Attachment B

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

SANITARY SEWER SYSTEM ANNUAL REPORT
FY 2017-2018

Trimble and Amberwood Sanitary Sewer Improvement Project - Pipebursting

October 2018

City of San José
Sanitary Sewer System Annual Report
FY 2017-2018

CONTENTS

I. HISTORY AND BACKGROUND

The City provides sanitary sewer service for the residents and businesses of San José and surrounding areas. The City owns and operates the sewer collection system consisting of approximately 2,030 miles[1] of pipes (which vary in size from 6 inches to 90 inches in diameter), including 10 miles of force mains, 18 pump stations and 45,000 manholes. There are over 202,000 lateral connections to the system. The collected wastewater is conveyed to the San José - Santa Clara Regional Wastewater Facility (RWF) by major interceptor pipelines located in the northern part of San José. This system conveys an average flow of 76 million gallons per day. The City's sanitary sewer collection system benefits from the generally uniform topography of the Santa Clara Valley which allows the majority of the wastewater flows to be conveyed to the RWF using gravity sewer lines with minimal use of lift or pump stations.

The sewer system dates back to the late 1800's which consisted of a main outfall sewer constructed of brick. This system conveyed combined sanitary and storm flows directly into the San Francisco Bay. In the 1950's this combined system was separated, and sanitary flows were directed through the wastewater treatment facility (currently known as the RWF) prior discharging into the bay. Approximately 85 percent of the system, which was constructed between 1950 and 1980 are local collector pipes that are 10 inches or less in diameter.

In general, the sanitary sewer system is overseen and managed by the following departments:

- The Department of Public Works designs and builds sanitary sewer infrastructure funded through the City's Capital Improvement Program. Public Works also reviews and inspects sanitary sewer improvements constructed by private developers and other public agencies. The Sanitary Capital and Master Planning Sections are part of the Transportation & Hydraulics Services Division in Public Works. The primary goal of these sections is to plan, design and construct improvements to sanitary sewer system, in an effort to provide safe and reliable sewer service to the current and future residents/ businesses of San José and contributing agencies.

- The Department of Transportation's Infrastructure Maintenance Division performs day-to-day operations and maintenance of the system.

- The Environmental Services Department manages the wastewater from the collection system to suitable treatment and discharge into the San Francisco Bay and for beneficial reuse to protect the environment and public health.

[1] Total length was updated in 2016 based on the latest GIS data to exclude sewer mains that were abandoned or owned by adjacent agencies or private developers.

