Draft Report Mission 4

Institutional and Organisational Strengthening of WASCO Saint Lucia and Regional Water Utilities

Saint Lucia

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March 2019
Title
Draft Report Mission 4
Institutional and Organisational Strengthening of WASCO Saint Lucia and Regional Water Utilities
Saint Lucia

Date
March 2019

Consultant
JOINT VENTURE
CONSULAQUA Hamburg Beratungs-GmbH - Como Consult GmbH

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<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>CAH</td>
<td>CONSULAQUA Hamburg Beratungsgesellschaft mbH</td>
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<tr>
<td>CARICOM</td>
<td>Caribbean Community and Common Market</td>
</tr>
<tr>
<td>CARPHA</td>
<td>Caribbean Public Health Agency</td>
</tr>
<tr>
<td>CATS</td>
<td>Caribbean Aqua-Terrestrial Solutions</td>
</tr>
<tr>
<td>CAWASA</td>
<td>Caribbean Water &amp; Sewerage Association Inc.</td>
</tr>
<tr>
<td>CD</td>
<td>Capacity Development</td>
</tr>
<tr>
<td>Como</td>
<td>Como Consult GmbH</td>
</tr>
<tr>
<td>CR</td>
<td>Customer Relations</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
</tr>
<tr>
<td>GIZ</td>
<td>Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH</td>
</tr>
<tr>
<td>HM</td>
<td>Hydraulic Modelling</td>
</tr>
<tr>
<td>HR</td>
<td>Human Resources</td>
</tr>
<tr>
<td>HW</td>
<td>HAMBURG WASSER</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organisation for Standardisation</td>
</tr>
<tr>
<td>KPI</td>
<td>Key Performance Indicator(s)</td>
</tr>
<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
</tr>
<tr>
<td>NRW</td>
<td>Non-Revenue Water</td>
</tr>
<tr>
<td>NURC</td>
<td>National Utilities Regulatory Commission</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operation and Maintenance</td>
</tr>
<tr>
<td>OD</td>
<td>Organisational Development</td>
</tr>
<tr>
<td>QMS</td>
<td>Quality Management System</td>
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<tr>
<td>QMU</td>
<td>Quality Management Unit</td>
</tr>
<tr>
<td>SOP</td>
<td>Standard Operating Procedure(s)</td>
</tr>
<tr>
<td>STA</td>
<td>Strategic Alliance for Water Loss Reduction</td>
</tr>
<tr>
<td>ToR</td>
<td>Terms of References</td>
</tr>
<tr>
<td>ToT</td>
<td>Training of Trainer(s)</td>
</tr>
<tr>
<td>TOM</td>
<td>Total Quality Management</td>
</tr>
<tr>
<td>WASCO</td>
<td>Water Supply and Sewerage Company Inc., Saint Lucia</td>
</tr>
</tbody>
</table>
1 INTRODUCTION

This is the report on the 4th mission under the project “Institutional and Organizational Strengthening of WASCO Saint Lucia and Regional Water Utilities”. The project started on 1st of November 2018, it has a duration of 13 months and is carried out by a joint venture between CONSULAQUA Hamburg and COMO Consult, both from Germany. The project objectives are schematically presented in the figure below:

![Project objectives diagram]

Figure 1: Project objectives

2 MISSION OBJECTIVES, ACTIVITIES AND DELIVERABLES

This mission, which focussed on the Institutional and Organisational Strengthening of WASCO and the overall coordination of the consultancy, was undertaken by the Project Coordinator Mr. J.W. Overbeek from 12th March – 27th March 2019. The mission had the following objectives:

- Finalize report on technical and Customer Services processes and recommendations
- Assist WASCO in preparing the draft NRW Reduction Strategy
- Prepare outline ToR for WASCO Master planning
- Prepare project progress report and attend Steering Committee Meeting

The expected deliverables for the mission were as follows:

- Draft WASCO Handbook on Management of Process and Procedures
- Draft NRW Reduction Strategy
- Outline of a Training Plan for Regional Upscaling
- Project Progress Report and MoM of Meeting Steering Committee
The key activities during the mission have been:

- 18 March: Project Steering Committee Meeting
- 18 March: Meeting on Training Program Regional Upscaling
- 20 March: Workshop on Management of Processes and Procedures
- 21 March: Meeting on Master Planning
- 21 March: Training Course on Demand Forecasting
- 25 March: Update Meeting on WASCO’s draft NRW Reduction Strategy

The terms of reference for the mission is attached as Annex 1.

3 FINDINGS & RECOMMENDATIONS

a. Project Steering Committee Meeting

A meeting of the Project Steering Committee took place on the 18th of March 2019 and was attended by the Chairman of the WASCO Board Mr. Francis Denbow, the CEO of CAWASA Mr. Ignatius Jean, the Head of Program of the CATS/GIZ program Dr. Horst Vogel, the Project Officer of the CATS/GIZ programme Mr. Timo Schirmer, the Head of the WASCO Strategic Planning Department Mr. Peter Norville and his colleague Mr. Mandille Alcee, Management Trainee and the Project Coordinator of the Consultants team Mr. J.W. Overbeek.

The Consultants prepared a Project Progress Report covering the period from 1st of November 2018 – 15 March 2019. The report was reviewed and discussed during the meeting and the draft Minutes of Meeting are attached as Annex 2 to this report. WASCO will circulate the draft MoM to participants in the meeting for comments. (Action WASCO)

b. Proposal for additional input for Organizational Development (OD)

During the Project Steering Committee, it was agreed that it would be beneficial for the project to add additional resources into organizational development of WASCO. An outline proposal for this was prepared by the Consultant and discussed in the Project Steering Committee Meeting. It was agreed that Consultants will formally submit a proposal for additional input by the OD Expert Mr. Thomas Holtkamp to WASCO and CATS/GIZ (Action Consultants).

c. Training Plan for Regional Upscaling

Consultants prepared a draft Plan for training of staff of WASCO and Regional Utilities, consisting of two major training events, one from 1-4 July 2019 and one from 17-20 September 2019. The regional training program will be organized in collaboration with CAWASA and WASCO. The following issues were discussed and agreed upon:

i. WASCO and CAWASA will request offers from various hotels (including Rodney Bay) where the training could take place and decide on the location (Action WASCO/CAWASA);
ii. Consultants will prepare short outlines of the content of the various training courses and send a draft outline of the training program to all (Action Consultants);

iii. CAWASA will send out the invitations to utilities in the region, inviting them to submit candidates for the training courses (Action CAWASA);

iv. CATS/GIZ to consider the possibility to subsidize some of the participants if necessary (Action CATS/GIZ).

