



City of Brentwood 2021 SSMP Internal Audit

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Introduction

The California State Water Resources Control Board adopted Order No. 2006-0003 (State Order) on May 2, 2006, to create an equitable statewide mechanism to manage all publicly owned wastewater collection agencies with more than one mile of pipeline, to reduce the number and severity of Sanitary Sewer Overflows (SSOs), and to set up a central depository for online reporting of SSOs when they do occur.

A principal element of the State Order is the requirement that the collection agencies adopt and maintain a management plan for the system, referred to as a Sewer System Management Plan (SSMP).

The City of Brentwood's SSMP was certified and implemented on July 31, 2009, in accordance with the State Order.

One of the provisions of the State Order is that agencies perform an internal audit of the SSMP every two years. These audits are to focus on evaluating the effectiveness of the SSMP and the Enrollee's compliance with the SSMP requirements identified in section D.13., including identification of any deficiencies in the SSMP and what steps are/will be taken to correct them.

The SSMP is required to be updated every five years, and the update must include any significant program changes. If significant changes are made, the SSMP must be re-certified by the City Council. A revised version of the SSMP, based on the 2013 Internal Audit, was presented to the City Council and approved on May 14, 2013. In 2014 the City began a comprehensive review and update of the SSMP. This review led to many changes and updates to the SSMP, the last of which were incorporated in 2016. On May 9, 2017 City Council passed resolution 2017-58 approving the 5-year SSMP (2017 Revision).

Background and System Overview

The City of Brentwood (City) was incorporated in 1948 as a General Law City. The City is predominately a bedroom community, of approximately 65,118 residents, that collects and treats wastewater generated almost exclusively by domestic (household) users. The City currently has no categorical significant industrial users. The bulk of the commercial businesses are retail food establishments, retail grocery stores, home improvement centers and retail department stores.

The City has a service area of nearly 12 square miles with roughly 319 miles of City owned and maintained sanitary sewer piping systems (including lower laterals) and three lift stations. The City's sewer mains range in diameter from six inches to 42 inches with approximately 80% of these lines being eight inches in diameter or smaller. Nearly all of the sewer laterals are four inches in diameter. Similar to other organizations, the City maintains a portion of the residential sewer laterals. The City maintains the "lower" lateral for single family residences, which is defined as the portion of the lateral extending from the edge of the property line (typically the back of the sidewalk) to the sewer main.

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Summary of SSO Events and Data

The City of Brentwood had two SSO's in 2019, and ten SSO's in 2020 (total volume = 193 gallons). The chart below (Figure 1) shows the number of recorded SSO's and the calculated number of SSO's per 100 mile of sewer main line since the City began tracking SSO events in 2007. This data represents an average of 2.2 SSO's per year, 1.1 SSO's per 100 mile of sewer main, and is considered indicative of a very high performing collection system.