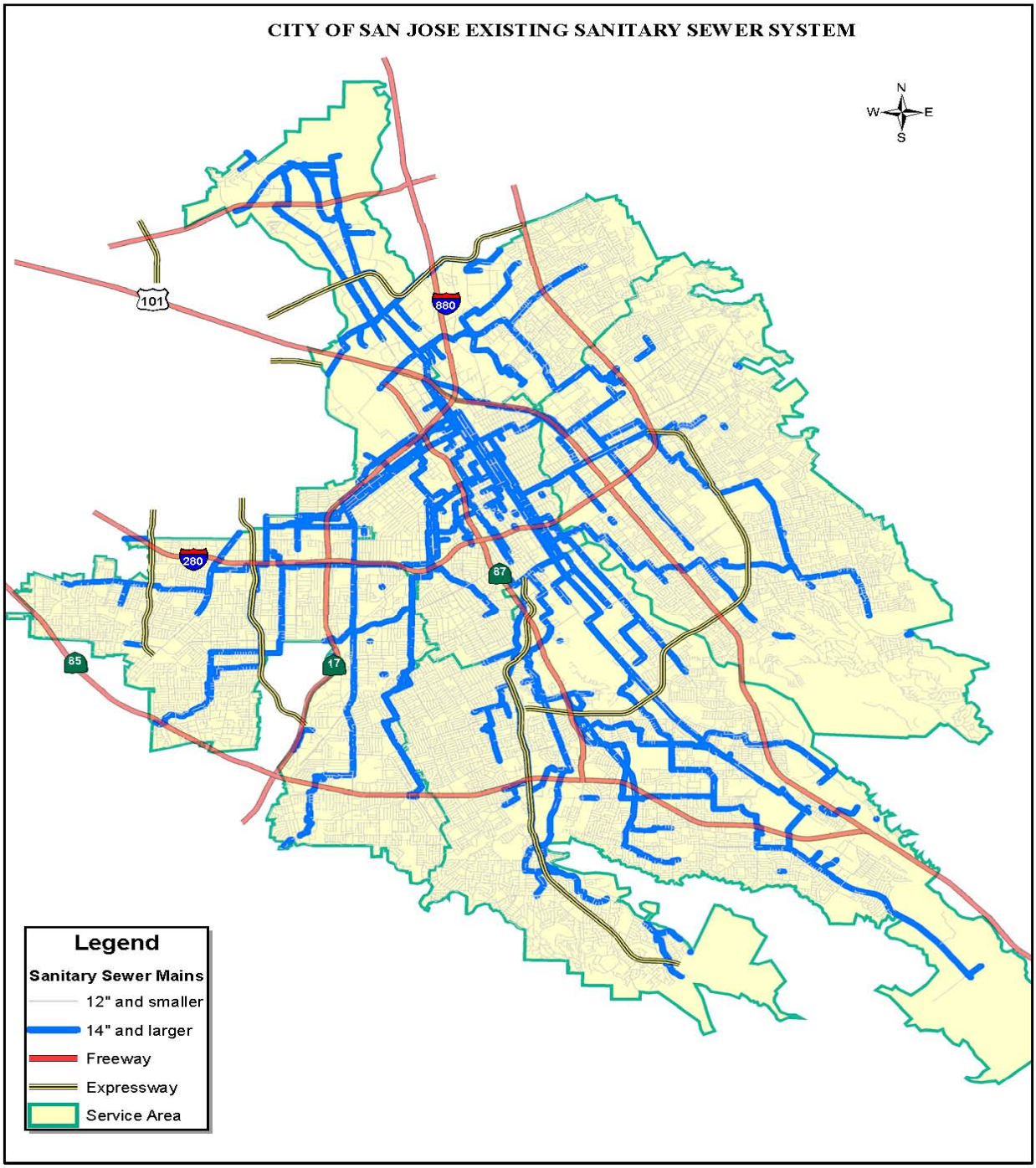


Figure 1 - City of San Jose Sanitary Sewer System

II. PROGRAM FUNDING

A. Adopted FY 2017-18 CIP Budget Revenue

Primary sources of funding include an annual transfer from the Sewer Service and Use Charge Fund, the Sanitary Sewer Connection Fee, and joint participation revenues. The Sewer Service and Use Charge Fund provides funding for capital improvement projects through the Sewer Service and Use Charge Capital Improvement Fund.

Sanitary Sewer Connection Fee Fund (Fund 540 - $4,402,574; 5-Year CIP) – Connection fees are charged to developers for connecting to the City's sanitary sewer system. Funds are restricted to the construction and reconstruction of the sewer system.

Sewer Service and Use Charge Capital Improvement Fund (Fund 545 - $81,133,685; 5-Year CIP) Sewer service and use charges are collected from existing property owners of the City. This funding accounts for the majority of the construction and rehabilitation of the sanitary sewer collection system.

Joint Participation Revenues ($1,510,000) – A portion of West Valley Sanitation District's, County Sanitation District 2-3, and Cupertino Sanitation District's sewage flows through the City's collection system. This revenue consists of the respective agencies' fair share contribution for the City's expenditures on capital improvements on the shared system.

B. Adopted FY 2017-18 CIP Budget Expenditures

The Sanitary CIP Program consists of a $228.4 million, 5-year budget. This funding is allocated between three broad categories which include capacity improvements, rehabilitation and non-construction activities.

Capacity improvements are identified through the on-going collection of flow monitoring data which is inputted into the computerized hydraulic model of the sewer network. Improvements are based on existing capacity deficiencies and capacity needs projected with the build out of the Envision 2040 General Plan. Projects in this category generally consist of upsizing of existing sewers or new sewers designed to reroute sewage flows from capacity deficient sewers to sewers with adequate capacity.

Rehabilitation projects originate from on-going maintenance history and results of the closed circuit television inspection and condition assessment programs. Projects typically consist of removal and replacement or rehabilitation of structurally compromised and root/grease prone sewers. Also included in this category is the rehabilitation of pump stations which typically involves upgrading of electrical and mechanical components.

The primary expenditures for non-construction activities are for the flow monitoring/ master planning and closed circuit television inspection/condition assessment programs. Each of these programs is essential to the planning and prioritization of capital improvements within the sanitary sewer system.

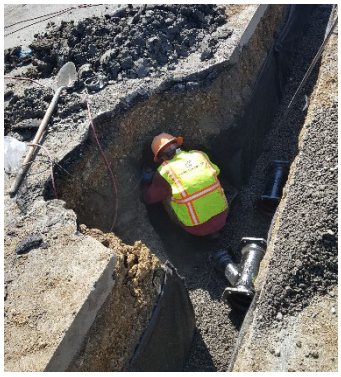
C. Adopted FY 2017-18 Operations and Maintenance Budget Expenditures

The annual ongoing operating and maintenance budget is approximately $17.8 million, which provides funding for the Department of Transportation administration, engineering, and maintenance.

III. PROGRAM ACTIVITY

A. Neighborhood Sewer Rehabilitation

Approximately 1,750 miles or 85 percent of the City's sanitary sewer system is considered neighborhood sewers. The average age of the neighborhood sewer system is approximately 45 years. These sewers generally consist of smaller diameter (6 to 10 inches) pipes constructed of vitrified clay or cast iron and buried three to six feet deep. These characteristics result in a variety of operational and maintenance issues including root intrusion, grease accumulation, corrosion (of the cast iron sewers), structural damage due to the depth of cover and the array of other utilities common at similar depths as the sewers. For these reasons, the vast majority of sanitary sewer overflows (SSOs) occur in these types of sewers.



During FY 2017-18, thirty-seven (37) separate contracts were either awarded and/or completed to address issues in neighborhood sewers. The total value of these contracts was $36 million. In order to address these issues in a timely and cost effective manner, a variety of types of construction contracts and methods were implemented. Traditional remove and replace contracts were utilized for cast iron sewer replacements and for system replacements which required changes in horizontal or vertical alignment. Changes in alignment are typically necessary to improve flow and prevent grease accumulation. Rehabilitation contracts, which consist of insertion of a liner into the existing sewer, or pulling in a new polyethylene pipe while breaking the old pipes were utilized to repair sewers with mild to moderate damage and prevent root intrusion. Point repair contracts, which consist of multiple locations under a single contract, were utilized to repair sewers which had severe localized damage.

