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# Lebanon Water and Wastewater Sector Support Year-Four Work Plan

September, 2012

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Lebanon Water and Wastewater Sector Support  
Year-Four Work Plan  
September, 2012  
USAID Contract EPP-I-00-04-00023-00/04

DISCLAIMER

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

## Preface

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The United States Agency for International Development (USAID) Lebanon Mission has contracted with Development Alternatives Inc. (LWWSS) to implement the Lebanon Water and Wastewater Sector Support Program (LWWSS) under contract number EPP-I-00-04-00023-00/04. This program has an effective contract date of October 1, 2009, and an end date of April 30, 2015. LWWSS will implement the project with the participation of Camp, Dresser, Mckee (CDM), ABA, Emerging Markets Group (EMG), ValueAdd Management Services, KREDO, and EMC.

In compliance with the provision of the contract, we hereby submit this work plan, covering the period from October 1, 2011 to September 30, 2012. The document presents a general plan forecasting activities throughout the life of the project. It also presents the year-four activities in greater detail. However, the LWWSS program is a demand-driven program and its operative focus is on flexibility and producing the maximum positive impact of any given activity. As a result, changes in this work plan are inevitable and expected.

In conjunction with the annual procurement and training plans, this work plan presents a complete picture of resource allocation, activities and expected accomplishments.

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Development Alternatives Inc.  
Chief of Party

August 31, 2012

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## Table of Acronyms

ACWUA	Arab Countries Water Utilities Association
AFD	French Development Agency
BMLWE	Beirut and Mount Lebanon Water Establishment
BWE	Beka'a Water Establishment
CAS	Central Agency for Statistics
CDG	Chairman and Director General
CDM	Camp, Dresser and McKee Engineering
CDR	Council for Development and Reconstruction
CIP	Capital Improvement Plan
CIS	Customer Information System
CSR	Customer Service Representative
CIS	Customer Information System
CLIN	Component Line Item Number
COP	Chief of Party
COTR	Contract Officer Technical Representative
CRM	Customer Relationship Management
DAI	Development Alternatives Inc.
DCOP	Deputy Chief of Party
DG	Director General
EIB	European Investment Bank
EU	European Union
ERP	Enterprise Resources Planning
FAS	Finance and Accounting System
GA	Geographic Area and Pilot Area
GIS	Geographical Information System
GIZ	German Technical Assistance
GOL	Government of Lebanon
GNSS	Global Navigation Satellite System
HPIP	High Priority Intervention Plan
HR	Human Resources
IAR	Initial Assessment Report
IRG	International Resource Group
IT	Information Technology
IAR	Initial Assessment Report
JDE	JD Edwards MIS platform
KPI	Key Performance Indicator
LWWSS	Lebanon Water and Wastewater Sector Support
LWPP	Lebanon Water Policy Program
MOEW	Ministry of Energy and Water
MMS	Maintenance Management System
MIS	Management Information System
MOF	Ministry of Finance
MOTGE	<i>Mise en place des Outils Techniques de Gestion de l'Eau</i>
NLWE	North Lebanon Water Establishment
NRW	Non-Revenue Water
NWSS	National Water Sector Strategy
O&M	Operations and Maintenance
PS	Pump Station
PSP	Private Sector Participation
PPP	Public Private Partnership
RFP	Request for Proposal
SCADA	Supervisory Control and Data Acquisition
SLWE	South Lebanon Water Establishment
TNA	Training Needs Assessment
TOR	Terms of Reference
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WE	Water Establishment
WPS	Water Pumping Stations
WW	Wastewater
WWTP	Wastewater Treatment Plant

# **PROGRAM INTRODUCTION**

## **1. The LWWSS Program Objectives**

Based on the initial LWWSS program objectives of building on previous USAID and other donor program progress and as a result of lessons learned during the first three years, the LWWSS program has focused on implementing its work plan within specific areas of Water Establishment (WE) operations, to address individual needs of each WE, and apply knowledge and expertise to leverage the successes accomplished to date.

The program contributes to the WEs' staff capacity building, capital investment planning, operational efficiency, financial management, customer service and outreach of the WEs. It also helps them invest in their infrastructure and equipment to enable them to improve and extend their services to a larger population, and deliver better services to the population.

The areas of focus that the LWWSS program will target include:

- building management capacity within the WEs;
- increasing financial management capacity and financial systems integration;
- procuring equipment to complement technical assistance and capacity building;
- business planning to increase capital planning and benchmarking capacity;
- funding urgent infrastructure works to enhance delivery or access and coverage;
- developing a corporate culture, customer service orientation and public outreach programs.

Ultimately, the program aims to help all four of Lebanon's Water Establishments (WEs) advance towards financial and operational sustainability and overcome the many challenges they face, including staff shortages, an aging workforce, poor customer relations, low tariffs that fail to recover operating costs, lack of metering, excessive non-revenue water, and underinvestment in the water and wastewater infrastructure.

## **2. Water and Wastewater Specific Challenges**

The challenges that face the LWWSS program in year four are many of the same challenges that the program was developed to address in assisting WEs and the MOEW in:

- Streamlining administrative procedures and communications between divisions of the WEs;
- Integrating business processes, modernizing data management, and adopting sound financial management
- Adopting strategic planning processes that enable the WEs to enhance their financial performance, decrease their costs, and plan ahead;
- Improving the operational efficiency of existing infrastructure, expanding the service coverage to the population, and promoting good practice in operations and maintenance;
- Improving customer relations through the promotion of a customer-oriented culture, the implementation of customer-relationship management systems, and

the optimization of customer-related processes such as service applications and claims;

- Building the capacity of the WEs in outreach and communication, as well as funding key outreach activities that contribute to enhancing the WEs' performance and promoting water conservation;
- Supporting the integration of wastewater management into the WEs' operations and investigating measures to enable wastewater plant operation and maintenance in pilot areas.

These challenges are addressed through LWWSS' work plan in specific WEs and activities that are presented below. Changes in some activities are expected during the year, and the LWWSS program remains flexible to adapt to changed policies and circumstances of the WEs and the MOEW.

# SUMMARY OF YEAR-FOUR ACTIVITIES

## 1. Background

Over the course of the past three years, the LWWSS program has implemented a series of activities, distributed across six program components<sup>1</sup>, in four water establishments. Many of these activities have been completed, while others are ongoing and will proceed throughout year four and into year five. Some have been modified or suspended as reported on a case by case basis, through work plan updates or amendments.

## 2. Activity Environment

The LWWSS team has planned year-four activities (both new and ongoing) while taking into consideration the strengths and weaknesses of each water establishment.

The process of assessing and identifying work plan activities takes into account the following:

- **Continuation Activities:** Many of the year-four activities (and their sub-components) are continuation activities from year three. They relate to the continuing implementation and support in areas such as equipment procurement, infrastructure services and works, operation and maintenance of supplied equipment, capacity building in preventive maintenance, and continuing service agreement with suppliers on completed activities. A number of activities also relate to the continuation in the supply of key consumables during the months following an activity's completion.
- **LWWSS Activities' Contribution to Other Efforts within the Water Sector in Lebanon:**

LWWSS' activities are increasingly being integrated into the beneficiaries' projects and other donors' contribution, which further increases the sustainability of these activities and multiplies their benefits.

Examples include:

- The UNDP's Lebanon hydrological survey is relying on the database produced by the LWWSS' Pump Station Survey and well tests in SLWE to build the hydrological database for Lebanon; SLWE (through the support of GIZ) will also use that same database as a key source of information in the development of the South Lebanon water supply master plan.
  - The coordination between the LWWSS team and the UNDP-funded Lebanese Center for Water Conservation led to the planning of a number of outreach efforts by the Center, by relying on existing efforts, experience and outreach documentation produced by the LWWSS program during the year-two and year-three outreach activity with youth in schools in BWE, NLWE and SLWE.
- **Contribution to the WEs' Business Plan Targets and MOEW's National Water Sector Strategy (NWSS):** In those water establishments where a five-year business

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<sup>1</sup> There originally were seven components in LWWSS but component one, development of the HPIP and IAR, was completed in the first six months of year one.

plan has been drafted and adopted, the LWWSS program is emphasizing activities that contribute to the achievement of those business plan targets and objectives. Further, the LWWSS program is aligning our project work planning to the Ministry of Energy and Water's (MOEW) National Water Sector Strategy (NWSS), which guides the planning and implementation of both capital and enabling initiatives such as legal reforms, tariff regulation, metering and management of the wastewater sector. The BWE Water Supply and Sewerage Master Plan, the BWE Water Quality Testing Protocol, and the SLWE source metering supply and installation are all projects that strongly take into account the guidance of NWSS and the WE's business plans.

- **The Importance of WE Staff Recruitment and Training**

The lack in skill, effectiveness and availability of staff remains a challenge within most WEs. Across all the program's components, the LWWSS program is focusing on assisting the WEs with appropriate employee placement and establishing training programs. Training and proper placement are especially applicable for procurement activities. For example, during year-three, LWWSS assisted SLWE in allocating adequate roles and responsibilities of staff within the Saida water analysis laboratory in the South Lebanon Water Establishment (SLWE) and provided these staff with specialist training, to enable optimal resources being dedicated to the atomic absorption meter provided under the program. Similarly, LWWSS continuing its assistance to BWE in allocating personnel to the operation and maintenance of chlorination equipment donated by UNICEF and installed by USAID.

- **Supply of Consumables to Equipment Procured**, where appropriate, to enable the equipment to be operated, trained on, and serviced during the warranty period, thereby ensuring sustainability of the program's activity while gradually building the WE's capacity to take possession and assume funding of the equipment's operation and maintenance. The provision of consumables is also complemented by a written commitment from WEs prior to each major procurement, confirming that the WE will supply the future consumables and assume the O&M responsibility for the procured equipment.

### 3. Wastewater Challenges

Wastewater is not a sector priority for the GOL, as proven in the NWSS document and by MOEW's allocation of funding for projects in the sector. The political leadership in Lebanon is focused on providing adequate water supply to the population. Although the MOEW has included wastewater in its NWSS, water remains by far the main focus of the strategy and wastewater will be addressed after the water supply issues and problems have been resolved. While the GOL might work with donors in the construction of wastewater treatment plants, the administrative infrastructure to be able to fully assume oversight of the service is lacking. The NWSS provides policy guidelines and should be supported in the future by clarifying legislation and regulations and funding for wastewater, generally after water supply is addressed.

Another indication of the secondary focus that wastewater has within the MOEW and NWSS is that only recently has the NWSS implementation plan begun to address the establishment of wastewater divisions within the MOEW and WEs. This task has been undertaken by GIZ over two years ago and is nearing completion as far as the proposed organizational and by-law changes. The process of establishing these divisions within the MOEW (and WEs) may take several years based on the lengthy administrative process (Ministry, Council of Minister

and, maybe, even Parliamentary approval), current funding limitations, and difficulties in filling permanent positions within each organization, which is why LWWSS chose to develop and propose the service area agreement approach.

In the meantime, LWWSS has continued to search and implement activities that would address the complex operating environment for wastewater systems within the BWE's jurisdiction. The sustainability of existing wastewater treatment plants is very much in question based on the fact that the Ministry of Energy and Water (MOEW), and the WEs may not have sufficient revenue to properly operate the existing wastewater treatment plants (provided by donors).

Additionally, there is a lack of commitment by the MOEW in establishing a full division at the ministry to plan, guide and regulate wastewater services, although the recent National Water Sector Strategy (NWSS) implementation plan moves positively in the direction of having a more robust organization overseeing wastewater collection and treatment. The implementation plan for the NWSS envisions passage of legislation that would address glaring problems existing in Law 221 and its subsequent amendments as well as changes within the Ministry to regulate wastewater services. However, changing legislation may take several years, if passed at all.

Since municipalities have installed, or at least own sewage collection systems installed by donors or the GOL, the BWE must work with the municipalities to define what the municipality will be responsible for and what the WE would be responsible for.<sup>2</sup> Unless the wastewater treatment plant is also owned by the municipality, the WE would assume operations and maintenance responsibility for the wastewater treatment plant and the municipality would continue operations and maintenance of the sewage collection lines.<sup>3</sup> The laws, Law 221 and its amendments, must be updated and improved to include clearer definitions of authority, management, and accountability. However, this effort could take many years and still not achieve the needed changes given the lengthy time it takes to pass legislation that entails some controversy (the WE role versus the municipality role are governed by two ministries and entail substantial political consideration).

With this working context in mind, LWWSS has attempted to work out how the two parties could come together, under current legislation, to assign responsibility, authority, and costs for providing wastewater services within the BWE. A pilot activity was planned and worked on in years two and three that would have the BWE and at least one municipality of three municipalities where USAID funded the construction of a wastewater treatment plan address the full spectrum of wastewater services. That is, through the use of a service agreement between a municipality and the BWE, many of the shortcomings of Law 221 and its amendments could be avoided. By contractually agreeing what authority, responsibility, accountability, and cost would be assumed by each party, the initial intent of Law 221 would be attained without waiting for additional legislation. Concurrently, the parties to the agreement would negotiate what costs and work each would carry out in providing the full wastewater service (collection, treatment, sludge disposition and effluent quality).

In addition to the challenges mentioned above, The LWWSS program also found that most WEs, notably BWE, SLWE and NLWE, are still incapable of assuming the financial

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<sup>2</sup> Law 221 uses the term responsibility for operations and maintenance but never defines it.

<sup>3</sup> Ownership is not well defined in the laws relating to wastewater treatment plants (WWTP). The current situation is that the MOEW owns most the WWTPs and the WWTPs are operated and maintained by the WEs. Continuation of this ownership by the MOEW is assumed in this work plan.

responsibility for subcontracting the operations and maintenance of the wastewater treatment plants, nor do they have the qualified personnel to take over the operations and maintenance itself. Despite some progress in the case of SLWE's taking over of the Saida plant, and of NLWE taking over the Tripoli plant, the WEs are yet to be given authority to legally enforce levy a firm wastewater tariff. This lack of authority further limits the WEs' resources and perpetuates the lack of commitment for wastewater service improvement and limits how much the LWWSS program can do to assist in the improvement of wastewater services in the WEs.

#### **4. Activity Selection Criteria**

Activity selection by LWWSS is based on extensive, participatory investigation through LWWSS's and subcontractors' specialists, using the following criteria:

- Activity being demand-driven
- Activity not duplicating other donor's efforts
- Specificity and focus of the activity
- Relevance to the LWWSS scope and work plan activities
- Availability of LWWSS funds
- Impact on the water establishment's long-term operations
- Sustainability of the activity in terms of operating costs, technology, availability of human skills and training required
- Timing and anticipated schedule of activity
- Measurable benefit and quantifiable outcome of the activity

Selected activities are the result of an iterative and investigative process of applying these criteria to a broader list of identified activities.

#### **5. Program Activity Matrix**

The list below includes three types of activities:

- Ongoing activities started earlier;
- Activities completed;
- New activities planned for year four onwards.

The table below consolidates all of LWWSS' activities to date, including those that were fully or partly completed, and identifies them by component and beneficiary. It also shows the status of each activity.

Table 1:

Item	Description	Beneficiary				Outcome by end of Year Four	Target Date
		BML	B	NL	SL		

Component 2: Capacity Building for Managerial, Technical and Operational Efficiency							
2.1	<b>Establishing and Building the Capacity of Metering Teams</b>				✓		
2.1.1	Assist in identifying metering teams and assess training needs				✓	- Activity conducted	September, 2013
2.1.2	Provide management team and field team training on metering				✓	- Activity conducted	September, 2013
2.1.3	Provide technical assistance (studies, training, study tours) and/or technological tools for water demand management				✓	- Activity conducted	September, 2013
2.2	<b>Building the WEs' Water Quality Management Capacity</b>		✓				
2.2.1	Conduct water quality baseline survey based on seasonal sampling of all sources, with on-the-job staff training		✓			- Activity Completed for Dry Season. Wet Season in end 2012 - Assessment issued to BWE	January, 2013
2.2.2	Establish a region-specific and Libnor-compatible testing protocols and methodology		✓			- Completed, assessment issued to BWE	May, 2013
2.2.3	Plan and conduct a comprehensive user training on all aspects of lab operation		✓			- Activity completed	May, 2013
2.3	<b>Build Pump Stations Operators Capacity in Operation and Maintenance</b>		✓	✓			
2.3.1	Pump station operators basic O&M and H&S training (70+ staff)		✓	✓	✓	- Activity completed in Year Two. Will be repeated in BWE and SLWE.	September, 2013
2.3.2	Pump station operators advanced training in O&M			✓		- Activity completed - Follow-on in place	December, 2012
2.4	<b>Capacity Building in Enhancing Administrative Performance</b>	✓	✓				
2.4.1	IT literacy training (Windows, Word, Excel, Access, PowerPoint) training aiming at increasing staff productivity	✓				- Training completed - Follow-up in place	September, 2012
2.4.2	Public administration and process management training aiming at increasing staff familiarity with WE systems and processes		✓			- Training completed - Follow-up in place	September, 2013

**Legend**

✓ Activities conducted wholly by LWSSS

• Activities conducted in collaboration with other donors



New activities for year-four onward



Completed activities

Item	Description	Beneficiary				Outcome by end of Year Four	Target Date
		BML	B	NL	SL		

**Component 2: Capacity Building for Managerial, Technical and Operational Efficiency**

2.5	<b>Increasing Capacity in Water Distribution Network Monitoring and Repair</b>		✓				
2.5.1	Basic training on network maintenance, monitoring and repair, for existing and newly recruited network team personnel		✓			- Training completed - Follow-up in place	September, 2013

