

Element 6 – Overflow Emergency Response Plan

SWB Requirements:

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

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

RWB Requirements:

Each wastewater collection system agency shall develop an overflow emergency response plan with the following elements:

- Notification – Provide SSO notification procedures.*
 - Response – Develop and implement a plan to respond to SSOs.*
 - Reporting – Develop procedures to report and notify SSOs per SSO Monitoring and Reporting Program.*
 - Impact Mitigation – Develop steps to contain wastewater, to prevent overflows from reaching surface waters, and to minimize or correct any adverse impact from SSOs.*
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6.1 Existing Documentation

SSO emergency response protocol is documented in the City's Sanitary Sewer Overflow and Backup Response Plan (Response Plan), prepared by *Risk Management Solutions* in 2006. The Response Plan was subsequently revised by City staff and Oakley Water Strategies to incorporate regulatory changes. A copy of the Plan is included in the **Element 6 Appendix**.

The document is organized in sections that correspond to purpose and activity to insure that responding personnel have the information readily at hand in an organized and convenient form, as follows:

- Response Plan Binder
- Field Guide
- Regulatory Notification Packet
- Sewer Backup Packet
- Sanitary Sewer Overflow Packet
- Miscellaneous
 - Public Posting
 - Door Hangers
 - Sewer Spill Reference Guide

The Response Plan's purpose is to provide guidance to personnel for responding to SSOs and backups to maximize protection of public health and the environment. The City's policy is to respond promptly to SSOs following notification and to report wastewater overflows in compliance with regulatory requirements.

6.2 Notification

The Response Plan Binder includes a section entitled, Receiving a Sewage Overflow/Backup Report. This describes the City's procedure for receiving service calls. During business hours, calls are routed through the main line at the Public Works & Utilities Department. The details of the call are logged into a database and the On-Call Person is contacted via pager and/or cell phone. If the service call is received during non-business hours, the call is routed to Police Dispatch who will notify the On-Call Person via pager and/or cell phone. If at any time the Sewer On-Call Person cannot be reached, then the Assistant Operations Manager will be contacted via cell phone. If additional assistance is required, the On-Call Person will contact the needed collection system staff through the Main Office (business hours) or via the Assistant Operations Manager (non-business hours). The Response Plan sections entitled, Sanitary Sewer Overflow Packet and Regulatory Notification Packet, include instructions for notifying regulatory agencies as required by the SWB. The Sanitary Overflow Packet also describes the chain-of-communication for reporting and responding to SSOs, and includes internal notification procedures.

6.3 Response

The Sewer Backup Booklet and the Sanitary Sewer Overflow Packet provide detailed instructions on responding to indoor sewer backups and outdoor SSOs, respectively. These two sections make up the majority of the contents of the Response Plan.

Responses related to Pump Stations: Ellis Creek to be contacted & **PAC Machine** for Pump Rentals: **916-387-1336 - Jeff Woodard – 707-580-3128.**

The Sanitary Sewer Overflow Packet includes the following information:

- Procedures for initial evaluation of the spill, placement of warning signs, and the dispatch of the appropriate crew and equipment;
- Instructions on containing and diverting the SSO from sensitive areas, clearing blockages, cleaning up the area, and documenting the event; and
- Information for obtaining emergency vendor and employee contact information if additional support is necessary.

The Response Plan states that every effort must be made to prevent the discharge of wastewater to surface waters. If the SSO does reach surface water, the Sanitary Sewer Overflow Packet provides detailed instructions for collecting samples. In addition, it contains a number of subsections with instructions on quantification, documentation and reporting of the SSO.

6.4 Reporting

The On-Call Person is responsible for completing the Sanitary Sewer Overflow Report. This report provides internal documentation of the specifics of the SSO, and includes details that are necessary to fulfill regulatory reporting requirements.

Officials receiving immediate notification of the SSO vary depending on the size of the spill and whether or not the spill reaches, or is likely to reach, surface waters, as indicated in **Table 4.**

Table 4. City Staff Receiving Immediate Notification of SSOs

Contact	Circumstances for Immediate Notification
Assistant Operations Manager	All SSOs
Environmental Services Supervisor	If the SSO is likely to reach surface waters.
Source Control Inspector	If Sewer Utilities Specialist is unavailable
Deputy Director of PW&U – Ops.	If the SSO is impacting a creek/channel

6.5 Response Plan Training

Immediately following the adoption of the Response Plan, collection system staff received 3 hours of interactive training covering in detail the facets of the document. A certificate of completion for each staff member attending the training is on file. Refresher training is periodically held and weekly tailgate trainings on plan components ensure staff response readiness.

List of Documents in Element 6 Appendix:

1. Response Plan
2. PIPS Forcemain Contingency Plan
3. Sanitary Sewer Overflow Sampling Standard Operational Procedure

ELEMENT 6 APPENDIX

1. Overflow Emergency Response Plan
2. PIPS Forecemain Contingency Plan
3. Sanitary Sewer Overflow Sampling Standard Operational Procedure

City of Petaluma

Overflow Emergency Response Plan

Sanitary Sewer Overflow and Backup Response Workbook

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- If this is a Category 1 SSO greater than or equal to 1,000 gallons, **immediately contact the Deputy Director of Operations or the Assistant Operations Manager to make the 2-hour notification to CalOES.**
- Refer to the Regulatory Reporting Guide** for additional reporting requirements.