Capital projects on neighborhood sewers are often developed to address on-going, repeated maintenance activities by the Department of Transportation. The Carmel and Arbor Drive Sewer Replacement, Cast Iron Sewer Replacement FY 17-18 Package I and Package III projects were constructed in FY 2017-18, replaced and rehabilitated a total of 11,665 feet of old 6-inch and 8-inch cast iron sewers and clay pipes with a more corrosion resistant ceramic coated ductile iron pipe, at a total cost of $5.6 million. In addition, several Miscellaneous Sewer Repairs projects and a General On-Call Engineering Contract were utilized to address structural defects found in the system at various locations throughout the City in an effort to assist the Department of Transportation (DOT) to reduce SSOs. The construction of a few projects that were specifically done to target SSO reduction included the Rio Hondo Drive, Norwood Avenue, and Fleming Avenue Sanitary Sewer Rehabilitation, Miscellaneous Sanitary Sewer Repairs Package I, and

Miscellaneous Sanitary Sewer Repairs Package III projects have also been completed in FY 2017-18 at a total cost of $3.4 million.

Prior to these projects, the sewer systems in many of these areas required cleaning by DOT on a weekly to monthly basis due to heavy grease accumulation. Each cleaning effort consisted of an average of four hours with a two person crew with a combination vactor/flushing truck. Upon completion of the capital project, maintenance activities have been reduced significantly to one light cleaning effort in a year.

The combined effort of capital improvements and the Department of Transportation's cleaning and maintenance program has resulted in a continued reduction in the number of SSOs, down from 192 in FY 2011-12 to only 22 in FY 2017-2018, as shown in Table 1.

Table 1 – Sanitary Sewer Overflow Data

Sanitary Sewer Overflow Totals													
	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	**Total**
FY 11/12	17	6	12	10	25	17	15	19	19	22	20	10	**192**
FY 12/13	12	12	14	8	22	12	19	14	18	10	8	6	**155**
FY 13/14	7	6	7	9	9	13	7	7	9	10	9	8	**101**
FY 14/15	8	4	4	9	11	15	18	8	7	4	7	2	**97**
FY 15/16	5	4	4	2	8	5	6	11	4	1	5	0	**55**
FY 16/17	4	6	5	4	5	7	4	8	7	3	3	2	**58**
FY 17/18	1	1	1	3	5	2	0	0	0	2	1	6	**22**

B. Exfiltration Abatement Program

In mid-2016, to resolve a lawsuit brought by San Francisco Baykeeper, a California non-profit corporation, ("Baykeeper") and with neither party admitting liability, the City and Baykeeper entered into a Consent Decree to resolve any potential Clean Water Act claims. The City agreed to develop and implement an Exfiltration Abatement Program in order to minimize the risk of wastewater leaking out of the sanitary sewer pipes and entering into an adjacent storm sewer system. The Consent Decree requires the City to identify all High-Risk sanitary sewer pipes and repair or rehabilitate these pipes within the next ten (10) years. High-Risk pipes are sewer segments that meet all of the following conditions:

1. Sewer segments that are constructed of vitrified clay or reinforced concrete,
2. Sewer segments that cross above a storm pipe, or are above and within ten (10) feet horizontally of storm pipes,
3. Sewer segments that are fifty years or older with a condition assessment that identifies that the Segment has a medium to severe crack, offset joint, or some other high grade structural defect per the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certificate Program (PACP) standards, and,
4. Sewer segments that are above the water table.

Sanitary sewer segments that are considered High-Risk will be repaired/rehabilitated by the City at an average of 6.5 miles annually and total 65 miles over the 10-year term of the Consent Decree.

C. Pump Stations

The average age of the City's 18 sanitary sewer pump stations is approximately 28 years. These facilities are listed in Table 2. The standard design-life of the mechanical and electrical components of pump stations are 10 to 25 years. Due to the wide range of pumping capacity for each station, the total cost to rehabilitate and/or replace these pump stations can range between $2 million and $10 million each.

Generally, the structural rehabilitation of a pump station would prolong the life and improve the reliability of the system; similarly, the upgrades of the electrical, mechanical and data communication components will allow staff to monitor these pumps remotely and also reduce the maintenance effort required to keep these pump stations operating correctly.

Table 2 – Sanitary Pump Stations

Sanitary Pump Stations and Other Facilities (Alphabetical Order)		
Name	Year Built	Year Rehabilitated/Status
Pump Stations		
1. Basking Ridge	2006	Pumps replaced by DOT in 2011
2. Brookside	2013	New pump station
3. Communication Hill	2007	To be abandoned with Communications Hill Phase 2 development
4. Gateway	1988	Initial assessment in progress; possible abandonment/rehabilitation
5. Happy Hollow Zoo	1967	Pump replaced in 2009
6. Junction	1979	*
7. Lamplighter	1984	Force main condition assessment completed in 2008
8. Margaret	1952	*
9. Montague	1978	Design for replacement completed and pending easement acquisition
10. Nordale	1960	Rehabilitated in 2018
11. Nortech	1983	Condition assessment in progress
12. Padres	2012	New pump station constructed in August 2012
13. Riddle Park	1982	*
14. San Felipe	1989	Abandonment in progress
15. Spreckles	1975	Rehabilitated in 2014
16. Tea Garden	1986	Rehabilitated in 1997
17. Willow	2003	Construction for replacement in progress
18. Zero Waste (Los Esteros)	2014	*
Other Facilities (Odor Control Stations)		
19. Canoas Ferrous Chloride Injection	1962	Rehabilitated in 2009 / Construction for tank replacement in 2018
20. Canoas Soil Bed Filter	1994	Planned for assessment
21. Zanker Soil Bed Filter	1995	Condition assessed in 2008; planned for re-assessment

* - No information on status

In FY 2017-18, approximately $1.7 million was allocated to rehabilitate and upgrade various pump stations.