**Component 3: Increase Financial and Commercial Viability of Water Establishments**

3.1	<b>Upgrade Finance and Accounting Standards and Methods</b>	✓	✓	✓			
3.1.1	Build the WE capacity in consolidating and issuing end of year financial reports	✓	✓			- Information collected - Reports produced	March, 2012
3.1.2	Training in Public Accounting, Finance, Procurement, Auditing	✓	✓	✓		- Training completed - Follow-up in place	February, 2012 (BWE) April, 2013 (NLWE)
3.1.3	Define cost centers, create/update chart of accounts, and accounting coding procedures	✓	✓	✓		- Information collected - New COAs and procedures defined	March, 2012 (BWE+BML); Sep, 2012 (NLWE)
3.1.4	Develop procedures for asset and inventory identification, coding and valuation	✓	✓	✓		- Procedures defined with the WE	March, 2012; (BWE+BML) Sep, 2012 (NLWE)
3.1.5	Develop procedures and a standard manual for yearly budgeting within the WE, and conduct applied training to key departments.	✓				- Procedures defined, manual produced, training conducted.	September, 2013
3.1.6	Develop procedures and a standard manual for internal audit within the WE, and conduct applied training to key departments.			✓		- Procedures defined, manual produced, training conducted.	September, 2013
3.1.7	Develop module, procedures and provide training on the Cost Tariff Model for Strategic Planning and Budgeting	✓				- Module installed and connected to ERP; - Procedures defined, training conducted	September, 2013

**Legend**

- ✓ Activities conducted wholly by LWSS
- Activities conducted in collaboration with other donors

- New activities for year-four onward
- Completed activities

Item	Description	Beneficiary				Outcome by end of Year Four	Target Date
		BML	B	NL	SL		

**Component 3: Increase Financial and Commercial Viability of Water Establishments**

3.2	<b>Integrate the WEs Financial, Accounting, Customer Service and Business Process Systems</b>	✓	✓				
3.2.1	Conduct business process mapping	✓	✓			- Workflow mapping completed and approved by WE	
3.2.2	Implement or upgrade Finance and Accounting System (FAS) and Customer Relationship Management (CRM) solution	✓	✓			- Activity completed	October, 2012
3.2.3	Implement intranet system enabling web-browser based e-training, communication and business process tools	✓	✓			- Activity completed	March, 2013
3.2.4	Conduct training, assist in transition phase and provide one/two year on site support	✓	✓			- Activity completed	September, 2013
3.2.5	Supply and install time attendance machines and implement administrative and HR measures to increase HR efficiency		✓			- Activity completed	September, 2012
3.3	<b>Pilot Stakeholder Exercise to Sustain O&amp;M of USAID WWTP</b>		✓			- Assessment report	September, 2012

**Component 4: Capital Investment Planning and Program/Project Management**

4.1	<b>Increase Capacity in Business Planning, Capital Investment Planning and Benchmarking</b>	•			✓		
4.1.1	Capacity building in planning and updating 5-year business plans, benchmarking and performance monitoring	•			✓	- Business plan prepared, issued to WE - Follow-up in place	
4.2	<b>Implement Asset Survey, Inventory and Valuation</b>				✓		
4.2.1	Pump-station inventory and valuation, in a format that is ready for integration into FAS, MMS and GIS				✓	- Activity completed in SLWE	June, 2012
4.2.2	Pump station equipment replacement packages for bidding				✓	- Activity completed in SLWE	June, 2012
4.2.3	O&M training needs assessment for pump-station operators				✓	- Activity completed in SLWE	June, 2012

**Legend**

- ✓ Activities conducted wholly by LWSS
- Activities conducted in collaboration with other donors

- New activities for year-four onward
- Completed activities

Item	Description	Beneficiary				Outcome by end of Year Four	Target Date
		BML	B	NL	SL		

#### Component 4: Capital Investment Planning and Program/Project Management

4.3	<b>Build Decision-Makers' Managerial Capacity in Water Utility Management</b>	✓	✓	✓	✓		
4.3.1	Water utility management: conferences, workshops, specialist training and study tours	✓	✓	✓	✓	- Activities planned and undertaken	September, 2013
4.4	<b>Master Planning</b>		✓				
4.4.1	Water Supply and Sewerage Master plan		✓			- SOW defined, consultancy appointed, activity started	September, 2013

#### Component 5: Procurement of Technical Equipment to Strengthen WEs

5.1	<b>Identifying Water Production and Contributing to Water Demand Management</b>				✓		
5.1.1	Supply and install up to 218 production meters, fittings and protection box/manhole (all non-metered sources in WE)				✓	- Activity substantially complete	September, 2013
5.1.2	Establish service agreements, conduct training and complete meter reading				✓	- Activity started	September, 2013
5.2	<b>Upgrading Pumping and Energy Efficiency</b>	✓		✓			
5.2.1	BMLWE: Jeita - Design equipment replacement and sand removal unit solution	✓				- Activity completed	
5.2.2	BMLWE: Jeita - Supply 18 pumps and motors (US made), associated valves, fittings and electrical panel boards	✓				- Equipment delivered to BMLWE	August 2012
5.2.3	NLWE: Test and design the replacement nine submersible pumps and associated works			✓		- Tests completed and design produced	April, 2013
5.2.4	NLWE: Supply and install the replacement nine submersible pumps and associated works			✓		- Procurement stage; contract placed	September, 2013
5.2.5	Establish service agreements, and conduct user training programs for the above activities	✓		✓		- Activity completed for Jeita - Activity planned for NLWE	September, 2013

#### Legend

- ✓ Activities conducted wholly by LWSSS
- Activities conducted in collaboration with other donors

-  New activities for year-four onward
-  Completed activities

Item	Description	Beneficiary				Outcome by end of Year Four	Target Date
		BML	B	NL	SL		

Component 5: Procurement of Technical Equipment to Strengthen WEs							
<b>5.3</b>	<b>Increasing Supply Hours to Areas Facing Supply Shortage</b>			✓			
5.3.1	Supply and install up to 9 back-up generators for key NLWE stations			✓		- Manufacturing and shipping done; - Installation substantially complete	September, 2013
5.3.2	Establish service agreements and conduct user training program for these generators			✓		- Activity in place	September, 2013
<b>5.4</b>	<b>Upgrading the Water Analysis Laboratories</b>		✓		✓		
5.4.1	Upgrade the water testing laboratories with infrastructure and equipment		✓		✓	- Completed in SLWE and BWE - Completed in BWE as per AUB specs (Y4)	September, 2013
5.4.2	Establish service agreements, and conduct user training programs for the above activities		✓		✓	- Activity planned in BWE - Activity completed in SLWE	September, 2013
<b>5.5</b>	<b>Establishing Direct Customer Interface</b>		✓				
5.5.1	Design branch office and customer service center in WE's premises in Zahle		✓			- Design complete and approved by WE	
5.5.2	Implement interior works and furnish the new customer service center; connect IT systems to head office		✓			- Implementation complete - Project handed over to WE	May, 2012
5.5.3	Assist WE in reaching to customers and build staff capacity in customer service		✓			- Activity planned	September, 2012
<b>5.6</b>	<b>Increase IT Infrastructure Efficiency</b>	✓	✓		✓		
5.6.1	Assess and design IT infrastructure for WE headquarters and connectivity to branches	✓	✓		✓	- Report issued and adopted by SLWE	
5.6.2	Upgrade server installation and power supply infrastructure at head office and selected branches	✓	✓		✓	- Activity completed in BWE (Y3) - Activity completed in SLWE (Y4)	September, 2013

**Legend**

- ✓ Activities conducted wholly by LWWSS
- Activities conducted in collaboration with other donors

- New activities for year-four onward
- Completed activities

Item	Description	Beneficiary				Outcome by end of Year Four	Target Date
		BML	B	NL	SL		

### Component 5: Procurement of Technical Equipment to Strengthen WEs

5.7	<b>Upgrade the WE's Topographic Surveying Capacity</b>				✓		
5.7.1.	Supply high accuracy GPS-based topographic survey equipment (GNSS) and associated computer tools				✓	- Equipment delivered - Implementation and training completed	
5.7.2	Conduct user training, assist in transition phase and provide on site support				✓	- Training completed - Follow-up ongoing	

### Component 6: Small to Medium Scale Rehabilitation/Upgrade/Extension Water and Wastewater Works within WEs

6.1	<b>Decreasing Water Losses and Upgrading Existing Networks</b>		✓				
6.1.1	Design network upgrades in Zahle: rehabilitating the water supply network of the region of Mar Elias		✓			- Design completed; Supervision Started	September, 2013
6.1.2	Implement network upgrades in Zahle: rehabilitating the water supply network of the region of Mar Elias		✓			- Contract placed, Works commenced	September, 2013
6.1.3	Design network upgrades in Zahle: rehabilitating five branch networks in Haouche el Oumara, Maalaka, Rassieh, Karak-Forzol and Midan		✓			- Design completed; Supervision Started	September, 2013
6.1.4	Implement network upgrades in Zahle: rehabilitating five branch networks in Haouche el Oumara, Maalaka, Rassieh, Karak-Forzol and Midan		✓			- Contract placed, Works commenced	September, 2013
6.2	<b>Expanding Service Provision to Non-Served Areas</b>			✓			
6.2.1	Beit Mellat, Akkar, North Lebanon: Design metered house connections to up to 12 villages			✓		- Design completed	September, 2013
6.2.2	Beit Mellat, Akkar, North Lebanon: Implement house connections to up to 12 villages			✓		- Procurement completed; Subcontractor appointed	September, 2013
6.2.3	Beit Mellat, Akkar, North Lebanon: Build WE capacity in increasing customer base and implementing consumer metering			✓		- Activity planned	

#### Legend

- ✓ Activities conducted wholly by LWSS
- Activities conducted in collaboration with other donors

-  New activities for year-four onward
-  Completed activities

Item	Description	Beneficiary				Outcome by end of Year Four	Target Date
		BML	B	NL	SL		

**Component 6: Small to Medium Scale Rehabilitation/Upgrade/Extension Water and Wastewater Works within WEs**

<b>6.3</b>	<b>Pump Station Rehabilitation</b>				✓		
6.3.1	SLWE: Test and design pumps, motors and associated works for the rehabilitation of selected stations				✓	- Activity completed	September, 2013
6.3.2	SLWE: Supply and install pumps, motors and associated works for the rehabilitation of selected stations				✓	- Infrastructure contract placed; works commenced	September, 2013
6.3.3	Establish service agreements, and conduct user training programs for the above activities				✓	- Activity planned	
<b>6.4</b>	<b>Water Treatment and O&amp;M Training</b>		✓				
6.4.1	Install up to 20 UNICEF-supplied chlorinator units; Supply and install safety equipment and gas detection systems		✓			- Installation complete	
6.4.2	Training course for operators and year-long service and supply of consumables		✓			- Training conducted (done) - 1 year service agreement, consumables	September, 2012

**Component 7: Corporate Culture, Customer Service Orientation, and Public Outreach**

<b>7.1</b>	<b>Building Customer Service Management Structure</b>		✓				
7.1.1	Build a customer service staffing plan; Coordinate roles and responsibilities between HO and branches		✓			- Activity completed and proposals approved by WE	
<b>7.2</b>	<b>Customer Service Management Capacity Building</b>	✓	✓	✓			
7.2.1	Customer service training aiming at enhancing service effectiveness and increasing customer satisfaction	✓	✓			- Training provided - Follow-up in place	August, 2012
7.2.2	On-the-job capacity building in communication planning			✓		- Training provided - Follow-up in place	

**Legend**

- ✓ Activities conducted wholly by LWSS
- Activities conducted in collaboration with other donors
- New activities for year-four onward
- Completed activities

Item	Description	Beneficiary				Outcome by end of Year Four	Target Date
		BML	B	NL	SL		

Component 7: Corporate Culture, Customer Service Orientation, and Public Outreach							
7.3	<b>Develop Tools and Support WEs in Adopting Corporate Communication</b>		✓	✓			
7.3.1	Design and Implement WE Brand Identity Guidelines			✓		- Activity completed	
7.3.2	Design and Implement WE Corporate Website			✓		- Activity completed	May, 2013
7.3.3	Develop and Adopt Customer Service Application Forms		✓			- Activity completed	March, 2012
7.4	<b>Nation-Wide Customer Satisfaction Poll</b>	✓	✓	✓	✓	- Activity completed in 2009 - Follow-on planned for 2015	Year Five
7.5	<b>Youth Water Conservation Programs</b>		✓		✓		
7.5.1	Elementary school outreach program in Zahle		✓			- Activity completed	
7.5.2	Elementary school outreach program in Jezzine				✓	- Activity completed	
7.6	<b>Consumer-Targeted Awareness Programs: World Water Day, Water Quality, Conservation</b>		✓	✓			
7.6.1	Collections- and conservation-related outreach activity for BWE (TV, radio, press, billboards)		✓			- Activity completed	
7.6.2	Water awareness campaigns on 2012 world water day			✓	✓	- Activity completed	April, 2012
7.6.3	Outreach material promoting public awareness and education on water conservation	✓	✓	✓	✓	- Activity completed	May, 2013

**Legend**

✓ Activities conducted wholly by LWWSS

• Activities conducted in collaboration with other donors



New activities for year-four onward



Completed activities

## YEAR-FOUR ACTIVITY DETAILS

Details on the background, strategy and identification of individual activities are provided within the sections below. The activity narrative, a program schedule, expected outcomes and the resources and teams allocated for each activity are also included. The activities are grouped by water establishment and aggregated by subject.

The following technical assistance and procurement activities, within the components 2, 3, 4, 5, and 7, are anticipated to extend beyond year four. With the exception of activity 4.4.1 (Master Planning), all these activities relate to the continuing maintenance and servicing of equipment and services that were funded during the first four years of the program.

The financial and contractual obligations associated with these extended contracts are limited to the costs of continuing the maintenance and servicing of supplied equipment by the suppliers. These costs cover the maintenance and servicing recommended by the manufacturers, and necessary for maintaining the warranty on the equipment). LWWSS does not envisage requiring additional technical staff to maintain the oversight and management of these contracts. As such, it is foreseen that the team initially planned to support component six during years five and six will provide support to manage the performance, contracts and payments associated with these extended contracts. The list below identifies each of these contracts, the scope foreseen in year five, and the latest contract end date anticipated:

<b>Component 4: Capital Investment Planning and Program/Project Management</b>
<i>4.4.1 – BWE Water Supply and Wastewater Master Plan</i>
This activity is anticipated to extend until the end of April 2014 (16 months from an anticipated commencement date of December, 2012).
<b>Component 5: Procurement of Technical Equipment to Strengthen WEs</b>
<i>5.1.2 – SLWE Source Meter Service, Maintenance and Meter Reading</i>
This activity relates to source meter installation maintenance, warranty, and meter reading for a period of one year per completed site. Our current estimation is that this activity might extend until April 2014 latest.
<i>5.3.2 – NLWE Pump Replacement Service Agreement</i>
This activity relates to the maintenance, warranty, and servicing of the installed pumps in North Lebanon for a period of one year from site completion. Our current estimation is that this activity might extend until September 2014 at the latest.
<i>5.2.5 – NLWE Generators Service Agreement</i>
This activity relates to the servicing and warranties of the installed generators in North Lebanon for a period of up to two years or 2,000 hours of operation from date of installation. Our current estimation is that this activity might extend until April 2015, at the latest.
<i>5.4.2 – BWE Laboratory Equipment Service Agreements</i>
This activity relates to the maintenance, warranty, and servicing of the forthcoming laboratory equipment to be supplied for the BWE laboratory in Zahle. The anticipated period service period will extend until July 2014.

# 1. BEKAA VALLEY WATER ESTABLISHMENT (BWE)

## Component 2: Capacity Building for Managerial, Technical and Operational Efficiency

Table 2

Item	Activity Description	Program Resource	Outcome by End of Year Four	Target Date
<b>2.2</b>	<b>Building the WEs' Water Quality Management Capacity: Water Quality Testing Plan</b>			
2.2.1	Conduct water quality baseline survey based on seasonal sampling of all sources, with on-the-job staff training	AUB	Activity Completed	Jan, 2013
2.2.2	Establish a region-specific and Libnor-compatible testing protocols and methodology	AUB	Activity Completed	Oct, 2013
2.2.3	Plan and conduct a comprehensive user training on all aspects of lab operation	AUB	Activity Completed	March, 2013
<b>2.3</b>	<b>Capacity Building in Operation and Maintenance of Pump Stations</b>			
2.3.1	Pump station operators basic O&M and H&S training (70+ staff)	CDM (BG, GT), LWWSS (MK) Kredo	Activity Completed	May, 2013
<b>2.4</b>	<b>Public administration and Process Management Training</b>			
2.4.2	Public administration and process management training aiming at increasing staff familiarity with WE systems and processes	- EMC (MC), DAI (MK) - Local supplier (TBD)	Training completed Follow-up in place	June, 2013
<b>2.5</b>	<b>Training on Network Maintenance and Repair</b>			
2.5.1	Basic training on network maintenance, monitoring and repair, for existing and newly recruited network team personnel	- DAI (MK) - Kredo/TBD	Training completed Follow-up in place	June, 2013

### Activity 2.2 - Building the WEs' Water Quality Management Capacity: Water Quality Testing Plan

#### *Background*

In September 2011, the LWWSS program started a comprehensive group of activities with the American University of Beirut (AUB) aimed at building BWE's capacity in monitoring and managing water quality, and increasing their transparency and accountability in water quality management.

To date, the BWE has been operating with minimal water quality monitoring, and negligible data management effort. Sources are tested sporadically, testing equipment is minimal (LWWSS arranged for supply of urgent laboratory equipment in year two and year three) and testing methods often do not conform to best

practices. Consumables are often in short supply due to lack of follow-up and funding, and management supervision is weak.