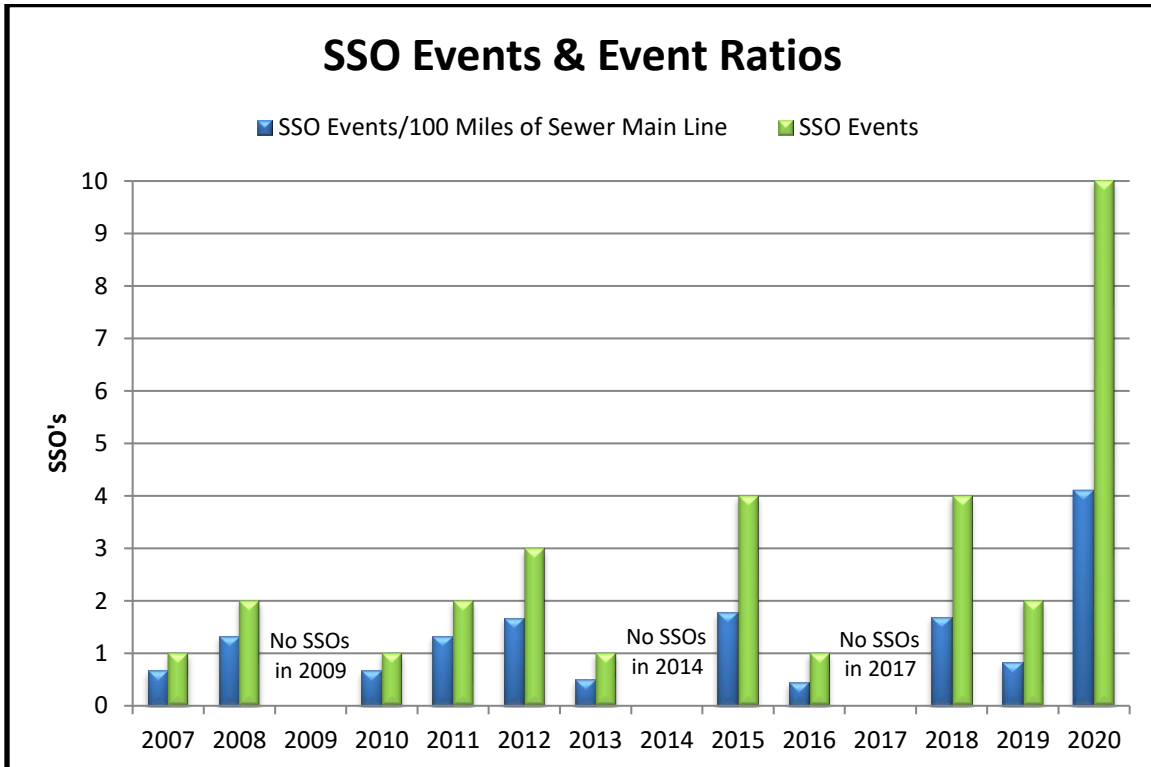


Figure 1

Figure 2 below shows a 14-year history of SSO volumes. Of the 17,730,670,000 gallons of sewage that flowed through the City's collection system since 2007 a total of 7119 gallons left the system as SSO's. Since the City began measuring SSO's the highest annual total of SSO volume was 1962 gallons. The 14-year average annual total SSO volume is 509 gallons per year, with a per-event average volume of 230 gallons.

