Chapter 1

INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

The City of Lincoln's Sewer System Management Program (SSMP) generally describes the City's sanitary sewer system operation and maintenance procedures, including the City's Standard Operating Procedures (SOP's). The SSMP combines preventive, predictive, and corrective maintenance strategies with current best management practices. The SSMP has been prepared to aid the City of Lincoln to effectively manage their sanitary sewer collection system.

1.2 ORGANIZATION

The City of Lincoln's Wastewater Division is under the Public Works Department and is responsible for all aspects of operating and maintaining the sanitary sewer collection system and wastewater treatment facilities. The Wastewater Collection Section is under the Wastewater Division and is responsible for maintaining, repairing, and operating the City's sanitary sewer collection system. Shown in Figure 1.1 is the Organizational Chart.

1.3 MISSION, GOAL AND ACTIONS

The Division's mission is to provide vital wastewater services to the citizens and customers of Lincoln, ensuring the highest possible levels of public health, economic growth, environmental quality, and fiscal responsibility for the community.

1.3.1 Wastewater Collection Section - Mission

The Mission of the Collection Section is to provide continuous and reliable wastewater collection service to the public through a comprehensive maintenance program and expansion of the wastewater collection system as needed, thereby providing sufficient capacity for existing and future development.

1.3.2 Wastewater Collection Section - Goal

The goal of the Wastewater Collection Section is to maintain a ratio of 2.0 or less stoppages per 100 miles of sanitary sewer pipe installed.

Organizational Chart

Lincoln Wastewater and Solid Waste Operations - Positions 02/13/2012

FIGURE 1.1 – ORGANIZATIONAL CHART
SEWER SYSTEM MANAGEMENT PLAN
CITY OF LINCOLN, NEBRASKA

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1.3.3 Actions

The following yearly actions are taken in order to achieve the stoppage goal and attempt to conform to the mission statements:

- Video inspect 100 miles of pipeline.
- Perform 500 miles of pipeline jetting.
- Perform 100 miles of pipeline root control.
- Perform 100 spot repairs.
- Replace 1,000 feet of pipeline.
- Rehabilitate 10,000 feet of pipeline.
- Repair/replace 100 manholes.
- Properly abandon 75 service taps no longer needed.
- Properly make 100 new service taps required.
- Handle 200 customer service calls.
- Perform 2,500 sanitary sewer locates.
- Comply with Federal, State and local regulations.
- Develop a 6 year Capital Improvement Plan.
- Manage approximately $2 million dollars of rehabilitation projects.
- Manage approximately $5 million dollars of new pipeline projects.

1.4 BACKGROUND

1.4.1 History

The City of Lincoln has been operating a wastewater collection system since 1888. The original collection system collected and conveyed the wastewater from the City to Salt Creek. The first wastewater treatment facility in Lincoln began operation in 1923 and was operated by Sanitary Improvement District No. 1. In 1957, the Sanitary Improvement District No. 1, deeded the original wastewater treatment facility to the City. This treatment facility was located at 24th and Theresa Streets, where the Theresa Street Wastewater Treatment Facility still exists to this day. Since then, the collection system has grown, and as a result, a second wastewater treatment facility has been constructed on the northeast side of the City. This treatment facility is identified as the Northeast Wastewater Treatment Facility.

The City's wastewater collection system is considered a sanitary sewer system only and is not a combined sanitary/storm sewer system. That means the flows conveyed in the wastewater collection system are derived from residential, commercial and industrial wastewater sources. Storm water from sources such as street runoff, roof drains and similar sources are not directed to the wastewater collection system. Separate facilities are provided to handle stormwater flows.

1.4.2 Sanitary Sewer Service Area and Population

The City's sanitary sewer service area currently encompasses 77.5 square miles as shown in Figure 1.2. The historical population data for the City is presented in Table 1.1 below.