d. Strategy for developing and implementing a Quality Management System (QMS) for WASCO

During the mission a workshop was organized on 20th March 2019 with senior management of WASCO to discuss options for internalizing and sustaining processes and procedures within WASCO, including those developed under the project. The workshop was attended by all senior managers of WASCO and in total 11 persons participated. The workshop discussed the concept of Total Quality Management and how this could be developed and implemented in WASCO. The suggestions were supported by the managers, who also identified the key processes within their respective departments that they would like to document in a future QMS. The workshop concluded that there is a need to develop and implement a QMS for WASCO and that an outline proposal for this should be presented to the WASCO Board to obtain their buy-in and support.

Following these recommendations, a meeting was organized on 22nd March 2019 with the Chairman of the Board, 2 Board members and the Board adviser. A proposal for developing and implementing a QMS system for WASCO was presented and received the full support of the participants in the meeting. The presentation is attached as Annex 3 to this report. The consultant was requested to prepare a draft strategy for developing and implementing a QMS for WASCO for approval by the Board. The draft Strategy will be submitted early April 2019 and will include a draft Table of Contents of a future Quality Handbook for WASCO (Action Project Coordinator (PC)).

e. Training Course on Demand Forecasting

On the request of WASCO, a half day training course on Demand Forecasting was conducted on Thursday 21st of March 2019. In total 19 staff members of WASCO participated in the course. A short report on the proceedings of the training is attached as Annex 4 to this report. A one-day training on demand forecasting is also included in the Training Program for Regional Utilities in July 2019.

f. Outline of Master Planning Activities

Activity A.3.5 of the ToR for the project requires consultants to “prepare an Outline of Actions for Master Planning of WASCOs future projects, resulting in a compilation of recommendations developed during the course of the consultancy, merged into a conclusive framework for the development of a master plan for WASCO”.

WASCO and Consultants agreed to interpret the above activity as follows:

- Prepare an overview of existing long-term development plans for water and wastewater within WASCO;
- Review international best practice for master planning;
- Recommend an overall framework for strategic and master planning for WASCO;
- Prepare a draft ToR for developing a master plan (including issue like climate resilience).

The above activity will be carried out by the National Planning Expert (Mr. Lester Arnold), who will submit a draft report by the end of May 2019. He will be supported by the international consultants as necessary (Action: National Planning Expert).

g. Assist in preparing the draft NRW Reduction Strategy

During the mission the consultant prepared a PP presentation on the draft NRW Reduction Strategy for WASCO. The presentation (attached as Annex 5 to this report) was presented and discussed with the key managers involved (8 key managers participated) to obtain their feedback. In general, the draft NRW Reduction Strategy was received well by the managers who made the following remarks:

- Reducing illegal connections needs to be added as a separate activity;
- A budget needs to be prepared;
- The installation of the bulk meters could be a separate sub-project;
- Managers prefer a separate and dedicated NRW project team;
- It is important to make a start with the NRW Reduction Program;
- Important to consider production considerations in the design of the NRW Reduction Program;
- Targets for NRW should be realistic;
- There is a huge demand for water from new developments, which WASCO currently is not able to supply. Therefore, the NRW Reduction program is even more urgent!

The Strategic Planning Department intends to finalize the draft NRW Strategy in May 2019 (after having consulted CAH technical experts in April) and submit it to the GM and Board for approval in June 2019 (Action: WASCO).

4 MISCELLANEOUS ISSUES

a. Hydraulic Model for Castries

This issue was discussed in the context of the forthcoming mission of the Hydraulic Management Expert, and it was decided to change this activity into preparing a Hydraulic Model for the Pilot Implementation Zone (Action: Water Balance Expert).

b. Training on Leak Detection Equipment
This issue was discussed in the context of developing the Regional Training Program. In fact, WASCO is of the view that any issues with the functioning of the Leak Detection Unit (LDU) are not caused by a lack of understanding on how to use the equipment, but that the issues are related to the structure and way the LDU operates. Therefore, it was decided to cancel the Training on Leak Detection Equipment and ask the senior O&M Expert in her mission in May to investigate this and recommend how to approach this issue (Action: Sr. O&M Expert).

c. Office Equipment and Project Equipment

This issue was discussed during the Project Steering Committee Meeting. It was agreed that

- WASCO will prepare a list with equipment and materials that can be used for meetings and training to be purchased under the budget line office equipment;
- The Hydraulic Experts to assist WASCO in preparing a list with technical equipment to be used in the DMA’s to carry out water audits etc.
- WASCO to send both lists to the Consultant to obtain a no-objection from CATS/GIZ and proceed with procurement.

(Action: WASCO)

d. Template for SOPs

Consultants have submitted the draft SOP on Inspection of valves etc. to be the template for SOPs for WASCO. WASCO will inform consultants in case there are any further comments or suggestions to adapt the format (Action WASCO).

e. Standard Operating Procedures

The project is expected to produce several SOPs, as listed in the first two columns of the table below. However, it makes sense to combine some of these processes into one SOP, as is proposed in the third column below. Each SOP could include various technical instructions, forms and checklists for different technical types of facilities. It is proposed that the Sr. O&M Expert reviews the list of SOPs below together with the WASCO counterparts and decide on the final structure (Action Sr. O&M Expert).