Willow Pump Station - This pump station was constructed in 2003 to temporarily replace a damaged creek-crossing siphon until a new siphon was built. Staff later determined that upgrading the existing pump station would be a better alternative compared to constructing a new siphon due to constructability and the stringent permitting process. In 2016, the U.S. Army Corps of Engineers in coordination with the Santa Clara Valley Water District informed the City that they have a plan to widen the creek, thus staff had extended the completion of the design to allow further

coordination with the Army Corps. The project was awarded in June 2017 and is currently in construction with a scheduled completion date set for November 2018.

Nordale Pump Station - The Nordale sanitary pump station is a subterranean station built in 1960 and is in need of replacement. The work to be performed for this project consists of demolition of the existing pump station, construction of a new pump station structure (the wet well) and pump station systems. The project was awarded in November 2016 and was completed in May 2018.

Montague Sanitary Pump Station - This station is located at the southeast corner of the intersection of Montague Expressway and North First Street. Built in 1978, the pump station has been offline since the mid-1980s as the pumping capacity of this station has been accommodated by the Lamplighter pump station to the north. The upgrade of Montague Sanitary Pump Station is necessary to accommodate anticipated future development in the area. Staff completed the design and along with Real Estate they are in negotiations with the new property owner adjacent to the existing pump station with hopes of obtaining a larger easement for the pump station expansion. The project is scheduled has been adjusted for award in 2019.

D. Interceptor and Capacity Improvements

The interceptor system between the RWF and approximately Empire Street consists of four parallel large diameter (60 to 90-inch) sewers. The locations of various reaches of the system are designated by Phases I through VII, with Phase I located furthest to the north entering the RWF and Phase VII located near Empire Street accepting flows from major trunk sewers. This system conveys approximately 80 percent of the total wastewater flows to the RWF. A schematic diagram of the interceptor system is shown in Figure 4 below.

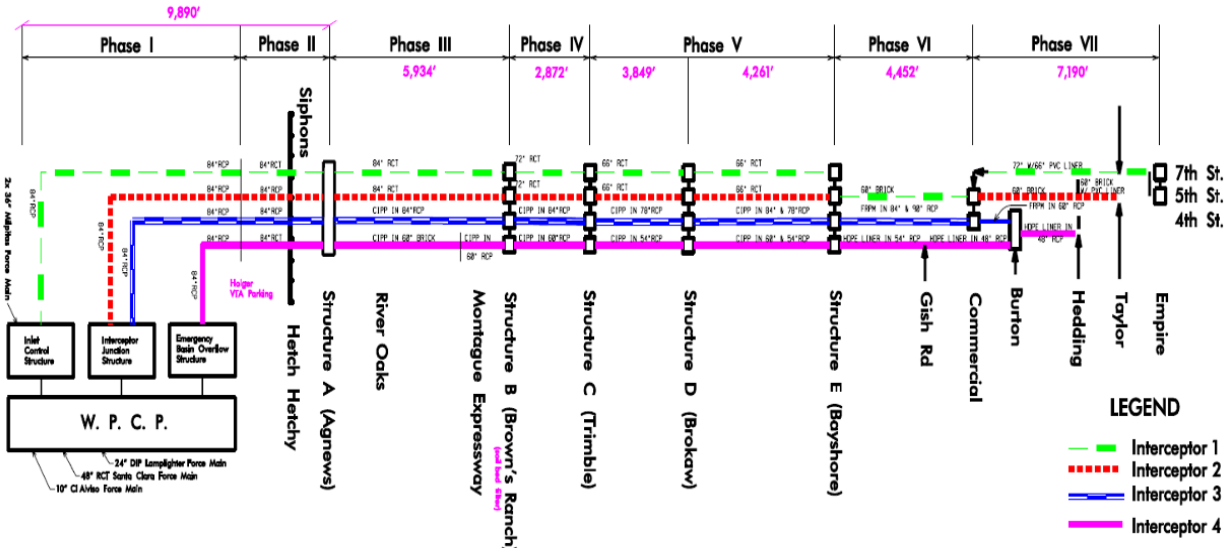


Figure 2 - Sanitary Sewer Interceptor System

Capacity improvements to the interceptor system between the RWF and U.S. Highway 101 (Phases I through V) have been completed over the last two decades. The primary focus for future

improvement to the system is being done through the on-going design of the Phase VI reach along North Fourth Street between U.S. Highway 101 and Commercial Street. This project consists of upsizing approximately 5,000 feet of 54-inch diameter sewer to 84-inch. The 2017-2021 Adopted CIP allocates $40.0 million for this project. The project was awarded in May 2018 and is currently in the design process. Staff and the Design Build Contractor are in the process of acquiring a Caltrans permit for the work related to the U.S. Highway 101 undercrossing.

Initiation of design for the Phase VII capacity improvements are scheduled for an out-year. When completed, the interceptor system will maintain enough capacity to allow any one of the parallel interceptors to be taken out of service during dry weather for maintenance and/or rehabilitation.

During the FY 2017-18, several large capital improvement projects had achieved their beneficial use status including the 30-inch Old Bayshore Supplement, Capital Brokaw III, and Williams Road – Moorpark Avenue projects. In addition, several capacity improvement projects were awarded or are in construction including the Rincon Avenue-Virginia Avenue Sanitary Sewer Improvement, and the Trimble Road and Amberwood Lane Sanitary Sewer Improvement projects. These projects, totaled $22.4 million, were developed to upsize the existing sanitary sewer system to eliminate capacity deficiency in the system.