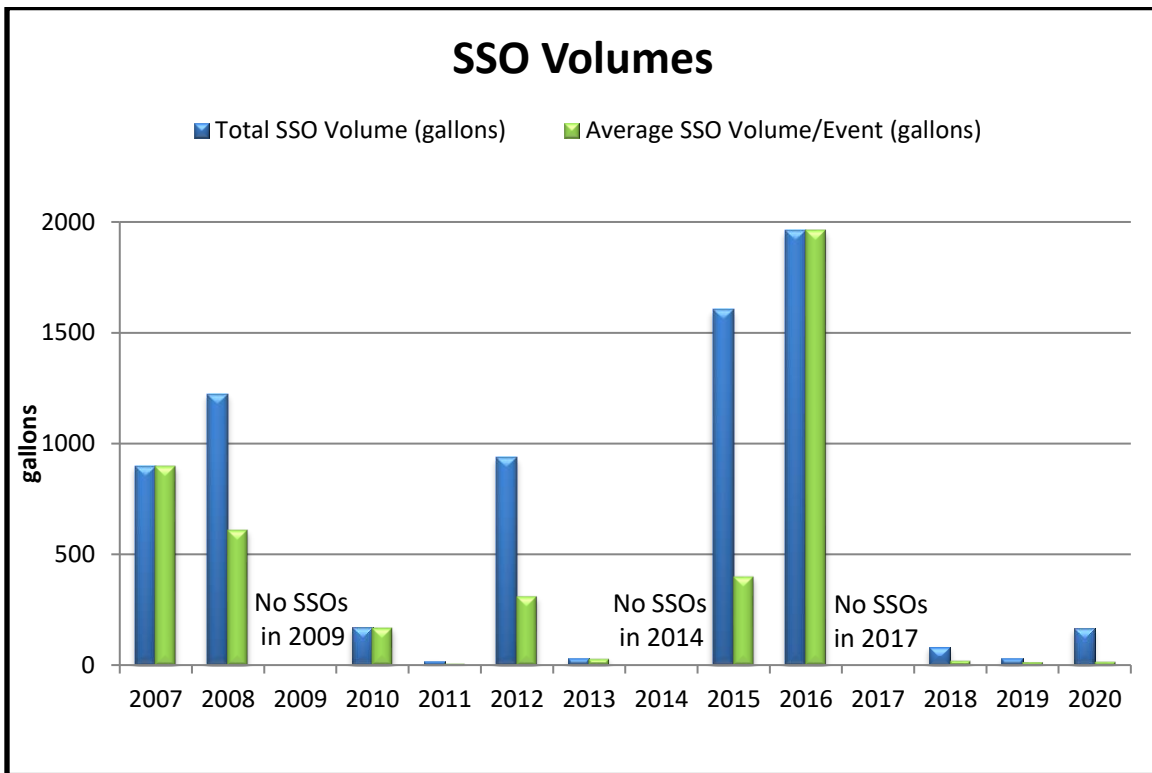


Figure 2

Historically, most of the SSOs recorded in the City are completely recovered and do not reach surface waters. Since 2007 the City has averaged an SSO recovery rate of 63%. Of the 193 gallons lost during the twelve SSO's in 2019 & 2020 38 gallons (20%) were recovered and returned to the sewer system. Figure 3 below shows the annual percent recovery of SSO's.

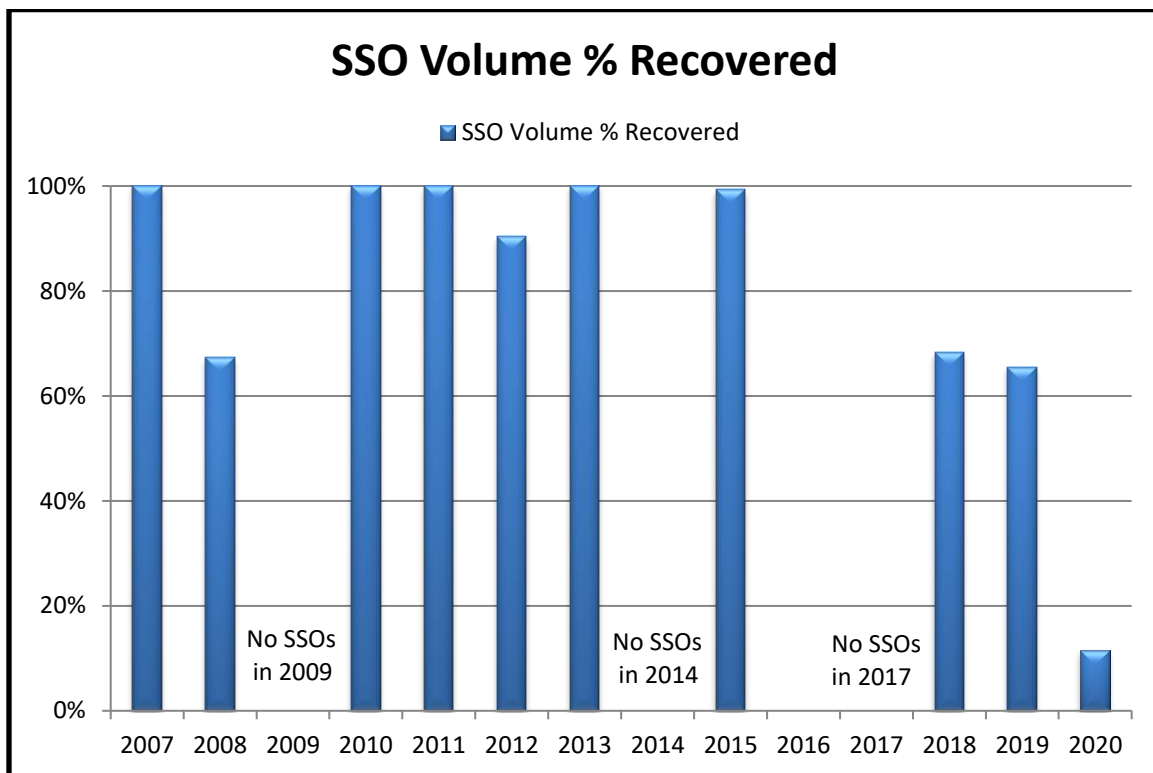


Figure 3

Table 1 below lists the data used in Figures 1, 2, and 3 above.