Don't forget to take photos!

Notification Trigger:	Contact Immediately:	Telephone:
For all backups into/onto private property possibly due to problems in the public sewer	Assistant Operations Manager	(707) 778-4546 <i>Refer to City directory in cell phones for additional contact information.</i>
For any media requests	Deputy Director of Operations	(707) 778-4546 <i>Refer to City directory in cell phones for additional contact information.</i>

To collect water samples:

- During working hours - Ellis Creek Main Line (707) 776-3777
- Outside of normal working hours - Ellis Creek On-Call Operator (707) 776-3777, select Option 2

<p>Sewer Crew:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Follow the instructions on the Overflow/Backup Response Flowchart and complete forms in this workbook as indicated. <input type="checkbox"/> Complete the chain of custody record (to the right) and deliver this workbook to the Assistant Operations Manager. 	<p>Print Name: _____</p> <p>Initial: _____</p> <p>Date: _____</p> <p>Time: _____</p>
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<p>Assistant Operations Manager:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Review the SSO Event Checklist and the forms in this booklet. Contact the Field Crew for additional information if necessary. <input type="checkbox"/> Confirm that all required regulatory notifications have been made. <input type="checkbox"/> If this was a Sewer Backup, complete the Backup Forms Checklist. <input type="checkbox"/> Complete the Collection System Failure Analysis Form. <input type="checkbox"/> Enter data into CIWQS. <input type="checkbox"/> Complete the Chain of Custody record (right) and file this booklet 	<p>Print Name: _____</p> <p>Initial: _____</p> <p>Date: _____</p> <p>Time: _____</p>
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SSO Event Checklist

Date of SSO: _____ SSO Location/Name: _____

CIWQS Event ID #: _____ Category? 1 2 3 OES#: _____

Property Damage? Yes No Service Request #: _____

- Effort made to contain and return a portion/all to the sanitary sewer
- Pictures/video taken of overflow
- Pictures taken of affected/unaffected area
- If property damage, start that process
- Pictures taken of containment efforts
- If Cat 1 > 1000 gals:
OES Control # _____
- Impacted waters identified?
- No impacted waters?
- SSO Report Form Complete (includes fields for all required fields in CIWQS, and a sketch of SSO)
- Volume Estimation Worksheet(s) done
- Start Time Determination Form done
- Initial review of forms is complete (ensure consistency with dates, times, volumes, and other data)
- Review of photos and videos (label/date)
- Start Folder for all documentation for this SSO event. Put everything in it (SR, Field Reports, Worksheets/Forms, follow-up work orders, notes, pics, drawings, etc. CIWQS print outs and emails)
- Failure Analysis
 - TV to determine cause
 - Review Asset History
- Determine next steps to prevent recurrence
- Document findings and next steps on SSO Report
- Submit Draft in CIWQS w/in 3 business days (for Categories 1 and 2 only)
- Print CIWQS Draft hard copy and email
- Review CIWQS, SSO Report, Worksheets, CMMS, and any other documentation to ensure data is consistent (e.g. dates, times, volumes, cause, follow-up action, etc.)
- Attach photos, forms etc. to CIWQS
- Submit Ready to Certify in CIWQS (with sufficient time for LRO review)
- Print CIWQS Ready to Certify and email
- Hand folder to LRO
- LRO review folder and CIWQS verify accurate and consistent data
- Certify in CIWQS (within 15 calendar days for Categories 1 & 2, 30 days after the month for Category 3)
- Print Certified CIWQS and email
- Any changes? Change in CIWQS and hard copies and explain changes, print our current version
- Move completed folder to SSO Binder
- For 50, 000 gallons or larger
 - Follow Water Quality Monitoring and Sampling procedures
 - Map of where samples were taken
 - Sampling results
 - Write Technical Report
 - Attach to CIWQS
 - Add to SSO Folder/Binder
- If any changes are made to SSMP
 - Update SSMP and link on CIWQS to SSMP
 - Add change to SSMP Change Log
 - If change is substantive, re-certify SSMP

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Regulatory Reporting

Deadline	Category 1 SSO	Category 2 SSO	Category 3 SSO
2 hours after awareness of SSO	If the spill is greater than or equal to 1,000 gallons, call CalOES.	-	-
48 Hours after awareness of SSO	If 50,000 gal or more will likely reach receiving waters, begin water quality sampling and initiate impact assessment	-	-
3 Business Days after awareness of SSO	Submit Draft Spill Report in the CIWQS database.*	Submit Draft Spill Report in the CIWQS database.*	-
15 Days after response conclusion	Certify Spill Report in CIWQS.* Update as needed until 120 days after SSO end date.	Certify Spill Report in CIWQS.* Update as needed until 120 days after SSO end time.	-
30 Days after end of calendar month in which SSO occurred	-	-	Certify Spill Report in CIWQS.* Update as needed until 120 days after SSO end date.
45 days after SSO end date	If 50,000 gal or more were not recovered, submit SSO Technical Report in CIWQS.*	-	-

* In the event that the CIWQS online SSO database is not available, Make required notifications to the San Francisco Regional Water Quality Control Board (SFRWQCB office) and the State Water Resources Control Board (SWRCB) by phone or email until the CIWQS online SSO database becomes available.

