Capital Improvement Project (FY26-FY32)

### **Priority Rank**

Category

2

Renovation, Remodel, or Replacement

### **Project Description**

The water treatment plant currently utilizes chlorine gas for primary disinfection and to form chloramines for secondary disinfection. Due to the extreme toxic and corrosive nature of chlorine, and the large quantities of chlorine stored at the plant, the USEPA Risk Management Program Rule requires that a hazard assessment be completed. The hazard assessment for the water treatment plant (attached) estimates that in a worst-case scenario, a major chlorine leak at the water plant could be toxic to a population of 13,365.

A disinfection process analysis was completed in FY25 (attached). This was a comprehensive review of the existing disinfection system and considerations for conversion from chlorine gas to sodium hypochlorite. Utilizing sodium hypochlorite will eliminate the potential hazards of chlorine gas.

This project is for the engineering, management, and construction of new facilities needed to convert our existing chlorine gas feed system to sodium hypochlorite.

#### **Project Justification**

Chlorine is stored and shipped by the chemical supplier as a liquefied gas under pressure in one-ton cylinders. These are unloaded and stored in a covered outdoor area adjacent to the treatment plant administrative area. There are typically two one-ton cylinders at the water plant.

Chlorine gas is highly toxic and corrosive and has been placed in Toxicity Category I (indicating the highest degree of acute toxicity) for oral, dermal, eye and inhalation effects. When chlorine liquid converts to gas, it expands 457 times. Additionally, chlorine gas is 2.5 times heavier than air. In the event of a catastrophic chlorine leak at the water plant, a significant amount of the town will need to be evacuated. However, the Raleigh regional HAZMAT team is the dedicated responder, and it would take some time for them to arrive given the distance. Significant impacts are unlikely to be avoided.

The disinfection process analysis included recommendations to improve the safety, accuracy and efficiency of the existing chlorine system. The existing procedures for delivery drivers to unload the cylinders is not in accordance with standard practices. Improvements to the loading dock and cylinder handling devices are needed. Additionally, only having a sliding steel door in front of the cylinders to keep them from public view is a vulnerability.

The analysis also included recommendations to convert from a chlorine disinfection process to a sodium hypochlorite disinfection process. Conversion to a sodium hypochlorite disinfection system eliminates the safety concerns of using chlorine gas. This is likely the reason most water treatment facilities now use sodium hypochlorite for disinfection. Additionally, since the demand for chlorine gas is now so low, there is only one chlorine gas supplier in North Carolina. With only one supplier, the cost and availability are of concern. We have received several force majeure notices of shortages and price hikes during and since the COVID-19 pandemic.

The Hillsborough water treatment plant has been using chlorine gas for disinfection since the early 1970s and has had no major chlorine leaks. Major chlorine leaks that cause widespread injuries are rare. However, it can and does happen. Since utilizing sodium hypochlorite will eliminate the public health risk, staff is recommending conversion of the disinfection process to sodium hypochlorite.

## **Project Highlights**

Conversion to sodium hypochlorite for disinfection:

- · Safety concerns of using chlorine is eliminated
- Regulations are much less stringent
- Eliminates the need for a Risk Management Plan (\$4,200 per year for compliance management)
- Eliminates the need for a Hazard Assessment
- Additional operational costs anticipated to be minimal
- Chemical costs estimated to increase between \$20,000 and \$30,000 /year
- Total Construction Cost (2024 Dollars) estimated at \$1,590,600
- Engineering and construction administration services estimated at \$375,000

## **Project Expenditures**

Sodium Hypochlorite Conversion (Expenditures)

Object	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Capital - Infrastructure	\$0	\$375,000	\$1,590,600	\$0	\$0	\$0	\$0
TOTAL	\$0	\$375,000	\$1,590,600	\$0	\$0	\$0	\$0

Object	2031-32	Total
Capital - Infrastructure	\$0	\$1,965,600
TOTAL	\$0	\$1,965,600

### **Project Revenues**

Sodium Hypochlorite Conversion (Revenues)

Object	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Debt Issuance Proceeds	\$0	\$0	\$1,511,147	\$0	\$0	\$0	\$0
Transfer From Water Fund	\$0	\$375,000	\$79,453	\$0	\$0	\$0	\$0
TOTAL	\$0	\$375,000	\$1,590,600	\$0	\$0	\$0	\$0

Object	2031-32	Total
Debt Issuance Proceeds	\$0	\$1,511,147
Transfer From Water Fund	\$0	\$454,453
TOTAL	\$0	\$1,965,600

# **Operating Budget Impact**

Sodium Hypochlorite Conversion (Operating Impact)

Object	2024-25	2025-26	2026-27	2027-28	Total
Debt Service - Interest	\$0	\$0	\$0	\$75,557	\$75,557
Debt Service - Principal	\$0	\$0	\$0	\$70,030	\$70,030
TOTAL	\$0	\$0	\$0	\$145,587	\$145,587

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