

# **APPENDIX B OF SEWER SYSTEM MANAGEMENT PLAN**

## **BURNEY WATER DISTRICT SANITARY SEWER OVERFLOW EMERGENCY RESPONSE PLAN**

**Reviewed/Revised for 2022 SSMP by District Staff and PACE Engineering**

**Original Document 2017 completed by PACE Engineering**



## TABLE OF CONTENTS

I. Purpose.....	1
II. General.....	1
III. Overflow Response Procedure.....	3
IV. Regulatory Agency Notification Plan .....	10
V. Distribution and Maintenance of SSOERP .....	121
VI. Emergency Response Procedures.....	12
Wastewater Lift Station Alarms – General Response Actions.....	13
Lift Station Failure Caused by Force-Main Break inside the Dry Well, Pump Failure, or Valve Failure – Main Lift Station .....	15
Lift Station Failure Caused by Force-Main Break Inside the Wet Well, Pump Failure, or Valve Failure – Bartel Lift Station.....	17
Lift Station Failure Caused by Power Outage .....	19
Overflowing Sewer Manhole Resulting from Surcharged Sewer Main.....	20
Sewer Force-Main Break .....	22
Sewer Main Break/Collapse.....	24
VII Appendix A - SSO Reporting Procedures and Form .....	26
VIII Appendix B - SSO Volume Estimation .....	35
IX Appendix C – Water Quality Sampling Guidelines for Spills Greater Than 50,000 Gallons.....	35

## **ABBREVIATIONS**

<b>BWD</b>	<b>Burney Water District</b>
<b>CIWQS</b>	<b>California Integrated Water Quality System</b>
<b>District</b>	<b>Burney Water District</b>
<b>GPM</b>	<b>Gallons per Minute</b>
<b>LRO</b>	<b>Legally Responsible Official</b>
<b>OES</b>	<b>Office of Emergency Services</b>
<b>PLSD</b>	<b>Private Lateral Sewage Discharge</b>
<b>SI</b>	<b>Sewer Inspection</b>
<b>SSO</b>	<b>Sanitary Sewer Overflow</b>
<b>SSOERP</b>	<b>Sanitary Sewer Overflow Emergency Response Plan</b>
<b>WDR</b>	<b>Waste Discharge Requirements</b>

## **I. Purpose**

Burney Water District (BWD or District) has structured this Sanitary Sewer Overflow Emergency Response Plan (SSOERP) to satisfy the requirements of the Statewide General Waste Discharge Requirements (WDRs) for Sanitary Sewer Systems, Water Quality Order No. 2006-0003.

## **II. General**

The SSOERP is designed to define appropriate actions by BWD upon notification of a possible sanitary sewer overflow (SSO) caused by problems within the District-owned sewer collection system. BWD shall dispatch the appropriate personnel to investigate the possible SSO, identify the responsible party(ies), and provide appropriate customer service to minimize effects of the SSO on public health and quality of surface waters. For purposes of this SSOERP, "confirmed sewage spill" is also sometimes referred to as "sanitary sewer overflow," "overflow," or "SSO."

### **a. Objectives**

The primary objectives of the SSOERP are to:

- Protect public health and the environment, and
- Satisfy the requirements of regulatory agencies and waste discharge permits which address procedures for managing SSOs.

Additional objectives of the SSOERP are to:

- Provide appropriate customer service, protect the wastewater treatment plant and collection system including all related appurtenances and personnel, and
- Protect property from overflows resulting from problems within the publicly owned sanitary sewer system.

**b. Organization of Plan**

The key elements of the SSOERP are addressed individually as follows:

Section I	Purpose
Section II	General
Section III	Overflow Response Procedure
Section IV	Regulatory Agency Notification Procedure
Section V	Distribution and Maintenance SSOERP
Section VI	Emergency Response Procedures
Appendix A	SSO Reporting Form and Chain of Communication for Reporting SSOs
Appendix B	SSO Volume Estimation Methods

### III. **Overflow Response Procedure**

The SSOERP presents guidelines for BWD to mobilize labor, materials, tools, and equipment to correct or repair any condition which may cause or contribute to an un-permitted discharge from a publicly owned sanitary sewer system. A wide range of potential system failures is considered by the plan. Being prepared to respond to system failures could lessen the effect of overflows to surface waters, land, or buildings.

#### 1. **Receipt of Information regarding SSO**

District employees or the public may detect an overflow. The District Office is primarily responsible for receiving phone calls from the public notifying BWD of possible overflows from the wastewater collection system. The answering party is then responsible for forwarding the possible overflow information to the appropriate personnel within BWD.

**Emergency response personnel shall be available 24 hours a day, 365 days of the year.**

1. Office staff at BWD receiving a call from the public will obtain all relevant information available regarding the possible overflow including:
  - Time and date call was received;
  - Specific location and/or address of possible overflow;
  - Description of problem; and
  - Caller's name and call back phone number.
2. Pump station failures are monitored and received by the operator on duty. The operator on duty shall make note of the time and date the alarm call was received, as well as the alarm description.
3. SSOs detected by any personnel in the course of their normal duties shall be reported to the Field Superintendent or District Manager. Dispatched personnel should record all relevant overflow information and report back information to the Field Superintendent or District Manager. The Field

Superintendent or District Manager shall dispatch additional response crews, equipment, or contracted services as necessary.

4. It is the responsibility of the Field Superintendent or the response crew to gather all spill response data and communicate this data back to the District Manager as soon as possible. Until verified, the report of a possible spill will be referred to as a “sewer inspection (SI),” not an “SSO.”
5. An SI or SSO report should be completed by the Field Superintendent within 24 hours of the responding crew confirmation of an overflow. The District Manager is responsible for reviewing, updating, signing, and submitting the final SSO report to the SWRCB and California Integrated Water Quality System (CIWQS) website.

## **2. Dispatch of Appropriate Crews to the Site of an SSO**

Failure of any element within the BWD wastewater collection system that threatens to cause or causes an SSO will trigger a response to isolate and correct the problem. Crews and equipment shall be available to respond to any SI/SSO location. Crews will be dispatched to any site of a reported SSO as soon as possible.

### **1. Dispatching Crews**

Upon receipt of a report of a sewage overflow, all response crew members shall proceed to BWD corporate yard where they will gather all necessary equipment and resources before proceeding to the site of the SSO. Delays or conflicts in assignments and issues regarding equipment and resources should be reported to the Field Superintendent for resolution.

### **2. Responding Party**

The responding party should report his/her findings, including possible damage to the public system and, if assessable, to private property to the Field Superintendent. If the Field Superintendent has not received findings

from the responding party within an appropriate time frame, they should contact the response crew leader to determine the status of the investigation.

### **3. Additional Resources**

Request for additional personnel, material, supplies, and equipment from the responding party shall be conveyed to the Field Superintendent.

### **4. Preliminary Assessment of Damage to Private and Public Property**

The responding party should use discretion in assisting property owners/occupants who are affected by an SSO. Be aware that BWD could face increased liability for any further damages inflicted to private property during such assistance. Appropriate photographs and video footage, if possible, should be taken of the area of the SSO and impacted area, allowing for thorough documentation of the nature and extent of the impact. Photographs or video tape are to be forwarded to the District Manager for filing with the inspection/overflow report.

### **5. Coordination with Hazardous Material Response**

Upon arrival at the scene of an SSO, should a suspicious substance (e.g., oil sheen, foamy residue) be found on the ground surface, or should a suspicious odor (e.g., gasoline) not common to the sewer system be detected, the responding party(ies) should contact the Field Superintendent for guidance before taking further action.

- The Field Superintendent will alert the local fire department if necessary. The responding party shall await the arrival of the local fire department.
- After arrival of the local fire department, response crew members will take direction from the commanding officer of the local fire department. Only when the commanding officer determines it is safe and appropriate for the responding party(ies) to proceed can



containment, clean-up, and corrective activities be performed in accordance with the SSOERP.

- **Remember that vehicle engines, portable pumps, or open flames (e.g., cigarette lighters) can provide the ignition for an explosion or fire should flammable vapors or fluids be present at the site. Maintain a safe distance and observe caution until and after assistance arrives.**

### **6. Post-Cleanup Activities**

- The Field Superintendent should conduct a follow-up visit to the site of the overflow, if possible, to ensure the provisions of the SSOERP and other directives were properly followed.
- The Field Superintendent is responsible for confirming that the SI/SSO Report was provided to the District Manager.

### **3. Overflow Correction, Containment, and Cleanup**

Blocked sewers, pipe failures, or mechanical malfunctions can cause sanitary sewage overflows. Other natural and man-made disturbances are also possible causes of sanitary sewer overflows.

This section describes specific actions to be performed by the responding party(ies) during an SSO. The objectives of these actions are to:

- Determine the apparent cause of the overflow, for example, whether the cause lies in the publicly owned sewer or private lateral;
- Protect public health, the environment, and property by minimizing SSO impacts as soon as possible;
- Establish perimeters with appropriate barricades and control zones with vehicles or natural topography (e.g., hills, berms);

- Communicate preliminary overflow information and potential impacts as soon as practicable to the Office of Emergency Services, Regional Water Quality Control Board, and Shasta County Health Department, but not more than 2 hours after confirming an SSO, as required; and
- Contain the SSO to the maximum extent possible including preventing the discharge of sanitary sewage into surface waters.

### **1. Responsibilities of Responding Party Upon Arrival**

It is the responsibility of the first person who arrives at the site of an SSO to protect the health and safety of the public by mitigating the impact of the overflow to the extent possible. Should the overflow not be the responsibility of BWD, but there is imminent danger to public health, public or private property, or to the waters of the United States, then prudent action should be taken until the responsible party assumes control and provides remedial actions.

- Upon arrival at an SSO, the response crew should determine the cause of the SSO.
- If necessary, identify and request additional resources to correct the overflow, or to determine its cause.
- Appropriate personnel, materials, supplies, and/or equipment should be dispatched to minimize the impact of the overflow.