Year	SSO Events	Total SSO Volume (gallons)	SSO Volume recovered (gallons)	SSO Volume % Recovered	Average SSO Volume/Event (gallons)	Sewer Main Line (miles)	SSO Events/100 Miles of Sewer Main Line	Sewer Connections	WWTP Influent Flow (Mgal)
2007	1	900	900	100%	900	150	0.7	14,789	1,324.59
2008	2	1225	825	67%	613	150	1.3	15,104	1,218.61
2009	0	0	0			150	0.0	15,860	1,171.42
2010	1	170	170	100%	170	150	0.7	15,860	1,176.54
2011	2	15	15	100%	8	150	1.3	15,679	1,229.32
2012	3	937	847	90%	312	179	1.7	16,460	1,242.86
2013	1	29	29	100%	29	202	0.5	16,800	1,289.03
2014	0	0	0			209	0.0	17,505	1,343.27
2015	4	1606	1595	99%	402	225	1.8	17,674	1,189.20
2016	1	1962	0	0%	1962	226	0.4	18,180	1,233.41
2017	0	0	0			235	0.0	18,748	1,315.13
2018	4	82	56	68%	21	237	1.7	19,517	1,273.26
2019	2	29	19	66%	15	242	0.8	19,878	1,268.65
2020	10	164	19	12%	16	243	4.1	20,116	1,455.38
2007-present Total:	31	7119	4475						17,730.67
2007-present Average:	2.2	509	320	63%	230		1.07		
5 yr. Average:	3.4	447	19	36%	503		1.41		

Table 1

Table 2 below provides a breakdown of the listed causes of each of the SSO's recorded since 2007.

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	Mainline Stoppages by Cause														Total	%
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
Debris - General						1						1			2	6
Debris - Rags															0	0
Flow exceeded capacity															0	0
Grease (FOG)		1		1	2	2	1		2				2	2	13	42
Operator Error															0	0
Pipe structural problem/failure									1			2		5	8	26
Pump station failure															0	0
Rainfall exceeded design															0	0
Root intrusion									1			1		3	5	16
Vandalism															0	0
Contractor Causes	1	1								1					3	10
TOTAL	1	2	0	1	2	3	1	0	4	1	0	4	2	10	31	100

Table 2

Until 2013, the total footage of sewer mainline cleaning was relatively consistent. Beginning in 2013 the City transitioned to more of a proactive investigation of sewer mainlines rather than a “blind cleaning” method. Covid-19 caused a significant decline in the amount of mainline maintenance done in 2020. The City anticipates 2021 will see more mainline maintenance performed. Figure 4 below compares the overall footage of cleaning versus CCTV inspecting per year.