<table>
<thead>
<tr>
<th>Activity No (ToR)</th>
<th>SOP as proposed in the ToR</th>
<th>SOP as prepared under the project</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.1.3</td>
<td>Structuring of the communication and reporting during water supply disturbances</td>
<td>It is proposed that workflows mentioned in A.1.3, A.1.4, A.1.5 and B.1.2 will be combined into one major workflow and one SOP called “Distribution System - Repairs and Communications”. This SOP describes how WASCO deals with reports on water disturbances,</td>
</tr>
<tr>
<td>A.1.4</td>
<td>Analysis of actual procedure and organisation of repair work assignments (pipelines, valves, appurtenances, etc.), frequency and type of repair works and material</td>
<td></td>
</tr>
<tr>
<td>Activity No (ToR)</td>
<td>SOP as proposed in the ToR</td>
<td>SOP as prepared under the project</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>A.1.5</td>
<td>Workshop on and support in development of work flows for repair works, optimisation of travel times and equipping of repair crews</td>
<td>leakages etc. that are received by the control room and result in repairs and communication with customers. This will also include a technical instruction on the assessment and documentation of leakages and damages and feedback into the GIS system.</td>
</tr>
<tr>
<td>B.1.2</td>
<td>Review of processes and procedures for assessment and documentation of leakages &amp; damages and development of a SOP for feedback into the GIS system</td>
<td></td>
</tr>
<tr>
<td>A.2.1</td>
<td>Development of work flows, standard operating procedures and technical standards for the installation and repair of metering devices and house connections; infield pilot implementation of standards and development of SOP for feedback into GIS</td>
<td>This SOP already exists within Customer Services. The SOP needs to be set into new WASCO template and the GIS data entry procedure needs to be integrated into the procedure.</td>
</tr>
<tr>
<td>B.1.1</td>
<td>Workshop on (1) development of guidelines for inspection of condition and functionality of valves, flow meters and pressure gauges and (2) development of standardized analysis and condition-assessment form; in-field pilot implementation of the form and development of SOP for feedback into GIS</td>
<td>It is proposed that this SOP will be called Distribution Network – Preventive Maintenance, which involves preparation of a schedule for preventive maintenance, followed by inspection of the various components of the distribution system and preventive maintenance work.</td>
</tr>
<tr>
<td>C.2.1</td>
<td>Development of work flow and training on implementation of DMAs and water balance establishment</td>
<td>No changes proposed.</td>
</tr>
<tr>
<td>C.2.3</td>
<td>Development of workflow and related SOPs to collect, verify and manage flow and pressure measurement data</td>
<td>No changes proposed.</td>
</tr>
<tr>
<td>D.1.1</td>
<td>Support regarding the development of inventories for assets and a SOP for data input into GIS</td>
<td>No changes proposed.</td>
</tr>
</tbody>
</table>
5 SUMMARY LIST OF FOLLOW UP ACTIONS

In order to keep track of all outstanding actions in relation to this mission and earlier missions, it was agreed to prepare and regularly update an Action List. The table below summarizes the outstanding actions as a result of Mission 4.

List of Outstanding Actions

<table>
<thead>
<tr>
<th>No</th>
<th>Outstanding Actions</th>
<th>Person/Dept Responsible</th>
<th>Date of completion</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Circulate draft MoM of Project Steering Committee for comments</td>
<td>Strategic Planning</td>
<td>31/03/19</td>
<td>pending</td>
</tr>
<tr>
<td>2</td>
<td>Submit proposal for additional input OD expert to WASCO and CATS/GIZ</td>
<td>PC</td>
<td>31/03/19</td>
<td>pending</td>
</tr>
<tr>
<td>3</td>
<td>Select location for regional training event July</td>
<td>Strategic Planning</td>
<td>31/03/19</td>
<td>pending</td>
</tr>
<tr>
<td>4</td>
<td>Prepare training proposal for regional training event</td>
<td>PC</td>
<td>31/03/19</td>
<td>pending</td>
</tr>
<tr>
<td>5</td>
<td>Send out invitations to regional utilities</td>
<td>CAWASA</td>
<td>15/04/19</td>
<td>pending</td>
</tr>
<tr>
<td>6</td>
<td>Submit draft Strategy for WASCO QMS to WASCO</td>
<td>PC</td>
<td>05/04/19</td>
<td>pending</td>
</tr>
<tr>
<td>7</td>
<td>Review and comment on draft WASCO QMS and outline QMS Handbook</td>
<td>WASCO</td>
<td>05/05/19</td>
<td>pending</td>
</tr>
<tr>
<td>8</td>
<td>Finalize NRW Reduction Strategy and prepare budget</td>
<td>Strategic Planning</td>
<td>15/04/19</td>
<td>pending</td>
</tr>
<tr>
<td>9</td>
<td>Prepare hydraulic model for Pilot Implementation Zone</td>
<td>Water Bal. expert</td>
<td>30/04/19</td>
<td>pending</td>
</tr>
<tr>
<td>10</td>
<td>Prepare ToR for leak detection expert</td>
<td>Sr. O&amp;M Expert</td>
<td>20/05/2019</td>
<td>pending</td>
</tr>
<tr>
<td>11</td>
<td>Prepare list of office equipment and project equipment</td>
<td>Strategic Planning</td>
<td>15/04/19</td>
<td>pending</td>
</tr>
<tr>
<td>12</td>
<td>Comment on SOP template</td>
<td>Strategic Planning</td>
<td>15/04/19</td>
<td>pending</td>
</tr>
<tr>
<td>13</td>
<td>Decide with WASCO on list of SOPs to be produced for Water Services and Customer Services</td>
<td>Sr O&amp;M Expert/ WS / CS</td>
<td>15/05/19</td>
<td>pending</td>
</tr>
</tbody>
</table>
**ANNEX 1: TO\R FOR MISSION 4**

