



University of California
Santa Cruz

Sewer System Management Plan
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1.0 Goals

The Goals of the UCSC SSMP are to enable the Campus to:

- Properly manage, operate, and maintain all parts of the wastewater collection system.
- Eliminate/minimize both dry weather and wet weather sanitary sewer overflows.
- Mitigate the impact of sanitary sewer overflows that do occur.
- Provide adequate capacity to convey peak flows.

2.0 Organization

2.1 Responsibilities

The names and phone numbers for persons currently fulfilling the positions listed below is included in Attachment A. Attachment A shall be reviewed and if necessary updated at least annually.

Legally Responsible Official:

- Vice Chancellor Business & Administrative Services or
- Director Physical Plant

Authorized Representative:

- Storm Water Programs Manager
- Environmental Programs Manager

Vice Chancellor Business & Administrative Services:

- Establishes policy and
- Allocates program resources

Associate Vice Chancellor, Physical Planning & Construction:

- Maintenance of sanitary sewer system map (shared responsibility with Physical Plant)
- Design and construction standards and specifications for sewer systems including fat, oil and grease (FOG) measures; and
- Procedures and standards for inspecting and testing the installation of new and rehabilitated sewer systems

Director Physical Plant:

- Fat, oil and grease (FOG) disposal from sanitary sewer inline oil and grease capture devices associated with dining facilities.
- System Evaluation and Capacity Assurance Plan / Capital Improvement Plan including, hydraulic capacity evaluation, capacity enhancement measures and schedule (shared responsibility with Physical Planning and Construction)

Storm Water Programs Manager:

- Writes and updates SSMP to ensure compliance with regulations
- All regulatory notifications and communications;
- Communicates with downstream agency;
- Fat, oil and grease (FOG) education and outreach;

- Oversees fat, oil and grease (FOG) inspections;
- In collaboration with Plumbing Shop, conducts periodic audits of Sewer System Management Plan implementation.

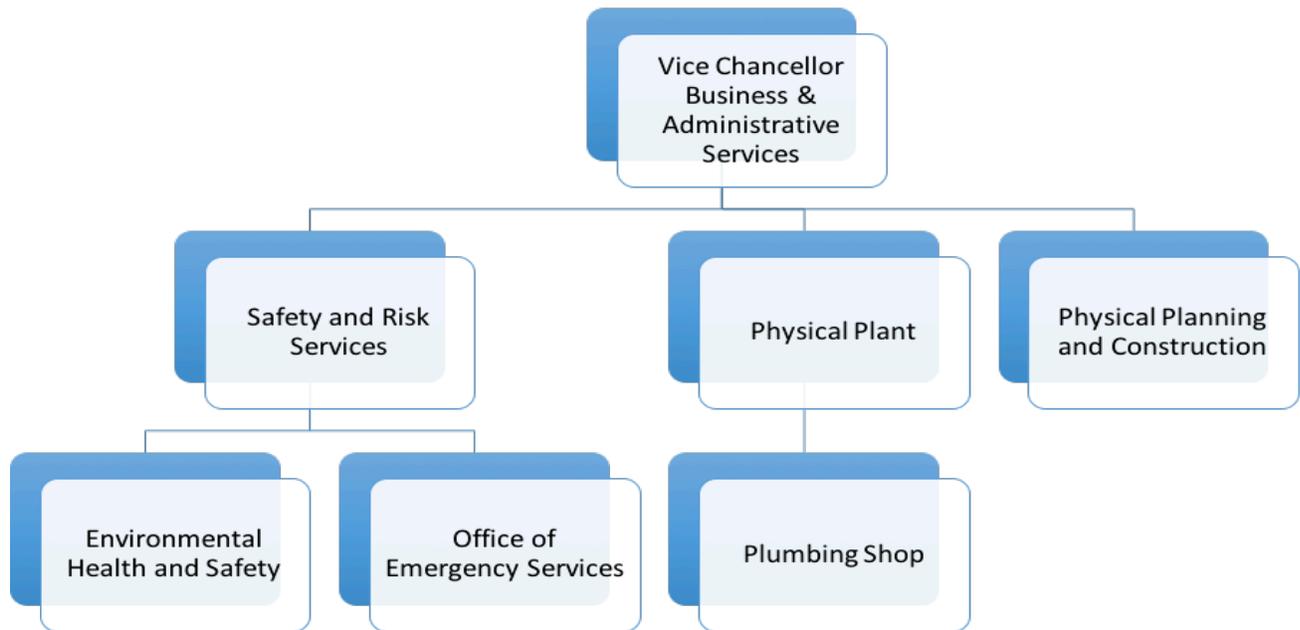
Supervisor Plumbing Shop:

- Maintenance of sanitary sewer system map (shared responsibility with Physical Planning and Construction)
- Routine preventive operation and maintenance activities
- Supervises primary responders for Sanitary Sewer Overflows
- Rehabilitation and replacement plan to identify and prioritize system deficiencies including:
 - Regular visual and TV inspections of manholes and sewer pipes and
 - Ranking system for scheduling rehabilitation
- Staff training in sanitary sewer system operations and maintenance, and requires contractors to be appropriately trained
- Identify and maintain equipment and replacement part inventories
- In collaboration with EH&S, conducts periodic audits of Sewer System Management Plan implementation.

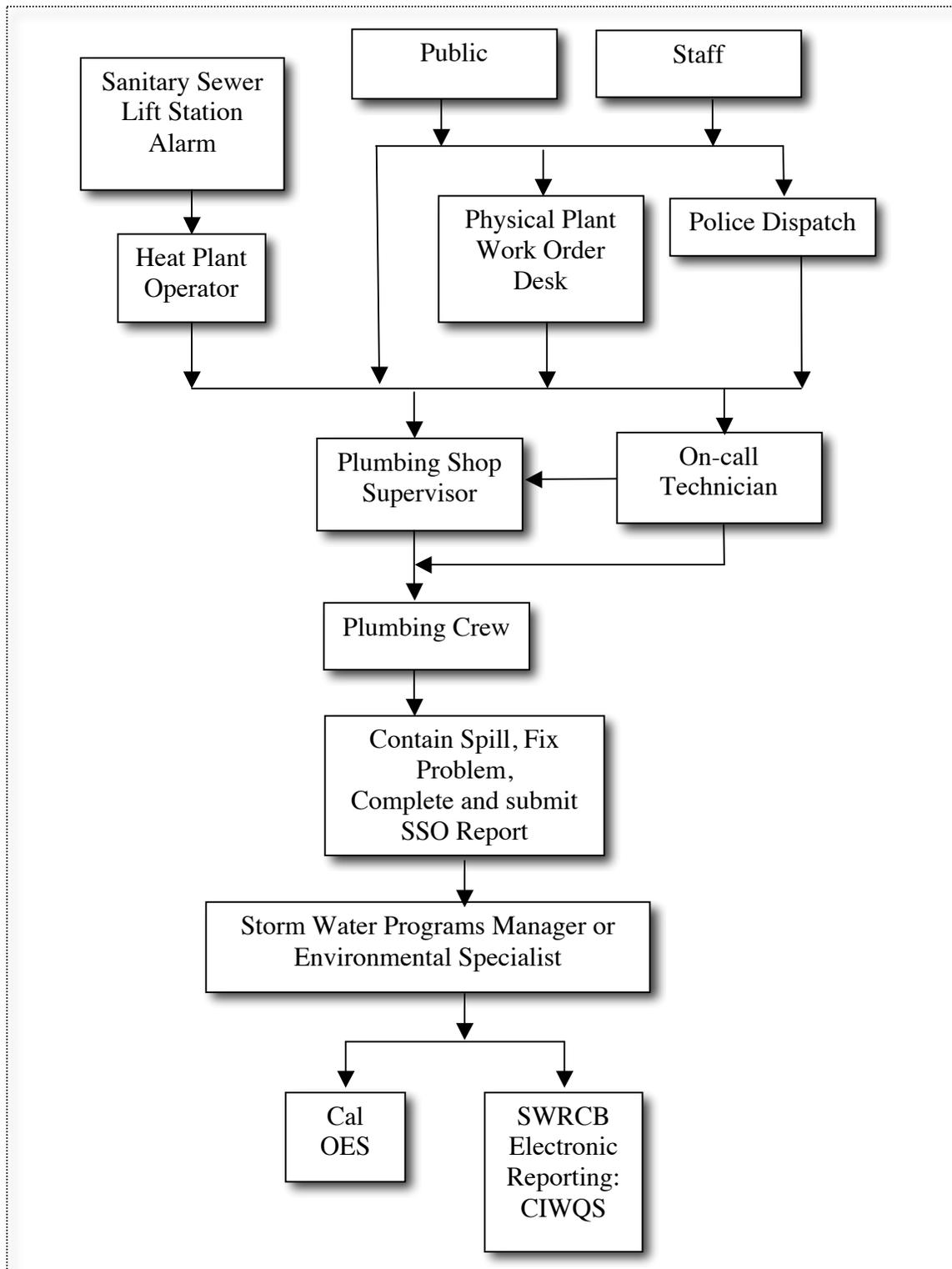
Fire Marshal, Office of Emergency Services

