

Water Asset Inventory & Assessment and Asset Management Plan

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1 Executive Summary

1.1 Introduction

The City of Lenoir (City), with the assistance of McGill Associates (McGill), developed an Asset Management Plan (AMP) and Asset Inventory and Assessment (AIA) for its water system. The AMP is funded through the North Carolina Department of Environmental Quality (NCDEQ) Division of Water Infrastructure (DWI) AIA Grant program.

1.2 Objectives

The purpose of this AIA and AMP is to deliver a long-term roadmap for the continuation of proactive management of the City's water assets. The AMP will deliver data-driven insights to the City empowering them to make informed capital planning decisions for future improvements. This approach will maximize the value of existing infrastructure in a cost-effective way, all while maintaining service levels for residents and business owners.

The AIA and AMP report consists of four key components:

1. Asset inventory (vertical and linear assets)
2. Asset condition assessment
3. Capital improvements plan (CIP) with preliminary opinions of probable costs
4. Operations and maintenance (O&M) plan

McGill assisted the City with the inventory and assessment process, system analysis and testing, and update of the 10-year CIP to guide the City with scheduling and financing the capital projects and equipment purchases necessary to maintain and improve the facilities in scope. Prioritized water system infrastructure projects, including preliminary opinions of probable costs, are included in long-term planning based on findings of this AIA. The City’s 10-year CIP will continue to allow the City to annually update its rate setting model to estimate future revenue and expenses, capital outlay, indebtedness, and overall health of the combined water system enterprise fund reserves.

1.3 AMP Components

1.3.1 Asset Inventory

The AIA began with the City and McGill meeting to review the project scope and proposed schedule, identify areas of concern, and obtain contact information for City maintenance personnel. Following this meeting, McGill conducted numerous site visits to collect geographic information system (GIS) data and evaluate critical point and linear assets within the City's water system. This information, along with input from the City, was utilized to create a detailed database of the City's water system. This database, which includes asset identification labels, attributes, and condition data, created the framework for the water system maps included in this report.

1.3.2 System Evaluation and Asset Assessment

The City's water treatment and distribution systems consist of the George L. Bernhardt, Sr. Water Treatment Plant, approximately 270 miles (combined) of water transmission and distribution lines ranging in size from 1.5" to 30", eight (8) water tanks, six (6) booster pump stations[1], and associated valves, meters, fire hydrants, and other appurtenances. Transmission mains were evaluated independently from distribution mains, and criticality ratings were assigned relative to other transmission assets based on redundancy, service area impact, and operational consequences.

Over the course of this study, McGill, accompanied by City staff, conducted site visits to the City's distribution system and treatment facility to evaluate system components. Site visit evaluations included visual inspections of each point asset, condition assessment of all equipment and systems, criticality assessment of each asset, and recording of performance observations reported by City staff. This information was utilized to evaluate the system and update system maps. Record drawings from previous system upgrades and expansions were also studied and utilized in the system evaluation.

1.3.3 Rehabilitation and Replacement Program / CIP

McGill conducted a desktop review of available water system mapping data combined with site visits to the George L. Bernhardt, Sr. Water Treatment Plant, booster pump stations, and water

[1] Quantity of tanks and booster pump stations does not include the Finley Elevated Tank and Booster Pump Station currently under construction at the time of report writing with completion anticipated for 2027.

storage tanks to identify needs in the system, such as high-risk pipes, pumps and treatment process equipment in need of repair or replacement. These data collection methods are detailed in Section 5. Documentation and analysis of all identified operational needs within the system are detailed in Section 6 based on information collected during the system evaluation and from consultation with City staff. McGill developed a risk assessment for each asset in the system and recommendations for rehabilitation and replacement (R&R) projects. Water system infrastructure projects, including preliminary opinions of probable costs, are included in this report for long-term planning.

1.3.4 O&M Plan

Lenoir currently has a robust O&M program; however, it is important to maintain a strategy of continuous improvement to ensure that the level of service objectives detailed in Section 2.6 continue to be met. Best practices for operation and maintenance of a municipal water utility, most of which are being performed by City staff, include but are not limited to:

- Continue to update system mapping and GIS files regularly.
- Collecting data on regular maintenance, emergency repairs, and maintenance requirements, and updating the City's water system GIS database.
- Preventative maintenance including inspections and/or replacement of assets before exceeding each asset's useful service life.
- A regular flushing schedule to maintain or improve water quality by removing stagnant water and sediment from water lines.
- Routine inspections to assess the condition of valves and hydrants, recording general conditions and evidence of leaks, possible structural problems or failures (offset structures, etc.), corrosion, and other damages.
- Proactively identifying and repairing leaks in the system to reduce the amount of non-revenue water, which reduces the cost of water for customers and operating costs for the City.
- Maintaining activity records of O&M and repair work, including equipment costs, staff labor time, and any other resources.
- Reviewing customer complaint records to document types/frequency of customer complaints, response time, and follow-up information.

1.4 Summary of Results

1.4.1 Assets

The City of Lenoir's water treatment, transmission, and distribution system contains both linear (water lines) and vertical assets (hydrants, valves, storage tanks, booster pump stations, water treatment plant, etc.). Linear assets and select vertical assets were included within the scope of this asset inventory and assessment as shown in Table 1.

Table 1: Water System Inventory

Asset Type	Quantity
Booster Pump Stations	6
Tanks	8
Water Mains - Distribution	239 miles
Water Mains - Transmission	30.7 miles
Water Treatment Plant	1 (12 MGD)

1.4.2 Risk Assessment

For this AIA and AMP, McGill evaluated the City of Lenoir's Water Treatment Plant and water distribution system including the distribution system water lines, booster pump stations, and storage tanks. The infrastructure evaluated ranges in age from over 70 years to recently constructed replacement lines. Portions of the system contain many older water lines that have exceeded or are approaching their expected useful life. Risk Ratings for the Linear Assets within the water treatment and distribution systems are summarized in Table 2.

Table 2: Distribution and Transmission Risk Ratings

Risk Rating	Total Length (LF)	Percent of System
1	0	0.00%
2	87,038	6.11%
3	41,547	2.92%
4	372,028	26.12%
5	5,321	0.37%
6	124,439	8.74%
8	504,592	35.43%
9	41,363	2.90%
10	49,260	3.46%
12	114,610	8.05%
15	39,545	2.78%
16	0	0.00%
20	3,080	0.22%
25	41,250	2.90%

1.5 Recommendations

1.5.1 Capital Improvement Plan

Based on the information compiled throughout the asset inventory and condition assessment, preliminary opinion of probable costs (POPC) were developed for each project. The City already had previously identified many of these project needs in its 10-year CIP. Other identified projects will be placed on the long-term planning list. A summary of future project needs with approximate costs is shown in Table 3.

Table 3: Water System Capital Improvements Projects

Proposed Projects	POPC*
Current Transmission & Distribution System CIP	$ 70,900,000
Additional Transmission & Distribution System CIP	$ 103,800,000
Current Water Treatment Plant CIP	$ 65,500,000
TOTAL	**$ 240,200,000**

* All costs in 2026 dollars

1.5.2 Operation and Maintenance (O&M) Plan

Maintenance strategies for utility systems usually fall into three separate categories based on capability and available funding for the system. These categories include preventative, reactive (or emergency), and deferred maintenance. Lenoir's utility staff diligently works to perform proactive maintenance and to limit reactive maintenance to emergency situations. In order to ensure that the water assets continue to be maintained and managed effectively and efficiently, O&M guidelines were updated to enhance preventative maintenance.