**Mission 4**

**Draft Terms of Reference**

**Area(s) of focus:** Institutional and Organizational Strengthening, Project Coordination

| Expert(s) | Key Expert A: Institutional Expert, Project Coordinator (Jan Willem Overbeek)  
|           | National Planning Expert (Lester Arnold) |
| Timeframe and place: | Preparation: 1-2 days  
|           | Mission dates:  
|           | ➢ Arrival: 13 March 2019  
|           | ➢ Departure: 26 March 2019  
|           | Preparation of Reports: 1-2 Days  
|           | Home Office  
|           | Castries  
| Reference to Project: | Final Inception Report, January 2019  
| Mission Objective(s) | • Finalize report on technical and Customer Relations processes and recommendations  
|           | • Assist WASCO in preparing the draft NRW Reduction Strategy  
|           | • Prepare outline ToR for WASCO Master planning  
|           | • Prepare project progress report and attend Steering Committee Meeting  
| Involved Staff WASCO: | General Manager WASCO  
|           | Head of Strategic Planning Department  
|           | Head of Operations  
|           | Head and staff Water Services  
|           | Head and staff of Support Services  
|           | Head and staff of Customer Services  
| Activities according to workplan: | Prepare for Mission:  
|           | ➢ Review documents and recommendations of missions 1, 2 and 3  
|           | ➢ Review relevant documentation received from WASCO  
|           | ➢ Video/Skype conference with WASCO  
|           | ➢ Discuss current process management  
|           | Home Office  
|           | Meetings/mini
| Practice with WASCO Management and agree on future management system for processes and procedures, with focus on  
- Network Operation and Maintenance  
- Customer Services | Workshops with management and key staff |
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>➢ Prepare first draft of a WASCO Handbook for Management of Processes and Procedures</td>
<td></td>
</tr>
<tr>
<td>➢ Review progress on WASCO’s NRW Reduction Strategy and discuss with Strategic Planning Department</td>
<td>Meeting with Strategic Planning Department</td>
</tr>
<tr>
<td>➢ Facilitate workshop on WASCO’s NRW Reduction Strategy with WASCO managers and key staff</td>
<td></td>
</tr>
<tr>
<td>➢ Assist in preparing a final draft of WASCO’s NRW Reduction Strategy</td>
<td></td>
</tr>
</tbody>
</table>
| ➢ Review needs and plans regarding WASCO’s masterplanning  
➢ Conduct half day workshop on demand forecasting with WASCO planners | Meeting/workshop with Strategic Planning and Design and Construction Departments |
| ➢ Prepare draft outline for Master Planning Document for WASCO | National Planning Expert will be involved |
| ➢ Discuss and agree on training plan for regional upscaling | Joint meeting with CAWASA, CATS/GIZ and WASCO |
| ➢ Prepare Project Progress Report for the period 1 November 2018 – 28 February 2019 (including draft M&E framework) | M&E expert is in the process of preparing the draft M&E framework |
| ➢ Attend the first Project Steering Committee Meeting | |

**Deliverables:**

- Draft WASCO Handbook on Management of Process and Procedures  
- Draft NRW Reduction Strategy  
- Outline of a Training Plan for Regional Upscaling  
- Project Progress Report and MoM of Meeting Steering Committee

**Tentative program/ agenda**

- See separate schedule below

**Reference documents**

- Inception Report, technical proposal, ToR  
- Reports produced during missions 1, 2 and 3  
- Reports and findings of previous projects  
- Existing SOPs and guidelines
## Proposed Schedule for Mission 4

**Dates: 12 – 27 March 2019**

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
<th>Persons involved</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 March</td>
<td>• Departure from Amsterdam</td>
<td>JWO</td>
<td></td>
</tr>
<tr>
<td>13 March</td>
<td>• Arrival Hewanorra Int. Airport at 14.18pm with Delta Airlines</td>
<td>JWO</td>
<td></td>
</tr>
<tr>
<td>14 March</td>
<td>• Kick off meeting</td>
<td>WASCO General Manager, Strategic Planning Dept., Head of Operations, Head of Water Services, Head of Support Services, Head of CR Dept.</td>
<td>Final Mission Schedule</td>
</tr>
<tr>
<td></td>
<td>• Review progress on Management of Processes and Procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 March</td>
<td>• Review project progress and prepare and distribute Project Progress Report</td>
<td>Staff Strategic Planning Department</td>
<td>Progress Report</td>
</tr>
<tr>
<td></td>
<td>• Review progress on WASCO NRW Reduction Strategy and plan for workshop</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Attend de-briefing meeting of GIS/Asset Management Experts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 March</td>
<td>• Prepare for Project Steering Committee Meeting</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Prepare for Workshop on Management of Processes and Procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 March</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 March</td>
<td>• Meeting Project Steering Committee</td>
<td>Members Project Steering Committee, WASCO, CAWASA</td>
<td>MoM Training proposal</td>
</tr>
<tr>
<td></td>
<td>• Prepare and distribute MoM Project Steering Committee</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Discuss draft Training Program for Regional Upscaling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Task Description</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
| 19 March | - Individual meetings with key staff on Management of Processes and Procedures  
- Prepare for workshop |
| WASCO General Manager  
Head of Operations  
Head of Water Services  
Head of Support Services  
Head of CR Dept. |
| 20 March | - Half day workshop with managers and key staff to discuss and decide on WASCO’s approach to management of processes and procedures |
| WASCO General Manager  
Strategic Planning Dept  
Head of Operations  
Head of Water Services  
Head of Support Services  
Head of CR Dept. |
- Assess WASCO needs and ideas for master planning |
| Strategic Planning Dept.  
Design and Construction Department  
National Planning Engineer |
| 22 March | - Prepare for NRW Reduction Workshop  
- Half day workshop on demand forecasting |
| Staff of Strategic Planning Dept and of Design and Construction Dept |
| 23 March | - Prepare for NRW Reduction Workshop  
- Report writing |
| 24 March | - Half day workshop to present and discuss WASCO’s NRW Reduction Strategy  
- Continue work on draft WASCO NRW Reduction Strategy |
| WASCO General Manager  
Strategic Planning Dept |
| Workshop Report  
Draft WASCO Guidelines on Management of Processes & Procedures |
### Draft Report Mission

#### Institutional and Organisational Strengthening of WASCO - SAINT LUCIA

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| 26 March | • Meet with Strategic Planning Department to evaluate results of the mission and agree on follow up actions.  
          • Departure from Hewanorra Int. Airport at 15.18pm by Delta Airlines | Strategic Planning Department  
          JWO |
| 27 March | • Arrival Amsterdam                                                          | JWO                 |
ANNEX 2: MoM OF THE PROJECT STEERING COMMITTEE MEETING (19/03/2019)

Meeting of the Project Steering Committee
March 18th, 2019

Attendees: Francis Denbow – Chairman, WASCO
Peter Norville - Strategic Planning Manager, WASCO
Ignatius Jean – Executive Director, CAWASA
Dr. Horst Vogel – Program Head GIZ – CATS
Timo Schirmer – Advisor for CATS program
Mandille Alcee – Trainee Manager, WASCO
Jan Overbeek – Project Coordinator

A total of three missions under the ongoing consultancy “Organisational and Institutional Strengthening of WASCO Saint Lucia and other Regional Utilities” have been completed. The first mission last year was the kick off mission, the second mission in February 2019 focused on network management and the third mission focused on GIS and asset management. The draft progress report has been circulated and provides a synopsis of the three missions undertaken as well as an outlook for the upcoming missions. The work done to date on the key areas of the consultancy was highlighted.