Note: For reporting purposes, if one SSO event results in multiple appearance points, complete one SSO report in the CIWQS SSO Online Database, and report the location of the SSO failure point, blockage or location of the flow condition that caused the SSO, including all the discharge points associated with the SSO event.

Category	Definition
1	Discharges of untreated or partially treated wastewater of any volume resulting from an enrollee's sanitary sewer system failure or flow condition that: <ul style="list-style-type: none"> - Reach surface water and/or reach a drainage channel tributary to a surface water; or - Reach a Municipal Separate Storm Sewer System (MS4) 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 MS4 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).
2	Discharges of untreated or partially treated wastewater of 1,000 gallons or greater resulting from an enrollee's sanitary sewer system failure or flow condition that do not reach surface water, a drainage channel, or a MS4 unless the entire SSO discharged to the storm drain system is fully recovered and disposed of properly.
3	All other discharges of untreated or partially treated wastewater resulting from an enrollee's sanitary sewer system failure or flow condition.
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 California Integrated Water Quality System (CIWQS) Online SSO Database.

Authorized Personnel:

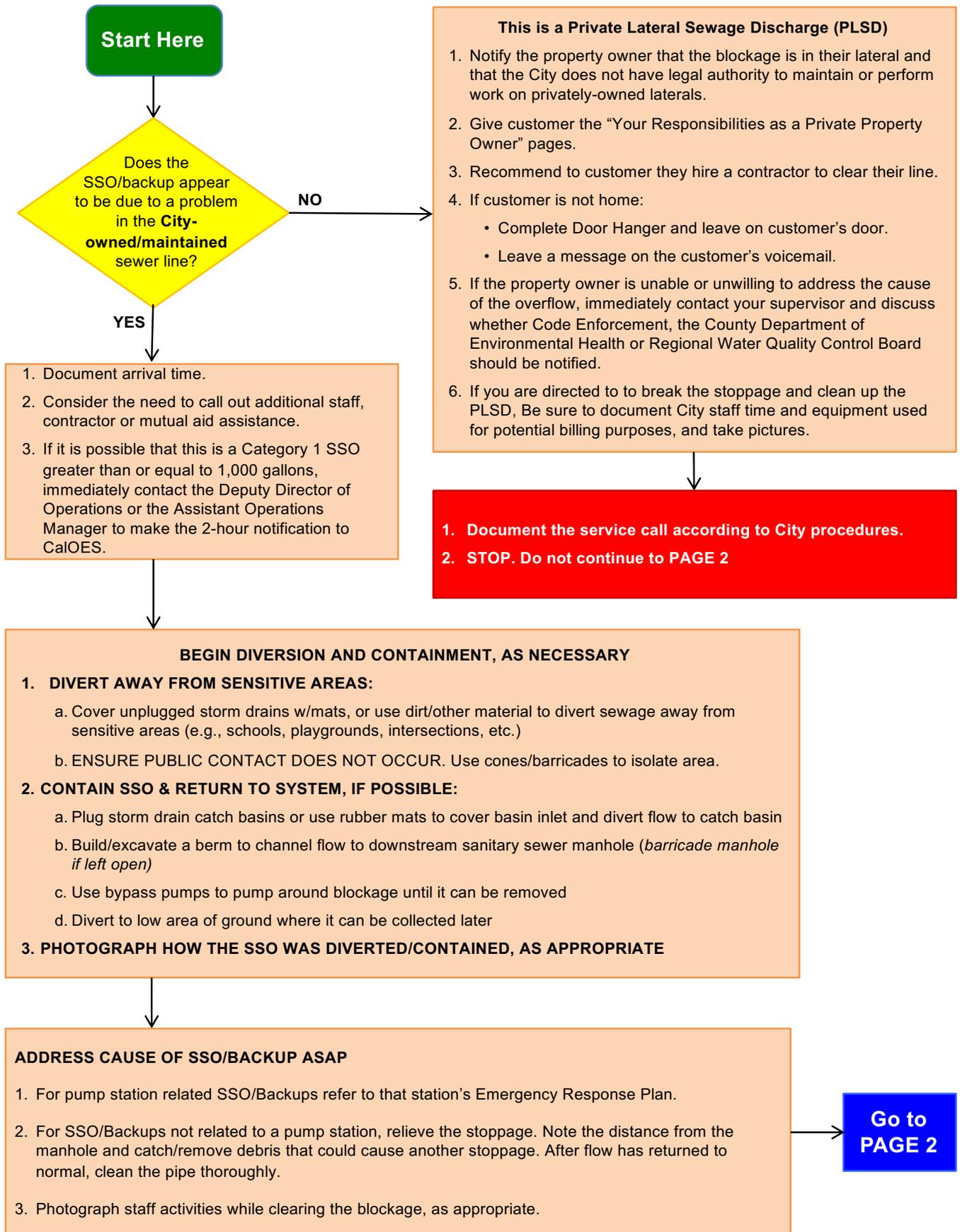
The City’s Legally Responsible Officials (LROs) are authorized to perform regulatory reporting and to electronically sign and certify SSO reports in CIWQS. Refer to the City phone directory in each City cell phone for contact information. The City’s LROs are:

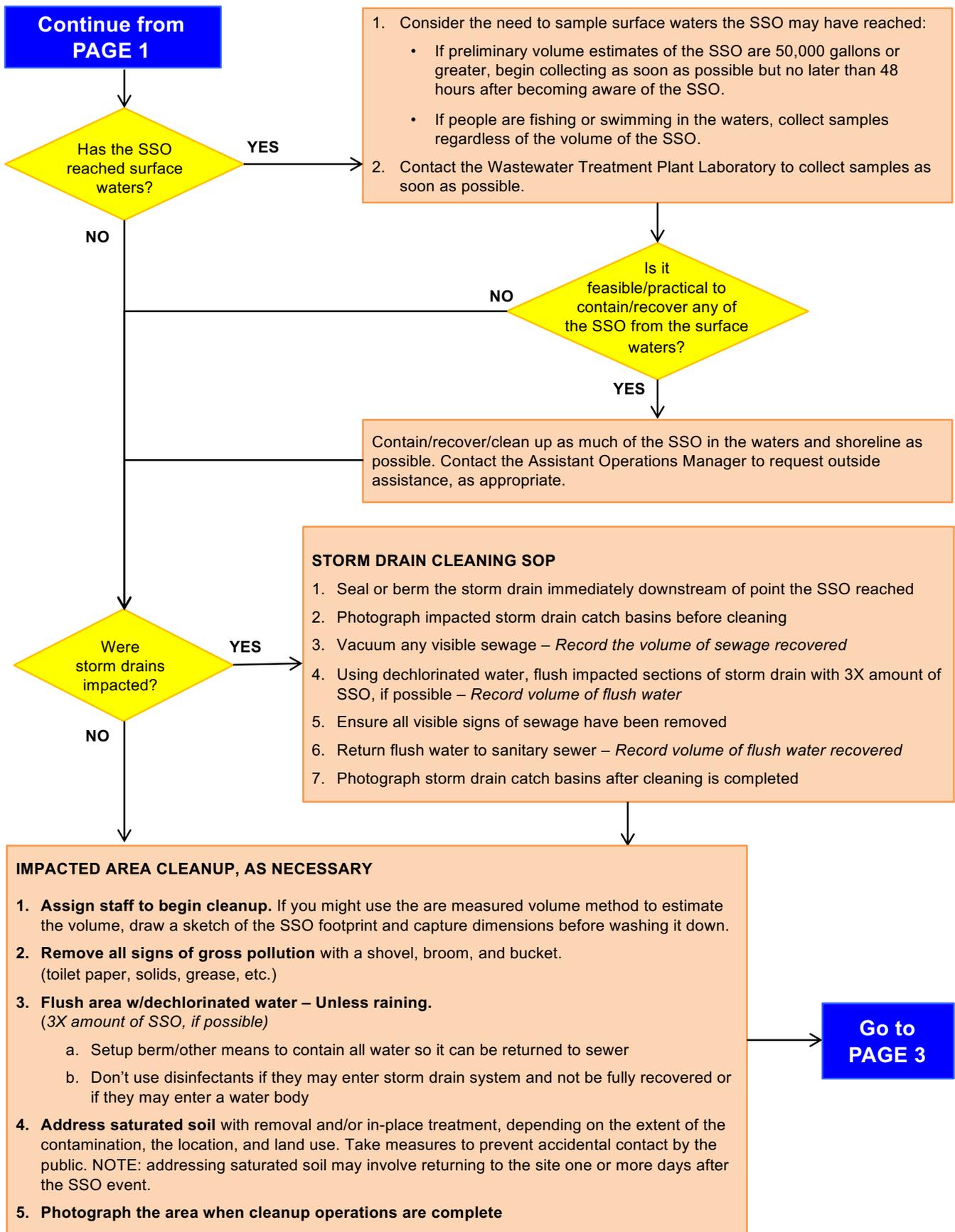
- Jason Beatty, Director of Public Works and Utilities
- Kent Carothers, Deputy Director of Public Works and Utilities
- Mike Ielmorini, Assistant Operations Manager