### *Scope*

The activity intends to develop a water quality management plan based on the reality of BWE's water pollution profile, water treatment and testing infrastructure, and human capacity. The plan is scalable and encompasses setting testing standards and methodologies, water monitoring protocols, as well as reporting and management.

This activity includes a comprehensive set of tasks:

1. Review and document the management of potable water by BWE (completed in year three, in May, 2012);
2. Conduct a comprehensive potable water quality survey to establish a database on the quality of water sources feeding distribution networks and water delivered through distribution network, pumping stations and storage reservoirs (will be completed in year four);
3. Develop a comprehensive potable water quality monitoring program (will be completed in year four);
4. Plan the location and specifications of laboratory units (locations, numbers and specifications) needed to implement potable water quality monitoring and prepare an inventory of required laboratory equipment and supplies (completed in year three, in July, 2012).
5. Design and implement a capacity building training program to enable the water establishment staff to conduct monitoring and quality assessment activities (will be completed in year four).

### *Impact*

The above group of tasks will collectively enable BWE to establish a water quality database, accessible to the key management personnel, and potentially accessible to other government agencies and relevant parties, as well as the public. These activities will also enable BWE laboratory and management team to understand the basics of laboratory operations and management, and conduct their activities in accordance with the standard practice. The impact will cover the entirety of the BWE service area and its population and increase the BWE capacity to deliver cleaner water, and enhance its credibility towards its water consumers. The activity impacts a population of over 338,000 served by WE water supply in the Bekaa.

### *Timeframe*

At the end of year three, AUB completed the assessment of the management of water quality in BWE (task 1 above) and identified the needed laboratory equipment and their specifications (task 4 above). Tasks 2, 3 and 5 will be completed in year four. The AUB subcontract extends until April, 2013.

AUB faced some delays (three months) in the water quality monitoring program (task three) due to equipment breakdown within its labs, and difficult access to remote water sites in the Bekaa which resulted in considerable revisits and reprogramming of sample collection efforts. This has now been rectified and will enable the

completion of the task within the time frame of AUB’s subcontract. All these realities, as well as sequencing the activity around the wet and dry seasons, dictate that this activity extends until mid year four (see below schedule for details) instead of end of year three as reported in the year three work plan.

As for the capacity building training (task 5), the course preparation is mostly completed and AUB is ready to provide the training to the existing BWE staff. However, during the last quarter of year three, BWE advised LWWSS that the national Civil Service Board has approved the hiring of additional permanent laboratory employees for BWE. As such, LWWSS and BWE found that it would be more beneficial if the training is delayed until such time as the permanent employees start at the BWE.

This postponement of the training (shown in the table below) would ensure stronger impact in terms of building the capacity of the forthcoming team, enhancing the ability of the laboratory personnel to operate as a coherent unit, and providing a tailored and interactive training course to all the BWE laboratory staff at once. Based on this finding, the training will take place as soon as the newly hired staff commence their duties (an estimate of three month delay is anticipated, however, the confirmed hiring date for permanent staff is not guaranteed given that the LWWSS program relying on the information provided by the national Civil Service Board). The delay in the provision of the training will remain within AUB’s contractual deadline, and will not result in any cost increase to this activity.

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-2 (FY'11)				Y-3 (FY'12)				Y-4 (FY'13)															
		Q2		Q4		Q1		Q2		Q3		Q4		Q1		Q2									
		A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
<b>2.2</b>	<b>Water Quality Testing Plan</b>																								
	Activity introduced *																								
	Subcontract placed with AUB as follows:																								
	Task 1: Review and document management of potable water																								
2.2.1	Task 2: Comprehensive water quality survey (2 seasons)**																								
2.2.2	Task 3: Develop water quality monitoring program																								
	Task 4: Plan location and specification of lab units																								
2.2.3	Task 5: Capacity building program***																								
	* Year Three Workplan																								
	** Delayed until Jan '13 as reported in the year four work plan																								
	*** Delayed until March '13 as reported in the year four work plan																								

Legend  
 Time frame as planned  
 Delays

### Activity 2.3 – Capacity Building in Operation and Maintenance of Pump Stations

#### *Background*

During year two, the LWWSS program successfully completed the Pump Station O&M training for 20 staff at BWE. This training resulted in improved skills and processes for pump station staff in operating and maintaining pump station plant and

equipment, as well as improved health and safety practices. The LWWSS program received requests to continue providing similar training to other existing and forthcoming staff at BWE, to increase knowledge of operators and enhance operation and maintenance at pump stations.

### *Scope*

The training course consists of three to five days of in-class and on-site training, covering all the basic aspects of operating and maintaining a pump station, including:

- Operating the mechanical and electrical equipment;
- Cleaning and maintaining the equipment;
- Electrical, hydraulic and chemical health and safety procedures;
- Facility management basics;
- Chlorinator reading and operating basics;
- First aid.

This activity includes:

- Interviewing the BWE employees that are proposed for the training, and assessing their specific training needs;
- Confirming and agreeing course details to suit the profiles of the selected persons;
- Conducting the training and evaluation both on site and in class;
- Certificate distribution;
- Evaluation and follow-up.

### *Impact*

This activity is a replication of a year two activity that resulted in improved skills and processes for pump station staff in operating and maintaining pump station plant and equipment, as well as improved health and safety practices. This training results in fewer site accidents and equipment breakdown, as well as improved efficiency for pumping and energy consumption. The training impacts five stations, serving a population of over 50,000 in central and south Bekaa.

### *Timeframe*

This activity was planned to take place in year three, however, as mentioned in the year three work plan, this activity will continue into the first half of year four. During year three, most of the preparations for the training took place. However, the training sessions did not happen, due to two factors:

- The unavailability of staff for training during the last quarter of year three due to the increased workload faced by BWE during the dry season and peak of water demand in the Bekaa in the summer of 2012;
- The continued delay in the hiring of new, permanent staff, as well as the delays in renewal of the contracts for the temporary staff at BWE, which created a lack of human resource and uncertainty at BWE: This delay, caused by political and administrative conflicts within the MOEW and between the MOEW and the GOL, resulted in repeated postponement of the training course.

In November, 2012, and in order to avoid further delay and uncertainty, the LWWSS program agreed with BWE management to proceed with training the existing staff, and consider training new recruits once their appointment is confirmed by the GOL.

Based on the above, the training is now programmed to take place in the first half of 2013 and be completed at the latest by May 2013.

Work Plan Item	Wok Plan Activity Title; Activity Stages	2 (FY'11)		Y-3 (FY'12)					Y-4 (FY'13)																
		Q4		Q1		Q2		Q3		Q4		Q1		Q2		Q3									
		J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
<b>2.3</b>	<b>Capacity Building in O&amp;M of Pump Stations</b>																								
	Activity introduced*																								
	Staff interviews																								
	Course preparation																								
	Conduct training**																								
	* Year Three Workplan																								
	** Delayed as reported in the year-three workplan amendment; Updated dates reported in the year four work plan																								

Legend

-  Time frame as planned
-  Delays

Activity 2.4 - Public administration and Process Management Training

*Background*

During the course of year three, and as the LWWSS program was implementing the Enterprise Resource Planning (ERP) system in BWE and conducting training to existing and newly employed temporary staff in the WE, it became apparent to both the WE management and DAI personnel that many staff members within the various departments within the WE were unfamiliar with some of the most basic regulations associated with the process management within their department.

As such, BWE and the LWWSS program found that this personnel needed to receive complementary training in general and administrative matters, that targets and builds on the contents of previous training provided by the LWWSS program, and provides a detailed overview of the business and administrative processes in the WE. Such training would cover the existing and newly hired staff in various departments within the establishment (BWE recruited more than 60 contract personnel in 2012, and is in the process of finalizing the permanent recruitment of another 60+ personnel).

*Scope*

The training is planned to take place in the first half of 2013, by a third-party management training specialist who will develop the training material based on the existing materials used by the LWWSS program to date (business process plan, by-laws-compliant flow charts, BWE by-laws, and other materials available to the training specialists at the time of information collection. The training will target



extremely frequent and breakdowns within the deteriorated networks happen on a daily basis. This activity was introduced based on the request of BWE management for applied training to the network repair teams.

### *Scope*

The training will cover network repair basics, such as leak detection, team composition, equipment needs, project management and task orders, site mobilization, sequencing of repair tasks, best practice in excavation, pipe laying, connections and backfilling, as well as health and safety.

To ensure sustainability of this activity, the LWWSS program will conduct a training needs assessment to identify the most suitable trainees in the BWE region. The course will be developed in close coordination with BWE management to ensure the material is compatible and applicable to the realities of BWE.

This activity faces some challenges, namely that skilled staff in BWE are limited, and their availability is not always guaranteed (due to their simultaneous involvement on many tasks and roles), and their motivation may be low. Low pay results in many staff being simultaneously employed by the WE while conducting other professional activities too. They lack interest in developing their career at the WE.

The LWWSS program will attempt to increase interest and attendance of staff by ensuring the training is relevant, applied and focused.

### *Impact*

This training will support the LWWSS program's efforts in BWE, namely the infrastructure activities which include network replacement in the city of Zahle. It will also introduce best practice methods for detection and repair of water distribution breakdowns, which will directly contribute to a decrease in service disruptions, faults and operational damage of networks, a reduction in the risk of personal injury of operating staff, and financial and resource savings for the BWE. This training may provide the foundation for other USAID programs such as the WISE program, and allow them to leverage the capacity building taking place in year-four, in areas such as water loss reduction.

### *Timeframe*



The ERP solution is developed by Microsoft and implemented through one of several certified providers in Lebanon. BWE is providing support to this activity through buy-in by the top management, and key personnel to operate and manage the platform.

The LWWSS program will provide on-site support for up to one year, once the implementation is completed. BWE will fund the maintenance and service agreements beyond the LWWSS program's activity completion.

BWE's engagement on enforcing system adoption throughout the departments, and establishing an IT unit that reports to senior management, as well as contracting and funding on-going support for system maintenance (for hardware and software) are the most critical areas for project success. During year three, BWE proceeded with the permanent recruitment for additional administrative personnel, some of whom will be tasked to oversee the ERP's operation and maintenance.

By end of year three, the LWWSS program had completed the deployment of most system modules, and started final field adoption training, commissioning and preparations for sign-off.

### *Scope*

The implementation of this activity is done through a local subcontractor, EDM, implementing a comprehensive Microsoft solution (Navision, CRM, Sharepoint) at both BMLWE and BWE. The systems will be operational and training completed by the end of the WE financial year, with ongoing training, transition, financial reports production and support expected to last through September, 2013.

This activity includes the following software modules that are central to water utility operation and management:

- Accounting (Chart of Accounts – General Ledger - Cost Centers - Dimensions - Cost Management - Receivables - Payables - Banks - Fixed Assets);
- Budget (Budget Accounts - Reservation - Contract - Liquidation);
- Purchasing (Planning - Order Processing - Other Expenses - Tenders);
- Warehouse (Receive - Transfer);
- Human Resources and Payroll (Master File employees - Payroll)
- Billing & Collection
- Document Registry
- Customer Service Management
- Intranet Solution (Sharepoint)

As part of this activity, the LWWSS program has also provided four Time Attendance Machines in the BWE headquarters, Zahle branch and Baalbeck branch, during year two and year three. This installation is critical to modernizing the human resource and financial operations in the WE. It will empower the WE to proceed with their already started efforts to modernize their HR and finance systems by obtaining automatic logging of hours and by providing the senior management with tools to enforce staff attendance.

### *Impact*

Prior to this activity, the BWE's financial, accounting and administrative operations were conducted either manually or through fragmented applications run by individual employees. Data was frequently lost, and financial reports manually produced. The WE was continuously vulnerable to data inaccuracy errors, time delay in data production, and inconsistency in financial and accounting standards application.

Upon completion of this activity, BWE will have a centralized management information system that connects to all branches and handles all financial, administrative and customer-related processes, using a robust IT infrastructure with a well trained team of employees. This will result in a substantial increase in the efficiency of conducting business by the WE, in terms of financial performance and control, compliance, HR systems and processes, customer service and organizational collaboration.

Through the ERP system, many aspects of the foundation of wastewater management at the WE level are being addressed. Similarly, the LWWSS sponsorship of business plan development training and mentoring in BMLWE and SLWE, as well as GIZ's sponsoring of business plan development in BWE, will readily include wastewater services as they are added.

However, these capacity building steps do not get at the core problem of responsibility, authority and sustainability of operating and maintaining the WWTPs, as noted in section 3 above, "Wastewater Challenges".

#### *Timeframe*

The implementation of the ERP was expected to be completed in the first quarter of year four for all modules. This has been achieved for all the modules with the exception of the two modules associated with customer service and billing & collection.

The delay is due to the BWE having faced repeated shortage of staff in late 2012, which has prevented the LWWSS team from implementing these modules on the field, and training the WE staff on data migration and module operation. The staff shortage is due to delays in recruitment of permanent staff, and other delays in renewal of contracts of temporary staff. These delays have also generated substantial backlog of work for the BWE staff, thereby further compiling the delays on the ERP activity. The two delayed modules will be completed by April, 2013.

In support of the implementation of this activity, subcontractor ABA is augmenting the LWWSS team's efforts, and providing financial and management consultancy assistance to the program and to the WE's teams. ABA's role includes ensuring compliance of the ERP components with the WE by-laws and regulations, as well as the accuracy of the modules' financial transactions. As part of this role, ABA's management expert Ahmad Al-Azzam will conduct a detailed review of the completed ERP modules in April, 2013 and a follow-up review around September 2013.

These reviews will take place in the presence of the LWWSS program's specialists, the platform's supplier EDM, and the WE personnel. They will also include a review



WEs have done so, such as SLWE, for whom the USAID/LWPP program developed a sewerage master plan in 2006.

Further to the adoption of NWSS and the ongoing development of a five-year business plan for BWE with funding by GIZ, and starting from year-three, the LWWSS team identified an important potential to assist the BWE by developing an engineering water supply and sewerage master plan that will guide the WE's development over the next twenty years. Further to the procurement stage for this activity, DAI appointed local consultancy Kredo for the implementation of the master plan.

### *Scope*

This activity identifies and sets priorities for key initiatives, including capital investment, for the period 2014-2035, and will lead to reliable planning for the provision of water supply and wastewater services to the residents within the service area of the BWE. A framework for the irrigation services to be delivered by the BWE will also be included within this activity. In addition, this initiative will also serve to guide the capital budgeting and support for the central government, as well as multi-lateral and bi-lateral donors/lenders in support of improved services to be provided by the Bekaa Water Establishment.

The main components for the Master Plan activities are summarized below:

- Collection of existing water supply system, wastewater and irrigation information, starting at the sources of supply and to include all pipelines, structures and operating facilities, working in close collaboration with the BWE staff;
- Reviewing population projections and historical demand, by system supply zone, across the entire service area;
- Recommending specific improvements to the water and wastewater systems, consistent with the National Water Sector Strategy of the Government and the Strategic Goals of BWE as stated in its 2012-2016 Business Plan, in consultation with key stakeholders; Drafting scope of work for irrigation master planning;
- Evaluating initiatives and funding mechanisms essential to the timely construction of the recommended improvements and relating them to the defined capital costs;

The water supply and sewerage master plan will combine an asset survey activity, a GIS database, an irrigation status report, but will also expand a detailed survey of population, water demand projections and sewerage requirements, as well as capital financing needs for the longer term.

### *Impact*

The development of the master plan is a well timed activity as it is also a requirement of the NWSS, and in line with the national effort to empower WEs and assist them by building their capacity in capital investment planning and increasing their efficiency in fulfilling their roles and duties towards the population.

During year-three, DAI and ValuAdd completed the Scope of Work document for the master planning activity and launched the procurement process. The appointment of

the master planning subcontractor is expected to take place at the beginning of year four. The appointment was expected to take place by September, 2012, but was delayed by two months due to procurement challenges faced by the LWWSS program team. The provision of the services will commence in early year four and will last 16 months. Given the complexities and the sequencing of work necessary under this activity, the timeframe necessary for its completion will extend into year five, as shows in the below time frame schedule.

As a part of the water and wastewater master plan, BWE will have a new, comprehensive plan for addressing wastewater services and the capital planning to accompany the master plan. This, along with the MOEW's NWSS implementation efforts in establishing a wastewater division within the BWE, is hoped to enable the BWE to begin taking over the wastewater treatment plants within its jurisdiction.<sup>4</sup>

### Timeframe

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-2 (FY'11)		Y-3 (FY'12)				Y-4 (FY'13)				Y-5 (FY'14)		
		Q2	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q2
		A M J	J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J
4.4	<b>Water Supply and Wastewater Master Plan</b>													
	Activity introduced*													
	Define scope of works; Procure the master planning services**													
	Develop Master Plan***													
	* Year three work plan													
	* Year four work plan													

#### Legend

-  Time frame as planned
-  Delays

## Component 5: Procurement of Technical Equipment to Strengthen WEs

Table 5

Item	Activity Description	Program Resource	Outcome by End of Year Four	Target Date
5.4	<b>Upgrading the Water Analysis Laboratories</b>			
5.4.1	Upgrade the water testing laboratories with infrastructure and equipment	AUB Local suppliers	- Urgent equipment provided Y1-Y3 - Comprehensive equipment supplied as per AUB specs (Y4)	September, 2013
5.4.2	Establish service agreements, and conduct user training programs for the above activities	AUB LWWSS (MK)*	- Activity planned in BWE - Activity completed in SLWE	September, 2013

### Activity 5.4 – Upgrading Water Analysis Laboratory

#### Background

<sup>4</sup> As a central part of the water and wastewater master plan, capital planning and funding of operating and maintaining the WWTPs will be included in the plan.

As detailed under activity 2.2 above, the LWWSS program is proceeding with a comprehensive group of activities that aim to build BWE's capacity in managing water quality through an adapted management plan, a comprehensive training, and a phased procurement and installation of laboratory equipment that takes into account the capacity of the BWE to deploy and operate the equipment.