Organisational Strengthening

- One of the key recommendations emanating from the three missions to date is the need for a quality management system to be established within WASCO. This will ensure that SOPs are implemented, monitored and evaluated. As part of the QMS, it is proposed that all procedures are included in a WASCO Quality Handbook.

Improved Planning

- Some of the key activities under this part of the consultancy include master planning for WASCO, a review of the tariff application and assistance with the development of WASCO’s non-revenue water strategy.
- Meeting to discuss the approach to master planning for this consultancy will be held on March 21st, 2019.
- The non-revenue water strategy is still in a working draft format and a date for the completion of the document has not been set.
- The last tariff application submitted to the National Utilities Regulatory Commission (NURC) by WASCO will be reviewed and recommendations made for improvements.

Improved Network Management
Further discussion on the proposed training in leak detection is required. The issues with leak detection may be more managerial in nature than the need for training in the use of leak detection equipment.

Concerns were raised over the work to be undertaken on the northern distribution line. The northern line run from Choc to Cap Estate and the GIZ is concerned that it may be perceived that this exercise on the northern line will benefit the more privileged people of Cap Estate and the major hotels in the north of the island. However, the northern distribution line also serves many other communities along the northern corridor and its environs and is the primary source of water for these communities. Nonetheless, the concern of the GIZ team was duly noted.

Hydraulic Modelling

The fifth mission will focus on hydraulic modeling and will take place from April 1st to 12th 2019.

GIS and Asset Management

Assessment undertaken showed that GIS is hardly used by other department and questions were raised on the slow progress of data entry since the last consultancy.

However, efforts are ongoing to provide other departments with access to the data in the GIS. WASCO will also continue with the development of mobile applications to be used in the GIS. For example, the customer meter app and the leak detection app which have both been developed during mission three. A GIS Action Plan was developed during the mission of the GIS experts.

Regional Upscaling

The cost of regional training is a concern due to budgetary constraints within GIZ to subsidize participants from regional utilities. Therefore, these utilities should as much as possible pay for travel and accommodation themselves. To facilitate the regional training in July and September, one suggestion was to allow the utility to pay for 1 participant and CATS/GIZ to fund the other participant. This would reduce the cost to GIZ.

Possibility to use the regional CAWASA conference to gauge support and suggestions from utility managers about the concept of the Centre of Excellence.

Project Budget

The equipment budget is proposed to be used to purchase equipment that would be used for the NRW reduction strategy and specifically in undertaking water audits. WASCO and Consultants will prepare a draft list for approval of CATS/GIZ.
• List of office supplies is to be prepared and submitted by Consultants based on budgetary allocation under the consultancy. This budget line is proposed to be used for the purchase of training equipment for WASCO.

• An assessment and proposal for an additional mission by the OD expert will be undertaken and submitted by consultants to WASCO and CATS/GIZ. Some reallocation of resources from existing activities may have to be done to facilitate this additional mission or it could be funded from the budget line “flexible remuneration”.
ANNEX 3: PRESENTATION ON QMS SYSTEM FOR WASCO

INSTITUTIONAL AND ORGANISATIONAL STRENGTHENING OF WASCO SAINT LUCIA AND REGIONAL WATER UTILITIES

SAINT LUCIA

WASCO MANAGEMENT SYSTEM
March 2019

OUTLINE OF THE PRESENTATION

1. THE NEED FOR A WASCO MANAGEMENT SYSTEM (WMS)
2. TOTAL QUALITY MANAGEMENT CONCEPT
3. WMS - SCOPE
4. WMS - STRUCTURE
5. WMS - DESIGN
6. WMS – PREPARATION OF SOPS
7. WMS – DISCUSSION
THE NEED FOR A WASCO MANAGEMENT SYSTEM

Key Issues identified for WASCO Management during mission 1

- A pro-active and systematic approach towards management of key processes is lacking
- There are many initiatives but there is a lack of implementation and follow-through (e.g. NRW Report 2012, GIS recommendations of 2014, SOP development in Dennery Project)
- Departments work in silos; common management approach is lacking
- Delegation of authority and related accountability not always clear
- Lack of qualified staff and communication with staff not always effective

Task Consultants

- Assist in developing a WASCO System for Management of Processes and Procedures (WMS)

TOTAL QUALITY MANAGEMENT

INPUTS
- Materials
- People
- Equipment

PROCESSES
- Core
- Management
- Support

QUALITY OUTPUTS
- Products
- Services
TOTAL QUALITY MANAGEMENT

1. Customer Focus (external and internal)
2. Active involvement of employees (communication!!)
3. Focus on Processes which transform inputs into outputs
4. Integrated System for the whole Organization
   - Everyone understands mission, policies and objective
   - Core processes, management processes, support processes
   - Horizontal processes
5. Strategic and Systematic Approach with Quality at its core
6. Systematic monitoring and collection of data
7. Continual improvement
WMS - STRUCTURE

- Each Department (Head and Staff) is responsible for:
  - Identification of key processes
  - Preparing process documentation (SOPs, checklists, standards)
  - Implementation of processes according to standards
  - Data collection and monitoring of processes
  - Continuous Improvement

- All Documentation to be presented in a WASCO Management Handbook/Manual which is ‘owned’ by a Quality Management Unit which reports to the GM, and will be responsible for:
  - Maintaining the Handbook
  - Making it accessible to staff (intranet, training)
  - Train a team of internal auditors
  - Arrange schedule of internal audits
  - Producing regular reports on WMS Implementation

- These responsibilities are included in job descriptions of heads and staff and the basis for performance evaluation

PREPARATION OF SOPs

1. Each Department (management and staff) to prepare SOPs
   a. based on WASCO template
   b. SOPs describe basic steps in processes
   c. Based on risk analysis (where does/can it go wrong)
   d. Involve internal/external “clients”
   e. Keep it simple
   f. Support of Quality Management Unit in preparing a SOP

2. Test SOPs in the field and revise as necessary
3. SOPs approved by Line Manager and General Manager
4. Entered into the Handbook
5. SOP will be subject to regular audits
6. Revise SOPs where needed to reflect continuous improvement
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Institutional and Organisational Strengthening of WASCO - SAINT LUCIA

