: _____

Organization: _____

Role/ Position: _____

Location: _____

Date: _____

(Q1.) Can you tell me what your role entails with regards to LMWP II and/or CIP?

- What are your tasks and responsibilities?
- Who do you report to?
- Who reports to you?
- In what geographical areas do you work?

EQ1 and EQ2: Infrastructure Planning, Construction, and Quality – adapted questions

(Q2.) Please tell us about the project you worked on, in detail.

- Were there any delays? How were they managed?
- What is the set-up of LWSC staff at the outstations? Do they receive any benefits (per diem, accommodation, etc.) to live there? What about for Monrovia-based staff who travel to the outstations?

(Q11.) What do you see as the key accomplishments to date? What are the key weaknesses/challenges of the activity?

EQ3: Capacity Building and Cost Sustainability – adapted questions

(Q12.) What is the related framework/MoU/documents for the agreement between LWSC and AfDB? Are any other partners involved? Can we have copies of these documents?

- What are the strengths?
- What are the weaknesses/limitations?
- Do you have any recommendations to improve the (current or similar, future) framework and/or underlying contracts/MoU's? What are the lessons learned? How can those lessons learned be used to help the water sector in its own reform plan?

(Q13.) What model is AfDB/LWSC using to facilitate financial sustainability? Can you explain the Social Connection Fund and how it works?

- Are the revenues sufficient (or will they be in the long-term) to fully cover operation & maintenance costs of the water systems (i.e. full O&M cost recovery)?
- If not, do the AfDB/LWSC underlying contracts provide sufficient guidance (and legality) to facilitate financial sustainability – and expansion – of the water systems?
- Do you have any plans to expand these projects in the future?

(Q14.) To what extent has LWSC been able to take ownership of the infrastructure according to the AfDB model and their related framework/MoU?

- What could be better?

- To what extent was AfDB instrumental in that? What capacity-building plan, if any, did AfDB plan for LWSC? How much of this has been achieved to date, i.e. what trainings? How is this going?

(Q15.) What Monitoring and Evaluation systems are/were in place? Measuring what?

- Who is in charge of collecting and analyzing this data?
- What is the process of reporting on and verifying this data?

(Q17.) Given your experience with the project, do you have suggestions for improving its performance and/or for future similar projects? (What are the lessons learned to date?)

Closing

Is there any other information you feel would be useful for this evaluation?

Is there any other person you recommend us to interview?

Are there any additional documents you recommend us to look at?

Summary of the discussion, key findings, and thoughts to move forward:

Consumer Interview Tool

Semi-structured Questionnaire for consumers at the water kiosk, as part of the kiosk site visits

This interview guide is meant to be carried out as a loosely-based discussion with community members (consumers) who will be identified at the water distribution points (kiosks) during site visits. There is a section at the end of this tool to add notes about the discussion with the Kiosk Operator as well; questions will be posed to the operators based on the context, considering relevant questions from the KII guide.

Consent given by community members for this interview (circle one):

Yes No (if no, stop the interview)

Interviewer's Name: _____

Note-taker's Name: _____

City: _____

Specific location: _____

Date: _____

Number of consumers present / number spoken with: _____

Q1. How is your experience at this water kiosk?

- What's good?
- What's bad?
- What should/could be better?
- How's the service of the operator?

Q2. Does this water source provide sufficient/enough water throughout the year?

- Since when have you had a functioning and completed water system?
- Do you come and buy water year-round or only during the dry season?
- Can you collect water 24/7? If not, when can/can't you collect water (normally)?
- Is the kiosk often closed for other reasons? I.e. malfunction (at kiosk) or no water (from treatment plant)?
- Are there any broken or malfunctioning water distribution points (kiosks) or other infrastructure? Where? How long have they been broken? How does this affect your water access?

Q3. How far is the kiosk from your home?

- How far do you walk/travel?
- How often do you come here to collect water? Primarily who collects the water in your family?
- Do you know someone in your community who doesn't have water access? Who, why?

Q4. What is your opinion on the water provided here?

- Taste, color, odor, overall quality
- Cost: expensive/cheap? What is the monthly/daily cost of water to the households receiving water? _____ (per household)
- Affordability: if expensive, from where do you find the money? (What purchasing do you give up to find the money to pay for the water?) How is this different for households/areas getting subsidies?
- How does this water source compare to other water sources?

Q5. What do you use the water for?

- Drinking
- Cooking
- Bathing
- Sanitation and hand-washing
- Cleaning/Washing (laundry and/or house)
- Other, e.g. animals, irrigation

Q6. Has the water kiosk impacted your life? (open-ended, no prompt)

- I now have to walk less far to collect water
- I/we now only drink treated water
- I/we suffer less diarrhea (or other health outcomes)
- Other:

Other comments and observations, and notes from discussion with the Kiosk Operator:

Business Interview Tool

Semi-structured Questionnaire for potential commercial water clients

This interview guide is meant to be carried out as a loosely-based discussion with business owners (potential water consumers) who will be identified through snowball sampling in the three sites.