- Emergency operations

2.2 Organization Chart



2.3 Sanitary Sewer Overflow (SSO) Chain of Communications



3.0 Legal Authority

The Regents of the University of California is a Constitutional Corporation, organized under Article IX, Section 9 of the California Constitution, with full authority over governance and management of the University operations. Under this authority, the University of California has legal authority to:

- Prevent illegal discharges into its system (e.g., storm water or chemical dumping).
- Require that sewers and connections be properly designed and constructed.
- Ensure proper installation, testing, and inspection of new and rehabilitated sewers (such as new or rehabilitated collector sewers and new or rehabilitated laterals).
- Ensure access for maintenance, inspection, or repairs of all portions of the system operated by UCSC.
- Limit fats and greases and other debris that may cause blockages in the collection system.

4.0 Operation and Maintenance

The sanitary sewer collection system consists of approximately 12 miles of sewer pipes, 400 manholes, 13 pump stations, and other related infrastructure. The campus operates and maintains the sanitary sewer system through a balanced Sanitary Sewer Maintenance Program that includes the following elements.

4.1 System Inventory and Mapping

The campus's sewer collection system assets are fully inventoried in a Physical Planning and Construction database system that is able to provide full mapping capability. Updates to the data are made regularly in order to accurately reflect conditions in the field. The maps show all gravity line segments, manholes, pumping facilities, pressure pipes and valves. (There are currently no valves in the system) Maps of the storm water conveyance system are also available.

4.2 Preventative Operation and Maintenance

The campus constantly monitors sanitary sewer blockages and other conditions that indicate the need for regular cleaning maintenance. Cleaning cycles are established and performed based on this assessment and can range from monthly to every three years. Regularly scheduled maintenance is also performed on all pump stations.

UCSC has measures in place in order to keep the system in good repair and prevent excessive infiltration/inflow, service interruptions, and system failures. This is done through scheduled regular maintenance and cleaning of the collection system, which is summarized below. The refinement of the Preventative Maintenance Program has occurred over a period of 25-years. The Preventative Maintenance Program is designed to address two main issues: root intrusion and FOG.

Every month:

- Sediment/paint traps in Art Studios inspected and maintained

Every two months:

- Cleaning of grease interceptors by outside contractor.

Every three months:

- Lift stations: inspected and maintained
- Root related problem areas receive chain flail
- Non-Root related problem areas receive hydro-jet rodder
 - dining halls/kitchens
 - other identified non-root related problem areas

Every six months:

- Isolated manholes below McHenry library and within Jordan Gulch are visually inspected. This is done on a rotating basis to ensure each is inspected every 2 years.

Every year:

- 14 identified campus areas inspected and roddered
- Chain flail/root cutting in identified problem areas
- Manholes: 1/5 of the manholes are inspected each year on a rotating basis.

Every three years:

- Two critical areas known as the Porter Run and the Oakes Path Run are serviced every three years by a contractor, currently Greenline Inc, who removes roots and records video of the lines.

4.3 Rehabilitation and Replacement

4.3.1 Long Term Planning: The final draft of Long Range Development Plan, September 2006, reported the existing on-campus sanitary sewer system will have adequate capacity for the proposed new development. New construction will be limited to repair, maintenance, limited upgrades, and extensions to areas of new development. For additional details refer to Section 8 of this plan and the Long Range Development Plan.

