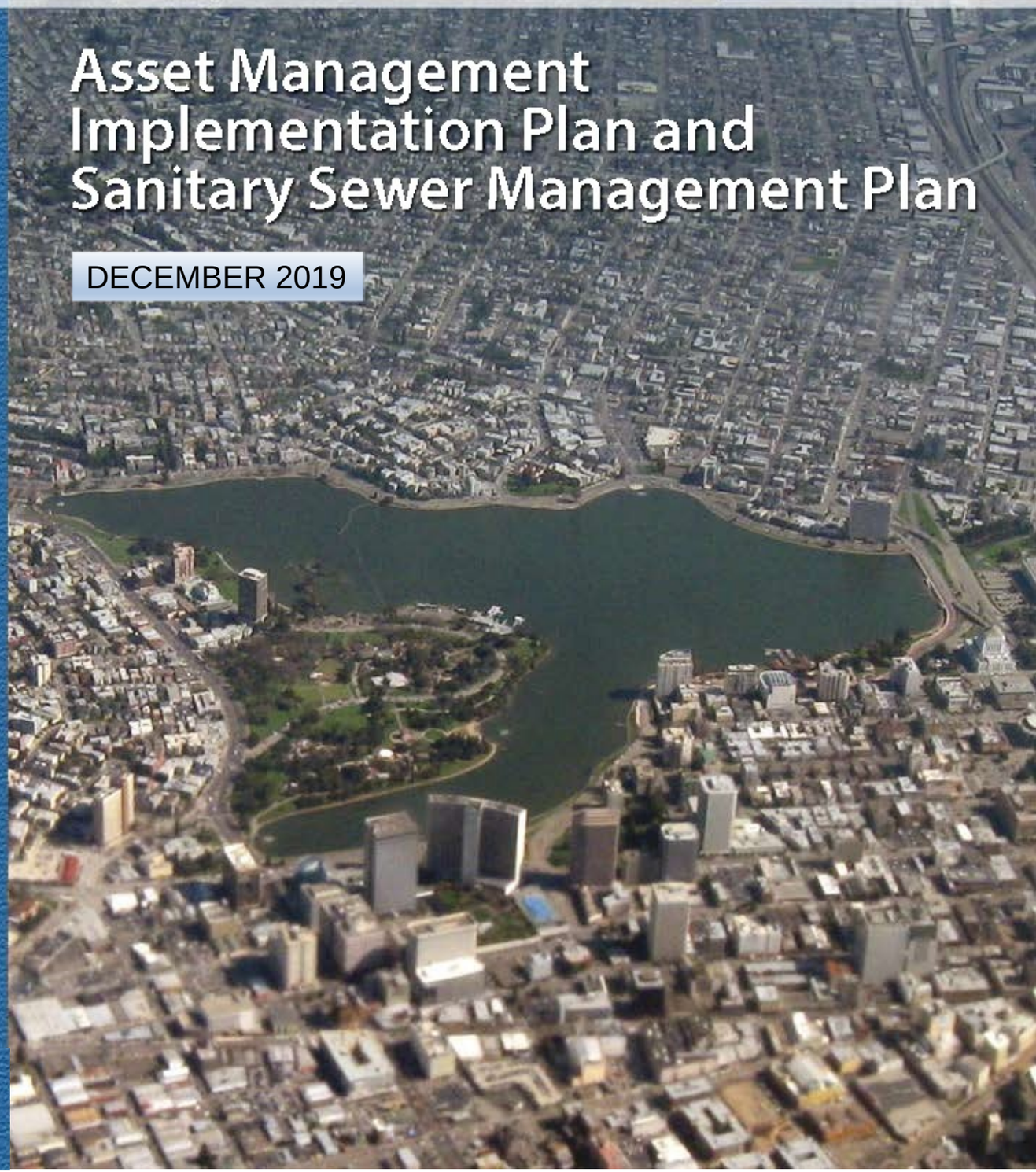
OAKLAND

Asset Management Implementation Plan and Sanitary Sewer Management Plan

DECEMBER 2019



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ASSET MANAGEMENT IMPLEMENTATION PLAN AND SEWER SYSTEM MANAGEMENT PLAN

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CITY OF OAKLAND

ASSET MANAGEMENT IMPLEMENTATION AND SANITARY SEWER MANAGEMENT PLAN

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EPA Final Consent Decree, Case 3:09-cv-95684-RS …….. Final Consent Decree
Ordinance Number 13080 (Private Sewer Lateral Ordinance) …….. PSL Ordinance
Standard Detail Drawings for Public Works Construction …… Standard Details
Sanitary Sewer Design Standards …… Sewer Design Standards
Oakland Municipal Code Section 13.08 ……..Chapter 13.08 - Building Sewers
Manual of Construction Management Practices……*Construction Manual*
Sanitary Sewer System General Waste Discharge Requirements (Order No. 2006-0003-DWQ) …… 2006 SSS-WDR
Monitoring and Reporting Program (MRP) Order No. WQ 2013-0058-EXEC …. 2013 MRP

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LIST OF ACRONYMS

ACEH - Alameda County Environmental Health
AMIP – Asset Management Implementation Plan
BEC - Bureau of Engineering and Construction
BMP – Best Management Practice
Cal/OSHA - California Occupational Safety and Health Administration
CAO – City Administrator's Office
CCTV – Closed Circuit Television
CD – Consent Decree
CDO - Cease and Desist Order
CIP – Capital Improvement Project
CITY – City of Oakland
CMMS – Computerized Maintenance Management System
CWEA – California Water Environment Association
CIWQS – California Integrated Water Quality System
DPW – Department Public Works
DS - Downstream
LACP - Lateral Assessment and Certification Program
LRO – Legally Responsible Official
EBMUD – East Bay Municipal District
EPA – Environmental Protection Agency
EBRPD – East Bay Regional Parks District
ESD – Environmental Services Department (City of Oakland)
FOG – Fats, Oils, and Grease
FSE – Food Service Establishments
GIS – Geographic Information System
GPM – Gallons per minute
WDR - General Waste Discharge Requirements (State of California)
I/I – Infiltration and Inflow
LS - Lift Station
MACP - Manhole Assessment and Certification Program
MH - Manhole
MRP - Monitoring and Reporting Program
NASSCO - National Association of Sewer Service Companies
NEC – National Electric Code
NEPA – National Environmental Policy Act
NPDES - National Pollutant Discharge Elimination System
O&M – Operations and Maintenance
OERP – Overflow Emergency Response Plan
OES - Office of Emergency Services (State of California)

OFD – Oakland Fire Department
OMC – Oakland Municipal Code
OPW – Oakland Public Works
PACP - Pipeline Assessment & Certification Program
PSL – Private Sewer Lateral
QA/QC – Quality Assurance/Quality Control
OPW – Oakland Public Works
REP - Registered Environmental Professional
RTSP – Regional Technical Support Program
RWQCB – Regional Water Quality Control Board
SOP – Standard Operating Procedure
SSMP – Sanitary Sewer Management Plan
SSO – Sanitary Sewer Overflow
SSORP – Sanitary Sewer Overflow Response Plan
SWRCB - State Water Resources Control Board
UBC – Uniform Building Code
USEPA – United States Environmental Protection Agency
WDID – Waste Discharger Identification Number
WDR – Wastewater Discharge Requirements

EXECUTIVE SUMMARY

ASSET MANAGEMENT IMPLEMENTATION PLAN (AMIP)/ SANITARY SEWER MANAGEMENT PLAN (SSMP)

This Asset Management Implementation and Sanitary Sewer Management Plan (AMIP/SSMP) has been developed to meet the requirements of the Environmental Protection Agency's (EPA) Consent Decree (Case 3:09-cv-00186-RS) entered on September 22, 2014; the State Water Resources Control Board's Sewer System Management Plan (SSMP), as defined by the Statewide Sanitary Sewer Waste Discharge Requirements, Order No. 2006-0003-DWQ (WDR); the Statewide Monitoring and Reporting Program, Order No. WQ 2013-0058-EXEC (MRP); and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0038512 Waste Discharge Requirements for the City of Oakland Sanitary Sewer Collection System, Order No. R2-2014-0049. It replaces the plan adopted by the City of Oakland Council on March 3, 2015.

Introduction. The City of Oakland (City) owns and operates a wastewater collection system that serves approximately 400,000 people and includes 101,000 service connections. The collection system encompasses approximately 933 miles of gravity sewer mains, over 1 ¼ miles of pressurized sewer mains, and 11 wastewater pump/lift stations. The system also contains approximately 1,000 miles of private sewer laterals owned and maintained by private property owners. The City's collected wastewater is conveyed to the East Bay Municipal Utility District's (EBMUD's) wastewater interceptor system, which transports it to EBMUD's main wastewater treatment plant for treatment. The treated effluent is ultimately discharged to San Francisco Bay.

Condition Assessment. The City primarily uses Closed Circuit Television (CCTV) for routine inspection of its sewer system. CCTV is also used when responding to a Sanitary Sewer Overflow (SSO), or when blockages or structural damage in sewer mains is encountered. CCTV is performed by City personnel, using City-owned materials and equipment. Following completion of a CCTV inspection, each pipe segment is rated using the National Association of Sewer Service Companies' (NASSCO) PACP Quick Rating System. The Consent Decree (CD) requires the City to assess the condition of at least ten percent (10%) of the total linear footage of its sewer mains (approximately 93 miles) per fiscal year, on a cumulative basis.

Maintenance Holes at either end of a sewer segment are also inspected, in a manner and frequency that complies with CD mandates.

The City visually inspects each of its eleven (11) pump stations weekly.

Property owners are required to inspect and, if necessary, repair private sewer laterals (PSLs) upon transfer of title; if remodeling in excess of $100,000; or if there is a change in water meter size. Where applicable, the City's building permit process requires EBMUD to issue a Certificate of Compliance confirming that PSLs meet a minimum standard before a building permit is finalized.

Inflow Identification. A previous study of Oakland's sewer system identified areas where stormwater, which is supposed to be captured through the stormwater collection system, finds its way into the sanitary sewer system. The City has developed a targeted rehabilitation and replacement plan for select sub-basins where high levels of inflow and infiltration (I/I) have been identified. The City also works with EBMUD to evaluate other sub-basins within the system, annually. Additional rehabilitation, replacement, and/or repair of sewer pipes found to be defective is prioritized, accordingly.

In addition, the City monitors water levels at twelve (12) locations where capacity problems may exist, and will take corrective action as required.

Operations and Maintenance. The CD requires the City to clean at least 184 miles of sewer main, annually, and in a manner that is effective in preventing the occurrence of SSOs. Any sewer pipe that experiences more than one SSO in a three-year period is considered high risk, and is placed on a minimum twelve-month cleaning cycle, until there are no recurring SSOs within a three-year period.

In addition, the City utilizes chemical root control treatment to help reduce SSOs caused by excessive root intrusion into sewer pipes. Fifty miles of sewers with heavy root growth is treated with root growth retardant, annually.

Overflow Emergency Response Plan (OERP). City crews respond to reports of SSOs with a goal of initiating response within sixty minutes of receipt of the report by the Oakland Public Works (OPW) Call Center, Oakland Fire Dispatch, or a designated third-party. Every attempt is made to keep SSOs from reaching receiving waters, and to report to regulatory agencies, as required. The City's SSO Emergency Response Plan was originally approved by EPA on November 30, 2010 and a revised OERP has been added to Appendix C and formally adopted by the City Council along with this revision.

Capital Improvements. The CD requires the City to rehabilitate twelve miles of sewer mains per year, from specified sub-basins, and on a cumulative basis. An additional mile of sewers must be rehabilitated from anywhere in the City. Prior to re-connection to the rehabilitated sewer main, lower portions of the PSLs are inspected and rehabilitated (if necessary) at the same time as the sewer mains.

Minor repairs that are within the City's in-house capabilities are placed on the Sewer Maintenance Repair List and are generally completed within one year of identification.

The City uses the statewide Standard Specifications for Public Works Construction ("Green Book") for installation, rehabilitation, and repair of sewers. The Bureau of Design and Construction (BDC) maintains an annual sewer on-call construction contract to provide quick response to emergencies and other urgent repair requests.

Data Management. The City uses CityWorks Computerized Maintenance Management System (CityWorks CMMS), to track work on all sewer system assets. CityWorks CMMS is linked to the City's Geographic Information System (GIS).

Program Monitoring. Beginning September 30, 2015, and by September 30th of each year thereafter, the City of Oakland will submit Annual Reports to the EPA summarizing implementation of this AMIP/SSMP. In addition, the City will conduct an internal audit of the AMIP/SSMP every two (2) years from the original adoption date of the AMIP/SSMP by the City Council which occurred on March 3, 2015. The findings of the audit will result in the preparation of an Audit Report that will be made available to the City Council, the State/Regional Water Board, and U.S. EPA, upon request.

Under the direction of the Director of Public Works, compliance with the AMIP/SSMP will be reviewed, evaluated, and reported, as required by the Consent Decree and the WDR. The City will update and re-certify the AMIP/SSMP at least once every five (5) years from the original adoption date, or when significant changes are made. Any significant changes will be submitted to the Public Works Committee for recommendation and to the City Council for approval and adoption.

Communication Plan. The Consent Decree and all Annual Reports since 2014 have been placed on the City's web site. This AMIP/SSMP is also available on the City website. The Annual Report will be presented to the City Council's Public Works Committee, annually, as part of continued discussion about the condition of the City's sewer

infrastructure.

1 INTRODUCTION

1.1 COLLECTION SYSTEM OVERVIEW

The City of Oakland (City) owns and operates a collection system that serves approximately 420,000 residents within the City (Figure 1.1). The collection system includes approximately 932 plus miles of gravity main, one half mile of force main, and seven wastewater pump stations. There are approximately 101,000 private lateral sewer connections to the City sewer collection system.

The City's service area includes the Port of Oakland (Port), which owns and maintains approximately 39 miles of gravity sewers, laterals, and force mains.
These systems discharge to the City's collection system. The Port sewer system infrastructure is governed by a separate governing body and is a completely separately enrolled sewer system under the State General Waste Discharge Requirements.

Oakland does not own or operate wastewater treatment facilities. The City's collected wastewater is conveyed to EBMUD's wastewater interceptor system, which transports it to EBMUD's main wastewater treatment plant for treatment. The treated effluent is ultimately discharged to San Francisco Bay.

1.2 PURPOSE

Oakland's original Asset Management Implementation and Sanitary Sewer Management Plan (AMIP/SSMP) was developed in 2014 and adopted by the City Council in March 2015 to meet both the requirements of the Environmental Protection Agency's (EPA's) Stipulated Order Docket No. CWA 309(a)-10-009 filed on March 15, 2011 and the State Water Resources Control Board's SSMP and Monitoring and Reporting Program (MRP) requirements in Order No. 2006-0003-DWQ including the September 2013 Monitoring and Reporting Program Order Number WQ 2013-0058-EXEC. That AMIP was conditionally approved by EPA on December 28, 2012.

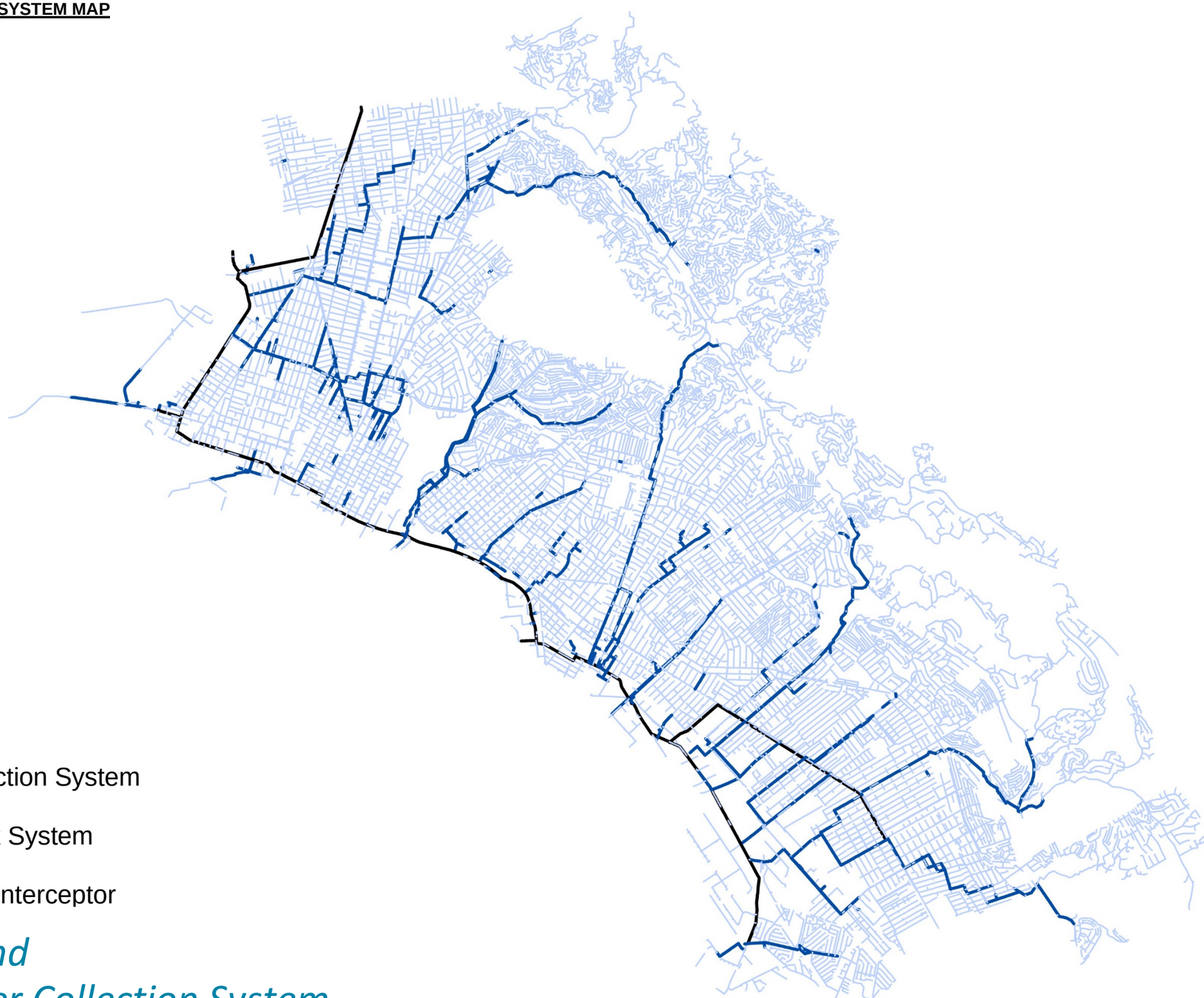
This AMIP/SSMP has been prepared as required by Paragraph 81 of Consent Decree Case 3:09-cv-05684-RS with an Effective Date of September 22, 2014, which states:

"The City shall revise its AMIP as necessary, so that it is consistent with the requirements of this Section, and to ensure that Repair and Rehabilitation projects continue to be adequately identified and planned for..."

The AMIP serves as the basis for maintaining and reporting on the maintenance of Oakland's sewer collection system.

FIGURE 1.1 COLLECTION SYSTEM MAP

CITY OF OAKLAND



SS Collection System

SS Trunk System

EBMUD Interceptor

City of Oakland
Sanitary Sewer Collection System

1.3 GOALS

The goal of the AMIP/SSMP is to document, build upon, and strengthen the City's ongoing sewer management program so that the City continues to:

- anage, operate, and maintain all parts of the collection system;
- Comply with requirements of Consent Decree, Case 3:09-cv-95684-RS;
- Minimize the frequency and impact of Sanitary Sewer Overflows (SSOs);
- Reduce infiltration and inflow (I/I); and
- Comply with all applicable regulations including the City's National Pollutant Discharge Elimination System (NPDES) permits and the California General Waste Discharge Requirements for Sanitary Sewer Systems (GWDR).

1.3.1 Performance Measures

The follow performance measures shall be used to measure progress toward goals listed above:

- Minimize the frequency and impact of SSOs by:
  - Cleaning 184 miles of sewer mains annually;
  - Treating 50 miles of sewers per year to control root growth;
  - Cleaning high frequency lines annually or more frequently, if required;
  - Repairing acute defects in the sewer collection system within 12 months of identification;
  - Monitoring water levels at 12 locations for capacity assurance; and
  - Completing improvements to pump stations by October 15, 2022.
- Reduce I/I by:
  - Rehabilitating 63,360 linear feet (12 miles) of sewer mains per year in specified sub-basins;
  - Rehabilitating an additional 5280 linear feet (one mile) of sewer mains per year anywhere in the City;
  - Inspecting and documenting condition assessment of sewer mains at an annual rate of no less than 10 percent per year;
  - Inspecting and repairing or rehabilitating, as necessary, all sewer laterals owned by City in specified sub-basins;
  - Taking steps to eliminate high priority sources of inflow and rapid infiltration and
  - Performing other work required by the consent decree and/or the NPDES and WDR.

1.4 ORGANIZATION

The City is governed by an elected Mayor and an elected City Council. The City Council consists of seven members elected from Council Districts and one member elected from the City at-large. A City Administrator (CAO) manages the day-to-day administrative operations of the City.

Director of Oakland Public Works - Reports to the CAO and is responsible for managing the City's infrastructure, including the wastewater collection system. S/he directs the development and implementation of all wastewater program goals, objectives, policies, and service priorities. S/he monitors and evaluates the efficiency and effectiveness of the AMIP/SSMP, and ensures that the agency maintains appropriate organizational structure, adequate staffing, effective administrative systems, and necessary funding. S/he also identifies opportunities for improvement, and increased coordination and collaboration with other wastewater collection system stakeholders.

Assistant Director of Public Works - Receives policy direction from the Director of Public Works, and exercises direction over Principal Civil Engineers, Division Managers, Management Assistant, and other supervisory, professional, technical, and clerical staff, in the planning, organization, development, and implementation of wastewater program(s). S/he directs the preparation of a variety of complex studies and reports relating to current, and long-range planning needs, for engineering, operation, and maintenance services for the wastewater collection system. S/he directs the preparation and administration of the budget for management of all City of Oakland wastewater assets.

Figure 1.2 shows the organizational hierarchy of responsibility for the City's wastewater collection system.

FIGURE 1.2 ORGANIZATIONAL CHART FOR IMPLEMENTATION OF AMIP/SSMP

CITY OF OAKLAND

ASSET MANAGEMENT IMPLEMENTATION PLAN & SANITARY SEWER MANAGEMENT PLAN

1.5 RESPONSIBILITIES

Regulatory Compliance Officer – Is responsible for ensuring the compliance of the wastewater program with the 2014 Final Consent Decree, Waste Discharge Requirements for Sanitary Sewer Systems, and the City's NPDES permit.

Principal Engineer, Wastewater Engineering Division – Functions as the primary engineer for, and is the designated asset manager of, the wastewater collection system. S/he oversees the planning, development, and implementation of the City's inflow/infiltration reduction program activities. S/he provides technical support for the City's SSO reduction program activity.

Principal Engineer, Construction Management Division – Is responsible for management of all wastewater program construction projects.

Operations Manager, Sewer Maintenance Division – Is responsible for the operation and maintenance (O&M) of the wastewater collection system. S/he is also responsible for planning, developing, and implementing SSO reduction, and emergency response, program activity.

Planner/Scheduler, Sewer Maintenance Division – Coordinates and plans the materials, staffing, and equipment resources needed for maintenance, inspection, and repair of the wastewater collection system. S/he schedules, monitors, assesses, and reports on the work order system(s). S/he performs asset management work assessments and assists with development of the Annual Report.

Supervisor I/II, Sewer Maintenance Division - Plans, organizes, directs, and reviews all the programs and activities related to the operation, inspection, maintenance, and repair of the City's wastewater collection system. S/he assists with budget preparation and monitoring; supervises, trains, and evaluates assigned staff.

Maintenance Leader/Worker, Sewer Maintenance Division – Performs a variety of duties in sewer maintenance including maintenance, inspection, and repair of the wastewater collection system. S/he functions as primary first responders for SSO, other sewer emergencies, and complaints.

Information for key City personnel responsible for the WDR Section D13 responsibilities in the AMIP/SSMP is shown in Table 1.3.

TABLE 1.3 Positions Responsible for Implementing SSMP sections

SSMP Element No.	SSMP Element Description	AMIP-SSMP Section Reference	Responsible Position
-	Introduction		Regulatory Compliance Officer
1	Goal	Section 1	Director, Public Works
2	Organization	Section 1, Appx C	Director, Public Works
3	Legal Authority	Section 1	Director, Public Works
4	O&M Program	Section 3.1	Operations Manager, Sewer Maintenance
5	Design & Performance Provisions	Section 4.1-4.7	Principal Civil Engineer, Wastewater Engineering Division
6	Overflow Emergency Response Program	Section 3.4	Operations Manager, Sewer Maintenance
7	FOG Control Program	Section 3.3	Principal Civil Engineer, Wastewater Engineering Division
8	System Evaluation and Capacity Assurance Plan	Section 4.5	Principal Civil Engineer, Wastewater Engineering Division
9	Monitoring, Measurement, and Program Modifications	Section 5.1-5.3; Section 7.4	Principal Civil Engineer, Wastewater Engineering Division; Operations Manager, Sewer Maintenance
10	SSMP Program Audits	Section 5.4	Regulatory Compliance Officer
11	Communication	Section 7.1-7.3	Director, Public Works
SSMP - Adoption	SSMP Adoption Documents	App A –	Regulatory Compliance Officer
SSMP - Changes	SSMP Change Log	App B –	Regulatory Compliance Officer
-	Audit Reports	-	Regulatory Compliance Officer

As of October 2019 the City has designated the staff positions identified in Table 1.4, as Legally Responsible Officials (LRO) for certification of all reports documents and CIWQS overflow in the State of California overflow database. The City has also designated the following positions as Data Submitters who are responsible data entry and documentation support lo the LRO for all information and data required by the WDR and MRP:

TABLE 1.4 City of Oakland WDR Designated Officials

Designated Person	Position Title	Legally Responsible Official	Data Submitter
Jason W. Mitchell	Director of Public Works	X	
Tyree A. Jackson	Compliance Officer	X	
Robert Kennedy	Interim Operations Manager	X	
Johnny Ray Nicks	Supervisor II	X	
Ameal McLaurin	Supervisor II	X	
Al Swithenbank	Sewer Maintenance Planner		X
Joseph Knight	Supervisor I		X

1.6 LEGAL AUTHORITY

Chapter 13 of the City of Oakland's Municipal Code (OMC) provides the City with the legal authority to:

- Collect sewer service charges to pay for operation and maintenance of the sewer collection system;
- Install, test, and inspect connections to the sewer system;
- Control I/I; and
- Enforce City standards and prohibitions.

Table 1.5, below is provided for easy reference to specific sections of the OMC supporting the sanitary sewer program.

TABLE 1.5 Legal Authorities

Requirement	Oakland Municipal Code Reference OMC Sections 13.02 to 13.08
Prevent illicit discharges into its sanitary sewer system (examples may include I/I, stormwater, chemical dumping, unauthorized debris and cut roots, etc.);	13.08.160 - .180
Require that sewers and connections be properly designed and constructed	13.08.040 13.08.340 13.08.420 13.08.500 - .530
Ensure access for maintenance, inspection, or repairs for portions of the lateral owned or maintained by the Public Agency;	13.08
Limit the discharge of fats, oils, and grease and other debris that may cause blockages	13.08.160 - .170
Enforce any violation of its sewer ordinances	1.08 to 1.28 13.08.580 et seq..

2 CONDITION ASSESSMENT

This chapter describes the status of the City of Oakland's (City) sanitary wastewater collection system assets and provides information on how the City assesses the condition of those assets.

2.1 INVENTORY – USE OF A GEOGRAPHIC INFORMATION SYSTEM

2.1.1 Inventory

Oakland's sanitary sewer collection system serves approximately 400,000 people and includes approximately 929 miles of gravity sanitary sewer mains ranging in size from 6 to 81 inches in diameter. The sewer system connects to approximately 101,000 residential units, commercial units, industrial units, and public authorities. Additionally, all sanitary sewer flows from the City of Piedmont are collected and transported through Oakland's collection system. Two basins flow from Oakland into the City of Emeryville's sewers and one flows into the City of Berkeley's sewers.

Figure 2.1 shows the breakdown of the sewer collection system by year of installation. The sizes and distribution of the active sewers within Oakland are described in Table 2.1.

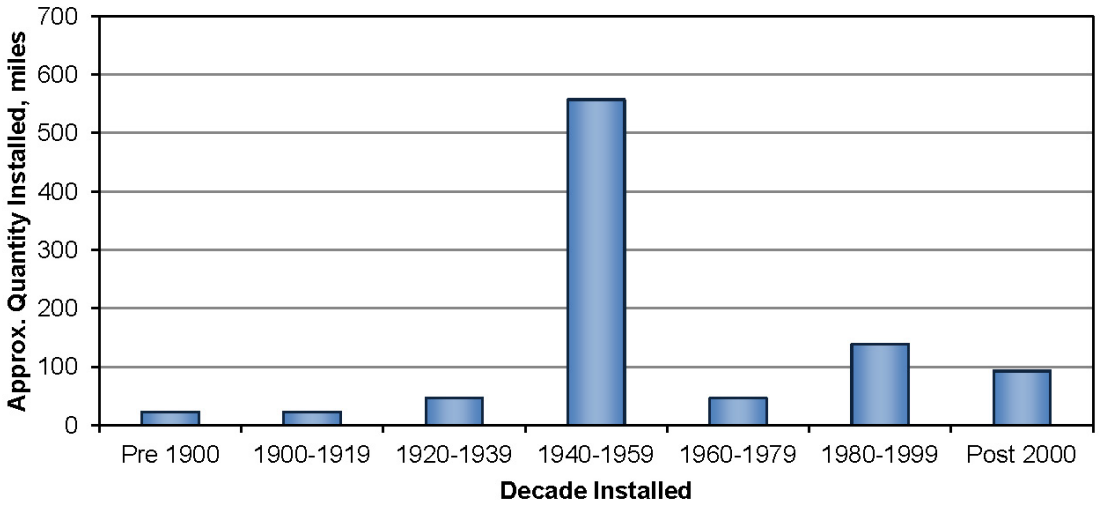


FIGURE 2.1 CITY OF OAKLAND SS INSTALLATIONS BY YEAR

TABLE 2.1 Size and Distribution of Active Gravity Sewer Mains, City of Oakland

Pipe Diameter (in.)	Length (ft.)	Length (mi.)	Percentage of System (%)
6	588,464	111.5	12.00%
8	3,258,843	617.2	66.20%
10	382,926	72.5	7.80%
12	213,217	40.4	4.30%
14	37,700	7.1	0.80%
15	67,328	12.8	1.40%
16	34,868	6.6	0.70%
18	102,229	19.4	2.10%
21	76,792	14.5	1.60%
24	57,929	11	1.20%
27	9,528	1.8	0.20%
30	19,369	3.7	0.40%
33	10,395	2	0.20%
36	23,615	4.5	0.50%
42	8,794	1.7	0.20%
48	12,078	2.3	0.20%
54	7,810	1.5	0.20%
60	3,240	0.6	0.10%
66	6,604	1.3	0.10%
80	1,245	0.2	0.00%
Total	**4,922,974**	**932.4**	**100.00%**

The City also operates eleven pump stations as described in Table 2.2

TABLE 2.2 Pump Station Asset Information, City of Oakland

Pump Station	Type	Capacity (gpm)	In Service Date	Standby Power	Location	No. of Pumps	Pump HP	Pump Mfg
Denton Place	Submersible	145	7/1/1995	None	5610 Denton Place	2	5	Flygt
Fallon Street	Dry Pit	2,111	7/1/2017	On-site	900 Fallon Street	2	30	Flygt
Hegenberger Road	Submersible	2,191	1/1/2019	On-site	201 Hegenberger Rd	2	30	Flygt
Parkridge Drive	Dry Pit	150	1/1/1969	None	5195 Parkridge	2	10	Flygt
Tidewater Avenue	Submersible	1,230	7/1/2015	Auxiliary	4575 Tidewater	2	20	Flygt
Shepherd Canyon Road	Submersible	78	7/1/2016	On-site	6000 Shepherd Canyon Road	2	5	Flygt
Skyline Blvd	Submersible	114	1/1/1995	None	13150 Skyline Blvd	2	5	Flygt
OAB Station No. 1	Submersible	1,500	7/1/2018	Auxiliary	309 Burma Road	2	10	Flygt
OAB Station No. 2	Submersible	1,200	7/1/2018	Auxiliary	2090 Maritime Street	2	10	Flygt
OAB Station No. 3	Submersible	1,200	7/1/2018	Auxiliary	1390 Maritime Street	2	10	Flygt
OAB Station No. 4	Submersible	1,200	7/1/2018	Auxiliary	712 Maritime Street	2	10	Flygt

2.1.1.1 Pump Station Force Mains

Each of the eleven pump stations includes discharge mains that operate under pressure until discharged into the gravity sewer system. The force main assets are as described in Table 2.3.

TABLE 2.3 City Force Main Asset Information

Pump Station Name	Install Date	Length, Lineal Feet	Size, Inches	Material
Denton Place	Unknown	230	4	DIP
Fallon Street	Unknown	150	10	DIP
Hegenberger Road	Unknown	310	8	DIP
Parkridge Drive	Unknown	660	4	DIP
Tidewater Avenue	Unknown	255	8	DIP
Shepherd Canyon Road	Unknown	265	6	DIP
Skyline Blvd	Unknown	360	3	PVC
OAB Station 1 (Burma Road)	2017	2,734	8	DIP
OAB Station 2 (Maritime Street)	2017	1,010	8	DIP
OAB Station 3 (Maritime Street)	2017	710	8	DIP
OAB Station 4 (Maritime Street)	2017	610	8	DIP
Total		**7,294**		

2.1.2 Collection System Map and Geographic Information System

The City's sanitary sewer and storm water collection system are mapped in detail and integrated into a Geographic Information System (GIS). Drawings are available in both hard copy and electronic format and are made available to the City's Engineering and Maintenance staffs and to other public and utility agencies as needed. The maps are continually updated and are the basis for the development of construction plans for the City's capital improvement projects. Maps are used by Maintenance staffs to plan cleaning, inspection and maintenance work in the field and both map systems assist emergency response staff during wastewater overflow events

2.2 SEWER MAIN AND MAINTENANCE HOLE INSPECTION

Paragraph 83.c. of the Consent Decree states: *"For the duration of this Consent Decree, the City of Oakland shall inspect, using CCTV or other equally effective methods, and document condition assessment of, its Collection System at an annual rate of no less than 10 percent of its Sewer Mains per Fiscal Year (at least 485,760 feet of Sewer Main per Fiscal Year) on a cumulative basis (e.g. 242,880 feet by June 30, 2014; 728,640 feet by June 30, 2015; 1,214,400 feet by June 30, 2016; etc.). When the City inspects a Sewer Main, it shall also inspect all Maintenance Holes associated with that Sewer Main."*

2.2.1 Sewer Main Inspection.

The City uses Closed Circuit Television (CCTV) for most routine sewer main inspections. In addition, cleaning crews call for CCTV inspection when responding to a Sanitary Sewer Overflow (SSO) or when they encounter blockages or structural damage in sewer mains. CCTV is performed by in-house crews using City-owned equipment. Additional support from contractors is sometimes used in areas where specialized services are required or when short-term demand exceeds available City resources.

Other visual means are used when sewer mains are too small or otherwise unable to accommodate CCTV cameras. In the future, the City may choose to use ultrasonic inspection for large sewer mains to determine the depth of sediment to determine if additional cleaning is required.

Sewer Mains are inspected:

- On a proactive sub-basin by sub-basin basis to assess the condition of sewer mains and to gather/confirm data for the City's GIS;
- Before street paving and before and after sewer main rehabilitation;
- After an SSO to determine the cause of the SSO and identify corrective action; and

- Based on a random sample of sewers that have been cleaned or treated with root foam as a quality-control measure.

Paragraph 83.c. of the Consent Decree requires the City to inspect and assess the condition of at least 728,640 feet (138 miles) of sewer mains by June 30, 2015, and 485,760 feet (92 miles) per fiscal year thereafter, on a cumulative basis. As explained in its recently submitted Annual Report, the City is ahead of schedule in meeting this requirement.

2.2.2 Sewer Main Condition Assessment

Following completion of a CCTV inspection, each pipeline segment (the length of pipe between two manholes) is evaluated using the National Association of Sewer Service Companies' (NASSCO) Pipeline Assessment Certification Program (PACP) Quick Rating system. PACP uses defect severity grades (both structural and O&M) for observed conditions in a pipe segment. PACP defect grades are described in Table 2.3.

TABLE 2.4 NASSCO PACP Defect Grades

Defect Grade	Defect Title	Description
5	Immediate Action	Defects requiring immediate action.
4	Poor	Severe defects that will become Grade 5 defects within the foreseeable future.
3	Fair	Moderate defects that will continue to deteriorate.
2	Good	Defects that have not begun to deteriorate.
1	Excellent	Minor defects.

The PACP Quick Rating system expresses the number of occurrences of the two highest severity grades in a pipe segment. A four-character score is used to characterize a pipe segment's structural, O&M, and overall condition as follows:

- The first character is the highest severity grade occurring along the pipe segment.
- The second character is the total number of occurrences of the highest severity grade. If the total number exceeds 9, then alphabetic characters are used as follows: 10 to 14, A; 15 to 19, B; 20 to 24, C; etc.
- The third character is the next-highest severity grade occurring along the segment.
- The fourth character is the total number of the second-highest severity grade occurrences, derived as in item 2 above.

As an example, a pipeline segment with 17 grade 4 defects and 7 grade 2 defects would be given/assigned a PACP Quick Rating of 4B27. If a pipe segment has only one defect grade, the first two characters specify the grade and quantity of defects, and the last two characters are 00. A pipe segment with no defects would have a PACP Quick Rating of 0000.

The condition assessment is performed by a technician certified in accordance with PACP standards. Post-cleaning inspections to assess the quality of sewer cleaning work do not need to be performed by a PACP-certified technician, although the City may choose to do so on a case-by-case basis.

2.2.3 Maintenance Hole Inspection

Maintenance holes at either end of a sewer segment are inspected at the time the segment is inspected. Results of the inspection are entered into CityWorks CMMS.

2.2.4 Pump Station and Force Main Inspection

The City's collection system includes eleven pump stations ranging in capacity from less than 78 gallons per minute (gpm) to 2,191 gpm, as shown in Table 2.2.

In 2007, the City developed a Pump Station Evaluation Plan that evaluated the collection system pump stations and identified needed improvements for each station. The following standards were used as comparison benchmarks in the evaluation of the collection system pump stations:

- State Water Resources Control Board (SWRCB) General Wastewater Discharge Requirements (WDRs)
- Uniform Building Code (UBC)
- California Occupational Safety and Health Administration (CalOSHA)
- National Fire Protection Act (NEPA) 820
- National Electric Code (NEC)
- National Electrical Manufactures Association (NEMA), Standard 250/Underwriters Laboratories (UL)

The Pump Station Evaluation Plan included detailed assessments, evaluations, and recommended improvements for each pump station. It also provided preliminary cost estimates for the recommended improvements. The recommended improvements were then prioritized based upon the level of risk to life safety, public health, and regulatory requirements.

The City visually inspects each pump station weekly. Inspection results are entered into CityWorks CMMS.

The City owns and operates approximately 1.3 miles of force main in the collection system, as detailed previously in Table 2.3. Inspection of force main piping occurs during the repair and improvement of each associated pump station.

2.2.5 Computerized Maintenance Management System

The City uses CityWorks CMMS, a Computerized Maintenance Management System, to plan and schedule sewer inspection activities, to record completed work, track customer complaints and sewer overflow activities. When a sewer line segment has been inspected, a work order is created in CityWorks CMMS with information about which assets were inspected. The City uses GraniteXP for CCTV inspection and keeps an up-to-date database that is readily accessible.