### **2. Initial Measure for Containment**

Following the above preliminary assessment, Wastewater Collection staff will:

- Initiate measures to contain the overflow and, where possible, recover sewage which has already been discharged, minimizing impact to public health or the environment

- Determine the immediate destination of the overflow, such as storm drain, street curb gutter, creek, water body, etc.
- Identify and request the necessary materials and equipment to contain or isolate the overflow, if not readily available
- Take immediate steps to contain the overflow, such as block or bag storm drains, recover through vacuum truck, divert into downstream manhole, etc.

### **3. Additional Measure under Potentially Prolonged Overflow Conditions.**

In the event of a prolonged sewer line blockage or a sewer line collapse, a determination should be made to set up a portable by-pass pumping operation around the obstruction.

- Appropriate measures shall be taken to effectively handle the sewage flow.
- Continuous or periodic monitoring shall be implemented as required.
- Regulatory agency issues shall be addressed in conjunction with emergency repairs.

### **4. Cleanup**

Sewer overflow sites are to be promptly cleaned to the highest degree possible after an overflow. No readily identifiable residue is to remain in the area of the SSO.

- The SSO site is to be secured to prevent access to the site by the public until the site has been thoroughly cleaned.
- Where practicable, the area is to be thoroughly flushed and cleaned of any sewage or wash-down water. Solids and debris are to be transported for proper disposal.

- Where appropriate, the overflow site is to be disinfected and any ponds formed by the SSO will be pumped dry and residue will be disposed of properly.

### **Overflow Report (Found in Appendix A)**

An overflow report shall be completed by the responding party(ies), who shall promptly notify the Field Superintendent when the overflow is eliminated. The SSO Reporting Form can be found in Appendix A, as well as information required for reporting.

To properly complete an overflow report:

- Determine if the SSO may have impacted surface waters.
- Characterize the SSO by evaluating the following:
  - Sewage overflows to storm water system,
  - Preplanned or emergency maintenance jobs involving bypass pumping,
  - Overflows where observation or on-site evidence clearly indicates all sanitary sewage was retained on land and did not reach surface water and where cleanup occurs, and
  - Any other pertinent information relating to each individual SSO.
- Use one of the following criteria to estimate the start date/time of the SSO:
  - Information reported to BWD and later verified by a sewer investigator, or
  - Visual observation.
- Use one of the following criteria to estimate the end date/time of the SSO:

- When the blockage is cleared or flow is controlled or contained, or
- The arrival time of the responding party if the overflow stopped between the time it was reported and the time of arrival.
- Estimate the flow rate of the SSO in gallons per minute (GPM) by any of the methods available in Appendix B.
- Estimate the volume of the SSO when the rate of overflow is known by multiplying the duration of the overflow by the overflow rate.
- Photograph the event.
- Describe any damage to the exterior areas of public/private property.

#### **IV. Regulatory Agency Notification Plan**

The Regulatory Agency Notification Plan establishes procedures that BWD shall follow to provide formal notice to the SWRCB and Shasta County Officials as necessary in the event of SSOs. Agency notification requirements vary depending on the quantity of sewage spilled and the location the spill reaches. The following reporting criteria explain to whom various forms of notifications should be sent to, and list agencies/individuals to be contacted.

##### **Notification Procedure:**

BWD should notify the county regulatory agency representative as soon as possible and keep them abreast of response actions and final corrective actions. See Table 1 for Chain of Communication for reporting SSOs.

**Table 1 - Chain of Communication**

<b>Contact</b>	<b>Position</b>	<b>Office Phone Number</b>	<b>Work Cell Phone</b>
<b>David Zevely</b>	District Manager	530-335-3582	530-238-7833
<b>Mike Skelly</b>	Field Superintendent	530-335-3582	530-524-4395
<b>Willie Lyons</b>	Utility Worker	530-335-3582	530-524-4395
<b>Keith Moore</b>	Utility Worker	530-335-3582	530-524-4395
<b>Valerie Rasmussen</b>	<b>SWRCB</b>	530-224-6130	
<b>Shasta County Health Department</b>		530-225-5073	
<b>Cal OES – Spill Notification</b>		800-852-7550	Or 916-845-8911
<b>Department of Fish &amp; Game</b>		530-225-2300	

Notification will be by telephone no later than twenty-four (24) hours or the next working day after an overflow is confirmed. SSOs that reach a surface water or drainage channel must be reported within 2 hours to the following agencies:

- **State of California Office of Emergency Services (OES)\***  
Phone: (800) 852-7550
- **State Water Resources Control Board**  
Phone: (530) 226-3458
- **Shasta County Health Department**  
Phone: (530) 225-5073
- **State of California Department of Fish & Game – Northern Region**  
Phone: (530) 225-2300

**\*Note:** When contacting OES, be prepared to give information related to the spill (e.g. spill volume, SSO description, SSO impacts, etc.). OES will supply a control number to be used when referring to the SSO.

## **V. Distribution and Maintenance of SSOERP**

Annual updates to the SSOERP should be made to reflect all changes in policies and procedures as may be required to achieve its objectives. Copies of the SSOERP and any amendments should be distributed to the following departments and functional positions:

- District Office – one copy
- District Manager – one copy
- Field Superintendent – one copy
- Utility Workers – one copy
- Field Trucks – one copy
- Treatment Plant – one copy

All other personnel who may become incidentally involved in responding to overflows should be familiar with the SSOERP. Appended to the SSOERP copy kept at the District Office should be a sign off sheet that states they have read and completely understand the SSOERP.

## **VI. Emergency Response Procedures**

The following section contains instructions for responding to the various causes of SSOs included below:

- Wastewater lift station alarms.
- Lift station failure caused by force-main break inside the dry well, pump failure, or valve failure.
- Lift station failure caused by force-main break inside the wet well, pump failure, or valve failure.
- Lift station failure caused by a power outage.
- Overflowing sewer manhole resulting from a surcharged sewer main.
- Sewer force-main break.
- Sewer main break/collapse.

## **Wastewater Lift Station Alarms – General Response Actions**

### **Emergency Procedures:**

1. Send an individual to the station indicating an alarm as soon as possible. If serious trouble is found, call for additional assistance and keep an individual at the station until further instructions are received.
2. Always check with the power company when an alarm goes on to see if there is/was a power outage in the area. The pole number nearest the station should be reported.
3. Personnel called to investigate lift station alarms shall respond to the station even if the alarm has cleared prior to their arrival. All alarm conditions are to be checked and logged. Use the following guidelines and follow confined space entry procedures if applicable.

### **Wet Well/Dry Well-Type Lift Stations:**

1. Check atmosphere within dry well prior to entering with gas meter.
2. Take your time entering the dry well. Never enter a flooded dry well.
3. Note any unusual odors – i.e. burning electrical equipment or paint.
4. Listen and note any unusual noises.
5. Lightly touch pump motors and pump bearing housing. Note any that seem unusually hot.
6. Observe every piece of equipment in the station. Note anything that looks out of place.
7. Record all gage readings i.e. wet well level, hour meters, flow charts, on-off levels, psi gauges on pumps, and anything else which you feel is significant.
8. Based on available information, trouble-shoot the failure. By process of elimination, the failure will be isolated.
9. Emergency personnel should be absolutely certain that the cause of the pump station alarm or failure has been properly identified and corrected prior to leaving the station.
10. Reset any/all alarm feature indicator lights.



**Submersible-Type Lift Stations:**

1. Check atmosphere within the wet well prior to working over the top with a gas meter.
2. Note any unusual odors – i.e. burning electrical equipment or paint.
3. Listen and note if pump(s) are running and any unusual noises.
4. Observe every piece of equipment in the station (pay specific attention to the level control system). Note anything that looks out of place.
5. Record all gage readings i.e. wet well level, hour meters, flow charts, on-off levels, psi gauges on pumps, and anything else which you feel is significant.
6. Based on available information, trouble-shoot the failure. By process of elimination, the failure will be isolated. Check level controls, pump operation using manual position, and pump output. Once problem is isolated, engage mechanical or electrical disciplines for repairs.
7. Emergency personnel should be absolutely certain that the cause of the pump station alarm or failure has been properly identified and corrected prior to leaving the station.
8. Reset any/all alarm feature indicator lights.
  - Various types of level sensors may be present in the lift stations, including bubbler systems, float switches, or ultrasonic transducers. Similarly, various types of controls may be present for pump cycling including pneumatic systems, simple relays, and/or computerized processors. The responding crew should be fully capable and trained in the proper function of each of these systems present within BWD. Trouble shooting these controls is specific to the unit. The O&M Manual for the level sensor system and pump controls should be consulted during a failure.

<b>Minimum Levels of Staffing: 2</b>	
<b>Minimum Emergency Equipment</b>	<b>Specialized Equipment</b>
<ul style="list-style-type: none"> <li>• Gas meter</li> <li>• Harness and lifeline</li> <li>• Tripod</li> <li>• Personal protective equipment</li> <li>• Ventilation blower</li> </ul>	<ul style="list-style-type: none"> <li>• As applicable for trouble-shooting</li> </ul>

## **Lift Station Failure Caused by Force-Main Break inside the Dry Well, Pump Failure, or Valve Failure – Main Lift Station**

### **Emergency Procedures:**

1. Dispatch crew to the lift station immediately.
2. Upon arrival the crew should identify if the dry well is flooded. The pumps may be still pumping if the motors are above the water level.
3. After further investigation, the crew should determine the nature of the failure, if possible prior to entering dry well, i.e. pump(s), valve(s), or force main(s).
4. Call additional personnel to bring appropriate portable pump(s) including all required lengths of suction and discharge hose to the lift station.
5. Before entering the dry well, measure atmospheric conditions for sufficient oxygen and the presence of explosive or toxic gases. Remove all hazards as appropriate prior to entering station including electrical and engulfment hazards.
6. Constantly monitor the atmospheric conditions while working in the dry well of the station.
7. Upon arrival of the portable pump, connect the appropriate lengths of suction hose that will suspend into the wet well, and then connect enough discharge hose to pump into bypass connection.
8. Set up an additional portable trash pump to pump out the dry well into the wet well.
9. Enter the dry well and inspect the following facilities:
  - Lighting
  - Ventilation
  - Sump pump operation
  - Motor control system including air compressors
  - Bubbler system (if applicable)
  - Pump alternator
  - Control and instrument readings
  - Temperature of pump motors
  - All internal piping
10. Isolate the failed component by valve operation. Start the auxiliary pump and motor, if possible after exiting the dry well.