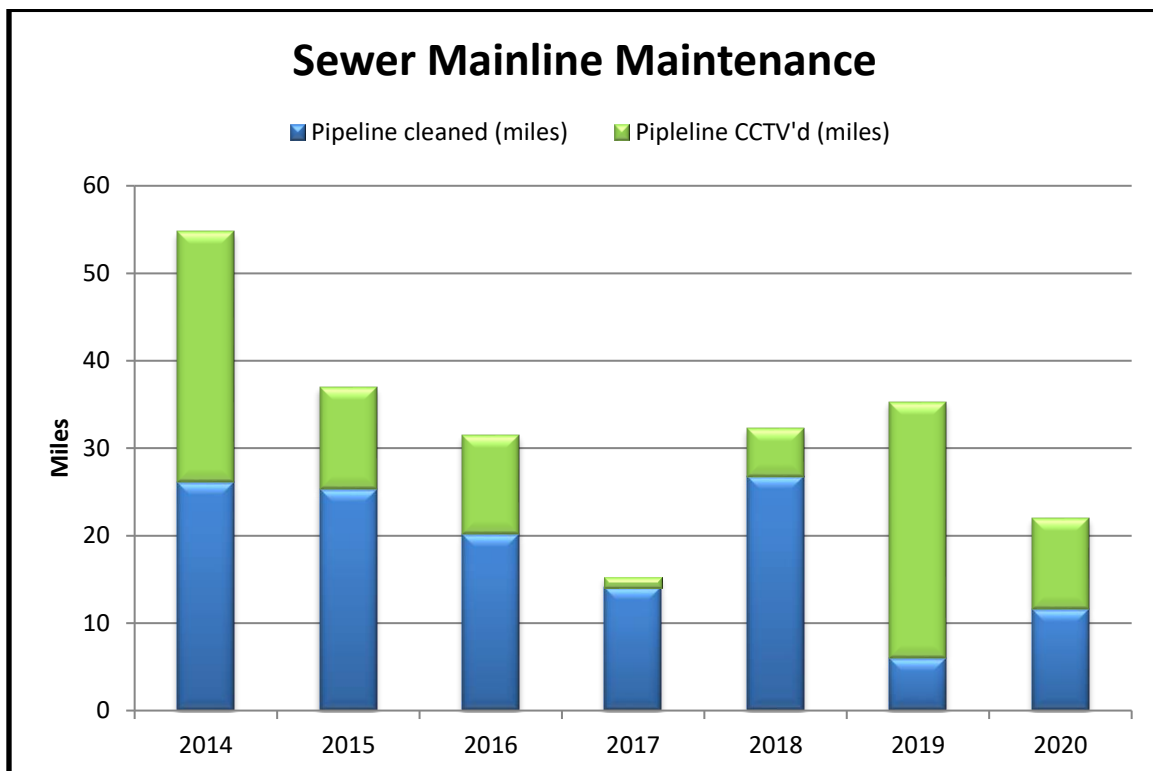


Figure 4

Figure 5 is a map of the City’s entire collection system with the locations of all the SSOs since 2012. This map serves as an indicator of overall system health. Since the SSOs occur in random places, the City can reasonably conclude that there are no overly problematic areas that are in danger of having SSOs or needing repair.

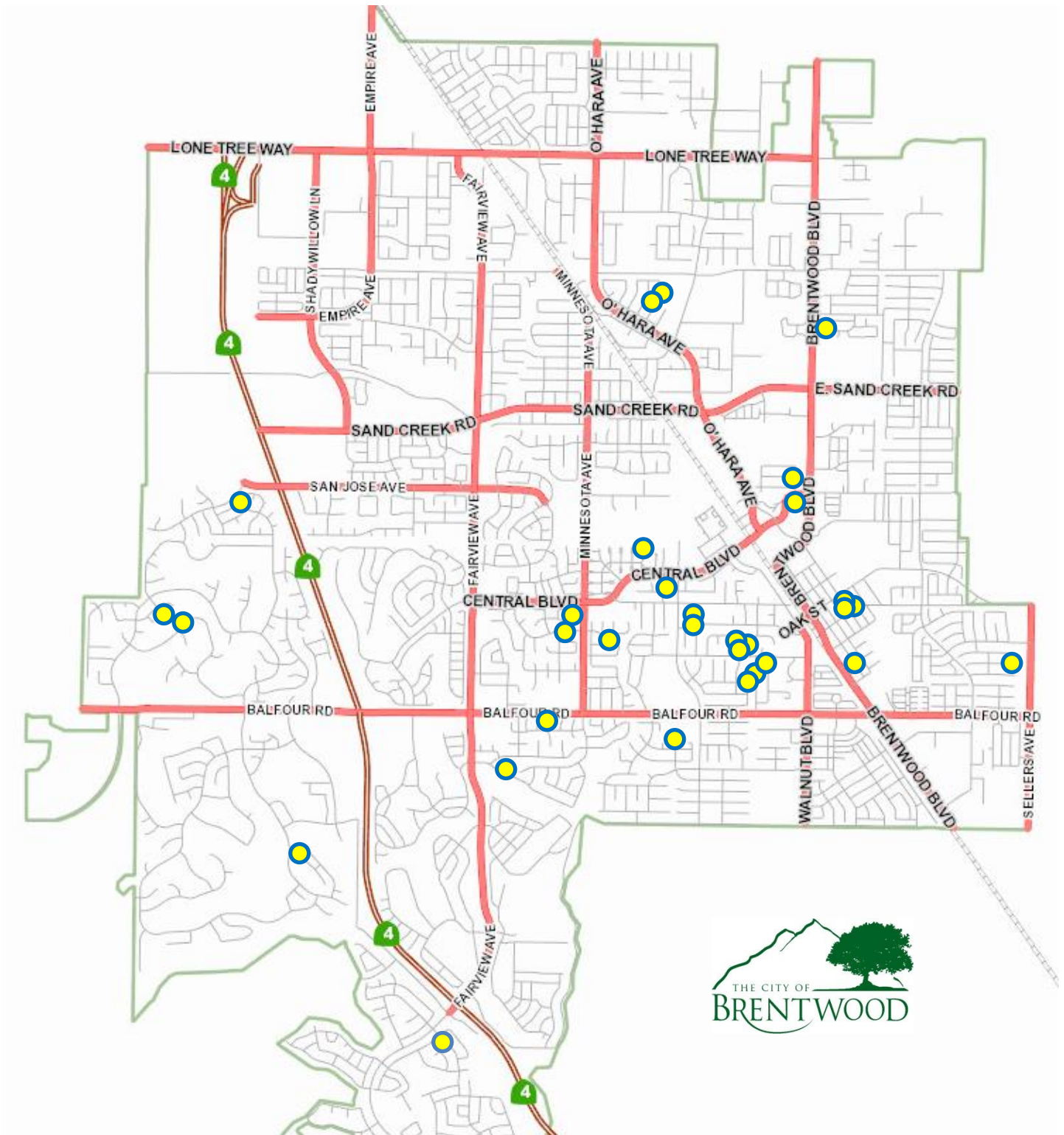
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Historical SSO Map 2007-2020