2.3 PUBLIC ENTITY SEWER LATERAL INSPECTION AND NOTIFICATION

Paragraph 84.e. of the Consent Decree states: *"In the event the City identifies a property owned by a Public Entity or the State or federal government that has an identified defective Sewer Lateral, the City shall report the address of the property and the name of the owner to Plaintiffs as part of its Annual Report, and provide a description of the PSL defect."*

To date, the City has not identified any defective sewer laterals owned by public entities. The City will comply with this requirement and, when identified, include defective sewer laterals owned by public entities in its Annual Report.

2.4 PRIVATE SEWER LATERAL INSPECTION AND REPAIR

2.4.1 Private Sewer Lateral Inspection Required on Sale or Remodeling of Private Property.

Paragraph 84.b. of the Consent Decree states: *"…the City of Oakland shall include as part of its application process for building permits and approvals for construction or remodeling projects in excess of $100,000 a requirement that the applicant submit a valid Compliance Certificate." (*from East Bay Municipal Utility District [EBMUD])

On July 21, 2011, the Oakland City Council passed ordinance number 13080 C.M.S. the Consolidate Regional Private Sewer Lateral Ordinance stating that it is the responsibility of the property owner to perform all required maintenance, repairs and replacement of the upper and lower building sewer lateral in accordance with EBMUD's and the City's ordinance requirements. The new ordinance is available at:

http://www.eastbaypsl.com/eastbaypsl/doc/RegionalPSLOrdinance.pdf

A statement of roles and responsibilities between the City and EBMUD for the implementation of East Bay Regional Private Sewer Lateral Program is available at http://www.eastbaypsl.com/eastbaypsl/.

A property owner is required to obtain a "Compliance Certificate" for the sewer lateral prior to transferring the property title, obtaining any permit for the construction or significant

modification of the property, or obtaining an approval for a change in size of the water service meter. Compliance Certificates are issued by EBMUD and are valid for 20 years from the date of issuance for complete replacement of the private sewer lateral, and 7 years for compliance resulting from a repair or testing without a repair. A Compliance Certificate confirms that the sewer lateral serving the subject property is in good condition and is not a source of infiltration or inflow of rainwater.

The property owner is responsible for all work required for the certification of the private sewer lateral (PSL) in accordance with EBMUD's procedures. All repair and replacement work must conform to the City's standards and permit requirements.

In the near future, the City will amend its existing ordinance to make these requirements apply to privately owned upper sewer laterals only. Lower laterals will be rehabilitated as part of the City's sewer main rehabilitation program as described in the Consent Decree.

Paragraph 84.c further states: *"The City…shall document, in spreadsheet format the building permits issued during the Fiscal Year, the certificates of occupancy issued, and whether a Compliance Certificate was submitted prior to issuance of the certificate(s) of occupancy."*

The City has and will continue to report this information as part of its Annual Report.

2.4.2 Repair of Defective Private Sewer Laterals Identified by City Forces

Paragraph 85.a. of the Consent Decree states: *"Within 90 days of identifying a Sewer Lateral as defective the City of Oakland shall notify the owner in writing…"*

Occasionally, sewer maintenance workers responding to reports of SSO's, sewer blockages, or pavement subsidence encounter defects in private sewer laterals.

These defects are reported to Engineering and Right-of-Way Management Division personnel who issue Notices to Abate to private property owners within 90 days and take other enforcement actions in accordance with the Public Works Code and the Consent Decree. Defects identified and enforcement actions are reported as part of the City's Annual Report.

2.4.3 Education and Outreach Program

Paragraph 85.b of the Consent Decree states:

"The City of Oakland shall assist EBMUD in the development, pursuant to Paragraph 32 above, of an education and outreach program encouraging Sewer Lateral owners to inspect and, if necessary Repair or Rehabilitate Sewer Laterals before owners are required to under the Regional or Local Ordinances."

The City will work with EBMUD to implement this program.

2.5 INFLOW IDENTIFICATION

2.5.1 Completed Smoke Testing

Based on the Environmental Protection Agency's (EPAs) Stipulated Order, during 2012–2014 the City smoke-tested certain sewer sub-basins identified with high levels of inflow/infiltration. Results of the smoke testing were analyzed, and capital rehabilitation or replacement projects were designed for defective pipelines. In addition, notices were sent to the owners of private properties which were suspected sources of inflow and infiltration.

2.5.2 EBMUD's Regional Technical Support Program (RTSP)

Paragraph 87 of the Consent Decree states: *"In lieu of further implementation of the inflow identification portions of the IIRP* [Inflow Identification and Reduction Program]*, the City shall cooperate with EBMUD's implementation of the Regional Technical Support Program."*

As part of the RTSP, "*EBMUD shall give formal notification of the identified sources of Inflow and Rapid Infiltration in a letter to Oakland, and a copy to Plaintiffs, no later than September 30th of each Year. EBMUD's formal notification to the City shall include the physical location of each source, whether the source is in sub-basins 80-111 or 80-011, a description of the source and the defect and an estimate of the expected Inflow and Rapid Infiltration reduction into Oakland's Collection System of the source if eliminated." (Paragraph 28.b.)*

The City shall:

- Review the list of sources provided by EBMUD;
- Classify the sources as Linear, Non-Linear or Private sources;
- Designate which of the sources are High Priority; and
- Submit a formal notification to Plaintiffs of the City's determination regarding the above items by December 31st of each year.

High Priority Sources shall be eliminated within 24 months of the December 31st formal notification.

2.6 CAPACITY MONITORING

In response to the EPA's Stipulated Order, the City developed a hydraulic model that allowed a determination of the available capacity in the existing collection system and identified sewer main segments where capacity improvements may be needed in the future. The flow data from both the City and EBMUD's metering programs was used in the development, calibration, and validation of the City's hydraulic computer model. The

hydraulic model showed collection system capacity was adequate, although potential capacity deficiencies were identified at eleven locations. None of those locations had experienced capacity related Sanitary Sewer Overflows.

To assure no capacity related SSO's occur at these locations and at a twelfth location identified by EPA, Paragraph 89.a. of the Consent Decree states *"The City of Oakland shall monitor the water level in Maintenance Holes at the following locations:*

i. San Pablo at 60th Street

ii. San Pablo at 62nd Street

iii. Stanford Avenue at Gaskill Street

iv. 27th Street at Vernon Avenue

v. Harrison Street at 27th Avenue

vi. Grand Avenue at Harrison Street

vii. 19th Street at Jackson Street

viii. Park Boulevard at Spruce Street

ix. 18th Avenue at 4th Avenue

x. Maybelle Avenue at Masterson Street

xi. 76th Avenue at Garfield Avenue

xii. Trestle Glen at Creed Road."

The City has installed electronic maintenance hole (MH) covers at these twelve locations to monitor the level of flow at each MH and notify maintenance staff when the water level rises within three feet of the MH rim. Maintenance staff responds to these alarms to prevent SSO's at these locations.

If the water level in any of these MH's rises to within one foot of the rim due to lack of capacity, the City is required to increase capacity of the affected main within 24 months of the incident. This sewer main replacement is further discussed in Section 4.5 of this AMIP.

3 OPERATIONS AND MAINTENANCE

3.1 SEWER MAINTENANCE

This section incorporates and replaces the Sewer Cleaning and Inspection Work Plan, which was submitted to the Environmental Protection Agency (EPA) in March 2011. The objectives of this sewer cleaning plan are to:

- Reduce Sanitary Sewer Overflows; and
- Comply with the sewer cleaning regulatory requirements in EPA's Consent Decree.

Sewer maintenance crews perform maintenance duties with the following priorities:

- Reports of sanitary sewer overflows;
- High Frequency ("Hot Spot") cleaning;
- Customer service requests;
- Requests for CCTV inspection from Engineering group; and
- Scheduled preventive maintenance.

3.1.1 Sewer Cleaning Methods

The City uses industry best practices to identify which cleaning methods are most effective.

For gravity sewers up to 15 inches in diameter, the most effective sewer cleaning method is the use of a high-velocity cleaner (hydro-flushing), or a mechanical rodding machine used on a preventive maintenance schedule.

For gravity sewers over 15 inches in diameter, large flow-volume hydro-jetting nozzles used on a preventive maintenance schedule, are effective in maintaining optimal operation.

3.1.2 Sewer Cleaning Quality Assurance/Quality Control

Quality assurance/quality control (QA/QC) is an essential element of the City's sewer cleaning program. The effectiveness of the cleaning program in meeting its stated objectives is directly related to the quality of work being performed. For this reason, the City's new sewer cleaning quality control program includes the following:

- Operator Training: The City's sewer system maintenance staff receives training through the California Water Environment Association's (CWEA) Collection System Maintenance Certification Program for future Grade 1 thru 4 Collection System certification. Key City staff also receives training from the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP). In addition, periodic classroom and field training covering cleaning methods, proper tool selection, and proper reporting of cleaning findings/observations

is provided to maintenance staff on an on-going basis.

- Post-Cleaning CCTV Inspection: For QA/QC the City's Sewer Maintenance Planner will select two percent of the cleaned pipes at random and inspect them with CCTV. If any pipes are found to be inadequately cleaned, the City will correct the deficiencies within 30 days and re-inspect the pipe. This process will continue until the line has passed its post-cleaning CCTV inspection. In addition, if deficiencies are found the City will immediately increase its random QA/QC inspection to four percent.

  Note: Since the City is required to inspect the entire collection system within ten years, the City's post-cleaning CCTV inspection QA/QC will effectively approach 100 percent.
- Data Analysis: The City analyzes its computerized maintenance management system (CMMS) data related to the sewer cleaning program on a continuing basis to provide decision makers with the relevant data on the quality and effectiveness of recent sewer cleaning activities.

3.1.3 Staffing Duties

The City of Oakland's Sewer Maintenance Division has five types of work crews, with each crew receiving assignments daily. The type and number of work crews in the Sewer Maintenance Division are:

- Five hydro-flusher cleaning crews;
- Four power-rodding cleaning crews;
- Three complaint/hand rodding crews;
- Five closed circuit television (CCTV) inspection crews;
- Two construction crews; and

Three hydro-flusher crews are assigned to one of three work zones within the city for preventive maintenance activities; the fourth and fifth crews operate citywide to handle complaints. Hydro-flushers (high-velocity cleaners) are the most effective tools for removing grease blockages and debris.

Three power-rodding crews are assigned to one of three work zones within the city for preventive maintenance activities; the fourth crew operates citywide to handle complaints. Mechanical power rodders are the most effective tools for removing root blockages and debris.

Three complaint/hand rodding crews are assigned to one of three work zones within the city. Each complaint crew responds to all complaints received within their zone. These crews also perform Hand Rodding as preventive maintenance on sewer easements. Work on easements is primarily related to root removal since no mechanical devices can be used for this operation.

Three CCTV inspection crews are assigned to one of three work zones within the city for preventive maintenance CCTV inspections; the fourth and fifth CCTV crews assist with engineering and design projects. All CCTV crews televise sewers after sanitary sewer overflows and as part of on-going sewer inspection.

Two construction crews are assigned to the East and West Oakland areas to make spot repairs to compromised sections of the collection system. The construction crews are also responsible for making repairs to existing manhole and lamp hole structures.

Note: All staff and crews are interchangeable; emergency response crews are on call 24/7.

3.1.4 Work Order System

The City's uses CityWorks CMMS to plan and schedule sewer cleaning activities, as well as to record completed work. When an individual sewer line segment has been cleaned, the data regarding the cleaning activity is recorded in the CMMS.

3.1.5 Sewer Cleaning Schedule

Paragraph 92.a. of the Consent decree states: *"The City of Oakland shall complete the cleaning of its entire Collection System program, which began in 2010, by June 30, 2018. By June 30, 2014, the City will have cleaned 1,900,800 feet of Sewer Mains. Beginning July 1, 2014, the City shall clean its remaining Sewer Mains at the rate of 739,200 feet per Fiscal Year on a cumulative basis (i.e., 2,640,000 by June 30, 2015; 3,379,200 by June 30, 2016; etc.)*

As of June 30, 2018, the city had cleaned the entire sewer system of 4,903,673 feet. The City is ahead of schedule in its sewer cleaning program and intends to continue complying with the consent decree requirement going forward for the cleaning of 998,933 linear feet per year.

3.1.6 Modification of Sewer Cleaning Frequency

The City is required to clean 971,520 feet of Sewer Main per Fiscal Year after July 1, 2018. However, selection of which sewer mains to clean will be at the discretion of the City. As the City implements this sewer cleaning program, modifications to the cleaning frequencies may be necessary. The conditions in any sanitary sewer system are dynamic and are subject to weather cycles, asset deterioration, asset damage, human activity, and other factors. Information obtained from the sewer inspection program, will be used by the City to optimize the frequency of sewer cleaning. Determination of which sewer mains need to be cleaned more, or less often will be determined based on analysis of the effectiveness of the cleaning programs throughout the various cleaning cycles. These changes will be incorporated in subsequent updates to this AMIP/SSMP.

3.1.7 High Frequency Cleaning

Paragraph 92.d of the Consent Decree states: *"The City of Oakland shall revise its hot spot cleaning program to ensure that Sewer Mains with a history of SSOs or that are at risk for SSOs are included in the program. For inclusion in the program, the City shall consider risk factors such as pipe age, pipe size, materials of construction, pipe slope, known poor condition from CCTV inspection, food service establishments that may contribute to*
FOG-related SSOs, and excessive root intrusion/grease/debris accumulation observed during cleaning. To the extent that the City does not have this information, it shall collect it during cleaning and CCTV inspection, and record it in its GIS. The City shall also add a location to its hot spot list if more than one SSO occurs within a 3-Year period at that location. Hot spot locations shall be cleaned at least annually, or more frequently based on information from previous cleanings or inspections. If an additional SSO occurs in the
3-Year period following inclusion on the hot spot list, the frequency of cleaning shall be increased. If no SSOs occur in a 3-Year period, the City may remove the location from its hot spot list.

Any sewer pipe that experiences a sanitary sewer overflow (SSO) is cleaned and televised (CCTV) as described in the City's Overflow Emergency Response Plan (Appendix C).

The City maintains a High Frequency Cleaning List that was revised in July 2017, and that is reviewed and updated, annually. Figure 3.1 contains a map of High Frequency Cleaning locations. Included in the High Frequency List, are locations that have been reviewed by Sewer Maintenance Workers, Lead Workers, and Supervisors, and are determined to required special attention. These locations are cleaned as frequently as necessary to minimize the occurrence of SSOs.

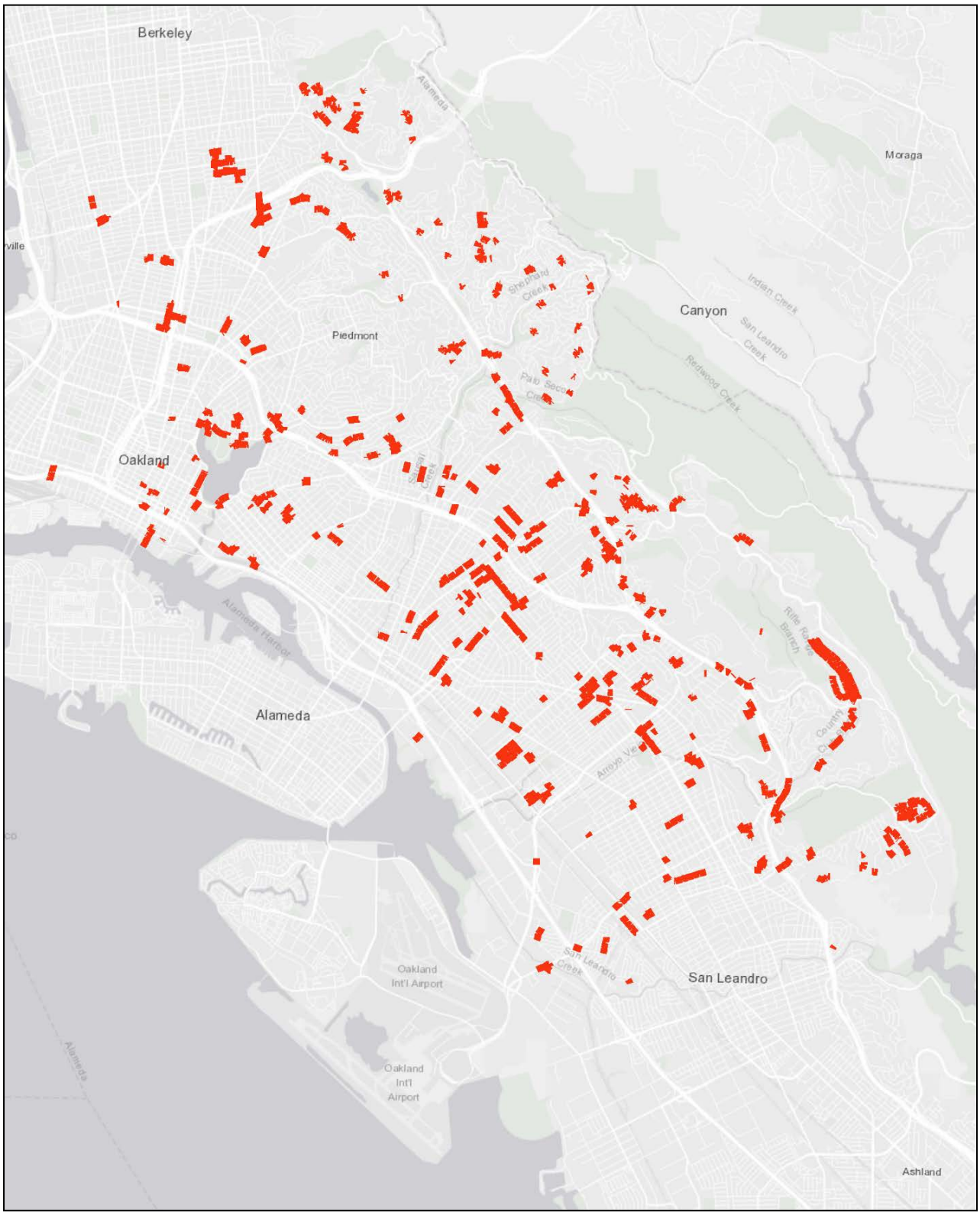


FIGURE 3.1 MAP OF HOTSPOT LOCATIONS

CITY OF OAKLAND
ASSET MANAGEMENT IMPLEMENTATION PLAN & SANITARY SEWER MANAGEMENT PLAN
PREPARED BY OPW SEWER TEAM

3.1.8 High Frequency Cleaning – See Section 3.1.7

3.2 ROOT CONTROL PROGRAM

The objectives of the Root Control Program are to:

- Focus the use of root control herbicides on gravity sewer line segments with severe levels of root intrusion;
- Apply root control herbicides where it is economically justified;
- Extend the useful life of gravity sewers by minimizing damage from roots; and
- Coordinate with EBMUD to minimize the impact of the root control herbicides on the downstream wastewater treatment processes and receiving waters.

Paragraph 92.e. of The Consent decree states:

"Root Cleaning. The City of Oakland shall treat Sewer Mains to control excessive roots in the Collection System for the duration of the Consent Decree. For the first three Fiscal Years, the City of Oakland shall treat a minimum rate of 264,000 feet of Sewer Mains per Fiscal Year on a cumulative basis (i.e., 264,000 feet by June 30, 2014; 528,000 feet by June 30, 2015; and 792,000 feet by June 30, 2016; etc.). By December 31, 2016, the City shall submit an evaluation of its root control program to EPA for review and approval. The evaluation shall consider the need to treat additional or fewer Sewer Mains to address results from cleaning and CCTV. The evaluation shall propose refinements to the City's root control program in order to ensure excessive roots in the Collection System are controlled. The City of Oakland shall not treat less than 264,000 feet of Sewer Mains on a cumulative basis without approval from EPA, after consultation with the Regional Board. Any proposal to treat less than 264,000 feet of Sewer Mains shall be made in Oakland's Annual Report as a proposed modification to its AMIP. The proposal, if approved, shall be a non-material modification subject to the requirements of Section XXIX (Modification)."

3.2.1 Root Control Methods

The City uses a private contractor to perform root control activities on the collection system. Root control contracts are awarded annually to the lowest responsible bidder. The City's approach to performing the root control activities is summarized in Figure 3.2.

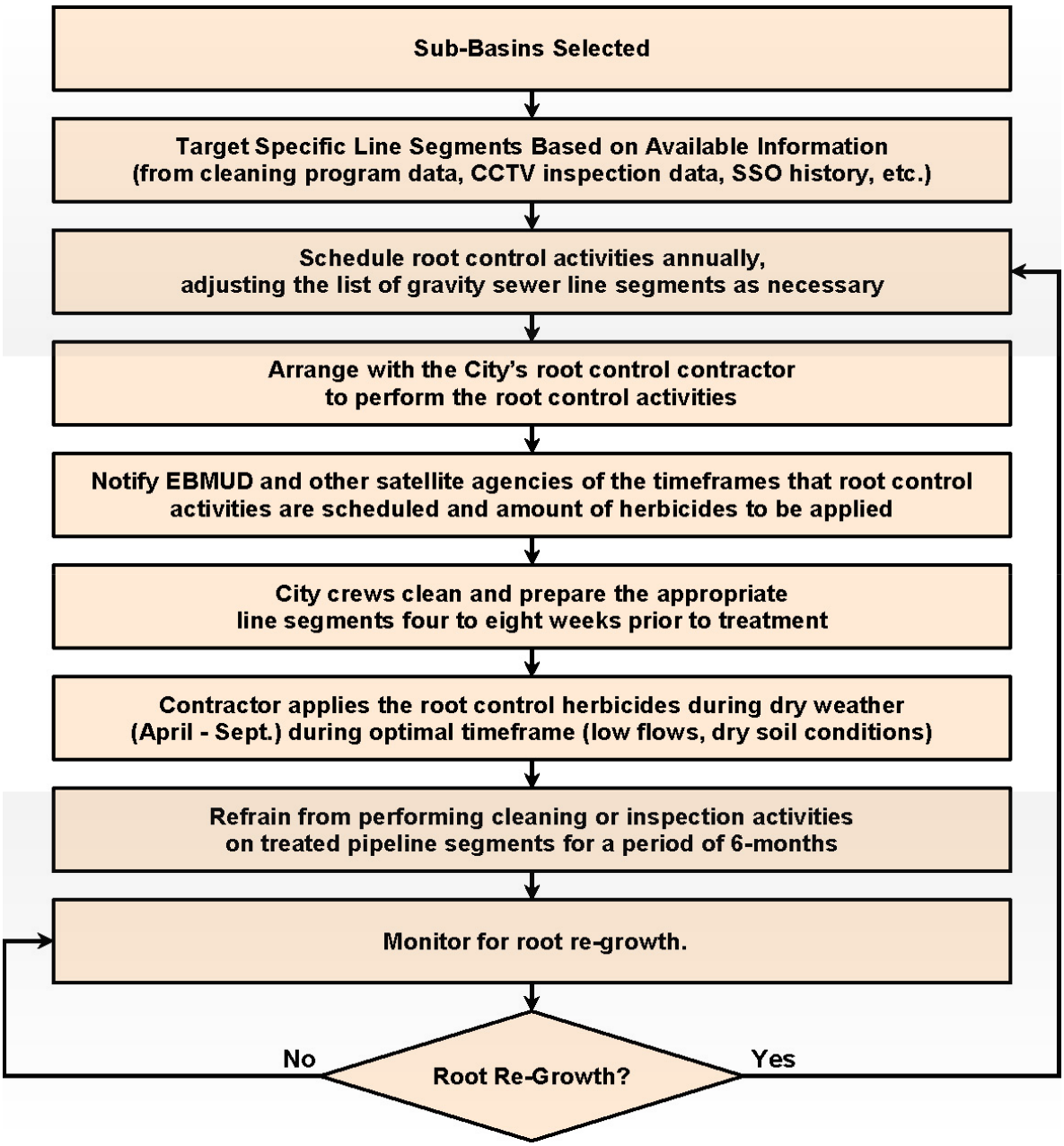


FIGURE 3.2 HERBICIDES ROOT CONTROL PROCESS

CITY OF OAKLAND

ASSET MANAGEMENT IMPLEMENTATION PLAN & SANITARY SEWER MANAGEMENT PLAN

3.2.2 Staffing Duties

The City contracts with the lowest responsible bidder to perform root-control activities. City staff coordinates the contractor's activities with City maintenance staff,. City maintenance staff cleans and prepares the line segments selected for treatment and implements quality-control measures to confirm that the treatment has been effectively applied.

3.2.3 Work Order System

An SSO overflow map was developed by the City that showed the SSOs in each sub-basin for the years 2008, 2009, and 2010. The sub-basins with the most overflows attributed to roots were selected for root control treatment. As root-control activities are completed on individual sewer line segments, results are documented in CityWorks CMMS. Figure 3.3 shows areas root foamed to date and planned for future root foaming.

3.2.4 Root Control Program Scheduling

The relative success of herbicide root-control activities is sensitive to the time of year in which the herbicides are applied, as well as the condition of the roots at the time of the herbicide application. Because of this, proper scheduling of root-control work is important. Root-control work is based on an annual schedule in which individual sewer line segments are targeted for herbicide root-control activities during a given year. The City coordinates work with the root control contractor, City maintenance staff, to make sure that root-control activities are performed as scheduled.

Based on the new Consent Decree, the City continues to treat 50 miles (264,000 feet) of Sewer Mains per Fiscal Year. The root treatment continues to focus on treating entire sub-basins. At the same time sewer maintenance personnel are recording locations where they encounter tree roots as part of their maintenance work.

3.2.5 Root Control Quality Control

Quality Control is an important aspect of the root-control program. Quality Control helps prevent root re-growth in treated sewers. For this reason, the City will perform CCTV inspections of selected sewer line segments that receive herbicide root treatment six months after the herbicides are applied. The information obtained will be used as a guide for City staff to determine whether additional root-control actions (e.g., mechanical root control, additional herbicide root control) should be taken.

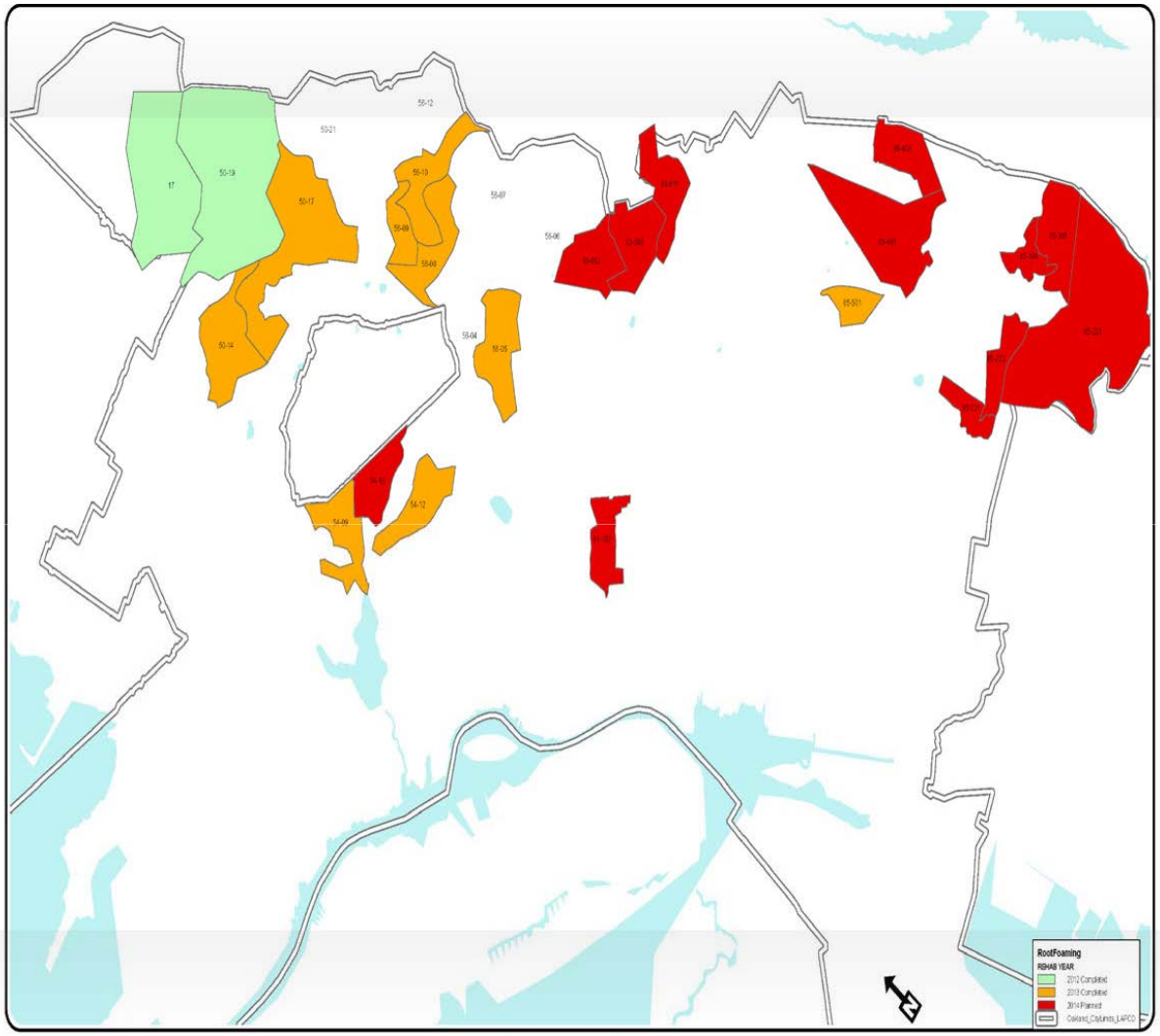


FIGURE 3.3 ROOT FOAMING AREAS

CITY OF OAKLAND

ASSET MANAGEMENT IMPLEMENTATION PLAN & SANITARY SEWER MANAGEMENT PLAN

3.3 FATS, OIL, AND GREASE (FOG) CONTROL

Paragraph 93 of the Consent decree states:

"FOG Control. The City shall continue to work with EBMUD in the implementation of the EBMUD Regional Fats, Oils and Grease (FOG) Control Program, and coordinate EBMUD's FOG activities within the City. The City shall refer FOG-related SSOs or excessive buildup of grease to EBMUD for investigation. If a food service establishment is determined to be contributing to FOG-related SSOs and does not implement recommendations made by EBMUD, the City shall take actions necessary to ensure that the food service establishment adequately controls FOG."

The City's FOG abatement efforts consist of routine CCTV inspections, aggressive FOG-removal maintenance – which includes the use of industrial degreasers in the wastewater collection system, multi-language outreach to food service establishments (FSEs) in the service area, and investigations of suspected dischargers whenever excessive FOG is encountered in the system. The installation of a grease interceptor is required by the City's Uniform Plumbing Code. A key element of the program includes grease trouble spot response, and a targeted response to grease related blockages and SSOs. Response activities include CCTV investigations for FOG-related blockages, and corrective maintenance actions and/or enforcement procedures, as needed.
The City will also continue to provide FOG-related notification to EBMUD, to assist its Regional FOG Control Program efforts in the City's service area.

The City's FOG abatement program and/or activity includes:

- Source identification.
- Legal Authority.
- Program structure/requirements.
- Grease removal device technologies for FSEs.
- Inspections and monitoring of FSEs.
- FOG control enforcement of FSEs.
- FOG disposal.
- Public education and outreach.

3.3.1 Source Identification

Locations of SSO's suspected to be caused by FOG discharges are investigated for corrective action.

3.3.2 Legal Authority for FOG Program Requirements

Existing codes and ordinances, plumbing codes, and other local regulations, such as the health code, provide the City legal authority to control FOG discharge by FSE's.

3.3.3 Program Structure/Requirements

Grease control devices are required for all new FSE's. FSEs are also required to keep and maintain maintenance contract and hauling logs.

While residential customers do not have discharge permits, educational mailers are provided to educate individuals on prohibited discharge items.

3.3.4 Grease Removal Device Technology for FSEs

Grease-control device installation, design, and sizing follow plumbing code requirements. Device type, installation, design, and sizing are coordinated with the local health authority and building department.

3.3.5 Inspections/Monitoring for FSEs

Identification and inspection of grease trouble spot areas includes the following:

- Identification of FOG-related blockages by City staff.
- Reporting of FOG-related blockages for further investigation.
- Inspections target FSEs upstream of the reported location. Grease control devices are inspected, and a measurement of grease, water, and solids is taken. Additional follow-up actions may be required based on data collected. Both mainline and lateral camera inspections may be performed. When the cause has been found, City inspectors meet with FSEs and provide educational materials.
- City conducts follow-up inspections to assure the problem is resolved.

3.3.6 Enforcement for FSEs

An initial non-compliance action by an FSE results in progressive enforcement. Additional notices are sent to a non-compliant FSE until the problem is corrected.

3.3.7 FOG Disposal (Grease Trap and Grease Interceptor Waste)

The EBMUD wastewater treatment plant is the receiving facility for waste grease from inside and outside the EBMUD service area.

3.3.8 Public Education and Outreach

FSEs are provided with program brochures, a best management practices (BMP) chart, a BMP poster, "How to Maintain a Grease Interceptor" flyers, "Do Not Pour" posters, and access to the EBMUD FOG web page.

Residential customers are provided with brochures, grease scrapers, flyers, access to used cooking oil collection centers, and access to the EBMUD FOG web page. Public information events are also held to educate people about FOG disposal.

3.4 OVERFLOW EMERGENCY RESPONSE PLAN – Replaced with OERP in Appendix C

3.4.1 Responding to Sanitary Sewer Overflows – *See Appendix C – City of Oakland OERP*

3.4.2 Containing Overflows from the Collection System and Force Mains – *See Appendix C – City of Oakland OERP*

3.4.3 Containing Overflows from Pump Stations – *See Appendix C – City of Oakland OERP*

3.4.4 Estimating Overflow Volume – *See Appendix C – City of Oakland OERP*

3.4.5 Notifying Regulatory Agencies – *See Appendix C – City of Oakland OERP*

3.4.6 Notifying the Public – *See Appendix C – City of Oakland OERP*

3.4.7 Responding to Media Requests

Sewer maintenance events, media requests for video, photos or interviews for media coverage shall follow the existing media policy of both the City and the OPW. Sewer Maintenance Division staff shall contact their supervisor.

Only staff at or above the Division Manager level may respond to media requests. Before speaking to or arranging a media interview, staff shall contact the Director of Public Works, Assistant Director, and/or the Media Coordinator to ensure continuity and consistency in communications. If an immediate response is necessary, staff should respond as appropriate, but respond only about things they know. Staff should not speculate or guess about issues with which they are not familiar. "I don't know" is an acceptable answer.

Following the interview, staff should immediately inform the Media Coordinator of the interview and the information provided to the media.

OPW's Standard Operating Procedure addresses how Sewer Maintenance Division staff are to respond to public inquiries and media requests.

3.4.8 Sampling Affected Surface Waters – *See Appendix D – City of Oakland WQMP*

3.4.9 Analyzing the Causes of Sanitary Sewer Overflows

The Sewer Maintenance Division Manager is responsible for ensuring that each SSO event is analyzed to determine its "root cause" and to identify and implement

corrective action(s) needed to reduce the risk of recurrence.

Sewer System Maintenance Supervisor I/II, those involved in the emergency response, and the Sewer Maintenance Planner/Scheduler shall review the relevant data to determine corrective action(s) for the line segment, or necessary changes in response procedures as part of a debrief and failure analysis process. This review will include:

- Reviewing and/or correcting the Sanitary Sewer Overflow Report.
- Discussing SSO response and findings with the sewer crew and its supervisor.
- Reviewing past maintenance records.
- Reviewing available photographs.
- Reviewing CCTV inspection data to determine the condition of the line segment where the SSO occurred.
- Assuring that all regulatory reporting requirements have been met.
- Completing an analysis report to include in the SSO event file.

Sewer Maintenance Division Supervisor I/II will consult with departmental engineers when pipe failures are identified and where engineering judgment is needed.

3.4.10 Record Keeping

3.4.10.1 SSO File

The Sewer Maintenance Division maintains separate files for each SSO event. Each file contains:

- The Sanitary Sewer Overflow Report.
- Event start time documentation
- Copies of all California Integrated Water Quality System (CIWQS) certification draft and certified SSO reports.
- The CCTV report and analysis.
- All work orders associated with the SSO event (including initial complaint, and any/all follow up activity).
- Photographs, videos and sketches from the overflow event,
- Assumptions and calculations of all spill and recovered volumes on Appendix C of the City OERP below.
- Analytical reports from any water quality sampling and analyses performed.
- Technical reports for spills greater than 50,000 gallons.
- Debrief/Failure analysis documentation from Section 3.4.9.

3.4.10.2 Sanitary Sewer Overflow Report

Field crews responding to an SSO fill out a Sanitary Sewer Overflow Report found in Appendix A of the OERP, which contains the following minimum information:

- Start time documentation

- Spill location.
- Spill description.
- Spill occurring time.
- Cause of spill.
- Spill response.
- Notification details.
- All required information for CIWQS reporting.

3.4.10.3 CIWQS Report

The Sewer Maintenance Supervisor is responsible for ensuring that a copy of the California Integrated Water Quality System (CIWQS) draft and certified SSO report(s) are included in the file.

3.4.10.4 CCTV Report

The Sewer Maintenance Supervisor is responsible for ensuring that a copy of the CCTV evaluation report(s), assessment results and recommendations are included in the SSO file.

3.4.10.5 CMMS Work Order(s)

CityWorks CMMS is used to record all pertinent overflow information input by sewer staff daily.

3.4.10.6 Photographs/Videos

Any photographs, videos, and/or sketches related to the SSO are also stored in the SSO file. Each photo should be dated, and a map of photo or video locations included along with the name of the person(s) responsible for the picture (if known).

3.5 DATA MANAGEMENT

This section incorporates and replaces the Maintenance Management System Plan, which was submitted to the EPA in October 2010 and was approved by the EPA on December 6, 2010. It describes the functions available to maintenance workers for maintenance data management.

CityWorks CMMS is a state-of-the art, GIS-centric maintenance management system. It is used by over 500 public works agencies and utilities to manage work on public works assets.

The City of Oakland purchased and began using CityWorks CMMS in March 2008. Implementation of its use for service requests was completed in March 2009. Implementation of its use for sewer work orders was completed in January 2010.

A Sewer Maintenance Planner and a Program Analyst have been hired in the Sewer

Maintenance Division to assist with data management.

3.5.1 Scheduling and Tracking Completion

CityWorks CMMS is capable of scheduling and tracking the completion of sewer cleaning, maintenance, repairs, and SSO responses. The City has configured CityWorks CMMS with work order templates specific to the work performed by OPW. This specifically includes the Sewer Maintenance Division.

CityWorks CMMS allows work to be scheduled for immediate action or to be completed in the future. Work can be scheduled as a one-time action (e.g., spill response) or on a cyclical basis (e.g., maintenance).

For work scheduled for immediate action, a work order is created in CityWorks CMMS and assigned to a crew leader. For work scheduled for future action, a work order is created in CityWorks CMMS and given a Projected Start Date and a Projected Finish Date in CityWorks CMMS.

For work in CityWorks CMMS, an asset (or assets) is selected using any criteria and/or the GIS map. The asset can be a segment of sewer pipe, a sewer structure (e.g., maintenance hole), a pump station, etc. After the asset is selected, the type of work is identified (e.g., clear main).

Completion of the work is tracked in CityWorks CMMS. For each work order, a Sewer Maintenance Division staff member:

- Identifies the asset in the GIS maps, and associates that asset(s) with the work order in CityWorks CMMS.
- Enters the Actual Start Date and Actual Finish Date.
- Enters the crew leader who completed the work.
- Enters the Units Accomplished (e.g., 500 linear feet).
- Enters labor information (who did the work and how much time it took).
- Enters equipment information (what vehicle(s) were used and for how long).
- Enters additional information as needed (e.g., if it was caused by roots, caused by fats, oil and grease, if it was at a hot spot, etc.).