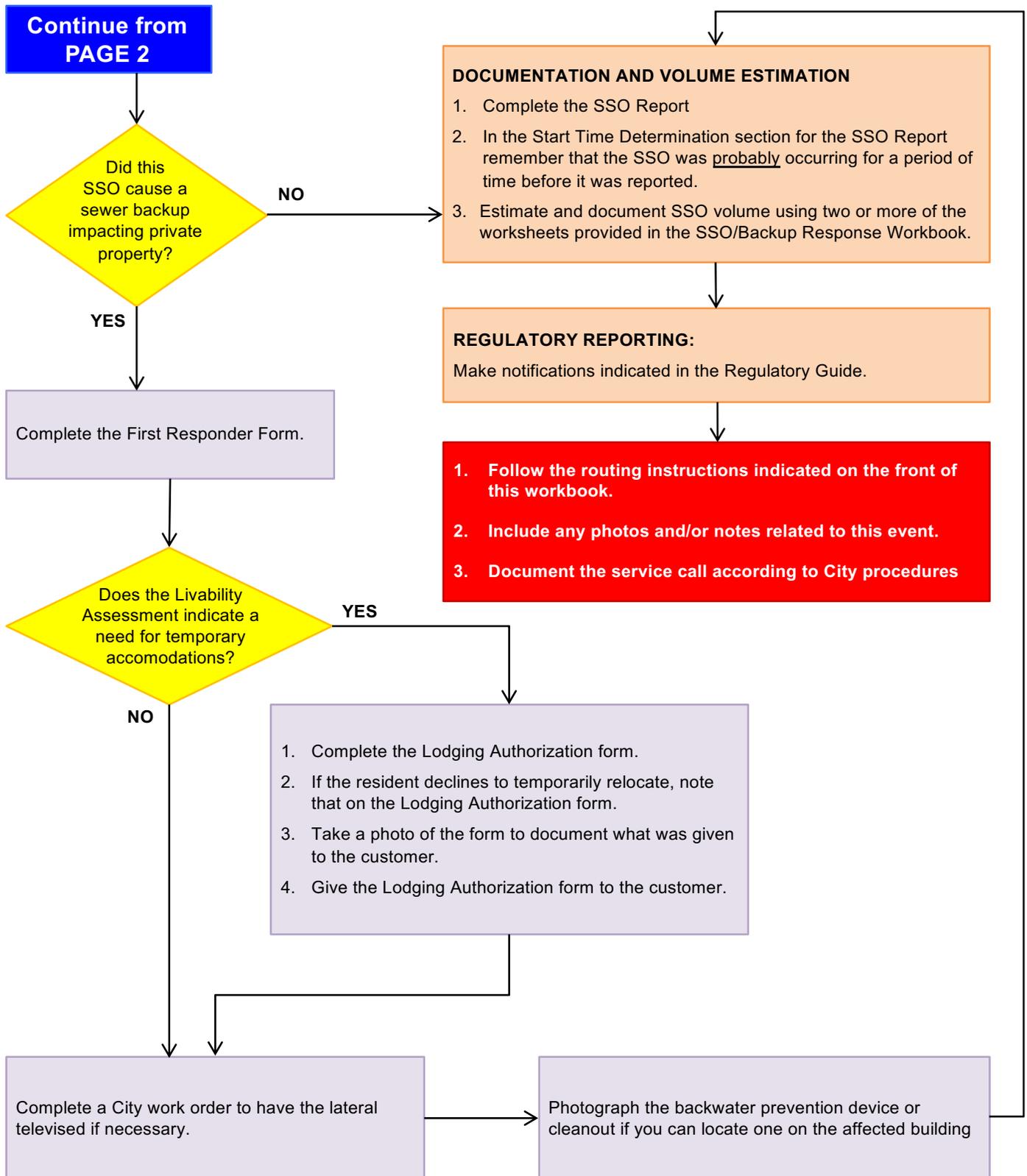
Contact	Telephone/Email
CalOES	(800) 852-7550
San Francisco Regional Water Quality Control Board	Phone: (510) 622-2369 Fax: (510) 622-2460
State Water Resources Control Board Walter Mobley	(916) 323-0878 Walter.Mobley@waterboards.ca.gov

NOTIFICATIONS	
CAL OES (800) 852-7550	
Notification Date/Time:	
Name of Who You Spoke To:	
OES Control Number:	
San Francisco Regional Water Quality Control Board	
Notification Date/Time:	
Name of Who You Spoke To: Left Message: <input type="checkbox"/>	
State Water Resources Control Board	
Notification Date/Time:	
Name of Who You Spoke To: Left Message: <input type="checkbox"/>	

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Flowchart







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SSO Report

PHYSICAL LOCATION DETAILS		
Spill location name		
Latitude of spill location		
Longitude of spill location		
County		
Regional Water Quality Control Board	San Francisco RWQCB	
VOLUMES BY DESTINATION	Volume Spilled (Gallons)	Volume Recovered (Gallons)
2.a/2.b Estimated spill volume that reached a separate storm drain that flows to a surface body of water? (If not all recovered, this is a Category 1)		
2.c/2d Estimated spill volume that directly reached a drainage channel that flows to a surface water body? (Any volume spilled is a Category 1)		
2.e/2.f Estimated spill volume discharged directly to a surface water body? (Any volume spilled is a Category 1)		
2.g/2.h Estimated spill volume discharged to land? (Includes discharges directly to land, and discharges to a storm drain system or drainage channel that flows to a storm water infiltration/retention structure, field, or other non-surface water location. Also, includes backups to building structures).		
	Volume Spilled	Volume Recovered
Total Volume Spilled (Verify this matches the table in between 2.h and 3 in CIWQS)		
Information that was relied on to estimate the volume that reached surface waters (if applicable):		

DATE/TIME DETERMINATIONS		
	DATE	TIME
Start of SSO (Use Start Time Determination/Notes Below)		
Agency Notified		
Collection System Operator Dispatched		
Collection System Operator Arrived		
End of SSO		
End of Spill Response		

Start Time Determination/Notes

Don't forget to take photos!