11. Complete repairs to pipe, pump, or valve as per policy. If permanent materials are not readily available, install blind flanges for temporary conditions.
12. Restore facilities to normal and inspect other components of the force main and pumping system for signs of similar failure.
13. Shut down bypass operation. Do not disconnect hoses until repair is checked for leaks. Operate pumps to check repair under pressure and normal operating conditions.
14. If no leaks are observed, return pumps to normal conditions. Monitor pumps to check lead/lag operations.
15. Proceed to wet well for inspection. Before entering the wet well, measure atmospheric conditions for sufficient oxygen and the presence of explosive or toxic gases. Check the following if applicable:
  - Wet well Level
  - Float controls/level sensors
  - Grease assessment
16. Make a report indicating the following:
  - Time of call
  - Description of the problem
  - How repair was made
  - Personnel present
  - Equipment used
17. If sewage overflow occurred, complete an SSO report form and forward to the District Manager within 24 hours.

<b>Minimum Levels of Staffing: 2-4</b>	
<b>Minimum Emergency Equipment</b>	<b>Specialized Equipment</b>
<ul style="list-style-type: none"> <li>• Gas meter</li> <li>• Harness and lifeline</li> <li>• Tripod</li> <li>• Personal protective equipment</li> <li>• Miscellaneous tools</li> <li>• Portable pumps and hoses</li> <li>• Flashlight</li> <li>• Ventilation blower</li> </ul>	

## **Lift Station Failure Caused by Force-Main Break Inside the Wet Well, Pump Failure, or Valve Failure – Bartel Lift Station**

### **Emergency Procedures:**

1. Dispatch crew to the lift station immediately.
2. Upon arrival the crew should identify the storage capacity in the wet well and collection system. This will give some indication of the time available for response.
3. Inspect the motor control circuit for failure indications. Check alternator to determine failure, if applicable. If pump failure is determined, skip to bypass steps.
4. Prior to working above the wet well, measure atmospheric conditions for sufficient oxygen and the presence of explosive or toxic gases. If flooded, skip to bypass steps.
5. Constantly monitor atmospheric conditions while working in or above the wet well. Inspect the wet well. Check the wet well floats or level control system and pump volute for clogging or other problems.

### **Bypass Steps:**

1. If pump failure, determine if bypass pumping is necessary. If unnecessary, skip to repair procedures.
2. For bypass pumping, call additional crew to bring appropriate portable pump(s) including all required lengths of suction and discharge hose to the lift station if necessary. Upon arrival of the portable pump, connect the appropriate lengths of suction hose that will suspend into the wet well, and then connect enough discharge hose to pump into appropriate manhole or bypass connection (if so equipped). Go through the procedures for starting the portable pump, and begin pumping.

### **Repair Steps:**

1. Enter wet well and inspect piping and valves for cause of failure. Monitor atmospheric conditions for sufficient oxygen and the presence of explosive or toxic gases.

2. Complete repairs to pipe, pump, or valve as per policy. If permanent materials are not readily available, install temporary repairs until permanent repairs can be completed.
3. Restore facilities to normal and inspect other components of the force main and pumping system for signs of similar failure.
4. Shut down bypass operation. Do not disconnect hoses until repair is checked for leaks. Operate pumps to check repair under pressure and normal operating conditions.
5. If no leaks are observed, return pumps to normal operating conditions. Monitor pumps to check lead/lag operations.
6. Make a report indicating the following:
  - Time of call
  - Description of the problem
  - How repair was made
  - Personnel present
  - Equipment used
7. If sewage overflow occurred, complete an SSO report form and forward to the District Manager within 24 hours.

<b>Minimum Levels of Staffing: 2-4</b>	
<b>Minimum Emergency Equipment</b>	<b>Specialized Equipment</b>
<ul style="list-style-type: none"> <li>• Gas meter</li> <li>• Harness and lifeline</li> <li>• Tripod</li> <li>• Personal protective equipment</li> <li>• Miscellaneous tools</li> <li>• Portable pumps and hoses</li> <li>• Flashlight</li> <li>• Ventilation blower</li> </ul>	

## Lift Station Failure Caused by Power Outage

### Emergency Procedures:

1. Dispatch personnel to the lift station immediately. If outage is at the Bartel Lift Station, the crew needs to bring the auxiliary generator to operate the lift station until power is restored if there is not sufficient capacity in the wet well and collection system.
2. Dispatcher shall request assistance of the power company in restoring power to the station if necessary. Determine the estimated time of arrival of the power company crew and then notify the responding party(ies).
3. Operators should check overhead power lines for fuses that might have blown or downed power lines as they approach the lift station. If the operators notice a blown fuse or downed power line, they should identify the pole number(s) and notify the dispatcher to relay to the power company the location and the pole number(s).
4. Lock out and tag out the main line disconnect (if applicable).
5. Go through the specific procedures for starting the generator to supply power to the station.
6. Run station with the auxiliary generator until power is restored.
7. Make a report indicating the following:
  - Time of call
  - Description of the problem
  - How repair was made
  - Personnel present
  - Equipment used
8. If sewage overflow occurred, complete an SSO report form and forward to the District Manager within 24 hours.

<b>Minimum Levels of Staffing: 2-3</b>	
Minimum Emergency Equipment	Specialized Equipment
<ul style="list-style-type: none"> <li>• Gas meter</li> <li>• Harness and lifeline</li> <li>• Tripod</li> <li>• Personal protective equipment</li> <li>• Miscellaneous tools</li> <li>• Portable pumps and hoses</li> <li>• Portable generator</li> <li>• Flashlight</li> </ul>	<ul style="list-style-type: none"> <li>• Power testing equipment</li> </ul>

## **Overflowing Sewer Manhole Resulting from Surcharged Sewer Main**

### **Emergency Procedures:**

1. Refer to sewer maps for location of sewers (private lands, flow patterns, manholes, etc.) and determine if the area is served by a pump station before responding to the call.
2. Dispatch the sewer crew immediately to the problem location to assess immediate danger to the environment.
3. Determine location of the blockage by inspecting the downstream manholes until a dry manhole is found.
4. Install the proper size sand trap in the downstream invert of the manhole before clearing the blockage to capture the debris. From the debris collected try to determine the cause of the blockage and remove the debris from the manhole.
5. Use necessary equipment to relieve the blockage, including jet flushing and/or power rodding.
6. If it is imminent that wastewater will be released into wetlands, receiving waters, or a drinking water supply watershed, the District Manager should be notified. The District Manager will notify the proper authorities and agencies. See notification charts.
7. Call additional crews to set up sandbags and flotation booms across streams, brooks, etc., as necessary. Unless special conditions exist, freeing the blockage is priority to containing the bypass.
8. Gather and remove sewage-related debris and organic matter from affected area.
9. If wastewater is in streets/roads (public or private), then contain the wastewater as best as possible with sand bags or other industry accepted alternatives to minimize any impact to public health or the environment.
10. Sandbag nearby catch basin inlets to prevent wastewater from entering the drainage system and causing potential contamination to tributary receiving waters.
11. If ponding should occur on the street or easement (public or private), cordon off the area.
12. Remove as much sewage as possible.

13. Disinfect ponding areas with an industry standard disinfectant and notify surrounding homes.
14. If the wastewater should jeopardize a playground or park, cordon off the entire area. Close the park to the public until the issue has been remedied to the satisfaction of the local and state boards of health and the local park superintendent.
15. Make a report indicating the following:
  - Time of call
  - Description of the problem
  - How repair was made
  - Personnel present
  - Equipment used
16. If sewage overflow occurred, complete an SSO report form and forward to the District Manager within 24 hours.

<b>Minimum Levels of Staffing: 2-3</b>	
<b>Minimum Emergency Equipment</b>	<b>Specialized Equipment</b>
<ul style="list-style-type: none"> <li>• Gas meter</li> <li>• Harness and lifeline</li> <li>• Tripod</li> <li>• Personal protective equipment</li> <li>• Miscellaneous tools</li> <li>• Portable pumps and hoses</li> <li>• Portable generator</li> <li>• Traffic cones</li> <li>• High pressure cleaner</li> <li>• Disinfectants</li> <li>• Ventilation blower</li> </ul>	<ul style="list-style-type: none"> <li>• TV camera unit</li> <li>• Caution tape</li> </ul>



## **Sewer Force-Main Break**

### **Emergency Procedures:**

1. Dispatch a sewer crew to the site to assess the immediate danger to the environment and to determine who and what might be affected.
2. Set up signs, barricades, and/or barrels for traffic control and public safety.
3. Reroute traffic as necessary. Deploy traffic control measures such as police or flag person as needed.
4. Request additional manpower and equipment as needed based on initial damage assessment (e.g. excavating crew, bypass pumping equipment, etc.).
5. Bypass pumping from the pump station wet well to the force-main discharge manhole may be required. If necessary, set up bypass pumping equipment.
6. If bypass pumping is not an option, then the line may need to be repaired under pressure. Shut down the lift station only if detention time is known and can be mitigated.
7. Call additional crews to set up sandbags and flotation booms across streams, brooks, etc., as necessary. Unless special conditions exist, bypassing the broken force main is priority before containing the bypass.
8. The crew shall initiate measures to contain the sewer overflow as best as possible, cordon off the affected area, and place absorbing booms or sandbags to collect any floatable debris.
9. Check the tributary area to determine if the discharge will affect any receiving waters.
10. If it is determined receiving water may be affected, the dispatcher should notify the proper authorities or agency,
11. If the break is on the pipe length, then a repair can be made with a wrap-around sleeve. If the break is at the bell, then a bell-joint clamp may be used.