4.3.2 Short Term Planning: Short-term actions are taken on an as needed basis as identified during routine inspections. Short-term actions implemented through this method include the following:

- Grease interceptor installation
- Identification and replacement of laterals
- Reverse grade and root intrusion corrections

4.4 Training

Campus staff responsible for maintaining the sewer system are thoroughly trained and experienced in performing the duties required to safely and effectively operate and maintain the sewer system. Employees are directed to follow standard operating procedures for all sewer cleaning, repair and other maintenance functions.

- 4.4.1 EH&S: Leads monthly safety training on a variety of topics that, on an annual basis includes confined space entry, use of ladders and exposure control.
- 4.4.2 Physical Plant: Provides yearly technical training for staff responding to sewer spills. Provides technical training when new systems are installed to operators of system.
- 4.4.3 Outside contractors who perform maintenance on the sewer system operate under a contract that stipulates that contractor's staff must be properly trained.

4.5 Contingency Equipment and Replacement Inventories

- 4.5.1 Vehicles and Equipment: The Fleet Services Department works closely with Physical Plant staff to ensure vehicles and equipment are functioning properly and safely. Replacement equipment needs are evaluated annually and considered during the budget process.
- 4.5.2 Emergency Stand-by Generators: the Electrical Department conducts three no load runs for 30 minutes annually and three loaded runs for 90 minutes annually.
- 4.5.3 A stock room of parts and equipment, including emergency pumps, lights and generators is maintained. Repairs that require equipment or materials beyond existing capabilities are executed by an outside contractor via a service agreement contract. Current contractors with service agreements are:
 - George H. Wilson Inc
 - Greenline Inc.
 - Rain for Rent Inc (by-pass pumps and hoses)
 - Granite Construction Inc

4.6 Condition Assessment

The UCSC Plumbing Department assesses physical conditions of the sanitary sewer system during PM programs. Needed repairs are noted and placed on the deferred maintenance list and repaired when funding is available.

5.0 Design and Performance Provisions

Physical Planning and Construction (PP&C), and Physical Plant are responsible for ensuring the design and performance standards are implemented on campus.

5.1 Standards for Installation, Rehabilitation, and Repair

Sanitary Sewage System Standards - Section 02730 - of the UCSC Campus Standards Handbook contains the current Campus standards and can be found at the following link: <http://ppc.ucsc.edu/standards/specifications/02000.pdf/>. Section 02730 includes standards for:

- System Design
- Materials
- Installation

- Testing

Other applicable but separate standards, such as Earthwork standards, are also part of the UCSC Campus Standards Handbook.

Sanitary Sewage System Standard Details - In addition to the above standards, the Campus had developed standard details for various sewer system elements. The standard details can be found at the following link:

<http://ppc.ucsc.edu/standards/details/02000/>. Examples of standard details include:

- Standard Utility Trench
- Precast Manhole
- Sewer Clean Out
- Cast Iron Manhole Frame and Cover

5.2 Revising and Updating Standards

Only PP&C may modify standards. Each Standards Division (such as the Sanitary Sewer standards) may be assigned a Division Owner by the Campus Architect or Campus Engineer. Requests to change a Division will be directed to the respective Owner. Changes may also originate with the Division Owner. The Division Owner may elect to incorporate the change in a draft revision for upcoming adoption. The revised Division shall be approved by either the Campus Architect or Campus Engineer depending on section and incorporated into the Campus Standards Handbook.

5.3 Standards for Inspection and Testing of New, Rehabilitated and Repaired Facilities.

Inspection and testing of new or rehabilitated facilities ensures that the established standards are being implemented in the field. Acceptance testing for gravity sewers can include: low pressure air test or water test to identify leakage, mandrel test to identify deflection of flexible pipe, water or vacuum test of manholes to identify leakage, and television inspection to identify grade variations or other construction defects. UCSC will adhere to the standards for inspection and testing of new or rehabilitated facilities as outlined in the Campus Standards Handbook and as provided for in the Campus Standard Details.

6.0 Overflow Emergency Response Plan

The Campus responds to sanitary sewer overflows and other sewer system emergencies according to a well-established sewer overflow emergency response plan intended to protect both public health and the environment.