The LWWSS program appointed the American University of Beirut's (AUB) Public Health Department to provide the services of surveying and specifying the required laboratory equipment, under this group of activities. AUB completed the specification of the equipment associated with the three laboratories in BWE (two are currently operational, and located in Zahle and Baalbek, while one is not operational, and is intended to be located in Jeb Jennine, serving South Bekaa). As agreed with BWE, and given that the operation of the Baalbeck lab is outsourced to a private sector operator, and that the South Bekaa laboratory may be funded by another donor project, the LWWSS program will proceed with the procurement of additional equipment for the Zahle laboratory based on the AUB water quality management plan and recommend list of equipment. The Zahle laboratory has been the most actively operated by the WE, and as such, has the highest potential for successful and sustainable operation.

### *Scope*

This activity builds on a previous stage of urgent laboratory equipment procurement conducted by the LWWSS program during September, 2011 for the BWE laboratories, whereby essential equipment was provided to enable the basic water testing operations to proceed, as well as user training on equipment operation, and a short general training on water testing (which took place at the premises of AUB). All equipment procurement is accompanied with provision of consumables. This supply of consumables continues until the end of the one-year service provided by the equipment's supplier, and is essential for enabling the equipment to be operated using official supplies, and sets the correct approach for the WE to follow, in terms of using authorized suppliers of equipment, thereby enhancing safety and operational sustainability. During year four, the program will procure and install additional equipment, and will conduct associated minor rehabilitation works in the lab, and will provide user training, accessories and consumables for a period of one year.

### *Impact*

The equipping of the laboratory with AUB's prescribed tools and equipment, accompanied with training, will provide the WE with a central laboratory that will serve as a pilot project aiming to adopt some of the findings and recommendations of the water quality testing plan. Skilled personnel are now available at the Zahle lab and the BWE is in the process of hiring a permanent laboratory manager to lead the water quality processes in BWE.

Once completed, BWE will possess a fully equipped laboratory in Zahle, with its equipment tailored to a gradual expansion of water testing scope based on the water quality testing plan. The equipment will allow BWE to conduct most of the tests listed

in as national standards in Lebanon and by the World Health Organization's standards for drinking water testing. This will result in a substantial increase in capacity for the WE to monitor water quality accurately, record findings and report issues. It will enable a substantially increased scope of testing for bacteriological and chemical water contamination, as well as advanced methods for data analysis. The laboratory equipment, consumables and training can be used for both drinking water and wastewater analysis. Therefore, BWE will have the capacity to conduct analysis for wastewater samples collected from the WWTPs, which augments BWE's nascent capacity to address wastewater management.

Task 5.4.2. (relating to maintenance, warranty, and servicing of the forthcoming laboratory equipment) might extend until July 2014.

### Timeframe

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-3 (FY'12)				Y-4 (FY'13)													
		Q3		Q4		Q1		Q2		Q3		Q4							
		A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
<b>5.4</b>	<b>Upgrading the Water Analysis Laboratory</b>																		
	Finalize laboratory layout and commence procurement																		
	Deliver and install equipment, complete works																		
	Establish service agreements and provide user training																		
	* Year three work plan																		
	* Year four work plan																		

#### Legend

	Time frame as planned
	Delays

## Component 6: Small to Medium Scale Rehabilitation/Upgrade/Extension Water and Wastewater Works within WEs

Table 6

Item	Activity Description	Program Resource	Outcome by End of Year Four	Target Date
<b>6.1</b>	<b>Decreasing Water Losses and Upgrading Existing Networks</b>			
6.1.1	Design network upgrades in Zahle: rehabilitating the water supply network of the region of Mar Elias	LWWSS (Infrastructure PM) Local Engineering Firm (TBD)	Design completed; Supervision Started	September, 2013
6.1.2	Implement network upgrades in Zahle: rehabilitating the water supply network of the region of Mar Elias	Local Engineering Firm (TBD) Local subcontractor (TBD)	Contract placed, Works commenced	September, 2013
6.1.3	Design network upgrades in Zahle: rehabilitating five branch networks in Haouche el Oumara, Maalaka, Rassieh, Karak-Forzol and Midan	LWWSS (Infrastructure PM) Local Engineering Firm (TBD)	Design completed; Supervision Started	September, 2013
6.1.4	Implement network upgrades in Zahle: rehabilitating five branch	Local Engineering Firm (TBD)	Contract placed, Works commenced	September, 2013

networks in Haouche el Oumara, Maalaka, Rassieh, Karak-Forzol and Midan

Local subcontractor (TBD)

## Activity 6.1 - Decreasing Water Losses and Upgrading Existing Networks in Zahle

### *Background*

This group of activities is a continuation from year-three. It contains two projects located in the city of Zahle and its surroundings. They relate to the replacement of distribution lines that have been in service for 30–50 years and suffer from frequent breaks and water service shut-downs.

Zahle is the Bekaa's largest urban center, has the highest number of subscribers among cities in the Bekaa (20 percent), and has the highest rate of bill collection in the Bekaa (45 percent). However, its water network is reported to be the most deteriorated because of aging infrastructure and lack of capital investment.

The BWE chairman and the MOEW have repeatedly urged funding to be channeled to Zahle given the high potential for increasing WE income from such investments. The LWWSS program's investigations with the BWE Director General and key staff resulted in priority projects that are considered to be urgent, with important immediate benefits including enhanced water delivery to a large population and increased subscriptions and revenues for the WE.

The deterioration of the pipes in Zahle, such as the pipes in the Mar Elias district, is causing one of the highest financial burdens on the BWE. According to the BWE, the pipes covered by the below projects are among the oldest in Zahle, dating from the 1950s, and many are made of fragile cast-iron with deteriorated lead joints. As such, the WE estimates that in areas such as the Mar Elias district, the deterioration of pipes is resulting in 50-60% physical water loss due to continuous, unnoticed leaking as well as frequent breakage, which translates into energy and financial costs to the WE and poor water quality.

The identified projects fall within the strategic targets of the WE's two-year urgent strategy dated December 2010 and the WE's forthcoming business plan.

### *Scope*

#### **Project A: Rehabilitating the water supply network of the region of Mar Elias.**

The project's scope relates to the replacement of aged and leaky branch network lines, serving a population of over three thousand people. The project will replace 2.2 kilometers of pipe of various diameters in the region of Mar Elias in Zahle. This project meets all the parameters of the LWWSS program's infrastructure activities and as such, it is adopted as a replacement of the Zahle main water pipeline project.

**Project B: Rehabilitating five branch networks in Haouche el Oumara, Maalaka, Rassieh, Karak-Forzol and Midan.** This project will replace several kilometers of

branch network pipes within Zahle’s most densely populated areas. Details of pipe lengths, subscriber numbers and population affected are outlined in the table below.

During the last month of year three, the LWSS program’s technical investigation and preliminary design on the two above projects revealed that there may be a potential for achieving an enhancement of the performance of the replaced pipelines, and an increase in the beneficiary population numbers, through the addition of small extensions to some district pipelines. These extensions would enable a number of benefits, such as:

- An upgrade in size for some additional upstream connections that would increase the pipeline diameter and provide increased water supply to the district;
- Circumventing lengthy and costly land expropriations, through the addition of extra length which enables rerouting of the pipelines;
- Serving proportionately large numbers of additional beneficiaries in densely populated districts, through minor pipeline extensions.

These possible extensions are driven by BWE’s requests and are being investigated by the LWSS program’s engineering team. They will be formalized and proposed to USAID for review in the first quarter of year four, prior to procurement of the infrastructure works package for projects A and B above.

Table 7 - Estimated Quantities and Impacts of Zahle Project

Region	Pipeline Length (km)*	Number of subscribers*	Population affected*
<u>PROJECT A</u>			
Mar Elias	2.3	717	3,011
<u>PROJECT B</u>			
Haouch Al Omara	1.05	2,661	11,176
Maalaka	0.70	2,818	11,835
Rasiyeh	1.50	1,160	4,872
Karak-Forzol	1.60	742	3,116
Midan	0.65	1,348	5,661
<b>TOTAL</b>	<b>7.8 km</b>	<b>9,446 subscribers</b>	<b>39,671 inhabitants</b>

\*these details are based on updated numbers provided by BWE during the data collection stage ahead of the appointment of the engineering consultant for this project by the LWSS program, in 2012. The LWSS program has now appointed the engineering consultant and the numbers are being verified through a detailed site survey and topographic field measurement. Final and confirmed lengths will be reported in detail once the design stage is completed.

As with any infrastructure work, a number of risks need to be taken into account, such as the possibility that existing network underground may be in worse condition than expected. Even in generally good conditions, stress on the network from construction disturbances can cause breakages or new problems. The LWSS program will incorporate mitigation measures into construction contracts and conduct careful construction oversight, and quality control. The LWSS program will also

monitor key risks for early detection and analyze and report them as soon as they are identified.

### *Impacts*

#### **Project A: Rehabilitating the water supply network of the region of Mar Elias.**

The population that will be impacted under this project is about three thousand people as opposed to eight thousand five hundred people earlier anticipated for project A. However, this project is of higher priority to BWE and will have a more immediate impact on the served population of about 3,000 people (see table above).

#### **Project B: Rehabilitating five branch networks in Haouche el Oumara, Maalaka, Rassieh, Karak-Forzol and Midan.**

This project will provide over 36,000 people (see table above) with increased water quantity, fewer water cuts, and better water quality by replacing the deteriorated networks with new ones.

The two projects will improve water services for about 39,000 people within BWE's largest urban center. The specific impact will be to reduce water supply service disruptions to the population, improve water pressure to upper levels of multi-apartment dwellings, decrease physical losses as well as illegal water tapping, and improve the BWE financial position by reducing costly water losses. Furthermore, the project will contribute to enhancing the quality of water delivered to households through the replacement of deteriorated pipes with HDPE pipes.

The above projects will provide BWE with an opportunity to initiate a cycle of operations improvement and revenue enhancement: BWE will improve customer satisfaction by extending service reliability, while simultaneously reducing costs due to leakage and maintenance needs. This process should also further improve customer bill payments, and thereby, BWE's revenue position. The LWWSS program's current and forecasted yearly technical assistance activities will also complement this effort through the provision of WE staff capacity building on O&M of the network.

### *Timeframe*

During year three, the LWWSS program appointed the local engineering firm WET to implement these projects. WET has issued their preliminary design at the end of year three, and they are in the process of completing the detailed design for both projects.

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-2	Y-3 (FY'12)					Y-4 (FY'13)				Y-5 (FY'14)		
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2		
		J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S	O N D	J F M		
<b>6.1</b>	<b>Decreasing Water Losses and Upgrading Existing Networks in Zahle</b>													
	Projects introduced*													
	Hiring project personnel; conducting technical investigation													
	Drafting engineering SOW, appointing engineering subcontractor													
	Engineering design stage and preparation of bid package													
	Procurement and contract signature with infrastructure subcontractor													
	Site implementation stage													
	Completion of both projects**													
	* Year Three work-plan													
	** End date as per DAI LWWSS follow-on contract mod #3													

Legend  
 Time frame as planned  
 Delays

## Component 7: Corporate Culture, Customer Service Orientation, and Public Outreach

Table 8

Item	Activity Description	Program Resource	Outcome by End of Year Four	Target Date
7.6	<b>Consumer-Targeted Awareness Programs</b>			
7.6.3	Outreach material promoting public awareness and education on water conservation	- EMC (NA) - Local subcontractor (TBD)	- Activity completed	March, 2013

### Activity 7.6 - Promoting public awareness and water conservation

#### *Background*

Water demand is increasing every year in Lebanon, while resources are becoming more and more limited. The dry season in 2012 has witnessed serious water service disruptions due to power cuts, frequent equipment breakdowns, and human resource issues resulting in public strikes demanding service enhancement. These disruptions caused social and political problems across the territory. The combination of poor water resource governance, poor power supply and deteriorating water quality, is leading to unprecedented challenges on the water sector in Lebanon.

Despite the outreach effort by a multitude of stakeholders (NGOs, WEs, municipalities, foreign aid agencies), many households in Lebanon are still unaware, of the scale of the issues faced, and of the importance of water conservation.

#### *Scope*

In year four, the LWWSS program is proposing to continue to conduct national outreach on the critical need for water conservation. The LWWSS program's previous activities in BWE, SLWE and NLWE on this topic were highly successful and reached thousands of youth and adults. We also found that the impact of youth outreach activities is higher in terms of penetration through social and age groups

within the targeted regions, as compared to, for example, activities that only target adults.

On behalf of the WEs, and at their request, the LWWSS program will continue to promote public awareness on water conservation and water use efficiency to help decrease overuse and thereby enable more people to have access to water supply at home. The planned activity includes developing, printing and distributing water conservation education forms to water subscribers WE-wide.

A preferred form of communication is a yearly calendar. The LWWSS program has published a yearly calendar in year-two and has received very positive feedback on this activity from the WEs. The process of preparing the calendars helps increase inter-WE communication, given that all four WEs will be agreeing to a unified calendar content, sponsored and facilitated by the LWWSS program. This effort builds the capacity of the WEs to collaborate between each other, and ultimately helps them communicate with their customers. The documents would be disseminated through one or more of the following methods: collectors, the WE branches, schools, or mail delivery.

*Impacts*

Calendars are more popular than other forms of communication as they are more widely used by people to organize their busy personal and work schedules. They are also used year-round and as such, they continuously serve the purpose of promoting the water establishments and provide visual messages towards water conservation. Further, they enable information such as WE phone numbers, address, and office hours to be listed and easily referred to by the customers.

Based on the above, the LWWSS program will target to reach a total of 26 water establishment branches (all four WEs), thereby extending its awareness message to most of population. The calendar numbers, format and contents will be prepared in the first three months of year four, and the estimated printing and distribution will occur in the first three months of the year 2013.

*Timeframe*

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-3 (FY'12)				Y-4 (FY'13)													
		Q3		Q4		Q1		Q2		Q3		Q4							
		A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
<b>7.6</b>	<b>Promoting public awareness and water conservation</b>																		
	Activity introduced*																		
	Develop concept and content																		
	Discuss content and agree with WE management																		
	Obtain USAID approval on content, print and share																		
	* Year-Four Work Plan																		

Legend

-  Time frame as planned
-  Delays

This activity applies to several WEs. As such, this activity's background, scope, impact and timeframe have been also referred to in the work plan sections associated with BMLWE, NLWE and SLWE.

## 2. BEIRUT-MOUNT LEBANON WATER ESTABLISHMENT (BMLWE)

### Component 3: Increase Financial and Commercial Viability of Water Establishments

Table 9

Item	Activity Description	Program Resource	Outcome by End of Year Four	Target Date
<b>3.1</b>	<b>Upgrade Finance and Accounting Standards and Methods</b>			
3.1.5	Develop procedures and a standard manual for yearly budgeting within the WE, and conduct applied training to key departments.	- EMC (MC), DAI (AS) - ABA	- Procedures defined, manual produced, training conducted.	September, 2013
3.1.7	Develop module, procedures and provide training on the Cost Tarif Model for Strategic Planning and Budgeting	- EMC (MC), DAI (AS) - ABA	- Module installed, connected to ERP - Procedures defined, training conducted	September, 2013
<b>3.2</b>	<b>Integrate the WEs Financial, Accounting, Customer Service and Business Process Systems</b>			
3.2.2	Implement software platform including Finance and Accounting System and Customer Relationship Management solution	EMC (MC, NA), LWWSS (AS), ABA EDM	- Activity completed	October, 2012
3.2.3	Implement intranet system enabling web-browser based e-training, communication and business process tools	EMC (MC, NA), LWWSS (AS), ABA EDM	- Activity completed	March, 2013
3.2.4	Conduct training, assist in transition phase and provide one/two year on site support	EMC (MC, NA), LWWSS (AS), ABA EDM	- Activity completed	September, 2013

#### Activity 3.1 –

#### 3.1.5 - Develop procedures and a standard manual for yearly budgeting within the WE, and conduct applied training to key departments;

##### *Background and Scope*

Budget preparation and implementation is one of the key activities performed in each Water Establishment on an annual basis. It is a tool for planning and control, and is closely supervised by the Ministry of Finance. The budgeting process in BMLWE has been enhanced through the implementation of the five-year business planning activity completed in years two and three by the LWWSS program, as well as the public finance training conducted and the ERP solution and its associated training

conducted by the LWWSS program. This activity builds on the ERP platform and enables the use of the budgeting module to its full potential. The activity takes full advantage of the fact that the ERP integrates all the financial data within one database. It builds the capacity of the key WE personnel associated with annual budgeting to use the centralized and flexible database, analyze the financial information and extract key data for more accurate and reliable budgeting.

As the ERP solution is being launched and because all financial processes are centralized within it, the LWWSS program and BMLWE agreed to bolster the effort and capacity building provided under the above-mentioned activities, by creating a budget preparation manual that enables staff to apply the material given during the training, and follow standard practice in terms of budgeting, to further institutionalize the practice of preparing well-documented budget forecasts on a yearly basis.

Upon conducting an early assessment for this activity, the LWWSS program noticed that all four WEs need a budget preparation manual, and all would definitely benefit from a structured approach to budget preparation. But due to the similarities between the four WEs and based on our experience in deployment of nation-wide activities, we believe it is better to start with a pilot for one of the WEs for enhanced testing, upgrading and training implementation. Once the activity is successful in one of the WEs, it may be replicated in others.

Our review has shown that BMLWE's teams are most prepared for this activity. Our selection is based on the following:

- This activity was initiated based on several requests from BMLWE staff;
- BMLWE has the largest budget of all WEs, has more projects and conducts more detailed planning, which means that the LWWSS program has a better chance of conducting a comprehensive effort which would cover the other WEs' requirements while working on BMLWE budget manual;
- Unlike other WEs, BMLWE has the funds but lacks the correct budget planning to implement its projects sustainably.