Witness 1: _____
Name Contact Information

Where did you see sewage spill from?

Manhole Inside Building Vent/Clean Out Catch Basin Wet Well/Lift Station Other: _____

Last Time Witness Observed **NO Spill** occurring: _____ AM / PM Date ____ / ____ / ____

Comments: _____

Witness 2: _____
Name Contact Information

Where did you see sewage spill from?

Manhole Inside Building Vent/Clean Out Catch Basin Wet Well/Lift Station Other: _____

Last Time Witness Observed **NO Spill** occurring: _____ AM / PM Date ____ / ____ / ____

Comments: _____

Witness 3: _____
Name Contact Information

Where did you see sewage spill from?

Manhole Inside Building Vent/Clean Out Catch Basin Wet Well/Lift Station Other: _____

Last Time Witness Observed **NO Spill** occurring: _____ AM / PM Date ____ / ____ / ____

Comments: _____

Start Time Determination/Notes continued

If the volume of the SSO and rate of flow are known, divide volume by rate of flow to get duration of SSO event.

_____ Gallons ÷ _____ GPM = Minutes (SSO Duration).

Subtract the Duration from the SSO End Date/Time to establish the SSO Start Date/Time.

Other Efforts to Determine Start Time: _____

Other Comments Regarding Spill Start Time: _____

Estimated SSO Start Time: _____ AM / PM Date: _____ / _____ / _____

SSO End Time: _____ AM / PM Date: _____ / _____ / _____

SSO FIELD REPORT		
Spill location description:		
Number of appearance points:		
Spill appearance points: (Check all that apply)		
<input type="checkbox"/> Backflow Prevention Device	<input type="checkbox"/> Force Main	<input type="checkbox"/> Gravity Mainline
<input type="checkbox"/> Inside Building/Structure	<input type="checkbox"/> Lateral Clean Out (Private/Public)	
<input type="checkbox"/> Lower Lateral (Private/Public)	<input type="checkbox"/> Manhole Pump Station	<input type="checkbox"/> Upper Lateral (Private/Public)
<input type="checkbox"/> Other Sewer System Structure		
Spill appearance point explanation. (Enter information here if "Other" or multiple appearance points were selected):		
Description of terrain surrounding the point of discharge/overflow, including the direction of the flow:		
Final spill destination: (Check all that apply)		
<input type="checkbox"/> Building/Structure	<input type="checkbox"/> Combined Storm Drain	<input type="checkbox"/> Drainage Channel
<input type="checkbox"/> Other (Specify Below)	<input type="checkbox"/> Paved Surface	<input type="checkbox"/> Separate Storm Drain
<input type="checkbox"/> Street/Curb and Gutter	<input type="checkbox"/> Surface Water	<input type="checkbox"/> Unpaved Surface
Explanation of final spill destination (Enter information if "Other" was selected):		

SSO FIELD REPORT

Spill cause: (Check One)

- Air Relief Valve (ARV)/Blow Off Valve (BOV)/Backwater Valve Failure
- Construction Diversion Failure
- CS Maintenance Caused Spill/Damage
- Damage by Others Not Related to CS Construction/Maintenance (Specify Below)
- Debris from Construction
- Debris from Lateral
- Debris-General
- Debris-Rags
- Debris Wipes/Non-Dispersible
- Flow Exceeded Capacity (Separate CS Only)
- Grease Deposition (FOG)
- Inappropriate Discharge to CS
- Natural Disaster
- Operator Error
- Other (Specify Below)
- Pipe Structural Problem/Failure
- Pipe Structural Problem/Failure – Installation
- Pump Station Failure – Controls
- Pump Station Failure – Mechanical
- Pump Station Failure – Power
- Rainfall Exceeded Design, I and I (Separate CS Only)
- Root Intrusion
- Siphon Failure
- Surcharged Pipe (Combined CS Only)
- Vandalism

Spill cause explanation: (Required if Spill Cause is “Other”)