12. If a repair cannot be made while the line is under pressure, or bypass pumping cannot be completed, two (2) alternatives exist:
- Utilize a vactor truck to remove the water from the wet well. Discharge the water into a manhole in a different tributary area or at the treatment plant.
  - If the vactor truck has insufficient volume, the scenario may require the assistance of several tanker trucks.
13. Upon confirmation of adequacy of the repair, backfill the excavation if necessary and restore surface conditions to existing conditions.
14. While the crew is restoring the excavation, the crew leader should conduct a preliminary assessment of damage to private and public property. The crew leader should take appropriate photographs and video footage, if possible, of the outdoor area of the sewer overflow and impacted area to thoroughly document the nature and extent of the impacts.
15. Make a report indicating the following:
- Time of call
  - Description of the problem
  - How repair was made
  - Personnel present
  - Equipment used
16. If sewage overflow occurred, complete an SSO report form and forward to the District Manager within 24 hours.

<b>Minimum Levels of Staffing: 2-3</b>	
<b>Minimum Emergency Equipment</b>	<b>Specialized Equipment</b>
<ul style="list-style-type: none"> <li>• Gas meter</li> <li>• Harness and lifeline</li> <li>• Tripod</li> <li>• Personal protective equipment</li> <li>• Miscellaneous tools</li> <li>• Portable pumps and hoses</li> <li>• Portable generator</li> <li>• Traffic cones</li> <li>• High pressure cleaner</li> <li>• Disinfectants</li> <li>• Ventilation blower</li> </ul>	<ul style="list-style-type: none"> <li>• TV camera unit</li> <li>• Caution tape</li> <li>• Backhoe</li> <li>• Vactor truck</li> </ul>

## **Sewer Main Break/Collapse**

### **Emergency Procedures:**

1. Dispatch sewer crew to location of break/collapse immediately.
2. Set up signs, barricades, and/or barrels for traffic control and public safety.
3. Reroute traffic as necessary. Deploy traffic control measures, such as police or flag person as needed.
4. Request additional manpower and equipment as needed based on initial damage assessment (e.g. excavating crew, bypass pumping equipment, etc.).
5. Bypass pumping from the upstream manhole to the downstream manhole may be required. If necessary, set up bypass pumping equipment. If not necessary, prepare for repairs while the pipe is flowing.
6. Call additional crews to set up sandbags and flotation booms across streams, brooks, etc., as necessary. Unless special conditions exist, bypassing the broken sewer main is priority before containing the bypass.
7. Gather and remove sewage-related debris and organic matter from the affected area.
8. If wastewater is in the streets/roads (public or private), contain the wastewater as best as possible with sand bags or other industry accepted alternatives to minimize any impact to public health or the environment.
9. Sandbag nearby catch basin inlets or paved leak-offs to prevent wastewater from entering the drainage system and causing potential contamination to tributary receiving waters.
10. If ponding should occur on the street or easement (public or private), cordon off the area.
11. Remove as much sewage as possible.
12. Disinfect ponding areas with an industry standard disinfectant and notify surrounding homes/businesses.
13. If the wastewater should jeopardize a playground or park, cordon off the entire area. Close the park to the public until the issue has been remedied to the satisfaction of the local and state boards of health and the local park superintendent.
14. Determine the location of the break/collapse and make necessary repairs. Use repair procedures consistent with policy. If the break is on the pipe length, the

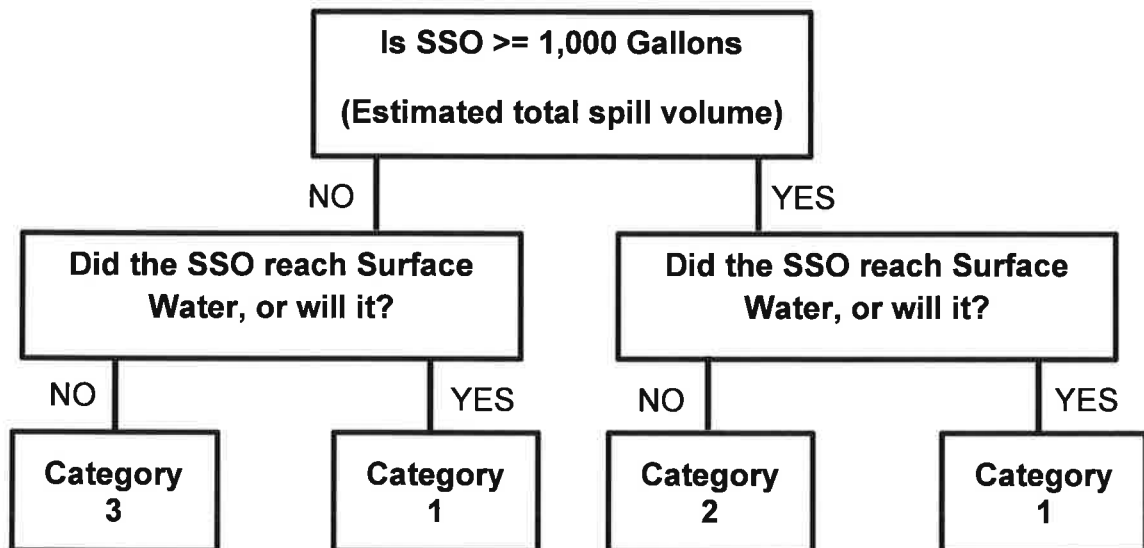
repair can be made with a wrap-around sleeve. If the break is at the bell, then a bell-joint clamp may be used.

15. Upon confirmation of adequacy of the repair, backfill the excavation if necessary and restore surface conditions to match existing conditions.
16. To restore the sewer line to full capacity, the crew should remove any debris that may have entered and accumulated in the sewer line downstream and upstream from the break/collapse. The crew should clean the sewer line as described below.
17. Install the proper size sand trap in the downstream invert of the downstream manhole against the flow to the upstream manhole.
18. Repeat this procedure for several upstream and downstream pipe reaches.
19. The crew leader should take appropriate photographs and video footage, if possible, of the outdoor area of the sewer overflow and impacted area to thoroughly document the nature and extent of the impacts.
17. Make a report indicating the following:
  - Time of call
  - Description of the problem
  - How repair was made
  - Personnel present
  - Equipment used
18. If sewage overflow occurred, complete an SSO report form and forward to the District Manager within 24 hours.

<b>Minimum Levels of Staffing: 2-3</b>	
<b>Minimum Emergency Equipment</b>	<b>Specialized Equipment</b>
<ul style="list-style-type: none"> <li>• Gas meter</li> <li>• Harness and lifeline</li> <li>• Tripod</li> <li>• Personal protective equipment</li> <li>• Miscellaneous tools</li> <li>• Portable pumps and hoses</li> <li>• Portable generator</li> <li>• Traffic cones</li> <li>• High pressure cleaner</li> <li>• Disinfectants</li> <li>• Ventilation blower</li> </ul>	<ul style="list-style-type: none"> <li>• TV camera unit</li> <li>• Caution tape</li> <li>• Backhoe</li> </ul>

# Appendix A - SSO Reporting Procedures and Form

## SSOs Determination of Category



**CATEGORY 1 SSO:** Discharges of untreated or partially treated wastewater of any volume resulting from an enrollee's sanitary sewer system failure or flow condition that:

- a) Reach surface water and/or reach a drainage channel tributary to a surface water; or
- b) 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 a dedicated storm water or groundwater infiltration basin (e.g., infiltration pit, percolation pond)
- c) Conduct water quality sampling within 48 hours after initial SSO notification for Category 1 SSO that exceed 50,000 gallons to a surface water. (See Appendix C)

**Notification:** Within two hours of becoming aware of any Category 1 SSO greater than or equal to 1,000 gallons discharged to a surface water or spilled in a location where it probably will be discharged to surface water notify the California Office of Emergency Services (Cal OES) and obtain a notification number.

**Reporting:** Submit draft report within three business days of becoming aware of the SSO and certify within 15 calendar days of the SSO and date.

**Technical Report:** Submit within 45 calendar days after the end date of any Category 1 SSO in which 50,000 gallons or greater are spilled to surface waters.

**CATEGORY 2 SSO:** 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.

**Reporting:** Submit draft report within three business days of becoming aware of the SSO and certify within 15 calendar days of the SSO and date.

**CATEGORY 3 SSO:** All other discharges of untreated or partially treated wastewater resulting from an enrollee's sanitary sewer system failure or flow condition.

**Reporting:** Submit certified report within 30 calendar days of the end of the month in which SSO occurred. For instance, if the SSO occurred on February 1st, the enrollee must certify the Category 3 SSO before March 30th.

**PRIVATE LATERAL SEWAGE DISCHARGE (PLSD):**

Discharges of untreated or partially treated wastewater resulting from blockages or other problems within a privately-owned sewer lateral connected to the enrollee's sanitary sewer system or from other private sewer assets.