E. Sanitary Sewer Condition Assessment Program

The Sanitary Sewer Condition Assessment (SSCA) Pilot Program was initiated in 2010. The original pilot project utilized closed circuit television (CCTV) to video and collect data on a 46 mile representative sample of the City's 2,030 mile sanitary sewer system. The results from this study were used to determine the funding need and road map for the comprehensive SSCA program.

In 2013, the City procured a sanitary sewer asset management software program to develop risk assessments based on an array of the sewer's physical properties and consequence of failure. Since early 2014, City staff utilized the software, along with available CCTV data and maintenance records, to analyze collected data and determine the risk level of the City's sanitary sewer system. Based on the risk levels, staff has developed a priority list of the sanitary sewer basin areas to assess with a goal to inspect all small diameter pipes in ten years.

Table 3 – CCTV Inspection

Year	Fiscal Year	Miles of Pipeline (from SSCA and CIP)	Miles of Pipeline (from DOT)
0	2010 Pilot and Prior to 2011	123.5	No data
1	2011-2012	26.4	No data
2	2012-2013	222.4	45.2
3	2013-2014	40.8	43.8
4	2014-2015	79.1	67.7
5	2015-2016	91.9	80.7
6	2016-2017	179.7	71.0
7	2017-2018	53.1	84.0
	Total	**816.8 (40%)**	**303.4 (15%)**

** Chart numbers has been revised to reflect actual inspection information in the InfoMaster database. Previous reports were based on funding and contract award period.*

Four CCTV projects were awarded in fiscal year 2017-2018. Data for those projects have not been finalized and entered in the InfoMaster database as of this report. The miles will be adjusted accordingly in the next report.

In an effort to minimize sanitary sewer repairs on a newly paved roadway, as part of the Pavement Maintenance Program, DOT video inspected all sanitary sewer lines on these roadways and repaired any damages before they were paved.

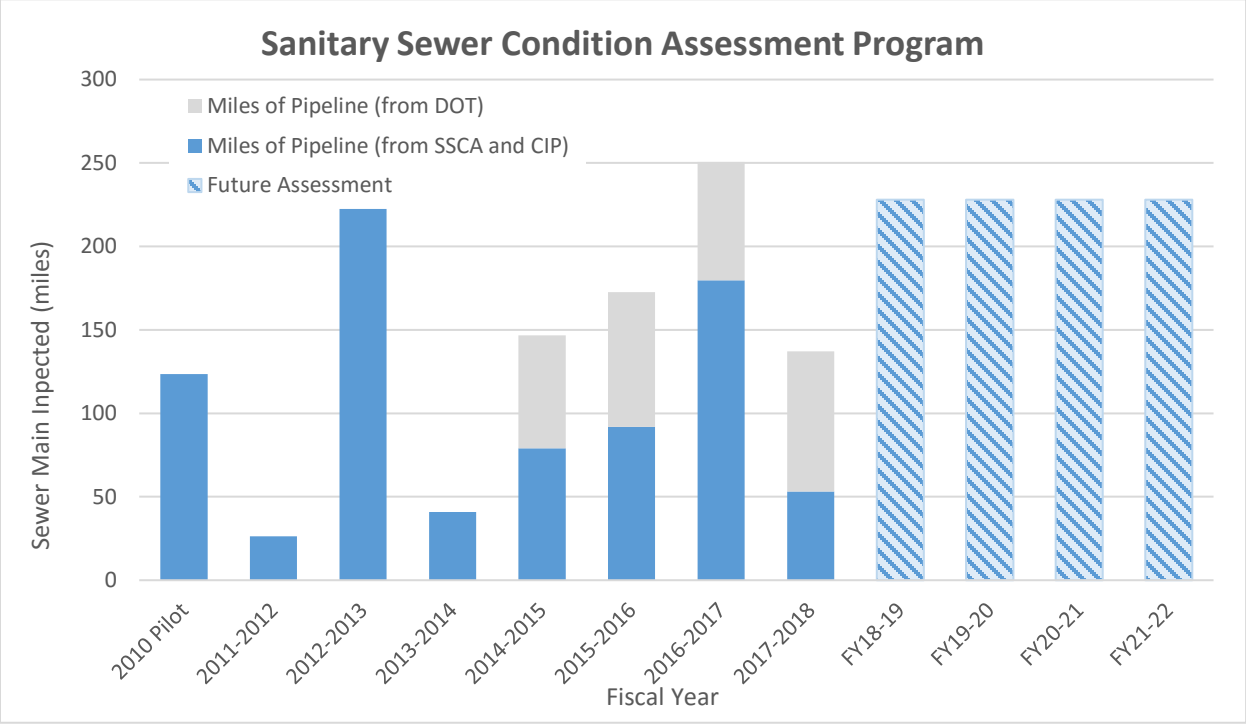


Figure 3 - Sanitary Sewer Condition Assessment

Data collected through CCTV contracts is used in developing the City's Sanitary CIP program to proactively repair or rehabilitate these pipelines before they fail. A decision tree model has been created to determine the most appropriate repair or rehabilitation techniques for each pipeline. The model will be used to forecast and determined the total cost to repair and rehabilitate the City's sanitary sewer system. As larger data sets are gathered through each year's CCTV contracts, more analysis can be performed to better adjust the decision tree model.