SOP DRAFT TEMPLATE

MANAGEMENT HANDBOOK
SOP Title: TD 01 Maintenance - Inspection of Valves

TD 01 Maintenance - Inspection of Valves

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SOP process owner: Manager Water Services

SOP approved by: General Manager

NEXT STEPS

2019
1. Prepare proposal and action plan for the gradual implementation of a QMS within WASCO (Consultants)
2. Obtain support and commitment from WASCO Board and senior management
3. Continue preparation of 6-7 SOPs under the CATS/GIZ project and when finished, formally approve and enter in Handbook
4. Adapt existing SOPs to WASCO format, approve and enter into Handbook
5. Adapt job descriptions of all staff and management to incorporate QMS tasks and responsibilities

2020
1. Install a Quality Management Unit within WASCO (as part of Internal Auditing?)
2. Develop new SOPs in Operations and Laboratory, approve and enter into Handbook
ANNEX 4: REPORT ON TRAINING COURSE ON DEMAND FORECASTING

Introduction

At the request of WASCO, a half-day workshop on Demand Forecasting took place on the 21st of March 2019, at the Finance Administrative Centre, Pointe Seraphine, in Castries. The purpose of bringing forward the workshop was to allow as many WASCO staff as possible to participate. The Workshop will again be conducted during the Training Event in July, in connection with the CAWASA Regional Conference.

Proceedings

The workshop was attended by 19 staff members of WASCO and a list of participants is attached. The program of the workshop was as follows:

- Introduction
- Factors which affect demand
- Some concepts regarding demand
- Data needed for demand forecasting
- Sources of data for demand forecasting
- The need for demand management
- Instruments for demand management
- Exercise

A PP presentation and the trainers’ notes for the course are attached as Annex 1 and 2 to this report. All trainees received a Handout, which is available within WASCO.

Evaluation

All participants filled in a short evaluation form. The results indicated that all participants were either satisfied or very satisfied with the agenda of the workshops, its results and the way the workshop was conducted. Also, the majority of the participants were very satisfied with the level of staff involvement during the workshop. Overall, most participants were very satisfied with the arrangements for the workshop and many made the suggestion for additional training in the area of water demand forecasting, surveys and data analysis.
Conclusion

The workshop will again be conducted in July 2019. Additional practical exercises will be added to the program and there will be training on conducting household surveys.
A.1 List of Participants

1. Gregory Inglis Water Services
2. Antony Joseph Water Services
3. Malcolm Kirton Water Services
4. Nicholai Hyacinth Strategic Planning/GIS
5. Matthew Francis Customer Services
7. Jim King Water Services
8. Adrian Medard Production, Treatment and Quality
9. Cletus Felicien Design & Construction
10. Marvin Jermott Water Services
11. Ken Goodman Operations South
12. Genella Fontenelle Operations South
13. Anthony Reece Design & Construction
14. Kelvin Emilien Design & Construction
15. Timothy James Water Services
17. Ignatius Jean CAWASA
18. Mandille Alcee Strategic Planning
19. Peter Norville Strategic Planning
20. Lester Arnold Planning consultant
Institutional and Organisational Strengthening of WASCO Saint Lucia and Regional Water Utilities

Saint Lucia

DEMAND FORECASTING
March 2019

A. Domestic Demand
- Number and size of households
- Population growth
- Family income and income distribution
- Costs of water presently used
- Cost of future water used
- Connection charges
- Availability and quality of service
- Cost and availability of water using devices
- Availability of alternative water sources
- Present water consumption
- Legal requirements
- Population density
- Cultural influences
### DETERMINANTS OF DEMAND - 2

**B. Commercial Demand**
- Sales and turnover
- Costs and volume of water presently used
- Price of future water used
- Connection charges
- Costs of water using appliances
- Quality and reliability of service
- Working hours of various types of commercial establishments
- Legal requirements

**C. Industrial Demand**
- Present and future costs of water
- Type of industry and water use intensity
- Relative price of alternative sources
- Quality and reliability of supply
- Costs of treatment and disposal of waste water
- Legal requirements

### DETERMINANTS OF DEMAND - 3

**D. Agricultural Demand (for [non] piped water supply)**
- Present and future costs of water
- Availability of other sources
- Quality and reliability of supply
- Supply cost of alternative water systems
- Number of cattle
- Legal requirements

**E. Public Services Demand**
- Present and future costs of water
- Revenue of local governments
- Number and size of public schools, hospitals, ministries, etc.
- Legal requirements

**F. Technical requirements**
- Unaccounted for Water (leakage)
- Peak factors
- Seasonal fluctuations
DEFENITION OF DEMAND

The demand for water is the **quantity** of water demanded at a given **service level** and at a specified **price**.
FUTURE COSTS OF WATER

DEMAND MANAGEMENT IN MELBOURNE

You are to prepare a demand forecast for Castries for the next 25 years. Please answer the following questions:

1. What type of data do you need?
2. How are you going to collect the data?
3. What sources of information you intend to use?
4. What measures would you propose to manage demand?
A.3 Trainers Notes

Course name: Demand Analysis and Forecasting

Time: To coincide with CAWASA Seminar

Objective: At the end of the workshop participants will be able to

- Identify the various factors which determine the demand for water
- Explain the need to manage the demand for water
- Describe the various instruments to manage the demand for water
- List the types of data needed to forecast the demand for water
- Identify the main sources for data collection
- Explain the concepts Willingness and Ability to Pay
- Carry out a simple exercise in forecasting water demand

Duration: One day

Training methods: Short lectures, group discussions, group work, various exercises


Target Group: 1. Utility and government staff involved in the planning and design of new water supply systems or extensions of existing water supply systems

2. Staff working with regulatory authorities supervising water utilities

Trainer: J.W. Overbeek, Institutional Expert and Economist

Tentative Program:

1. Introduction
2. Group work to identify the various factors which determine the demand for water
3. Introduction on the various instruments to manage water demand
4. Group discussion on the effectiveness and feasibility of the identified instruments
5. Group work to identify potential sources of data needed for demand forecasting
6. Introduction on Willingness and Ability to Pay followed by discussion
7. Carry out a simple case study in estimating water demand
Session Guide

A. The Determinants of the Demand for Water
1. Divide participants in groups of two (sitting next to one another). Ask all groups to take 10 minutes and list the factors that determine the future demand for water and make a distinction between domestic and industrial/commercial demand.