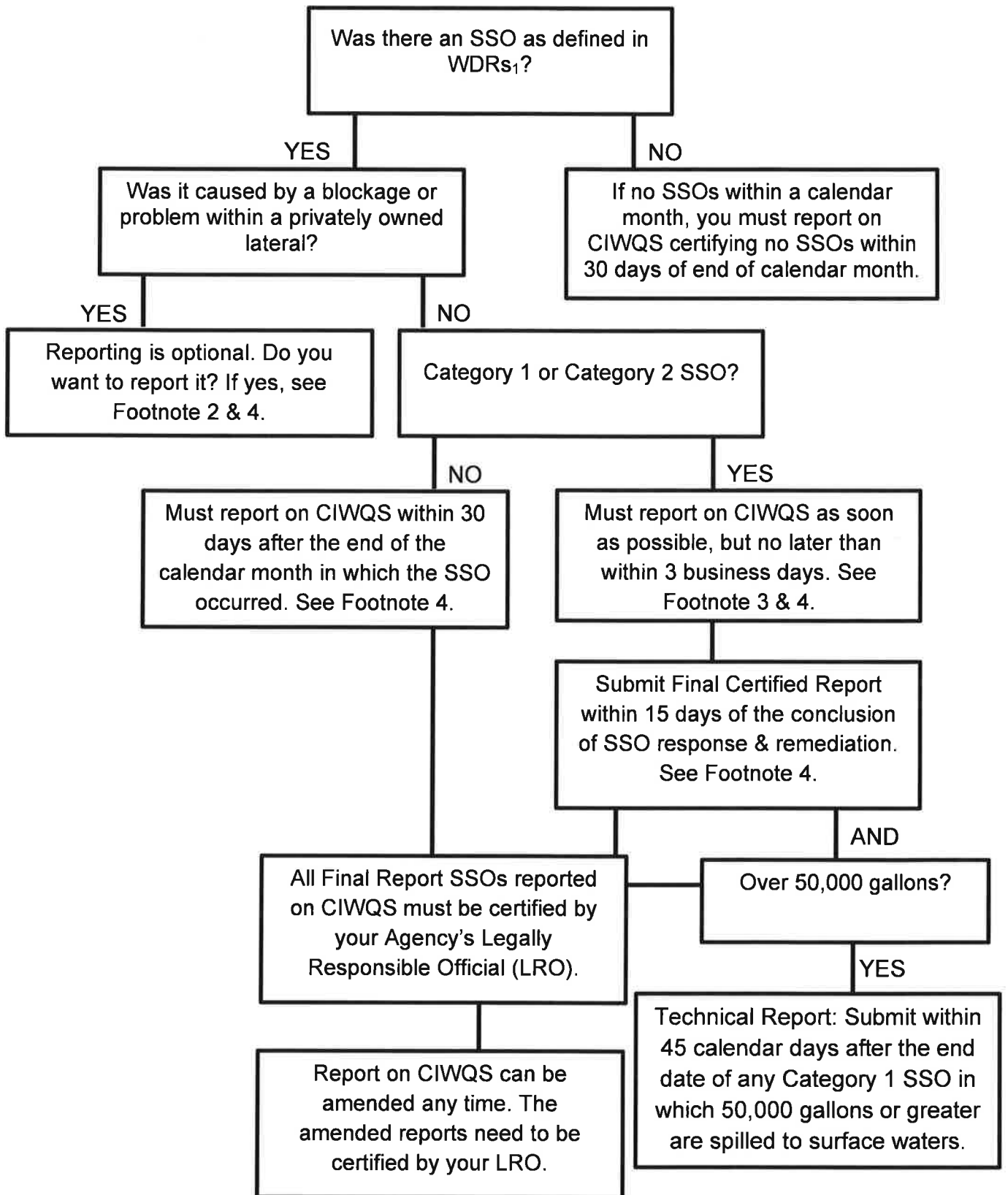
PLSDs that the enrollee becomes aware of may be voluntarily reported to the SSO Database. The State Water Board encourages enrollees to Notify Cal OES for PLSDs greater than or equal to 1,000 gallons that result or may result in a discharge to surface waters.

**NO SPILL CERTIFICATION:**

Certify that no SSO's occurred within 30 calendar days of the end of the month or, if reporting quarterly, the quarter in which no SSO's occurred.

<b>Category</b>	<b>Contact</b>	<b>Time Frame</b>	<b>Phone Number</b>
1	Cal OES	Within 2 hours	800-852-7550 Or 916-845-8911
	Shasta County Health Department		530-225-5073
	Department of Fish & Game		530-225-2300
	Regional Water Quality Control Board		530-224-6130
2	Shasta County Health Department	Within 2 hours	530-225-5073
3	Submit certified report on CIWQS	n/a	

## SSO Reporting Requirements





## SSO Reporting Requirements Footnotes

1. WDR-SSO: Any overflow, spill, discharge, or diversion of untreated or partially treated wastewater from a sanitary sewer system. SSOs include:
  - Overflows or releases of untreated or partially treated wastewater that reach waters of the United States;
  - Overflows or releases of untreated or partially treated wastewater that do not reach waters of the United States; and
  - 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. The enrollee must identify the sewage discharge as occurring and caused by a private lateral, and a responsible party (other than the enrollee) should be identified, if known.
3. Category 1 and Category 2 SSOs – Must be reported as soon as (1) the enrollee has knowledge of the discharge, (2) reporting is possible, and (3) reporting can be provided without substantially impeding cleanup or other emergency measures. Initial reporting of Category 1 and 2 SSOs must be reported to the online SSO system as soon as possible but no later than 3 business days after the enrollee is made aware of the SSO.
4. Technical Report: Submit within 45 calendar days after the end date of any Category 1 SSO in which 50,000 gallons or greater are spilled to surface waters. Minimum information that must be contained in the 3-day report must include all information identified Footnote 4 below.
5. At a minimum, the following SSO Report must be completely filled out prior to finalizing and certifying an SSO report for each category of SSO.

# SSO Field Report

## Burney Water District

SSO

PLSD

Document with Photographs and/or Video

Circle Category: 1, 2, or 3

### Reporting party name and contact information

Date/Time Notified/Discovered the Spill

Estimated Arrival Date/Time

Estimated Spill Start Date/Time

Estimated Spill End Date/Time

---

---

---

---

---

### SSO Location Details

Address, Location Description, and/or MH#

Cross Street

---

---

### Spill Details

Number of Spill Appearance Points  1 to 10

Appearance Point(s) (Circle One or More)

Force Main                      Clean Out (Public)                      Pump Station  
Gravity Main                      Lateral (Private)  
Inside Building or Structure      Manhole  
Lateral Clean Out (Private)      Other Sewer System Structure

Describe location(s) if other or multiple appearance points selected

---

---

### Final Spill Destination (Choose all areas the wastewater flowed through and ultimately reached)

Beach                      Other (specify below)      Street/Curb and Gutter  
Building or Structure      Paved Surface              Surface Water  
Drainage Channel              Separate Storm Drain      Unpaved Surface

Explain Final Spill Destination if Other Circled

---

---

### Spill Cause (Circle One or More)

Air Relief Valve /Blow-Off Valve Failure                      Grease Deposition (FOG)  
Construction Diversion Failure                      Inappropriate Discharge to CS  
CS Maintenance Caused Spill/Damage                      Natural Disaster  
Damage by Others Not Related to CS                      Non-Dispersibles  
Construction/Maintenance (Specify Below)                      Operator Error  
Debris from Construction                      Other (Specify below)  
Debris from Lateral                      Pipe Structural Problem/Failure  
Debris – General                      Pipe Structural Problem/Failure – Installation  
Debris – Rags                      Pump Station Failure – Controls  
Flow Exceeded Capacity                      Pump Station Failure – Mechanical  
Describe Spill Cause

---

---

**Where Did Failure Occur** (Circle One or More)

- |                                 |                            |                      |
|---------------------------------|----------------------------|----------------------|
| Air Relief Valve/Blow-Off Valve | Manhole                    | Pump Station – Power |
| Force Main                      | Other (Specify below)      | Siphon               |
| Gravity Mainline                | Pump Station – Controls    |                      |
| Lateral (Private)               | Pump Station – Mechanicals |                      |

Describe Where Failure Occurred if Other \_\_\_\_\_

Was This Spill Associated with a Storm Event?      Yes      No

Pipe Diameter at Blockage or Failure? \_\_\_\_\_

Pipe Material at Blockage or Failure? \_\_\_\_\_

Estimated Age of Sewer Asset at Blockage or Failure? \_\_\_\_\_

**Spill Response Activities** (Circle One or More)

- |                                   |                                    |
|-----------------------------------|------------------------------------|
| Cleaned Up                        | Returned All Spill to Sewer        |
| Mitigated Effects of Spill        | Returned Portion of Spill to Sewer |
| Contained All or Portion of Spill | Property Owner Notified            |
| Other (Specify below)             | Other Enforcement Agency Notified  |
| Restored Flow                     |                                    |

Describe Response Activities if Other \_\_\_\_\_

**Spill Response Completion Date/Time** \_\_\_\_\_

**Spill Corrective Action Taken**

- |   |  |
|---|--|
| •Adjust Schedule/Method of Preventative Maintenance | •Other (Specify below)                       |
| •Enforcement Action Against FOG Source              | •Plan Rehabilitation or Replacement of Sewer |
| •Inspected Sewer Using CCTV to determine Cause      | •Repaired Facilities or Replaced Defect      |

Describe Corrective Action Taken if Other \_\_\_\_\_

**Is There an Ongoing Investigation?**      Yes      No

Reason for Ongoing Investigation \_\_\_\_\_

**Visual Inspection Results from Impacted Water**  
(Describe observations and **take Photographs**)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Health Warnings Posted?**      Yes      No

**Did the Spill Result in a Beach Closure?**      Yes      No

If Yes, Name of Closed Beach(es) \_\_\_\_\_

Name of Impacted Surface Water(s) \_\_\_\_\_

**Water Quality Samples Analyzed for** (Circle One or More)

- Dissolved Oxygen
- Other Chemical Indicators – Specify below
- Biological Indicators – Specify below
- No Water Quality Samples Taken
- Not Applicable to this Spill
- Other – Specify below

Water Quality Samples Analyzed for \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Water Quality Samples Reported to** (Circle One or More)

- County Health Agency
- Regional Water Quality Control Board
- Other (Specify Below)
- No Water Quality Samples Taken
- Not Applicable to This Spill

If Other, Enter Agencies Reported to \_\_\_\_\_  
\_\_\_\_\_

**Cal OES Control Number** \_\_\_\_\_  
**Cal OES Called Date/Time** \_\_\_\_\_

**SSO Contact Information** (Person Who can Answer Specific Questions about the Spill)

Name and Title \_\_\_\_\_  
Phone Number \_\_\_\_\_

**PLSD Contact Information** (Person Who can Answer Specific Questions about the Spill)

Name and Phone Number (if different than RP) \_\_\_\_\_  
Address \_\_\_\_\_

Estimated Spill Volume that reached a separate storm drain that flows to a surface water body?