In FY 2017-18, the City awarded four Sanitary Sewer Condition Assessment (SCCA) projects totaling 104 miles and $3.6 million in FY 2017-18.

As of the end of FY 2017-18, the City had video inspected 55% of the system and is on track to complete the first video inspection cycle in FY 2021-22.

F. Master Planning

1. Capacity Management

a. Sanitary Sewer Master Plan Studies (Capacity Assessments)

Sanitary sewer collection systems are designed to convey anticipated peak flows, based on current and predicted/planned future demands under both dry weather and design storm conditions. The State Water Resources Control Board requires sewer agencies to prepare System Evaluation and Capacity Assurance Plans to evaluate the capacity of key system components and hydraulic deficiencies and to develop capacity enhancement measures.

The citywide Trunk Sanitary Sewer Master Plan completed in early 2013 evaluated the sewer system of 10-inch and larger in diameter. Subsequently, the City also completed a detailed sewer master plan study for the North San Jose Development Policy Area that reviewed the capacity of the entire system of this area. The Master Plan Studies incorporated Census 2000 population, non-residential water use, latest development and General Plan 2040 land uses, and flow information.

The Master Plans identified more than 340,000 feet of the pipes with capacity deficiencies of the system for both existing and future land use conditions. and recommended a sewer capacity improvement CIP program to address these deficiencies. The CIP program included 105 cost-effective capacity assurance pipeline improvement projects to install 200,000 feet of relief sewers totaling approximately $188 million (2013 dollars). The program level CEQA of the citywide Trunk Sewer Master Plan was approved as an Addendum to the Envision San Jose 2040 General Plan in June 2015.

In early 2018, City staff procured a master agreement for consultant services for the next phase of master plan study (Phase III) – expanding the trunk system model to include all smaller diameter (6-inch and 8-inch) pipes of the City's sewer system. The multi-year Phase III master plan project will develop an all-pipe model network; incorporate recent manhole survey information, 2010 census population, and latest water use data; review and calibrate the model using available

temporary and long-term flow monitoring data; and evaluate deficiencies of the small diameter sewers.

b. Master Plan Project Confirmation and Implementation

Flow monitoring during the Phase I and Phase II master plan studies was limited to large trunk line locations. Assumptions were made to estimate flow at upstream locations or the neighboring sewer sheds where flows were not measured. Therefore, each master plan recommended project not previously confirmed by flow monitoring data for existing condition will first be validated through flow monitoring activities before being programed in to the 5-year CIP. Normally, flow monitoring includes a period of rainy weather to verify the wet weather deficiencies.

Sometimes, wet seasons did not bring larger storms during the flow monitoring period. In these cases, only dry weather flow condition of the deficiency could be confirmed and flow monitoring would be repeated in the next wet season. Through these project confirmation exercises, some projects were confirmed, some were determined to be un-necessary, and other would need to wait for sufficient wet weather flow data for further evaluation.

Since the completion of the Sewer Master Plans, based on the prioritization results, staff developed a 20-year plan for CIP project implementation. The 20-year plan is updated with the results from on-going project confirmation activities.

The color-coded map below (Figure 7) provides the project timeline in the 20-year plan along with completed projects and projects in design and construction phases.

To date, the City has incorporated 39 master plan projects into the 5-year CIPs, including nine projects as part of public improvements in development projects.