SSO FIELD REPORT		
Where did failure occur? <input type="checkbox"/> Air Relief Valve (ARV)/Blow Off Valve (BOV) Failure <input type="checkbox"/> Force Main <input type="checkbox"/> Gravity Mainline <input type="checkbox"/> Lower Lateral (Public) <input type="checkbox"/> Manhole <input type="checkbox"/> Other (Specify Below) <input type="checkbox"/> Pump Station Failure – Controls <input type="checkbox"/> Pump Station Failure – Mechanical <input type="checkbox"/> Pump Station Failure – Power <input type="checkbox"/> Siphon <input type="checkbox"/> Upper Lateral (Public)		
Explanation of where failure occurred: (Required if Where Failure Occurred is “Other”)		
Was spill associated with a storm event?	YES	NO
Diameter of sewer pipe at the point of blockage or failure:	inches	
Material of sewer pipe at the point of blockage or failure:		
Estimated age of sewer asset at the point of blockage or failure (if applicable):	years	
Spill Response Activities. (Check all that apply) <input type="checkbox"/> Cleaned-Up <input type="checkbox"/> Mitigated Effects of Spill <input type="checkbox"/> Contained All or Portion of Spill <input type="checkbox"/> Other (Specify Below) <input type="checkbox"/> Restored Flow <input type="checkbox"/> Returned All Spoil to Sanitary Sewer System <input type="checkbox"/> Property Owner Notified <input type="checkbox"/> Other Enforcement Agency Notified		
Explanation of spill response activities: (Required if spill response activities is “Other”):		

SSO FIELD REPORT		
Spill corrective action taken: (Check all that apply) <ul style="list-style-type: none"> <input type="checkbox"/> Add location to, or increase frequency check, in Preventive Maintenance Program <input type="checkbox"/> Adjusted Schedule/Method of Preventive Maintenance <input type="checkbox"/> Enforcement Action Against FOG Source <input type="checkbox"/> Inspected Sewer Using CCTV to Determine Cause <input type="checkbox"/> Other (Specify Below) <input type="checkbox"/> Plan Rehabilitation or Replacement of Sewer <input type="checkbox"/> Repaired Facilities or Replaced Defect 		
Explanation of corrective action taken: (Required if spill corrective action is "Other")		
Is there an ongoing investigation?	YES	NO
Health warnings posted?	YES	NO
Did spill result in beach closure?	YES	NO
Name of Impacted Beach(es): (Enter N/A if none)		
Name of impacted surface waters:		
Information relied on to determine whether any portion of the spill reached a surface water:		

SSO FIELD REPORT	
Water quality samples analyzed for: (Check all that apply)	
<input type="checkbox"/> Dissolved Oxygen <input type="checkbox"/> Other Chemical Indicators(s) – Specify Below <input type="checkbox"/> Biological Indicator(s) – Specify Below <input type="checkbox"/> No Water Quality Samples Taken <input type="checkbox"/> Not Applicable to the Spill <input type="checkbox"/> Other (Specify Below)	
Explanation of water quality samples analyzed for: (Required if water quality samples analyzed for is "Other chemical indicator(s)", "Biological indicator(s)", or "Other")	
Water quality samples analyzed for: (Check all that apply)	
<input type="checkbox"/> Dissolved Oxygen <input type="checkbox"/> Other Chemical Indicators(s) – Specify Below <input type="checkbox"/> Biological Indicator(s) – Specify Below <input type="checkbox"/> No Water Quality Samples Taken <input type="checkbox"/> Not Applicable to the Spill <input type="checkbox"/> Other (Specify Below)	
Explanation of water quality sample results reported to: (Required if water quality sample results reported to is "Other")	
Method and explanation of volume estimation methods used: (Check all that apply)	
<input type="checkbox"/> Eyeball Estimate <input type="checkbox"/> Measured Volume <input type="checkbox"/> Duration and Flow Rate <input type="checkbox"/> Counting Upstream Connections <input type="checkbox"/> Other (Explain):	

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Volume Estimation**

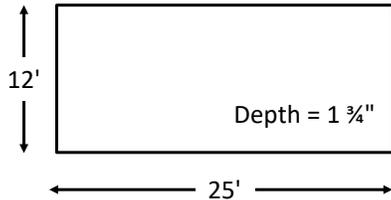
Miscellaneous Computations & Examples

To convert inches to feet (NOTE: for the purposes of this worksheet, the unit of measurement will be in feet for formula examples)	Divide the inches by 12 or use the chart on the right. Example 1: $27" \div 12 = 2.25'$ Example 2: $1\frac{3}{4}" = ?'$ $1" (0.08') + \frac{3}{4}" (0.06') = 0.14'$	Convert Inches to Feet	
		Inches	Feet
Volume of one cubic foot	7.48 gallons of liquid	1/8"	0.01'
		1/4"	0.02'
Area: Two-dimensional measurement represented in square feet (SQ/FT or ft ²)	Square/rectangle: Area = Length x Width Circle: Area = $\pi \times r^2$ (where $\pi \approx 3.14$ and $r = \text{radius} = \frac{1}{2} \text{ diameter}$) Triangle: Area = $\frac{1}{2} (\text{Base} \times \text{Height})$	3/8"	0.03'
		1/2"	0.04'
		5/8"	0.05'
		3/4"	0.06'
		7/8"	0.07'
		1"	0.08'
		2"	0.17'
		3"	0.25'
		4"	0.33'
		5"	0.42'
		6"	0.50'
		7"	0.58'
Volume: Three-dimensional measurement represented in cubic feet (CU/FT or ft ³)	Rectangle/square footprint: Volume = Length x Width x Depth Circle footprint (cylinder): Volume = $\pi \times r^2 \times \text{Depth}$ (where $\pi \approx 3.14$ and $r = \text{radius} = \frac{1}{2} \text{ diameter}$) Triangle footprint: Volume = $\frac{1}{2} (\text{Base} \times \text{Height}) \times \text{Depth}$	8"	0.67'
		9"	0.75'
Depth: Wet Stain on Concrete or asphalt surface	If the depth is not measurable because it is only a wet stain, use the following estimated depths: Depth of a wet stain on concrete surface: 0.0026' (1/32") Depth of a wet stain on asphalt surface: 0.0013' (1/64") These were determined to be a reasonable depth to use on the respective surfaces through a process of trial and error. One gallon of water was poured onto both asphalt and concrete surfaces. Once the area was determined as accurately as possible, different depths were used to determine the volume of the wetted footprint until the formula produced a result that (closely) matched the one gallon spilled. This process was repeated several times.	10"	0.83'
		11"	0.92'
Depth: Contained or "Ponded" sewage	Measure actual depth of standing sewage whenever possible. When depth varies, measure several representative sample points and determine the average. Use that number in your formula to determine volume.	12"	1.00'