Table 1.1 Historical Population From 1880 to 2010 SSMP Update - 2013 City of Lincoln, Nebraska			
Year	**Population**	**Year**	**Population**[(1)]
1880	13,003	1950	98,884
1890	55,154	1960	128,521
1900	40,169	1970	149,518
1910	43,973	1980	171,932
1920	54,948	1990	191,972
1930	75,933	2000	225,581
1940	81,984	2010	258,379
(1) Population Data from 2030 Comp Plan, 2040 Comp Plan and 2010 Census			

1.4.3 Condition and Age of Collection Facilities

As of August 2012, the City's collection system included over 1,020 miles of sanitary sewer piping. Table 1.2 presents historical length of sanitary sewer pipe in the City's system for the years 1880 through 2010. As shown in Table 1.2, there are over 400 miles of pipe potentially over 50 years old, and over 200 miles of pipe potentially over 100 years old. The older sections of the collection system are considered to be outdated with respect to materials of construction and current construction techniques. These sewers are monitored on a regular basis to confirm their structural conditions and to check that the infiltration and inflow (I/I) rates are within acceptable limits.

The sewer system is comprised of several sizes of sewers; the largest sewers, which collect and convey the wastewater from the tributary areas to the WWTF facilities are called trunk sewers. The trunk sewer system for the City is shown in Figure 1.3. In addition to the wastewater collection piping, there are also 14 wastewater lift stations located throughout the system. These lift stations are strategically located to either serve a low-lying area, or to pump the collected wastewater across one of the many streams or creeks located throughout the City.

Table 1.2 Historical Length of Sanitary Sewer Pipe Installed
SSMP Update - 2013
City of Lincoln, Nebraska

Year	Miles of Sewer Pipe in System [1, 2]	Percentage Increase in Pipe Miles [3]	Miles of Sewer Pipe per Population in 1000s
1880	37	-	2.85
1890	201	443.2%	3.64
1900	201	0.0%	5.00
1910	201	0.0%	4.57
1920	203	1.0%	3.69
1930	284	39.9%	3.74
1940	307	8.1%	3.74
1950	372	21.2%	3.76
1960	486	30.6%	3.78
1970	567	16.7%	3.79
1980	651	14.8%	3.79
1990	697	7.1%	3.63
2000	857	23.0%	3.80
2010	994	13.7%	3.85

Notes:

1. Actual values from City used for 1980 to 2010.
2. 1880 to 1970 values are estimated and correspond to the percentage population change for that period.
3. Length was not increased due to negative population trends.