Consent given by business-owner for this interview (circle one):

Yes No (if no, stop the interview)

Interviewer's Name: _____

Note-taker's Name: _____

City: _____

Specific location: _____

Type of business: _____

Date: _____

Number of business owners present / number spoken with: _____

Q1. What is your current water source?

- What should/could be better about it?

Q2. Does this water source provide sufficient/enough water throughout the year?

- Where do you buy water during the dry season?
- Can you collect water 24/7? If not, when can/can't you collect water (normally)?

Q3. How far is your current water source from your home? Please explain this process.

- How far do you walk/travel?
- How often do you collect water? Primarily who collects the water for your facility?

Q4. Can you describe the quality of this water?

- Taste, color, odor, overall quality
- Cost: expensive/cheap?
- Affordability: if expensive, from where do you find the money? How much would you be willing to pay for water?

Q5. What do you use the water for?

- Drinking – if no, where do you get drinking water?
- Cooking
- Bathing
- Sanitation and hand-washing
- Cleaning/Washing (laundry and/or house)
- Other, e.g. animals, irrigation

Q6. Are you aware of the LMWP water kiosks? What barriers do you face to access those kiosks, if any?

- How does the kiosk compare to other water sources around here?
- Are you interested in having a water connection directly to this facility?
- How much would you be willing to pay to set up a water connection point to your business?

Other comments and observations:

ANNEX H: OUTSTANDING ITEMS FOR UIP'S DEFECTS-LIABILITY PERIOD

There are no defects in the infrastructure works, but there were outstanding issues at the time of the evaluation that, according to UIP, have since been resolved. As of November 2018 (as already reported to USAID), issues for each of the three sites for UIP's defects-liability period included:

Outstanding issues identified in Sanniquellie include:

- **Delivery of Materials:** Delays in delivery of materials for leak repairs on walls penetration in the sedimentation basin and the clear well tank in the pump room. Delivery of sand filter media for use during contractor liability period is in progress.
- **Erosion at the WTP Site:** UIP was advised to control soil erosion within the WTP site, around the solar field and along the distribution network during the rainy season. Planting of grass around WTP site to control soil erosion is required. Also, proper backfilling and compaction of eroded areas along the pipe lines.
- **WTP Influent Room:** Water leakages are observed at the inlet to the aeration basin and at the ceiling/wall joint.
- **Cascade Aerator:** Repairing of leakages at inlet and adjacent rooms and epoxy painting of the basin is required according to the Technical Specifications. Epoxy painting to be done during the contractor liability period.
- **Sedimentation Basin:** Epoxy painting of the basin is required according to the Technical Specifications. Leakages on the walls of the basin to be repaired.

Outstanding items in Voinjama include:

- Epoxy paint for the aeration basin, sedimentation basin, and clear water tank. Epoxy arrived on site in July 6, 2018. UIP to apply the paint after the rainy season, i.e., in October or November 2018.
- Exterior paint flaking off at the intake building, elevated water tank, and standard kiosks. UIP to repair the paint after the rainy season.
- Quality issues listed in the live O&M activity tracker and updated weekly.

Outstanding items in Robertsport include:

- Leakage within the roof slab and sliding windows of the office building.
- Procurement and delivery of additional filter media materials for the O&M phase.

ANNEX I: COST OF SERVICES ASSUMPTIONS AS OF AUGUST 2015

The data listed here are cost-related assumptions made for the MOU (August 2015) used to calculate financial models and projections.

COS Assumptions as of August 2015

1. Annual rate of inflation: 7.5 percent (<http://www.tradingeconomics.com/liberia/inflation-cpi>)
2. Study period from 2017 to 2036
3. Population based on Master Plan projections (based on 2008 census baseline and growth rates)
4. Percent coverage increases from 90 percent to 100 percent
5. Residential demands increase from 1.3 gpcd (5 lpcd) to 13.2 gpcd (50 lpcd)
6. Chlorine (HTH) effectiveness: 70 percent
7. Cost of HTH: \$5.84/lb
8. Materials cost for solar O&M per solar designer (Robertsport: approx. \$13,000/year, Sanniquellie and Voinjama: approx. \$20,000/ year).
9. Energy costs of \$0.204/kWH for Robertsport and \$0.107/kWH for Sanniquellie and Voinjama. These values account for the renewable energy fraction and generator efficiency in the solar-diesel hybrid system.
10. Staffing levels based on organograms approved by LWSC in February 2014.
11. Personnel costs based on LWSC provided rates March 2015.
12. Other fixed costs such as training, vehicles/transport, administrative/office, maintenance/operations (e.g. tools, equipment, wearing apparel) based on LWSC 2012 annual report, information gleaned from the current Robertsport operation, and professional judgment.
13. LWSC Head Office (HO) allocation is proportionally based on number of connections or HH served in the specific service area divided by the total number of LWSC connections or HH served. Total HO costs were extrapolated based on data received from LWSC in Nov 2013.
14. Does not account for depreciation or return on rate base.