6.1 Notification Procedures for Primary Responders

The Sanitary Sewer Overflow Chain of Communications, see Section 2 of the SSMP, diagrams the detection and notification for sewer overflows. Plumbing

Department Technician(s) receive notification of an overflow through either a lift station alarm (monitored 24 hours/day), public reporting (may be direct contact or a call to the Work Order Desk or a call to Emergency Dispatch) or in the course of performing regular duties. In some circumstances the Fire Department may initially provide or may assist with response to overflows.

6.2 Notification Procedures for Regulatory Agencies

For all Category 1 and 2 spills, EH&S is notified as soon as it is safe to do so and will not impede the overflow response. After evaluating the characteristics of the spill, EH&S follows Notification, Water Quality Monitoring and Reporting Requirements according to amended Monitoring and Reporting Program effective September 9, 2013.

6.3 Response to Overflows

The Plumbing Department Technician (or alternate responder) will:

- 6.3.1** Make an initial assessment of the location, extent and cause of the overflow;
- 6.3.2** Call for assistance (if needed) including additional personnel, materials, supplies, equipment and/or outside contractors;
- 6.3.3** Based on training protocols and the professional judgment of the Plumbing staff, notify EH&S if the spill may be Category 1 or 2;
- 6.3.4** If there are indications of hazardous materials not normally associated with sewage request hazardous materials assistance;
- 6.3.5** Identify and use appropriate Personal Protective Equipment;
- 6.3.6** Identify and use appropriate safety precautionary measures including Lockout/Tag out protocol;
- 6.3.7** Obtain necessary equipment to respond to spill. Plumbing maintains a supply of materials to mitigate spills. Available equipment includes sand bags, spill containment devices, bypass pumps, hoses, emergency generators, and heavy equipment;
- 6.3.8** Stop the overflow. If the failure is at a lift station, take the malfunctioning pump off line;
- 6.3.9** Contain the wastewater discharged to the maximum extent possible by utilizing spill containment devices;
- 6.3.10** If site security or traffic control is needed, request assistance from TAPS by contact to dispatch;
- 6.3.11** Implement appropriate corrective actions. This may include the use of effluent pumping trucks, emergency pumps, stand-by temporary bypass pipe and emergency generators;
- 6.3.12** Appropriately clean the affected area(s). As appropriate coordinate with Grounds Services or CUHS Facilities to clean and secure the affected area;
- 6.3.13** If this was a minor overflow and EH&S was not previously contacted, provide EH&S with a verbal summary of the overflow and response. A voice mail message is sufficient; and
- 6.3.14** Finalize the required documentation for the incident.

6.4 Water Quality Monitoring

The SSO Water Quality Monitoring Program is meant to assess impacts from SSOs to surface waters in which 50,000 gallons or greater are spilled into surface waters.

- When sampling account for spill travel time in the surface water.
- All samples being tested for indicators are to be analyzed in an accredited or certified laboratory.
- When analyzing samples, only use monitoring instruments and devices that have been properly maintained and calibrated.
- Within 48 hours of the enrollee becoming aware of the SSO, water quality sampling must, at a minimum, test for ammonia and appropriate bacterial indicators.

6.5 Regulatory Notification Procedures

EH&S is responsible for implementing regulatory reporting in accordance with current laws, regulations and permits. The following officials are required to receive notification within two hours of becoming aware of any Category 1 SSO greater than or equal to 1,000 gallons discharged to surface water or spilled in a location where it probably will be discharged to surface water:

- California's Office of Emergency Services

6.6 Training Requirements

6.6.1 Training will be conducted for members of the departments that are responsible for implementing the Overflow Emergency Response Plan.

6.6.2 EH&S is responsible for providing exposure control training for Plumbing staff, Grounds Services staff, and CUHS Facilities staff.

6.6.3 Physical Plant is responsible for providing technical training for Plumbing staff responding to sewer spills.

7.0 Fats, Oil & Grease (FOG) Control

Fats, Oils and Greases (FOG) are one of the reasons for sanitary sewer blockages. FOG is introduced into the sewer system from various sources including residences and kitchens. The Campus has a FOG program that provides a balanced approach to address the problem.

7.1 Education Program: All campus eateries and Dining Halls train affected employees on required procedures to control FOG.

7.2 Routine Service for all grease traps and interceptors: As listed in Section 4 of this SSMP, the preventative maintenance program provides for bimonthly inspection and pumping of all grease traps and interceptors.