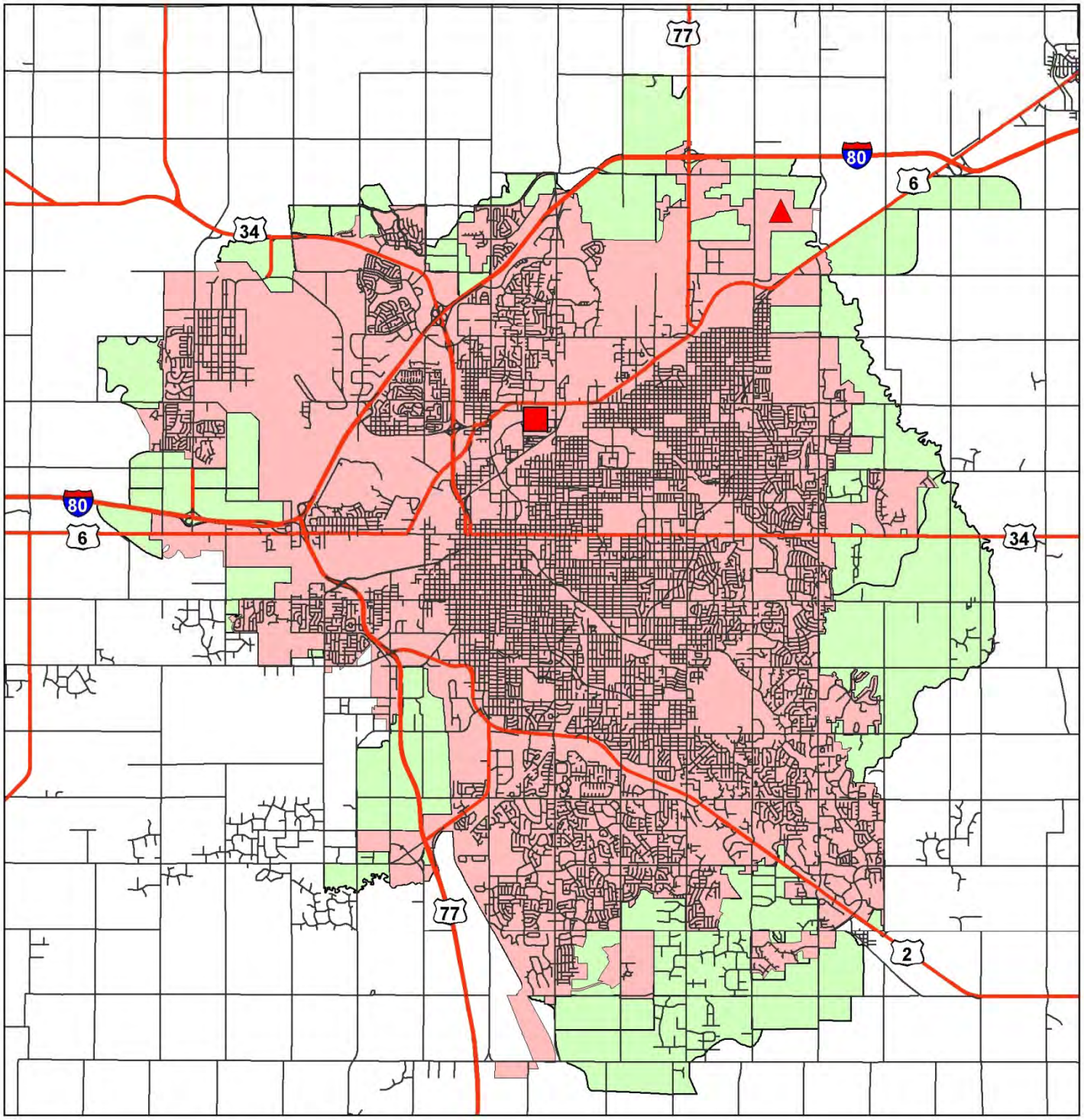

FIGURE 1.2 – EXISTING AND FUTURE TIER I SERVICE AREA
SEWER SYSTEM MANAGEMENT PLAN
CITY OF LINCOLN, NEBRASKA

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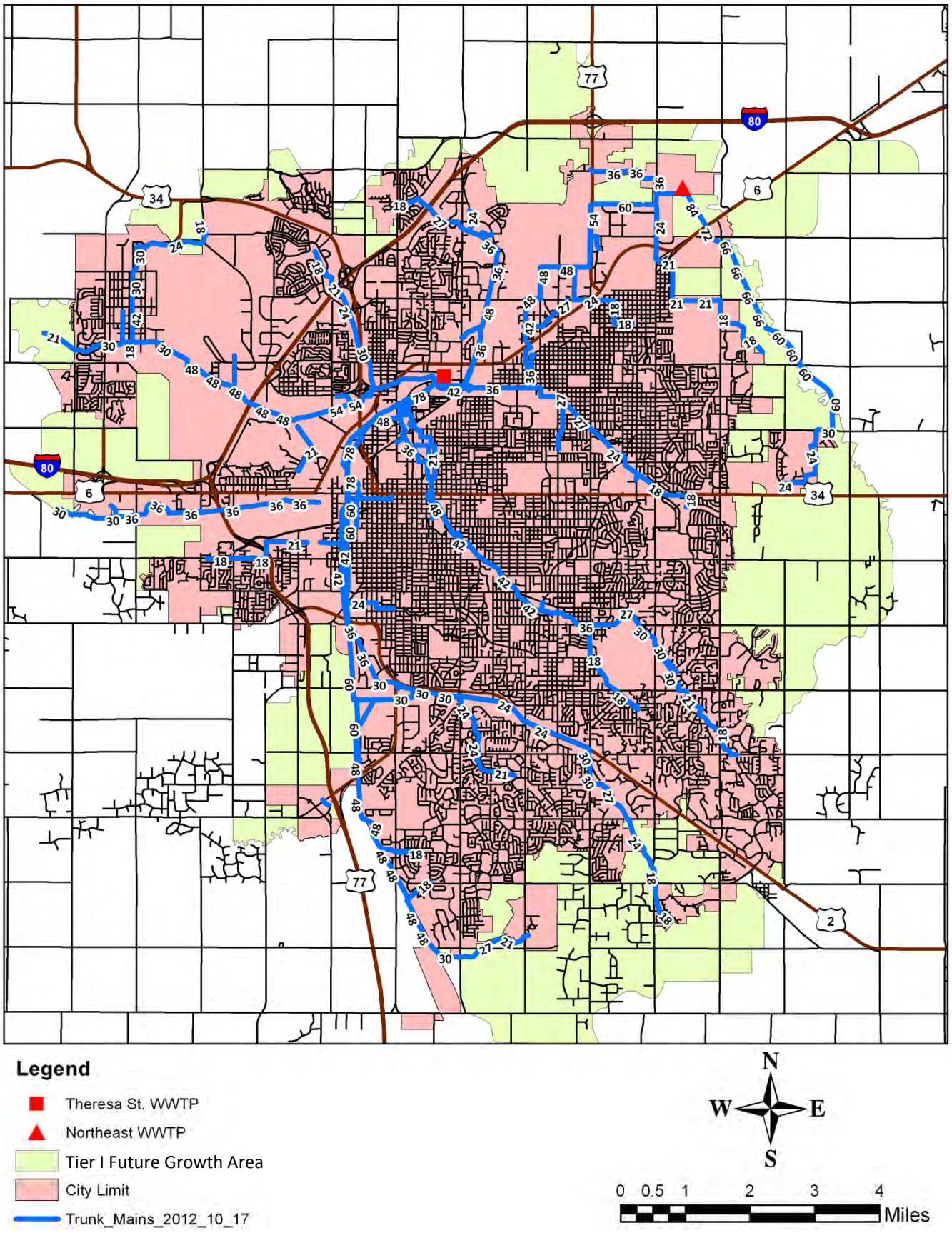

FIGURE 1.3 – WASTEWATER TRUNK SEWER SYSTEM
SEWER SYSTEM MANAGEMENT PLAN
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1.5 REGULATORY ENVIRONMENT

1.5.1 National Regulatory Background

Nationally, SSO's have been in the regulatory spotlight since 1995, when the United States Environmental Protection Agency (USEPA) formed the Sanitary Sewer Overflow Federal Advisory Subcommittee (SSO Subcommittee). The purpose of the SSO Subcommittee is to examine the need for national consistency in permitting and enforcement of SSO's.

From 1985 to 1999, the CSO Subcommittee met 12 times to discuss policy issues associated with SSO's. In 1999, the CSO Subcommittee supported basic principals requiring the following:

1. Capacity, management, operation, and maintenance (CMOM) programs for municipal sanitary sewer collection systems.

2. A prohibition of SSO's, which includes a closely circumscribed framework for raising a defense for unavoidable discharges.

3. Reporting, public notification, and record keeping requirements for municipal sanitary sewer collection systems and SSO's.

The recommendations of the SSO Subcommittee were then incorporated into the proposed "SSO Rule," which was published in the Federal Register in January 2001. For a variety of reasons, however, the proposed SSO Rule has yet to be formally adopted by the USEPA on a national level.