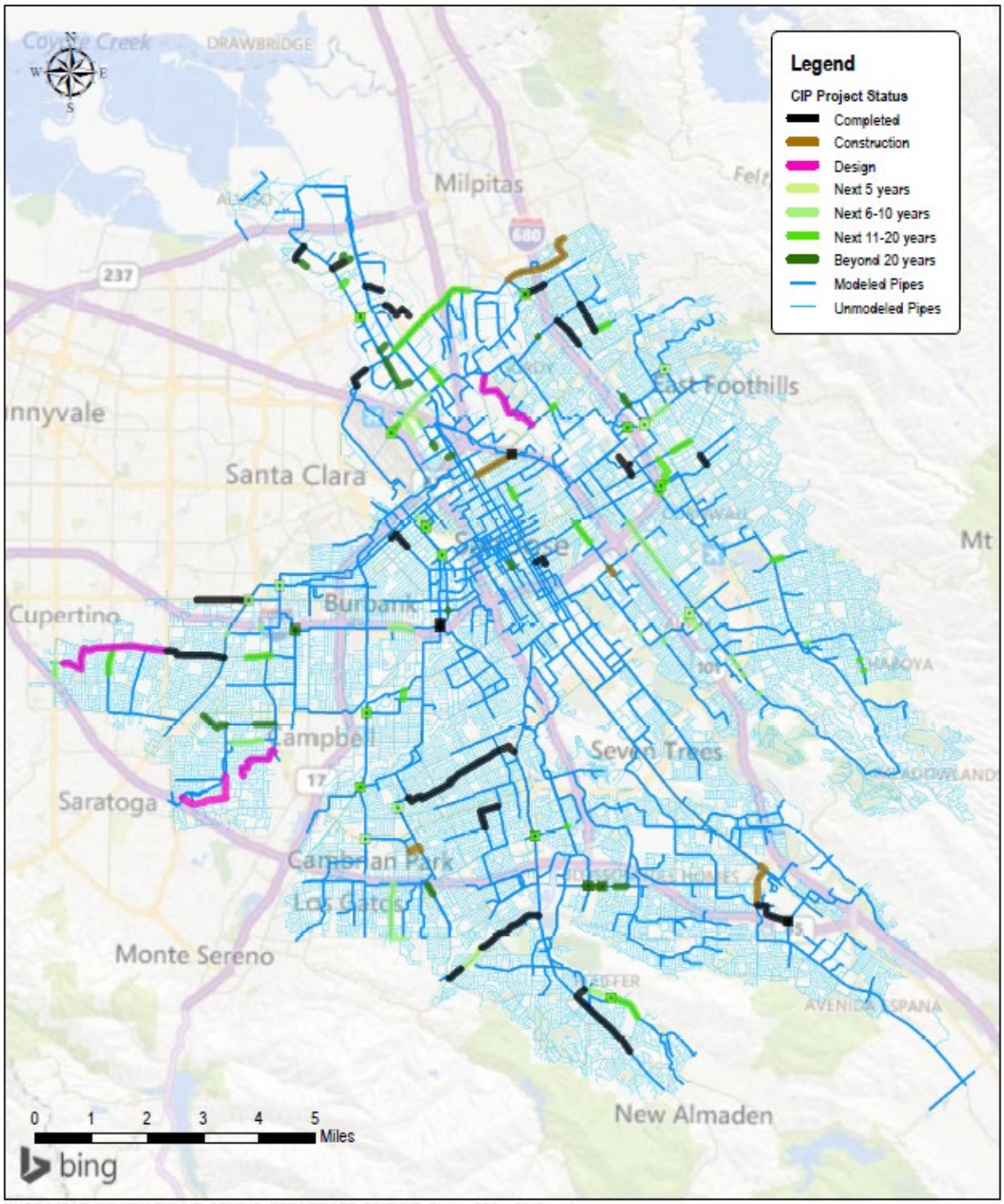


Figure 4 - Master Plan Sanitary Sewer Improvement Locations and Status

c. Flow Monitoring Program

The City has a long-term flow/rainfall monitoring system that consists of 54 flow meter and 16 rain gauge sites. The flow/rainfall monitoring system provides the City with near real-time flow/rainfall measurements via the ADS IntelliServe web-based data collection and review

platform. Each flow meter is equipped with a real-time high flow alarm system that timely reports high flow conditions to City staff. High flow alarms occurred for the Downer-Canoas System since February 2017 had triggered investigation on sewer condition of this system. As a result of the investigation, staff put together a sewer cleaning project to remove grit accumulated since last cleaning project in 2007.

In addition to the long-term flow monitoring system, temporary or short-duration meters were installed to collect flow data to confirm master plan recommended capacity projects, to assist the design of sewer improvement projects and the review of land use development projects, as well as to conduct inflow/infiltration investigation in high RDII response areas identified through the long-term monitoring program. In January 2017, eighteen flow meters were installed for the wet season to collect sewer flows for project confirmation purpose. An additional ten depth meters were installed in February to collect flow depth information to investigate odor issues in downtown near 7th Street and to assist in the design of a sewer improvement project to address the odor issue.

Monitoring of flow and rainfall at strategic locations are necessary to understand the hydraulic performance of the sewer system and changes in sewer flow over time, to develop an accurate correlation between rainfall and inflow/infiltration into the system, to establish the effect of the water conservation practice, and to provide additional data for on-going update, verification, and refinement of the hydraulic model.

2. Support for Economic Development

City staff from DPW, DOT and ESD have been working very closely with outside agencies such as VTA, and developers to provide review and assistance to resolve sewer capacity issues for many land use development projects.

Development projects may be discharging to a sewer with existing capacity deficiencies. The master plan study identified existing deficiencies in multiple locations of the sewer systems that serve the Midtown, Diridon, Downtown Transit Employment, and other urban village planning areas. A capacity improvement project - Lincoln Avenue & Savaker Avenue Sanitary Sewer Improvements (JLS-11) was constructed in December 2016 and will provide the needed capacity for the economic development of these growth areas.

A development project may cause or increase the capacity deficiency of an existing sewer system. In such case, City staff will perform modeling analysis and evaluate the degree of deficiencies, and determine the urgency of an improvement project. Some of these sewer improvements may be constructed by the developments which could receive credits and partial cost reimbursement towards the improvements.

During FY 2017-18, the City's capacity analysis determined that the following development projects would cause deficiencies or connect to an already deficient sewer downstream:

- 1495 Winchester Blvd. – Development would contribute flow to an existing deficiency in Forest Ave. and Cypress Ave. Master Plan Phase II has identified CIP project FSR-12 to address the deficiency.

- 2050 Southwest Expressway – Development would trigger a new deficiency in an 8-inch sewer line in Southwest Expressway. Master Plan team recommended an improvement project to upsize the downstream sewer line.
- Stevens Creek at Lopina – Development would trigger a new deficiency in an 8-inch sewer line in S. Kiely Blvd. Master Plan team recommended an improvement project to address the deficiency.
- 2881 Hemlock Ave. - Development would contribute flow to an existing deficiency in Forest Ave. and Cypress Ave. Master Plan Phase II has identified CIP project FSR-12 to address the deficiency.
- Flea Market Phase III – Development was conditioned to construct a 21-in line from Berryessa Road to Oakland Road (BKW-7). Development increased its scope, and analysis found that the new scope would causes deficiency in planned siphon. Master Plan team requested developer to re-design the siphon.

The cost share information based on the average dry weather flow ratios would be provided to the Development Services staff for the development's contribution toward these sewer improvement projects. All sewer improvement projects are required to be designed to convey flows generated by General Plan 2040 land use scenarios and to meet the City's sewer design standards.