Gallons

Estimated Spill Volume recovered from a separate storm drain that flows to a surface water body?

Gallons

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

Gallons

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

Gallons

Estimated spill volume discharged directly to a surface water body?

Gallons

Estimated spill volume recovered from a drainage channel or surface water body?

Gallons

Estimated spill volume discharged to land or structure?

Gallons

Estimated spill volume recovered from the discharge to land?

Gallons

### Volume Estimation Methods Used

A Separate Note Sheet may include Drawings, Calculations, and other details that determine Spill Volume

Reported By/Date: \_\_\_\_\_

## **Appendix B - SSO Volume Estimation**

**All SSO volume estimation methods taken from  
*Sewer Spill Estimation Guide* developed by the  
Orange County Area Waste Discharge  
Requirements Steering Committee, Orange County,  
CA, revised May 15, 2014.**

**Disclaimer from *Sewer Spill Estimation Guide*: “Methods used for spill estimation and the estimates itself are solely the responsibility of the agency making the estimate. The authors or contributors to this Sewer Spill Estimation Guide do not accept any responsibility for the spill estimation methods used; their accuracy or any spill estimate determined through use of this guide.”**

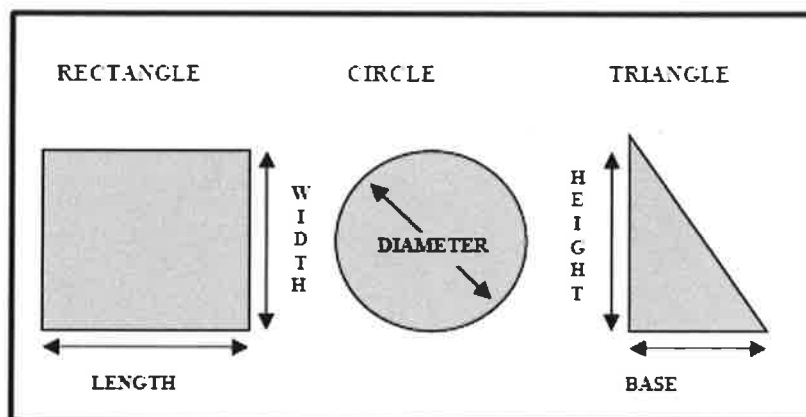
## Visual or Eyeball Method

- Imagine the amount of water that would spill from a 1-gallon jug, 5-gallon bucket, or 50-gallon barrel.
- Estimate how many 1-gallon jugs, 5-gallon buckets, or 50-gallon barrels the SSO would fill.
- Use chart below to estimate total volume.

	How Many	Multiply by	Total Volume
1-gallon jug		1	
5-gallon bucket		5	
50-gallon barrel		50	

## Measured Method

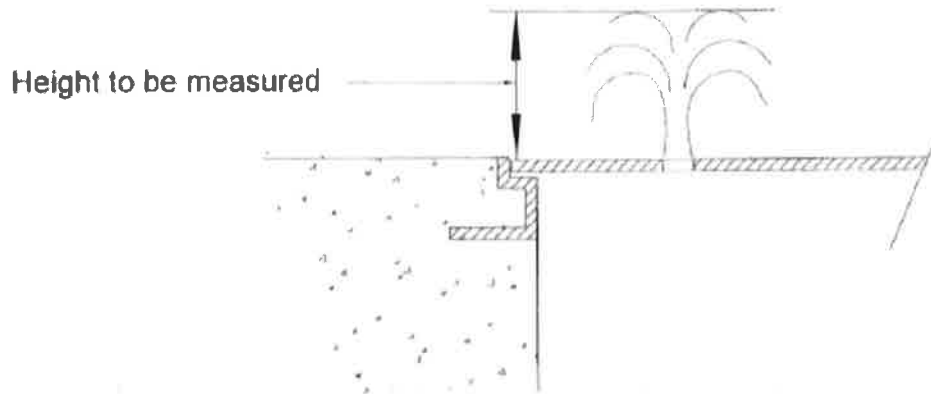
### *Common Shapes and Dimensions*



1. Sketch the shape of the contained wastewater.
2. Measure or pace off the dimensions.
3. Measure the depth at several locations and select an average.
4. Convert the dimensions, including depth, to feet.
5. Calculate the area:
  - Rectangle: Area = length (feet) x width (feet)
  - Circle: Area = diameter (feet) x diameter (feet) x 3.14 divided by 4
  - Triangle: Area = base (feet) x height (feet) x 0.5
6. Multiply the area (square feet) times the depth (in feet) to obtain the volume in cubic feet.
7. Multiply the volume in cubic feet by 7.48 to convert to gallons.

## Pick and Vent Holes in Manhole Covers

To estimate an SSO occurring from the manhole pick and vent holes, measure the height of the wastewater plume exiting the holes. Find that height and hole diameter on the manhole pick or vent hole chart to determine the flow rate escaping the pick/vent hole. Multiply the flow rate times the number of holes that are discharging wastewater. Once the total volume (gpm) has been determined, multiply the gpm by the duration of the SSO in minutes. This will result in the total estimated gallons of the SSO.





## Pick and Vent Hole Estimation Chart

### Estimated Flows thru Manhole Cover Vent Holes and Pick Holes for SSO estimating

Hole Dia. Inches	Area sq. ft.  Formula: =0.785*A*x* A=1/4	Coef. of Vel. Cv	Coef. Of Cont. Cc	C Cv x Cc Formula: =I*x^449	Water Ht inches	Water Ht inches	Water Ht feet Formula: =Wx/12	Q cfs Formula: =E*x*B*x*(S QRT(2*32 24x))	Q gpm Formula: =I*x^448	Q gph Formula: =J*x^60
<b>Vent Hole:</b>										
0.50	0.00136	0.945	0.70	0.662	1/16 th	0.063	0.005	0.0005	0.23	14
0.50	0.00136	0.945	0.70	0.662	1/8 th	0.125	0.010	0.0007	0.33	20
0.50	0.00136	0.945	0.70	0.662	1/4 th	0.250	0.021	0.0010	0.47	28
0.50	0.00136	0.945	0.70	0.662	one half	0.500	0.042	0.0015	0.66	40
0.50	0.00136	0.945	0.70	0.662	3/4 ths	0.750	0.063	0.0018	0.81	49
0.50	0.00136	0.945	0.70	0.662	1 inch	1.000	0.083	0.0021	0.94	56
0.50	0.00136	0.945	0.70	0.662	1 1/4 "	1.250	0.104	0.0023	1.05	63
0.50	0.00136	0.945	0.70	0.662	1 3/8"	1.375	0.115	0.0024	1.10	66
0.50	0.00136	0.945	0.70	0.662	1 1/2"	1.500	0.125	0.0026	1.15	69
0.50	0.00136	0.945	0.70	0.662	1 5/8"	1.625	0.135	0.0027	1.20	72
0.50	0.00136	0.945	0.70	0.662	1 3/4"	1.750	0.146	0.0028	1.24	74
0.50	0.00136	0.945	0.70	0.662	2 inches	2.000	0.167	0.0030	1.33	80
0.50	0.00136	0.945	0.70	0.662	2 1/4"	2.250	0.188	0.0031	1.41	84
0.50	0.00136	0.945	0.70	0.662	2 1/2"	2.500	0.208	0.0033	1.48	89
0.50	0.00136	0.945	0.70	0.662	2 3/4"	2.750	0.229	0.0035	1.56	93
0.50	0.00136	0.945	0.70	0.662	3 inches	3.000	0.250	0.0036	1.62	97
0.50	0.00136	0.945	0.70	0.662	3 1/4"	3.250	0.271	0.0038	1.69	101
0.50	0.00136	0.945	0.70	0.662	3 1/2"	3.500	0.292	0.0039	1.75	105
0.50	0.00136	0.945	0.70	0.662	3 3/4"	3.750	0.313	0.0040	1.82	109
0.50	0.00136	0.945	0.70	0.662	4.000	4.000	0.333	0.0042	1.88	113
<b>Vent Hole</b>										
0.75	0.00307	0.955	0.67	0.640	1/16 th	0.063	0.005	0.0011	0.51	31
0.75	0.00307	0.955	0.67	0.640	1/8 th	0.125	0.010	0.0016	0.72	43
0.75	0.00307	0.955	0.67	0.640	1/4 th	0.250	0.021	0.0023	1.02	61
0.75	0.00307	0.955	0.67	0.640	one half	0.500	0.042	0.0032	1.44	87
0.75	0.00307	0.955	0.67	0.640	3/4 ths	0.750	0.063	0.0039	1.77	106
0.75	0.00307	0.955	0.67	0.640	1 inch	1.000	0.083	0.0045	2.04	122
0.75	0.00307	0.955	0.67	0.640	1 1/4 "	1.250	0.104	0.0051	2.28	137
0.75	0.00307	0.955	0.67	0.640	1 3/8"	1.375	0.115	0.0053	2.39	144
0.75	0.00307	0.955	0.67	0.640	1 1/2"	1.500	0.125	0.0056	2.60	160
0.75	0.00307	0.955	0.67	0.640	1 5/8"	1.625	0.135	0.0058	2.60	156
0.75	0.00307	0.955	0.67	0.640	1 3/4"	1.750	0.146	0.0060	2.70	162
0.75	0.00307	0.955	0.67	0.640	2 inches	2.000	0.167	0.0064	2.89	173
0.75	0.00307	0.955	0.67	0.640	2 1/4"	2.250	0.188	0.0068	3.06	184
0.75	0.00307	0.955	0.67	0.640	2 1/2"	2.500	0.208	0.0072	3.23	194
0.75	0.00307	0.955	0.67	0.640	2 3/4"	2.750	0.229	0.0075	3.38	203
0.75	0.00307	0.955	0.67	0.640	3 inches	3.000	0.250	0.0079	3.63	212
0.75	0.00307	0.955	0.67	0.640	3 1/4"	3.250	0.271	0.0082	3.68	221
0.75	0.00307	0.955	0.67	0.640	3 1/2"	3.500	0.292	0.0085	3.82	229
0.75	0.00307	0.955	0.67	0.640	3 3/4"	3.750	0.313	0.0088	3.95	237
0.75	0.00307	0.955	0.67	0.640	4.000	4.000	0.333	0.0091	4.08	245
<b>Vent Hole</b>										
1.00	0.00545	0.960	0.65	0.624	1/16 th	0.063	0.005	0.0020	0.88	53
1.00	0.00545	0.960	0.65	0.624	1/8 th	0.125	0.010	0.0028	1.25	75
1.00	0.00545	0.960	0.65	0.624	1/4 th	0.250	0.021	0.0039	1.77	106
1.00	0.00545	0.960	0.65	0.624	one half	0.500	0.042	0.0056	2.50	150
1.00	0.00545	0.960	0.65	0.624	3/4 ths	0.750	0.063	0.0068	3.06	184
1.00	0.00545	0.960	0.65	0.624	1 inch	1.000	0.083	0.0079	3.54	212
1.00	0.00545	0.960	0.65	0.624	1 1/4 "	1.250	0.104	0.0088	3.96	237
1.00	0.00545	0.960	0.65	0.624	1 3/8"	1.375	0.115	0.0092	4.15	249
1.00	0.00545	0.960	0.65	0.624	1 1/2"	1.500	0.125	0.0097	4.33	260
1.00	0.00545	0.960	0.65	0.624	1 5/8"	1.625	0.135	0.0100	4.51	271
1.00	0.00545	0.960	0.65	0.624	1 3/4"	1.750	0.146	0.0104	4.68	281
1.00	0.00545	0.960	0.65	0.624	2 inches	2.000	0.167	0.0111	5.00	300
1.00	0.00545	0.960	0.65	0.624	2 1/4"	2.250	0.188	0.0118	5.31	318
1.00	0.00545	0.960	0.65	0.624	2 1/2"	2.500	0.208	0.0125	5.59	336
1.00	0.00545	0.960	0.65	0.624	2 3/4"	2.750	0.229	0.0131	5.87	352
1.00	0.00545	0.960	0.65	0.624	3 inches	3.000	0.250	0.0136	6.13	368