CityWorks CMMS was configured with work order templates to meet the needs of the Sewer Maintenance Division.

3.5.2 Record Keeping

Information acquired through the work order is recorded in CityWorks CMMS. This information includes but is not limited to what asset was inspected, who did the work, what

vehicles they used, and when the work was performed. Sewer maintenance hole condition ratings are stored in CityWorks CMMS and can be used to update the City's Enterprise GIS.

The CityWorks CMMS can also be used to record work done by outside contractors, such as capital improvement projects. Relevant attribute information can be updated in the GIS. This includes but is not limited to installation and warranty dates. Updating the information in GIS makes the information immediately available in CityWorks CMMS; CityWorks CMMS accesses the Enterprise GIS data directly (there is no replication involved).

The SMD has established a program for filing of all records supporting and documenting certified overflow reports in the State CIWQS database. A separate file folder for each overflow event is established and the file folder is identified by the CIWQS event number, location, date and volume. All supporting documents from the event are filed in the folder and the folders are retained in a locked file cabinet in the Sewer Maintenance Division. Only LROs have access to this file cabinet and the files are maintained in file cabinet draws by year. These file records will be retained as required by the WDR and the City records retention schedule.

3.5.3 Report Generation

CityWorks CMMS has extensive querying, exporting, and reporting capabilities. These functions are primarily used to summarize SSOs and to identify hot spots.

3.5.4 Geographic Information System (GIS) Coordination

CityWorks CMMS uses the enterprise GIS database as an asset inventory. The enterprise GIS contains the City's sanitary and storm sewer pipes, structures, and pump stations. CityWorks CMMS does not contain separate asset tables that have to be integrated, synchronized, or linked to the enterprise GIS; the inventory of capital assets and infrastructure is maintained in the enterprise GIS system.

All Sewer Maintenance Division CityWorks CMMS users have access to the GIS map of the wastewater collection system; it is part of CityWorks CMMS and has been since March 2009.
The City's Enterprise GIS contains the capability to record asset age, material, and dimensions. Where these fields are populated with data, the data is immediately available to CityWorks CMMS users.

3.6 STAFFING AND EQUIPMENT

3.6.1 Staff

The Sewer Maintenance Division(SMD) is responsible for maintaining Oakland's sewer collection system and for responding to sewer overflows and service calls related to the

system. During normal business hours (7:00 am to 3:30 pm), the full staff of the Sewer Maintenance Division is available. This staff currently consists of 69 employees:

- One (1) Operations Manager
- Two (2) Public Works Supervisor II's
- Five (5) Public Works Supervisor I's
- Twenty-two (22) Sewer Maintenance Leaders
- Thirty-two (32) Sewer Maintenance Workers
- Two (2) Heavy Equipment Operators
- One (1) Sewer Maintenance Planner
- One (1) Program Analyst
- One (1) Administrative Assistant II

During non-business hours, a two-person Sewer Maintenance Crew is on call to respond to reports of SSOs. Additional employees can be called as necessary. Historically, these resources have always been sufficient to respond to SSOs within the City of Oakland.

All SMD employees have been adequately trained to respond to, contain, report, and mitigate SSOs.

3.6.2 Equipment

Major equipment used for sewer system operation and maintenance in the SMD includes:

- Five (9) Hydro-flusher Trucks
- Four (4) Power-rodder Trucks
- Three (3) Complaint Crew Trucks with blockage removal equipment
- Six (6) CCTV Trucks
- Two (2) Construction Utility Trucks with equipment to perform minor spot repairs
- Two (2) Backhoes
- Two (2) 10-yard Dump Truck
- One (1) 5-yard Dump Truck
- One (1) 3-yard Dump Truck
- Two (2) 2-inch trash pumps
- Two (2) 4-inch trailer-mounted diesel powered pump
- One (1) 6-inch trailer-mounted diesel powered pump
- Three (3) portable generators

TABLE 3.4 Major Equipment List

Vehicle No.	Vehicle Type	Vehicle Model	Workgroup
4184	Box Truck	F-450	CCTV
4581	Box Truck	F-450	CCTV
4914	Box Truck	GMC-4500	CCTV
4071	Box Truck	GMC-3500	CCTV
4069	Box Truck	F-350	CCTV
4384	Box Truck	F-450	CCTV
4776	HYDRO-EXC	V2100	HF
4854	HYDRO-VAC	ECO900	HF
4853	HYDRO-VAC	ECO900	HF
4398	HYDRO-VAC	B-6	HF
4291	HYDRO-VAC	B-10	HF
4292	HYDRO-VAC	B-10	HF
4397	HYDRO-VAC	B-6	HF
4588	HYDRO	RAMJET1015	HF
4589	HYDRO	RAMJET1015	HF
4315	RODDER	S660	MR
4218	RODDER	S660	MR
4219	RODDER	S660	MR
4217	RODDER	S660	MR
4077	2 Yard Dump:	F-550	REPAIR
VEH:	3 Yard Dump:		REPAIR
4585	10 Wheel Dump:		REPAIR
VEH :	Backhoe:		REPAIR
7305	Backhoe:		REPAIR
4309	Excavator:		REPAIR
4366	Crew Cab:		REPAIR
4310	Compressor:		REPAIR

Note: Equipment List as of November 2019 as provided by SMD

- One (1) 10 Wheeled Dump Truck
- One (1) Four yard Dump Truck
- One (1) Three Yard Dump Truck
- Two (2) 2-inch trash pumps
- Two (2) 4-inch trailer-mounted diesel powered pump
- One (1) 6-inch trailer-mounted diesel powered pump
- Three (3) portable generators

All SMD equipment is available 24 hours per day. Additional equipment can be rented if necessary.

3.6.3 Replacement Parts Inventory

The SMD has established a list of available replacement parts that are available at the City Maintenance Yard or by agreement with local supply shops 24 hours per day for use in the sanitary sewer system or during emergency response events. Table 3.6 below provides the inventory of replacement parts.

TABLE 3.6 Replacement Parts Inventory

Part Number	Part Description	Number Available	Location
NA	4 in. Bypass pump	x2	MSC Corp Yard
NA	6 in. Bypass pump	x1	MSC Corp Yard
NA	4 in. lay-flat discharge hose	500 FT.	MSC Corp Yard
NA	6 in. lay-flat discharge hose	1000 FT.	MSC Corp Yard

3.7 TRAINING

Paragraph 89 of the Consent Decree provides, in part*: "The City of Oakland shall continue to ensure that agency staff and responders are adequately trained to perform the procedures outlined in its AMIP, and to retain appropriate records and evaluate on a Fiscal Year basis agency staff's and responders' adherence to the AMIP as approved."*

The City requires all staff in OPW to complete a set of specific training activities related to their respective job classifications. Continuous training is provided through Oakland's Citywide Training Program. Training on contents of the new Consent Decree was provided to all sewer maintenance staff and sewer design engineers and inspectors on September 18, 2014.

The City also holds an annual Safety Academy featuring many job-related safety training sessions.

The City intends to provide additional training/certification related to sewer system maintenance and inspection to appropriate City staff. Specifically, appropriate City staff will pursue training/certification through the CWEA Collection System Maintenance Certification program and have received training on NASSCO's PACP certification program.

The City will provide sewer and emergency response personnel regular training on the WDR,

MRP, the City AMIP/SSMP and other sewer related policies and procedures.

3.7.1 CWEA Collection System Maintenance Training

CWEA's Collection System Maintenance Certification program offers multi-level technical certification training for sewer system maintenance personnel. Tests are written by specialists in the field and administered throughout the year.

To become certified, all applicants must complete the Application for Technical Certification, pay an application fee, have suitable experience and education, and pass the computer-based test. The Collection System Maintenance Certification program is divided into four separate grades, based on the experience of the applicant

3.7.2 NASSCO PACP Training

The PACP program was developed by NASSCO to provide a reliable and standardized approach to characterize pipeline conditions. PACP assigns defect severity grades from one to five (both structural and O&M) for observed conditions in a pipe segment. The entire pipeline segment is then assigned a structural, O&M, and overall rating based on the number and severity of the observed defects.

NASSCO offers training courses for the PACP program throughout the country that familiarize the student with the PACP coding procedures, provide opportunities for students to ask questions and clarify various aspects of the program, and ensure the contents of the PACP have been adequately conveyed to the student through the successful completion of the certification examination.

City staff members completed NASSCO PACP training in late January and early February 2011, as well as NASSCO's Manhole Assessment and Certification Program (MACP) and Lateral Assessment and Certification Program (LACP). City staff were recertified on as required by NASSCO and a Master Roster has been created to ensure that staff is recertified every three (3) years as required to maintain NASSCO PACP, MACP and LACP certification.

4 CAPITAL IMPROVEMENTS

4.1 DESIGN AND CONSTRUCTION STANDARDS

4.1.1 Standards for Installation, Rehabilitation, and Repair

The City of Oakland (City) uses the statewide *Standard Specifications for Public Works Construction* (the "Green Book") for installation, rehabilitation, and repair of sewers. These standards are updated, adopted, and published every three years. These standards are supplemented by Special Provisions for each contract to reflect local conditions.

The City also publishes *Standard Detail Drawings for Public Works Construction 2002 Edition* for sanitary sewer work. These drawings are available online. (*See link under List of References section)*

Sanitary sewer design is controlled by the City's *Sanitary Sewer Design Standards August 2008*. This document is available online. (*See link under List of References section)*

Requirements for building sewers are also provided in the Oakland Municipal Code Section 13.08. (*See link under List of References section)*

4.1.2 Standards for Inspection and Testing of New and Rehabilitated Facilities

The City's construction testing and inspection standards are in the *Green Book*. The City has a full-time inspection staff (Resident Engineers) who inspect new construction and sewer rehabilitation work. Resident Engineers ensure that all Collection System construction meets the City's standards and codes. All sewers constructed by contractors are tested and video inspected before acceptance.

The Project Delivery and Construction Management Division of the Bureau of Engineering and Construction maintains the *Manual of Construction* for the construction management staff. This document provides training and guidance to inspection staff and establishes the standards for the inspection of all construction work.

4.1.3 Development of Regional Standards

Paragraph 83.d of the Consent Decree states:

"*The City shall work with the other Defendants to create Regional Standards for sewer installation, Rehabilitation and Repair and participate in submitting a group report of the recommended Regional Standards for EPA's review and approval by June 30, 2016, and for review, every five years thereafter."*

As part of updating the *Green Book* described in Section 4.1.1 above, the City is working with other Defendants to develop Regional Standards and to modify its Standard Specifications and special provisions for sewer work.

4.2 SEWER MAIN AND MAINTENANCE HOLE REHABILITATION

The City's sanitary sewer capital improvements address two objectives: 1) infiltration/inflow (I/I) correction; and 2) emergency and major defect Repair/Rehabilitation. The I/I correction program was established in response to the 1980's regional I/I program and will continue under the 2014 Consent Decree. The City's emergency and major defect Repair/Rehabilitation responds to the findings of the City's Sewer Inspection Program. In general, Repair/Rehabilitation locations are categorized as either minor repairs ("dig-ups") or major repairs. Minor repairs are usually performed by in-house maintenance staff. Major repairs and emergencies are normally corrected through capital improvements.

4.2.1 Inflow and Infiltration Rehabilitation Requirements

Paragraph 83.a of the Consent Decree states:

"Between January 1, 2014 and June 30, 2016, the City of Oakland shall rehabilitate 158,400 feet of Sewer Main [30 miles]. *Beginning on July 1, 2016, the City of Oakland shall complete, by the end of each Fiscal Year, rehabilitation of no less than 63,360 feet* [12 miles] *of Sewer Mains identified in Appendix E based on a cumulative total (i.e. 221,760 feet* [42 miles] *by June 30, 2017; 285,120 feet* [54 miles] *by June 30, 2018; 348,480 feet* [66 miles] *by June 30, 2019; etc.) for the duration of the Consent Decree. When the City rehabilitates a Sewer Main, it shall also Rehabilitate, as needed, all Maintenance Holes associated with the Sewer Main and ensure that abandoned Sewer Laterals are not connected to that Sewer Main."*

Paragraph 83.a i. further states:

"*Effective July 1, 2016, the City shall prioritize those Sewer Mains for Rehabilitation that are located within the Sub-Basins specified in Appendix H."* (Table 4.2)

The City is ahead of schedule in complying with these requirements as documented in our Annual Reports submitted by September 30th of each year.

The City's Sanitary Sewer 5 Year CIP Project Schedule and Five-Year Financial Plan are shown in Section 4.7 below.

4.2.2 Additional Rehabilitation Requirements

Paragraph 83.b states:

"In addition to the Work required under Paragraph 83(a), beginning on July 1, 2014, the City shall complete, by the end of each Fiscal Year, Rehabilitation of no less than 5,280 feet

[1 mile] of Sewer Main, anywhere within the City's Collection System, based on a cumulative total (i.e. 5,280 feet [1 mile] by June 30, 2015; 10,560 feet [2 miles] by June 30, 2016; 15,840 feet [3 miles] by June 30, 2017; etc.) for the duration of the Consent Decree."

Based on results of the sewer inspection program, the City plans to rehabilitate at least one mile of Sewer Main per Fiscal Year consisting of minor, major, and emergency sewer work to reduce the occurrence of Sanitary Sewer Overflows.

TABLE 4.1 CD Appendix H: Oakland Sub-Basin Rehabilitation Priorities

Basin 50	Basin 52	Basin 54	Basin 56	Basin 58	Basin 59	Basin 60	Basin 61	Basin 80	Basin 81	Basin 82	Basin 83	Basin 84	Basin 85	Basin 86	Basin 87
50L-1	**52-1**	**54-1_2**	**56-1**	**58-1**	**59-1**	**60-1**	**61-1**	**80-1**	**81-1_2**	**82L-1**	**83L-1**	**84L-1**	**85L-1**	**86-1**	**87-1**
5010	52 *	5414/5415*	5602	5802	5901	6007	6101	80102	81201	82003	83001	84101	85101	86002	87001
50U-1		5408 *	5601	5804		6006	6102	80101	81102	82001	**83U-1_2_4**	84102	85102	86001	
5014 *		5416 *	5606			6008	61	80113	81012	82002	83202	84003	85202	**86-2**	
5016 *			5607			6003	**62-2**	80001	81101	**82L-2**	83002	**84L-4**	**85U-1**	86002	
5020 *						6004	6202	**80-2**	81013	82001	83201	84101	85502		
5022 *						**60-2**	**62-3**	80113	81015	**82U-1**	83303 *	**84U-1**	85012		
						6001	6202	80022	81002	82005	83013	84102	**85U-2A**		
								80021	**81-3**	82004	83012	**84U-3**	85211		
									81001		83402	84004	**85U-2B**		
									81-4		83011		85231		
									81001		83503		85232		
											83404		85205		
											83501				
											83403				
											83502				
											83401 *				
											83U-3				
											83102				
											83103				

* Partial rehabilitation in this Sub-basin is expected in the earlier years of the Consent Decree. No additional rehabilitation, including City facility lateral rehabilitation work as stated in Paragraph 84.d, is expected in this Sub-basin.

4.2.2.1 Minor Repairs and Improvements

Sewer maintenance crews report Sewer Main and Maintenance Hole defects requiring Repair or Rehabilitation to the Sanitary Sewer Maintenance Supervisor II. The Supervisor determines whether the Repair/Rehabilitation can be done by in-house employees. If the work is within the City's in-house capabilities, it is placed on the Sewer Maintenance Repair List ("Dig-up List") and addressed in the order in which the work request was received.

Minor Repair/Rehabilitation is normally completed within a one-year period. If the work exceeds the City's in-house capabilities, the Sewer Maintenance Supervisor refers the work to the Bureau of Engineering and Construction (BEC) for Repair/Rehabilitation by contract. After July 1, 2016, this work may be counted toward the City's 12 mile per year Rehabilitation requirement (Paragraph 4.2.2 above) if it is located in the Sub-Basins listed in Table 4.2. If work is done in Sub-Basins outside those listed in Table 4.2, the work may be counted as part of the additional mile of required work discussed in Section 4.2.3.

4.2.2.2 Major Repairs and Improvements

The Bureau of Engineering and Construction (BEC) maintains an annual sewer on-call construction contract to provide quick response to emergencies and other urgent major repair requests, including Acute Defects referred by the Sanitary Sewer Maintenance Supervisor. Other less urgent repair locations are repaired through a design-bid-build process that follows the City's Design and Construction Standards. The City budgets $2,500,000 annually for such projects. Staff from engineering and maintenance hold regular monthly meetings to discuss, monitor, and coordinate respective activities. After July 1, 2016, the work described in this paragraph may be counted toward the City's 12 mile per year Rehabilitation requirement if it is located in the Sub-Basins listed in Table 4.2. If work is done in Sub-Basins outside Table 4.2, the work may be counted as part of the additional mile of required work.

4.2.2.3 Lower Lateral Rehabilitation Requirements

Paragraph 86.a. of the Consent Decree states:

"The City of Oakland shall continue its existing practice of, when Rehabilitating Sewer Mains, evaluating the condition of Lower Laterals connected to those Sewer Mains and Rehabilitating or requiring Rehabilitation of defective Lower Laterals."

The City is continuing its practice of inspecting and, where needed, rehabilitating Lower Laterals as part of Sewer Main Rehabilitation, except where Lower Laterals are constructed within sub-sidewalk basements and other occasions where Lower Laterals are not readily accessible. Under those conditions, property owners are issued Notices to Repair their Lower Laterals, if defective.

4.3 ELIMINATION OF ACUTE DEFECTS

Paragraph 8 of the Consent Decree defines Acute Defects as:

"…a failure in a sewer pipe in need of an urgent response to address an imminent risk of an SSO."

Paragraph 91 states:

"The City of Oakland shall continue to Repair Acute Defects as soon as possible, but no later than within one Year of identification."

The City recognizes the need for quick response and has performed most repairs to Acute Defects within one year of completion of identification as described in our Annual Report. Additional emphasis is now being given to assure **all** Acute Defects are repaired within 12 months.

The City repairs Acute Defects using in-house crews and on-call contractors. In addition to in-house forces, the City has an annual budget in its Ten-Year Financial Plan for emergency sewer work. This funding has always proven enough. If the number of Acute Defects increases to a level that cannot be repaired within one year, the City will consult with EPA to determine future actions.

Repair/Rehabilitation of acute defects may be counted toward the City's 12 mile per fiscal year rehabilitation requirement if the entire sewer segment (maintenance hole to maintenance hole) is replaced and the segment is located in the Sub-Basins listed in Table 4.2. If work is done in Sub-Basins outside Table 4.2, the work may be counted as part of the additional mile of required work.

4.4 PUMP STATION AND FORCE MAIN IMPROVEMENTS

This section incorporates and replaces the City's Pump Station Reliability Plan, which was approved by EPA on March 14, 2011. The Pump Station Reliability Plan is based upon an update of the work completed in the City's September 2007 Pump Station Master Plan.

The 2007 Pump Station Master Plan recommended several improvements to the City's sewer pump/lift stations. Table 4.3 summarizes costs of the Pump Station Master Plan's recommended improvements for each pump station with its corresponding priority ranking.

The Pump Station Master Plan analyzed each pump/lift station service area, land uses, influent and effluent piping, design flows, and pump size and capacity, and concluded that all existing pump stations are adequately sized for current design flows. The scope of work for all future pump station upgrades will include replacing pumps, mechanical piping, electrical components, providing stand-by power for portable back-up generators or hook-ups, and a remote auto-dialer alarm system.

TABLE 4.2 Pump Station Preliminary Improvement Costs

Priority	Pump Station	Cost
~~1~~	~~Tidewater Avenue~~	~~$948,000~~
2	Fallon Street	$138,000
3	Hegenberger Road	$120,500
4	Parkridge Drive	$127,000
5	Shepherd Canyon Road	$289,300
6	Skyline Boulevard	$92,400
7	Denton Place	$65,300
Engineering, CM, and Contingency (40%)		$712,500
Total		**$2,493,000**

Note: Costs are based on *Engineering News Record* (ENR) 20-City Construction Cost Index of 8049.65 (Sep 2007)

Paragraph 94 of the Consent Decree states:

"On March 14, 2011, EPA approved the City of Oakland's Pump Station Reliability Plan. The City shall complete the improvements described in the Plan by October 15, 2022."

Work on the Tidewater Pump Station has been completed. Planning and design of improvements to the other pump stations has begun. The City is significantly ahead of schedule with its Pump Station Improvement Program, with completion planned for 2017, five years ahead of schedule.

The City owns approximately 1050 linear feet of force mains. The force mains will be inspected as the pump stations are constructed. As these pipelines are inspected, future pipeline rehabilitation projects may be identified. At this time, no force main improvement projects are scheduled.

4.5 CAPACITY IMPROVEMENTS

Paragraph 89.a of the Consent Decree requires the City to monitor twelve Maintenance Holes at locations where computer modeling suggests capacity may be deficient. Paragraph 89.b states:

"In the event that the City at any of the locations in subparagraph 89(a): (i) experiences an SSO caused by lack of capacity; (ii) determines that the water level reaches within one (1) foot of the Maintenance Hole rim due to a lack of capacity, except during a rain event that is greater than the December 5, 1952 Storm; or (iii) has reason to believe a capacity related

SSO is likely to occur, the City shall implement improvements to address the capacity deficiency within twenty four months of the SSO, the date when the water level reached within one (1) foot of the Maintenance Hole rim, or the event triggering the likelihood of an SSO."

The City will continue to monitor water levels at the specified Maintenance Holes and take corrective action as required. The City has budgeted a million dollars per Fiscal Year as contingency to fund this or other work that may be required.

4.6 REHABILITATION OF CITY OWNED SEWER LATERALS

Paragraph 84.d of the Consent Decree states:

"The City agrees to inspect and Repair or Rehabilitate, as necessary, all Sewer Laterals owned by the City of Oakland identified in Appendix H.1 within a period of ten (10) Calendar Years from the Effective Date."

The City has begun collecting As-Built drawings for the 95 buildings listed in Appendix H-1 of the Consent Decree in order to identify and locate City owned sewer laterals. Within ten years of the Effective Date of the CD (September 2014) the City will identify, test and inspect Sewer Laterals associated with these buildings. A Repair/Rehabilitation schedule will be developed and included in future updates of this AMIP/SSMP once inspection results are known.

The following Table 4.6 has been removed from Appendix H1, List of Targeted Oakland Owned Facilities for Sewer Lateral Rehabilitation from the consent decree for information and understanding of the requirements placed on the City for City owned sewer lateral inspection:

TABLE 4.6 List of Targeted Oakland-Owned Facilities for Sewer Lateral Rehabilitation (from CD Appendix H1)

April-14

No.	NAME	Address	Sub-Basin
1	Sanborn (Carmen Flores) Recreation Center	1637 Fruitvale Ave	5601
2	Dimond Branch Library	3565 Fruitvale Ave	5602
3	Firehouse #14	3459 Champion St	5602
4	Firehouse #14 Storage Building	3459 Champion St	5602
5	Firehouse #25	2795 Butters Dr	5606
6	Firehouse #25 Exercise Building	2795 Butters Dr	5606
7	Joaquin Miller - Abbey	near 3594 Sanborn Drive	5606
8	Joaquin Miller - Fire Circle Restroom	near 3594 Sanborn Drive	5606
9	Joaquin Miller - Sanctuary to Memory	near 3594 Sanborn Drive	5606
10	Joaquin Miller Community Center	near 3594 Sanborn Drive	5606
11	Joaquin Miller Park - 415 Society Trailer	near 3594 Sanborn Drive	5606
12	Joaquin Miller Park - Meadow Restroom	near 3594 Sanborn Drive	5606
13	Joaquin Miller Park - Shipping Containers (2)	near 3594 Sanborn Drive	5606
14	Joaquin Miller Park - Storage	near 3594 Sanborn Drive	5606
15	Joaquin Miller Park - Storage Barn	near 3594 Sanborn Drive	5606
16	Ranger Station	3590 Sanborn Dr	5606
17	Sequoyah Lodge	2666 Mountain Blvd	5606
18	Woodminster Cascade	3300 Joaquin Miller Rd	5606
19	Woodminster Theater	3300 Joaquin Miller Rd	5606
20	Woodminster Theater - Concession Booth	3300 Joaquin Miller Rd	5606
21	Woodminster Theater - Restroom	3300 Joaquin Miller Rd	5606
22	Joaquin Miller - PAL Cabin 1	near 10909 Skyline Blvd.	5607
23	Joaquin Miller - PAL Cabin 2	near 10909 Skyline Blvd.	5607
24	Joaquin Miller - PAL Cabin 3	near 10909 Skyline Blvd.	5607
25	Joaquin Miller - PAL Cabin 4	near 10909 Skyline Blvd.	5607
26	Joaquin Miller - PAL Cabin 5	near 10909 Skyline Blvd.	5607
27	Joaquin Miller - PAL Cabin 6	near 10909 Skyline Blvd.	5607
28	Joaquin Miller - Redwood Glen Restroom	near 10909 Skyline Blvd.	5607
29	Joaquin Miller - Rotary	near 10909 Skyline Blvd.	5607
30	Joaquin Miller Park - Metropolitan Horseman's Association Clubhouse	near 10909 Skyline Blvd.	5607
31	Joaquin Miller Park - Rotary Day	near 10909 Skyline Blvd.	5607
32	Joaquin Miller Park - Rotary Day Camp	near 10909 Skyline Blvd.	5607
33	Joaquin Miller Park - Sequoia Arena Restroom	near 10909 Skyline Blvd.	5607
34	Joaquin Miller Park - Siniwak Cabin	near 10909 Skyline Blvd.	5607
35	San Antonio Park Head Start Center	1701 East 19th St	6003
36	San Antonio Recreation Center	1701 East 19th St	6003
37	Manzanita Head Start Center	2701 22nd Ave	6008
38	Manzanita Recreation Center	2701 22nd Ave	6008

No.	NAME	Address	Sub-Basin
39	Union Point - South Parking Lot (haz mat under pavement)	near 2311 Embarcadero	6103
40	Union Point - Union Hill (haz mat under hill)	near 2311 Embarcadero	6103
41	Animal Shelter	1101 29th Ave	6202
42	Peralta Hacienda Historical House	2465 34th Ave	80001
43	Coolidge House	2496 Coolidge Ave	80022
44	Peralta Hacienda Park - Community Center	2500 34th Av	80022
45	Peralta Hacienda - Restroom	near 2465 34th Ave	80101
46	Peralta Hacienda - Restroom	near 2465 34th Ave	80101
47	55th Avenue Head Start Center	1800 - 55th Ave	82002
48	Fremont Pool	4550 Foothill Blvd	82004
49	Fremont Pool - Locker Rooms & Mechanical Room	4550 Foothill Blvd	82004
50	Melrose Library	4805 Foothill Blvd	82004
51	Firehouse #18 Storage/Hose Tower	1700 50th Ave	82005
52	Rainbow Teen Center	5818 International Blvd	83002
53	Rainbow Recreation Center	5800 International Blvd	83201
54	Burckhalter Park - Restroom	4060 Edwards Ave	83404
55	McCrea Park - Caretaker House (vacant)	near 4498 Shepherd Street	83501
56	McCrea Park - Fly Casting Pools	near 4498 Shepherd Street	83501
57	Redwood Heights Recreation Center	3883 Aliso Ave	83501
58	Leona Lodge	4444 Mountain Blvd	83502
59	81st Avenue Library	1021 81st Ave	84003
60	Carter Gilmore Park - New Restroom	1390 66th Ave	84101
61	Firehouse #29	1016 66th Ave	84101
62	Firehouse #29 Garage	1016 66th Ave	84101
63	Martin Luther King, Jr. Branch	6833 International Blvd	84101
64	Officer Willie Wilkins Park - Restroom	near 9710 C Street	85202
65	Firehouse #20	1401 98th Ave	85205
66	Elmhurst Branch Library	1427 88th Ave	85211
67	Dunsmuir House - Barn	2960 Peralta Oaks Ct	85231
68	Dunsmuir House - Carriage House	2960 Peralta Oaks Ct	85231
69	Dunsmuir House - Chauffeur's House	2960 Peralta Oaks Ct	85231
70	Dunsmuir House - Chicken Coop	2960 Peralta Oaks Ct	85231
71	Dunsmuir House - Dinkelspiel House	2960 Peralta Oaks Ct	85231
72	Dunsmuir House - Gardener's House	2960 Peralta Oaks Ct	85231
73	Dunsmuir House - Mansion	2960 Peralta Oaks Ct	85231
74	Dunsmuir House - Milk House	2960 Peralta Oaks Ct	85231
75	Dunsmuir House - Pavilion	2960 Peralta Oaks Ct	85231
76	Dunsmuir House - Restroom	2960 Peralta Oaks Ct	85231
77	Dunsmuir House - Ticket Booth	2960 Peralta Oaks Ct	85231
78	Lake Chabot - Clubhouse	near 11450 Golf Links Rd	85231
79	Lake Chabot - former Caretaker's Mobile Home	near 11450 Golf Links Rd	85231
80	Lake Chabot - Maintenance Building A	near 11450 Golf Links Rd	85231

No.	NAME	Address	Sub-Basin
81	Lake Chabot - Maintenance Building B	near 11450 Golf Links Rd	85231
82	Lake Chabot - Maintenance Building C	near 11450 Golf Links Rd	85231
83	Lake Chabot - Maintenance Building D	near 11450 Golf Links Rd	85231
84	Lake Chabot - Maintenance Building E (not permanent building)	near 11450 Golf Links Rd	85231
85	Lake Chabot - Maintenance Building F (not permanent building)	near 11450 Golf Links Rd	85231
86	Lake Chabot - Restroom #1	near 11450 Golf Links Rd	85231
87	Lake Chabot - Restroom #2	near 11450 Golf Links Rd	85231
88	Lake Chabot - Restroom #3 (closed)	near 11450 Golf Links Rd	85231
89	Lake Chabot - Sewer Pump Station	near 11450 Golf Links Rd	85231
90	Lake Chabot - Snack Bar	near 11450 Golf Links Rd	85231
91	Sheffield Village Recreation Center	247 Marlow Dr	85231
92	Columbian Gardens - Community Building	near 9920 Empire Rd	86001
93	Brookfield (Ira Jinkins) Recreation Center	9175 Edes Ave	86002
94	East Oakland Sports Center	9161 Edes Ave	86002
95	Otis Spunkmeyer Field - Restroom	near Doolittle/Harbor Bay Pkwy	87001

4.7 FIVE-YEAR CAPITAL IMPROVEMENT PROGRAM (CIP)

The City's Sanitary Sewer Five (5) Year CIP Project Schedule is shown in Figure 4.2. The CIP Projects Schedule is provided in Table 4.7The Five-Year CIP Schedule will be updated each time the AMIP/SSMP is updated to reflect progress, findings of EBMUD's Regional Technical Support Program, and other developments which may occur during the life of the Consent Decree. The City has in 2019 initiated an effort to have prepared a Sewer Collection System Master Plan that will provide additional evaluations of both capacity and rehabilitation projects into the future as well as include evaluation of the lift stations and associated force mains. It is expected that this master plan with establish capital program project priority for at least ten years upon acceptance and adoption of the CIP by the City Council.

TABLE 4.7 CIP Projects Schedule

		Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Subbasin	**Project Title**	**19/20**	**20/21**	**21/22**	**22/23**	**23/24**	**24/25**
	Sanitary Sewer Root Foaming FY2016-19						
Citywide	On-call emergency repair 2019-2024	■	■	■	■	■	■
Citywide	Sanitary Sewer Master Plan	■	■	■			
Citywide	Capacity Upgrade		■	■	■	■	■
Citywide	Annual Inflow Correction Program		■	■	■	■	■
Citywide	Sanitary Sewer Root Foaming FY2019-21	■	■	■			
Citywide	Sanitary Sewer Root Foaming FY22-24				■	■	■
81014, 81013, 81202	**1001173** C329154 Task 3 - Maybelle Ave and Park Blvd	■					
83503*	Rehabilitation of Sanitary Sewer in the Area bounded by Redwood Road, Mountain Boulevard, Crestmont Drive, and Skyline Boulevard (83-503) Phase I	■					
84003	Rehabilitation of Sanitary Sewer in the Area bounded by Spencer Street, Hegenberger Expressway, International Boulevard, and 81st Avenue (84-003)	■					
	Rehabilitation of Parkridge Dr, Skyline Blvd., and Denton Ct Sanitary Sewer Pump Station	■					
81201	Rehabilitation of Sanitary Sewer in the Area bounded by 35th Avenue, Penniman Avenue, High Street, and Nevil Street (81-201)	■	■				
85202	Rehabilitation of Sanitary Sewer in the Area bounded by 103rd Avenue, International Boulevard, 98th Avenue, B Street, Elmhurst Avenue, E Street, and 92nd Avenue (85- 202)	■	■				
83001*	Rehabilitation of Sanitary Sewer in the Area bounded by International Boulevard, 57th Avenue, Coliseum Way, and 66th Avenue (83-001) Phase 1	■	■				

83102*	Rehabilitation of Sanitary Sewer in the Area bounded by 65th Avenue, Foothill Boulevard, 67th Avenue, and International Boulevard (83-102) Phase 1						

		Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Subbasin	**Project Title**	**19/20**	**20/21**	**21/22**	**22/23**	**23/24**	**24/25**
83102*	Rehabilitation of Sanitary Sewer in the Area bounded by 65th Avenue, Foothill Boulevard, 67th Avenue, and International Boulevard (83-102) Phase 2						
83001*	Rehabilitation of Sanitary Sewer in the Area bounded by International Boulevard, 57th Avenue, Coliseum Way, and 66th Avenue (83-001) Phase 2						
82005*	Rehabilitation of Sanitary Sewer in the Area bounded by 47th Avenue, Brookdale Avenue, Trask Street, 55th Avenue, and Princeton Street (82-005) - Phase 1						
81014	**1001173** C329154 Task 4 - 76th Ave & Bancroft Ave						
85211/85003	Various Locations SS Rehab: Auseon Ave (Plymouth & Birch), 85th Ave (Plymouth & Birch), 83rd Ave (Holly & Plymouth)						
5205	Sanitary Sewer Upgrades on 19th Street & Jackson Street						
City-Wide	On-Call Sanitary Sewer emergency Project FY 2016-17						
	Pump Station Improvements						
5601	Rehabilitation of Sanitary Sewer in the 2354(56-01)						
82005	Rehabilitation of Sanitary Sewer in the Area bounded by 47th Avenue, Brookdale Avenue, Trask Street, 55th Avenue, and Princeton Street (82-005) - Phase 2						
83403	Rehabilitation of Sanitary Sewer in the Area bounded by Foothill Boulevard, 44th Avenue, Coliseum Way, 42nd Avenue, International Boulevard, and 36th Avenue (81-002)						

86002	Rehabilitation of Sanitary Sewer in the Area bounded by Edes Avenue, Jones Avenue, Tunis Road, and Hegenberger Road (86- 002)						
83503	Rehabilitation of Sanitary Sewer in the Area bounded by Redwood Road, Mountain Boulevard, Crestmont Drive, and Skyline Boulevard (83-503) Phase 2						

5 MONITORING, MEASUREMENT, REPORTING, AND PROGRAM MODIFICATION

5.1 MEASURING PROGRESS

The effectiveness of the City's Asset Management Improvement Plan/Sanitary Sewer Management Plan (AMIP/SSMP) is tracked through Oakland Public Works' (OPW's) Asset Management Program by reviewing scheduled and completed work and by WDR biannual internal audits of the sewer program and the SSMP portions of this AMIP/SSMP. The resulting Audit Report will evaluate the effectiveness of the program and identify any deficiencies found or opportunities for improvement. Any changes or modifications resulting from the audit will be displayed in the AMIP/SSMP Change Log in Appendix B.

CityWorks Computerized Maintenance Management Software (CMMS) is used to log service requests and track preventive and corrective maintenance activities, condition assessments thru CCTV and emergency response. The sewer inspection history of any segment of pipe is electronically retrievable. This data will be used along with field observations and the Sewer Master Plan to develop condition ratings to aid in prioritizing future sewer rehabilitation projects, maintenance activities, and updating future AMIP/SSMP.

5.2 PROGRAM MONITORING

OPW produces monthly Asset Management Reports for each infrastructure element (streets, streetlights, traffic signals, etc.) which describe the work done during the previous month and progress toward achieving annual goals. The Asset Management Report for sewers has been modified to include reporting on the goals specified in Section 1.3.1. The Director of Public Works holds monthly meetings with each to review progress. This progress is and will continue to be used to monitor work on implementing this AMIP/SSMP.

5.2.1 CONSENT DECREE ANNUAL REPORTS

Paragraph 139 of the Consent Decree states:

"By September 30th of each Fiscal Year [sic]… each Defendant shall submit to Plaintiffs, with a copy to Intervenors, an annual progress report ("Annual Report") covering the period July 1st through June 30th of the prior Fiscal Year."

Beginning September 30, 2015, and by September 30th of each year thereafter, the City of Oakland will submit Annual Reports to the USEPA summarizing implementation of this AMIP/SSMP. Copies of the signed report will be sent to:

- State Water Resources Control Board (SWRCB);
- Regional Water Quality Control Board (RWQCB);
- Baykeeper and Our Children's Earth; and
- East Bay Municipal Utilities District (EBMUD).

Paragraphs 141 – 145, 165 – 167 and 172 -176 of the Consent Decree contain details of approximately 90 items to be monitored and reported in the Annual Report. Systems have been established to track these items.

A copy of the Annual Report will be posted on the City's website and kept in the City's files.

5.2.2 INTERNAL SSMP PROGRAM AUDITS

The WDR requires enrolled agencies to conduct internal audits of the effectiveness and deficiencies in implementation of the sanitary sewer program and SSMP, on at least a biannual basis. The depth of the audit should be appropriate to the size of the system, and number of sewer overflows that may have occurred over the audit period. The City's Compliance Officer is responsible to see that these audits are conducted and that a formal audit report is prepared, kept on file, and made available to the Regional and/or State Water Board. The audit must focus on the City's compliance with the SSMP requirements in the WDR, and should include the identification of any deficiencies, and action(s) necessary to correct those deficiencies.

6 ASSET MANAGEMENT IMPROVEMENT PLAN/SANITARY SEWER MANAGEMENT PLAN READOPTION

Since approval by regulatory agencies of the Asset Management Improvement Plan/Sanitary Sewer Management Plan (AMIP/SSMP) the Consent Decree governs actions taken by the City of Oakland to maintain its Sewer Collection System.

6.1 REVIEW

Section XVIII of the Consent Decree contains Annual Reporting Requirements

6.2 PROGRAM MODIFICATIONS

If deficiencies or modifications are identified as part of the Annual Report or bi-annual audits, the AMIP/SSMP will be updated or changes will be cataloged. In some cases, program modifications may be assigned to a lead person – who will set the priority level and establish a schedule for implementation. Major modifications to the program will be submitted to EPA and other regulatory agencies for approval in accordance with Section XXIX, Modification, of the Consent Decree.

6.3 AMIP/SSMP Updates and Re-adoption

The SSMP portions of the AMIP/SSMP must be updated at least every five (5) years. Any significant program changes must be included. Recertification by the City Council is required in accordance with WDR Section D.14 when significant updates to the SSMP are made. Copies of all Council adoption documents shall be included in Appendix A or provided to the SWRCB, as required. To complete the re-certification process, the City designated LRO must enter and certify the date in the CIWQS SSO Database. In addition, records documenting all changes made to the SSMP since its last certification indicating when a subsection(s) of the SSMP was changed and/or updated, and who authorized the change or update, shall be maintained. These changes shall be attached to the AMIP/SSMP in the SSMP Change Log in Appendix B.

The LRO shall provide the publicly available internet web site address to the CIWQS SSO Database where a downloadable copy of the enrollee's approved SSMP, critical supporting documents referenced in the SSMP, and proof of local governing board approval of the SSMP is posted.

