

CHAPTER 2

INTRODUCTION

Background

The City of Lincoln's last wastewater facilities plan update was completed in 1995. Lincoln's increasing population and the overall age of some wastewater system components are driving the need for system improvements. Several regulations have also been promulgated which impact the City's wastewater treatment requirements. The City of Lincoln Public Utilities Department initiated this update of the 1995 Facilities Plan to proactively address wastewater issues and assure that the City is well prepared to meet wastewater service needs when they occur.

This updated Wastewater Facilities Plan has been developed in conjunction with the 2002 update of the Lincoln-Lancaster County Comprehensive Plan. The study identifies the wastewater collection and treatment system improvements the City of Lincoln will require over the next 25 years and serves as a planning guide for both short (year 2025) and long-term (year 2050) improvements to the collection and treatment facilities. The information contained in this report will be used for general planning, identifying capital improvement projects, and determining funding requirements.

Factors Affecting the Facilities Planning Study

Since completion of the 1995 facilities plan update, a number of factors have arisen that impact the City's wastewater treatment requirements. These include:

- Regulatory changes,
- Population increase, and
- Aging facilities.

Regulatory Changes. Regulations affecting the City's wastewater treatment facilities include the following:

- The Clean Water Act (CWA),
- Title 117 - Nebraska Surface Water Quality Standards,
- The Clean Air Act (CAA), and
- 40 Code of Federal Regulations (CFR) Part 503.

Clean Water Act. The CWA impacts the City of Lincoln's wastewater treatment requirements in several ways. Proposed changes to Lincoln's National Pollutant Discharge Elimination System (NPDES) Discharge Permits will require removal of ammonia from the wastewater prior to its discharge to Salt Creek. The anticipated ammonia removal requirements will significantly reduce the capacity of existing treatment facilities and ultimately necessitate system expansion at both the Theresa Street and Northeast facilities.

It is anticipated that the concentration of chlorine allowed in the City of Lincoln's wastewater discharges will also be severely restricted. To address this issue the City is installing ultraviolet (UV) disinfection systems at both treatment facilities. The use of UV disinfection will eliminate the addition of chlorine to the wastewater under dry weather conditions.

New SSO requirements proposed under the CWA will prohibit sanitary sewer overflows or treatment system bypasses during wet weather periods. To comply with these regulations, Lincoln will be required to construct facilities to provide adequate treatment of all wet weather flows.

Title 117 – Nebraska Surface Water Quality Standards. These standards represent the State's policy to protect surface waters for a variety of uses. Recently revised standards for Salt Creek impact the quality of effluent allowed to be discharged from Lincoln's two wastewater treatment plants. The revised standards are more restrictive than the previous standards with respect to chlorine and ammonia.

Clean Air Act. This regulation deals with toxic air emissions from various sources, including wastewater treatment plants. Because wastewater treatment facilities typically have fugitive emissions which are toxic, such as hydrogen sulfide and methylmercaptans, the City of Lincoln may be impacted by this regulation and consequently have to implement a toxic air emissions reduction program.

40 CFR Part 503. In February 1993 the US EPA published 40 CFR Part 503 which deals with the use and disposal of municipal sewage sludges. These regulations are comprehensive and affect some the City's sludge handling and reuse practices.

Population Increase. The City of Lincoln's population has increased approximately 30 percent since the last expansion of the Theresa Street WWTF in 1973. Growth is expected to continue at a steady pace for the foreseeable future. This growth will tax existing wastewater collection and treatment facilities. In several areas, hydraulic loadings during peak rainfall events are approaching, or have already exceeded, the sewer system's capacity to transport wastewater flows.

Aging Facilities. The Lincoln wastewater collection system dates back to 1888 when the first sewer lines were installed in the Lincoln area. Some of the older sections of the system are badly deteriorated due to age or are simply out of date with respect to construction methods and materials. Replacement or rehabilitation of older sections of the system is necessary to assure continued reliable service and/or to reduce the quantity of storm water or ground water entering the system.

The original wastewater treatment facilities were constructed at the Theresa Street site in 1923. The system was upgraded and expanded in the 1940s to include the present trickling filters. Subsequent expansions in 1966 and 1973 added the West Side and East Side activated sludge facilities. The Northeast WWTFs were constructed in 1980 and placed into service in 1981. Because of age, some portions of the treatment facilities have deteriorated to the extent that they must be refurbished or replaced just to remain functional. Other units, such as the trickling filters at the Theresa Street facility, need to be replaced because they represent outdated technology that will no longer meet the City's treatment needs.

Planning Goals and Objectives

The overall goal of the 2003 Lincoln Wastewater Facilities Plan Update is to identify wastewater collection and treatment system modifications required to:

1. Provide efficient wastewater service,
2. Assure adequate protection of public health and the environment, and
3. Comply with all relevant local, state, and federal requirements.

A series of specific objectives have been identified for the wastewater facilities planning update. These objectives are:

1. Review the City's planning documents, including the Draft 2002 Lincoln-Lancaster County Comprehensive Plan, and the 1995 Wastewater Facilities Plan. Assess the findings and recommendations of these plans, and identify items that impact the City's wastewater collection and treatment systems.
2. Estimate future service area wastewater flows using the 2002 Lincoln-Lancaster Comprehensive Plan population projections and operations records provided by the City.
3. Review current and anticipated laws and regulations affecting wastewater management and identify specific requirements that impact Lincoln's wastewater program.
4. Identify applicable water quality and wastewater discharge standards.
5. Define the current capacities and treatment capabilities of the Theresa Street WWTF and Northeast WWTF.
6. Identify the most cost-effective, long-term configuration for the Lincoln wastewater system, including collection and treatment components.
7. Develop a phased plan and schedule for implementing required system improvements.

These specific objectives are addressed in detail in the following chapters of this report.