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Audit Approach

As specified in the State Order, the SSMP is comprised of eleven sections or subsets of Section D.13 of the State Order, as follows:

D.13.i	Goals
D.13.ii	Organization
D.13.iii	Legal Authority
D.13.iv	Operation and Maintenance Program
D.13.v	Design and Performance Provisions
D.13.vi	Overflow Emergency Response Plan
D.13.vii	FOG (Fats, Oils, & Grease) Control Plan
D.13.viii	System Evaluation and Capacity Assurance Plan
D.13.ix	Monitoring, Measurement and Program Modifications
D.13.x	SSMP Program Audits
D.13.xi	Communication Program

This internal audit is focused on the above eleven categories as required by the State Order. The evaluation of each element in each category is standardized with sufficiency. Compliance ranking has been based on State Order audit guidelines and sufficiency. A recommendation has been provided when there is enough information to support it.

The format for audit reporting is as follows:

- State Order Section/Subsection
- Sufficiency Ranking
 - Complies,
 - Substantially complies,
 - Partially complies,
 - Marginally complies,
 - Does not comply
- Findings
- Reference Information
- Recommendation when appropriate

1. Audit of Goals – State Order D.13.i

Review the SSMP to determine if it complies with the State Order by having a goal to provide a plan to manage, operate, and maintain all parts of the City of Brentwood Wastewater Collection System.

Sufficiency: **Complies.**

Findings: The City has established a list of goals in its SSMP that complies with the goals established in the State Order.

The City's Goals for the SSMP together with progress to date are as follows:

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1. To minimize the number and impact of SSOs;

Complete. Adherence to the SSMP has helped limit the average number of SSOs to 2.2 per year with an average total volume of 509 gallons per year since the SSS WDR was adopted in 2007.

2. To maintain existing infrastructure and plan for future Capital Improvement Projects (CIPs);

Complete. Adherence to the SSMP coupled with sound planning has resulted in an up-to-date infrastructure with no major deficiencies. The average age of the collection system piping is approximately 19 years.

3. To continue to provide capacity evaluation for the collection system and plan for future growth;

Complete. A Wastewater Collection System Master Plan was prepared in 2001 and subsequently updated in 2006 to accommodate a rapidly growing community. Additional updates were prepared in 2010 and 2017 to forecast collection system flow conditions at the current General Plan “build-out”, taking into account changes in water use as a result of the drought years in 2013-2015. The 2017 update provided recommendations for capital improvement projects to optimize the collection system to handle the planned growth.

4. To develop a plan to increase the number of staff to meet the obligations of the SSMP;

Complete. The City added one full-time Collection System Worker in FY 2014/15. An additional Collection System Worker was hired in FY 2018/19. Staffing levels are reviewed annually through a City-wide 10-year staffing plan.

5. To operate the Collection System in a safe and efficient manner, thus maximizing production;

Complete. There were no lost-time injuries associated with the collection system since the last audit period.

Reference: City of Brentwood SSMP (COB SSMP).

Recommendation: None. The City is in compliance with the *Goals requirement of the State Order*.

2. Audit of Organization – State Order D.13.ii

Review the SSMP to determine if it complies with the State Order by having the names of authorized representatives published and updated in the SSMP.

Sufficiency: **Complies.**

Findings: The City has identified the names of its authorized representative, management, administration, and maintenance personnel and has shown the chain of communication for reporting SSOs. The organization chart is up to date as of January 1, 2021.

Reference: COB SSMP, Element 2, Page 5, Organizational Chart
COB SSMP, Element 2, pages 6-7, Staff Roles
COB SSMP, Element 2, Page 8, Communication Flow Chart

Recommendation: None.

3. Audit of Legal Authority – State Order D.13.iii

Review the SSMP to determine if it complies with the State Order by having ordinances and agreements in place and updated to prevent illicit discharges, provide for proper design of sewers and connections, ensure access for maintenance, inspection, and repair of laterals, limit the discharge of blockage causing debris, and enforce any violation of sewer ordinances.