7 COMMUNICATION PLAN

Oakland's Public Works (OPW) understands it is important to clearly and effectively communicate with its residential and commercial customers. The public communication activities described here are in addition to the standard regulatory reporting efforts outlined in other parts of this plan.

7.1 INFORMATIONAL WEBSITE

The City of Oakland (City) maintains a website (www.oaklandnet.com) to inform the public about City activities. The website is updated often to make sure that it can be the first place the public can search on a particular issue.

Paragraph 4 of the Consent Decree states:

"Each Defendant shall provide a copy of this Consent Decree to all officers, employees, and agents whose duties might reasonably include compliance with any provision of this Consent Decree. Defendants may comply with the preceding sentence by providing a link to a web site."

The Consent Decree and the AMIP/SSMP have been posted on the website. *(See link under List of References section)*

The Sanitary Sewer page on the website will be updated with the revised AMIP/SSMP and all critical supporting documents (references). Consent Decree annual reports can be located on the City's website. *(See link under List of References section)*

7.2 CONSENT DECREE ANNUAL REPORT

The Annual Reports submitted to EPA by September 30th of each years since 2014, have been posted on the City's web site. Each report will be presented to the City Council's Public Works Committee and the City Council.

In addition, the WDR requires the City to prepare biannual internal audit of the SSMP portions of the AMIP/SSMP to evaluate the effectiveness of the implementation of the sewer program and the SSMP as well as the identify any deficiencies in the implementation. The internal audit must result in the preparation a formal written and certified Internal Audit Report. The Audit Report will be presented to the City Council's Public Works Committee and the City Council upon certification by the City LRO.

7.3 COORDINATION WITH OTHER AGENCIES AND CITIES

The City communicates and works with other agencies that retain regulatory authority over the City sanitary sewer system. The City also interacts with EBMUD and the six other agencies satellite to EBMUD as necessary. Agencies in the Bay Area Clean Water Agency (BACWA), meeting bimonthly in the Collection Committee to discuss relevant collection system issues.

7.4 HISTORICAL PERFORMANCE RESULTS

The City tracks several sewer system performance results in the consent decree annual reports. In addition, the City posts sanitary sewer overflow certified reports into the State of California Water Quality Tracking Database. The performance and overflow results are attached in Appendix E and will be updated each year along with the preparation of the CD annual reports. The performance result graphs are taken directly from the annual reports and from CIWQS and cover the period since the approval of the consent decree. The overflow graphs provide the City activity since the inception of reporting in the CIWQS system starting in 2007 and as of June 30, 2019. Future updates will be included in the appendix upon approval and submittal to the EPA no later than September 30th of each year.

APPENDIX A City Council Adoption Documents

Approved as to Form and Legality

City Attorney's Office

OAKLAND CITY COUNCIL

RESOLUTION NO. 87954 C.M.S.

INTRODUCED BY COUNCILMEMBER [IF APPLICABLE]

RESOLUTION APPROVING THE ASSET MANAGEMENT IMPLEMENTATION PLAN AND SANITARY SEWER MANAGEMENT PLAN – December 2019 AS REQUIRED BY THE STATE WATER RESOURCES CONTROL BOARD'S STATEWIDE GENERAL DISCHARGE REQUIREMENTS FOR SANITARY SEWER SYSTEMS AND THE 2014 FINAL CONSENT DECREE

WHEREAS, all entities, including municipalities, that own or operate sanitary sewer systems greater than one mile in length and convey wastewater to a publicly owned treatment facility in the State of California are required to comply with the orders issued by the Regional and State Water Boards related to managing sanitary sewer systems; and

WHEREAS, the State Water Board's General Wastewater Discharge Requirements mandates that each sewer system operator develop and implement a system-specific Sanitary Sewer Management Plan (SSMP) to facilitate proper funding and management of its sanitary sewer system; and

WHEREAS, the SSMP must include provisions to provide proper and efficient management, operation, and maintenance of sanitary sewer system, while taking into consideration risk management and cost benefit analysis, and must contain a spill response plan that establishes standard procedures for immediate response to a sanitary sewer overflow in a manner designed to minimize water quality impacts and potential nuisance conditions; and

WHEREAS, said plan must be updated every five (5) years, include any significant program changes, and must be re-certification by the governing board of the sewer system operator; and

WHEREAS, in addition to the State Water Board's requirement, the Sewer Consent Decree with the United States Environmental Protection Agency also requires the City to develop an Asset Management Implementation Plan (AMIP) for its sanitary sewer system, similar and complementary to, the SSMP; and

WHEREAS, the City has combined the SSMP and AMIP into a single document entitled, Asset Management Implementation Plan and Sanitary Sewer Management Plan (AMIP/SSMP); and

WHEREAS, the AMIP/SSMP (Plan) is responsive to both the requirements of the US EPA's Consent Decree and the State Water Board's Statewide General Wastewater Requirements for Sanitary Sewer Systems, and has been updated to reflect current organizational structure, operational procedure, and means and methods, for management of the sanitary sewer system; and

WHEREAS, as required by the State Water Resources Control Board, the Plan is intended to be made publicly available at the office of Public Works Department, on the City's website, and by uploading into the State Water Resources Control Board's California Integrated Water Quality System (CIWQS) database; now, therefore, be it

RESOLVED: That, by the City Council of the City of Oakland, the Asset Management Implementation Plan and Sanitary Sewer Management Plan completed in December 2019 is hereby approved.

IN COUNCIL, OAKLAND, CALIFORNIA, DEC 10 2019

PASSED BY THE FOLLOWING VOTE:

AYES - FORTUNATO BAS, GALLO, GIBSON MCELHANEY, KALB, REID, TAYLOR, THAO AND PRESIDENT KAPLAN – 8

NOES – 0

ABSENT – 0

ABSTENTION – 0

ATTEST: _____
LATONDA SIMMONS
City Clerk and Clerk of the Council of the
City of Oakland, California

Approved as to Form and Legality
City Attorney

OAKLAND CITY COUNCIL

RESOLUTION NO. 85437 C.M.S.

Introduced by Councilmember _____

RESOLUTION APPROVING THE SANITARY SEWER MANAGEMENT PLAN AS REQUIRED BY THE STATE WATER RESOURCES CONTROL BOARD'S STATEWIDE GENERAL DISCHARGE REQUIREMENTS FOR SANITARY SEWER SYSTEMS

WHEREAS, all entities, including municipalities, that own or operate sanitary sewer systems greater than one mile in length and convey wastewater to a publicly owned treatment facility in the State of California are required to comply with the orders issued by the Regional and State Water Boards related to managing sanitary sewer systems; and

WHEREAS, the State Water Board's General Wastewater Discharge Requirements requires each sewer system operator develop and implement a system-specific Sanitary Sewer Management Plan (SSMP) to facilitate proper funding and management of its sanitary sewer system; and

WHEREAS, such plan is required to be publicly available at the operator's office and/or on the Internet; and be approved by the governing board at a public meeting; and

WHEREAS, such plan must include provisions to provide proper and efficient management, operation, and maintenance of sanitary sewer systems, while taking into consideration risk management and cost benefit analysis. Additionally, a plan must contain a spill response plan that establishes standard procedures for immediate response to an SSO in a manner designed to minimize water quality impacts and potential nuisance conditions; and

WHEREAS, in addition to the State Water Board's requirement, the recently approved Sewer Consent Decree with the United States Environmental Protection Agency also requires the City to develop a Sanitary Sewer Asset Implementation Plan (AMIP) that is similar to the SSMP; and

WHEREAS, the City has revised its SSMP and incorporated to it additional components as required by the US EPA. The combined document is entitled the City of Oakland's Asset Management Implementation Plan and Sanitary Sewer Management Plan (AMIP/SSMP); and

WHEREAS, the AMIP/SSMP (Plan) is responsive to both the requirements of the US EPA's Consent Decree and the State Water Boards' Statewide General Wastewater Requirements for Sanitary Sewer Systems; and

WHEREAS, as required by the State Water Resources Control Board, the Plan is publicly available at the office of Public Works Department and on the Internet at the following Link: http://www2.oaklandnet.com/oakca1/groups/pwa/documents/report/oak050527.pdf ; now, therefore, be it

RESOLVED, by the City Counsil of the City of Oakland that the Asset Management Plan and Sanitary Sewer Management Plan completed in October 2014 is hereby approved and a copy of said Plan shall continue to be posted on the City of Oakland's website.

IN COUNCIL, OAKLAND, CALIFORNIA, MAR 03 2015, 20____

PASSED BY THE FOLLOWING VOTE:

AYES - BROOKS, CAMPBELL WASHINGTON, GALLO, GUILLEN, KALB, KAPLAN, REID, and PRESIDENT GIBSON MCELHANEY — 8

NOES - 0

ABSENT - 0

ABSTENTION - 0

ATTEST: LaTonda Simmons

LaTonda Simmons
City Clerk and Clerk of the Council
of the City of Oakland, California

APPENDIX B **SSMP Change Log**

Date of Change	Type of Change[*]	AMIP/SSMP Section No.	Description	Authorized By

[*] Type A – Substantial policy/program change; Type B – Minor policy/program change; Type C – Minor administrative/clerical change.

APPENDIX C City of Oakland Overflow Emergency Response Plan

CITY OF OAKLAND

PUBLIC WORKS AGENCY • 250 FRANK H. OGAWA PLAZA OAKLAND • CALIFORNIA • 94612
(510) 238-3961 FAX (510) 238-6428 TDD (510) 238-7644

City of Oakland
Overflow Emergency Response Plan

Effective Date: December 21, 2019

Reviewed by:

Robert Kennedy, Interim Operations Manager

Jimmy Mach, Principal Civil Engineer

Tyree Jackson, Regulatory Compliance Officer

Approved by: Jason W. Mitchell, Director of Public Works

Signature: **Date:** 2/24/2020

City of Oakland
Overflow Emergency Response Plan

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City of Oakland
Overflow Emergency Response Plan

List of Acronyms

BMP	Best Management Practice
CCTV	Closed-Circuit Television
CIP	Capital Improvement Program
CIWQS	California Integrated Water Quality System
CMMS	Computerized Maintenance Management System
DS	Data Submitter
FOG	Fats, Oils, and Grease
FSE	Food Service Establishments
GRD	Grease Removal Device
I/I	Infiltration and Inflow
LRO	Legally Responsible Official
MS4	Municipal Separate Storm Sewer System
MRP	Monitoring and Reporting Program *(effective 9/9/13)*
NASSCO	National Association of Sewer Service Companies
O&M	Operations & Maintenance
OES	Office of Emergency Services, State of California
PACP	Pipeline Assessment & Certification Program
PLSD	Private Sewer Lateral Discharge
PM	Preventive Maintenance
POTW	Publicly Owned Treatment Works
QA/QC	Quality Assurance/Quality Control
R/R	Rehabilitation or Repair/Replacement
RWQCB	Regional Water Quality Control Board
SSMP	Sewer System Management Plan
SSO	Sanitary Sewer Overflow
SWRCB	State Water Resources Control Board
WDR	Waste Discharge Requirements
WWTP	Waste Water Treatment Plant

Definitions

Blockage – Occurs when the flow of wastewater is slowed or stopped but does not leave the sanitary sewer system.

Category 1 SSO – Discharges of untreated or partially treated wastewater of **any volume** resulting from a wastewater system failure or flow condition that:

- Reaches surface water and/or a stormwater drainage channel tributary to a surface water;
- or reaches a separate municipal stormwater system and is not fully captured and returned to the wastewater system, or not otherwise captured and disposed of properly. Any volume of wastewater not recovered from the municipal stormwater system is considered to have reached surface water – unless the stormwater system discharges to a dedicated groundwater infiltration basin.

Category *2 SSO* – Discharges of untreated or partially treated wastewater of 1,000 gallons or greater resulting from a wastewater system failure or flow condition that **do not reach surface water, a drainage channel, or the separate municipal stormwater system,** unless the entire SSO discharged to the stormwater system is fully recovered and disposed of properly.

Category *3 SSO* – All other discharges of untreated or partially treated wastewater resulting from a **wastewater** system failure or flow condition.

Enrollee – A public entity that owns or operates a sanitary sewer system and has submitted a complete and approved application for coverage under the SSS WDR.

Nuisance – California Water Code section 13050(m) defines nuisance as anything which meets all of the following requirements:

- Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property;
- Affects at the same time an entire community or neighborhood or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal;
- Occurs during the treatment or disposal of wastes.

Private Lateral Wastewater Discharge – sewer discharges that are caused by blockages or other problems within a privately owned lateral.

Residential/Commercial Backup – occurs when a blockage results in a sanitary sewer overflow (SSO) discharge onto private property.

Sanitary Sewer Overflow (SSO) – any overflow, spill, release, discharge or diversion of untreated or partially treated wastewater from the wastewater collection system. SSOs include:

- Overflows or releases of untreated or partially treated wastewater that reach the Waters of the State;

- Overflows or releases of untreated or partially treated wastewater that do not reach the Waters of the State; and
- Wastewater backups into buildings and/or onto private property that are caused by blockages or flow conditions within the publicly owned portion of a wastewater collection system.

Sanitary Sewer System – any system of pipes, pump stations, sewer lines, or other conveyances upstream of a wastewater treatment plant headworks used to collect and convey wastewater to the publicly owned treatment facility. Temporary storage and conveyance facilities (such as vaults, temporary piping, construction trenches, wet wells, impoundments, tanks, etc.) are part of the sanitary sewer system.

Service Lateral – A segment of pipe that connects a home or building to a sewer main, which may be located beneath a street or easement. The responsibility for maintaining a service lateral is solely that of the private property owner.

Storm Drain – For the purposes of complying with the SSS WDR, any pipe that is part of a Municipal Separate Storm Sewer System (MS4) used for collecting or conveying storm water.

Total Volume Reached Surface Water – Amount of wastewater discharged from a sanitary sewer system, private lateral, or collection system estimated to have reached surface water.

Total Volume Recovered – Amount of wastewater discharged that was captured and disposed of properly.

Untreated or partially treated wastewater – any volume of waste discharged from the sanitary sewer system upstream of a wastewater treatment plant headworks.

City of Oakland
Overflow Emergency Response Plan

Section 1 - Introduction

1.1 Purpose

The purpose of the Overflow Emergency Response Plan (OERP) is to provide protocols, procedures, and guidelines to ensure effective response to sanitary sewer overflows (SSOs) by City of Oakland (City) personnel. The plan establishes guidelines for the response to, containment and mitigation of, and documentation, notification, and reporting of sanitary sewer overflows which may occur within the City's service area, and/or emanate from the City's wastewater collection system.

1.2 Regulatory Requirement

State Water Resources Control Board Order No. 20006-0003-DWQ, §D.13(vi) states:

> *D.13.(vi)* ***Overflow Emergency Response Plan*** *- Each Enrollee shall develop and implement an overflow emergency response plan that identifies measures to protect public health and the environment. At a minimum, this plan must include the following:*
>
> *(a) Proper notification procedures so that the primary responders and regulatory agencies are informed of all SSOs in a timely manner;*
>
> *(b) A program to ensure appropriate response to all overflows;*
>
> *(c) Procedures to ensure prompt notification to appropriate regulatory agencies and other potentially affected entities (e.g. health agencies, regional water boards, water suppliers, etc.…) of all SSOs that potentially affect public health or reach the waters of the State in accordance with the MRP. All SSOs shall be reported in accordance with this MRP, the California Water Code, other State Law, and other applicable Regional Water Board WDR or NPDES permit requirements. The SSMP should identify the officials who will receive immediate notification;*
>
> *(d) Procedures to ensure that appropriate staff and contractor personnel are aware of and follow the Emergency Response Plan and are appropriately trained;*
>
> *(e) Procedures to address emergency operations, such as traffic and crowd control and other necessary response activities; and*
>
> *(f) A program to ensure that all reasonable steps are taken to contain and prevent the discharge of untreated and partially treated wastewater to waters of the United States and to minimize or correct any adverse impact on the environment resulting from the SSOs, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge.*

Development and implementation of the action and procedures prescribed within this plan are authorized under the following:

- Health & Safety Code Sections 5410 - 5416
- Fish and Game Code Sections 5650 - 5656
- California Water Code Section 13271
- SWRCB Order Number 2006-0003-DWQ
- SWRCB Order Number WQ 2013-0058-EXEC

1.3 SSO Response Policy

Sewer Maintenance Division personnel are required to respond to any/all sanitary sewer overflows encountered when on assignment for the City. Response to an SSO includes, but is not limited to taking appropriate action to secure wastewater overflow area, properly report to the appropriate regulatory (or other affected) agencies, relieve the cause of the overflow, and ensure that the affected area is restored as soon as possible to minimize public exposure to health hazards and/or hazards to the environment. Standard operational procedures for response to SSO is included in this plan (see Appendix C).

The City's goal is to respond to SSOs as soon as possible upon notification. The City will follow notification and reporting procedures as set forth by the San Francisco Regional Water Quality Control Board (Regional Board) and the California State Water Resources Control Board (SWRCB), and per mutual agreement of select agencies/stakeholders within its service area.

City of Oakland
Overflow Emergency Response Plan

Section 2 – Notification (Internal)

2.1 First Responder Notification Priorities *(see Contact Hot Sheet for current personnel)*

The First Responder's notification priorities are:

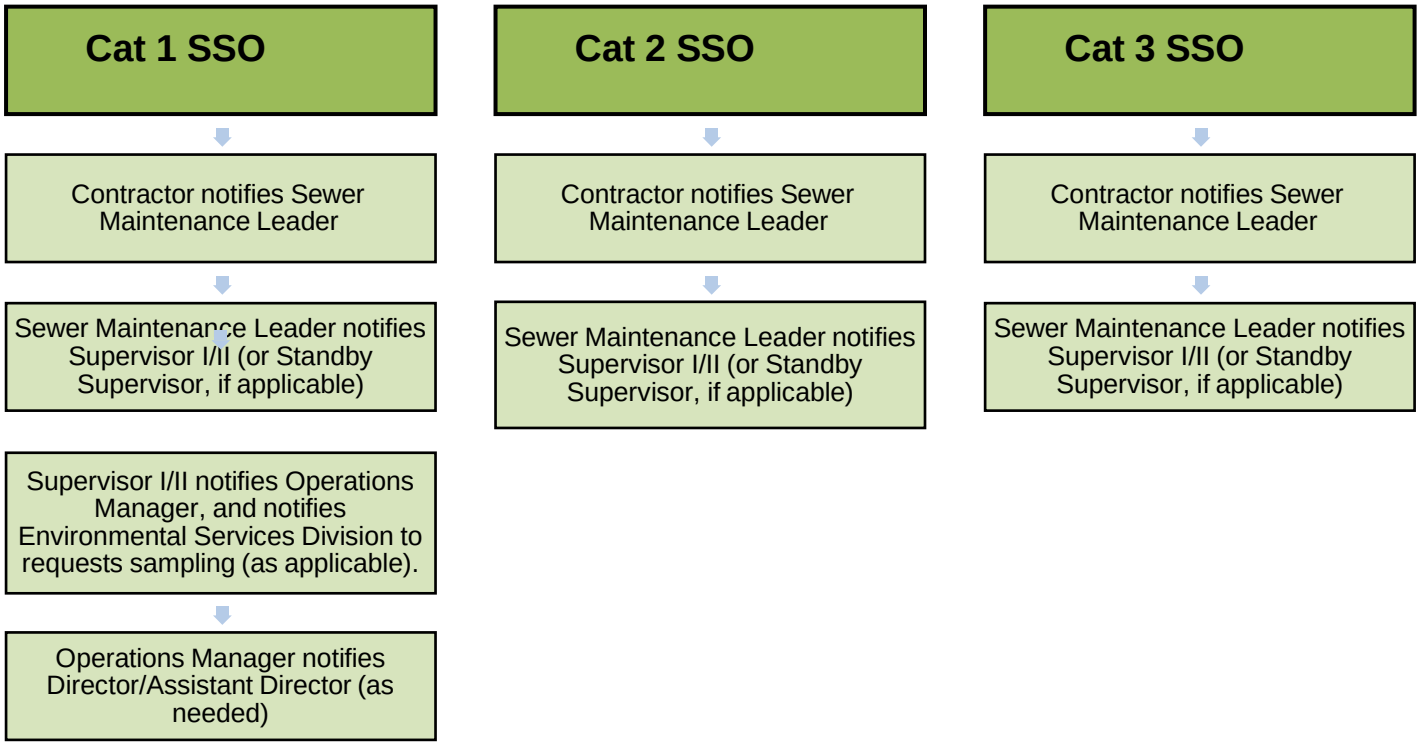
a. Standby or Immediate Supervisor (Sewer Division)

b. Operations Manager (Sewer Division)

c. Director/Assistant Director

2.2 Notification Procedure

***See Water Quality Monitoring Plan for notification details related to sampling/water quality monitoring.**



City of Oakland
Overflow Emergency Response Plan

Section 3 – Notification (External)

3.1 Notification Priorities

The First Responders and Supervisors/Managers notification priorities are:

a. CalOES

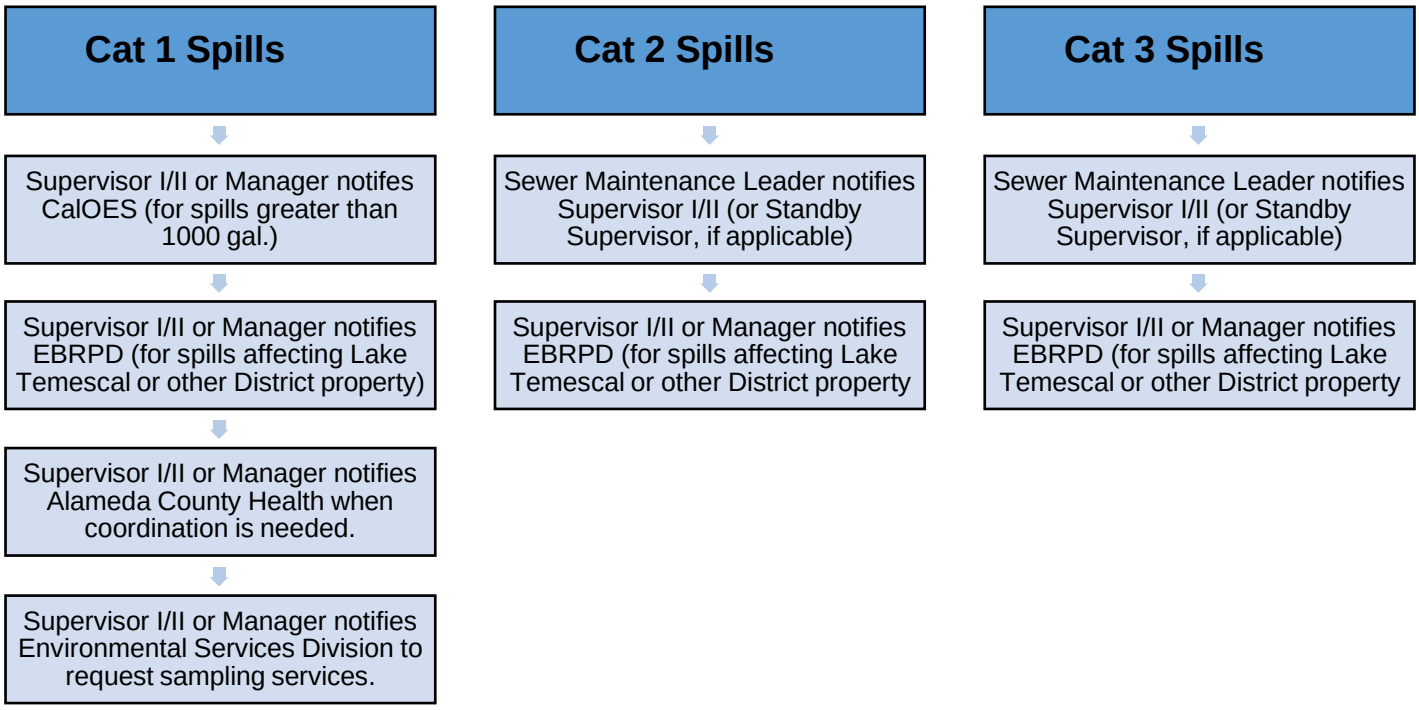
b. East Bay Regional Park District and/or East Bay Municipal Utility District (as applicable)

c. Alameda County Health

d. City of Oakland Environmental Services Division

Note: Within two hours of becoming aware of any **Category 1 SSO greater than or equal to 1,000 gallons (or any SSO in a location where it probably will be discharged to surface water)**, designated Responders must notify the California Office of Emergency Services (CalOES) at **(800) 852-7550**.

3.2 Notification Procedure *(See Appendix B – SSO Notification Protocol)*



Section 4 – SSO Response

4.1 First Responder Priorities

The First Responder's priorities are to:

1) Always follow safe work practices.
2) Respond promptly with the appropriate tools and equipment.
3) Document all spill response activity.
4) Initiate spill containment immediately (wherever feasible).
5) Break stoppage and restore the flow (as quickly as possible).
6) Minimize public exposure to (and/or contact with) wastewater contaminants.
7) Capture and return any/all spilled wastewater to the sewer system.
8) Notify designated Public Works Supervisor, Manager and Director/Asst. Director in event of any Category 1 SSO.

4.2 Initial Response Action

The First Responder must investigate the complaint by contacting the reporting party, and/or dispatching to the problem site to visually check for actual (or potential) sewer stoppages or overflows.

The First Responder should:

- Note arrival time at the site of the overflow/backup.
- Verify the existence of a sewer system spill or backup. ***(photo)***
- Determine if the overflow or blockage is caused by a public or private sewer. ***(photo)***
- Identify and assess the affected area and extent of the spill.
- Contact caller (if time permits).

The First Responder must decide whether to proceed with relieving the blockage to restore flow, or to initiate containment measures. The following should guide this decision:

- For small spills (i.e., spills that are easily contained and are flowing less than 100 gpm) – proceed with attempts to relieve the blockage. **15 min. max, then initiate containment measures.**
- For moderate or large spills (i.e. spill is flowing more than 100 gpm) where spill can be easily contained – proceed with the containment measures.
- For moderate or large spills (i.e. spill is flowing more than 100 gpm) where containment is difficult (i.e. during wet-weather events) – proceed with attempts to relieve the blockage. **90 min. max, then initiate bypass measures.**

4.3 Photo Documentation

To ensure appropriate photo documentation, First Responders (and/or other SSO investigators) should follow these guidelines:

- Place an object near the overflow area (i.e. safety cone, 5-gallon bucket, tape measure, etc.) to give the picture a scale of reference.
- In addition to close-up photos, take pictures of the entire scene (20yd – 40yd, wide-angle, landscape).
- Take pictures upon arrival, during and after corrective action, and post-SSO event.
- Take pictures of any specialty tools and/or equipment used.
- Take pictures of all containment/mitigation efforts, blockage material captured and removed from the sewer, and clean-up action.
- Take pictures of any damaged property (public or private).
- Take pictures of condition of manholes upstream AND downstream of the site of the overflow.

4.4 Restoration of Flow

Identify (and use) the appropriate tools and equipment to relieve stoppages and restore flow. Whenever possible, set up downstream of the blockage and hydro-jet/machine-rod upstream from a clear manhole (i.e. channel or outlet pipe is visible).

Prior to breaking the stoppage, an attempt should be made to inspect the pipe with CCTV to determine the direct cause of the blockage.

Attempt to remove the material that caused the blockage from the system, and observe restored flow over a 20 min. – 40 min. period to ensure that the blockage does not recur downstream. **If the blockage cannot be cleared within a reasonable time from first arrival (90 min. max) or the pipe must be repaired in order to restore flow, then initiate containment and/or bypass pumping.**

4.4.1 How to Relieve a Stoppage with a Rodding Machine

Identify the location of the stoppage.
Take photos of the overflowing structure and spill area.
Locate overflowing manhole or rodding inlet. Isolate plugged portion by finding non-surcharged manhole(s) connected to overflowing manhole(s).
Set up on non-surcharged manhole (typically located directly downstream of the blockage). **Depending on access or safety concerns, it may be necessary to set up on the upstream manhole*
Breaking the Stoppage
Attach an undersized auger to the rod (i. e. 4” auger for a 6” line) and lower into the line.
Rotate the auger (slowly) and work into the blockage, back and forth, until you can push all the way through the plug.
Run the tool up to the end of the line, then pull back (without rotating the rod) to cut out more of the plug while retracting the rod and auger.

Follow Up Maintenance
Once the blockage is relieved and full (or partial) flow is observed in the manhole, then change to a spring-blade cutter to remove any remaining debris.

4.4.2 How to Relieve a Stoppage with a Hydro-flusher

Identify the location of the stoppage.
Take photos of the overflowing structure and spill area.
Position vehicle/sewer cleaning equipment at the manhole directly downstream of the blockage. **On steep lines where the setup manhole is less than 5 feet deep, take necessary precautions to prevent an overflow of overspray water from the hydro-jet by using*
Breaking the Stoppage
Select a penetrating nozzle with a small angle (i.e. 15 degrees) for most blockages. **A rotating cutter-nozzle may be needed for hard-material plugs in the pipeline.*
Lower the hose, nozzle extension and nozzle into the manhole and into the pipe invert. **If using a ROLLER GUIDE, insert the hose as far as possible (but AT LEAST 3 FEET) into the pipe before using the lower roller guide and engaging the water pressure.*
Run the line with just enough pressure to reach the plug. When you reach the plug the hose should stop.
Adjust the water pressure to the level appropriate for the type of plug, pipe and situation. **Check maintenance records for prior notices about property owner toilets bubbling or overflowing from over-pressurized lines. If this is a concern, use a lower pressure to prevent backups.*
If the hose does not advance, pull back on it and then re-engage into the blockage. Repeat the steps until the hose breaks through the plug. ** If the hose breaks through and the line is still plugged, run the hose until you hit another plug, then repeat the steps again.*
Always jet the line a few feet at a time, returning the debris to the setup manhole. Remove debris so further plugs are not created downstream.
Once you hear or see the rush of water, turn off the pressure until the water level drops in the line.
Follow Up Maintenance
Once the flow is back to normal, run the hose up to the next manhole to ensure that the line is free of all plugs.
Check the upstream manholes to make sure the line is open and flowing without obstruction.

4.5 Containment and Mitigation

A reasonable attempt to contain sewer overflows must be made, whenever possible. Containment becomes more difficult if the overflow reaches the stormwater collection system or a drainage channel, because wastewater can rapidly contaminate receiving waters such as creeks, streams, and other bodies of water. During dry weather, the stormwater collection system can be used to store the overflow – if it can be plugged downstream, or if the downstream stormwater pump station can be deactivated.

The first responder should attempt to contain as much of the spilled wastewater as possible, using the following steps:

1. Determine the immediate destination of the overflowing wastewater.
2. For spills that enter a storm drain inlet:
    a. If the spill can be contained in the nearby surface area, then plug, cover, or make a berm around the storm drain inlet(s) using pneumatic (or mechanical) plugs, rubber spill mats, and/or sandbags;
    b. If the spill cannot be contained on the nearby surface area, then locate a dry location downstream of where the wastewater enters the storm drain, and attempt to interrupt the flow by plugging or damming the storm drain pipe or waterway.
3. Use a hydro-vacuum or bypass pump to extract the contained wastewater and return it to the collection system (at another location).
4. In some instances, it may be feasible to divert wastewater into a paved (or unpaved) containment area. The wastewater can be returned to the system, or the contaminated soil removed and disposed of, after the blockage has been relieved and flow restored.

4.5.1 Options for Containing the Overflow (Typical)

Overflow onto paved surface:
Place rubber mats at the catch basin or inlet.
Place sand bags in the gutter and around catch basin or inlet.
Use plastic sheeting to prevent the flow from advancing toward storm drain and culverts.
Dig an earthen trench or build a berm to create a pond.

Overflow into building:
Evacuate affected people, if necessary.
Avoid electrical shock by turning power off if outlets or other energized equipment is wet or sitting in water.

Use sand bags and plastic sheeting (as necessary) to contain spill inside a structure.

Overflow into storm drain or drainage channel (dry-weather only): Trace the overflow in the storm drain system to its downstream end (use tracer dye if needed).
Plug (or block) all affected stormwater collection system outlets.
Turn off storm water pump station (if applicable).
Use hydro-vacuum, or bypass pump, to recover spilled wastewater and return to the sewer system.

Cleanup and disinfection procedures should be implemented to reduce the potential for harm to human health and adverse environmental impacts. Where cleanup and disinfection is beyond the capabilities of City staff, then a hazardous waste mitigation contractor should be used.

For private property:

City crews are responsible for the cleanup when the property damage is minor in nature and is outside of private building dwellings. In all other cases, affected property owners should call a water damage restoration (or hazardous-waste mitigation) contractor to complete the cleanup and disinfection. *If the failure of the City's system is the definite cause of the overflow, then City claim forms may be issued (if requested) by the property owners.

Hard-surface areas:

Collect all signs of wastewater solids and wastewater-related debris either by protected hand, or with the use of rakes and brooms. Wash down the affected area with clean (dechlorinated) water until the water runs clear. Take reasonable steps to contain and dispose of the wash-down water.

Repeat the process, as necessary.

Landscaping and unimproved vegetation:

Collect all signs of wastewater solids and wastewater-related debris either by protected hand, or with the use of rakes and brooms. Disinfect the surrounding area with 10:1 water to bleach (or other disinfectant). Turn soil with rake to spread surface area contact with disinfectant.

Natural waterways:

The Department of Fish and Wildlife will be notified by CalOES as appropriate in the event of:

- Fish kill;
- SSO greater than or equal to 1,000 gallons;

Fish and Wildlife will provide the professional guidance needed to effectively clean up spills that occur in sensitive water environments. Any water that is used in the cleanup should be de-chlorinated prior to use.

In the event an overflow occurs at night, then the location should be inspected first thing the following day. The field crew should look for any signs of wastewater solids and wastewater-related material that may warrant additional cleanup activities.

4.6 Hazard Control/Exposure Prevention

Sewer Maintenance Division personnel are required to take appropriate action to secure wastewater overflow area, install temporary advisory signage, establishing appropriate traffic control (as necessary), and ensuring that the affected area is restored as soon as possible to minimize public exposure to health hazards and/or hazards to the environment.

Signage advising of hazardous conditions should be posted, and barricades put in place, to keep vehicles and pedestrians away from contact with spilled wastewater. Signage should remain in place until analytical reports indicate acceptable contaminant levels, or City staff are directed by the appropriated stakeholders to remove the signage and/or barricades.

Creeks, streams and beaches that have been contaminated as a result of an overflow should be posted at visible access locations until the risk of contamination has subsided to acceptable background bacteria levels. The warning signs, once posted, should be checked daily to ensure that they are still in place. Photographs of sign placement should be taken.

When contact with the local media occurs, the City's designated Public Information Officer will make any/all statements to the media, and provide any/all information relevant to the situation.

4.7 Volume Estimation

Sewer Maintenance Division personnel are required to provide estimates of the volume of wastewater discharged during an overflow. The purpose of the worksheet(s) included below is to capture the data and method(s) used in estimating the volume of an overflow. Since there are many variables and often unknown values involved, this calculation is just an estimate. It is useful to use more than one method, if possible, to validate the estimate. Additionally, volume estimates should NOT include wastewater that has been recovered and returned to the system. However, calculations methods listed below can (and should) be used to estimate recovered wastewater, as well.

The following methods were developed, and are commonly accepted, in the public domain. All methods that are used should be clearly indicated on the volume estimation worksheet (or applicable documentation):

- Eyeball Estimate Method
- Measured Volume Method
- Duration and Flow Rate Method (Account for diurnal flow pattern for long duration)
- SSO Flow Rate Estimating Diagram
- Other (i.e. estimated upstream per capita daily use; pump station telemetry; flow monitor data, etc.)

See Appendix C for additional SSO Volume Estimation Worksheets.

Eyeball Estimate Method

Imagine a bucket(s) or barrel(s) of water tipped over.

Size of bucket	How many?	Multiplier	Total Est. Volume (gal.)
5 gal. bucket		X5	
32 gal. trash bin		X32	
55 gal. drum		X5	

Total			

Measured Volume Method

This may take several calculations as odd shaped spills may have to be broken down into rectangles, circles, and/or polygons. It is important when guessing depth to measure in several locations (if possible), and use an average depth. The *SSO Volume Estimate by Area Work Sheet* can be used to sketch the shapes, if necessary.

1. Draw a sketch of the spill SSO Volume Estimate by Area Work Sheet, or use a photo copy of USD block book to draw on and attach it.
2. Draw shapes and dimensions used on your sketch.
3. Use correct formula for various shapes.

Geometric Shape	Formula
Rectangle	Length x Width x Depth
Circle	3.14 x radius^2 x diameter

Duration and Flow Rate Method

Event Data	Calculations
Start Date and Time:	Line 1.
End Date and Time:	Line 2.
Total time elapsed for overflow (Subtract Line 1 from Line 2):	Line 3.
Average flow rate (gpm):	Line 4.
Total estimated volume (Multiply Line 3 and line 4):	Line 5.

4.8 SSO Standard Operating Procedure

See Appendix A

Section 5 – Training & Field Exercises

5.1 Purpose

The training protocol has been developed to ensure that City staff, and select Contractors, are made aware of, are appropriately trained, and consistently follow the Overflow Emergency Response Plan. At a minimum, both Management, Supervisory, and Operational staff are expected to understand and/or execute procedures for:

- Using appropriate tools and equipment to contain and/or mitigate an overflow;
- Using appropriate tools and equipment to clear a blockage in sewer pipes in varying sizes (6 inches – 24 inches in diameter);
- Using appropriate tools and equipment to bypass a blockage in large-diameter sewer pipes (30 inches or greater);
- Using appropriate tools, equipment, and procedures, to investigate and/or test for water quality contaminants in affected waterways;
- Properly documenting an overflow event;
- Accurately completing SSO field reports, draft CIWQS SSO reports, and certified CIWQS SSO reports, in a timely manner;
- Appropriately notifying regulatory agencies and affected municipalities and/or utilities, when an overflow has occurred, and advising/warning the public, when the overflow may cause a nuisance to (or otherwise affect) human health and safety.

5.2 OERP Awareness

Under the direction of a registered LRO for the City of Oakland, Sewer Maintenance Division personnel will review the OERP biennially, and as part of the introductory training regimen for all probationary staff new to the Wastewater Collection System program. A hard-copy of the OERP will be made available to all staff (upon request).

In addition, select aspects of the OERP will be reviewed with all contracted service providers, when that service includes maintenance, inspection, and/or the general response to and dispatch of crews for, complaints or service requests associated with the wastewater collection system. Said review shall be documented and made a condition of eligibility for issuance of a contracted Task Order.

5.3 OERP Field Exercises

To ensure staff maintains the appropriate level of readiness, the following field exercises will be conducted annually by a registered LRO for the City of Oakland, or a qualified third-party instructor:

- SSO volume estimation;
- Comprehensive SSO response (i.e. 360 SSO Drill);
- Bypass setup and operation;
- Wastewater ammonia testing.

5.4 SSO Notification and Reporting

To ensure staff understands and meets all notification and reporting requirements, the following training will be conducted annually (and in some cases in conjunction with other SSO trainings) by a registered

LRO for the City of Oakland, or a qualified third-party provider:

- Submitting and certifying CIWQS SSO Reports;
- Completing SSO Field Report forms:
- Notification requirements and inter/intra-agency notification protocols for SSOs.

5.5 Training and Field Exercise Program

As a general guideline, the following training and field exercises will be provided to staff on a regularly occurring basis. A reasonable attempt to cover all training topics relevant to this OERP will be made, with the understanding that some training topics not currently identified in the document may be substituted for topics listed below.

In addition, topics and trainings may be implemented ad hoc, and at the discretion of the Director of Public Works (or his/her designated authority).