1.5.2 State of Nebraska Regulatory Background

Although the State of Nebraska does not specifically have an SSO policy, SSO's are considered to be a violation of the NPDES discharge permit as follows.

> *As defined in Title 119 – Nebraska Department of Environmental Quality, a POTW is defined as: "096 - Publically owned treatment works (POTW, means a treatment works as defined by Section 212 of the Clean Water Act, which is owned by a state or municipality. This definition includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial waste of a liquid nature. <u>It also includes sewers, pipes and other conveyances</u> only if they convey wastewater to a POTW Treatment Plant."*

The State of Lincoln's discharge permit specifies the quality of the effluent leaving the POTW's. This permit does not authorize the discharge through outfalls from the POTW's that includes any untreated influent wastewater.

Although the permit does not specifically state the requirements for reporting SSO's and/or them being violations of the permit, SSO's have to be considered violations of the permit based on the following pacts:

1. The definition of a POTW above, and
2. The POTW is permitted to discharge only treated wastewater.

In addition, the State of Nebraska requires that the City of Lincoln monitor, record, and report the occurrence of any SSO's every six months.

1.5.3 Local Regulatory Background (Sewer Use Ordinance)

The City of Lincoln has a comprehensive sewer use ordinance which regulates the use of the wastewater collection system, which is located in Title 17.58, Title 17.60, and Title 17.62 of the City of Lincoln's Municipal Code. A copy of this ordinance can be found in the City's website.

1.6 DEFINITIONS

- Sanitary Sewer Overflow (SSO) – SSO is defined as any overflow release, discharge, or diversion of untreated or partially treated wastewater from a sanitary sewer system. SSO's include overflows out of manholes onto city streets, sidewalks, parks and other locations. Backups into buildings caused by conditions in the sanitary sewer system are also considered SSO's. SSO's that reach the waters of the United States are point source discharges and are prohibited under Section 301 of the Clean Water Act. SSO's that do not reach the waters of the United States may violate NPDES permit conditions requiring proper operation, maintenance, and capacity of treatment facilities and associated conveyance infrastructure per the federal regulations 40 CFR 122.4I(e).
- Basement Backup – Basement backups can be due to either public or private issues. If the backup is due to conditions in the publically owned sections of the sanitary sewer collection system piping, the City will resolve the issue. If the problem is caused by a defect in the private line serving the property, the City will inform the property owner and it is their responsibility to resolve.
- Stoppage – A City of Lincoln Wastewater definition for any time there is an SSO or Basement Backup or a blockage in the line that is the responsibility of the City.
- PLT (Private Line Trouble) - PLT is when an SSO or basement backup that is caused by blockage or other issues within the private property owner's service line. Such service line issues are considered PLT and are the responsibility of the private property owner. Shown in Figure 1.4 is an example of where the private line ties into the public system and the figure delineates where the property owners responsibility begins.