### *Impact*

Currently, the budget process at BMLWE follows a dated approach using the previous year's budget adjusted by a predetermined percentage for all items throughout the document. This results in incorrect budgeting and unrealistic estimations that are not based on the forthcoming year's plans for revenues and expenses. It also limits the use of the budget as a planning tool, and creates several shortages during the year since the budget focuses on last year and does not take into consideration BMLWE's strategy and plans.

The budget manual will introduce a new culture in BMLWE that will improve the use of budgeting as a planning and control tool, and will provide BMLWE key staff (finance department, engineering department and top management) with a step by step guide on how to plan, prepare and implement the budget to improve planning and operations.

The expected impacts of this activity on the WE's management and operations include:

- Improved planning tools, allowing BMLWE to prepare their budget using the bottom-up approach to ensure enough budget is available for each budget line item according to BMLWE strategy;
- Better stakeholder involvement in budget preparation, ensuring smooth operations during budget implementation;
- Budget control and performance evaluation on a yearly basis and good approach to establish standard practice across departments in the Water Establishment.
- Contribution to better allocation of funds which will enable the WE's operations to proceed with less delays. This contributes to higher efficiency in operation and better operational and financial performance for the WE.

### Timeframe

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-3 (FY'12)				Y-4 (FY'13)												
		Q3		Q4		Q1		Q2		Q3		Q4						
		A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A
<b>3.1.5</b>	<b>Develop procedures and a standard manual for yearly budgeting</b>																	
	Activity introduced*																	
	Investigate, and define key best practices in budgeting																	
	Draft budgeting manual and establish linkages with ERP solution																	
	Issue final manual and conduct training and follow-up																	
	* Year-Four Work Plan																	

#### Legend

-  Time frame as planned
-  Delays

### 3.1.7 - Develop module, procedures and provide training on the Cost Tariff Analysis Module for Strategic Planning and Budgeting

#### Background

The USAID-funded Lebanon Water Policy Program (LWPP) assisted the Lebanese Water Establishments to prepare a cost tariff analysis module that BMLWE used as a planning tool. This module was prepared according to the year 2004's data that was available at the time, and only limited updates were done to the module over the past years, due to the lack of accurate, dynamic and up-to-date financial data within each establishment.

#### Scope

The cost tariff analysis module is a complex excel document where the user inputs key financial data related to the WE's operations, to calculate a medium term forecast of the financial performance of the WE on a yearly basis. The module is fully customized to the realities of the Lebanese WE's and is in line with their by-laws and their operational model.

It is also designed to integrate key assumptions and performance indicators to enable the creation of various scenarios for forecasts, and to enable the reporting of these scenarios according to predefined criteria and benchmarks. This enables the WE to input and report on NWSS benchmarks as well as its own business planning benchmarks through the use of the cost tariff analysis module.

During year four, and as the ERP solution is adopted in BMLWE, the LWWSS program and BMLWE will be expanding the potential of this platform and will make use of the accuracy and timeliness of the financial information within it, by updating the LWPP-developed cost tariff analysis module and connecting it to the ERP platform. This enables the module to fully utilize the ERP solution's output and provide BMLWE management with a strong financial, analytical and planning tool for costing and tariff to improve their decision making process.

### *Impact*

Currently, BMLWE has no real data on cost of water production, distribution and billing and collection. Although the ERP platform contains accurate financial information, this information is not consolidated into a single module that analyzes it within a single interface for planning and decision making. As such, updating and connecting the existing cost recovery module to the ERP platform will enable BMLWE to capitalize the ERP solution's output.

The Cost Tariff Analysis Module will provide BMLWE with an analytical tool that supports financial and business planning and enables the decision maker to adjust their strategies for the future in accordance with the foreseen costs and revenues of the WE. It complements the budgeting efforts to strengthen the WE's capacity to improve their decision making process, and to achieve cost recovery and better financial performance.

As with activity 3.1.5 above, the impacts of this activity are eventually intended to be replicated across all the WEs, and will greatly benefit them all by providing them with a systematic and coherent analysis tool, and guide their planning and reporting to the Ministry of Energy and Water. However, and for much of the same reasons presented in activity 3.1.5 above, BMLWE seems to have many advantages over the other WEs in terms of its ability to provide a better environment for implementing this activity on a pilot basis.

The approach, analysis, testing and feedback could be recorded and taken into account by the LWWSS team more effectively when the activity is conducted in BMLWE. The WE's financial capacity, diverse operations and the presence of the LWWSS -funded ERP solution make it a suitable starting point for the Cost Tariff Analysis Module and training. Once the document is completed, it may be replicated in all the other WEs.

Anticipated impact on the WE's management and operations:

- BMLWE will have a Planning and Budgeting Tool to help in planning for:
  - Cost Recovery,
  - Water Balance,
  - Tariff,

- Efficiency,
- Capital Investment,
- Public Private Partnership
- Cost details for each level of service or facility will be provided through the module, and forecasted over the coming years, thereby enabling advanced analysis of individual costs, and empowering the WE management to take informed decisions in relation to future expenditure and investments.

The finalized module may also be deployed in other WEs, notably BWE. This is contingent on the readiness of the BWE staff to engage in advanced modeling and analysis of costs and tariffs.

*Timeframe*

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-3 (FY'12)				Y-4 (FY'13)													
		Q3		Q4		Q1		Q2		Q3		Q4							
		A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
<b>3.1.7</b>	<b>Develop module and training on the Cost Tariff Analysis Module</b>																		
	Activity introduced*																		
	Conduct data collection from finalized modules of the ERP																		
	Conduct modeling, update model and connect to ERP platform																		
	Develop user manual, train and follow-up																		
	* Year-Four Work Plan																		

Legend

-  Time frame as planned
-  Delays

Activity 3.2 - Integrating the WE’s Financial, Accounting, Customer Service and Business Process Systems: The Enterprise Resource Planning (ERP) Platform

*Background*

The LWWSS program is continuing with the implementation of the Enterprise Resource Planning (ERP) platform in BWE and BMLWE, by finalizing the rolling-out of the ERP software and providing comprehensive training and on-site support. The ERP provides BMLWE with an integrated, flexible and modern platform for computerized operation across all its departments, and enables it to achieve fast progress in terms of increased administrative efficiency, accountability, quality control and informed decision making.

The ERP solution is developed by Microsoft and implemented through one of several certified providers in Lebanon. BWE is providing support to this activity through buy-in by the top management, and key personnel to operate and manage the platform.

BMLWE is providing support in terms of funding and implementing all hardware server infrastructure necessary for the ERP, as well as the connectivity infrastructure and connection between branches, and buy-in by the top management. BMLWE is also providing key personnel to operate and manage the platform, as well as funding

for maintenance and service agreement beyond the LWWSS program's contract period with the implementation subcontractor.

The LWWSS program will provide on-site support for up to one year, once the implementation is completed. The program is also continuously engaged with BMLWE in terms of coordination and assessment of the pace of progress, risks and success factors for this project.

BMLWE's engagement on enforcing system adoption throughout the departments, as well as contracting and funding on-going support and maintenance for the system beyond 2013 are the most critical areas for project success. During 2012, the LWWSS program will be contributing to the supply of some user computer equipment to be located in branches of the WE, to ensure critical dates are met for system deployment.

By end of year three, LWWSS had completed the deployment of most system modules, and started final field adoption training, commissioning and preparations for sign-off.

### *Scope*

The implementation of this activity is done through the appointment of a local subcontractor, EDM, implementing a comprehensive Microsoft solution (Navision, CRM, Sharepoint) at both BMLWE and BWE. The implementation is expected to be completed in the early weeks of year four, and the systems will be operational and training completed by the end of the WE financial year, with ongoing training, transition, financial reports production and support expected to last through September, 2013.

This activity includes the following software modules that are central to water utility operation and management:

- Accounting (Chart of Accounts – General Ledger - Cost Centers - Dimensions - Cost Management - Receivables - Payables - Banks - Fixed Assets);
- Budget (Budget Accounts - Reservation - Contract - Liquidation);
- Purchasing (Planning - Order Processing - Other Expenses - Tenders);
- Warehouse (Receive - Transfer);
- Human Resources and Payroll (Master File employees - Payroll)
- Billing & Collection
- Document Registry
- Customer Service Management
- Intranet Solution (Sharepoint)

BMLWE has committed to provide the IT backbone equipment (servers and connectivity to all branches) as well as support from top management, personnel to operate and manage the platform, and funding for maintenance and service agreement beyond the LWWSS program's completion.

### *Impacts*

Prior to this activity, the BMLWE's financial, accounting and administrative operations were conducted either manually or through fragmented applications run by individual employees. Data was frequently lost, and financial reports manually produced. The WE was continuously vulnerable to data inaccuracy errors, time delay in data production, and inconsistency in financial and accounting standards application.

Upon completion of this activity, BMLWE will have a centralized management information system that connects to all branches and handles all financial, administrative and customer-related processes, using a robust IT infrastructure with a well trained team of employees. This will result in a substantial increase in the efficiency of conducting business by the WE, in terms of financial performance and control, compliance, HR systems and processes, customer service and increased inter-departmental efficiency.

### *Timeframe*

The process of implementing the software platform is progressing, and BMLWE's continuous engagement in terms of enforcing system adoption throughout the departments and allocating staff for implementation meetings and workshops as well as training has generally been positive. The implementation was expected to be completed in the first quarter of year four for all modules. This has been achieved for all the modules with the exception of the following four modules: i) customer service, ii) billing & collection, iii) intranet platform (SharePoint), and iv) document registry.

The delay on these four modules is due a breakdown in the connectivity within BMLWE IT network. This breakdown is causing a break-down in the connection between the headquarters and the branches, and is preventing the deployment of the pending modules. To help with these issues and assist in mitigation, the LWWSS program mobilized a technical team to assist BMLWE with troubleshooting this network breakdown. Further to an extensive investigation in late 2012, the network problems were resolved which will enable the LWWSS program to proceed with the deployment of the remaining modules.

Despite the progress and the repeated positive feedback received from BMLWE, as well as the clear optimization that the ERP is providing to all those departments where it's being deployed, this activity is still facing a number of risks due to potential resistance by BMLWE team-members. This resistance might have one or more of the ERP's modules at risk. As such, the LWWSS program is continuously monitoring the implementation risks and reporting them to the BMLWE management for prompt resolution.



100,000 Lebanese, especially the lower-income population who frequently incur increasing costs of having to purchase water during shortage periods.

### *Scope*

The activity incorporates a number of sub-activities to ensure sustainability of the works, as follows:

- Provision of a complete design for the Jeita pump station site, including rehabilitation works associated with electrical and mechanical components (including a sand-removal tank), as well as design and specification for the replacement of key equipment (LWWSS activity 5.2.1).
- Supply, shipment and delivery of 18 sets of pump and motor equipment, meeting the design requirements. Note: Installation of the equipment and other rehabilitation works will take place by BMLWE's teams.
- On-the-job training by the LWWSS program specialists for BMLWE engineering staff on specification writing, bid and bills of quantity drafting, and engineering management to enable staff to better identify technical requirements within their bids, thereby avoiding inappropriate procurement (completed).
- Operation and maintenance training on the equipment installed within the Jeita pump station, for the operators of those stations.

### *Impact*

The anticipated benefits of this activity include:

- Extended hours of water supply to more than 100,000 water users due to an increase of up to 30 percent in efficiency (through new pumps and motors), a decrease in break-downs and down time (due to new equipment and new electrical and hydraulic installations), and a longer lifecycle for the equipment (due to the sand filter solution designed by the LWWSS program and financed by BMLWE).
- More efficient design and installation for this key pump station, decreasing operating and maintenance costs for BMLWE. Currently, equipment installation is so poor that BMLWE spends one-third of its yearly O&M costs on servicing Jeita.
- Jeita staff will be trained, using the LWWSS-developed O&M manuals, safety procedures and checklists, and they will receive additional specialized training from the equipment suppliers. This process will decrease accidents on site, avoid human errors, extend the life of BMLWE's equipment, and build the capacity of staff to ensure sustainability.

### *Timeframe*

During year three, BMLWE completed the sand removal tank construction as designed by LWWSS, and under CDM Smith oversight. BMLWE also completed the installation of critical valve equipment necessary to enable further works to proceed prior to the full rehabilitation.

The LWWSS program's orders for pumps and motors, as well as those related to valves and fittings have been delayed in year three due to consecutive procurement

complications associated with availability of suppliers, pricing and bid quality issues with the suppliers. However, these issues were resolved throughout the summer of 2012, and by the beginning of the month of August, 2012, all the shipments were delivered to Beirut. BMLWE and the LWWSS program have worked to reschedule the rehabilitation works around these delays, while avoiding extensive shut down periods of the station.

During the month of August, 2012, all the LWWSS-funded components associated with the Jeita Pump Station Rehabilitation project were delivered to the site, under the oversight of the LWWSS program's engineering consultants (CDM Smith). The installation followed with oversight from CDM Smith's engineers as part of the LWWSS team.

BMLWE started the installation works in early September 2012 with CDM Smith overseeing the installation and testing. The installation is expected to be fully completed by the end of 2012 at the latest.

The installation works by BMLWE are currently expected to be completed in end 2012. The suppliers and CDM Smith will provide on the job training and guidance to WE staff on operation of the equipment and on the preventive maintenance required.

Throughout the course of this activity, the LWWSS teams have also provided on-the-job training for two key BMLWE engineering staff, through the LWWSS program's engineering team (CDM Smith) and senior procurement personnel on topics such as specification writing for engineering equipment and installations, bid and bills of quantity drafting and review, and engineering management. This training contributes to the LWWSS program's efforts to provide training in matters of public procurement, especially in terms of transferring the experience of the LWWSS program's specialists to BMLWE's senior engineering staff on matters of advanced specification definition and writing. The training augments the staff's capacity to better identify technical requirements in advance for projects, and incorporate such requirements in the bids, thereby avoiding costly omissions or inappropriate procurement. The activity also includes on-the-job training on the installation, testing, commissioning and operation and maintenance of the equipment provided by the LWWSS program. This training is provided through a combination of electrical and mechanical STTA experts from CDM Smith, as well as the equipment manufacturers' representatives in Lebanon. The training is being given to the WE's senior engineering teams, as well as their site personnel who are attending the installation and overseeing the operation of the equipment.



## Activity 2.3 – Capacity Building in Operation and Maintenance of Pump Stations

### *Background*

As mentioned in the year three work plan, this activity will continue to the first months of year four. The activity is a follow-on of the successful year-two activity of basic pump station operators O&M training. This activity relates to a more specific training topic for pump stations operators, covering preventive operation and maintenance of pump station equipment and facilities.

The predecessor to this activity is a year-two basic training that took place with pump station staff. It was a highly successful activity and it resulted in a recommendation by both trainees and WE management for the LWWSS program to pursue a more advanced training that addressed specific needs of employees in areas of pump station operation. This follow-on training was therefore designed based on the findings of the initial training and the WE's feedback.

During year three, the LWWSS program completed the preparations for the Advanced Pump Station O&M training by conducting detailed interviews with NLWE senior engineering management and O&M personnel, and selecting two teams that will form the core of the trainee units for this advanced training.

### *Scope*

Based on the findings of the investigation with NLWE, the advanced training topics will cover areas of preventive maintenance on large NLWE plants such as those in the Hab station in Tripoli and the pump station of Koura. The training will be conducted in a participatory manner whereby the trainers and the trainees define priority areas for preventive maintenance within the stations, and together, develop an advanced system of preventive maintenance covering the process, the personnel roles, the documentation and the frequency, methods of action to address each category of preventive maintenance issues, and reporting methodologies.

The training was expected to take place at the end of the Summer of 2012, but was repeatedly postponed due to the political and security situation in Tripoli, which resulted in a delay on the training schedule. The training is now planned to be completed by the first months of year-four. The course is developed by the LWWSS program's subcontractor KREDO and based on detailed assessment of the training needs.

### *Impact*

This activity is a follow-on to the year-two activity that resulted in improved skills and processes for pump station staff in operating and maintaining pump station plant and equipment, as well as improved health and safety practices. This training will result in fewer site accidents and equipment breakdown, a decrease in operating and repair costs for NLWE, as well as improved efficiency for pumping and energy



- Public accounting and financial reporting
- General accounting and financial analysis
- Public procurement
- Taxation and financial reports

*Impact*

The purpose of this sub-activity is to build the capacity of the WE staff to fully adopt accrual accounting standards while meeting the government of Lebanon’s requirements and regulations. This will potentially double the efficiency of NLWE’s existing accounting systems (PIMS) by linking the accrual based accounting methods to the cash accounting methods within the PIMS system, reducing data entry time by half, minimizing human error, and increasing accuracy and flexibility within the system.

*Timeframe*

The LWWSS program has successfully completed all tasks under this activity during year three, with the exception of the public finance and accounting training. This training was rescheduled until middle of year-four based on LWWSS’ agreement with NLWE to grant the WE a period of time to adjust to the newly introduced concepts prior to holding the comprehensive public training.

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-2	Y-3 (FY'12)					Y-4 (FY'13)						
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3					
		J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J					
3.1.2	<b>Training in Public Accounting, Finance, Procurement, Auditing</b>													
	Activity introduced*		■											
	Staff interviews, training needs assessment					■	■	■						
	Training in Public Accounting, Finance, Procurement, Auditing**					■	■	■	■	■				
	Define cost centers, create/update chart of accounts, and procedures					■	■	■						
	Develop RFP and procedures for asset and inventory identification and valuation					■	■	■						
	* Year-Three Work Plan													
	** As reported in the Year Four Work Plan													

Legend  
 Time frame as planned  
 Delays

3.1.6 - Develop procedures and a standard manual for internal audit within the WE, and conduct applied training to key departments.