5.5.1 SSO Training and Field Exercise Program

Training Topic	Type/Description	Trainees	Frequency
Regulatory compliance/ OERP	Classroom/ Review of OERP, WDR, and MRP requirements.	Sewer Maintenance Division; Wastewater Engineering Division; Environmental Compliance Division	Every 2 years; Promotion/New-hire
SSO volume estimation	Classroom (with hands-on/field exercise component)/ Review of different methods to make (and document) volume estimations.	Sewer Maintenance Division	Annually; Refresher, as needed
360 SSO Drill	Field exercise/ Comprehensive review and practice of SSO response activities.	Sewer Maintenance Division	Every 3-5 years;
Bypass setup/operation	Field exercise/ Review of equipment and practice setup and operation.	Sewer Maintenance Division;	Annually; Refresher, as needed
Sampling/WQM	Classroom (with hands-on/field exercise component)/ Review of appropriate methods for composite and/or grab sampling, test-strip analysis.	Sewer Maintenance Division; Environmental Compliance Division	Every 2 years; Promotion/New-hire
SSO Reporting	Classroom (with hands-on application)/ Overview of CIWQS SSO reporting module for DS and LRO.	Sewer Maintenance Division;	Every 2 years; Promotion/New-hire; Refresher, as needed

City of Oakland
Overflow Emergency Response Plan

Appendix A

2019 City of Oakland Sanitary Sewer Overflow Response Manual & Templates

CITY OF OAKLAND

2019 City of Oakland Sanitary Sewer Overflow Response Manual & Templates

CAL OES Office of Emergency Services Contact Number: **Phone1 (800) 852-7550**

"Estimated spill volumes subject to change"

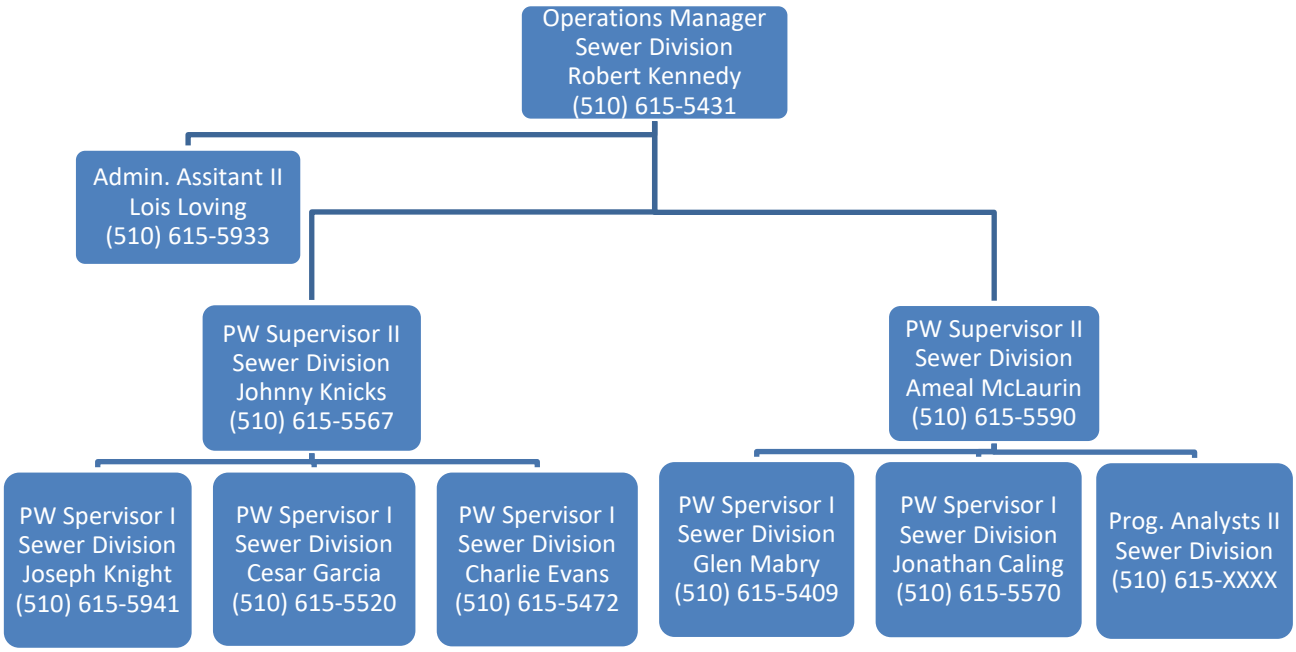
- The City of Oakland Sewer System is experiencing an SSO at Give the location
- The estimated spill volume is Provide estimated volume, which is subject to change
- The spill has been contained and our crew is currently working on our cleanup efforts
- The spill is ongoing as we are working on clearing the impacted sewer line

Senior Supervisor: **Johnny Nicks** (510)-615-5567
Senior Supervisor: **Ameal McLaurin** (510)-615-5590

1. Supervisor I: **Joseph Knight** (510)-615-5941office / (510)-773-0999 cell
2. Supervisor I: **Cesar Garcia** (510)-615-5520 office / (510)-453-7006 cell
3. Supervisor I: **Charlie Evans** (510)-615-5472 office / (510)-925-7780 cell
4. Supervisor I: **Glen Mabry** (510)-615-5409 office / (510)-919-6674 cell
5. Supervisor I: **Jonathan Caling** (510)-615-5570 office (510)-457-5071 cell

Operations Manager: **Robert Kennedy** (510)-615-5431

Contact only if you cannot get ahold of any other Supervisor



CATEGORIES	DEFINITIONS
CATEGORY 1	Discharges of untreated or partially treated wastewater of any volume resulting from an enrollees sanitary sewer system failure or flow condition that: Reach surface water and/or reach a drainage channel tributary to surface water; or Reach a municipal separate storm sewer system and are not fully captured and returned to the sanitary sewer system or not otherwise captured and disposed of properly. Any volume of wastewater not recovered from the municipal separate storm sewer system is considered to have reached surface water unless the storm drain system discharges to dedicated stormwater or groundwater infiltration basin (e.g., infiltration pit, percolation pond).
CATEGORY 2	Discharges of untreated or partially treated wastewater of **1,000 gallons or greater** resulting from an enrollee's sanitary sewer system failure or flow condition that **do not** reach surface water, a drainage channel, or a municipal separate storm sewer system unless the entire SSO discharged to the storm drain system is fully recovered and disposed of properly.
CATEGORY 3	All other discharges of untreated or partially treated wastewater resulting from an enrollees sanitary sewer system failure or flow condition.

1. Sanitary sewer overflow (SSO) - Any overflow, spill, release, discharge or diversion of untreated or partially treated wastewater from a sanitary sewer system. SSOs include: (i) Overflows or releases of untreated or partially treated wastewater that reach waters of the United States; (ii) Overflows or releases of untreated or partially treated wastewater that do not reach waters of the United States; and (iii) Wastewater backups into buildings and on private property that are caused by blockages or flow conditions within the publicly-owned portion of a sanitary sewer system.

2. Nuisance - California Water Code section 13050, subdivision (m), defines nuisance as anything which meets all of the following requirements: a. Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property. b. Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal. c. Occurs during, or as a result of, the treatment or disposal of wastes.

3. When a sanitary sewer overflow occurs, the Enrollee shall take all feasible steps and necessary remedial actions to

    a. Control or limit the volume of untreated or partially treated wastewater discharged,
    b. Terminate the discharge, and
    c. Recover as much of the wastewater discharged as possible for proper disposal, including any wash down water. The Enrollee shall implement all remedial actions to the extent they may be applicable to the discharge and not inconsistent with an emergency response plan, including the following:
        i. Interception and rerouting of untreated or partially treated wastewater flows around the wastewater line failure;
        ii. Vacuum truck recovery of sanitary sewer overflows and wash down water;
        iii. Cleanup of debris at the overflow site;
        iv. System modifications to prevent another SSO at the same location;
        v. Adequate sampling to determine the nature and impact of the release; and
        vi. Adequate public notification to protect the public from exposure to the SSO.
4. The Enrollee shall properly, manage, operate, and maintain all parts of the sanitary sewer system owned or operated by the Enrollee, and shall ensure that the system operators (including employees, contractors, or other agents) are adequately trained and possess adequate knowledge, skills, and abilities.
5. The Enrollee shall allocate adequate resources for the operation, maintenance, and repair of its sanitary sewer system, by establishing a proper rate structure, accounting mechanisms, and auditing procedures to ensure an adequate measure of revenues and expenditures. These procedures must be in compliance with applicable laws and regulations and comply with generally acceptable accounting practices.

6. **Overflow Emergency Response Plan** - Each Enrollee shall develop and implement an overflow emergency response plan that identifies measures to protect public health and the environment. At a minimum, this plan must include the following:

    a. Proper notification procedures so that the primary responders and regulatory agencies are informed of all SSOs in a timely manner;
    b. A program to ensure an appropriate response to all overflows;
    c. Procedures to ensure prompt notification to appropriate regulatory agencies and other potentially affected entities (e.g. health agencies, Regional Water Boards, water suppliers, etc.) of all SSOs that

potentially affect public health or reach the waters of the State in accordance with the MRP. All SSOs shall be reported in accordance with this MRP, the California Water Code, other State Law, and other applicable Regional Water Board WDRs or NPDES permit requirements. The SSMP should identify the officials who will receive the immediate notification;

d. Procedures to ensure that appropriate staff and contractor personnel are aware of and follow the Emergency Response Plan and are appropriately trained;
e. Procedures to address emergency operations, such as traffic and crowd control and other necessary response activities; and
f. A program to ensure that all reasonable steps are taken to contain and prevent the discharge of untreated and partially treated wastewater to waters of the United States and to minimize or correct any adverse impact on the environment resulting from the SSOs, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the discharge.

Southern Section Collection Systems Committee

5gpm

25gpm

50gpm

100gpm

R View

View

150gpm

200gpm

300gpm

400gpm

R View

View

Providing Training for Collection System Personnel Since 1991

To continuously increase the level of professionalism of Collection Systems personnel involved in the operation, maintenance, design and construction of Wastewater Collection Systems, by providing education and training, taking an active role in promoting certification, and recognizing proficiency in our field.

City of Oakland AMIP/SSMP - 2019

SUBJECT:		Provide direction for crews that respond to Sanitary Sewer Over-Flows (SSO's)
INTENT:		Process for the Assessment, Response, and Documentation of a Sanitary Sewer Over-Flow
RESPONSIBLE PERSON:		Public Works Supervisor I/ Public Works Supervisor II & Sewer Maintenance Leader
CRITICAL TIMING:		Year-Round
INVOLVED INDIVIDUALS:		Public Works Supervisor II's (Sewers) and Operations Managers (Sewers)
PROCEDURES:		Receive, Assess, and Responds to (All) Emergency Sanitary Sewer Over-Flows related to call from OPW Call Center and OFD Dispatch Center
REVIEW:		Review annually in July

Supervision

The response city staff will take regarding and Sanitary Sewer Over-Flow (SSO). Crew(s) are to use their best efforts to arrive at the overflow location and initiate response activities as soon as possible, with a goal of initiating response no later than 60 minutes after receipt of the report by the Call Center. Concurrently, the Sewer Maintenance Crew notifies a Sewer Maintenance Supervisor, who initiates the regulatory reporting process. The Sewer Maintenance Supervisor monitors the SSO response and provides additional help if necessary.

Required Training

All Public Works Supervisor II's, Supervisor I's and Sewer Maintenance Leaders responding to Sanitary Sewer Over-flows are required to complete the **CIWQS** training regarding SSO Reporting in the California Integrated Water Quality System, overflow estimating, assessments and initial documentation. This training will consist of reviewing the SOP defining the expectations of call receipt, incident, or call assessment, callout procedures, and all related SOPs and any other relevant policies. The training will occur in January and July of each year.

1. CIWQS training
    a. Situation Assessment
    b. Spill volume estimation
    c. Documentation process
    d. Containment and Clean-up

Assessment of Calls from the PWA Call Center

If it is clear that the incident requires an immediate response, the supervisor fielding the call will contact the appropriate staff as soon as possible (within 60min) and assign the SSO work-order. (Sewer maintenance Leader, Sewer Maintenance Worker) Concurrently the fielding Supervisor will create a Cityworks work-order for the active SSO once they have confirmed the SSO.

Upon arrival at the spill site, the Sewer Maintenance Leader will begin to assess the situation to determine what course of action needs to be taken. Once the situation has been assessed and preventative measures have been delegated to the Sewer Maintenance Worker, the Sewer Maintenance Leader needs to begin the initial documentation process.

The first responder's priorities are:

- To follow safe work practices.
- To respond promptly with the appropriate and necessary equipment.
- To contain the spill wherever feasible.
- To restore the flow as soon as practicable.

- To minimize public access to and/or contact with the spilled sewage.
- To promptly notify the Public Works Supervisor in event of major SSO.
- To return the spilled sewage to the sewer system.
- To restore the area to its original condition (or as close as possible).
- To photograph and document affected and unaffected areas from a spill.

Initial Response- The first responder will: **Call CalOES 1 (800) 852-7550 and notify them of the SSO incident with an estimated volume which is subject to change.**

- If the spill is large or in a sensitive area, document conditions upon arrival with photographs. Decide whether to proceed with clearing the blockage to restore the flow or to initiate containment measures. The guidance for this decision is:
  - Small spills (i.e., spills that are easily contained) – proceed with clearing the blockage.
  - Moderate or large spill where containment is anticipated to be simple – proceed with the containment measures.
  - Moderate or large spills where containment is anticipated to be difficult – proceed with clearing the blockage; however, whenever deemed necessary, call for additional assistance and implement containment measures.

Initial documentation and notification process

- The reporting Employee will use the SSO binder provided to document the SSO event for either a Category I, II, III spill and follow the instructions within the binder.
  - Determine if the overflow or blockage is from a public or private sewer.
- Take photos Pre-spill clean up (Justifies our estimating process) and Post-spill clean-up(showing containment and the affected area which was cleaned up)
- Upon completion of the response to the Emergency SSO, the responding "Lead" employee will complete the "SEWER INCIDENT RE-CALL LOG." This document will

SSO Response Closeout

- Complainant Follow-up, the employee taking the lead role in the response shall follow-up with the complainant and notify them of our completed work. If the said complainant is not available a door hanger shall be left with all of the relevant contact information for the City and information regarding our clean up activities.
- Upload all photos of the spill so they can be attached to the Cityworks work order.
- Upload the CCTV video footage

QA/QC and CIWQS Documentation

- Supervisor I and Sewer Maintenance Leader shall gather all of the necessary documents to complete the initial file for the SSO incident and review prior to delivering to the Assigned LRO
- Supervisor II Ameal McLaurin will ensure the incident information is updated on the SSO Job Board
- Supervisor II Ameal McLaurin will Draft the SSO incident into CIWQS
- Supervisor II Johnny Nicks will then Certify the SSO event

Callouts from Daupler (After Hours)

When a callout is made by Daupler, a response within 60 minutes is expected. The on-call sewer employee fielding the call will coordinate the equipment needed and report to the scene. (Sewer Supervisor I, Sewer Maintenance Leader, and Sewer Maintenance Worker) Concurrently Daupler will create a Cityworks work-

request and assign it to the responding sewer employee which will start the documenting process for the emergency SSO response.
Upon arrival at the spill site, the Sewer Employee will begin to assess the situation to determine what course of action needs to be taken. **(Initial Response)** Once the situation has been assessed and preventative measures have been delegated to the assisting Sewer Maintenance Worker, the Sewer Maintenance Leader needs to begin the initial documentation process.

The first responder's priorities:

- To follow safe work practices.
- To respond promptly with the appropriate and necessary equipment.
- To contain the spill wherever feasible.
- To restore the flow as soon as practicable.
- To minimize public access to and/or contact with the spilled sewage.
- To promptly notify the Public Works Supervisor in event of major SSO.
- To return the spilled sewage to the sewer system.
- To restore the area to its original condition (or as close as possible).
- To photograph and document affected and unaffected areas from a spill.

Initial Response-The first responder will:

- If the spill is large or in a sensitive area, document conditions upon arrival with photographs. Decide whether to proceed with clearing the blockage to restore the flow or to initiate containment measures. The guidance for this decision is:
  - Small spills (i.e., spills that are easily contained) – proceed with clearing the blockage.
  - Moderate or large spill where containment is anticipated to be simple – proceed with the containment measures.
  - Moderate or large spills where containment is anticipated to be difficult – proceed with clearing the blockage; however, whenever deemed necessary, call for additional assistance and implement containment measures.

Initial documentation and notification process

- The reporting Employee will use the SSO binder provided to document either a Category I, II, III spill and follow the instructions within the binder.
  - Determine if the overflow or blockage is from a public or private sewer.
- Take photos of the spill in process (Justifies our estimating process)
- Take photos post-spill (showing containment and the affected area which was cleaned up)
- Upon completion of the response to the Emergency SSO, the responding "Lead" employee will complete the "SEWER INCIDENT RE-CALL LOG." This document will

SSO Response Closeout

- Complainant Follow-up, the employee taking the lead role in the response shall follow-up with the complainant and notify them of our completed work. If the said complainant is not available a door hanger shall be left with all of the relevant contact information for the City and information regarding our clean up activities.
- Upload all photos of the spill so they can be attached to the Cityworks work order.
- Upload the CCTV video footage

QA/QC and CIWQS Documentation

- Supervisor I and Sewer Maintenance Leader shall gather all of the necessary documents to complete the initial file for the SSO incident and review prior to delivering to the Assigned LRO

- Supervisor II Ameal McLaurin will ensure the incident information is updated on the SSO Job Board
- Supervisor II Ameal McLaurin will Draft the SSO incident into CIWQS
- Supervisor II Johnny Nicks will then Certify the SSO event
- CIWQS Email is sent to all LRO's in the system for QA/QC

SANITARY SEWER OVER-FLOW STANDARD OPERATING PROCEDURE
During Work Hours- Incoming Complaints from Call Center

Assesment:
1. Supervisor I will field the call and verfiry in the SSO in the field.
Once verified the **Supervisor I** will dispatch a Sewer Maintenance Leader and crew to the scene
2. Next the **Supervisor I** will create a CityWorks Work Order for the SSO event folder

1st responder:
1. Supervisor I/Sewer Maintenance Leader takes site condition photo's of SSO and containment procedures
2. Make the area safe for the public
3. Determine flow volume and Spill Category (I,II, or III spill)
4. Call CalOES 1 (800) 852-7550: Inform them of the SSO incident
"Provide then with an estimated volume which is subject to change"

2nd Responder:
1. Once verfied if the **Supervisor II** is needed they will report to the scene to assist staff
2. Provide general information to the effected parties (i.e, homeowner, business owner, etc)

Response Documentation:
1. Sewer Maintenance Leader begins documenation process
2. Initial condition photo of event (effected address and area effected)
3. Photograph compromised sewer structure (what asset caused the spill)
4. Post spill photo document the condition of the effected area after our clean-up
5. Use the SSO binder provided to document the SSO event for either a Category I, II, III spill and follow the instructions within the binder.

Initial Notifications:
1. Supervisor I will begin the notification process by calling neighboring/ effected Agencies EBRPD, PG&E, EBMUD, etc.

Primary Response:
1. Containment
2. Mitigation → (Photo document this entire process **Sewer Maintenance Worker & Supervisor I**)
3. Restoration

Internl Reporting:
1. Supervisor I and Sewer Maintenance Leader to work together on the SSO event
- **a.** Upload all photos of the event
- **b.** Review initial SSO binder documentation
- **c.** Finalize the CityWorks W.O. (notes and number)
- **d.** Work with **Supervisor II** to ensure the event is posted on the **SSO jobs board**
- **e.** Work with the **Supervisor II** to ensure necessary items have been checked off the intake folder checklist

Draft Reporting:
(Separate Sup. II)
1. Supervisor II (LRO) to create the draft CIWQS report within the required timeframe
2. Track the entire SSO event process and provide updates on current point in the process

Final Reporting:
(Separate Sup. II)
1. Supervisor II (LRO) to certify the final CIWQS report

Close-Out:
1. Supervisor II reviews SSO event file and ensures completenes for fileing
- a. Review checklist
- b. Finalize File Name Tab
- c. Place in secured filing cabinet

SANITARY SEWER OVER-FLOW STANDARD OPERATING PROCEDURE
After Hours- Incoming Complaints from Daupler

Assesment:
1. **Daupler** will field the call and dispatch a Sewer Maintenance Leader to verfiry SSO.
2. Sewer Maintenance Leader to verify complaint issue and confrim with Supervisor I

1st responder:
1. Sewer Maintenance Leader takes a condition photo of SSO and containment procedures
2. Make the area safe for the public
3. Determine flow volume and Spill Category (I, II, or III spill)
4. **Call CalOES 1 (800) 852-7550: Inform them of the SSO incident**

"Provide then with an estimated volume which is subject to change"

Response Documentation:
1. Sewer Maintenance Leader begins documenation process
2. Initial condition photo of event (effected address and area effected)
3. Photograph compromised sewer structure (what asset caused the spill)
4. Post spill photo document the condition of the effected area after our clean-up
5. Use the SSO binder provided to document the SSO event for either a Category I, II, or III spill and follow the instructions within the binder.

Initial Notifications:
1. Supervisor I will begin the notification process by calling neighboring/ effected Agencies EBRPD, PG&E, EBMUD, etc.

Primary Response:
1. Containment
2. Mitigation → (Photo document this entire process)
3. Restoration

Internl Reporting:
1. Supervisor I and Sewer Maintenance Leader to work together and create a CityWorks Work Order for the SSO event and prepair the SSO event folder
   a. Upload all photos of the event
   b. Review initial SSO binder documentation
   c. Finalize the CityWorks W.O. (notes and number)
   d. Work with Supervisor II to ensure the event is posted on the **SSO jobs board**
   e. Work with the Supervisor II to ensure necessary items have been checked off the intake folder checklist

Draft Reporting: (Separate Sup. II)
1. Supervisor II (LRO) to create the draft CIWQS report within the required timeframe
2. Track the entire SSO event process and provide updates on current point in the process

Final Reporting: (Separate Sup. II)
1. Supervisor II (LRO) to certify the final CIWQS report

Close-Out:
1. Supervisor II reviews SSO event file and ensures completenes for fileing
   a. Review checklist
   b. Finalize File Name Tab
   c. Place in secured filing cabinet

SEWER INCIDENT RE-CALL LOG – FIELD INSPECTION OR REMOTE SUPERVISION OF CREW

Supervisor's Name: Date:

Call Date / Time	Caller Name / Caller Phone #	Begin Time / End Time	Nature of Complaint / Type of Incident	Location of Incident	Resolution / Action Taken	SSO CAT I, II, III ---------- CWIQS #

Category 1 Spill Reporting Form

SSO Spill Report

CITY OF OAKLAND

CITY OF OAKLAND

Spill General Information

Spill Location Address: _____ Agency: City of Oakland Sanitary Sewer

WDID: 2SSO11204 _____ Sanitary Sewer System: Oalkand City CS

Spill - General Information

1 - Spill Type: (CAT. 1/ CAT. 2/ CAT. 3)

*2 - Estimated Spill Volumes

a) Estimated spill volume that reached a separate storm drain that flows to a

b) Estimated spill volume recovered from the separate storm drain that

c) Estimated spill volume that reached a drainage channel that flows to a surf

d) Estimated spill volume recovered from a drainage channel that flows to a s

e) Estimated spill volume discharged directly to a surface water body?

f) Estimated spill volume recovered from surface body of water?

g) Estimated spill volume discharged to land? (Includes discharges directly

h) Estimated spill volume recovered from the discharge to land? (Do not

Estimated Total spill volume to Reach Surface Water (a-b+c+e)	Estimated Total spill volume to Reach Land (g)	Estimated Total spill volume Recovered (b+d+f+h)	Estimated Total spill volume (a+c+e+g)

*3 - Did the spill discharge to a drainage channel and/or surface water?

*4 - Did the spill reach a storm drainpipe that is not part of a combined sewer

*5 - If spill reached a separate storm drainpipe, was all of the wastewater

CITY OF OAKLAND

SSO Spill Report

CITY OF OAKLAND

Physical Location Details

Map #	
Upstream/Down Stream Manhole #	Upstream ____ Downstream ____
Pipe Asset #	
***9 - County:**	Alameda County
***10 - Regional Water Quality Control Board:**	Region 2
11 - Spill location description: (easement or street)	
***12 - SSO12-Number Appearance Points**	
***13 - SSO13-Spill Appearance Point** Back-flow Prevention Device, Combined Sewer DI (Combined CS Only), Force Main, Gravity Mainline, Inside Building or Structure, Lateral Clean Out (Private), Lateral Clean out (Public), Lower Lateral (Private), Lower Lateral (Public), Manhole, Other Sewer system structure, Pump Station, Upper Lateral (Private), Upper Lateral (Public), **(If other you'll need to explain below)**	
***14 - SSO14-Appearance Pt Explain**	
****15 - Final Spill Destination** Beach, building or Structure, Combined Storm Drain (Combined CS only), Drainage Channel, Other (specify below), Paved Surface, Separate Storm Drain, Street/Curb and Gutter, Surface Water, Unpaved surface, **(If other you'll need to explain below)**	
16 - Explanation of final spill destination:	

SSO Spill Report

CITY OF OAKLAND

CITY OF OAKLAND

*17 - Estimated spill start date/time: ____ date ____ time Date Format: MM/DD/YYYY

*18 - Date and time sanitary sewer system agency was notified of or discovered spill: ____ date ____ time Date Format: MM/DD/YYYY

*19 - Estimated Operator arrival date/time: ____ date ____ time Date Format: MM/DD/YYYY

**20 - Estimated spill end date/time: ____ date ____ time Date Format: MM/DD/YYYY

**21 - Spill Cause:
(Debris from Construction, Debris-General Debris-Rags, Debris-Wipes, Grease Deposition (FOG), Other specify below, Pipe Structure Problem/ Failure, Root Intrusion)

22 - Spill cause explanation:

**23 - Where did failure occur?
(Gravity Mainline, Manhole, Pump Station-Mechanical)

24 - Explanation of where the failure occurred:

**25 - Was the spill associated with a storm event? ____

26 - Diameter of sewer pipe at the point of blockage or failure: ____ inches

27 - Material of sewer pipe at the point of blockage or failure: ____

**29 - Spill response activities:
Cleaned-up, Contained all or portion of spill, Mitigated Effects of Spill, Other (specify below), Other enforcement agency notified, Property owner notified, Restored flow, Returned all spill to Sanitary Sewer System, (If other specify below)

30 - Explanation of spill response activities:

**31 - Spill response completion date: ____ date ____ time Date Format: MM/DD/YYYY

CITY OF OAKLAND

SSO Spill Report

CITY OF OAKLAND

**32 - Spill corrective action taken:
Added sewer to preventative maintenance program, Adjusted schedule/method of preventative maintenance, enforcement action against FOG source, Inspected Sewer Using CCTV to Determine Cause, Other (specify below), Plan rehabilitation or replacement of sewer, Repaired Facilities or Replaced Defect **(If other specify below)**

33 - Explanation of spill corrective action taken:

**34a - Is there an ongoing investigation? Yes/No

34b - Reason for ongoing investigation?

35 - Visual inspection results from impacted receiving water:

**36 - Health warning posted? Yes/No

**37 - Did the spill result in a beach closure (If YES, answer question 38)? Yes/No

**38 - Name of impacted beach(es) (enter NA if None):

39 - Name of impacted surface water(s) (enter Un-named tributary to XXXXX where XXXXX is the name downstream tributary if receiving surface water body is un-named):

SSO Spill Report

**44 - Explanation of volume estimation method used:
(Volume per household, Count connections, Manhle flow-rate chart, Simulated visual chart)

45 - Cal OES Control Number

46 - Cal OES Called Date/Time ____ date ____ time Date Format: MM/DD/YYYY

*47(a) - Name and Title (contact person who can answer specific questions about this SSO)

*47(b) - Contact Person Phone Number

Incident Commander On-Site: _____ Date: _____
(Supervisor I/II or Sewer Maintenance Leader)

- [x] Check the boxes that you have completed
- [ ] Pictures of the SSO event uploaded to Cityworks
- [ ] Cityworks work-order # ____ work-order #
- [ ] CCTV video footage uploaded

Category 2 Spill

SSO Spill Report

CITY OF OAKLAND

Spill General Information

Spill Location Address: _____ Agency: City of Oakland Sanitary Sewer

WDID: 2SSO11204 _____ Sanitary Sewer System: Oalkand City CS

Spill - General Information

1 - Spill Type: (CAT. 1/ CAT. 2/ CAT. 3)

*2 - Estimated Spill Volumes

a) Estimated spill volume that reached a separate storm drain that flows to a surface water body?

b) Estimated spill volume recovered from the separate storm drain that flows to a surface water body? (Do not include water used for clean-up)

c) Estimated spill volume that reached a drainage channel that flows to a surface water body?

d) Estimated spill volume recovered from a drainage channel that flows to a surface water body?

e) Estimated spill volume discharged directly to a surface water body?

f) Estimated spill volume recovered from surface body of water?

g) Estimated spill volume discharged to land? (Includes discharges directly to land, and discharges to storm drain system or drainage channel that flows to a storm water infiltration/

h) Estimated spill volume recovered from the discharge to land? (Do not include water used for clean-up)

Estimated Total spill volume to Reach Surface Water (a-b+c+e)	Estimated Total spill volume to Reach Land (g)	Estimated Total spill volume Recovered (b+d+f+h)	Estimated Total spill volume (a+c+e+g)

*3 - Did the spill discharge to a drainage channel and/or surface water?

*4 - Did the spill reach a storm drainpipe that is not part of a combined sewer

*5 - If spill reached a separate storm drainpipe, was all of the wastewater

SSO Spill Report

Physical Location Details

Map #			
Upstream/Down Stream Manhole #		Upstream	Downstream
Pipe Asset #			
*9 - County:	Alameda County		
*10 - Regional Water Quality Control Board:	Region 2		
11 - Spill location description: (easement or street)			
*12 - SSO12-Number Appearance Points			
*13 - SSO13-Spill Appearance Point			

Back-flow Prevention Device, Combined Sewer DI (Combined CS Only), Force Main, Gravity Mainline, Inside Building or Structure, Lateral Clean Out (Private), Lateral Clean out (Public), Lower Lateral (Private), Lower Lateral (Public), Manhole, Other Sewer system structure, Pump Station, Upper Lateral (Private), Upper Lateral (Public), (If other you'll need to explain below)

*14 - SSO14-Appearance Pt Explain	
**15 - Final Spill Destination Beach, building or Structure, Combined Storm Drain (Combined CS only), Drainage Channel, Other (specify below), Paved Surface, Separate Storm Drain, Street/Curb and Gutter, Surface Water, Unpaved surface, (If other you'll need to explain below)	
16 - Explanation of final spill destination:	

SSO Spill Report

CITY OF OAKLAND

CITY OF OAKLAND

*17 - Estimated spill start date/time: ____ date ____ time Date Format: MM/DD/YYYY

*18 - date and time sanitary sewer system agency was notified of or discovered spill: ____ date ____ time Date Format: MM/DD/YYYY

*19 - Estimated Operator arrival date/time: ____ date ____ time Date Format: MM/DD/YYYY

**20 - Estimated spill end date/time: ____ date ____ time Date Format: MM/DD/YYYY

**21 - Spill Cause: ____
(Debris from Construction, Debris-General Debris-Rags, Debris-Wipes, Grease Deposition (FOG), Other specify below, Pipe Structure Problem/ Failure, Root Intrusion)

22 - Spill cause explanation: ____

**23 - Where did failure occur? ____
(Gravity Mainline, Manhole, Pump Station-Mechanical)

24 - Explanation of where the failure occurred: ____

**25 - Was the spill associated with a storm event? ____

26 - Diameter of sewer pipe at the point of blockage or failure: ____ inches

27 - Material of sewer pipe at the point of blockage or failure: ____

**29 - Spill response activities: ____
Cleaned-up, Contained all or portion of spill, Mitigated Effects of Spill, Other (specify below), Other enforcement agency notified, Property owner notified, Restored flow, Returned all spill to Sanitary Sewer System, (If other specify below)

30 - Explanation of spill response activities: ____

**31 - Spill response completion date: ____ date ____ time Date Format: MM/DD/YYYY

SSO Spill Report

CITY OF OAKLAND

CITY OF OAKLAND

**32 - Spill corrective action taken:
Added sewer to preventative maintenance program, Adjusted schedule/method of preventative maintenance, enforcement action against FOG source, Inspected Sewer Using CCTV to Determine Cause, Other (specify below), Plan rehabilitation or replacement of sewer, Repaired Facilities or Replaced Defect (If other specify below)

33 - Explanation of spill corrective action taken:

**34a - Is there an ongoing investigation? ☐ Yes/No

35 - Explanation of volume estimation method used:
(Volume per household, Count connections, Manhle flow-rate chart, Simulated visual chart)

*36(a) - Name and Title (contact person who can answer specific questions about this SSO)

*36(b) - Contact Person Phone Number

Incident Commander On-Site: _____ Date: _____
(Supervisor I/II or Sewer Maintenance Leader)

- ☑ Check the boxes that you have completed
- ☐ Pictures of the SSO event uploaded to Cityworks
- ☐ Cityworks work-order # ☐ work-order #
- ☐ CCTV video footage uploaded

Category 3 Spill

SSO Spill Report

CITY OF OAKLAND

Spill General Information

CITY OF OAKLAND

Spill Location Address: _____ Agency: City of Oakland Sanitary Sewer

WDID: 2SSO11204 _____ Sanitary Sewer System: Oalkand City CS

Spill - General Information

1 - Spill Type: (CAT. 1/ CAT. 2/ CAT. 3)

*2 - Estimated Spill Volumes

a) Estimated spill volume that reached a separate storm drain that flows to a surface water body?

b) Estimated spill volume recovered from the separate storm drain that flows to a surface water body? (Do not include water used for clean-up)

c) Estimated spill volume that reached a drainage channel that flows to a surface water body?

d) Estimated spill volume recovered from a drainage channel that flows to a surface water body?

e) Estimated spill volume discharged directly to a surface water body?

f) Estimated spill volume recovered from surface body of water?

g) Estimated spill volume discharged to land? (Includes discharges directly to land, and discharges to storm drain system or drainage channel that flows to a storm water infiltration/

h) Estimated spill volume recovered from the discharge to land? (Do not include water used for clean-up)

Estimated Total spill volume to Reach Surface Water (a-b+c+e)	Estimated Total spill volume to Reach Land (g)	Estimated Total spill volume Recovered (b+d+f+h)	Estimated Total spill volume (a+c+e+g)

*3 - Did the spill discharge to a drainage channel and/or surface water?

*4 - Did the spill reach a storm drainpipe that is not part of a combined sewer

*5 - If spill reached a separate storm drainpipe, was all of the wastewater

CITY OF OAKLAND

SSO Spill Report

CITY OF OAKLAND

Physical Location Details

Map #				
Upstream/Down Stream Manhole #		Upstream		Downstream
Pipe Asset #				
*9 - County:	Alameda County			
*10 - Regional Water Quality Control Board:	Region 2			
11 - Spill location description: (easement or street)				
*12 - SSO12-Number Appearance Points				
*13 - SSO13-Spill Appearance Point Back-flow Prevention Device, Combined Sewer DI (Combined CS Only), Force Main, Gravity Mainline, Inside Building or Structure, Lateral Clean Out (Private), Lateral Clean out (Public), Lower Lateral (Private), Lower Lateral (Public), Manhole, Other Sewer system structure, Pump Station, Upper Lateral (Private), Upper Lateral (Public), (If other you'll need to explain below)				
*14 - SSO14-Appearance Pt Explain				
**15 - Final Spill Destination Beach, building or Structure, Combined Storm Drain (Combined CS only), Drainage Channel, Other (specify below), Paved Surface, Separate Storm Drain, Street/Curb and Gutter, Surface Water, Unpaved surface, (If other you'll need to explain below)				
16 - Explanation of final spill destination:				

CITY OF OAKLAND

SSO Spill Report

CITY OF OAKLAND

*17 - Estimated spill start date/time: ____ date ____ time Date Format: MM/DD/YYYY

*18 - Date and time sanitary sewer system agency was notified of or discovered spill: ____ date ____ time Date Format: MM/DD/YYYY

*19 - Estimated Operator arrival date/time: ____ date ____ time Date Format: MM/DD/YYYY

**20 - Estimated spill end date/time: ____ date ____ time Date Format: MM/DD/YYYY

**21 - Spill Cause: ____
(Debris from Construction, Debris-General Debris-Rags, Debris-Wipes, Grease Deposition (FOG), Other specify below, Pipe Structure Problem/ Failure, Root Intrusion)

22 - Spill cause explanation: ____

**23 - Where did failure occur? ____
(Gravity Mainline, Manhole, Pump Station-Mechanical)

24 - Explanation of where the failure occurred: ____

**25 - Was the spill associated with a storm event? ____

26 - Diameter of sewer pipe at the point of blockage or failure: ____ inches

27 - Material of sewer pipe at the point of blockage or failure: ____

Cleaned-up, Contained all or portion of spill, Mitigated Effects of Spill, Other (specify below), Other enforcement agency notified, Property owner notified, Restored flow, Returned all spill to Sanitary Sewer System, (If other specify below) ____

29 - Explanation of volume estimation method used: ____
(Volume per household, Count connections, Manhle flow-rate chart, Simulated visual chart)

CITY OF OAKLAND

SSO Spill Report

CITY OF OAKLAND

*30(a) - Name and Title (contact person who can answer specific questions about this SSO)

*30(b) - Contact Person Phone Number

Incident Commander On-Site: _____ Date: _____
(Supervisor I/II or Sewer Maintenance Leader)

- [x] Check the boxes that you have completed
- [ ] Pictures of the SSO event uploaded to Cityworks
- [ ] Cityworks work-order # _____ work-order #
- [ ] CCTV video footage uploaded

City of Oakland
Overflow Emergency Response Plan

Appendix B

Sewer Overflow Communication and Notification Protocol for Lake Temescal

City of Oakland

Public Works – Bureau of Infrastructure & Operations

CITY OF OAKLAND

East Bay Regional Park District

Acquisition,Stewardship & Design- Stewardship Department

East Bay Regional Park District

Sanitary Sewer Overflow Notification Protocol
City of Oakland and East Bay Regional Park District

Effective Date: July 16, 2018

July 12, 2018
Date

Richard Battersby
Interim Assistant Director
City of Oakland Public Works

July 12, 2018
Date

Mathew Graul
Chief, Stewardship Department
East Bay Regional Park District

Sewer Overflow Communication and Notification Protocol for Lake Temescal

Oakland Public Works Department
Bureau of Infrastructure & Operations

&

East Bay Regional Park District
Stewardship Department

CITY OF OAKLAND

East Bay
Regional Park District

Emergency Operation and Notification Protocol

A. Subject
B. Intent
C. Responsible Party
D. Critical Timing
E. Chain of Communication
F. Emergency Response
G. Review
H. Attachments

A. Subject

This document is intended to clarify the interagency notification protocol in response to sanitary sewer overflows (SSOs) that discharge directly to, or otherwise affect, Temescal Regional Recreation Area (Lake Temescat).

Lake Temescal is part of the East Bay Regional Park District (Park District) and is open to the public for recreational swimming and fishing. The Park District regularly monitors the lake to ensure the water quality meets acceptable levels for recreational use. To address sanitary sewer overflows {or potential overflows) into Lake Temescal, the City of Oakland (City) and the Park District have developed this emergency communication and notification protocol.

B. Intent

The intent of this protocol is to:

- Ensure public health and safety of park visitors.
- Ensure effective communication between City and Park District in the event of sanitary sewer overflow, or potential thereof, into the lake by establishing a guideline for communication and clear notification protocols.
- Support environmental protection by facilitating a rapid response to contamination of the lake, or potential thereof, caused by sewer overflow from the City of Oakland's wastewater collection system.