## Pick and Vent Hole Estimation Chart - continued

**Estimated Flows thru Manhole Cover Vent Holes and Pick Holes for SSO estimating**

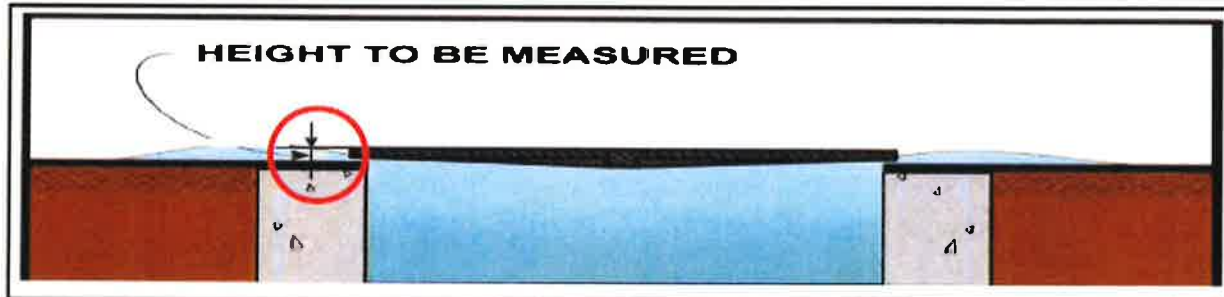
Hole Dia. Inches	Area sq. ft.	Coeff. of Vel. Cv	Coeff. Of Cont. Cc	C Cv x Cc	Water Ht Inches	Water Ht Inches	Water Ht feet	Q cfs	Q gpm	Q gph
	<b>Formula: =0.785*A*x² A x /144</b>			<b>Formula: =C x A x 449</b>			<b>Formula: =G x /12</b>	<b>Formula: =E x B x (S QRT(2 x 32. 2 x H x))</b>	<b>Formula: =I x A x 449</b>	<b>Formula: =J x A x 60</b>
<b>Vent Hole</b>										
1.00	0.00545	0.960	0.65	0.624	3 1/4"	3.250	0.271	0.0142	6.38	383
1.00	0.00545	0.960	0.65	0.624	3 1/2"	3.500	0.292	0.0147	6.62	397
1.00	0.00545	0.960	0.65	0.624	3 3/4"	3.750	0.313	0.0153	6.85	411
1.00	0.00545	0.960	0.65	0.624	4.000	4.000	0.333	0.0158	7.08	425
<b>Pick Hole semicircular area</b>										
1.00	0.00273	0.960	0.65	0.624	1/16 th	0.063	0.005	0.0010	0.44	27
1.00	0.00273	0.960	0.65	0.624	1/8 th	0.125	0.010	0.0014	0.63	38
1.00	0.00273	0.960	0.65	0.624	1/4 th	0.250	0.021	0.0020	0.89	53
1.00	0.00273	0.960	0.65	0.624	one half	0.500	0.042	0.0028	1.25	75
1.00	0.00273	0.960	0.65	0.624	3/4 ths	0.750	0.063	0.0034	1.53	92
1.00	0.00273	0.960	0.65	0.624	1 inch	1.000	0.083	0.0039	1.77	106
1.00	0.00273	0.960	0.65	0.624	1-1/2 inch	1.500	0.125	0.0048	2.17	130
1.00	0.00273	0.960	0.65	0.624	2 inches	2.000	0.167	0.0056	2.51	150
1.00	0.00273	0.960	0.65	0.624	2 1/4"	2.250	0.188	0.0059	2.66	159
1.00	0.00273	0.960	0.65	0.624	2 1/2"	2.500	0.208	0.0062	2.80	168
1.00	0.00273	0.960	0.65	0.624	2 3/4"	2.750	0.229	0.0065	2.94	176
1.00	0.00273	0.960	0.65	0.624	3 inches	3.000	0.250	0.0068	3.07	184
1.00	0.00273	0.960	0.65	0.624	3 1/4"	3.250	0.271	0.0071	3.19	192
1.00	0.00273	0.960	0.65	0.624	3 1/2"	3.500	0.292	0.0074	3.31	199
1.00	0.00273	0.960	0.65	0.624	3 3/4"	3.750	0.313	0.0076	3.43	206
1.00	0.00273	0.960	0.65	0.624	4.000	4.000	0.333	0.0079	3.54	213

## Manhole Ring

To estimate the volume in this example, measure the observed height of the wastewater plume exiting the manhole cover. Find the height and manhole diameter on the Manhole with Cover in Place to determine the flow rate escaping the manhole. (Be sure to use the appropriate chart for MH Cover in Place or MH Cover Removed). The chart has two columns, one for 24-inch-diameter covers and one for 36-inch-diameter covers.

Wastewater will also be escaping from the pick hole and must be accounted for separately by following the instructions for estimating an SSO from pick/vent hole. Multiply the flow rate times the number of holes that are discharging. The total estimated rate (gpm) is determined by adding together the rate being lost (gpm) from around the cover with the rate being lost (gpm) from the pick and/or vent hole(s). Once the total rate (gpm) has been determined, multiply the gpm by the duration of the SSO in minutes. This will result in the total estimated gallons of the SSO.

MH Cover in Place:



MH Cover Removed:



**ESTIMATED SSO FLOW OUT OF MH WITH COVER IN PLACE**

**24" COVER**

Height of spout above M/H rim H in inches	SSO FLOW		Min. Sewer size in which these flows are possible
	in gpm	in MGD	
1/4	1	0.001	
1/2	3	0.004	
3/4	6	0.008	
1	9	0.013	
1 1/4	12	0.018	
1 1/2	16	0.024	
1 3/4	21	0.030	
2	25	0.037	
2 1/4	31	0.045	
2 1/2	38	0.054	
2 3/4	45	0.065	
3	54	0.077	
3 1/4	64	0.092	
3 1/2	75	0.107	
3 3/4	87	0.125	
4	100	0.145	
4 1/4	115	0.166	
4 1/2	131	0.189	
4 3/4	148	0.214	
5	166	0.240	
5 1/4	185	0.266	
5 1/2	204	0.284	
5 3/4	224	0.322	6"
6	244	0.352	
6 1/4	265	0.382	
6 1/2	286	0.412	
6 3/4	308	0.444	
7	331	0.476	
7 1/4	354	0.509	
7 1/2	377	0.543	
7 3/4	401	0.578	8"
8	426	0.613	
8 1/4	451	0.649	
8 1/2	476	0.686	
8 3/4	502	0.723	
9	529	0.761	

**36" COVER**

Height of spout above M/H rim H in inches	SSO FLOW		Min. Sewer size in which these flows are possible
	in gpm	in MGD	
1/4	1	0.002	
1/2	4	0.006	
3/4	8	0.012	
1	13	0.019	
1 1/4	18	0.026	
1 1/2	24	0.035	
1 3/4	31	0.044	
2	37	0.054	
2 1/4	45	0.065	
2 1/2	55	0.079	
2 3/4	66	0.095	
3	78	0.113	
3 1/4	93	0.134	
3 1/2	109	0.157	
3 3/4	127	0.183	
4	147	0.211	
4 1/4	169	0.243	
4 1/2	192	0.276	
4 3/4	217	0.312	6"
5	243	0.350	
5 1/4	270	0.389	
5 1/2	299	0.430	
5 3/4	327	0.471	
6	357	0.514	
6 1/4	387	0.558	8"
6 1/2	419	0.603	
6 3/4	451	0.649	
7	483	0.696	
7 1/4	517	0.744	
7 1/2	551	0.794	
7 3/4	587	0.845	10"
8	622	0.896	
8 1/4	659	0.949	
8 1/2	697	1.003	
8 3/4	734	1.057	
9	773	1.113	

The formula used to develop Table 1 measures the maximum height of the water coming out of the maintenance manhole above the rim. The formula was taken from Hydraulics and Its Application by A.H. Gibson (Constable & Co. Limited).