*Background*

To date, internal audits within the WEs have had a limited role, as they focused only on finding problems after an event has occurred. They focus on regular inspections of annual documentation and do not undertake routine reviews and revisions of ongoing systems and processes.

During the course of year-three, LWWSS' specialists and NLWE senior management identified the need to conduct a pilot effort within NLWE whereby the internal audit processes would be fully reviewed, and LWWSS would assist NLWE by developing a thorough Internal Audit Manual that will cover all aspects of audit controls dictated by the by-laws and the legislation applicable to the WEs, in order to improve detective, corrective and preventative controls within the WE. The effort would also allow the WE to conduct an operational review of performance on a yearly basis, thereby providing the WE management with powerful tools to monitor the WE's performance and compliance.

NLWE and other water establishments do not have Internal Audit Manuals at this stage. They do not even have specialized staff to perform the required internal procedure. This limits available control over establishment activities and prevents the management from obtaining internal feedback on control gaps and operational performance.

### *Scope*

As part of this activity, LWWSS and NLWE will work to assign staff to lead the process of internal auditing, conduct comprehensive training on the manual's contents and processes.

While this activity is needed for all four WEs, LWWSS identified NLWE as the most suitable institution for this effort, based on a number of reasons, as follows:

- This activity was initiated through a request from NLWE management;
- NLWE's finance and administrative team is interested and includes some highly capable personnel, which increases the chances for activity success and ensures that impacts of this activity are sustainable. It will also facilitate LWWSS' work in terms of collecting required information and designing the audit department's requirements;
- Over the last few years, NLWE has had a stable financial management system being operated by its staff. The WE has a clear hierarchy of command. These strengths facilitate the implementation and augments the chances of success of the above activity;
- Based on an initial investigation, LWWSS determined that NLWE has staff that can be assigned to perform the audit process.

The training sub-components include:

- Risk Assessment, Controls, and Risk Management
  - Internal control structure and management philosophy
  - Internal control policies for safeguarding and assurance
  - Internal control risk
- Internal Auditing
  - Responsibility and authority of the internal audit function
  - Types of Audits conducted by internal auditors
- Ethical considerations for management auditing

- Team work & Training
- Meetings & Reports
- Methodology of verification
- Quality Control
- Templates & Work flows
- Systems controls and security measures (general accounting system control - application and transaction control - network control - backup controls)

*Impact*

Expected enhancements generated by the activity will include substantially enhanced capacity within the WE to control the establishment’s financial and administrative processes, identify and reduce inefficiencies, clamp on illegitimate activity conducted within the WE, increase accountability within it, provide the WE senior management as well as the GOL’s auditor’s with feedback on WE performance.

*Timeframe*

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-3 (FY'12)				Y-4 (FY'13)													
		Q3		Q4		Q1		Q2		Q3		Q4							
		A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
<b>3.1.6</b>	<b>Develop procedures and a standard manual for internal audit</b>																		
	Activity introduced*																		
	Review NLWE requirements and define key best practices																		
	Draft audit manual, review and issue to NLWE																		
	Conduct training, incorporate any revisions, and issue final copy																		
	* Year-Three Work Plan																		

Legend

-  Time frame as planned
-  Delays

**Component 5: Procurement of Technical Equipment to Strengthen WEs**

Table 14

Item	Activity Description	Program Resource	Outcome by End of Year Four	Target Date
<b>5.2</b>	<b>Upgrading Pumping and Energy Efficiency</b>			
5.2.3	Review and design the replacement nine submersible pumps and associated works	- CDM (BG, GT, EH) - Local subcontractor (TBD)	Tests completed and design produced	April, 2013
5.2.4	Supply and install the replacement nine submersible pumps and associated works	- CDM (BG, GT, EH) - Local subcontractor (TBD)	Procurement stage; contract placed	September, 2013
<b>5.3</b>	<b>Increasing Supply Hours to Areas Facing Supply Shortage</b>			

5.3.1	Supply and install up to 9 back-up generators for key NLWE stations	- CDM (BG, GT, EH) - Local subcontractor (TBD)	- Manufacturing and shipping done; - Installation substantially complete	September, 2013
5.3.2	Establish service agreements and conduct user training program for these generators	- CDM (BG, GT, EH), DAI (MK) - Local subcontractor (TBD)	- Activity commenced	April, 2015

## Activity 5.2 - Upgrading Pumping and Energy Efficiency

### *Background*

This is a continuation of a year-three activity in NLWE. Among the highest priorities for NLWE is the enhancement of the pumping efficiency in key pump stations across North Lebanon.

Given the age and poor condition of the existing pumps within NLWE's stations, LWWSS found that submersible pump replacement and basic pump station repair is an essential capital investment that results in immediate improvement of up to 20 percent in pumping efficiency, reflected through an increase in the quantity of water pumped into the network and a decrease in power consumption. It also results in an immediate reduction in operation, maintenance and repair costs.

### *Scope*

This task will include a supply of submersible pumps, power management panels, protection, power cables, gauges and sensors, as well as necessary electrical, mechanical and safety protection installations.

The installation will be followed by operation and maintenance training by the equipment supplier, specifically related to the equipment procured. This training complements other O&M trainings in NLWE, but is not related to them. It is a short training aimed at teaching the operator means of applying manufacturer's instructions to avoid equipment damage, avoid warranties being voided, increase the lifespan of the pumps and the sustainability of the procurement activity.

NLWE identified the key sites where equipment replacement is expected (33 sites), and provided an estimate of the specifications required for these sites. The WE requested LWWSS' engineering teams to use pre-existing specifications developed by the WE. However, upon closer inspection by CDM Smith, it was concluded that most of the WE's performance and specification data was incorrect, and was based on unchecked estimates instead of up-to-date information such as well tests, well inspections, and engineering calculation.

This led LWWSS' team to conduct an extended investigation of the through the CDM Smith engineers. The team surveyed the NLWE-listed sites. Based on the survey, the team found that many sites are not suitable for pump replacement. Some lacked

essential and basic infrastructure (such as reliable power supply, secure location for installation, disputed property, etc), or required major redesign and rehabilitation. Based on the findings, only nine sites were found to be technically suitable for rehabilitation.

NLWE approved DAI's shortlist of nine sites. Based on the findings, it was agreed that the scope for the equipment replacement will also include some minor and necessary electrical works needed for pump replacement.

The nine pumps identified are located in the following stations:

- a- Tripoli area:
  - Abou Halqa spring (one pump)
  - Manar tank (one pump)
- b- Qobayyat
  - Kfartoun (one pump)
- c- Batroun
  - Kfarhelda - Der Bella station (one pump)
  - Mar Yaacoub (one pump)
- d- Halba
  - Al Ouyoun (four pumps located in wells)

Once the list was finalized, LWWSS's engineering team (CDM Smith) conducted detailed field testing and updated the budget estimate for this activity. The agreement and finalization of the shortlist necessitated NLWE approval, which resulted in several weeks of negotiation and discussions with the WE which resulted in an agreement on the finalized list of stations in May, 2012

### *Impact*

The efficient operation of these nine pump stations is crucial to the livelihoods of the water users connected to these stations, especially lower income populations, who frequently incur the steep costs of purchasing water from private suppliers during shortage periods. The cost per unit of water supply (m<sup>3</sup>) from private suppliers is considerably higher than the cost per unit of WE-supplied water.

The current pumps necessitate frequent motor rewinding locally in Lebanon, which results in operation and maintenance problems, excessive down time, excessive running costs, low performance, and frequent shut downs especially during the drought seasons.

The anticipated benefits of this activity include:

- Extended hours of water supply to the water users of these stations, due to an increase of up to 20 percent in efficiency (through new pumps and motors), a decrease in break-downs and down time (due to new equipment and new electrical and hydraulic installations), and a longer lifecycle for the equipment (due to better O&M practices as part of the training).
- O&M staff will be trained, using the suppliers' and LWWSS' manuals and checklists, and they will receive additional specialized training by equipment suppliers. This will decrease accidents on site, avoid human errors, extend

the life of the equipment, and build the capacity of staff to ensure sustainability.

Given that the sub-activity 5.2.4 includes tasks such as supplier's maintenance, warranty, and servicing of the installed pumps for a period of one year from site completion, we estimate that the implementation period for this activity might extend until September 2014 at the latest.

### *Timeframe*

NLWE approved the updated and finalized list of stations that met the LWWSS program's criteria in May, 2012. This approval enabled LWWSS to commence the preliminary design for the pumps started in the list.

The feedback and investigations conducted by CDM Smith led the LWWSS program to the conclusion that NLWE's initially supplied data is unreliable and imprecise, and that the replacement of pumps located within wells will require thorough well tests prior to the design of the pump package. A series of well tests and inspections was determined to be necessary for the wells where four pumps were located (Al Ouyun Station, Halba, Akkar).

These hydraulic tests will allow CDM Smith to determine the status of the well and the water table, conduct a CCTV inspection of the well condition, as well as potential well-rehabilitation works to enable accurate testing. The procurement for the well tests was planned to take place by end of Year Three.

As reported in the year-three progress reports, the procurement of the well tests was found to be a challenging task that has caused several months of delay: two rounds of open procurement took place, and included nation-wide advertisement, but they consistently resulted in inadequate offers being received. The reasons behind a lack of response seemed to relate mainly to the remoteness of the area where the tests were taking place, and the anticipated flow tests that required large pumps to be transported to the well site. During November and December 2012, the LWWSS teams solicited the non-responsive bidders and appealed to them to collect the bids and price them. Two additional bids were received. Of the three total bids received, only one was found to meet the technical requirements and the timeframes for the activity.

Taking into account the above delay, the updated timeframe for well testing, and equipment specification for all nine pumps is expected to be completed by mid Year Four, which will enable the procurement of the equipment to commence.

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-2 (FY '11)				Y-3 (FY'12)				Y-4 (FY'13)				Y-5 (FY'14)										
		Q2		Q4		Q1		Q2		Q3		Q4		Q1		Q2								
		A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F
<b>5.2</b>	<b>Upgrading Pumping and Energy Efficiency</b>																							
	Activity introduced*																							
	Survey and data gathering*																							
	Bidding documents and specifications*																							
	Procurement*																							
	Activity rescheduled based on findings regarding NLWE's data quality**																							
	Complete assessment and design for pumps**																							
	Confirm costing and start testing ahead of procurement**																							
	Start procurement process for manufacturing and installation**																							
	Activity rescheduled due to delays with procurement of well-test package***																							
	Complete well assessment and obtain well test results***																							
	Finalize design, confirm costing and start procurement***																							
	Manufacturing and installation***																							
	* As planned in Year-Two Work Plan Amendment #3 dated June 24th, 2011																							
	** As planned in Year-Three Work Plan																							
	*** As detailed in Year-Three fourth quarterly report and Year-Four Work Plan																							

Legend  
 Time frame as planned  
 Delays

Based on the details presented above, LWWSS estimates that the last stages of this activity (completion of installation, training, service agreement) may extend into year five.

### Activity 5.3 - Increasing Supply Hours to Areas Facing Supply Shortage

#### *Background*

This is a continuation of a year-three activity. The supply of power generation equipment for key pump stations in NLWE is one of the most crucial capital investments identified for NLWE. It will enable the WE to provide water supply to remote areas where power is unstable and cuts are frequent.

The request for power generation equipment necessitated several rounds of investigations and negotiations to ensure the requests meet LWWSS' activity selection criteria.

Based on the investigations, a shortlist was produced that included the finalized locations and sizes of generators to be investigated, designed and procured.

#### *Scope*

The project includes the following stages:

- Due diligence to identify the detailed power requirements of each pump station (completed in year-two)
- Design of the required generator infrastructure (completed in year-two)
- Procurement and installation of the generators (procurement completed in year-three and orders placed awaiting installation and manufacturing in year four)
- Operations and maintenance training to pump station staff

The stations that were identified to receive generator power-supply procurement are the following:

- Hab
- Aayrouniyeh
- Nakhle
- Bqerqacha
- Beshmezzin
- Qbayyet
- Kfartoun
- Rahbeh

The works include the supply of generators, but also a group of associated works such as power management panels, protection and fencing, power cables, concrete pad, steel bollards, generator tanks as well as necessary electrical and safety protection installations.

It is estimated that task 5.3.2 of this activity (servicing and warranties for the installed generators in North Lebanon for a period of up to two years or 2,000 hours of operation from date of site completion) might extend until April 2015, latest.

#### *Impact*

As part of its current operational practice, it is standard for NLWE to rely on stand-by generators in those key stations that help maintain 24-hour supply to Tripoli, and to provide back-up power supply to those stations that are located far from stable power supply. In the latter case, the generator power supply enables the pumping and distribution of water to thousands of users in rural, deprived areas of NLWE's territory.

The provision of power generation equipment will result in an increased water supply to high density urban areas within the capital of North Lebanon (Tripoli) and within some of the villages that need water supply the most.

#### *Timeframe*

This activity has been progressing as planned in the Year Three work plan. The LWWSS program has placed the contract for the supply and installation of the generators in September, 2012, with local subcontractor Eden Group.



regions was incomplete. The impact on the water supply situation in the region was therefore unachieved. The population is currently either underserved by public water supply or not served at all.

The WE is starting a process of putting the system in operation, with an in-house project aiming at connecting up to seven of the villages to permanent water supply. NLWE has requested the LWWSS program to contribute to this project and fund the commissioning and water connection to households in other villages within the Beit Mellat region.

As part of this activity, LWWSS will provide household connections, commission required network parts, and where possible, incorporate consumer metering—supplying and installing metering boxes, installing meters in houses of current subscribers—so as to complete the investments and improve service. The meters will be provided by NLWE. This project aligns with the overarching objective of the LWWSS program to improve service delivery, and is particularly attractive because it does so in one of Lebanon’s poorest districts.

### *Scope*

Specifically, the project will include the following activities:

- Conduct a thorough investigation of the existing household connections in the 12 villages;
- Define exact project scope, update costing and program;
- Complete bid package for infrastructure works, and procure works;
- Connect customers to the water supply network through rehabilitating or re-commissioning the house-connections as needed; supply protective boxes to each building or residential unit;
- Commission the new, but as yet unused, water distribution network;
- In conjunction with NLWE, conduct outreach to inform the population of the connection of metered water supply to households, and encourage households to subscribe;
- Build the capacity of NLWE’s regional teams to run and operate the metered water supply network.

The NLWE conducted a detailed assessment to identify a long-list of priority villages that require assistance from LWWSS. The general approach for assessing and selecting villages by NLWE was based on two sets of criteria:

Economic scoring: favoring villages that are likely to generate the highest income to the WE, once connected, while costing the least in terms of network repair. This method encourages financial sustainability and income generation, which will enable further funds to be generated by the WE.

- Humanitarian criteria: this criterion takes into account the urgency for water supply in each village. It favors villages that have the highest need for water, especially those with larger populations where the lack of water supply puts risks on public health and economic development.

Both criteria maximize the potential for project success by ensuring that water is delivered to those households that are most in need of water.

Once the scoring and ranking was done, NLWE produced a long-list of 12 villages. This list will be investigated during year-four in detail by LWWSS' engineering consultants prior to procurement of the infrastructure work associated with this activity. Several sessions took place throughout the course of year three between NLWE and LWWSS to facilitate the identification of these priority villages. The identified villages are as follows:

Prio- rity	Village name	Number of current subscribers*	Number of illegal Users*	Number of potential new subscribers*	<b>Total number of households impacted</b>
<b>1</b>	Bebnine	0**	0**	4,354	<b>4,354</b>
<b>2</b>	Hakour	117	7	33	<b>157</b>
<b>3</b>	Bqerzla	227	114	109	<b>450</b>
<b>4</b>	Dahr Nassar	22	38	35	<b>95</b>
<b>5</b>	Rahbeh	652	121	503	<b>1,276</b>
<b>6</b>	Ilet	141	60	99	<b>300</b>
<b>7</b>	Edbel	185	97	174	<b>456</b>
<b>8</b>	Gebrayel	176	34	121	<b>331</b>
<b>9</b>	Beit Mellat	186	38	84	<b>308</b>
<b>10</b>	Dahr Ellaysineh	49	4	52	<b>105</b>
<b>11</b>	Hekr Cheikh Taba	33	8	15	<b>56</b>
<b>12</b>	Berqayel	0	0	2,296	<b>2,296</b>
		<b>1,788</b>	<b>521</b>	<b>7,875</b>	<b>10,184</b>

\* source: NLWE management

\*\* The villages with no current subscribers are selected based on the substantial mass of potential subscribers anticipated upon their connection, given that these are highly urbanized villages. NLWE assessment estimates that these villages might provide a major share of the income anticipated.

### *Impact*

By completing this project, LWWSS estimates to connect up to 7,875 households to enhanced water supply, and leverage substantial existing investments and commitments from NLWE, and demonstrably improve service coverage in Akkar.

This project will result in:

- Improved water service delivery by NLWE to up to 7,875 households that will be connected to the new water supply network;
- Contribute to the MOEW National Water Sector Strategy, and the five-year business plan adopted by NLWE in 2010, to increase the metered customer base and apply consumption-based tariffs for water use that exceeds the minimum threshold of 1 m<sup>3</sup>/day/household. This will increase NLWE's revenue as it seeks to move away from the flat annual rate tariff scheme paid by most customers, improving financial sustainability and solvency.

### *Timeframe*

The priority list of villages was finalized in May 2012 and officially submitted by NLWE to the LWWSS program. Based on the contents of the list, the LWWSS

program commenced the procurement of the engineering services associated with the design and supervision of the works for this project.