Sufficiency: **Complies**

Findings: The City has an adopted Municipal Code that addresses the legal authority required to carry out actions identified in the SSMP. Specifically, section 13 of the Brentwood Municipal Code prohibits illicit discharges, sets standards for the design of sewers and connections, and provides a means to enforce violations of the provisions within the Code. In March 2015, the City adopted a revision to section 13 (Sewers) of the Municipal Code. A link to the Municipal Code is included in the electronic version of the SSMP and is available on the City’s website.

Reference: COB SSMP, Element 3
City of Brentwood Municipal Code, Section 13.

Recommendation: None

4. Audit of Operation and Maintenance Program – State Order D.13.iv

Review the SSMP and activities of staff, consultants, and contractors to determine compliance with the State Order by having (a) an up-to-date map of the Collection System that shows all pipe reaches, manholes, siphons, diversion structures, and pump stations and (b) a routine preventative maintenance program, (c) a rehabilitation and replacement plan, (d) an operations and maintenance training program, and (e) a parts inventory program including identification of critical replacement parts.

Sufficiency: **Complies**

Findings: The Collection System Map is kept up-to-date electronically through a GIS program (GeoVault) managed by the Engineering division. The map is available on the City’s intranet. Collections crews have access to the electronic map room via a laptop in the field, and through desktop computers in the office.

As outlined in the COB SSMP the routine preventative maintenance program consists of quarterly hot-spot cleaning, and CCTVing/cleaning of the balance of the collection system on a 4-year basis. The City utilizes Maintenance Connection, an enterprise asset management software package to track all the O&M activities of the collection system, including customer complaints and investigation results..

Formal pipeline condition assessments are not currently conducted. Manholes, pipelines, and lift stations are informally assessed during routine cleaning/CCTVing activities. If system deficiencies are noted, rehabilitation and replacement are accomplished through capital improvement projects. The City has an annual asset replacement fund to cover any urgent major pipeline repairs. In addition, periodic CIPs are done on a case-by-case basis as needs are identified. The latest examples of these are the Park Way Rehab project and the Citywide Wastewater Rehab project completed in fiscal year 2016/17. These projects replaced sewer mainlines and laterals and installed new manholes in various locations.

The City maintains a sufficient spare parts inventory of critical equipment. This list can be found in Appendix B of the SSMP.

The City budgets for employee training each year. Collections staff occasionally participates in industry-wide training events .

Reference: COB SSMP, Appendix E

Recommendation: None.

5. Audit of Design and Performance Provisions – State Order D.13.v

Review the SSMP to determine if it complies with the State Order by having design and construction standards and specifications for installation of new facilities, including coverage for testing of new facilities prior to acceptance.

Sufficiency: **Complies**

Findings: The City has adopted Standard Plans and Specifications for, among other things, construction of sewers and sewer appurtenances. A link to the applicable Standard Specifications (Section 71 and 75) is included in the SSMP. These specifications address testing necessary for acceptance.

Reference: COB SSMP, Element 5
City of Brentwood Standard Plans and Specifications

Recommendation: None

6. Audit of Overflow Emergency Response Plan – State Order D.13.vi

Review the SSMP to determine if it complies with the State Order by having an overflow emergency response plan that includes (a) proper notification procedures, (b) a program that assures proper response to all overflows (c) procedures that ensure prompt notification of regulatory agencies and other affected entities, (d) procedures to ensure that appropriate personnel are aware of the plan and appropriately trained, (e) procedures to address traffic control and crowd control, and, (f) implementation of steps to prevent SSOs from reaching waters of the United States.

Sufficiency: **Complies**

Findings: The City has a stand-alone Overflow Emergency Response Plan (OERP) that is incorporated into the SSMP. This plan effectively addresses notification procedures, assures proper response to overflows, contains procedures to ensure the proper regulatory notifications are made, and has provisions to address traffic control associated with SSOs. Copies of the Sewer Overflow Reports used by staff are found in the SSMP in Appendix B.

Reference: City of Brentwood Overflow Emergency Response Plan
COB SSMP, Element 6

Recommendation: None

7. Audit of FOG (Fats, Oils, and Grease) Control Plan– State Order D.13.vii

Review the SSMP to determine if it complies with the State Order by having a FOG Control plan with (a) a public education outreach element, (b) a plan for the disposal of FOG, (c) ordinances, rules and regulations to prevent FOG, (d) requirements to install FOG traps together with standard drawings for traps, owner maintenance, record keeping, and reporting requirements, (e) FOG inspection and enforcement authority and staffing, (f) FOG mapping and cleaning schedule, and (g) source control measures.