Revenues Collected

1. Unaccounted for water: 15 percent
2. Non-residential demands: 12 percent of the residential demands
3. Collection efficiency ranges from 95 percent in the first years of operation to 85 percent in later years to reflect a shift from cash and carry operations to direct connections.
4. Single tariff set for all customer classes.

WTP and ATP

1. Monthly WTP ranges from the 2012 HH survey (Robertsport: \$9.38-\$18.75, Sanniquellie: \$12.50-\$25.00, Voinjama: \$7.29-\$14.58)
2. Median monthly surplus income from 2012 HH survey represents 2012 ability to pay (Robertsport: \$35.42, Sanniquellie: \$40.56, Voinjama: \$30.56) as it represents income from which households could potentially draw on for spending on an improved water source.
3. 2012 WTP and ATP amounts increased by a factor of 10 percent per year to account for increases in Gross National Income (GNI) per capita. GNI grew by 22.2 percent in 2011, 12.1 percent in 2012, and 10.8 percent in 2013. (<http://data.worldbank.org/country/liberia>)
4. For Voinjama only, an additional factor of 20 percent was applied to the 2012 WTP and ATP values to account for the fact that the HH size increased from 5 ca/HH to 8 ca/HH between 2012 and 2014.
5. HH size is based on 2014 HH survey (Robertsport: 6 ca/HH, Sanniquellie: 9 ca/HH, Voinjama: 8 ca/HH).

ANNEX J: DISCLOSURE OF ANY CONFLICTS OF INTEREST

Disclosure of Conflict of Interest for USAID Evaluation Team Members

Name	William S.H. Doe
Title	Financial Analyst
Organization	
Evaluation Position?	<input type="checkbox"/> Team Leader <input checked="" type="checkbox"/> Team member
Evaluation Award Number (contract or other instrument)	
USAID Project(s) Evaluated (Include project name(s), implementer name(s) and award number(s), if applicable)	
I have real or potential conflicts of interest to disclose.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If yes answered above, I disclose the following facts: <i>Real or potential conflicts of interest may include, but are not limited to:</i> <ol style="list-style-type: none"> 1. Close family member who is an employee of the USAID operating unit managing the project(s) being evaluated or the implementing organization(s) whose project(s) are being evaluated. 2. Financial interest that is direct, or is significant though indirect, in the implementing organization(s) whose projects are being evaluated or in the outcome of the evaluation. 3. Current or previous direct or significant though indirect experience with the project(s) being evaluated, including involvement in the project design or previous iterations of the project. 4. Current or previous work experience or seeking employment with the USAID operating unit managing the evaluation or the implementing organization(s) whose project(s) are being evaluated. 5. Current or previous work experience with an organization that may be seen as an industry competitor with the implementing organization(s) whose project(s) are being evaluated. 6. Preconceived ideas toward individuals, groups, organizations, or objectives of the particular projects and organizations being evaluated that could bias the evaluation. 	


I certify (1) that I have completed this disclosure form fully and to the best of my ability and (2) that I will update this disclosure form promptly if relevant circumstances change. If I gain access to proprietary information of other companies, then I agree to protect their information from unauthorized use or disclosure for as long as it remains proprietary and refrain from using the information for any purpose other than that for which it was furnished.

Signature	William S. H. Doe
Date	August 23, 2018

Disclosure of Conflict of Interest for USAID Evaluation Team Members

Name	BOSA C. OKEKE
Title	CIVIL ENGINEER
Organization	
Evaluation Position	<input type="checkbox"/> Team Leader <input checked="" type="checkbox"/> Team member
Evaluation Award Number (contract or other instrument)	
USAID Project(s) Evaluated (Include project name(s), implementer name(s) and award number(s), if applicable)	
I have real or potential conflicts of interest to disclose.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>If yes answered above, I disclose the following facts:</p> <p>Real or potential conflicts of interest may include, but are not limited to:</p> <ol style="list-style-type: none"> 1. Close family member who is an employee of the USAID operating unit managing the project(s) being evaluated or the implementing organization(s) whose project(s) are being evaluated. 2. Financial interest that is direct, or is significant though indirect, in the implementing organization(s) whose projects are being evaluated or in the outcome of the evaluation. 3. Current or previous direct or significant though indirect experience with the project(s) being evaluated, including involvement in the project design or previous iterations of the project. 4. Current or previous work experience or seeking employment with the USAID operating unit managing the evaluation or the implementing organization(s) whose project(s) are being evaluated. 5. Current or previous work experience with an organization that may be seen as an industry competitor with the implementing organization(s) whose project(s) are being evaluated. 6. Preconceived ideas toward individuals, groups, organizations, or objectives of the particular projects and organizations being evaluated that could bias the evaluation. 	