C. Responsible Partv(s)

The following personnel are responsible for development, review, and implementation of the emergency response protocol:

City of Oakland	**East Bay Regional Park District**
Assistant Director, Public Works Agency	Chief of Stewardship
Public Works Operations Manager	Environmental Services Manager
Public Works Supervisor I & II	Water Management Supervisor

D. Critical Timing

Year-round

E. Chain of Communication

In the event of contamination (or suspected contamination) of Lake Temescal from a sanitary sewer overflow the following person(s), and/or entities, should be notified immediately:

City of Oakland

1. City of Oakland Call Center {Oak311) - 311 or (510) 615-5566 from outside Oakland
2. City of Oakland Public Works Supervisor - (510) 615-5969
3. City of Oakland Public Works Operations Manager (Sewers Division) – (510) 615-5431

East Bay Regional Park District

1. Park District Dispatch Emergency – (510) 881-1121
2. Park District Dispatch Non-Emergency - (510) 881-1833
3. Park District Park Supervisor - (510) 544-3090
4. Park District Water Management Supervisor - (510) 544-2328

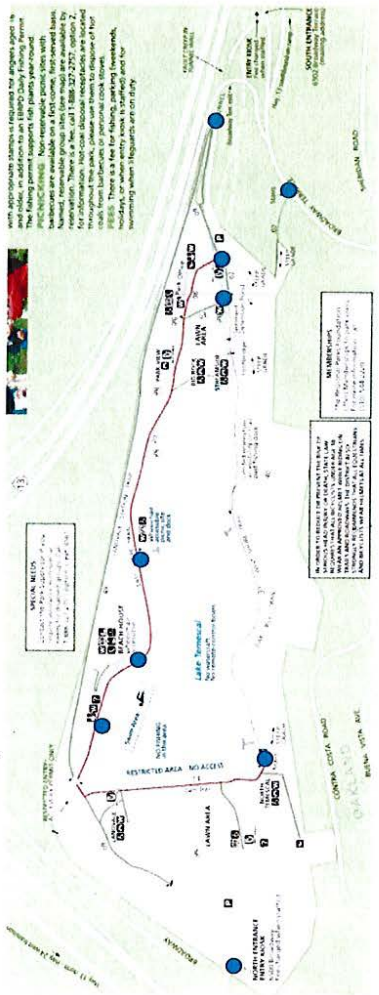
F. Emergency Response

In the event of sanitary sewer overflow (or suspected overflow) into Lake Temescal/Temescal Creek {above the lake), the following action shall be taken:

1. If an overflow or potential overflow is detected, or reported to either the City or Park District, then both entities will notify each other immediately, using the chain of communication indicated in *Item E. – Chain of Communication*.
2. Upon notification of a potential sewer overflow, the City will investigate the concern/complaint immediately. The investigation may include: dye-testing; and/or conducting water quality sampling and analysis for the following nutrients and/or bacteria: ammonia, fecal coliform, and E. coli. The purpose of the analysis is to confirm that a sanitary sewer overflow has occurred and resulted in contamination of the lake.
3. To facilitate spill response, the City will have the right and responsibility to enter Park District property for investigation and assessment, containment and mitigation of sewer overflow (if possible), and to post warning signs, as necessary.
4. City personnel will post warning signs at locations in/around the lake, at those locations pre-determined by Park District (see *Attachment A - Warning Sign locations).*
5. The City will also post warning signs in/around waterways upstream of Lake Temescal, and will maintain signage until all mitigation efforts have been completed and water quality monitoring indicates typical background levels.
6. The Park District may elect to substitute their own warning signs to provide increased visibility and notice any closure of the Lake. In this case, the District may remove the City's warning posts in/around the lake at its sole discretion, and will notify the City accordingly.

Appendix A – Warning Sign Posting Locations

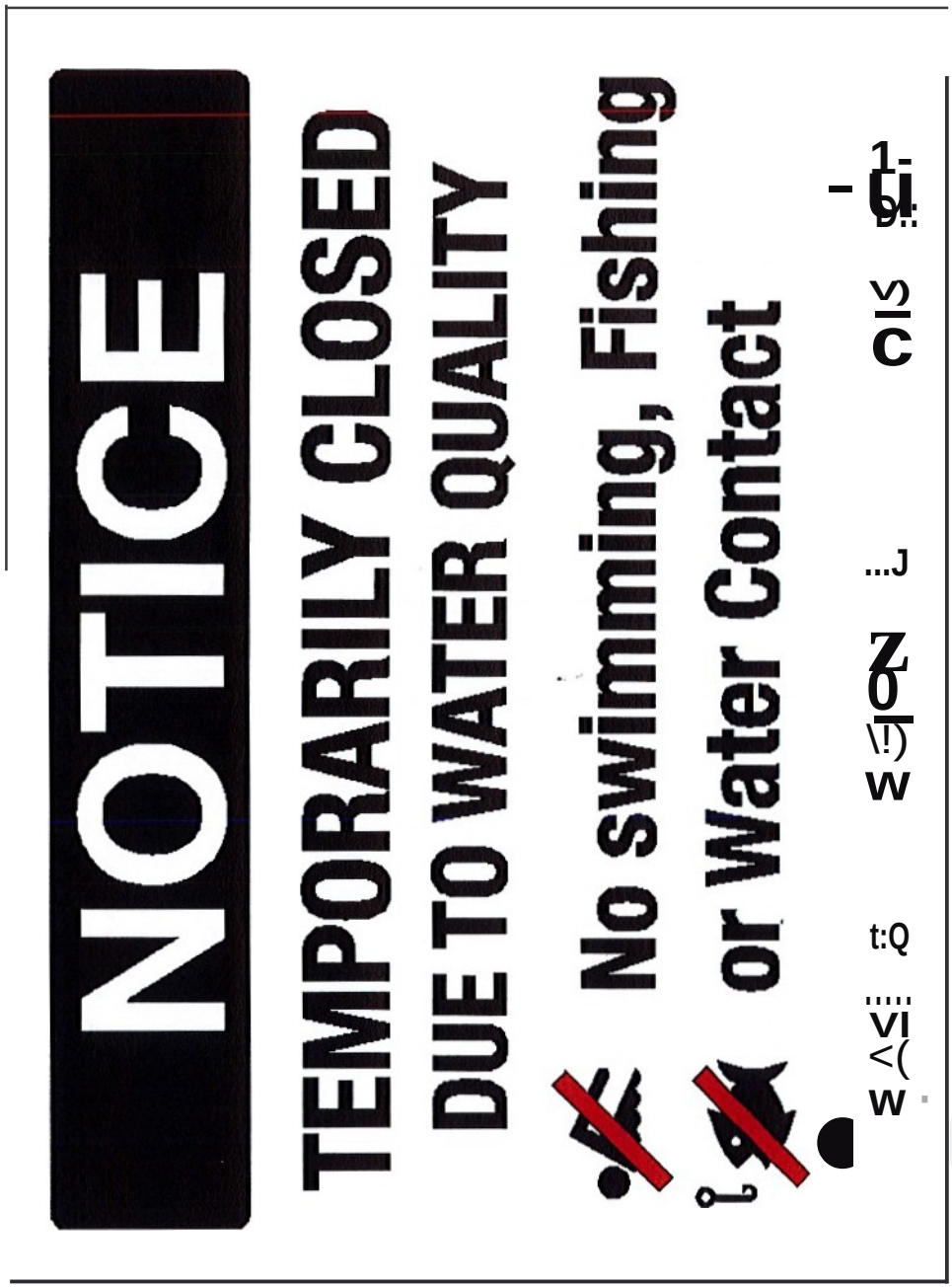
Lake Temescal SSO Sign Location Map



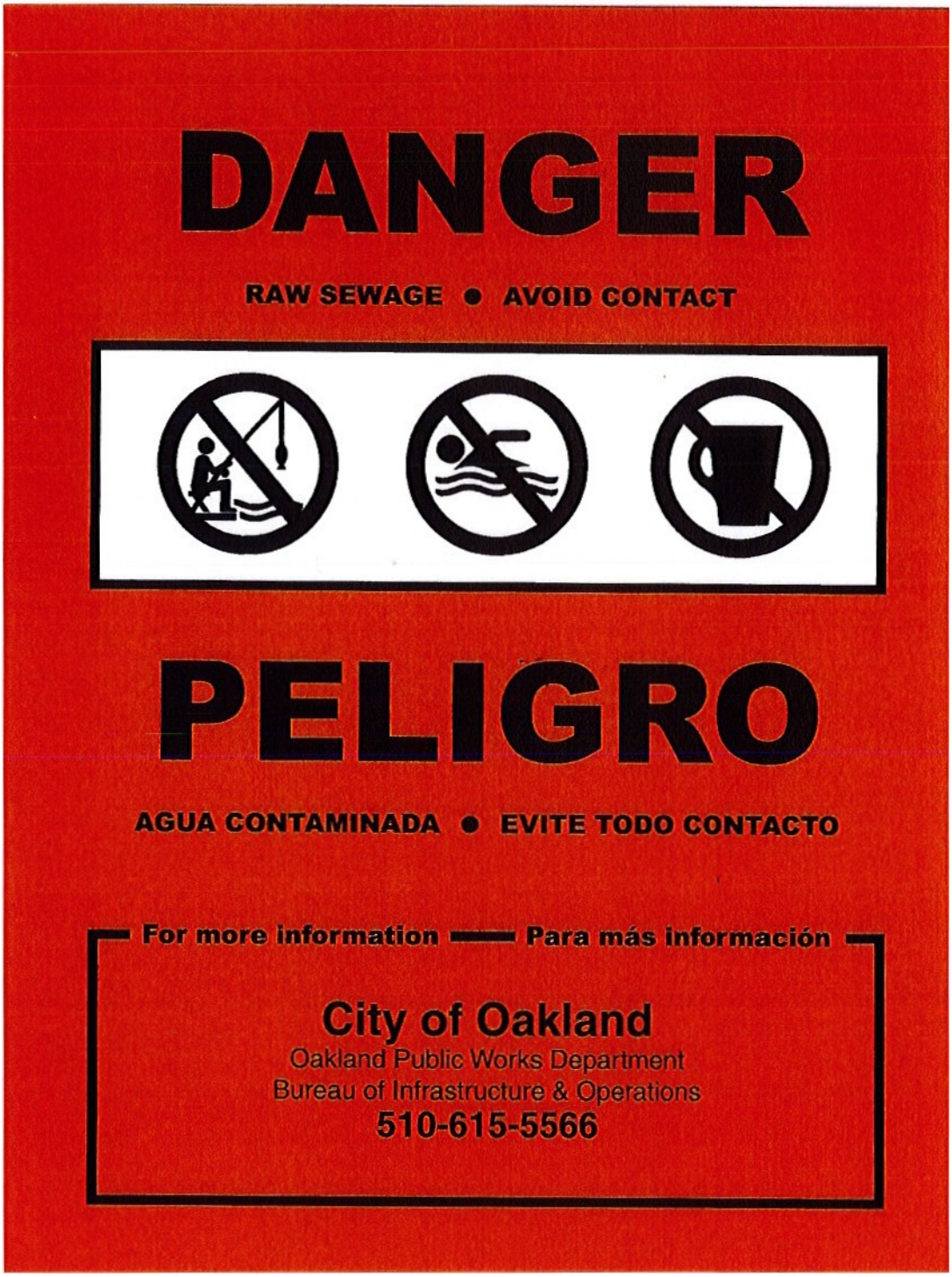
Sign Location List:

- North Entrance at Kiosk
- Swim Beach at Bulletin Board
- Swim Area at Water Fountain
- East Shore Trail at ADA Dock
- South Entrance at Broadway Terrace
- Trail Junction at Broadway Terrace
- South Parking Lot at Bulletin Board
- South start of West Shore Trail
- North start of West Shore Trail

Appendix B - Warning Sign (EBRPD)



Appendix C – Warning Sign (City of Oakland)



SSO Volume Estimation Worksheets

SSO Volume by Area Estimation Work Sheet

SSO Volume by Area Estimation Work Sheet

Surface: ☐ Asphalt ☐ Concrete ☐ Dirt ☐ Landscape ☐ Inside Building Other _____

(Draw / Sketch outline of Spill 'Footprint' and attach photos)

~~ Breakdown the 'Footprint' into Recognizable Shapes and Determine Dimensions of Each Shape ~~

Area #1_____ % Wet _____

☐ Stain. Depth1_____ Depth2 _____ Depth3 _____ Depth4 _____ Depth5 _____ Depth6 _____

Area #2_____ % Wet _____

☐ Stain. Depth1_____ Depth2 _____ Depth3 _____ Depth4 _____ Depth5 _____ Depth6 _____

Area #3_____ % Wet _____

☐ Stain. Depth1_____ Depth2 _____ Depth3 _____ Depth4 _____ Depth5 _____ Depth6 _____

Area #4_____ % Wet _____

☐ Stain. Depth1_____ Depth2 _____ Depth3 _____ Depth4 _____ Depth5 _____ Depth6 _____

Area #5_____ % Wet _____

☐ Stain. Depth1_____ Depth2 _____ Depth3 _____ Depth4 _____ Depth5 _____ Depth6 _____

SSO Volume by Area Estimation Work Sheet

Area #1 Square Feet: _ x % Wet = _ Sq/Ft

Ave Depth: _ ☐ Concrete 0.0026' ☐ Asphalt 0.0013'

Volume: _ Cu/Ft

Area #2 Square Feet: _ x % Wet = _ Sq/Ft

Ave Depth: _ ☐ Concrete 0.0026' ☐ Asphalt 0.0013'

Volume: _ Cu/Ft

Area #3 Square Feet: _ x % Wet = _ Sq/Ft

Ave Depth: _ ☐ Concrete 0.0026' ☐ Asphalt 0.0013'

Volume: _ Cu/Ft

Area #4 Square Feet: _ x % Wet = _ Sq/Ft

Ave Depth: _ ☐ Concrete 0.0026' ☐ Asphalt 0.0013'

Volume: _ Cu/Ft

Area #5 Square Feet: _ x % Wet = _ Sq/Ft

Ave Depth: _ ☐ Concrete 0.0026' ☐ Asphalt 0.0013'

Volume: _ Cu/Ft

Volume: _ Cu/Ft

Total::Volum

#1 _____ , #2 _____ , #3 _____ , #4 _____ , #5 _____ = *cu

*cu ft x 7.48 gallons = _ _____ **gallons spilled.**

SSO Volume by Area Estimation Work Sheet

CONVERSIONS

** To convert inches into feet: Divide the inches by 12.

Example: 27" / 12 = 2.25'

Or Use Chart A

Example: 1 ¾" = ?

1" (0.08') + ¾" (0.06') = 0.14'

** One Cubic Foot = 7.48 gallons of liquid.

Chart A

Conversion:

Inches	to	Feet
1/8"	=	0.01'
1/4"	=	0.02'
3/8"	=	0.03'
1/2"	=	0.04'
5/8"	=	0.05'
3/4"	=	0.06'
7/8"	=	0.07'
1"	=	0.08'
2"	=	0.17'
3"	=	0.25'
4"	=	0.33'
5"	=	0.42'
6"	=	0.50'
7"	=	0.58'
8"	=	0.67'
9"	=	0.75'
10"	=	0.83'
11"	=	0.92'
12"	=	1.00'

SSO Volume by Area Estimation Work Sheet

GEOMETRY

For the purposes of this work sheet, the unit of measurement will be in feet for formula

examples. Area is two-dimensional - represented in square feet. (Length x Width)

Volume is three-dimensional - represented in cubic feet. (Length x Width x depth) or (Diameter Squared) D^2 x 0.785 x depth.

A Note about Depth

Wet Stain on a Concrete Surface - For a stain on concrete, use 0.0026'. This number is 1/32" converted to feet. For a stain on asphalt use 0.0013' (1/64"). These were determined to be a reasonable depth to use on the respective surfaces through a process of trial and error by SPUD staff. A known amount of water (one gallon) was poured onto both asphalt and concrete surfaces. Once the Area was determined as accurately as possible, different depths were used to determine the volume of the wetted footprint until the formula produced a result that (closely) matched the one gallon spilled. 1/32" was the most consistently accurate depth on concrete and 1/64" for asphalt. This process was repeated several times.

Wastewater "Ponding" or Contained – Measure actual depth of standing wastewater whenever possible. When depth varies, measure several (representative) points, determine the average and use that number in your formula to determine volume.

Area/Volume Formulas

Area is two dimensional and is represented as Square Feet (Sq. Ft.)

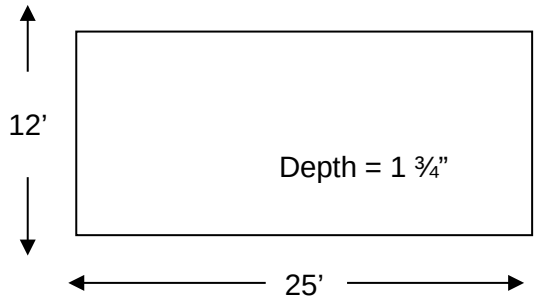
Volume is three dimensional and is represented as Cubic Feet (Cu. Ft.)

One Cubic Foot = 7.48 gallons

SSO Volume by Area Estimation Work Sheet

AREA/VOLUME OF A RECTANGLE OR SQUARE

Formula: **Length x Width x Depth** = Volume in Cubic Feet



Length (25') x Width (12') x Depth (0.14')

25' x 12' x 0.14' = 42 Cubic Feet.

Now the Volume in Cubic Feet is known.

There are 7.48 Gallons in one Cubic Foot

So, 42 Cubic Feet x 7.48 gallons/cubic feet = 314 Gallons

Chart A

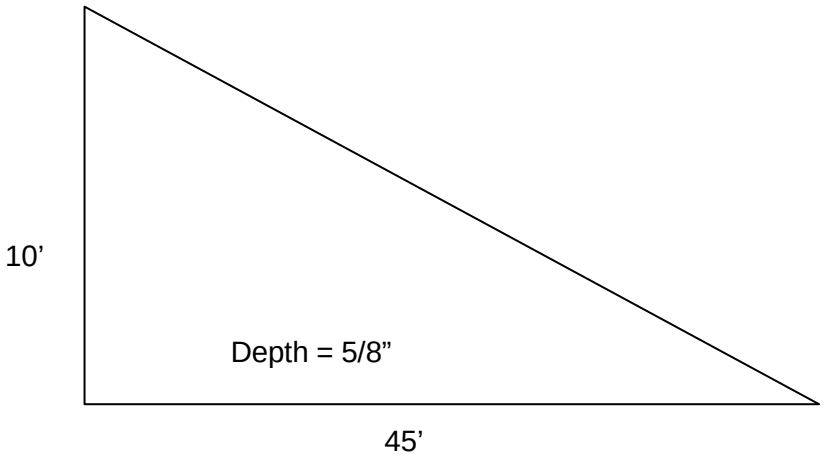
Conversion:

Inches		to
1/8"	=	0.01'
1/4"	=	0.02'
3/8"	=	0.03'
1/2"	=	0.04'
5/8"	=	0.05'
3/4"	=	0.06'
7/8"	=	0.07'
1"	=	0.08'
2"	=	0.17'
3"	=	0.25'
4"	=	0.33'
5"	=	0.42'
6"	=	0.50'
7"	=	0.58'
8"	=	0.67'
9"	=	0.75'

SSO Volume by Area Estimation Work Sheet

AREA/VOLUME OF A RIGHT TRIANGLE

Base x Height x 0.5 x Depth = Volume in Cubic Feet



Base (45’) x Height (10’) x 0.5 x Depth (.05’) x 7.48 gallons/cubic foot = 84 gallons

For Isosceles Triangles (two sides are equal lengths),
Break it down into two Right Triangles and compute area
as you would for the Right Triangle above.

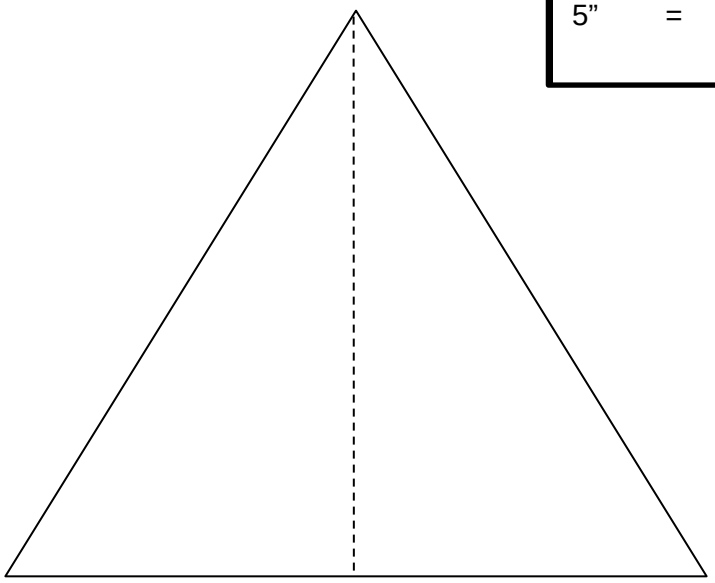


Chart A

Conversion:

Inches		to
1/8”	=	0.01’
1/4”	=	0.02’
3/8”	=	0.03’
1/2”	=	0.04’
5/8”	=	0.05’
3/4”	=	0.06’
7/8”	=	0.07’
1”	=	0.08’
2”	=	0.17’
3”	=	0.25’
4”	=	0.33’
5”	=	0.42’

SSO Volume by Area Estimation Work Sheet

AREA/VOLUME OF A
CIRCLE/CYLINDER

$D^2 \times 0.785 \times d$

Diameter Squared x 0.785 x Depth = Volume in cubic feet.

Diameter = Any straight-line segment that passes through the center of a circle.

For our purposes, it is the measurement across the widest part of a

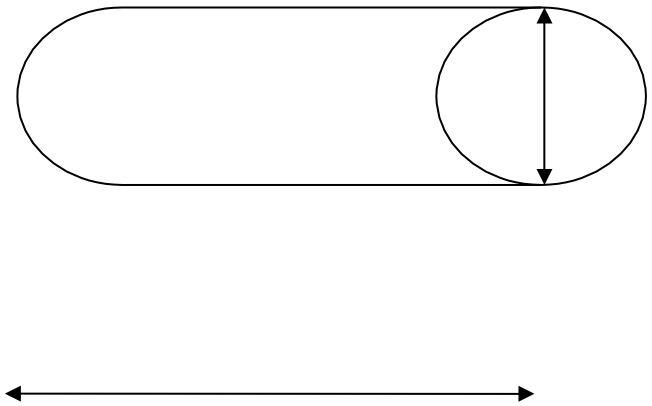
circle. D2 x 0.785 x depth = Volume in cubic feet

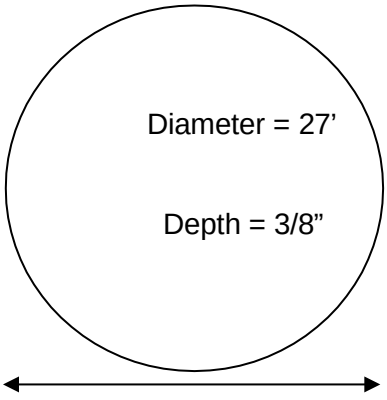
Example:

27’ x 27’ x 0.785 x 0.03 = 17.17 cubic feet

17.17 cubic feet x 7.48 gallons/cubic feet = 128 gallons

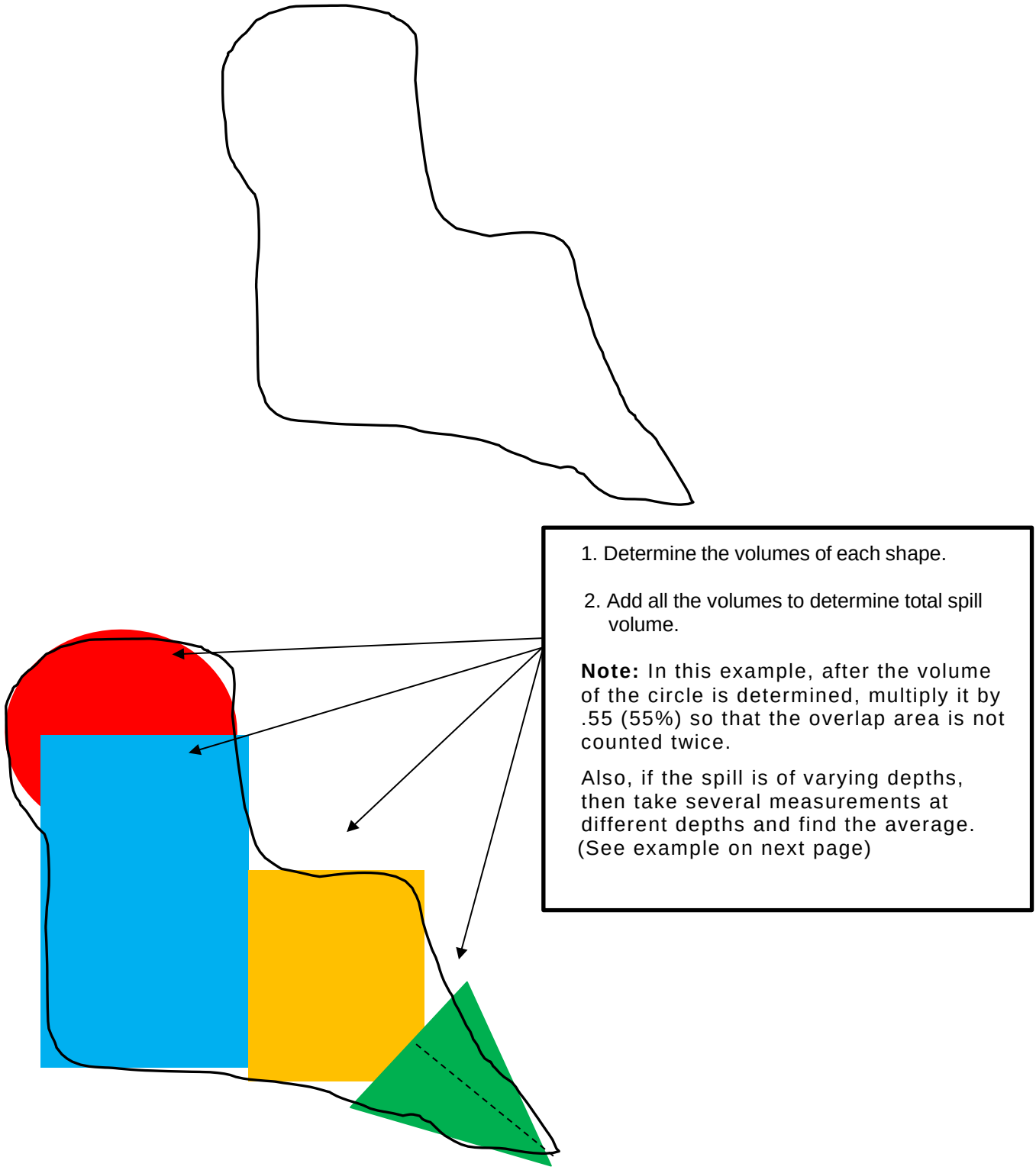
Chart - A		
Conversion:		
Inches to		
1/8”	=	0.01’
1/4”	=	0.02’
3/8”	=	0.03’
1/2”	=	0.04’
5/8”	=	0.05’
3/4”	=	0.06’
7/8”	=	0.07’
1”	=	0.08’
2”	=	0.17’
3”	=	0.25’
4”	=	0.33’





SSO Volume by Area Estimation Work Sheet

Find the geometric shapes within the shape. If this was the shape of your spill, break it down, as best you can, with the shapes we know.



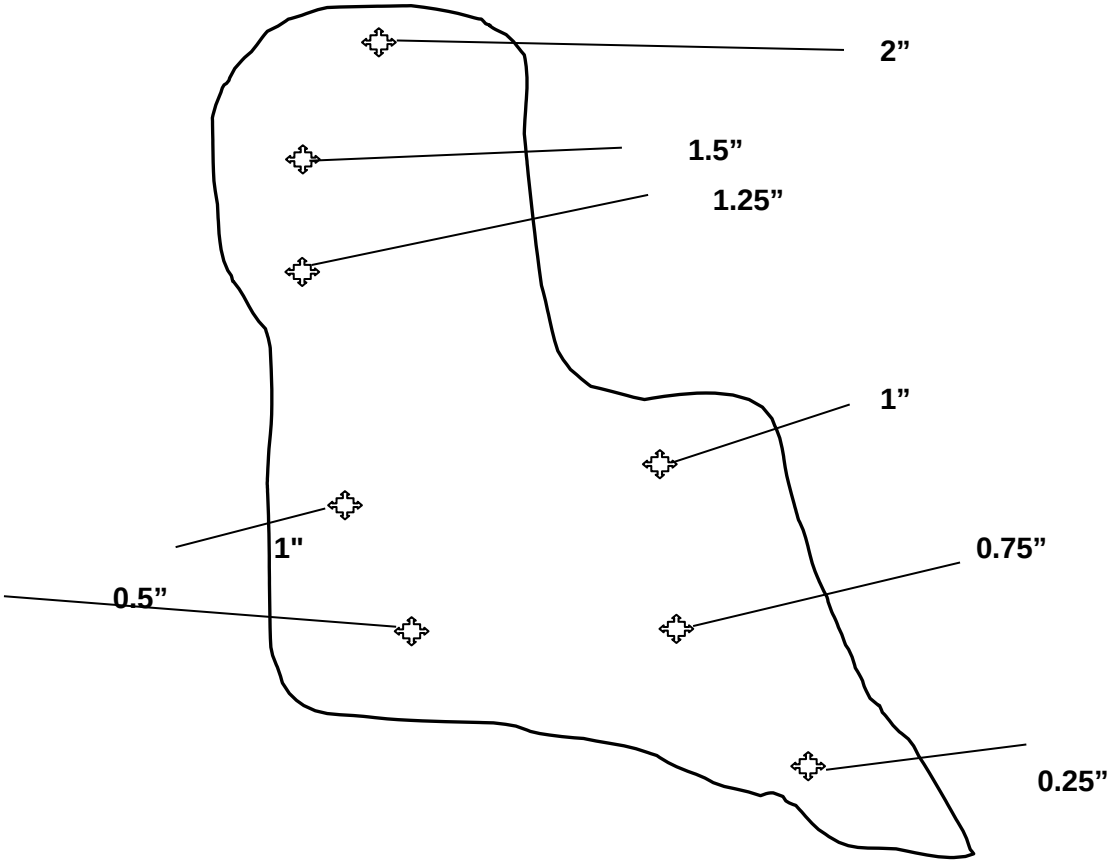
1. Determine the volumes of each shape.

2. Add all the volumes to determine total spill volume.

Note: In this example, after the volume of the circle is determined, multiply it by .55 (55%) so that the overlap area is not counted twice.

Also, if the spill is of varying depths, then take several measurements at different depths and find the average.
(See example on next page)

SSO Volume by Area Estimation Work Sheet (Hard-surface)



Example

Step 1 – Add up the various measured depths of the spill:

2” + 1.5” + 1.25” + 1” + 1” + 0.75” + 0.5” + 0.25” = 8.25”

Step 2 – Divide the sum of the measured depths by the number of measure locations where measurements were taken:

8.25” / 8 measurements = 1.03”

Average Depth = 1.03”

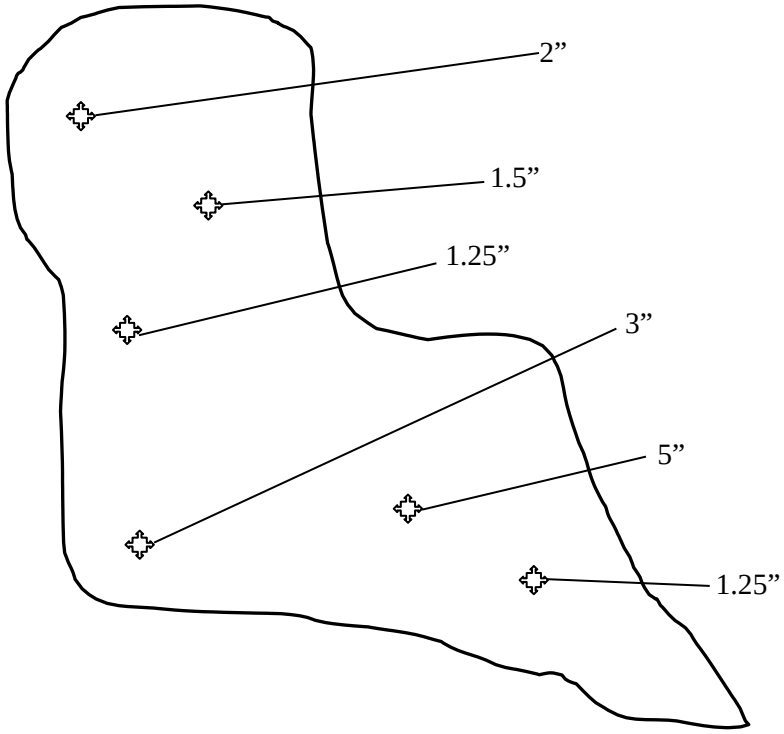
SSO Volume by Area Estimation Work Sheet

If the spill affects a dry, unimproved area such as a field or dirt parking lot, determine the *area* of the wetted ground in the same manner as you would on a hard surface.

1. Using a round-point shovel, dig down into the soil until you find dry soil. Do this in several locations within the wetted area and measure the depth of the wet soil.

2. Determine the average depth of the wet soil using the measured locations.

Note: This method may be used in a (dry) dirt, or grassy area that is not regularly irrigated (like a field or dirt, gravel parking lot, etc.). This method may not work for volume estimation during wet-weather events.



Example

Step 1 – Add up the various measured depths of the spill:

2” + 1.5” + 1.25” + 3” + 5” + 1.25” = 14.0”

Step 2 – Divide the sum of the measured depths by the number of measure locations where measurements were taken:

14.0” / 6 measurements = 2.33”

Average Depth = 2.33 (.194’)

If the area of the spill was determined to be 128 sq.ft and the average depth of the wet soil is 2.33 inches, then:

128 sq. ft. x 0.194 ft. = 24.83 cu. Ft.

24.83 cu.ft. x 7.48 gallons per cu. Ft. = 185.74 gallons

185.74 x 18% (ratio of saturation of wetted soil) = **33 gallons**

APPENDIX D City of Oakland Water Quality Monitoring Plan

CITY OF OAKLAND

PUBLIC WORKS AGENCY • 250 FRANK H. OGAWA PLAZA OAKLAND • CALIFORNIA • 94612
(510) 238-3961 FAX (510) 238-6428 TDD (510) 238-7644

Water Quality Monitoring Plan

Effective Date: December 10, 2019

Reviewed by:

Derek Lee, Environmental Services Manager

Robert Kennedy, Interim Operations Manager

Tyree Jackson, Regulatory Compliance Officer

Approved by: Jason W. Mitchell, Director of Public Works

Signature: **Date:** 2/24/2020

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1. PURPOSE OF PROGRAM PLAN

The purpose of this Water Quality Monitoring Program Plan (WQMP or Plan) is to implement the recent requirements for sampling of sanitary sewer overflows (SSOs) greater than 50,000 gallons that reach surface waters. This plan conforms to the State Water Resources Control Board Waste Discharge Requirements Order No. 2006-0003-DWQ, Section D.7 (v) and Monitoring and Reporting Program (MRP) Section D, Water Quality Monitoring Requirements issued by executive order number WQ 2013-0058-EXEC effective on September 9, 2013. This WQMP provides the City of Oakland (City) policies and procedures to assure consistent conformance to the regulatory requirements and to establish procedures for City staff and contractors in their responses to large releases of sanitary wastewater that reach surface waters. This WQMP is consistent with and supplemental to the City Overflow Emergency Response Plan of its SSMP/AMIP. Finally, this document will be used to coordinate training for the City's new employees and regular refresher training for existing employees.

This Plan establishes procedures for the identification of sampling locations, protocols for the proper collection of samples, the chain of custody for sample collections, the handling of samples, the reporting and recordkeeping to assure the legal integrity of monitoring for compliance with regulatory requirements. The plan also establishes policies and procedures that will be used to assure proper coordination between Contracted personnel, and City staff, in the taking and testing of samples.

This Plan is intended to establish protocols for all sampling including when, where and how; establish the required water quality sample analyses that will be conducted; identify the access and safety requirements related to sampling considerations; and identify any local concerns that this monitoring plan should address. In addition, the Plan establishes the requirements for equipment calibration, notification requirements related to an overflow, recordkeeping requirements, staff training issues and requirements for regular reviews and audits. Finally, all City forms used for water quality monitoring are included and available for use in any SSO incident.

2. DEFINITIONS

The following definitions and acronyms are used in this Plan:

BACTERIA	Probaryotic microorganisms typically a few micrometers in length, with shapes from spheres to rods and spirals
CalOES	State of California Office of Emergency Services
CALOSHA	California Division of Occupational Safety and Health
CFR	Code of Federal Regulations
CFS	Cubic feet per second
CIWQS	California Integrated Water Quality System
CSRMA	California Sanitation Risk Management Association
CWA	Clean Water Act
DH2O	Distilled Water
DEET	N,N-Diethyl-meta-toluamide
DOHS	California Department of Health Services
E. Coli	Escherichia coli (bacteria)
ELAP	Environmental Laboratory Accreditation Program
EPA	Environmental Protection Agency
Field QC	Field Quality Control
GPM	Gallons per minute
GWDR	General Waste Discharge Requirements or WDR
GIS	Geographic Information System
LIMS	Laboratory Information Management System
LRO	Legally Responsible Official
mg/l	Milligrams per liter
ml	Milliliter
MPN	Most probable number
MRP	Monitoring and Reporting Program
NH3	Ammonia
NH3-N	Ammoniacal Nitrogen

NPDES National Pollution Discharge and Elimination System

OERP Overflow Emergency Response Plan

OES See CalOES

PPE Personal Protective Equipment

ppm Parts per million

QA/QC Quality Assurance/Quality Control

RWQCB Regional Water Quality Control Board

SOP Standard Operating procedure

SSC Sewer Service Charge

SSMP Sanitary Sewer Management Plan

SSO Sanitary Sewer Overflow

SSO GWDR Sanitary Sewer Overflow General Waste Discharge Requirements

SURFACE WATER
All waters whose surface is naturally exposed to the atmosphere; for example, rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc., and all springs, wells, or other collectors directly influenced by surface water.

SWRCB State Water Resources Control Board

WQMP Water Quality Monitoring Program Plan

WQ Water Quality

WDR Waste Discharge Requirements

VOC Volatile Organic Compound

3. RESPONSIBILITY

The City shall designate responsibility for all WQMP roles to appropriate classifications in the City's organizational structure to assure conformance of all activities for the monitoring of SSOs greater than 50,000 gallons reaching surface waters (Category 1 SSOs), SSOs 10,000 gallons or greater reaching Lake Merritt, any SSOs into Lake Temescal (as agreed between the City and East Bay Regional Parks District (EBRPD), and SSOs 1000 gallons or greater into storm drains or natural watercourses to reduce potential liability, protect public health, and to assure those responsible for this Plan are trained in their roles and responsibilities for the performance of proper protocols. It is further recognized that the proper application of this Plan will assure that all monitoring can withstand regulatory or legal scrutiny of the State, Regional Board, or from the actions of a citizen lawsuit. These roles and responsibilities are intended to be compliant with WDR Sections D.13 (vi), G and Section C.5 and D of the September 9, 2013 MRP.