Sufficiency: **Complies**

Findings: The City’s FOG program accomplishes the above requirements. The Municipal Code establishes the enforcement authority for FOG inspections, and in 2019 the City hired an environmental compliance inspector whose duties include FOG inspection/prevention/enforcement, and implementing the FOG control plan.

Reference: COB SSMP, Element 7
City of Brentwood Municipal Code, Section 13.

Recommendation: None.

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8. Audit of System Evaluation and Capacity Assurance Plan – State Order D.13.viii

Review the SSMP to determine if it complies with the State Order by having a Capital Improvement Plan (CIP) that considers (a) Evaluation of those portions of the Collection System that experience SSO's due to hydraulic deficiency, (b) Design Criteria commensurate with the Collection System, (c) Capacity Enhancement Measures and steps to address short term and long term CIP goals and an implementation schedule, and (d) Schedule for completion of items identified in (a) – (c).

Sufficiency: **Complies**

Findings: The City has a Wastewater Collection System Master Plan that addresses the requirements identified in State Order D.13.viii. The City initially prepared the Wastewater Collection System Master Plan in 2001 following adoption of the “City of Brentwood General Plan 2021”. Due to an extremely accelerated growth rate in the years immediately following 2001, the City updated the Wastewater Collection System Master Plan in 2006. This Plan was updated again in 2010 and 2017. The 2017 update includes a capacity assessment based on hydraulic modeling of the collection system with future design flows at ultimate “build-out” development of the City. This modeling identified three projects that will ultimately require some sections of the sewer main piping to be replaced with larger diameter piping, or have parallel piping installed.

The City has not experienced any sanitary sewer overflows caused by hydraulic deficiencies in the existing wastewater collection system. As the City grows, the hydraulic capacity of the system continues to be monitored and the previously identified sections requiring replacement or parallel piping will be implemented as CIPs.

The City has comprehensive design criteria and standards relating to collection system design and construction. These criteria may be found in the City of Brentwood Standard Plans and Specifications.

References: COB SSMP, Element 8
City of Brentwood Wastewater Collection System Master Plan Update, 2017

Recommendations: None.

9. Audit of the Monitoring, Measurement, and Program Modifications – State Order D.13.ix

Review the SSMP to determine if it complies with the State Order by (a) maintaining relevant information that can be used to establish and prioritize appropriate SSMP activities, (b) measuring the effectiveness of each element of the SSMP, (c) assessing the success of the preventative maintenance program, (d) updating program elements, based on monitoring or performance evaluations, and (e) identifying and illustrating SSO trends, including frequency, location and volume.

Sufficiency: **Complies**

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Findings: The City began collecting data on SSOs upon the implementation of the State Order. This data is summarized in the figures and tables in *the Summary of SSO Events and Data* section on pages 3-6 of this document. This data continues to support the notion that the City's SSMP is working effectively to properly manage the collection system. SSO trends based on frequency, location, and volume are readily available, as are records of pipeline cleaning.

References: COB SSMP
2019 SSMP Internal Audit, Summary of SSO Events and Data section

Recommendations: None.

10. Audit of SSMP Program – State Order D.13.x

Perform an internal audit of the SSMP to determine if it complies with the State Order by evaluating the effectiveness of the SSMP and the City's compliance with the SSMP requirements including identification of any deficiencies in the SSMP and steps to correct them.

Sufficiency: **Complies**

Findings: The City has embarked on this audit of its SSMP within the two-year requirement specified in the State Order. The previous audit was performed in March of 2019.

References: COB SSMP, Appendix E

Recommendations: None

11. Audit of Communication Program – State Order D.13.xi

Review the activities of staff to determine if they have complied with the State Order by (a) communicating the performance of the SSMP with the public, and (b) providing the public the opportunity to provide input.

Sufficiency: **Complies**

Findings: Public input was solicited during the development of the SSMP in 2006 and 2007. Since the adoption of the SSMP, there has been little public input to the program.

With the completion of each audit, City staff makes the audit available to the general public by posting it, along with a copy of the SSMP, on the City website. SSO data is also publicly available on the CIWQS website.

References: City of Brentwood website, www.brentwoodca.gov

Recommendations: None.