2. After 10 minutes ask the first group to mention the first three factors. Ask group 2 to add another three factors. Continue the exercise until participants have listed most of the determinants of the demand for water mentioned below.

3. Write down the definition of the demand for water, as follows:

   The demand for water is the quantity of water demanded of a given service level and at a specified price.

   Explain that the demand is always related to a specific product or service level and the price paid for the product or service level.

B. Some Concepts
4. What is the difference between the “demand” for water and the “consumption” of water. Elicit the concept of “constrained” demand, i.e. that the actual demand is higher as consumption, but e.g. the water utility cannot provide enough water.

5. Ask participants if all water that WASCO produces represents additional demand for water? Elicit by questioning and discussion the difference between non-incremental demand and incremental demand for water. The difference is relevant, because non-incremental demand does not generate benefits for a water supply project, as it just replaces water. Incremental demand represents a benefit for a water supply project.

6. Ask participants what they can say about the relationship between the price and the volume of water demanded. Participants may suggest that the higher the price the lower demand. Suggest that in case supply of water is very limited, e.g. only a few liters per day, consumers may be willing to pay very high prices for water, for drinking. However, for the next few liters, e.g. for cooking, they will be prepared to pay less, and for the next 10 liters (for washing) they will be prepared to pay even less. Draw a demand curve on the board (nonlinear and linear) The downward slope of the demand curve indicates the decreasing marginal value of water. For practical purposes the linear demand curve is often used, whereas the non-linear version probably is a better representation of actual consumer behavior.

7. Draw a demand curve for a consumer who uses water from a public tap. Ask participants where the demand curve for water from a consumer with water from a house connection would lay. Probably the HC demand curve would lay higher and to the right of the PT demand curve indicating that consumers are willing to pay a higher price for the same quantity of water with a quality that they perceive as higher.

8. Introduce the concept of price elasticity. Price elasticity is the relative change in the quantity of water demanded divided by a relative change in the price of water. If the price elasticity is <1, we call demand inelastic, and if price elasticity is >1, we call demand elastic. Studies of the World Bank show, that the average demand for water is
rather inelastic and ranges between -0.2 and -0.8. This means that if the Price increases with 10% the demand for water will decrease with 2% - 8%.

9. Explain to participants that it would actually be very useful to know the actual shape of the demand curve. For that purpose, sometimes Willingness to Pay surveys are being carried out in the course of forecasting demands and planning for system development. In such WTP surveys, consumers are being asked how much they are willing to pay for a connection and/or for water. Such surveys often make use of the Contingency Valuation Method.

10. Another important determinant of the demand for water deals with income. Ask participants what will happen to the demand for water if income increases. Participants may guess that when income increases, customers are willing to pay more for the same quantity of water. This is called **Income elasticity**, which represents the relative change in the quantity of water demanded divided by the relative change in income. Income elasticity for water is rather inelastic and estimated at between 0.4 and 0.5, which means that e.g. an increase in income with 10% will lead to an increase in water demand of 4%.

11. Ask participants what they know about Ability to Pay which is defined as the ratio of the monthly household water consumption expenditure to the monthly household income. World Bank and other organizations apply a standard whereby ability to pay for water should not exceed 5%, which means that households should not be asked to spend more than 5% of their income for water supply.

C. Data needed and sources of information for water demand forecasting

12. Ask participants what sources are available to collect the necessary data for forecasting demand:
   (i) collection of secondary data from existing studies, water enterprises, government agencies, etc.;
   (ii) conducting reconnaissance surveys in the area to observe the actual field situation; and
   (iii) collection of primary data through field observations and household surveys.

Household surveys normally provide:
   (i) data about family size, occupation, income etc.;
   (ii) data about the quantity, quality and costs related to the current water supply (and sanitation) situation; and
   (iii) data about the future use of water supply and sanitation: the preferences of respondents about the future level of service, type of facility and what they are willing to pay for the preferred level of service.

D. The need to manage water demand

13. Is there a need to manage the demand for water? Elicit various reasons from participants why it is useful to consider demand management:
   a. Limited availability of water
   b. The need to share water among various sectors (agriculture, hydropower, tourism, nature, etc)
   c. The future costs of water
14. What can we say about the future costs of water supply? Will it be more expensive or less expensive as compared to our current supply. Elicit by questioning that the future costs of water, in the long run, will tend to be more expensive as compared to the current water source, because water will need to be transported, treated, etc. The following figure demonstrates this effect:

![Future Costs vs Current Costs Graph]

- Explain the concepts Willingness and Ability to Pay

E. Various instruments to manage the demand for water

15. Draw a demand curve on the whiteboard, and ask participants how they would go about reducing demand: Elicit the following answers:

a. reduce the quantity demanded by increasing the price of (excessive) water use. This will result in a reduction of demand through a movement along the same demand curve. At a higher price, a smaller quantity of water is demanded. By introducing financial incentives, consumers (domestic and nondomestic) can be expected to reduce their water consumption. Often, the objectives and reasons for such a policy will have to be thoroughly explained to the users through public education programs. Examples of introducing financial measures include:
   i. increasing the average water tariff;
   ii. introducing progressive water tariff structures, aiming at reduction of excessive water use;
   iii. increasing tariffs for wastewater discharge: (industries will be particularly sensitive to this measure);
   iv. introducing ground water abstraction fees;
   v. fiscal incentives (e.g. for investments in water saving devices or treatment plants);
   vi. utilization of water markets: experience from water markets in the United States and Gujarat, India indicates that water markets create a framework which contributes to the efficient use of water.

b. Move the demand curve to the left, resulting in a reduction in the quantity demanded and moving the demand curve to the left. This means that at the same
price level, the quantity of water demanded will be reduced. This can be achieved through:

i. introduction of water saving devices;
ii. changing consumer behavior through educational programs;
iii. legal measures (e.g. regulating the use of groundwater);
iv. industrial “water-audit” programs. This entails a review of the use of water and waste water in industrial plants, with the purpose of reducing the use of water.
v. save the use of water or avoid waste of water resources on the supply side. Such measures could include:
   • increase in efficiency at the utility level (reduction of production losses, UFW); and
   • institutional changes (merger of utilities may create economies of scale).