7.3 Building Design and Construction Standards: The Campus requires that grease removal devices be installed in certain applications, such as kitchens. Plan review and construction inspection processes ensure that required equipment is properly installed.

- 7.4** Food Facility Inspections: EH&S Sanitation staff implement a regular schedule of inspections for all restaurants and other food service facilities. These inspections include a review of grease production, collection and disposal activities.
- 7.5** Sewer Pipe investigations: In addition to a preventative maintenance program that has evolved over twenty-five years, Plumbing Department Technicians investigate areas of concern where there is an indication that excess grease is accumulating to determine the source of FOG. If identified, appropriate actions are taken to eliminate or control the source of FOG.

8.0 System Evaluation and Capacity Evaluation

The University of California, Santa Cruz, Long-Range Development Plan 2005–2020 (2005 LRDP) provides a comprehensive framework for the physical development of the UC Santa Cruz campus as it expands to a projected enrollment of up to 19,500 FTE students (fall-winter-spring three-quarter average).

Section H of the 2005 LRDP states: The existing on-campus sanitary sewer system was sized for 27,500 students and will have adequate capacity for the proposed new development. There are two major trunk sewers on the UCSC campus, one on Empire Grade and the other along Hagar Drive, that combine into a single sewer at the Cook House, which discharges into the city's sewer system at Bay and High streets. New construction will be limited to repair, maintenance, limited upgrades, and extensions to areas of new development.

Several sewer system evaluations were conducted to prepare the 2005 LRDP and associated Environmental Impact Report (EIR)

ARUP and Partners California Ltd (ARUP) conducted flow monitoring in 2003 and 2004 which coincided with rainfall events to determine Rainfall Dependant Inflow/Infiltration flow rates. The 2004 ARUP report states: “flow monitoring indicates that the existing sewers on campus have adequate capacity for the current program”.

URS Corporation (URS) conducted a review of the sanitary sewers in 2005. A summary of URS findings are below.

12-inch and larger line sizes appear to be able to handle the projected flow rates in 2020 for line sizes evaluated for the given slopes.

Depending on future development, 10-inch and smaller line sizes on both the West and East sides of the campus may require upgrading.

All new developments requiring sanitary sewer connection shall conduct an evaluation to verify adequate capacity exists below the point of connection, or to identify areas requiring upgrade. This process includes:

- Determine the new development’s peak wastewater discharge.
- Model the existing system from the point of connection to a trunk line (12-inch or greater) to verify adequate capacity exists.

At least every five years the capital improvement schedule shall be reviewed and updated.

9.0 Monitoring, Management, and Plan Modifications

Monitoring, managing and modifying the SSMP are necessary to ensure its effectiveness. The Campus tracks and evaluates a number of sewer system performance indicators to monitor and manage the SSMP as well as the sanitary sewer maintenance program. Some of these indicators are listed below:

Number of SSOs per year
Location of SSOs each year
Volume of SSOs per year
% of sewer lines without obstructions
% of blockages cleared within 4 hours
% of repairs completed within established time frames
Miles of sanitary sewer lines cleaned
Miles of sanitary sewer lines inspected

The data generated from the performance indicators is evaluated during the Program Audits described in section 10.

10.0 SSMP Program Audits

Every two years, the campus will evaluate the effectiveness of each element of the SSMP. The evaluation shall be documented. If the evaluation identifies program deficiencies it shall also identify the corrective actions to be taken. Attachment B provides an evaluation protocol.

11.0 Record Keeping

The following records will be available during inspection or upon request:

- SSO event records
- Records documenting Sanitary Sewer Management Plan implementation and changes/updates to the SSMP.
- Records to document Water Quality Monitoring for SSOs of 50,000 gallons or greater spilled to surface waters.
- Collection system telemetry records if relied upon to document and/or estimate SSO volume

12.0 Communications Program

UCSC's Environmental Health and Safety's Waste Water web page, <http://ehs.ucsc.edu/programs/environmental/waste-water.html>, provides information on UCSC's SSMP along with contact information for the Storm Water Program Manager.

The UCSC sewer collection system is tributary to the City of Santa Cruz sewer system. UCSC also communicates with the City of Santa Cruz Public Works Department about its SSMP.