The following table contains the roles and responsibilities as assigned by the City to individual classifications or service contractors of the City:

Roles and Responsibility	Responsible Classification
Provide and document regular training on WQMP for all City classifications that have a role or responsibility in the WQMP and identified herein	Regulatory Compliance Officer, OPW Administration
Identification and assessment of potential impacts to local areas with surface waters that may require WQMP (i.e. aerial crossings, creeks, waterways, rivers, bays, estuaries, etc.)	Operations Manager, OPW Sewer Maintenance Division
Certification of calibration of sampling equipment and maintenance of calibration records	Environmental Program Supervisor, OPW Environmental Services
Determination of specific sampling protocols and analytic methods to be used in this WQMP	Environmental Program Supervisor, OPW Environmental Services
Determination of appropriate bacterial indicators for sampling	Environmental Program Supervisor, OPW Environmental Services
Quarterly completion of the monitoring and sampling kit checklist from Appendix E	Operations Manager, OPW Sewer Maintenance Division
Annual review of all standard operating procedures related to this WQMP especially the Sample Collection procedures	Operations Manager, OPW Sewer Maintenance Division; Environmental Program Supervisor, OPW Environmental Services
Decision to invoke a WQMP and direct the monitoring program to conclusion	Regulatory Compliance Officer, OPW Administration
Selection of sampling locations	Operations Manager, OPW Sewer Maintenance Division
Coordination of field sampling	Operations Manager, OPW Sewer Maintenance Division
Conduct field sampling per City protocols	Supervisor I/II – OPW Sewer Maintenance Division
Authorization and direction for placement of public notifications and signage	Supervisor I/II – OPW Sewer Maintenance Division
Photographs of sampling and signage placed to protect public health and safety	Supervisor I/II – OPW Sewer Maintenance Division
Preparation of Chain of Custody for all samples taken including proper labeling (if applicable)	Supervisor I/II – OPW Sewer Maintenance Division

Determination of spill travel time, if applicable.	Supervisor I/II – OPW Sewer Maintenance Division
Review and evaluate lab results for termination of sampling and to determine the nature and impact of the release	Environmental Program Supervisor, OPW Environmental Services
Decision to terminate sampling	Environmental Program Supervisor, OPW Environmental Services
Preparation of detailed sampling location map	Environmental Program Supervisor, OPW Environmental Services
Conduct sample analysis	
Preparation of water quality sampling activities narrative for Technical Report	Environmental Program Supervisor, OPW Environmental Services
Review and Approval of Technical Report	Environmental Program Supervisor, OPW Environmental Services; Operations Manager, OPW Sewer Maintenance Division; Regulatory Compliance Officer, OPW Administration
Certification and placement of Technical report in the CIWQS spill reporting system.	Designated LRO
Failure Analysis Investigation of all water quality monitoring from the SSO event to determine all necessary changes or modifications to the WQMP	Environmental Program Supervisor, OPW Environmental Services; Operations Manager, OPW Sewer Maintenance Division
Audits of the WQMP as required by City SSMP/AMIP, Audit section.	Regulatory Compliance Officer, OPW Administration
Management of Change responsibilities for the WQMP and all associated forms and documents required for use during an incident	Regulatory Compliance Officer, OPW Administration

It is recommended that this list of responsibilities be placed on a laminated card and kept in the Monitoring and Sampling Kit for easy access during an SSO sampling incident.

4. AUTHORITY AND REFERENCES

The authority and or requirements for the monitoring and sampling of sanitary sewer overflows are contained in the following:

1. State Water Resources Control Board (SWRCB) Waste Discharge Requirements Order No. 2006-0003-DWQ, Section D.7 (v).
2. State Water Resources Control Board Monitoring and Reporting Program (MRP) Sections C.5 D, Executive Order number WQ 2013-0058-EXEC effective September 9, 2013
3. Standard Methods for the Examination of Water and Wastewater, 22nd Edition, American Public Health Organization et al.
4. Clean Water Act Sections 301(a), 304(h), and 501(a).
5. Code of Federal Regulations, Title 40, Part 136.
6. March 2019 Part 3, Bacteria Provisions for the SWRCB's Water Quality Control Plan for Inland Surface Waters, Enclosed Bays and Estuaries.

There are several applicable references that are available to assist with the Water Quality Monitoring Program as follows:

A. Basin Plan of the Regional Water Quality Control Board
B. Best Management Practices for Sanitary Sewer Overflow (SSO) Reduction Strategies, Central Valley Clean Water Associates and Bay Area Clean Water Agencies, December 2009
C. City Overflow Emergency Response Plans
D. Field Guide for Surface Water Sample and Data Collection, Air Program, USDA Forest Service, June 2001.
E. Standard Operating Procedures for Surface Water Quality Sampling, Arizona Department of Environmental Quality, Surface Water Section, September 2012.
F. Surface Water Sampling_AF.R3, Document Number SESDPROC-201-R3, Region 4, Environmental Protection Agency, Science and Ecosystem Support Division, Athens, Georgia, February 28, 2013.

5. IDENTIFICATION OF LOCAL SURFACE WATERS AND CHARACTERISTICS

An important element of any water quality monitoring program is the proper and thorough understanding of the service area and the various challenges the geography and sanitary sewer infrastructure of the service area present for the potential of wastewater reaching surface waters or storm water facilities. By evaluating the areas of concern in a service area such as lakes, rivers, dry creeks, aerial pipeline crossings over water ways and all storm water related infrastructure, the City can be better prepared to timely respond to any SSO reaching surface waters and to minimize the impacts of an SSO in or around local surface waters and storm water infrastructure.

A. Surface Waters of Concern

For the purposes of this Plan, surface waters are defined as all waters whose surface is naturally exposed to the atmosphere, for example, rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc., and all springs, wells, or other collectors directly influenced by surface water. In addition, the City will also identify and evaluate areas where collection system pipelines and force mains cross over or under waterways as these crossings can require additional resources and equipment to properly address any SSO from these collection system assets.

Surface waters of concern are those surface waters within the City's service area that may be impacted by a sanitary sewer overflow from the City's sanitary sewer collection system. Prior planning, review and evaluation of potential failure mechanisms can help minimize any potential impacts to surface waters or storm water infrastructure when and if the WQMP must be invoked. Any review of these important areas of potential surface water contamination in advance of an SSO should allow the City to be better prepared to respond to an SSO with the proper equipment and a better understanding of the procedures that may need to be invoked during the SSO such as flow rate of a creek or stream, and potential areas of significant environmental concern such as shell fish beds or fish habitats. In addition, having all storm water infrastructure located on the collection system field maps will help the City's responders quickly determine if SSOs may flow into storm drains reach and impact surface waters.

The following (Table 5.1) are the surface waters of concern within the City's jurisdiction:

Name	Type (see legend, below)	Map Location	Access Considerations	Safety Considerations
Lake Temescal	Lake (contact recreational)		Coordinate with EBRPD	Trip/fall, poison oak, drowning
Lake Merritt	Lake (non-contact recreational)			drowning
Arroyo Viejo	Stream		Limited,vegetation,private yards	Trip/fall, poison oak, drowning
Cerrito Creek	Ephemeral stream		Limited,vegetation,private yards	Trip/fall, poison oak, drowning
Codornices Creek	Ephemeral stream		Limited,vegetation,private yards	Trip/fall, poison oak, drowning
East (Peralta) Creek	Ephemeral stream		Limited,vegetation,private yards	Trip/fall, poison oak, drowning
Ettie Street Pump Station	Perennial Stream			drowning
Lion Creek	Stream		Limited,vegetation,private yards	Trip/fall, poison oak, drowning
Potter/Derby Creeks	Ephemeral stream		Limited,vegetation,private yards	Trip/fall, poison oak, drowning
San Antonio Creek	Perennial Stream		Limited,vegetation,private yards	Trip/fall, poison oak, drowning
Sausal Creek	Perennial Stream		Limited,vegetation,private yards	Trip/fall, poison oak, drowning
Strawberry Creek	Perennial Stream		Limited,vegetation,private yards	Trip/fall, poison oak, drowning
Temescal Creek	Perennial Stream		Limited,vegetation,private yards	Trip/fall, poison oak, drowning

Bog: Freshwater wetlands that are poorly drained and characterized by a buildup of peat.

Brackish Water: Generally, water containing dissolved minerals in amounts that exceed normally acceptable standards for municipal, domestic, and irrigation uses. Considerably less saline than sea water. Also, Marine and Estuarine waters with Mixohaline salinity (0.5 to 30 due to ocean salts). Water containing between 1,000-4,000 parts per million (PPM) Total Dissolved Solids TDS). The term brackish water is frequently interchangeable with Saline Water. The term should not be applied to inland waters.

Brook: A natural stream of water, smaller than a river or creek; especially a small stream or rivulet which breaks directly out of the ground, as from a spring or seep; also, a stream or torrent of similar size, produced by copious rainfall, melting snow and ice, etc.; a primary stream not formed by tributaries, though often fed below its source, as by rills or runlets; one of the smallest branches or ultimate ramifications of a drainage system.

Canal: A constructed open channel for transporting water.

Channel (CH): An area that contains continuously or periodically flowing water that is confined by banks and a stream bed.

Culvert (CU): A buried pipe that allows streams, rivers, or runoff to pass under a road.

Ditch: A long narrow trench or furrow dug in the ground, as for irrigation, drainage, or a boundary line.

Diversion channel: (1) An artificial channel constructed around a town or other point of high potential flood damages to divert floodwater from the main channel to minimize flood damages. (2) A channel carrying water from a diversion dam.

Drainage Channel (DC): For the purposes of complying with the Statewide Sanitary Sewer Order, (1) a man-made canal used to transport storm water as part of a municipal separate storm sewer system, or (2) an intermittent or perennial stream bed.

Dry Wash: A streambed that carries water only during and immediately following rainstorms.

Ephemeral Streams (ES):Streams which flow only in direct response to precipitation and whose channel is at all times above the water table.

Freshwater marsh: Open wetlands that occur along rivers and lakes.

Intermittent stream: Any nonpermanent flowing drainage feature having a definable channel and evidence of scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

Perennial streams (PS): Streams which flow continuously.

Pipe crossing: Crossing of a pipe or force main over or under a surface water body.

Riverine: Relating to, formed by, or resembling a river including tributaries, streams, brooks, etc.

Slough: A shallow backwater inlet that is commonly exposed at low tide.

Stream: A general term for a body of flowing water; natural water course containing water at least part of the year. In Hydrology, the term is generally applied to the water flowing in a natural channel as distinct from a canal. More generally, as in the term Stream Gaging, it is applied to the water flowing in any channel, natural or artificial.

For additional definitions refer to the glossary at http://www.streamnet.org/glossarystream.html.

6. LAB SELECTION

A. Analytical Lab

Samples collected for monitoring purposes will be analyzed either at the primary laboratory identified by service agreement with the City's contracted Service Provider, or a secondary laboratory to be determined, as needed. The City will ensure that all laboratories are accredited through California's Department of Public Health Environmental Laboratory Accreditation Program (ELAP). ELAP provides evaluation and accreditation of environmental testing laboratories to ensure the quality of analytical data used for regulatory purposes to meet the requirements of the State's drinking water, wastewater, shellfish, food, and hazardous waste programs. The State agencies that monitor the environment use the analytical data from these accredited labs. The ELAP-accredited laboratories have demonstrated capability to analyze environmental samples using approved methods. The secondary laboratory will be utilized when samples cannot be received by the primary laboratory.

B. Getting Samples to the Lab

At all times, sample hold times identified below will be observed in accordance with Section 7.0. Once samples are collected and coordination is made with the laboratory to receive the samples, they will be transported to the laboratory by contracted staff.

C. Lab Contact Info

Primary Lab

Name: Cel Analytical, Inc.

Contact: Yeggie Dearborn

Address: 82 Mary Street, Suite #2, San Francisco, CA 94103

Hours Samples Are Accepted: M-F 8:30 AM to 5:30 PM except holidays
(after hours by arrangement)

Phone: (415) 882-1690)

Alternate or After Hours Phone: (415) 882-1685

Secondary Lab

Name: Delta Environmental Lab

Address: 685 Stone Road, Suite 9-12, Benicia, CA 94510

Hours Samples are Accepted: M–F 8:30 AM to 5:00 PM except holidays

Phone: (707) 361-9035

Alternate or After Hours: (800) 747-6082

7. SAMPLING PARAMETERS

A. Required Sampling Parameters

The RWQCB Basin Plan and/or NPDES permit set the water quality standards against which one can judge the levels of impacts of an SSO on surface waters.

In accordance with the SWRCB Revised MRP WQ 2013-0058 and Part 3 (March 2019) Bacterial Provisions...of the SWRCB Water Quality Control Plan..., the following parameters will be sampled:

1. Ammonia

   Ammonia-N, is a key indicator of the extent of the gross pollution of the receiving water from a SSO. Untreated wastewater or partially-treated wastewater is generally high in ammonia-N (typical 20-30 mg/L). In comparison, the natural background concentration of most surface waters is low, typically, less than 0.5 mg/L. Therefore, the elevated concentration of ammonia of the surface water downstream or at the site of the SSO, as compared to that upstream of the site is a reasonable indication of the extent of contamination from the SSO.

2. Bacteriological Indicator as specified in the local Basin Plan

   Total coliform, fecal coliform, E coli. and enterococci count are indicators of potential public health impacts of an SSO on the receiving waters. If the concentrations of these groups of bacteria are elevated above and beyond the natural background and/or above the RWQCB Basin Plan Water Quality Standards (objective), public notification and posting may be necessary. For SSOs that are sampled, ones that enter fresh waters shall be analyzed for E. Coli and ones that transmit to saline waters shall be analyzed for enterococci.

   It should be noted that there may be non-SSO related causes of elevated bacteria in surface water, for example, animal sources, storm drain discharge, homeless encampments, septic system/leach field malfunctions. Any or all samples taken may reflect the extent of bacterial contamination from these other sources. Sometimes the extent of the SSO may be indistinguishable from the other natural sources beyond the City's control. This is especially true when taking Source samples based on an estimated downstream location of the SSO plume (Reference Section 7F).

   Generally, if the concentrations of these groups of bacteria at the downstream or at the site of impact are within the range of the non-impacted site (i.e. upstream) or levels indicated in historical background monitoring levels, the water quality impacts of the SSO are considered insignificant.

   The surface water quality objectives of these groups of bacteria are shown in Table 7.1 and 7.2, below. The threshold should be determined using Table 7.2, considering the beneficial use of affected surface water for either E. Coli or enterococci, depending on the salinity of the affected surface water body.

Table 7.1: Water Quality Objectives for Coliform Bacteria[a,g]		
Beneficial Use	**Fecal Coliform (MPN/100ml)**	**Total Coliform (MPN/100ml)**
Water Contact Recreation	Geometric mean < 200 90th percentile < 400	Median < 240 No sample > 10,000
Shellfish Harvesting[b]	Median < 14 90th percentile < 43	Median < 70 90th percentile < 230*
Non-contact Water Recreation[d]	Mean < 2000 90th percentile < 4000	
Municipal Supply: • Surface Water[e] • Groundwater	Geometric Mean < 20	Geometric Mean < 100 < 1.1[f]

NOTES:

a. Based on a minimum of five consecutive samples equally spaced over a 30-day period.
b. Source: National Shellfish Sanitation Program.
c. Based on a five-tube decimal dilution test or 300 MPN/100ml when a three-tube decimal dilution test is used.
d. Source: Report of the Committee on Water Quality Criteria, National Technical Advisory Committee, 1968.
e. Source: California Department of Health recommendation.
f. Based on multiple tube fermentation technique; equivalent test results based on other analytical techniques, as specified in the National Primary Drinking Water Regulation, 40 CFR, Part 1421.21 (f), revised June 10, 1992, are acceptable.
g. Enteroccoccus standards - applicable to estuarine waters (salinity >1 more than 5 percent of the time).. E. Coli standards - applicable to fresh waters (salinity <1 ppth).
   Numerical values are based on Part 3 of the Water Quality Control Plan...Bacteria Provisions.., effective March 2019.
   Water Contact Recreation (cfu/100ml): Enterococcus: geometric mean <30 STV <110,
   E. Coli: geometric mean <100, STV < 320

Source: San Francisco Bay Basin (Region 2), Water Quality Control Plan (Basin Plan)
California RWQCB, San Francisco Bay Region, Dec. 31, 2010, Part 3, Bacteria Provisions...August 2018

Table 7.2 – U.S. EPA Bacteriological Criteria for Water Contact Recreation[1, 2]
(in colonies per 100 ml)

Steady State (all areas)	Fresh Water		Salt Water
	Enterococci	E. Coli	Enterococci
	33	126	35
Maximum at:			
• Designated beach	61	235	104
• Moderately used area	89	298	124
• Lightly used area	108	406	276
• Infrequently used area	151	576	500

NOTES:

1. The criteria were published in the Federal Register, Vol. 51, No. 45 / Friday, March 7, 1986 / 8012-8016. The criteria are based on:
   a. Cabelli, V.J. 1983. Health Effects Criteria for Marine Recreational Waters, U.S. EPA, EPA 600/1-80-031, Cincinnati, Ohio, and
   b. Dufour, A.P. 1984, Health Effects Criteria for Fresh Recreational Waters, U.S. EPA, EPA 600/1-84-004, Cincinnati, Ohio.

2. The U.S. EPA criteria apply to water contact recreation only. The criteria provide for a level of production based on the frequency of usage of a given water contact recreation area. The criteria may be employed in special studies within this region to differentiate between pollution sources or to supplement the current coliform objectives for water contact recreation.

B. Sampling Parameters for Oakland

1. Ammonia
   - Discussion: See Section 7A
   - Sample Container: Plastic/glass
   - Sample Type: Grab
   - Sample Volume Required: 200 ml. minimum
   - Hold Time: 28 days
   - Preservative: Sulfuric acid
   - Analytical Method: Method 4500-XX R and C, Standard Methods for the Examination of Water or Wastewater, 21st Edition

2. E. coli (fresh water)
   - Discussion: See Section 7A.2
   - Sample Container: Plastic (sterile)
   - Sample Type: Grab
   - Sample Volume Required: 100 ml. minimum
   - Hold Time: 8 hours
   - Preservative: None if waters are not chlorinated
   - Analytical Method: Method 9221 B, C and E, Standard Methods for the Examination of Water or Wastewater, 21st Edition

3. Enterococcus (saline water)
   - Discussion: See Section 7A.2
   - Sample Container: Plastic (sterile)
   - Sample Type: Grab
   - Sample Volume Required: 100 ml. minimum
   - Hold Time: 8 hours
   - Preservative: None if waters are not chlorinated
   - Analytical Method: IDEXX Enterolert® Test Kit, Method 9230D, Standard Methods for the Examination of Water or Wastewater, 21st Edition

8. SAMPLING EQUIPMENT AND CALIBRATION

A. Sampling Equipment Used by City of Oakland
- Nitrogen, Ammonia Test Kit

B. Calibration and Record Keeping

Each piece of equipment is required to have an up-to-date calibration and/or maintenance logbook. The logbook will be maintained to have consecutively numbered pages and shall contain at least the following:
- Date
- Calibration Results (if applicable)
- Calibration/maintenance comments
- Initials of the individual calibrating/maintaining the instrument

Each instrument must be clearly identified (*e. g.,* the make, model, serial and/or ID number) to differentiate among multiple kits.

The appropriate calibration/maintenance procedure must be followed pursuant to the manufacturer's recommended standard operating procedure and if the instrumentation does not have an electronic program that maintains a running calibration/maintenance log, then the results must be recorded in the logbook each time a piece of field equipment is used, along with the date and name/initials of the person performing the calibration.

If difficulty is encountered in calibrating an instrument, or if the instrument will not hold calibration, this information must also be recorded. Malfunctioning equipment should not be used to collect data. Steps should be taken to correct the problem as soon as possible. All equipment maintenance should be recorded in the logbook indicating what was done to correct the problem, along with the date and signature/initials of the staff person that corrected the problem.

9. Sampling Procedures

A. Sample Location and Identification Procedures:

Samples for ammonia tests will be collected by Oakland Sewer Maintenance Division staff personnel. All other sampling activity will be performed by contracted personnel, and shall conform with the guidelines below. The most precise and accurate analytical measurements are worthless and even detrimental if performed on a sample that was improperly collected and stored, or was contaminated in the process. The purpose of sampling and analysis is to provide data that can be used to interpret the quality or condition of the water under investigation.

Unfortunately, water quality characteristics are not spatially or temporally uniform from one effluent to another. A sampling program must recognize such variations and provide a basis for compensations for their effects. The sample must be:

1. Representative of the material being examined;
2. Uncontaminated by the sampling technique or container;
3. Of adequate size for all laboratory examinations;
4. Properly and completely identified;

5. Properly preserved, and
6. Delivered and analyzed within established holding times.

These six requirements are absolutely necessary for a proper assessment of water quality.

It is impossible to establish hard and fast rules concerning sampling locations. However, the following general guidelines should be applied whenever City personnel conduct surface water sampling:

1. The sampling locations should be far enough upstream or downstream of confluences or point sources so that the surface water and SSO volume is well mixed - usually 50 feet upstream and downstream, in addition to one discharge point (close to) sample. Natural turbulence can be used to provide a good mixture.
2. Samples should be collected at a location where the velocity is sufficient to prevent deposition of solids, and to the extent practical, should be in straight reach having uniform flow. All flow in the reach should be represented, so divided flow areas should be avoided and samples should be taken towards the middle of the reach where feasible and six inches below the water surface where and when possible.
3. Sampler must always stand downstream of the collection vessel, and sample "into the current". Care must be taken to avoid introducing re-suspended sediment into the sample.

B. Sample Types:

Grab samples are appropriate for the characterization of surface waters at a particular time and place, to provide information about minimum and maximum concentrations, to allow for the collection of variable sample volume.

Grab samples may be collected directly into the sample container, or a clean decontaminated intermediate container may be used if a wading sample is not possible or safe. If an intermediate container is used, when in the field, double rinse the sampling device (bucket, automatic sampler) with sample water prior to collecting the sample and be sure to discard rinse water downstream of where sample will be collected. If samples are collected in a bucket and distributed a consolidation collection container, swirl the contents of the bucket as it is being poured into the consolidation collection container to avoid settling of solids (and pour in back and forth pattern – *e.g*., 1-2-3-3-2-1).

Grab Sample: A grab sample is defined as an individual sample collected at a given time. Grab samples represent only the condition that exists at the time the sample is collected (US EPA 1977).

Surface Grab Sample: A sample collected at the water surface (i.e. skimming) directly into the sample container or into an intermediate container such as a clean bucket. A single or discrete sample collected at a single location.

Field Blanks are used to evaluate the potential for contamination of a sample by site contaminants from a source not associated with the sample collected (e.g., airborne dust, etc.). Sterile, deionized water is taken into the field in a sealed container. This is the stock water. The stock water is then poured into the sample container. The containers and sample submission forms are labeled as "Field Blank". The same template selected for the test samples

should be used. Field blanks are subject to the same holding time limitations as samples. The appropriate FIELD QC box on the sample Chain of Custody form should be checked.

C. Decontamination Procedures

Removing or neutralizing contaminants from sampling equipment minimizes the likelihood of sample cross contamination, reduces or eliminates transfer of contaminants to clean areas, and prevents the mixing of incompatible substances.

Gross contamination can be removed by physical decontamination procedures. These abrasive and non-abrasive methods include the use of brushes, air and wet blasting, and high and low pressure water cleaning.

The decontamination procedure described above may be summarized as follows:

1. Physical removal
2. Non-phosphate detergent wash
3. Tap water rinse
4. Distilled/deionized water rinse
5. 10% nitric acid rinse
6. Distilled/deionized water rinse
7. Solvent rinse (pesticide grade)
8. Air dry
9. Distilled/deionized water rinse

D. Sample Labeling and Chain of Custody Procedures

A sample is a physical evidence of a facility or the environment. An essential part of all enforcement investigations is that evidence gathered be properly documented. To accomplish this, the following sample identification and chain of custody procedures are established.

1. The method of sample identification depends on the type of measurement or analyses performed. When in-situ measurements are made, the data are recorded directly in Field Data Worksheets with identifying information, field observations, and remarks. Examples of in-situ measurements are:

    - pH
    - Temperature
    - Dissolved Oxygen
    - Stream Flow Measurement

    Samples other than in-situ measurements, must be identified by a sample label. These samples are removed from the sample location and transported to a laboratory for analyses. Before removal, however, a sample is often separated into portions depending upon the analyses to be performed. Each portion is preserved in accordance with applicable procedures and each sample container is identified by a sample label.

2. At a minimum, the following grab samples will be collected, in duplicate:
    - Field Blank: See Section 9.B for discussion.
    - Upstream: This sample will be collected far enough upstream of the SSO's point of entry into the surface water as to be free of contaminants from the SSO. Typically, 50-feet is sufficient, but this may vary on circumstances of the spill.
    - Source: Immediate vicinity where the SSO entered the surface water. This point will actually be downstream of the actual SSO entry point for SSO's that have stopped entering the surface water to be sampled. If the SSO has stopped, calculate the approximate downstream distance from the original SSO location by multiplying the time since the SSO occurred by the estimated velocity. This is the approximate downstream distance from the SSO discharge point to the "source" sampling location.
        - Due to possible tidal action in the surface water or other factors, another method may be used to determine the "source" location at the discretion of the Environmental Program Supervisor.
        - See Section 9.F for information on determining velocity of the surface water to determine the Source sample location.
    - "Downstream" of SSO: This sample will be collected far enough downstream to be representative of the water quality of the surface water after adequate mixing of the surface water and the SSO have occurred. Typically, this location will be 50-feet downstream of the Source sample, but this may vary on the size and velocity of the surface water to be sampled.
        - NOTE: The terms "upstream" and "downstream" may depend on the tidal cycle if the water body is tidally influenced. Check the tide chart(s) and table at the following link: http://tidesandcurrents.noaa.gov/noaatidepredictions/NOAATidesFacade.jsp?Stationid=9415623.

3. Sample labels shall be completed for each sample, using waterproof ink. The information recorded on the sample tag/label includes:
    - Date: a six-digit number indicating the year, month, day of collection
    - Time: a four-digit number indicating military time of collection (e.g., 0954)
    - Sample Location: sampling location description as either Upstream, Source, or Downstream
    - Samplers: each sampler is identified
    - Parameter/preservative: the analysis to be conducted for the sample /sample preservation

4. Photos or video of each sample location will be taken, properly labeled with date, time, and view direction and a map of the photo locations completed. Photos and videos shall include relevant landmarks to identify sampling locations and their surroundings.

    Due to the evidentiary nature of samples collected during enforcement investigations, possession must be traceable from the time the samples are collected until they are analyzed. To document sample possession, a Surface Water Sample Chain of Custody Record (Attachment C) must be completed. A sample is under your custody if:

- It is in your possession, or
- It is in your view, after being in your possession, or
- It was in your possession and under your control to prevent tampering, or
- It is in a designated secure area.

5. As few people as possible should handle samples. The person taking the samples is personally responsible for the care and custody of the samples collected until they are transferred or dispatched properly.

6. Samples are accompanied by a chain of custody record. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents sample custody transfer from the sampler, often through another person, to the analyst at the laboratory. The samples are typically transferred to the sample-receiving custodian at the laboratory.

E. Safety Considerations

Personal safety of staff engaged in any fieldwork activity (e.g., in transit, walking or hiking, and any field activities while at the sample site) is of primary importance. Staff should never place themselves in dangerous or risky situations. Any hazards that are known by field personnel should be communicated to other members of the field crew.

Fieldwork should be postponed if there is indication that engagement in the field activity could cause bodily harm. Working during lightning storms, at night, in heavy vegetation or poison oak, near aggressive wildlife or domestic animals, traversing steep or rugged terrain, unstable slopes, or creek banks, near swift moving water or potential flash flood conditions, or during snowy weather is not considered "normal risk". If any member of the field crew is uncomfortable with a reasonable self-determined hazardous field condition, it is that person's responsibility to bring this to the attention of the on site field supervisor or their supervisor. A "reasonable self-determined hazardous field condition" is defined as other than normal risk. Supervisors shall not dismiss any person's spoken concerns that field conditions are too hazardous to complete the work assignment.

The person taking the samples must have adequate protection, including protective clothing. They must wear gloves, as protection against chemical and/or bacteriological hazards, while they are sampling or handling samples that are known or suspected to be hazardous (e.g. visible solids or sheens, downstream from wastewater spills, etc.), or if hands have open wounds. The type of gloves worn shall be determined by the sampling circumstance and type of pollutants expected – for instance longer gloves are needed when samples must be taken well below the surface.

When in a boat or wading in a stream, a personal floatation device shall be worn at all times. Other protective measures shall be taken in accordance with City safety procedures.

Upon arrival at a sampling site, safety equipment such as signs, cones, lights, etc. shall be set out as appropriate. Vehicles shall be parked in locations and directions to minimize traffic

disruption and avoid sample contamination. Photos should be ultimately taken of the placement of all safety equipment and signage

The following guidelines apply to all fieldwork by City staff.

- No sample or measurement is worth the risk of injury.
- All staff shall use proper personnel protective gear as appropriate for the incident (e.g., life preservers, gloves, goggles, etc.)
- Field sampling crews should consist of at least two members unless otherwise approved by a supervisor.
- Be conscious of the whereabouts of rattlesnakes, mountain lions, and other dangerous animals.
- Open body wounds are entry sites for infection; take the necessary precautions for self-protection using appropriate PPE.
- If there is storm activity in the work area, wait for safer conditions to develop or postpone the sampling.
- Do not sample at night without approval from your supervisor.
- Do not trespass on private property, or posted restricted public lands without prior permission and or written approval from property owner or administrator.
- If strange or suspicious looking people are in the work area, either wait for them to leave or postpone the work to a later time. Do not force confrontations with strangers and back away from any confrontations with the public. Be courteous and understanding of public concerns of the situation.
- Take the necessary precautions against exposure to harmful weather conditions such as heat, wind, snow, cold, rain, etc.
- Carefully evaluate a given on-site situation to determine if the task can be performed safely.
- Wear protective footwear when entering streams.
- Do not enter the stream if the water is flowing too fast.

F. Stream Velocity Measurements

If sampling is performed after the SSO has stopped, the velocity of the impacted surface water must be determined in order to estimate SSO travel time and select an accurate Source sample location. One way to measure the SSO travel time is to use a velocity probe (such as a Global Water FP111-S Flow Probe or similar in-stream flow measurement device) to determine the rate of flow in the water body. In cases where a water velocity probe is used, the manufacturer's instructions will be followed.

G. Water Body-Specific Sampling

Lake Merritt One sample will be collected at the point of discharge and one sample will be collected in each lateral direction form the point of discharge (50 feet laterally along the bank of the Lake), and then every 50 feet from there until the furthest sample in each lateral direction is at least 50 feet beyond the visible extent of the discharge when sampled. Warning signs will be posted and removed when follow-up sampling (9.I) is no longer needed.

Lake Temescal Sampling should be done in accordance with the July 16, 2018 understanding between the City and EBRPD. The City will contact EBRPD at 510-861-1883 immediately if it

detects a potential SSO into the Lake. The City will post warning signs as recommended by EBRPD. The City will conduct coliform and ammonia sampling for SSO discharges into waters and storm drains upstream of the Lake. Sampling will be done at SSO point of discharge, and 50 feet upstream and downstream.

H. Surface Water Maps
Maps of surface waters in Oakland's service area that may be impacted by an SSO are located in Attachment F.

I. Follow Up Sampling

1. Sampling will be repeated within 48 hours of receipt of sampling results that demonstrate on-going contamination from an SSO, or as directed by the RWQCB or Alameda County Environmental Health Department, until such time as one of the following criteria have been met:
   - The County Environmental Health Department or the RWQCB indicates follow up sampling is no longer required, or
   - Both the ammonia and bacteria levels downstream are approximately equal to or less than the upstream levels; or
   - The concentration of ammonia is at or below that of the upstream sample, or the un-ionized ammonia is below 0.4 mg/L as N; and,
     the concentration of bacteria or coliform levels are below the applicable acute water quality objective for the appropriate beneficial use listed in the table below.

Table 9.1 Excerpt of Table 3-1 of the June 2013 SF Bay Area Basin Plan

Beneficial Use	Fecal Coliform (MPN/100mL)	Total Coliform (MPN/100mL)	Enterococcus Bacteria (MPN/100mL)		E. coli (MPN/100m)
			Estuarine and Marine*	Fresh Water	Fresh Water*
Water Contact Recreation	90th percentile < 400	no sample > 10,000	Max of 104 Max of 124 Max of 276 Max of 500	Max at 89	Max at 235 Max at 298 Max at 406 Max at 576
Shellfish Harvesting	90th percentile < 43	90th percentile < 230	--	--	--
Non-contact Water Recreation	90th percentile < 4,000	--	--	--	--

* Designated Beach, Moderate, Light, and Infrequent Use Areas
Table 3-2 of Basin Plan, US EPA Bacteriological Criteria for Water Contact Recreation
(MPN of 235, 298, 406, and 576 respectively (fresh water)

I. Surface Water Sampling SOP
The Surface Water Sampling SOP, Attachment B, provides step-by-step procedures to collect samples and deliver them for analysis in accordance with Sections 6, 7 and 9.

10. NOTIFICATIONS OF SENSITIVE RECEPTORS AND REGULATORY AGENCIES

Table 10.1 describes regulatory and other notifications that must be made in accordance with the triggers indicated:

Table 10.1 Notifications of Sensitive Receptors and Regulatory Agencies

Contact	Trigger	Deadline	How	Person(s) Responsible
OES	If SSO is greater than or equal to 1,000 gallons and reaches or has potential to reach surface waters	2 hours after awareness of SSO	Call CalOES at (800) 852-7550	LRO
County Environmental Health	Not Applicable	Not Applicable	Not Applicable	
SWRCB	If 50,000 gal or more were not recovered	45 days after SSO end time, Submit SSO Technical Report.	CIWQS*	LRO, Director of Engineering and Operations
RWQCB	Not Applicable	Not Applicable	Not Applicable	

** In the event that the CIWQS online SSO database is not available, notify the State Water Resources Control Board (SWRCB) by phone or email and provide required information until the CIWQS online SSO database becomes available.*

11. TECHNICAL REPORT

The MRP requires that in the event of a 50,000 gal or greater overflow spilled to surface waters, the City must prepare and submit an SSO Technical Report that includes a description of all water quality sampling activities conducted, a location map of all water quality sampling points, and the analytical results and evaluation of the results, pursuant to Section B.5 of the MRP. In addition, this report must be submitted to the CIWQS Online SSO Database within 45 days of the end of the SSO and must be certified by the City's Legally Responsible Official.

12. RECORDKEEPING

All sampling related records associated with this WQMP should be contained in the appropriate SSO Incident file designated with a specific locator record number. These records shall include at least the following documents related to the WQMP:

- A narrative description of water quality sampling activities associated with the event.
- Timeline of the sampling activities until sampling is terminated.
- All surface water sampling worksheets.
- Computations of spill travel time in surface waters, if appropriate.
- Chain of Custody for all samples.
- Sampling Map of all sample locations.
- All photos or video showing sampling activities.
- Final analytical results from the certified laboratory conducting the sample analysis along with an Agency evaluation of the results to determine the nature and impact of the release.
- Failure analysis reviews of the WQMP including recommendations for changes and modifications.
- Calibration records for specific equipment used in the sampling processes.
- Notification documentation for all public and private agencies involved with or requiring monitoring related to final sample results.

The City shall maintain all records including records from service contractors associated with this WQMP as part of the file records for an SSO as required by the WDR and MRP. These records shall be maintained for a minimum period of five-years from the end date of the SSO unless required by regulatory enforcement action, request of the State or Regional Board or as support for claims litigation resulting from the SSO. All records associated with the SSO shall be destroyed upon reaching the end of the file retention period or as otherwise required by the Regional or State Board.

Samples of all City forms and records used in this WQMP are included as attachments.

13. TRAINING

Training will be provided in accordance with Table 13.1.

Table 13.1 City of Oakland surface water sampling training program	
Who Is Trained To Collect Surface Water Samples?	
Trainer Qualifications	The trainer shall, by virtue of training, experience, education or a combination thereof demonstrate expertise in surface water sampling science, techniques and documentation.
Training Curriculum	at a minimum, training shall include: • The City's Water Quality Monitoring Plan • Sampling technique, including hands on practice • Sampling equipment calibration, use and decontamination procedures, including hands on practice • Sampling safety • Completion of the Sampling Equipment Calibration/Maintenance Log, Surface Water Sampling Report and Chain of Custody
Training Documentation	Attendees shall be required to sign-in to all training on the appropriate forms used by Oakland.
Refresher Training Frequency	Annual
Who is Responsible for Ensuring Training Occurs?	Operations Manager, OPW Sewer Maintenance Division;
Required Training Records	Employee training sign in log
Who is Responsible for Maintaining Records?	Regulatory Compliance Officer, OPW Administration

14. INTERNAL REVIEW AND UPDATE OF THE WQMP

The WQMP is a requirement of the WDR and MRP regulations and therefore the WQMP must be adopted by the City governing board (City Council) when completed and thereafter at the same time as the new adoption of the SSMP every five years or when major changes to the SSMP are required. Internal reviews of the WQMP should be conducted at a minimum with City SSMP audits or with a failure analysis following a SSO event requiring the use of this WQMP. This latter evaluation should be used to determine if any procedures or program changes would improve the WQMP.

The internal review of the WQMP must include a thorough review of the then existing WQMP against actual performance by the agency staff and testing laboratory during and after the event. All documents associated with the water quality sampling should be reviewed and included in the SSO file and compared to the requirements in this Plan. Particular attention should be given to all dates and times associated with the monitoring, proper tests in support of the Regional Board Basin Plan, proper completion of the Chain of Custody, equipment calibration documentation of all equipment used for sampling and available photographs or video of the sampling processes, review and sign-offs by all responsible parties, review of the sampling locations map, final lab results and the certification report that the Technical Report was submitted within 45 calendar days of the end of the SSO to the CIWQS system.

In addition, the City should also conduct regular reviews of the WQMP at least annually or along with the bi-annual SSMP Audit required by the WDR. The review should be undertaken to determine that all information in the Program is current, that all classification responsibilities have not changed, that all forms are still appropriate and that all contract relationships with testing laboratories, if not associated with the agency, are still current and available 24 hours per day and 7 days per week. The review should also include a review of the Regional Board Basin Plan to assure continuing conformance with the Basin Plan.

This internal review should be conducted by the Regulatory Compliance Officer, Sewer Maintenance Division management, Environmental Services Division management and any outside contract laboratory services subsequent to any event or once per year if the WQMP has not had to be invoked during the preceding year.

Finally, a schedule and assignment of responsibility for completion of the recommended changes should be prepared along with additions to the SSMP Change Log for these changes and modifications of the WQMP.

CHANGE LOG

The 2013 MRP, Section E.3 requires that all changes to the Sanitary Sewer Management Plan be recorded and documented using an SSMP Change Log indicating what section is being change, a description of the changes, and the person or persons authorizing the changes. Because the WQMP is required by the WDR and MRP, it is also necessary that changes to the WQMP be included in the documentation of changes to the City's SSMP. Any changes resulting from Section 14 above should be added to the Change Log of the SSMP upon implementation and adoption of the changes as required by the WDR.