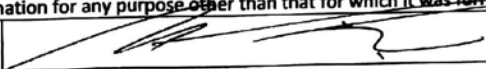
I certify (1) that I have completed this disclosure form fully and to the best of my ability and (2) that I will update this disclosure form promptly if relevant circumstances change. If I gain access to proprietary information of other companies, then I agree to protect their information from unauthorized use or disclosure for as long as it remains proprietary and refrain from using the information for any purpose other than that for which it was furnished.

Signature	
Date	20.08.2018

Disclosure of Conflict of Interest for USAID Evaluation Team Members

Name	Marco Visser
Title	MSc
Organization	Social Impact
Evaluation Position?	<input checked="" type="checkbox"/> Team Leader <input type="checkbox"/> Team member
Evaluation Award Number (contract or other instrument)	
USAID Project(s) Evaluated (Include project name(s), implementer name(s) and award number(s), if applicable)	Liberia Municipal Water Project II Midterm and Capital Improvement Project Final Performance Evaluation, Liberia
I have real or potential conflicts of interest to disclose.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If yes answered above, I disclose the following facts: <i>Real or potential conflicts of interest may include, but are not limited to:</i>	
<ol style="list-style-type: none"> 1. Close family member who is an employee of the USAID operating unit managing the project(s) being evaluated or the implementing organization(s) whose project(s) are being evaluated. 2. Financial interest that is direct, or is significant though indirect, in the implementing organization(s) whose projects are being evaluated or in the outcome of the evaluation. 3. Current or previous direct or significant though indirect experience with the project(s) being evaluated, including involvement in the project design or previous iterations of the project. 4. Current or previous work experience or seeking employment with the USAID operating unit managing the evaluation or the implementing organization(s) whose project(s) are being evaluated. 5. Current or previous work experience with an organization that may be seen as an industry competitor with the implementing organization(s) whose project(s) are being evaluated. 6. Preconceived ideas toward individuals, groups, organizations, or objectives of the particular projects and organizations being evaluated that could bias the evaluation. 	

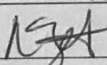
I certify (1) that I have completed this disclosure form fully and to the best of my ability and (2) that I will update this disclosure form promptly if relevant circumstances change. If I gain access to proprietary information of other companies, then I agree to protect their information from unauthorized use or disclosure for as long as it remains proprietary and refrain from using the information for any purpose other than that for which it was furnished.

Signature	
Date	11/9/2018

Disclosure of Conflict of Interest for USAID Evaluation Team Members

Name	Raina Zantout
Title	Consultant - Evaluation Specialist
Organization	WASH for Life
Evaluation Position?	<input type="checkbox"/> Team Leader <input checked="" type="checkbox"/> Team member
Evaluation Award Number (contract or other instrument)	
USAID Project(s) Evaluated (Include project name(s), implementer name(s) and award number(s), if applicable)	LSA 100069 LMWP II / CIP Evaluation
I have real or potential conflicts of interest to disclose.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<p>If yes answered above, I disclose the following facts:</p> <p><i>Real or potential conflicts of interest may include, but are not limited to:</i></p> <ol style="list-style-type: none"> 1. Close family member who is an employee of the USAID operating unit managing the project(s) being evaluated or the implementing organization(s) whose project(s) are being evaluated. 2. Financial interest that is direct, or is significant though indirect, in the implementing organization(s) whose projects are being evaluated or in the outcome of the evaluation. 3. Current or previous direct or significant though indirect experience with the project(s) being evaluated, including involvement in the project design or previous iterations of the project. 4. Current or previous work experience or seeking employment with the USAID operating unit managing the evaluation or the implementing organization(s) whose project(s) are being evaluated. 5. Current or previous work experience with an organization that may be seen as an industry competitor with the implementing organization(s) whose project(s) are being evaluated. 6. Preconceived ideas toward individuals, groups, organizations, or objectives of the particular projects and organizations being evaluated that could bias the evaluation. 	

I certify (1) that I have completed this disclosure form fully and to the best of my ability and (2) that I will update this disclosure form promptly if relevant circumstances change. If I gain access to proprietary information of other companies, then I agree to protect their information from unauthorized use or disclosure for as long as it remains proprietary and refrain from using the information for any purpose other than that for which it was furnished.

Signature	
Date	24-August 2018

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Monrovia, Liberia