

# Distribution System Optimization Plan Development



A Distribution System Optimization Plan entails a wide scope of work and will take time to develop. In an effort to pursue the goal of optimization, the steps the City should take are presented in a timeline below. The following pages include a preliminary list of resources necessary to meet the established timeline, and a general outline of goals developed by the City staff that are associated with this plan. As the plan is developed and implemented additional resources and outline items will be included.

## **Short Term (30-90 days)**

- Work with a consultant to develop an RFP to create and implement a distribution system optimization plan.
- Increase water monitoring in the in the distribution system. Select at least 10 additional sites to monitor chlorine residual, pH, and temperature throughout the system. Samples will also be collected and analyzed for disinfection by-products at locations throughout the system utilizing an in-line total trihalomethane monitor which has the ability to analyze 2 grab samples daily.
- Determine locations for inline chlorine monitoring. At this time The City is planning to use existing Wastewater pump stations located throughout the city. This will allow for access and security.
- Evaluate historical data collected out in distribution system.
- Compile City distribution system operations and evaluation data conducted over the last couple years covering valve exercising, assessment, and GPS mapping along with leak detection and pipe wall assessment.
- Review most recent distribution system Reliability Study from 2013. The MDEQ has contracted an engineering firm to update the study with current information.

## **Mid-Term (90-180 days)**

- Review responses to RFP for optimization plan, and select a qualified firm to complete the development of the optimization plan.
- Install in line chlorine analyzers at accessible locations throughout the distribution system and incorporate into SCADA system. Currently utilizing two located at distribution system reservoirs.
- Evaluate and purchase data management software to compile the information and data necessary to manage the optimization plan.

## **Long Term (180 days +)**

- Work with selected consultant to develop and implement the optimization plan, building from what has been accomplished in preceding short and mid-term timeline events.

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## Resources/Actions Necessary

- Acquire a consultant to assist in drafting a request for proposal (RFP) for developing a distribution system optimization plan.
- Increased staffing for treatment plant, distribution system, and data management.
- Purchase seven (7) In-line chlorine analyzers.
- Complete the lease to own option for the in-line total trihalomethane monitor.
- AWWA Utilities membership for the City.
- Data management software.

## General Outline Overview

- I. Monitoring Water Quality
  - A. Sample site plans for Total Coliform Rule (TCR) & Disinfection Byproduct (DBP) compliance.
    1. Review and adjust sampling plan to increase frequency of sampling and/or include additional site locations in the plan.
      - a. Identify critical areas in the distribution system utilizing chlorine mapping with historical data and EPA assistance. Incorporate data recently gathered by the EPA.
      - b. If site location availability is an issue, explore the option of installing water main tap samplers.
      - c. Review and as necessary, revise sample collection procedure as it pertains to calculated flushing time (CFT) for each specific site location.
      - d. Determine availability of locations for placement of inline chlorine residual monitoring in the system in addition to those in service at distribution system reservoirs.
      - e. Purchase Inline DBP monitor, which is currently leased, to monitor levels leaving the treatment plant and sites in the distribution system.
    2. Monitoring Goals
      - a. Maintain disinfectant residual of at least 0.2 mg/L free chlorine at all parts of the distribution.
        - If residual is less than 0.2 mg/L, collect and analyze samples for heterotrophic bacteria.
        - Boost chlorine at points in the system as needed taking into account the associated risk of DBP's.
      - b. Individual Site Goals for TTHM/HAA5:
        - Quarterly max LRAA values not to exceed 70/50 ppb.

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3. Corrosion Control
  - a. Install and monitor pipe loops at the Water Treatment Plant to observe the reaction of water with distribution system piping. This will be accomplished with the assistance of the EPA.
  - b. Conduct testing of water quality parameters in the distribution system as it relates to corrosion.
  - c. Conduct additional lead & copper monitoring beyond regulatory compliance.
  
4. Water Quality/Service Complaints & Customer Relations
  - a. Revise the customer inquiry/complaint log as it relates to communication with utilities departments and other City departments.
  - b. Revise and record responses to inquiries and complaints, and any associated customer visits and concurrent water testing.
  - c. Develop a timely response initiative to inquiries and complaints.
  - d. Develop a procedure for notification of customers in regards to service interruptions. This will include a combination of door hangers, customer visits, and media releases.

## II. Distribution Operations and Maintenance

### A. Valve Exercising & Replacement

1. Build a sustainable valve exercising program based on the most recent reliability study, and the valve exercising and replacement work completed in 2015.
  - a. Determine a goal for the number of transmission valves to be exercised annually.
  - b. Determine a goal for the number of distribution valves to be exercised annually.
  - c. Use exercising as an avenue to determine and identify critical valves in the system.
  - d. Verify location and access of system valves, and utilize data to begin creating an Asset Management Plan.

### B. Storage Facilities & Pump Stations

1. Review and revise minimum operating procedures for storage tanks in regards to storage tank turnover. Adjust procedures to account for seasonal variations.
  - a. Storage turnover goal: Each storage facility should have a turnover time less than or equal to 5 days.
  - b. During warm weather months, reduce storage capacity operation levels, but account for system fire demands and max day demands.
  - c. Evaluate the addition of mixing systems in the distribution storage reservoirs, to aid in residual maintenance and efficient chlorine boosting.

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- d. Develop a consistent program for routine periodic and comprehensive inspections of drinking water reservoirs.
- C. Hydrants
1. Review and revise spot flushing procedures and yearly hydrant flushing and winterization programs in place.
  2. Verify through testing, that proper velocities are used during specific flushing actions.
  3. Determine the feasibility of a unidirectional flushing program for the distribution system.
- D. Cross Connection & Backflow Prevention Plan
1. Review and update cross connections and backflow prevention program as necessary.
  2. Set annual goals for inspections of back flow devices.
- E. Metering
1. Develop a plan and schedule to test and replace meters in accordance with AWWA Manual M6 standards.
- F. Pipeline Rehabilitation & Replacement
1. Set goals & expectations for yearly improvement of system via distribution pipe replacement.
  2. Verify capability to attain set goals with funding and implementation.
  3. As rehabilitation and replacement occur, update mapping and records to reflect the current distribution system information.
- G. Employee Training
1. Develop written protocol and schedules for the training of employees in distribution operation and maintenance functions.
  2. Budget and initiate other outside training opportunities for employee in regards to distributions system operations and maintenance. This will be done with organizations such as the AWWA, MWEA, and others.
- H. Asset Management
1. Begin development of an Asset Management Plan to address all parts of the distribution system.