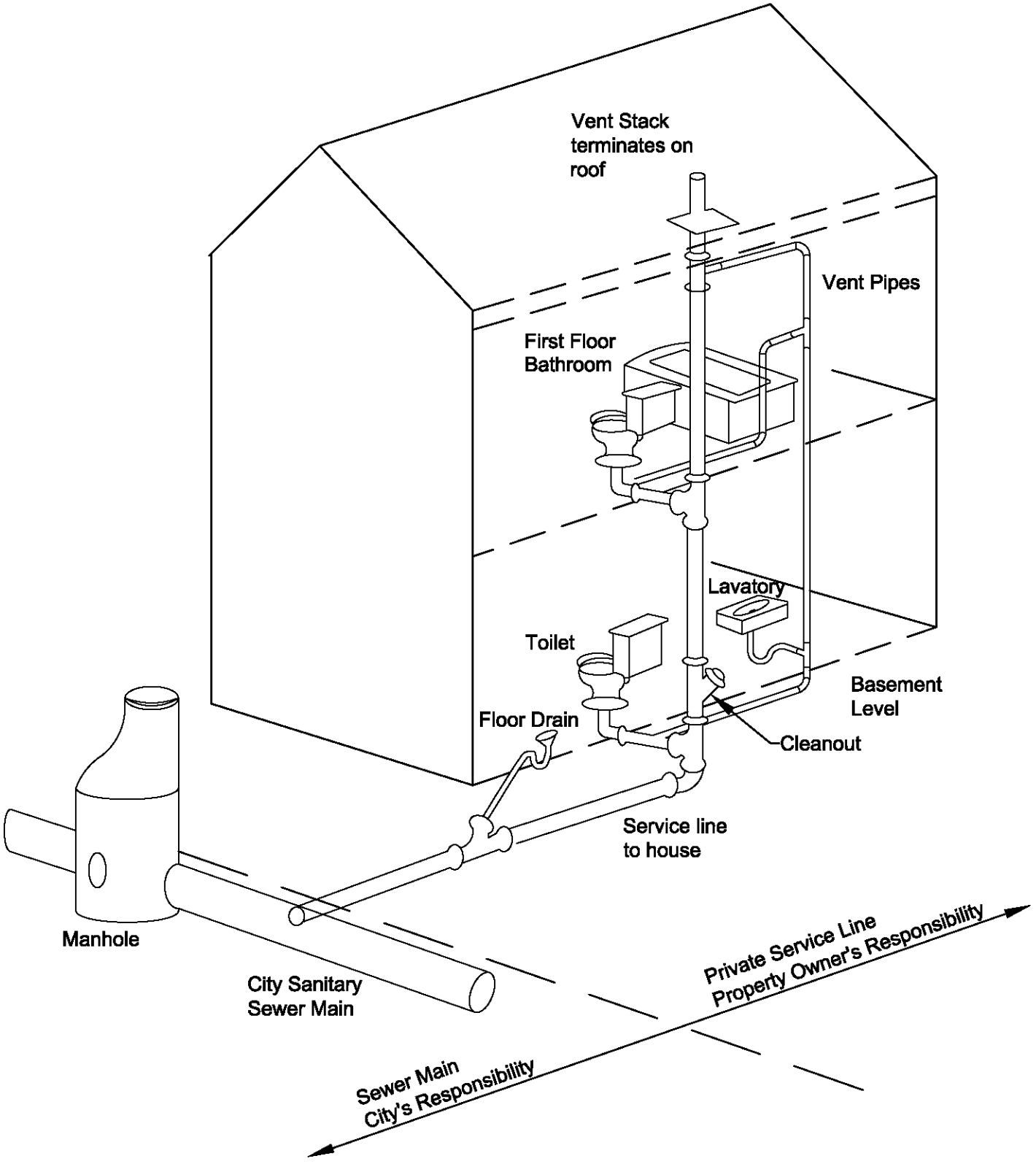

FIGURE 1.4 – TYPICAL RESIDENTIAL SERVICE CONNECTION

SEWER SYSTEM MANAGEMENT PLAN
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1.7 REFERENCE MATERIAL

During the course of preparing this SSMP update, several related studies, reports, memorandums, improvement plans, and other documents prepared for the City of Lincoln, were used, referenced and incorporated into this work. The following list includes, but is not limited to the documents that were incorporated into the preparation of this update.

- Title 17 of the City of Lincoln's Municipal Code.
- Title 119 – Nebraska Department of Environmental Quality.
- 2040 Comprehensive Plan.
- 2030 Comprehensive Plan.
- Update of the Wastewater Facilities Master Plan, 2007.
- City of Lincoln, Wastewater Data.

1.8 ACKNOWLEDGMENTS

The Lincoln Wastewater System (LWWS) was an integral partner in the development of this Sewer System Management Plan (SSMP). To that end acknowledgments are given to:

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- Mr. Dave Beyersdorf, P.E., Engineer.
- Mr. Mike Mandery, Assistant Superintendent of Collection.