16. In most cases, water demand management and conservation policies will consist of a comprehensive set of measures to be carried out over a longer period to achieve the desired results. However, in the long run, it may save millions of dollars in deferred investment, like the case study Melbourne (hand out the example).

F. Carry out a simple exercise in forecasting water demand

17. Tell trainees that now they will apply what they have learned in the sessions today. Divide participants in groups of 3-4 persons. Each group has that task to prepare a Demand Forecast for Babonneau (Hill 20 System) for the next 25 years. Each group has about 30 minutes to answer the following questions:

   a. What type of data do you need?
   b. How are you going to obtain the data?
   c. Which measures do you think could be considered to manage demand?

Reconvene the groups and ask each group to give a short presentation the answers to the three questions. Compare the three presentations and conclude the session.
Handout 1: The Determinants of the Demand for Water

A. Domestic Demand

- Number and size of households
- Population growth
- Family income and income distribution
- Costs of water presently used
- Cost of future water used
- Connection charges
- Availability and quality of service
- Cost and availability of water using devices
- Availability of alternative water sources
- Present water consumption
- Legal requirements
- Population density
- Cultural influences

B. Commercial Demand

- Sales or value added of non-subsistence commercial sector
- Costs and volume of water presently used
- Price of future water used
- Connection charges
- Costs of water using appliances
- Quality and reliability of service
- Working hours of various types of commercial establishments
- Legal requirements

C. Industrial Demand

- Present and future costs of water
- Type of industry and water use intensity
- Relative price of alternative sources
- Quality and reliability of supply
- Costs of treatment and disposal of waste water
- Legal requirements

D. Agricultural Demand (for [non] piped water supply)

- Present and future costs of water
- Availability of other sources
- Quality and reliability of supply
- Supply cost of alternative water systems
- Number of cattle
- Legal requirements

E. Public Services Demand

- Present and future costs of water
• Per capita revenue of local governments
• Number and size of public schools, hospitals etc.
• Legal requirements

F. Technical requirements

• Unaccounted for Water (leakage)
• Peak factors
• Seasonal fluctuations

ANNEX 5: PRESENTATION ON DRAFT WASCO NRW REDUCTION STRATEGY

OUTLINE OF THE PRESENTATION

1. Introduction
2. Vision and Objectives
3. NRW Reduction Strategy
4. NRW Reduction Organization
5. NRW Action Plan Year 1
THE NEED FOR NRW REDUCTION

- Operational budgets are reduced especially in areas of network maintenance.
- NRW increases.
- Revenues decrease and operational costs increase.
- Expenditure is increased to include operational improvements.
- NRW decreases.
- Revenues increase and operational costs decrease.

WATER BALANCE

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Source: International Water Association

3/25/2019
NRWR VISION & OBJECTIVES

Vision (Why)
Enable WASCO to efficiently operate a water supply system that provides high levels of service to customers and makes efficient use of scarce national water resources.

Mission (Where)
WASCO has reduced and is able to sustain NRW at economically sustainable levels.

Objective (What and when)
Within 5 years WASCO has reduced NRW to less than 20% and implements a sustained NRW reduction program.

NRW REDUCTION STRATEGY
YEAR 1

1. Prepare the WASCO Organization for the sustained implementation of a NRW Program (2019)
   - Prepare and formally approve the NRW Strategy and budget
   - Establish the NRW project organization and appoint staff
   - Formally kick-off NRW Reduction Program (June 2019?)
   - Prepare and implement key processes (SOPs)
   - Speed up using and fill GIS with data
   - Design and implement (bulk) metering programs (sub project)
   - Clean up inactive connections and follow up on illegal connections
   - Establish DMA’s, carry out Water Audits, follow up with repairs
   - Assess Northern Distribution Line and follow up
   - Create awareness among staff and key stakeholders
   - Identify sources of funding for NRW Reduction Program
   - Develop M&E system
   - Prepare Action Plan and budget for 2020 (technical approaches, outsourcing?)

* Supported by CATS/GIZ project
NRW REDUCTION STRATEGY
YEAR 2

Implement a sustained NRW Reduction Program (2020-2024)
✓ Sustained implementation of the NRW program
✓ Regular monitoring and reporting
✓ Communication to customers and the regular public

NRW PROJECT ORGANIZATION – OPTION 1

General Manager

Manager Customer Services
Manager Water Services
Manager Strategic Planning

NRW Task Force

Organization
- Monthly reporting of NRW Task Force to GM/MT
- Appoint strong NRW Project Manager
- Appoint dedicated staff for NRW Project Team?
- Provide materials, equipment and transport
- Adopt a "CAN DO" Attitude and make project visible in WASCO
ACTIVITIES YEAR 1

1. Finalize NRW Reduction Strategy (TF)
   - Obtain approval from GM and Board and ensure funding
   - Formalize Organization Structure, appoint Project Manager & Staff
   - Formal Kick Off and communicate NRWR Strategy to staff

2. Establish and implement key processes and procedures (TF)
   - Repairs and communication (WS)
   - Preventive Maintenance (WS)
   - Customer Services Processes (integrate GIS)
   - Prepare for and implement Water Audits

3. Implement GIS Action Plan (TF)
   - Data entry in GIS (starting with PIZ)
   - Speed up using GIS by C3 and WS (apps?)
   - Implement SOPs including feedback data into GIS

4. Design and implement metering program (PT)
   - Design bulk metering program
   - Install bulk meters in all selected locations
   - Clean up all inactive account in customer database

TF = NRW Task Force    PT = NRW Project Team

ACTIVITIES YEAR 1 CONTINUED

5. Develop and test approaches and training of staff (PT)
   - Establish DMAs in PIZ
   - Prepare for Water Audits
   - Carry out two water audits
   - Follow up on repairs

6. Assess Northern Distribution Line (TF/WS)
   - Carry out hydraulic analysis and recommend measures
   - Implement immediate repairs and replacements as needed
   - Prepare long term development plan for Northern Line

7. Prepare M&E System (TF)
   - Establish KPI’s and M&E Tool
   - Start Monitoring

8. Prepare annual plan for year 2 (TF)
   - Decide for (partial) outsourcing
   - Decide on technical approach
   - Decide on technical choices (pipe materials, etc.)