Case Study:
From policy to action: the City of Bulawayo adopts a Water and Wastewater Master Plan

June 2017

Authors: Faith Chikeya (ICLEI Africa), Sikumbhuzo Ncube (Bulawayo City Council)
1. ABSTRACT

The City of Bulawayo experiences water stress and is vulnerable to drought as the rainfall amounts, though little, tend to vary suddenly from year to year. The city has a wide network of water and sanitation infrastructure which is very old and some of the systems operate beyond design capacity. The City has a twinning arrangement with eThekwini Municipality (i.e. City of Durban) in South Africa where the two cities share and exchange knowledge and good practices driven towards promoting sustainability. Emerging from this partnership and focusing on water and sanitation, members of staff from eThekwini Water and Sanitation (EWS) visited the City of Bulawayo at the end of 2009 to assess the status of water and wastewater systems in the City.

The reconnaissance survey showed that:

- The original water and wastewater infrastructure was well planned and constructed
- The water and wastewater infrastructure had deteriorated and was in dire need of rehabilitation and upgrading
- Operations and maintenance resources were not coping under the circumstances
- Institutional and cost recovery for water and wastewater services needed to be improved urgently and concurrently with the infrastructure remedies

2. INTRODUCTION

Following the reconnaissance study detailed above, there was a recommendation for the City of Bulawayo to develop a Water and Wastewater Master Plan (WWMP). To this end, funding was sought from the Department of Trade and Industry (DTI) in South Africa to undertake a water and wastewater master planning study for the City of Bulawayo. The DTI approved funding of 55% of the costs for the study with the remaining 45% being counter funded by the City of Bulawayo. Bosch Stemele were appointed to undertake the WWMP study, and the professional services agreement between the City of Bulawayo and Bosch Stemele (Pty) Ltd was signed in January 2011.

In August 2011, the brief was extended to include the compilation of a Water Demand Management Business Plan, counter-funded by the Swedish International Development Corporation Agency (SiDA) through the Development Bank of Southern Africa (DBSA).
3. CITY IN CONTEXT

Bulawayo is located in Zimbabwe’s southwest, in the region known as Matabeleland (Figure 1).

The city faces several challenges, which has to improve services for the existing population and also meet the demands arising from high population growth.

Bulawayo has an estimated population of one million people and receives its water supply from six major dams and an underground source, all with a combined estimated safe yield of 148 000m³/day. This total supply is insufficient to meet the future needs of the rapidly growing population, a situation exacerbated by the aging infrastructure in constant need of rehabilitation. Moreover, the city is located in a drought prone region and periodically experiences water shortages.

Key challenges directly linked to the provision of water and sanitation services in the city include:

- Aged water treatment and supply infrastructure (in excess of design lifespan), which presents excessive leak and burst frequency;
- Aged and disintegrating assets. Water meters are over 20 years old, of which many have stopped or are under-reading. Mechanical and electrical components of the water and sewer network are operating beyond design lifespan, resulting in service interruptions and poor consumer confidence;
- Operational challenges, resulting in pressure zones being breached to solve network pressure complaints;
- The unavailability of locally produced supplies (valves, fittings, meters, chemicals etc.), resulting in long lead times for burst repairs;
- An unreliable energy supply, which causes water hammer and further stress on the aged network; and
- An unstable cash flow, resulting in little assurance in the supply of stock, materials, tools and equipment to operate and repair infrastructure

To address this, the city developed the WWMP with the intention that it would serve as a basis for integrated planning, sourcing funding, implementing renewal, inform remedial, upgrading among other interventions seeking to improve provision of water and wastewater services and moving progressively towards a resilient and sustainable city. The WWMP targeted the developed central and surrounding suburbs of the City of Bulawayo. The Master Plan was adopted in 2013 and covers a 20 year time period. The extent of the area covered by the WWMP is indicated by Figure 2 below.
4. CASE STUDY

4.1. Project objectives

The Master Plan emerged with priority actions to improve the water and wastewater situation in the city. To ensure feasibility in implementation given the available human, capital and infrastructure resources, and implementation was staggered in three phases as follows:

- An immediate action plan aimed at interventions to be implemented by the City of Bulawayo in the short term, in order to remedy priority problem areas.
- A short to midterm action plan for improving water and wastewater services in Bulawayo within a five year horizon.
- A medium to long term plan with a 20-year horizon, aimed at creating and delivering viable and sustainable water and wastewater services in Bulawayo.

The Master Plan also included planning for rehabilitation, renewal and upgrading of water and wastewater infrastructure, including associated operational and maintenance requirements as well as institutional aspects linked to cost recovery.

The key stakeholders involved in developing the Master Plan were World Vision in conjunction with the Australian Government Aid Programme (AusAid) and the Water and Sanitation Department of the City of Durban (EWS).

Bulawayo is continuously seeking opportunities to improve its water and wastewater management and an opportunity emerged from its twinning arrangement with eThekwini Municipality (City of Durban). This resulted in a scoping exercise on the state of water and sanitation in the city. The key findings were as follows:
The original water and wastewater infrastructure were well planned and constructed;
The water and wastewater infrastructure had deteriorated and needed rehabilitation and upgrading;
Operations and maintenance resources were not coping under the circumstances;
Institutional and cost recovery for water and wastewater services needed to be improved urgently.