IV. OPERATIONS AND MAINTENANCE

Funded directly from the Sewer Service and Use Charge Fund, the day-to-day maintenance and operations of the sanitary sewer collection system is primarily the responsibility of DOT. Functions performed by DOT generally include the following:

- Video inspection of, and cleaning and removal of grease, roots and other debris from the City's sewer lines, with a focus on local collector lines.
- Repairing localized failures and deficiencies in the City's sewer mains and lower lateral pipes with City-approved cleanouts.
- Inspecting, maintaining, and repairing pumps and other pump station facilities.
- Responding to and resolving reported sewer problems.

The primary goal of DOT's maintenance functions is to reduce or eliminate occurrences of Sanitary Sewer Overflows (SSOs) in which untreated sewage escapes the sewer system due to a sewer line blockage or other system malfunction. DOT has invested in and implemented a multi-year plan to greatly reduce the number and severity of SSOs that occur in the City each year. Specific elements of this plan include the following:

- Assigning specific cleaning frequencies (e.g. weekly, monthly, annually, etc.) to sewer line segments to prevent stoppages in known problematic areas.
- Performing sewer line inspections to identify needed cleaning, root control, and repairs.

- Managing the First Responder Program to ensure timely response to reported sewer problems in order to prevent and reduce the impact of SSOs.
- Optimizing the Computerized Maintenance Management System (CMMS) and analyzing the performance of the sewer system, identifying and planning effective maintenance strategies, and evaluating and managing the maintenance operations.
- Replacing obsolete and unreliable equipment and purchasing additional equipment to maximize the efficiency of the maintenance operations.
- Providing training for the sewer line cleaning crews.

Performance data and information from the last three fiscal years indicate that DOT's SSO reduction plan has been successful in reducing SSOs. Table 4 below highlights some of the results achieved by DOT over the past five years.

Table 4 – Performance Improvement Result

Key Indicator	FY 13-14	FY 14-15	FY 15-16	FY 16-17	FY 17-18
Number of SSOs	101	97	55	58	22
SSOs per 100 miles of pipe per year	4.6	4.3	2.4	2.5	1.1
Gallons of sewage spilled to surface water	22,266	49,188	35,018	19,318	3,920
Percent of reported sewer problems responded to within 30 minutes	74%	71%	68%	69%	66%
Percent of SSOs responded to within 30 minutes	86%	89%	81%	91%	86%
Miles of sewer lines cleaned	984	1035	993	936	942

Note: Prior to FY 2012-13, DOT's timeliness standard for responding to reported sewer problems was 4 hours.

The results show a downward trend in the number of SSOs, indicating that the investments and improvements made by DOT to reduce SSOs are paying off. The number of gallons of sewage lost to surface water also decreased significantly in FY 2017-18. The rate of response to reported sewer problems within 30 minutes has decreased slightly from a high in FY 2013-14, however the reduction may have been caused by increased traffic congestion, particularly during rush hours, which may be attributed to recent economic growth in the region.

Currently, DOT receives approximately $17.8 million in on-going funding each year to maintain and operate the sanitary sewer collection system. In FY 2015-2016, DOT was funded as a result of the River Watch Consent Decree with $300,000 for creation of a sewer lateral repair grant. The program is anticipated to launch in October of 2018. Going forward, DOT believes the performance of the sanitary sewer system and the productivity of maintenance staff will be

sustained with continuous investments in equipment, training, and personnel. Most notably, DOT will continue to enhance CMMS invest in additional technology. Staffing alignments will continue to be analyzed to optimize field productivity, data collection and overall sewer system management.

V. CONCLUSION

The Sanitary Sewer Capital Improvement Program continues to utilize strategic planning tools such as the Sanitary Master Plan and Condition Assessment program, in addition to input from our Operations and Maintenance partners in the Department of Transportation, to prioritize and implement improvements to the sanitary sewer system. Construction of these improvements will ensure safe and reliable sewer service to the current and future residents/businesses of San José and tributary agencies. Increasing regulatory oversight, reducing SSOs, and supporting economic development all require continued investment in active management, maintenance, and improvement of the City's 2,030 miles of sanitary sewer system. Increased capital funding for the sanitary capital program has increased our ability to maintain and enhance the system. The $32 million annual transfer which began in FY 2015-16, while still being short of the targeted revenue of $37 million per year, has allowed staff to deliver projects and clear up most of the backlogged repairs. The ending fund balance has been reduced significantly at the end of the year, and with the awarding the Phase VI interceptor project of over $42 million in FY 2017-2018, the accumulated ending fund balance has been further reduced.

- Seventeen (17) capital projects were awarded and nineteen (19) capital projects were completed to improve the capacity, restore the integrity and conveyance of the system, and/or reducing maintenance costs and the probability of SSOs and/or blockages.
- The Master Plan program has helped reduce the cost of development by providing efficiency in the sewer capacity review process and finding cost-effective measures to improve sewer capacity needed for land use development.
- 14,732 linear feet of structurally deficient sewer removed and replaced.
- 71,714 linear feet of moderately deteriorated sewers were rehabilitated.
- 137 miles of sewers were inspected by closed circuit television inspection.
- Two of the most deteriorated sanitary pump stations are in construction.
- The Sanitary Sewer Master Plan was continually updated and calibrated to develop and prioritize sanitary sewer capacity projects.
- The Condition Assessment program was developed and assists with development of a prioritized and proactive rehabilitation program.
- Over 942 miles of sewer lines were cleaned.
- The continued development of the Computerized Maintenance Management System and technology enhancements have contributed to planning effective maintenance strategies in order to maximize efficiency.