The engineering subcontractor will be appointed in early year four, and will conduct an investigation of the shortlisted villages, and a design stage that will result in a clear definition of the finalized and short-listed villages, a detailed scope of work within each village, and will complete the production of bid documents for infrastructure works.

The activity faced some delays during the long-listing stage, due to:

- The political upheaval and risky security situation in North Lebanon (Tripoli) during 2012 that resulted in disruption of NLWE operations and logistical challenges faced by NLWE in terms of collecting information and coordinating with the local stakeholders in the Akkar region;
- Delays on information collection and consolidation by NLWE, caused by the repeated need to verify unreliable data, and to address political interferences during the data collection stage.

The program initially intended for the procurement of the engineering services to be completed by September 2012. However, this procurement faced a number of delays associated with:

- Delay by NLWE in the selection and ranking of the priority villages associated with the project;
- The challenges associated with the security situation in North Lebanon which hampered the coordination of the activity with the Director General of NLWE and led to additional delays on the agreement on activity details;
- Procurement delay associated with extended bidding period due to inconsistencies in bid returns, especially in relation to engineering resource allocation. These inconsistencies resulted in requests for the bidders to revise their human resource matrices associated with the project;
- Additional delay associated with the due diligence effort conducted by DAI's contract office in relation to the selected bidder, whereby the LWWSS program's team conducted a series of verifications, background check, reference check and financial review of the selected bidder.

Due to these delays, the subcontract signature for the engineering package is likely to take place in early 2013. Overall, a three-month delay has been incurred. The LWWSS program intends to accommodate this delay by attempting to compress the design and project execution period.

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-2	Y-3 (FY12)				Y-4 (FY13)				Y-5 (FY14)				Y-6 (FY15)	
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
		J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S	O N D	J F M
<b>6.2</b>	<b>Expanding Service Provision to Non-Served Areas: Beit Mellat</b>															
	Activity introduced*															
	Hiring personnel, technical investigation of project parameters															
	SOW, procurement and appointment of engineering subcontractor**															
	Starting design and preparation for procurement of the works**															
	Detailed design period and bid preparation period															
	Procurement and appointment of infrastructure works contractor															
	Site implementation period															
	* Year-Three Work Plan															
	** Delayed by Three Months as per the Year-Four Work Plan															

Legend  
 Time frame as planned  
 Delays

## Component 7: Corporate Culture, Customer Service Orientation, and Public Outreach

Table 16

Item	Activity Description	Program Resource	Outcome by End of Year Four	Target Date
<b>7.3</b>	<b>Develop Tools and Support WEs in Adopting Corporate Communication</b>			
7.3.2	Design and Implement WE Corporate Website	EMC (NA), Local subcontractor (TBD)	- Activity completed	May, 2013
<b>7.6</b>	<b>Consumer-Targeted Awareness Programs</b>			
7.6.3	Outreach material promoting public awareness and education on water conservation	- EMC (NA) - Local subcontractor (TBD)	- Activity completed	March, 2013

### Activity 7.3 –Designing and Implementing WE Corporate Website

#### *Background*

This is a continuation of a group of communication-related activities conducted by the LWWSS program in NLWE as of year two. These activities encompass the development of corporate graphic communication guidelines, provision of on-the-job training on communication planning, and the design and implementation of a corporate website for the NLWE.

During year-three, NLWE engaged in a period of transition as it adopted the updated corporate graphic communication guidelines prepared by the LWWSS program, and deployed some of these guidelines in their communication material. Also during year-three, LWWSS held on-the-job training and awareness sessions within NLWE to promote the use of these guidelines.

The various components of the project:

- Successful and approved website design consistent with the NLWE corporate identity guidelines;
- Approved content, in three languages (English, French, Arabic), incorporated into the design;
- Website hosting agreement in place, tested and approved;
- Content management system is installed, which enables NLWE to update the contents of the website as needed;
- Testing and trial period completed and approved;
- Training and commissioning finalized and approved;
- Complete documentation approved and issued to NLWE;
- Website launched successfully;
- Service in place.

### *Impact*

Prior to this activity, NLWE never possessed a website. This activity will enable the NLWE to establish an online presence, which will provide it with an extended reach to its customers, and help it build trust with the population.

It will also facilitate the dissemination of public awareness messages to thousands of subscribers and visitors, provide information on the services that are accessible to customers through their computers, thereby increasing customer service effectiveness.

The website will also serve as a basis to enable NLWE to deploy on-line payment systems in the future, which will result in a substantial increase in customer service efficiency. The activity also includes the costs of hosting the website servers for the WE for a period of two years.

### *Timeframe*

As NLWE was undergoing a transition to the newly developed corporate graphic communication guidelines, it requested the LWWSS program to postpone launching the corporate website activity until year-four, to enable it to take place once the corporate graphic communication guidelines are fully adopted across the key departments within the WE.

This request by NLWE, and the political and security problems in Tripoli throughout 2012, led the LWWSS program's team to agree to postpone the last task of this activity (the development of the website) until year four. This rescheduling of the activity was detailed in the Year-Three work plan.

This postponement benefits the WE given that it provides sufficient time for the adoption of the corporate guidelines in three languages (Arabic, French and English) and across various departments in the WE. This postponement ensure the departments have been granted sufficient time to understand the various aspects of the new corporate identity guidelines, and its uses, before engaging on the website project. It therefore grants time for the departments to apply to guidelines and understand them clearly, and helps create a common understanding of these

guidelines by all the teams before these teams engage on the new website's project. It therefore increases the chances for the website activity to succeed and last.

The NLWE and the LWWSS program are now ready to launch the website activity, and are expecting to appoint a web design subcontractor to implement it during the first months of year four. The LWWSS program will also build the capacity building of NLWE's communication teams to establish the WE's online presence and reach out to customers through the web.

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-1	Y-2 (FY'11)				Y-3 (FY'12)				Y-4 (FY'13)		
		Q4	Q1	Q2	Q2	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
		J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J
<b>7.3</b>	<b>Designing and Implementing WE Corporate Website</b>												
	Activity introduced*	■											
	Website design and implementation**		■	■									
	Prepare for website activity launch								■	■	■		
	Appoint website design supplier										■	■	
	Implement website and go live										■	■	■
	* Year-Two Work Plan												
	** Activity rescheduled as per Year-Three Work Plan												

Legend

- Time frame as planned
- Delays

Activity 7.6 - Outreach material promoting public awareness and education on water conservation

This national outreach activity applies to several WEs. As such, for details in relation to its background, scope, impact and timeframe, please refer to activity 7,6, within component 7 of BWE's work plan above.

## 4. SOUTH LEBANON WATER ESTABLISHMENT (SLWE)

### Component 2: Capacity Building for Managerial, Technical and Operational Efficiency

Table 17

Item	Activity Description	Program Resource	Outcome by End of Year Four	Target Date
2.1	<b>Establishing and Building the Capacity of Metering Teams</b>			
2.1.1	Assist in identifying metering teams and assess training needs	- CDM (BG, GT, EH) - DAI (MK) - ValuAdd	- Activity conducted	September, 2013
2.1.2	Provide management team and field team training on metering	- CDM (BG, GT, EH) - DAI (MK)	- Activity conducted	September, 2013
2.1.3	Provide technical assistance (studies, training, study tours) and/or technological tools for water demand management	- DAI (TBD) - ValuAdd	- Activity conducted	September, 2013

2.3	<b>Build Pump Stations Operators Capacity in Operation and Maintenance</b>			
2.3.1	Pump station operators basic O&M and H&S training	- DAI (MK) - Kredo	- Activity conducted	September, 2013

## Activity 2.1 – Establishing and Building the Capacity of Metering Teams

### *Background*

This activity accompanies activity 5.1 to measure water production in SLWE, through the procurement and installation of source metering equipment.

### *Scope*

This activity consists of a comprehensive effort to establish a meter reading team, and implement an adapted methodology for meter reading, maintenance, data collection and management, as well as the principle of water balance for the WE. The initiative will include the provision of Microsoft Excel-based tools to enable the WE to effectively start monitoring water production and consumption. A geographic focus around cities where zone and consumer metering is being deployed will also take place.

The source metering installation activity will include training on water meter operation and maintenance for the pump station personnel to maximize the impact of this activity.

This activity will commence when field progress has been achieved on the source metering procurement activity (activity 5.1), i.e. around the middle of year four. This sequencing is necessary given that this activity is a follow-up to activity 5.1. Establishing and training metering teams is closely associated with the ongoing meter installation given that, in order to draft a metering strategy, assign teams and provide training, everything must link to the actual metering infrastructure that awaits installation.

### *Impact*

This activity yields tremendous benefit to SLWE, and advances its capacity to monitor water production per site, and instate a culture of water demand management within the WE, which enables the WE to control operating costs, manage water production, decrease losses, and advance towards achieving water balance.

### *Timeframe*

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-2	Y-3 (FY'12)					Y-4 (FY'13)						
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
		J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S				
<b>2.1</b>	<b>Establishing and Building the Capacity of Metering Teams</b>													
	Activity introduced*													
	Assist in identifying metering teams and assess training needs													
	Provide management and field team with training on metering													
	Propose provision of tools for demand management													
	* Introduced in Year-Three Work Plan, for implementation as of year-four.													

Legend

-  Time frame as planned
-  Delays

### Activity 2.3 – Capacity Building in Operation and Maintenance of Pump Stations

#### *Background*

During years two and three, the LWWSS program has implemented a group of successful activities that built the capacity of pump station operators in the areas of operation, maintenance, health and safety in both NLWE and BWE.

According to the WEs, this training resulted in improved skills and processes for pump station staff in operating and maintaining pump stations plant and equipment, as well as improved health and safety practices, and a decrease in the risk of accidents, injury and faults on site. The LWWSS program received requests from both BWE and NLWE to continue providing similar training to other existing and forthcoming staff, and in late 2012, the LWWSS program also received a request from SLWE to conduct a similar training in South Lebanon.

SLWE operates more than 220 water production, treatment and pumping sites, and as such, the requested capacity building activity has the potential to substantially enhance the effectiveness and safety of water supply practice in the South Lebanon region.

#### *Scope*

The proposed training course is already prepared in a template format by the LWWSS engineering training team. It is ready for customization to meet the need of SLWE. It consists of three to five days of in-class and on-site training, covering all the basic aspects of operating and maintaining a pump station, including:

- Operating the mechanical and electrical equipment;
- Cleaning and maintaining the equipment;
- Electrical, hydraulic and chemical health and safety procedures;
- Facility management basics;
- Chlorinator reading and operating basics;
- First aid.

Overall, the activity includes the following sequence of tasks:

- Interviewing the SLWE management, as well as the employees that are proposed for the training, and assessing their specific training needs;
- Confirming and agreeing the course details, to suit the profiles of the selected persons and their identified skills and needs;
- Conducting the training, both on-site and in classrooms, as well as the post-training evaluation;
- Certificate distribution;
- Continuing evaluation and follow-up.

### *Impact*

This activity is will result in improved skills and practice for the pump station operation staff in SLWE, as well as improved health and safety practices. The benefits include:

- An increased knowledge by operators of the basics of pump station functions, equipment and operation;
- Optimized operational practices that reduce wastage of time and resource, thereby increasing operational effectiveness of the pump station personnel;
- Increased knowledge of standard O&M practice, resulting in a decrease in malpractice, accidents, faults and break-downs. This enhancement will directly translate into less down-time at the pump stations, increased water supply hours to the population, and a decrease in repair costs;
- An enhanced knowledge of the health and safety basics of pump station operation and maintenance, which results in fewer personal accidents, injury and enhanced human technical and environmental performance on the site.

The precise geographical impact of the training will be determined once the investigation with the SLWE management and staff has been completed, and a detailed geographical scope has been determined. On the whole, and based on extrapolations from the previous similar training conducted in BWE and NLWE, it can be presumed that this training will target between 25 and 50 staff members in SLWE, impacting up to seven key geographical regions in SLWE, and a minimum of 50,000 water users in South Lebanon.

### *Timeframe*

The training is programmed to take place throughout 2013 and be completed at the latest by September 2013.



### *Scope*

This activity is a continuation from year three. Further to a detailed investigation stage, which led LWWSS engineering consultant CDM Smith to produce a complete bid package including the detailed specifications for source metering installation in around 220 sites in South Lebanon, LWWSS appointed subcontract Modon Group for the implementation of this activity.

### *Impact*

This activity will enable the water establishment to obtain highly accurate information on water production throughout the SLWE territory.

The information will serve the SLWE by providing increased accuracy on actual drinking water provision patterns, service areas and flows. It will enable the WE management to better design and manage water supply throughout the regions, arrange for remedies, and plan for long-term projects.

SLWE's planning will have the equipment and management tools (activity 2.1) to make the best use of the available water within the SLWE departments, and build a database on water production.

Non-revenue water reduction measures, and water demand management could then be undertaken with higher certainty. Ultimately, through this activity, SLWE will build its capacity to deliver higher water quantities more equitably to the population of South Lebanon.

### *Timeframe*

The subcontractor Modon Group completed the submission of all the drawings and equipment needed for the 218 stations by end of September, 2012. The orders will be placed in the first weeks of year four, and the supply and installation will proceed in parallel, starting with the minor civil works associated with each site.

The activity continues into a year-long meter reading service by the supplier, in addition to warranty and service of supplied equipment. A follow-up for this activity continues under activity 2.1, above.

It is estimated that task 5.1.2 of this activity (maintenance, warranty, and meter reading for a period of one year per completed site) will extend until April 2014 at the latest.



performance by all departments that rely on the JD-Edwards platform (accounting, finance, payroll, purchasing, etc).

*Timeframe*

During the course of year three, the LWWSS program team in coordination with SLWE personnel, prepared the specifications for the IT servers. They both agreed to delay the launching of the bids for the servers until such time as the ERP solutions in BMLWE and BWE were fully deployed, and feedback and lessons learned” is collected.

The progress on the ERP’s deployment has enabled LWWSS and SLWE to collect the information needed and launch the RFP for this activity toward the end of year three. The appointment of a supplier is therefore anticipated for the first months of year four. As a result, the hardware specifications in SLWE will be compatible with the requirements of the other WEs. This facilitates potential upgrades of the ERP solution by SLWE in the future, maximizes compatibility between the different WEs’ infrastructures, and enables potential interconnection or intercommunication between their systems in the future.

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-2	Y-3 (FY'12)					Y-4 (FY'13)																	
		Q4			Q1		Q2	Q3		Q4		Q1		Q2		Q3									
		J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
<b>5.6</b>	<b>Increasing Information Systems Infrastructure Efficiency</b>																								
	Activity introduced*																								
	Finalize specifications, start procurement for server upgrades																								
	Upgrade server installation and other key IT infrastructure																								
	Finalize specifications, start procurement for server upgrades**																								
	Conduct the procurement of the server infrastructure in SLWE**																								
	Supply and install servers and other key IT equipment; conduct training**																								
	* Introduced in Year-Three Work Plan																								
	** Rescheduled as per Year-Four Work Plan																								

Legend  
 Time frame as planned  
 Delays

**Component 6: Small to Medium Scale Rehabilitation/Upgrade/Extension Water and Wastewater Works within WEs**

Table 19

Item	Activity Description	Program Resource	Outcome by End of Year Four	Target Date
6.3	<b>Pump Station Infrastructure Rehabilitation</b>			
6.3.1	SLWE: Test and design pumps, motors and associated works for the rehabilitation of selected stations	- CDM (and their subcontractor DEP)	- Activity completed	September, 2013

6.3.2	SLWE: Supply and install pumps, motors and associated works for the rehabilitation of selected stations	- CDM (and their subcontractor DEP) - Local subcontractor (TBD)	- Infrastructure contract placed; works commenced	September, 2013
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## Activity 6.3 – Pump Station Infrastructure Rehabilitation

### *Background*

This is a continuation of a year-three activity. It relates to the rehabilitation of key pump stations in SLWE.

Some of SLWE’s key pump stations are in dire condition and require immediate intervention to replace their inefficient pumps and motors, enhance their overall performance, reduce their electrical consumption, and increase their supply hours to the population of South Lebanon. An improvement to the pump station infrastructure will increase supply, reduce water loss, and save energy in an area of Lebanon that faces decreasing groundwater resource availability because of overexploitation and increasing pollution contamination.

Further to an investigation of the most pressing needs for infrastructure projects in South Lebanon, the LWWSS program and SLWE determined that the rehabilitation of some of the WE’s key pump stations will result in a substantial and direct enhancement of the establishment’s capacity to deliver increased quantities of water to a larger population, while achieving energy savings due to modern and more efficient equipment design.

### *Scope*

Further to extensive research and analysis, three large stations were selected for rehabilitation by SLWE and the LWWSS program, as reported in the year-three work plan, and later updated through DAI’s memo to USAID dated July 5, 2012.

These stations cover important service areas and impact hundreds of thousands of the South Lebanon population. These stations are located throughout SLWE and include the following by order of priority:

- 1) Wadi Jeelo 1 Station (linked to the Al Shehabieh station. The two stations jointly supply over 51,000 people)
- 2) Al Shehabieh Station ( linked to the Wadi Jeelo 1 station. The two stations jointly supply over 51,000 people)
- 3) Batouley Station– supplying 116,000 people

The rehabilitation activity includes:

- Establishing key design parameters through well tests and measurements of the existing conditions of equipment and wells within the stations;
- Conducting preliminary and detailed design, to suit the design parameters determined in the initial investigation, such as well performance, population numbers, transmission and distribution network capacity, sustainability and future expansion, etc;

- Preparing a complete procurement package for the infrastructure works and associated equipment needed for the stations, and conducting the procurement stage;
- Placing contract and implementing and activity in all stations, including commissioning, handing over, and training.

*Impact*

Upgrading these priority pump stations is a natural extension of the LWWSS program’s activity. More than 167,000 people will benefit from an increased supply of water if these stations are rehabilitated.