In early 2011, a field reconnaissance of the water and wastewater systems was carried out by Bosch Stemele and InterAfrica consultants contracted by the City. Through a consultative process they carried out site assessments, reviewed maintenance records and engaged various stakeholders around the status of water and wastewater in the City. Some of the stakeholders and their roles are listed below:

- City of Bulawayo – The Master Plan will guide the city in achieving both short and long term goals that are designed to improve the water and wastewater infrastructure.
- Residents of Bulawayo – The Master Plan is expected to improve the lives of people living in the city with reference to water and sanitation. Consultations with the residents of Bulawayo are therefore constantly conducted.
- World Vision – World Vision in conjunction with the Australian Government Aid Program (AusAid) provided support to City of Bulawayo in terms of capacity building, rehabilitation and promoting sustainability of water and sanitation infrastructure and services in Bulawayo.
- City of eThekwini - Water and Sanitation Department – The cities of Bulawayo and Durban have a twinning arrangement and Memorandum of Understanding covering economic development, administrative and professional links, trade and cultural exchanges, sports and safety.
- Higher and tertiary education institutions – The Master Plan incorporated learning and research institutions such as the Bulawayo Polytechnic and the National University of Science and Technology situated within the city. This continues to guide students and academia to know which direction the city is headed in terms of water and wastewater infrastructure and services development.

For the purpose of infrastructure planning as part of the WWMP Study, a population growth rate of 2.0% was considered to be realistic. However, the study took cognisance of the ‘low road’ and ‘high road’ growth scenarios, with population growth rates of 1% and 3% respectively.

Cadastral layout mapping was used to identify and assess geographic areas that had been developed, while also identifying areas for potential growth and development in the city. Aerial photography was also used to corroborate results from the cadastral layout mapping. The latter was undertaken using the GIS base mapping developed as part of this Master Plan Study.

The future growth and development in Bulawayo was based on the available town planning master plan proposals for the City, namely the Bulawayo Master Plan Review undertaken by Plan Africa in 1999 and the Bulawayo Master Plan proposals prepared by the Engineering Services Department Town Planning Branch (Plan No. TPG 199 dated August 2001).
From the above assessment, it was estimated that the total number of residential stands within the Bulawayo study area boundary was approximately 107,547 at the time of the study, increasing to 214,498 sites in 20 years, and ultimately to 321,449 sites which was expected to be realised within a 40 year period.

The total extent of commercial and industrial areas was estimated at approximately 1,519 Hectares at present, increasing to 1,602 hectares in 20 years, and ultimately to 1,684 hectares in 40 years.

This initiative culminated with the development of the WWMP. The City of Bulawayo is proud to have achieved this milestone and stands ready to support other LAs through a similar process. Given that LAs have unique goals and objectives they would need a Master Plan tailor-made to suit each unique context. Each LA would need to undertake an assessment of its water and wastewater services so as to decide which course of action they wish to pursue.

As a twin City, EWS was instrumental in developing a proposal for the telemetry system for monitoring and managing Water services in Bulawayo.

5. Challenges and Lessons Learned

Financing has been a key challenge in implementing the Bulawayo WWMP. Water and wastewater projects require large sums of money and the City of Bulawayo cannot undertake all proposed actions at once. This has been addressed by undertaking the action plans in four stages prioritised as:

- Immediate action (Year 1)
- Short term (Year 2-4)
- Medium term (Year 5-9)
- Long term (Year 10-20)

This approach was adopted in order to minimise the financial load on the City of Bulawayo. The Master Plan gave the city the confidence to proceed with implementation of the following projects:

- Rehabilitation of Criterion Water Treatment Works – Refurbishment at Criterion Water works have improved the operation of the treatment works to acceptable standards. Thus, the city of Bulawayo has been able to provide safe drinking water to the inhabitants of the city.
- Rehabilitation of Wastewater treatment works Aisle by 3 works were rehabilitated and commissioned?
- Replacement of bulk water pipelines – The Master Plan identified that the pipelines in Bulawayo water supply system were reaching the end of their 50 year service life as evidenced by frequent pipe bursts. Most problematic pipelines have been detected and efforts are underway to secure funding to replace them in order to improve water conservation and demand management.

The Bulawayo WWMP will benefit the livelihoods of disadvantaged members in the community as it seeks to restrain dangers associated with poor water and wastewater services such as water borne diseases. The Master Plan also has the following strategies at three levels:
• An immediate action plan aimed at interventions to be implemented by the City of Bulawayo in the very short term, in order to rectify critical problem areas.
• A short term action plan for improving water and wastewater services in Bulawayo within a five year horizon.
• A medium to long term plan with a 20 year horizon, aimed at creating and delivering viable and sustainable water and wastewater services in Bulawayo.

These three levels ensure that the Master Plan objective is achievable.

6. COSTS AND FUNDING

Built Environment Professionals Export Council (BEPEC), Bosch Stemele offered to submit an application for funding on behalf of the City of Bulawayo to the DTI in South Africa, to undertake a water and wastewater master planning study for the City of Bulawayo. The application was successful and DTI approved funding of 55% of the costs for the study on 18 November 2010, with the remaining 45% being counter-funded by the City of Bulawayo. To this end, the contribution from the Bulawayo City Council was R4,661,250; while the DTI of South Africa contributed R 4,963,750.

7. CONTACTS

The Town Clerk
City of Bulawayo
City Hall Corner Fife St. / L. Takawira Ave
P.O Box 591
Bulawayo
Telephone: +263-9-75011 Ext 2352
Email: tcdept@citybyo.co.zw

8. REFERENCES