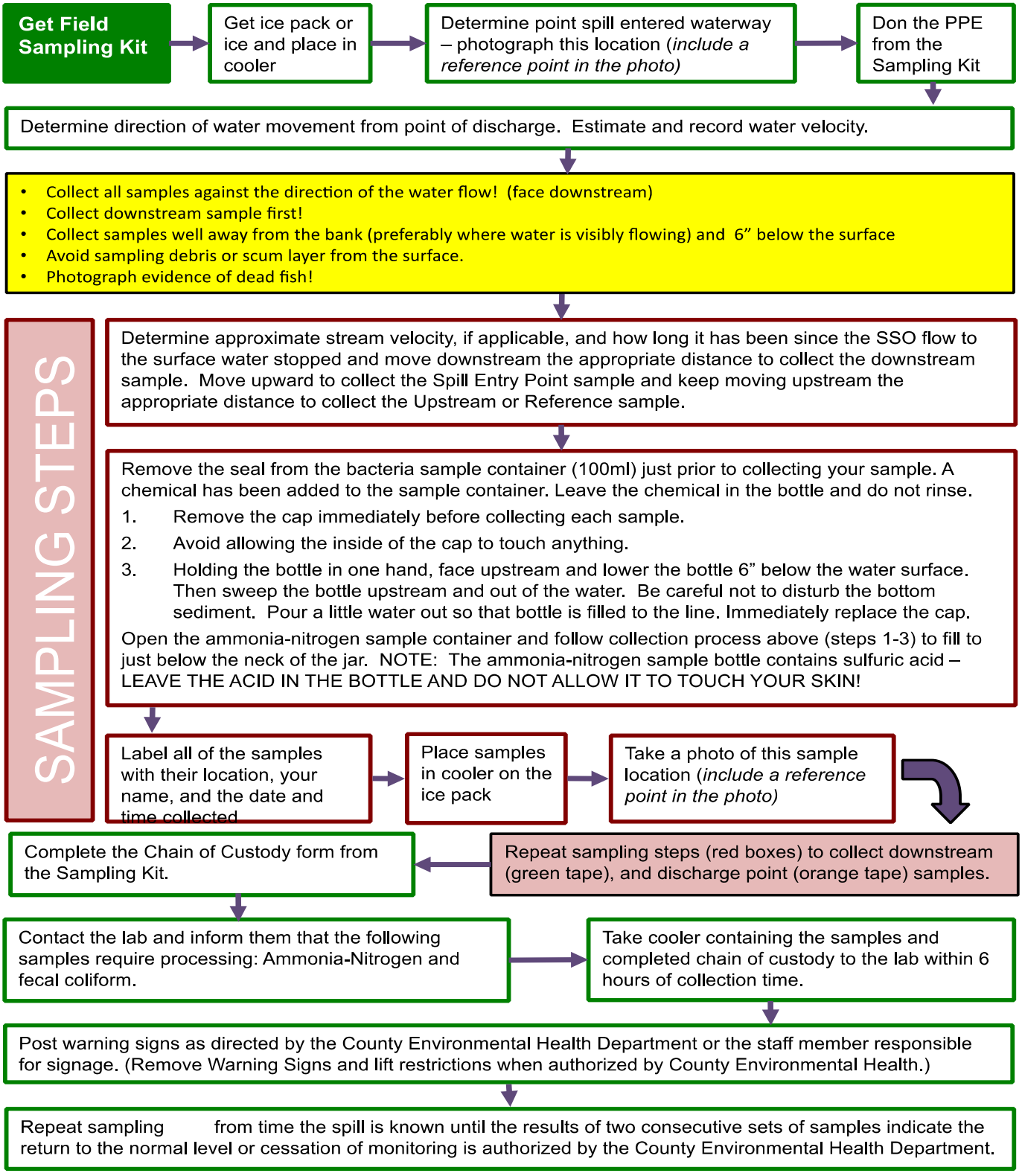
ATTACHMENT A
Water Quality Monitoring Plan Change Log

Water Quality Monitoring Plan Change Log

Date	Section(s) Changed	Summary of Change	Approved (signature)

ATTACHMENT B
Surface Water Sampling SOP

Surface Water Sampling Standard Operating Procedure



ATTACHMENT C
Sample Collection Chain of Custody Record

Surface Water Sample Collection Chain of Custody Record

Customer Name	City of Oakland			☐	**Hazardous Waste**	**PO#**	
Customer Address	250 Frank Ogawa Plaza, Oakland, CA 94612			☐	**Unknown Material**	**WO#**	
Customer Telephone		**Mail Code**		**CONTRACT LAB INFORMATION**		**Turnaround Requirement**	
Program Name				Ship to:		☐ Normal (21 days)	
Lab Program Coordinator		**Phone #**		Ship Date:		☒ Rush: 3 days ☐ Other:	
Sampled By				Courier:			

LIMS# (Issued by Lab)	SAMPLE COLLECTION INFORMATION									Analysis Requested					QA/QC Requirements
	Date	Time	Type: Composite	Type: Grab	Sample Location	Field pH	Field Temp	# Containers	Matrix*	Ammonia	Total Coliform / E. coli	Enterococcus			☒ Lab Standard ☐ Special (see attached) Remarks/Notes
			☐	☒	Upstream			3	A	☒	☒	☒	☐	☐	
			☐	☒	Entry Point			3	A	☒	☒	☒	☐	☐	
			☐	☒	Downstream			3	A	☒	☒	☒	☐	☐	
			☐	☒	Field Blanks**			2	O	☒	☒	☐	☐	☐	Distilled Water
			☐	☐						☐	☐	☐	☐	☐	
			☐	☐	** Only used for					☐	☐	☐	☐	☐	
			☐	☐	≥50,000 gal SSO					☐	☐	☐	☐	☐	

*Matrix: P = Potable Water, W = Wastewater, A = Ambient Water, G = Groundwater, S = Soil, B = Biosolids, I = Industrial, O = Other (specify in remarks)

Relinquished	Date	Time

Relinquished to	Date	Time

Transport/Shipping Information		
☐ USPS	☐ UPS	☐ FedEx
Tracing #:		
☐ Other:		

Sample Receiving Documentation

Container intact? ☐ Yes ☐ No	Correct container? ☐ Yes ☐ No	Field preserved? ☐ Yes ☐ No	Custody tape intact? ☐ Yes ☐ No
Cooled? ☐ Yes ☐ No	Temp. Blank? ☐ Yes ☐ No (°C)	Comments:	
Sample distribution: ☐ Lab bench ☐ Ice chest ☐ Walk-in cooler shelf #		Disposal Date:	Disposed by: (inits.)
C-O-C Distribution Date: By: ☐ Lab Admin File ☐ Prog/proj Mgr. ☐ Lab Prog. Coord. ☐ Delivery courier ☐ Pick-up courier			

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ATTACHMENT D
Surface Water Sampling Worksheet

Surface Water Sampling Worksheet

Sample Date:	Sample Time: ☐AM ☐PM	Sample Location:
Sampler(s)' Name(s):		
Sampler(s)' Signature(s):		

What is being sampled?
☐Stream ☐Pond ☐Lake ☐Lagoon
☐Bay/Estuary ☐Ocean ☐River ☐Other:

Weather at time of sampling: ☐Sunny ☐Overcast
☐Sprinkling ☐Raining ☐Snowing

Was the SSO actively entering the surface water during Sampling? ☐YES ☐NO
If no, complete A-D in the gray box to the right □

If the SSO was not actively entering the surface water during sampling:

A. Stream Velocity: _____Ft/s
B. How Long Has the SSO ***NOT*** Been Entering the Surface Water?
_____ minutes X 60sec/min = __ seconds
C. How Far Downstream Did You Travel To Collect The SOURCE Sample?
(A X B = Feet): _____ feet
D. Explain why you travelled a different distance, if you did, to collect the source sample:

NOTE: Calibrate equipment prior to use and record in the Equipment Calibration/Maintenance Log

Sample Location	# of Samples*	pH	Temp. (°C)	DO (mg/l)	Photo ID# of Sample Location	Visual Observations and/or Interferences
Upstream						
Source						
Downstream						
Field Blank						

* Minimum of 2 per location

FINISH CHECKLIST	NOTES / OBSERVATIONS
☐ **All Samples Labeled with:** ☐ Date: a six-digit number indicating the year, month, day of collection ☐ Time: a four-digit number indicating military time of collection. e.g. 0954 ☐ Sample Location: Upstream, Source, or Downstream ☐ Samplers: each sampler is identified ☐ Parameter/preservative: analysis to be conducted for sample/sample preservation ☐ **Chain of Custody Completed** ☐ **Samples on Ice in Cooler** ☐ **Pictures Taken of Each Sample Location and the Photo ID/# Noted Above** ☐ **All Sampling Equipment Collected**	

ATTACHMENT E
Technical Report

Technical Report
Outline

1. Introduction
   Agency/system description

2. SSO Technical Report - Contents and Responses
   a. Causes and Circumstances of the SSO
      i. Detailed explanation of how and when SSO was discovered
      ii. Diagram indicating SSO "Cause point", appearance point, and final destination (use attachments, maps and diagrams as needed)
      iii. Detailed description of methodology employed and available data used to calculate the SSO volume and any volume recovered
      iv. Detailed description of the cause(s) of the SSO
      v. Copies of the original field crew records used to document the SSO (attachment)
      vi. Historical maintenance records for the lines involved in the cause of the SSO (attachment)

   b. Agency's Response to the SSO
      i. Chronological narrative description of actions taken by agency to terminate the SSO
      ii. Description of how the OERP was implemented to respond to and mitigate any impacts of the SSO
      iii. Final corrective action(s) completed and/or planned, including a schedule for actions not yet completed

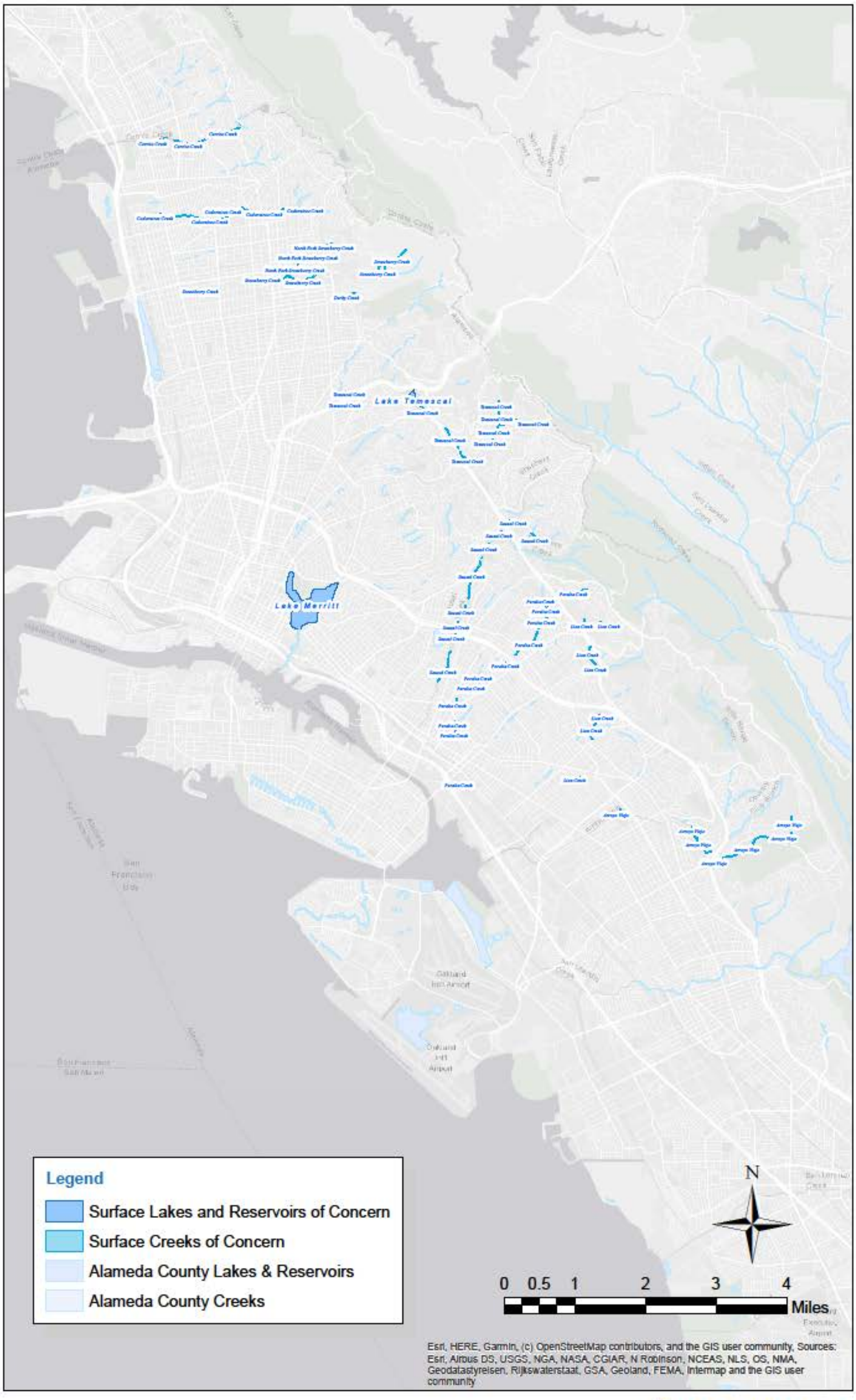
   c. Water Quality Monitoring
      i. Description of all water quality sampling activities conducted, including analytical results and evaluation of the results
      ii. Detailed location map illustrating all water quality sampling points

3. Conclusions

ATTACHMENT F
SURFACE WATER MAPS

December 2019

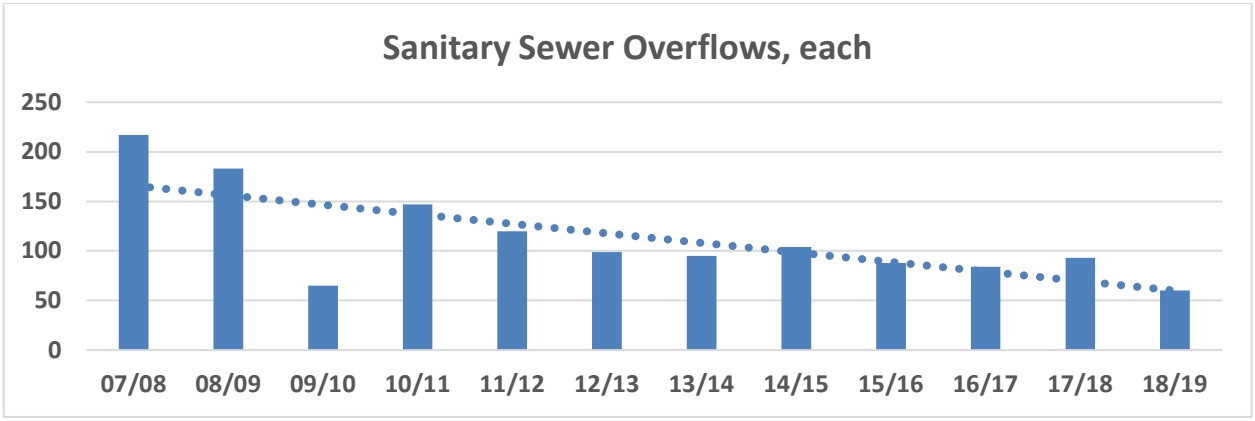
City of Oakland - Water Quality Monitoring Plan - Attachment F - Surface Water Map

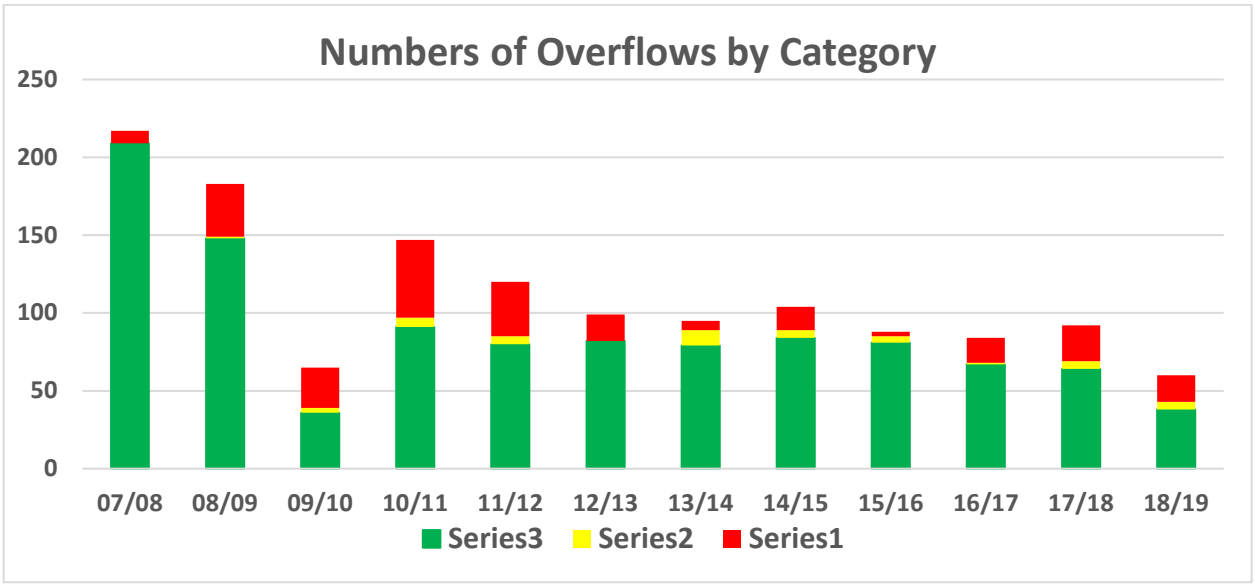


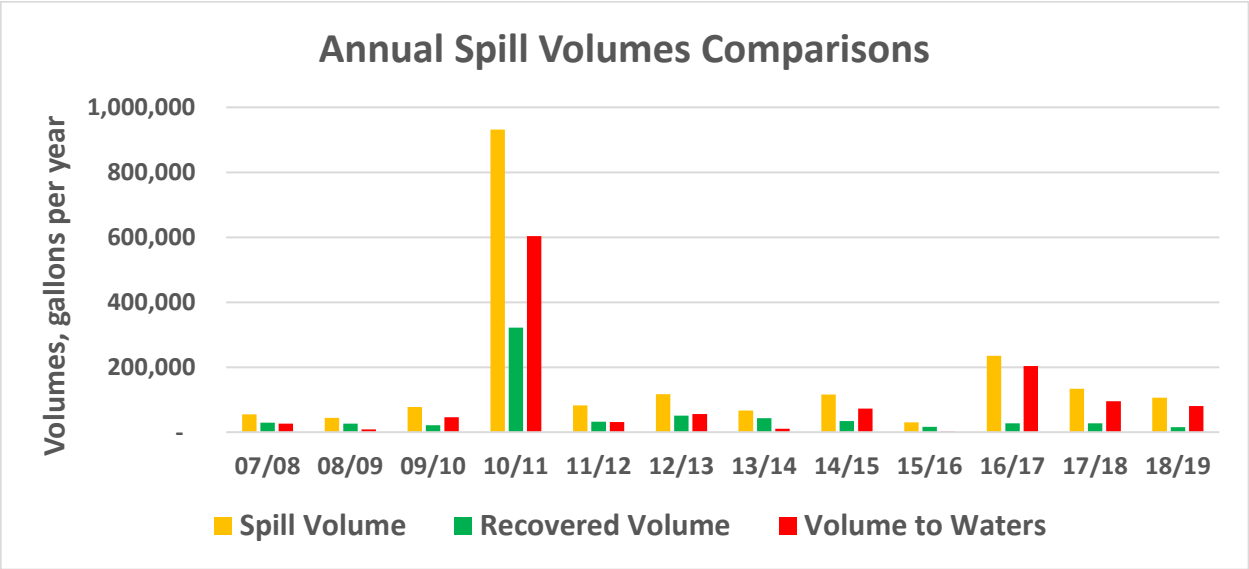
Pipe & Plant

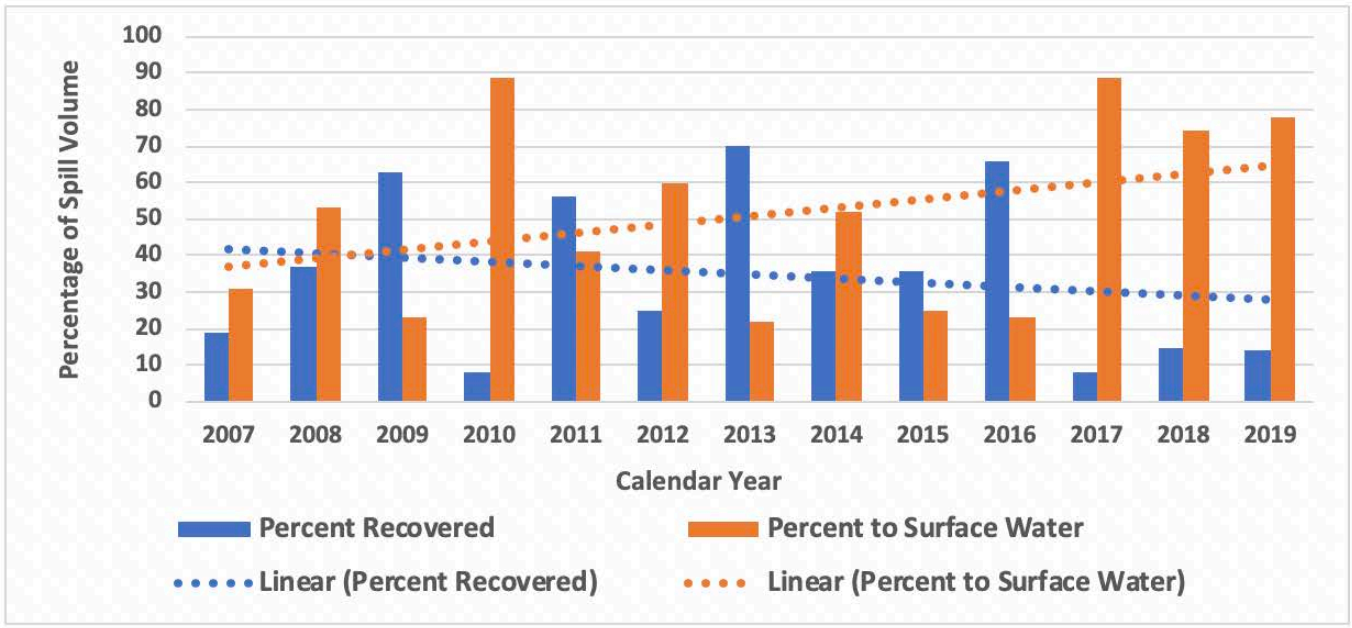
APPENDIX E City Historical Performance Results

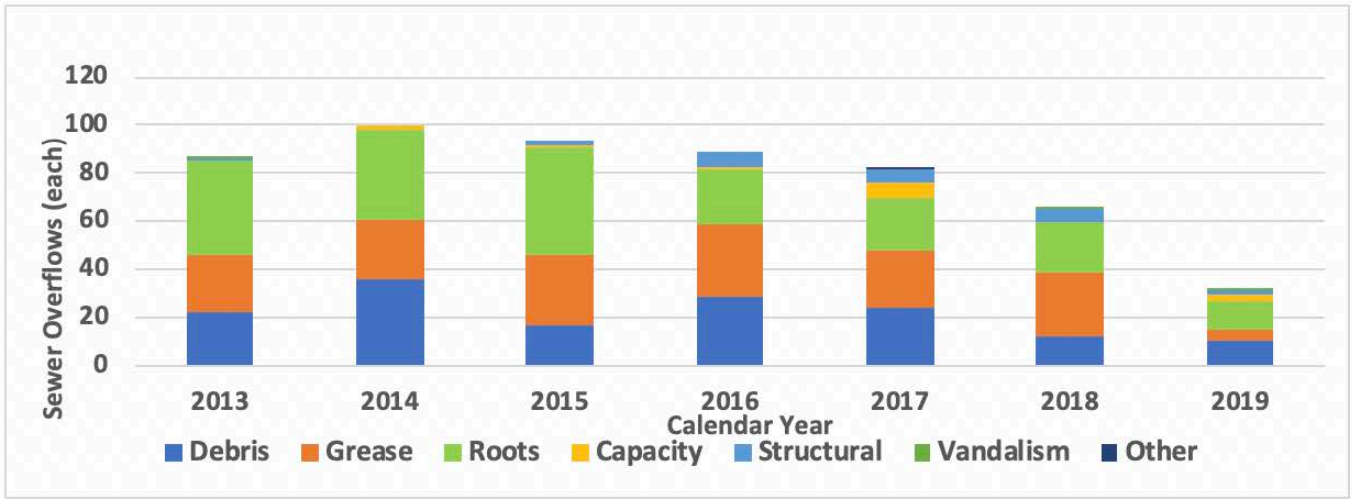
December 2019

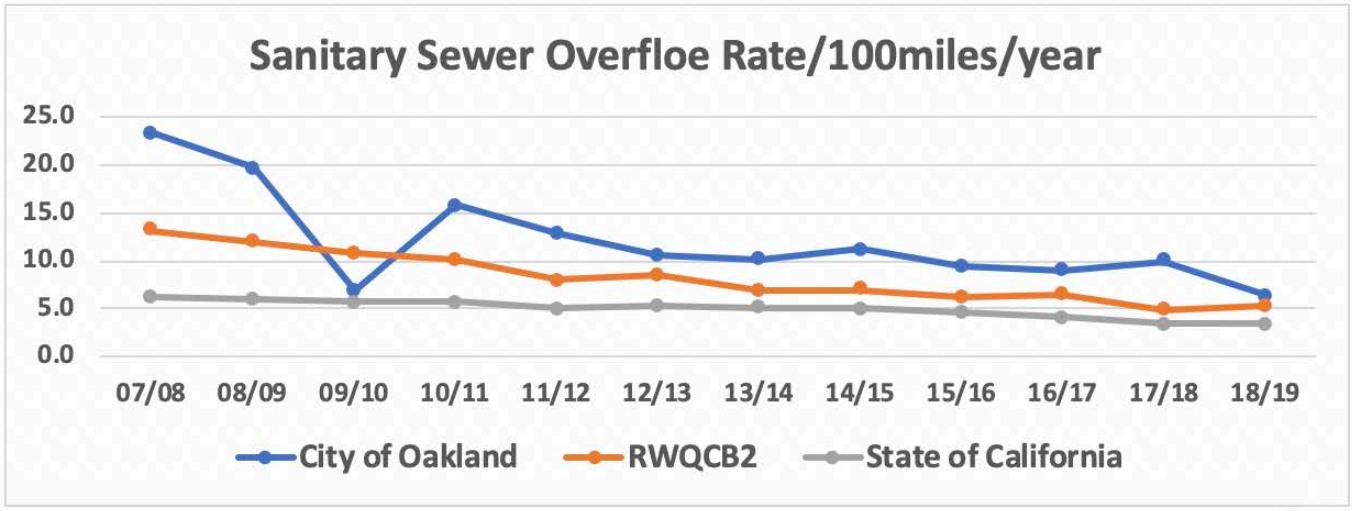

Sanitary Sewer Overflows, each
250
200
150
100
50
0
07/08
08/09
09/10
10/11
11/12
12/13
13/14
14/15
15/16
16/17
17/18
18/19

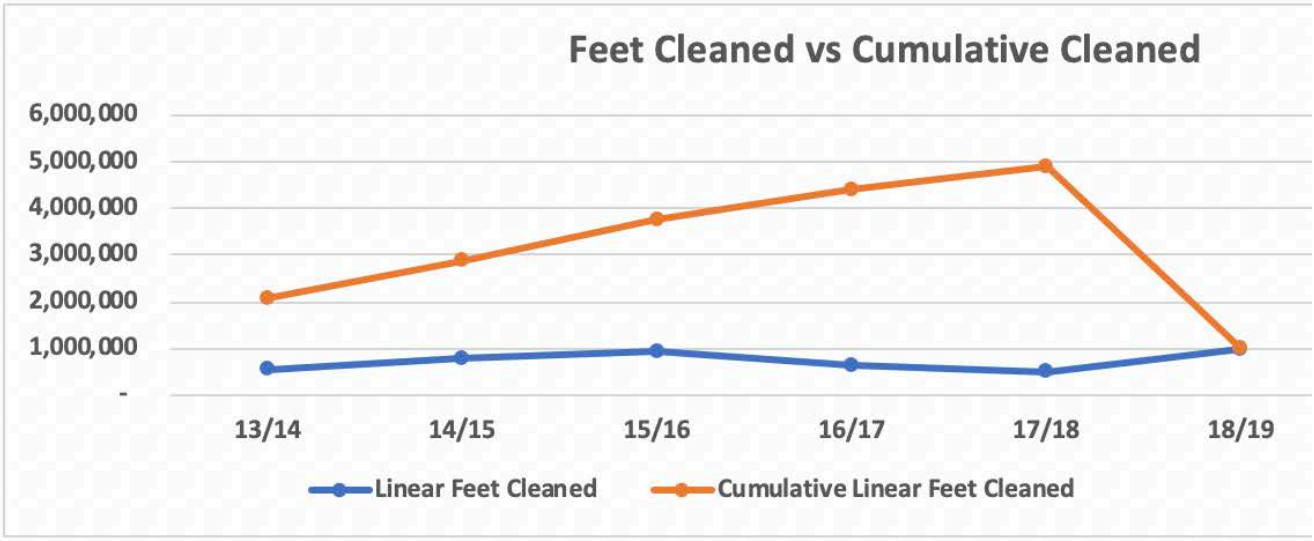

Numbers of Overflows by Category
250
200
150
100
50
0
07/08
08/09
09/10
10/11
11/12
12/13
13/14
14/15
15/16
16/17
17/18
18/19
Series3
Series2
Series1

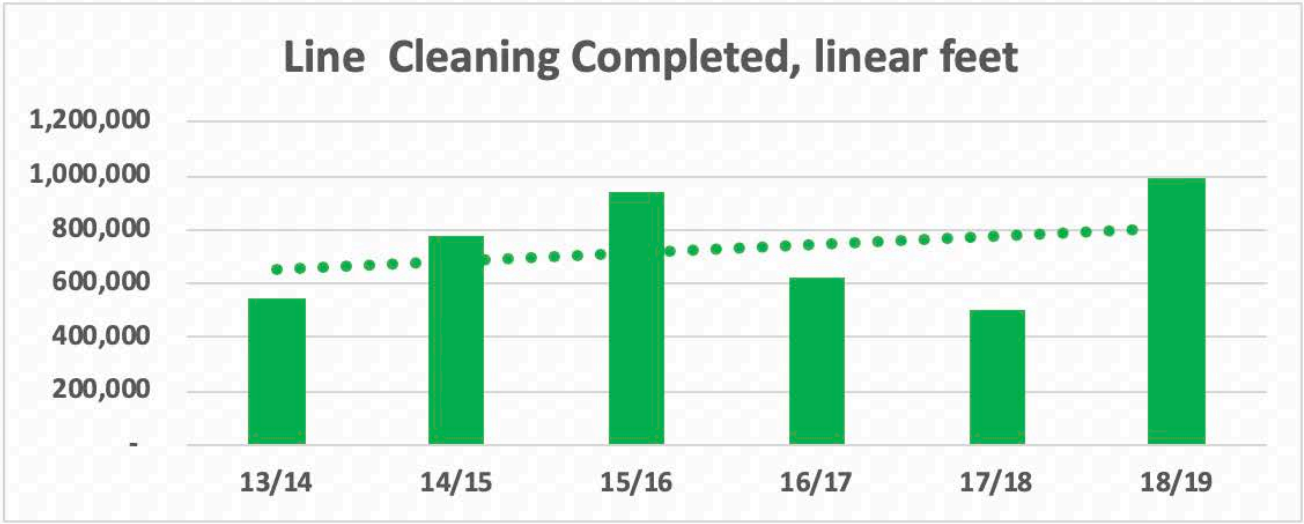

Annual Spill Volumes Comparisons
Volumes, gallons per year
1,000,000
800,000
600,000
400,000
200,000
-
07/08
08/09
09/10
10/11
11/12
12/13
13/14
14/15
15/16
16/17
17/18
18/19
Spill Volume
Recovered Volume
Volume to Waters

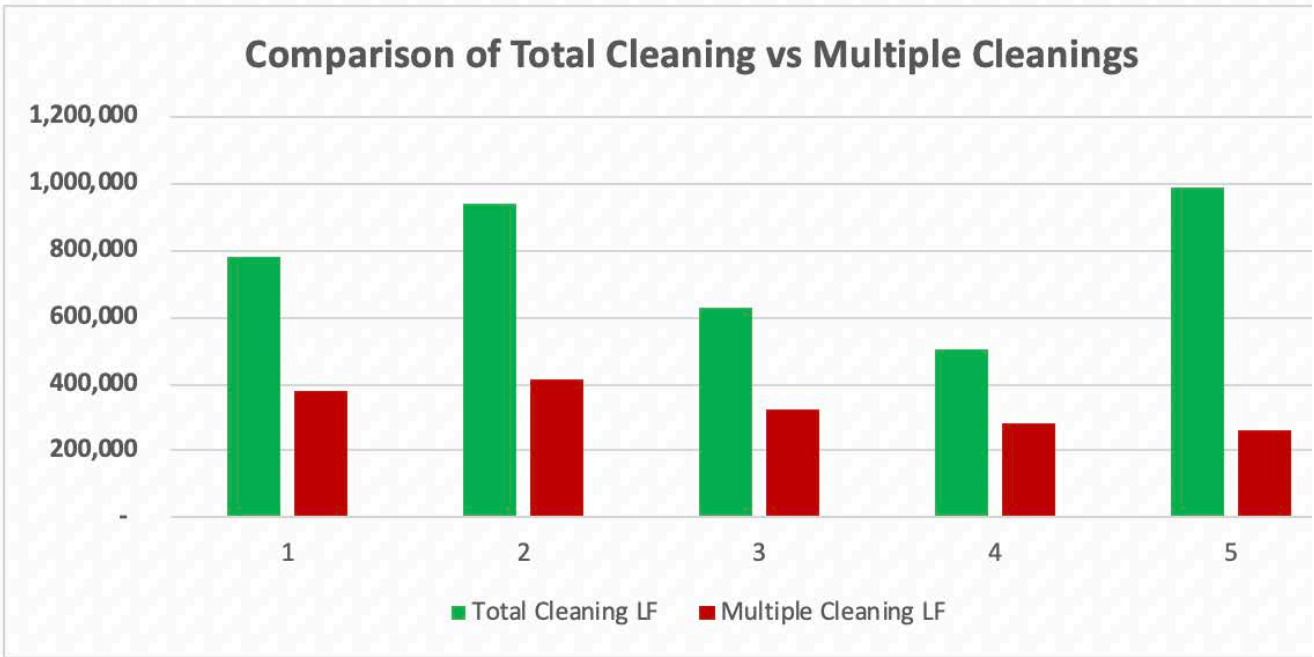

Percentage of Spill Volume
100
90
80
70
60
50
40
30
20
10
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Calendar Year
Percent Recovered
Percent to Surface Water
Linear (Percent Recovered)
Linear (Percent to Surface Water)

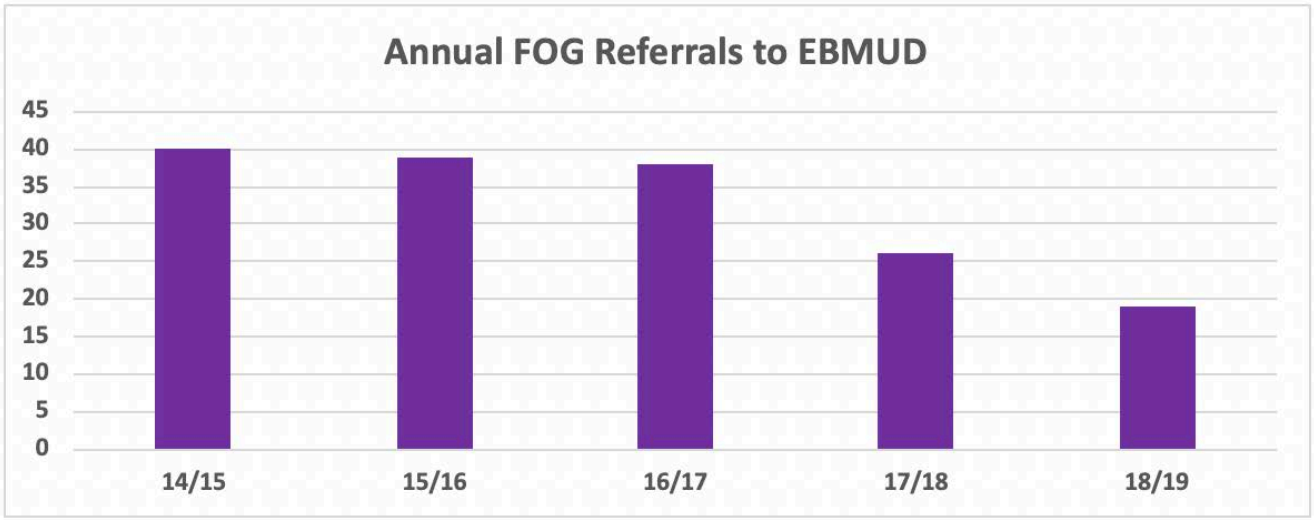

Sewer Overflows (each)
120
100
80
60
40
20
0
2013
2014
2015
2016
2017
2018
2019
Calendar Year
Debris
Grease
Roots
Capacity
Structural
Vandalism
Other

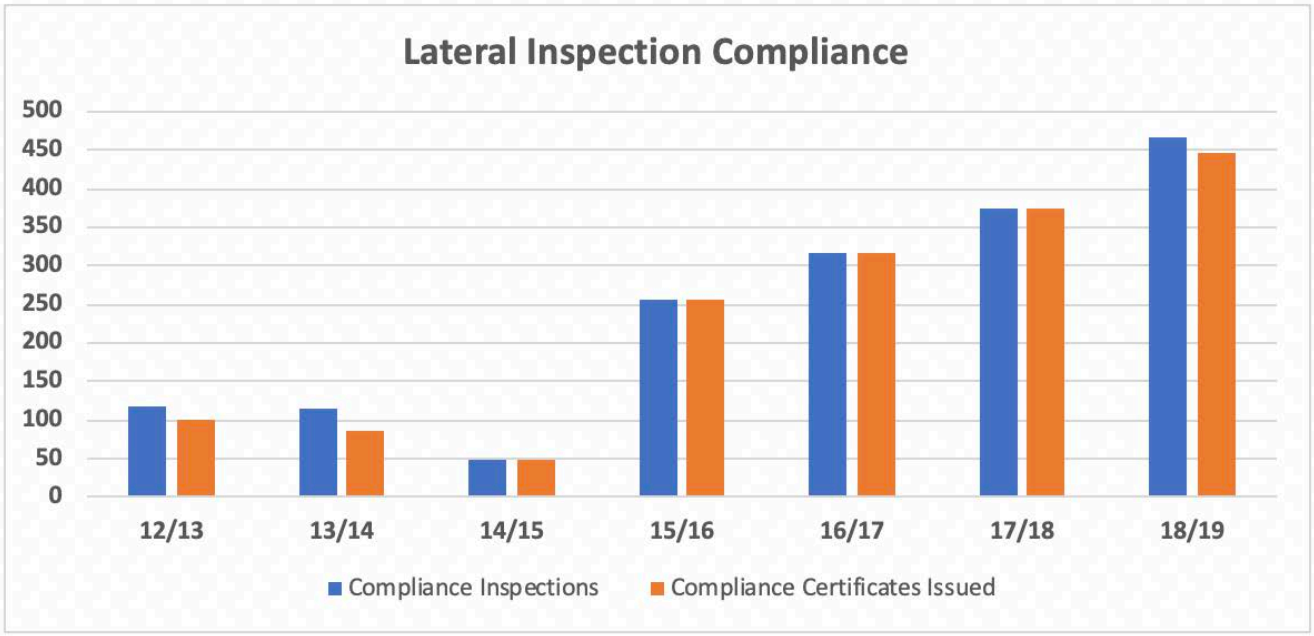

Sanitary Sewer Overfloe Rate/100miles/year
25.0
20.0
15.0
10.0
5.0
0.0
07/08
08/09
09/10
10/11
11/12
12/13
13/14
14/15
15/16
16/17
17/18
18/19
City of Oakland
RWQCB2
State of California


Feet Cleaned vs Cumulative Cleaned
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
-
13/14
14/15
15/16
16/17
17/18
18/19
Linear Feet Cleaned
Cumulative Linear Feet Cleaned


Line Cleaning Completed, linear feet
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
13/14
14/15
15/16
16/17
17/18
18/19


Comparison of Total Cleaning vs Multiple Cleanings
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
1
2
3
4
5
Total Cleaning LF
Multiple Cleaning LF


Annual FOG Referrals to EBMUD
45
40
35
30
25
20
15
10
5
0
14/15
15/16
16/17
17/18
18/19


Lateral Inspection Compliance
500
450
400
350
300
250
200
150
100
50
0
12/13
13/14
14/15
15/16
16/17
17/18
18/19
Compliance Inspections
Compliance Certificates Issued