**ESTIMATED SSO FLOW OUT OF M/H WITH COVER REMOVED**

**24" FRAME**

Water Height above M/H frame H in inches	SSO FLOW Q		Min. Sewer size in which these flows are possible
	in gpm	in MGD	
1/8	28	0.04	
1/4	62	0.09	
3/8	111	0.16	
1/2	160	0.23	
5/8	215	0.31	6"
3/4	354	0.51	8"
7/8	569	0.82	10"
1	799	1.15	12"
1 1/8	1,035	1.49	
1 1/4	1,340	1.93	15"
1 3/8	1,660	2.39	
1 1/2	1,986	2.86	
1 5/8	2,396	3.45	18"
1 3/4	2,799	4.03	
1 7/8	3,132	4.51	
2	3,444	4.96	21"
2 1/8	3,750	5.4	
2 1/4	3,986	5.74	
2 3/8	4,215	6.07	
2 1/2	4,437	6.39	
2 5/8	4,569	6.58	24"
2 3/4	4,667	6.75	
2 7/8	4,799	6.91	
3	4,910	7.07	

**36" FRAME**

Water Height above M/H frame H in inches	SSO FLOW Q		Min. Sewer size in which these flows are possible
	in gpm	in MGD	
1/8	49	0.07	
1/4	111	0.16	
3/8	187	0.27	6"
1/2	271	0.39	
5/8	361	0.52	8"
3/4	458	0.66	
7/8	556	0.8	10"
1	660	0.95	12"
1 1/8	1,035	1.49	
1 1/4	1,486	2.14	15"
1 3/8	1,951	2.81	
1 1/2	2,424	3.49	18"
1 5/8	2,903	4.18	
1 3/4	3,382	4.87	
1 7/8	3,917	5.64	21"
2	4,458	6.42	
2 1/8	5,000	7.2	24"
2 1/4	5,556	8	
2 3/8	6,118	8.81	
2 1/2	6,764	9.74	
2 5/8	7,403	10.66	
2 3/4	7,972	11.48	30"
2 7/8	8,521	12.27	
3	9,082	13.05	
3 1/8	9,604	13.83	
3 1/4	10,139	14.6	
3 3/8	10,625	15.3	36"
3 1/2	11,097	15.96	
3 5/8	11,569	16.66	
3 3/4	12,035	17.33	
3 7/8	12,486	17.98	
4	12,661	18.52	
4 1/8	13,076	18.83	
4 1/4	13,285	19.13	
4 3/8	13,486	19.42	

# Pictorial Reference

## City of San Diego Manhole Overflow Picture Chart



Wastewater Collection Division  
(619) 654-4160

Reference Sheet for Estimating Sewer Spills  
from Overflowing Sewer Manholes  
All estimates are calculated in gallons per minute (gpm)

City of San Diego  
Metropolitan Wastewater Department



rev. 4/09



All photos were taken during a demonstration using metered water from a hydrant in cooperation with the City of San Diego's Water Department

# SSCSC Manhole Overflow Gauge

DISCLAIMER: This overflow simulation may appear differently from those in other systems because of the materials and pipe line configuration. Manhole lids with single or multiple gull holes may appear differently during overflow conditions. However, the volume of effluent and the height of the wet area should appear relatively the same under similar slope conditions.



5 gpm



25 gpm



50 gpm



100 gpm



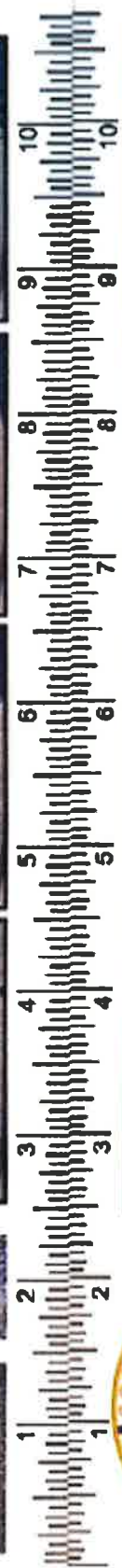
150 gpm



200 gpm



300 gpm



400 gpm



DISCLAIMER: This overflow simulation may appear differently from those in other systems because of the materials and pipe line configuration. Manhole lids with single or multiple gull holes may appear differently during similar overflow conditions. However, the volume of effluent and the height of the wet area should appear relatively the same under similar slope conditions.



## SSCSC MANHOLE OVERFLOW GAUGE

Overflow Simulations courtesy of Eastern Municipal Water District



## PROVIDING QUALITY TRAINING FOR COLLECTION SYSTEM PERSONNEL SINCE 1991

Mission Statement: 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 in an effort to increase the proficiency, safety and longevity of our field.

## **APPENDIX C: Water Quality Sampling Guidelines for Spills Greater Than 50,000 Gallons**

### **WATER QUALITY MONITORING REQUIREMENTS (from SSS WDR):**

To comply with subsection D.7(v) of the SSS WDRs, the enrollee shall develop and implement an SSO Water Quality Monitoring Program to assess impacts from SSOs to surface waters in which 50,000 gallons or greater are spilled to surface waters. The SSO Water Quality Monitoring Program, shall, at a minimum:

1. Contain protocols for water quality monitoring.
2. Account for spill travel time in the surface water and scenarios where monitoring may not be possible (such as safety, access restrictions, etc.).
3. Require water quality analyses for ammonia and bacterial indicators to be performed by an accredited or certified laboratory.
4. Require monitoring instruments and devices used to implement the SSO Water Quality Monitoring Program to be properly maintained and calibrated, including any records to document maintenance and calibration, as necessary, to ensure their continued accuracy.
5. Within 48 hours of the enrollee becoming aware of the SSO, require water quality sampling for, at a minimum, the following constituents:
  - a) Ammonia
  - b) Appropriate Bacterial indicator(s) per the applicable Basin Plan water quality objective or Regional Board direction which may include total and fecal coliform, enterococcus, and e-coli.

### **Sewer System Overflow Sampling Plan:**

The District Wastewater Collection Staff will first determine whether or not the SSO has reached a receiving water, by calculating travel paths, flow rates, and containment measures. If the spill is 50,000 gallons or greater and has come in contact with a receiving water, the SSO Sampling Plan will be followed. The receiving water will be monitored at three locations:

1. At the SSO discharge point to the receiving water.
2. Upstream from the point of the SSO.
3. Downstream from the point of the SSO.

Three parameters will be monitored per Standard Methods or EPA protocol:

1. Ammonia



2. Fecal Coliform
3. Enterococci

Notify Pace Analytical laboratory personnel of field sampling requirement related to spill over 50,000 gallons in waterway. In the event that the SSO occurs after hours, contact aforementioned laboratory at start of business hours the following morning.

Use Personal Protective Equipment (PPE) while performing sampling. Proceed with testing and/or sampling only when it is determined to be feasible and safe.

### **1.1 Point of Discharge Sampling/Testing**

- 1st. Move to the point where the SSO entered receiving water.
- 2nd. Photograph, map and mark the location for future reference.
- 3rd. Label the field samples with the date, time, location, and sampler's initials Record the testing results.
- 4th. Collect 2 bacteriological samples (Fecal Coliform and Enterococci) using the supplied containers labeled "micro".
- 5th. Collect a 500 ml sample for ammonia using a plastic 16 oz container that contains H<sub>2</sub>SO<sub>4</sub> (gold colored) preservative.
- 6th. Keep the samples under ice or refrigeration until transferred to the laboratory's process refrigerator (for example, use a cooler).

### **1.2 Upstream Sampling/Testing**

- 1st. Move 10' upstream from the point where SSO enters the receiving water (to obtain a non-contaminated baseline sample).
- 2nd. Follow the procedure mentioned in "1.1 Point of Discharge Sampling/Testing" (Steps 2 – 6).

### **1.3 Downstream Sampling**

- 1st. Determine how far the SSO has traveled downstream.
  - Estimate rate of flow of stream.
  - Use a floating item on the water to determine how far it travels in one minute x estimated number of minutes since SSO first reached the water. Then measure and record width of stream and in the same location measure the depth of stream in five locations from left to right.
- 2nd. Move to three locations downstream.
  - 50' and 200' downstream from the point where the SSO enters the receiving water, and
  - A point nearest the extent of how far the SSO traveled following calculation in Step 1.
- 3rd. Follow the directions mentioned in "1.1 Point of Discharge Sampling / Testing" (Steps 2 - 6)

**NOTES:**

- 1) Do not touch micro sample container's opening rim or bottom of the lid once the lid is removed.
- 2) Do not overfill sample containers because they contain preservatives including concentrated acids and caustics that are dangerous and harmful if contacted with skin, eyes etc.
- 3) All samples should be labeled with location, date, time, preservation and other pertinent. Follow-up sampling and testing will be performed if determined to be necessary.
- 4) A technical report summarizing spill event and associated analytical results will be prepared and submitted within the required 45 days.