The project will substantially increase the efficiency of these pump stations, resulting in up to a 25 percent enhancement in the number of hours of water supply delivery to these people. Efficiencies will also include up to a 15 percent reduction in electricity costs for SLWE, which represents one of the highest operating costs for these stations. The reduction is a crucial contribution to SLWE’s strategic targets set in its five-year business plan of achieving full O&M cost recovery.

The proposed upgrades will also reduce the frequency of equipment breakdowns—minimizing repair costs from labor assigned to these works and enabling staff to focus on other tasks. Importantly, the upgrades will also stem the long hours of service disruption due to these repairs. Furthermore, the new equipment will enhance health and safety practices in these stations because of the upgraded electrical installations, user training, and O&M capacity building. A safer working environment will in turn lead to fewer service disruptions due to accidents.

Finally, the WE will continue to build relationships with customers through enhanced service, and SLWE will have the water pumping capacity needed to extend the service to new customers.

*Timeframe*

Work Plan Item	Wok Plan Activity Title; Activity Stages	Y-2	Y-3 (FY'12)					Y-4 (FY'13)					Y-5 (FY'14)					Y-6
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1			
		J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S	O N D	J F M	A M J	J A S	O N D			
<b>6.3 Pump Station Infrastructure Rehabilitation</b>																		
Activity introduced*																		
Local engineer (subcontractor to CDM Smith): RFP stage																		
Conduct evaluation and appoint engineering subcontractor																		
Start design stage; issue completed design package																		
Complete design stage and prepare bids for all stations																		
Launch procurement for supply of pumps & rehabilitation works																		
Appoint infrastructure subcontractor; commence works																		
* Year-Three Work Plan																		

Legend  
 Time frame as planned  
 Delays

## Component 7: Corporate Culture, Customer Service Orientation, and Public Outreach

### Activity 7.6 - Outreach material promoting public awareness and education on water conservation

#### *Background*

This national outreach activity applies to several WEs. As such, for details in relation to its background, scope, impact and timeframe, please refer to activity 7,6, within component 7 of BWE’s work plan above.

## 5. STUDY TOURS AND CONFERENCES

Table 20: Study Tours and Conferences

Item	Activity Description	Program Resource	Outcome by End of Year Four	Target Date
4.3	<b>Build Decision-Makers' Managerial Capacity in Water Utility Management</b>			
4.3.1	Water utility management: conferences, workshops, specialist training and study tours	LWWSS (MK)	- Activities planned and undertaken	September, 2013

#### Background

Over the past three years, the LWWSS’ team has researched and identified a number of relevant opportunities to complement the program’s effort in capacity building for key personnel at the Water Establishment. These events have taken place both locally and regionally.

Once a suitable activity is identified, the LWWSS program conducts a detailed screening of the activity’s background, objectives, and outcomes, and works with the WEs to identify the personnel most suited for attendance, and ensure that the activity directly contributes to the LWWSS program’s scope and the WEs’ needs.

As such, the conference and study tour activities conducted to date have succeeded in serving as a complementary effort to enhance the success and impact of the LWWSS program’s efforts:

#### The first Arab Water Week Conference and Workshop

- Location: Amman, Jordan
- Dates: December 5 to December 9, 2010 (LWWSS year two)
- Conference and Workshop Topics: The theme of the conference training was cost recovery of water and wastewater utilities. The workshops focused on training the attendees on benchmarking, performance management, and planning.
- Participants:
  - SLWE: Director general and senior finance controller
  - NLWE: Head of the finance department

- Impacts: The conference topics directly support LWWSS emphasis on cost recovery improvement and the use of data for critical management decision-making in areas of operational performance improvement and capital investment planning.

#### Development of Water Safety Plan

Organized by UN ESCWUA, ACWUA and WHO

- Location: UN House, Beirut, Lebanon
- Dates : from January 9 to January 13 , 2012
- Subject: The purpose of the course is to train the participants to develop and apply a water safety plan in their institutions.
- Participants: eleven participants:
  - Two senior staff from NLWE
  - Three senior staff from BMLWE
  - Three senior staff from SLWE
  - Three Senior staff from BWE
- Impact: The workshop provided the attendees with a deeper understanding of the requirements for setting and maintaining a water safety plan that is adapted to the water utilities in Lebanon. The workshop also trained the attendees to collaborate with a team of peers and specialists to ensure the plan is feasible, taking into account the constraints and specificities of each utility. In doing so, the participants learned to safeguard customers, optimize operations and positively impact the environment.

#### ACWUA's 5th Best Practices Conference

- Location: Muscat, Sultanate of Oman
- Dates: June 3 to June 5, 2012 (LWWSS year three)
- Conference Topics: The theme of the conference is the utilities' perspective on water resource management in the Arab region. It aims to present and debate best practice in water utilities, and exchange local experiences with international water community experts on how to tackle water scarcity problems in the region. Discussions revolved on development of best practices and guiding principles on water resource management.
- Participants:
  - NLWE Director general
  - BMLWE Director general
  - BWE Director general
- Impacts: The conference provided case studies and best practices in water utility management in the Arab region, and enabled sharing and exchanging experiences with the international water community. It also provided a venue to for discussion on lessons learned from each case study being presented at the event.

For the coming year, the LWWSS program will continue to investigate conferences, workshops and study tours that bring tangible benefits to the WEs, and augment the

pace of their learning and modernization. LWWSS has been favoring regional efforts over international efforts, due to the increased relevance of successful examples in the region, and to their increased applicability in Lebanon. All the topics covered by the LWWSS scope are being investigated, to find a match between the forthcoming events, the LWWSS activities surrounding the event's topic, and the suitable local beneficiary that may be invited to attend.

It is worth noting that the study tours and conferences are constrained by the WE personnel's availability and the approvals necessary to allow their travel to take place. During the past years, LWWSS has learned that the WEs faced considerable challenges in obtaining clearance from the MOEW and the Ministry of Foreign affairs, for attending international training and conferences.

Once identified and discussed with the beneficiaries, events are proposed to USAID for approval on a case by case basis throughout the year.

## 7. ENVIRONMENTAL COMPLIANCE

The LWWSS Project's Environmental Mitigation and Monitoring Plan (EMMP) details the project environmental compliance requirements, as well as including a list of planning and reporting tools for submission to USAID. The primary environmental compliance planning tool is the Work plan, while the primary reporting tool is the Quarterly Report.

The first table below entitled "LWWSS Environmental Compliance Overview" summarizes the environmental compliance actions for each LWWSS program activity. The second table below entitled "LWWSS Environmental Mitigation and Monitoring Actions" details environmental mitigation and monitoring actions planned for year four for each activity that requires an ERAC and EMMP. The quarterly reports throughout year four will be tracking these actions.

Note:

ERAC = Environmental Review and Assessment Checklist

EMMP = Environmental Mitigation and Monitoring Plan

ES = LWWSS Environmental Specialist

### LWWSS Environmental Compliance Overview (as of September 30, 2012)

Activities (Completed, On-going, and Planned)		Environmental Compliance Actions		
#	Activity Description	Initial screening form completed?	Per screening form, is ERAC/EMMP necessary?	Approved ERAC and EMMP (if applicable)?
<b>Component 2</b>				
2.1	Source metering training in SLWE	Yes, see activity 5.1	See activity 5.1	See activity 5.1
2.2	Water quality management in the Bekaa implemented by AUB	Yes	No	N/A
2.3	O&M trainings for pump station operators in BWE and NLWE	Yes	No	N/A
2.4	IT literacy training for BMLWE	Yes, see activity 3.1	No	N/A
<b>Component 3</b>				
3.1	Upgrade finance and accounting standards and methods	Yes	No	N/A
3.2	Enterprise Resource Planning (ERP) platform and associated activities	Yes	No	N/A
3.3	Pilot Stakeholder exercise to sustain O&M of USAID WWTP	Yes	No	N/A
<b>Component 4</b>				
4.1	Business planning for BMLWE and SLWE	Yes	No	N/A
4.2	Pump station inventory in South Lebanon	Yes	No	N/A
4.3	Water utility management: conferences, workshops, specialist trainings and study tours	Yes	No	N/A

4.4	Master planning for the Bekaa	Yes	No	N/A
<b>Component 5</b>				
5.1	Source metering installation and training	Yes	Yes	Yes - see "LWWSS Environmental Mitigation & Monitoring Actions" table below
5.2.1; 5.2.2	Jeita pump station rehabilitation	Yes	Yes	Yes - see "LWWSS Environmental Mitigation & Monitoring Actions" table below
5.2.3; 5.2.4	Pump station rehabilitation in North Lebanon	Yes	Yes	No - planned for Q1 of Y4
5.3	Back-up power generators for NLWE pump stations	Yes	Yes	Yes - see "LWWSS Environmental Mitigation & Monitoring Actions" table below
5.4	Upgrading water analysis laboratories in SLWE and BWE	Yes	Yes	Yes - see "LWWSS Environmental Mitigation & Monitoring Actions" table below
5.5	Chlorination systems installation and training	Yes	Yes	Yes - see "LWWSS Environmental Mitigation & Monitoring Actions" table below
5.6	Upgrade IT equipment in BWE and SLWE	Yes	Yes	-Yes for BWE -No for SLWE, but planned for Q1 of Y4
5.7	GNSS procurement and training for SLWE	Yes	Yes	Yes - see "LWWSS Environmental Mitigation & Monitoring Actions" table below
5.8	Customer Service Center in BWE	Yes	Yes	Yes - see "LWWSS Environmental Mitigation & Monitoring Actions" table below
<b>Component 6</b>				

6.1	Network rehabilitation in Zahle (BWE)	Yes	Yes	Yes - see "LWWSS Environmental Mitigation & Monitoring Actions" table below
6.2	Expanding service provision in Beit Mellat (NLWE)	Yes	Yes	No - planned for Q2 of Y4
6.3	Pump station rehabilitation in South Lebanon	Yes	Yes	No - planned for Q1 of Y4
<b>Component 7</b>				
7.1	Building customer service management structure at BWE	Yes	No	N/A
7.2.1	Customer Service training at BWE and BMLWE	Yes	No	N/A
7.2.2	On-the-job training in communication planning	Yes	No	N/A
7.3.1; 7.3.2	Design and implement WE brand identity guidelines and design and implement corporate website	Yes	No	N/A
7.3.3	Design and adopt customer service application forms	Yes	No	N/A
7.4	Customer satisfaction survey	Yes	No	N/A
7.5	Youth water conservation programs	Yes	No	N/A
7.6.1	Media campaign in the Bekaa	Yes	No	N/A
7.6.2	World Water Day 2012 youth outreach	Yes	No	N/A

<b>LWWSS Environmental Mitigation &amp; Monitoring Actions</b>		
<b>Activity # (per Work plan)</b>	<b>Activity Description</b>	<b>Environmental Mitigation and Monitoring Actions Planned for Year Four</b>
<b>5.1</b>	<b>Source metering installation and training</b>	<p>Preparation works for the installation of source meters began at the end of the fourth quarter of Year Three by the subcontractor Modon, and installation will begin at the end of the first quarter or the beginning of the second quarter of Year Four. An LWWSS engineer is on site four days/week to supervise Modon's work. Once the installation starts, Modon will begin filling out the environmental mitigation inspection checklists that were developed by LWWSS' ES and will turn these in with monthly progress reports.</p> <p>Starting in the first quarter of year four, LWWSS' ES will go on monthly site visits (as permitted by the security situation, given that some of the sites are in risky areas in south Lebanon) with the LWWSS engineer to ensure that all mitigation measures are being followed. LWWSS' ES will document these site visits with photos and short reports and will summarize the visits in each quarterly report.</p>
<b>5.2.1-5.2.2</b>	<b>Jeita pump station rehabilitation</b>	The rehabilitation began at the end of the fourth quarter of Year Three and will continue through the first quarter of Year Four.

		<p>The EMMP includes an environmental mitigation inspection checklist that BMLWE's engineers must complete during the rehabilitation and at the beginning of the operation of Jeita. LWWSS is still awaiting a commitment letter from BMLWE's Director General concerning the environmental mitigation process, but will request this letter again during the first quarter of Year Four. However, LWWSS' ES met with BMLWE engineers during the fourth quarter of Year Three to discuss the EMMP and the environmental mitigation inspection checklist. The engineers understood the process and agreed to complete the checklists and turn them in during meetings with LWWSS engineers.</p> <p>During the rehabilitation, LWWSS' ES will go on a couple site visits with the LWWSS engineer to ensure that all mitigation measures are being followed during the rehabilitation process. LWWSS' ES will document these site visits with photos and short reports and will summarize the visits in each quarterly report.</p>
<b>5.2.3-5.2.4</b>	<b>Pump station rehabilitation in North Lebanon</b>	<p>This activity will begin during Year Four. The ES will complete the ERAC and EMMP during the first quarter of Year Four.</p> <p>Once the activity starts, LWWSS' ES will go on a couple site visits (as permitted by the security situation, given that a few of the sites are near risky areas) to ensure that all mitigation measures are being followed. LWWSS' ES will document these site visits with photos and short reports and will summarize the visits in each quarterly report.</p>
<b>5.3</b>	<b>Back-up power generators for NLWE pump stations</b>	<p>Edan Group International will most likely begin installation of generators during the second quarter of Year Four. Once the installation of the generators begins, Edan Group International's site manager will ensure that the mitigation measures are followed at each site and will complete the checklist. LWWSS engineers will be on site during the installation, and the ES will also conduct monthly site visits (as permitted by the security situation, given that a few of the sites are near risky areas) to ensure that mitigation measures are being followed.</p>
<b>5.4</b>	<b>Upgrading water analysis laboratories in SLWE and BWE</b>	<p>Year Four does not include monitoring of these activities, as LWWSS' capacity building specialist and engineers conducted frequent site visits to the laboratories throughout Year Three to ensure that all mitigation measures were followed and reported back to the ES, as well as taking photos for documentation. The ES also conducted a couple site visits to both SLWE and BWE and found that all mitigation measures were being followed.</p> <p>As per the EMMP, both the SLWE Director General and the BWE Director General signed commitment letters during Year Three agreeing to follow detailed safety procedures during use of the equipment and to dispose of laboratory equipment in an environmentally responsible manner at the end-of-useful life of the equipment.</p>
<b>5.5</b>	<b>Chlorination systems installation and training</b>	<p>Year Four does not include monitoring of these activities, as LWWSS' capacity building specialist and engineers conducted frequent site visits to chlorination sites throughout Year Three to ensure that all mitigation measures were followed and reported back to the ES, as well as taking photos for documentation.</p>
<b>5.6</b>	<b>Upgrade IT equipment in BWE</b>	<p>Year Four does not include monitoring of these activities, as all requirements were fulfilled in Year Three. As per the EMMP, the BWE Director General signed a commitment letter agreeing to dispose of IT equipment in an environmentally responsible manner at the end-of-useful life of the equipment.</p>

	<b>Upgrade IT equipment in SLWE</b>	This activity has not yet begun. The ERAC and EMMP for SLWE will be completed during the first quarter of Year Four. The EMMP will indicate the requirement for the SLWE Director General to sign a commitment letter agreeing to dispose of IT equipment in an environmentally responsible manner at the end-of-useful life of the equipment.
<b>5.7</b>	<b>GNSS procurement and training for SLWE</b>	Year Four does not include monitoring of these activities, as all requirements were fulfilled in Year Three. As per the EMMP, the SLWE Director General signed a commitment letter agreeing to dispose of the GNSS equipment in an environmentally responsible manner at the end-of-useful life of the equipment.
<b>5.8</b>	<b>Customer Service Center in BWE</b>	As per the EMMP, the BWE Director General signed a commitment letter during Year Three agreeing to follow the mitigation measures during operation of the customer service center. The ES also conducted a couple site visits to the customer service center during operation during Year Three to ensure that these measures are being followed and took photos for documentation. The ES will conduct one more site visit in Year Four to ensure that measures are still being followed. She will document these site visits with photos and short reports and will summarize the visits in each quarterly report.
<b>6.1</b>	<b>Network rehabilitation in Zahle (BWE)</b>	<p>The EMMP was developed in the fourth quarter of Year Three after the preliminary design was submitted by the engineering contractor WET. WET will be given the EMMP and the environmental mitigation inspection checklist once the ERAC and EMMP are approved by LWWSS' COTR.</p> <p>The EMMP will be included in the subcontract with the construction subcontractor, who will be responsible for following mitigation measures during the rehabilitation. WET will be responsible for monitoring the construction subcontractor and will fill out the checklists and turn them in with monthly reports.</p> <p>Once the rehabilitation begins in the second quarter of Year Four, LWWSS' ES will conduct monthly site visits to ensure that all mitigation measures are being followed. She will document these site visits with photos and short reports and will summarize the visits in each quarterly report.</p>
<b>6.2</b>	<b>Expanding service provision in Beit Mellat (NLWE)</b>	<p>This activity will begin during Year Four. The ES will complete the ERAC and EMMP during the first quarter of Year Four.</p> <p>Once the construction part of the activity starts in the third or fourth quarter of Year Four, LWWSS' ES will go on site visits (as permitted by the security situation, given that the sites are near risky areas) to ensure that all mitigation measures are being followed. LWWSS' ES will document these site visits with photos and short reports and will summarize the visits in each quarterly report.</p>
<b>6.3</b>	<b>Pump station rehabilitation in South Lebanon</b>	<p>This activity will begin during Year Four. The ES will complete the ERAC and EMMP during the first quarter of Year Four.</p> <p>Once the construction part of the activity starts, LWWSS' ES will go on site visits (as permitted by the security situation, given that the sites are near risky areas) to ensure that all mitigation measures are being followed. LWWSS' ES will document these site visits with photos and short reports and will summarize the visits in each quarterly report.</p>