Miscellaneous Computations & Examples (continued)

Area/Volume of a Rectangle or Square

Formula: Length x Width x Depth = Volume in **cubic feet**



$$\frac{25'}{\text{Length}} \times \frac{12'}{\text{Width}} \times \frac{0.14'}{\text{Depth}} = \underline{\underline{42 \text{ Cubic Feet}}}$$

Volume

Multiply the volume by 7.48 gallons to determine the volume in **gallons**:

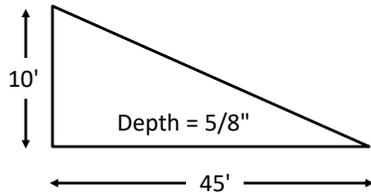
$$\frac{42 \text{ ft}^3}{\text{Volume}} \times \frac{7.48}{\text{gal/ft}^3} = \underline{\underline{314.16 \text{ gallons}}}$$

Volume

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

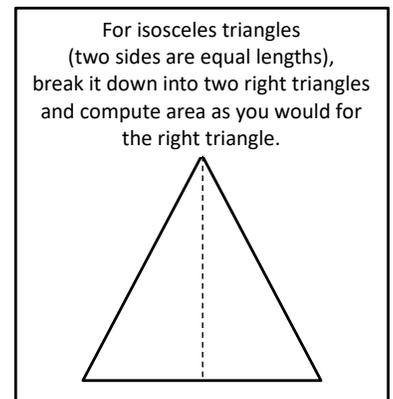
Area/Volume of a Right Triangle

Formula: Base x Height x Depth = Volume in **cubic feet**



$$\frac{45'}{\text{Base}} \times \frac{10'}{\text{Height}} \times 0.5 \times \frac{0.05'}{\text{Depth}} \times \frac{7.48}{\text{gal/ft}^3} = \underline{\underline{84.15 \text{ gallons}}}$$

Volume



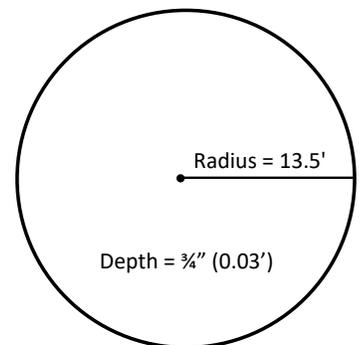
Area/Volume of a Circle

Formula: $\pi \times r^2 \times 0.785 \times \text{Depth} = \text{Volume in cubic feet}$

The diameter is a straight line passing from side to side through the center of a circle.

$$\frac{13.5'}{\text{Radius}} \times \frac{13.5'}{\text{Radius}} \times \frac{3.14}{\pi} \times \frac{0.03'}{\text{Depth}} \times \frac{7.48}{\text{gal/ft}^3} = \underline{\underline{128.42 \text{ gallons}}}$$

Volume



STEP 1: Position yourself so that you have a vantage point where you can see the entire SSO.

STEP 2: Imagine one or more buckets or barrels of water tipped over. Depending on the size of the SSO, select a bucket or barrel size as a frame of reference. It may be necessary to use more than one bucket/barrel size.

STEP 3: Estimate how many of each size bucket or barrel it would take to make an equivalent spill. Enter those numbers in Column A of the row in the table below that corresponds to the bucket/barrel sizes you are using as a frame of reference.

STEP 4: Multiply the number in Column A by the multiplier in Column B. Enter the result in Column C.

	A	B	C
Size of bucket(s) or barrel(s)	How many of this size?	Multiplier	Estimated SSO Volume (gallons)
1 gallon water jug		x 1 gallons	
5 gallon bucket		x 5 gallons	
32 gallon trash can		x 32 gallons	
55 gallon drum		x 55 gallons	
Other: _____ gallons		x _____ gallons	
Estimated Total SSO Volume:			

STEP 5: Is rainfall a factor in the SSO? Yes No

If yes, what volume of the observed spill volume do you estimate is rainfall? _____ gallons

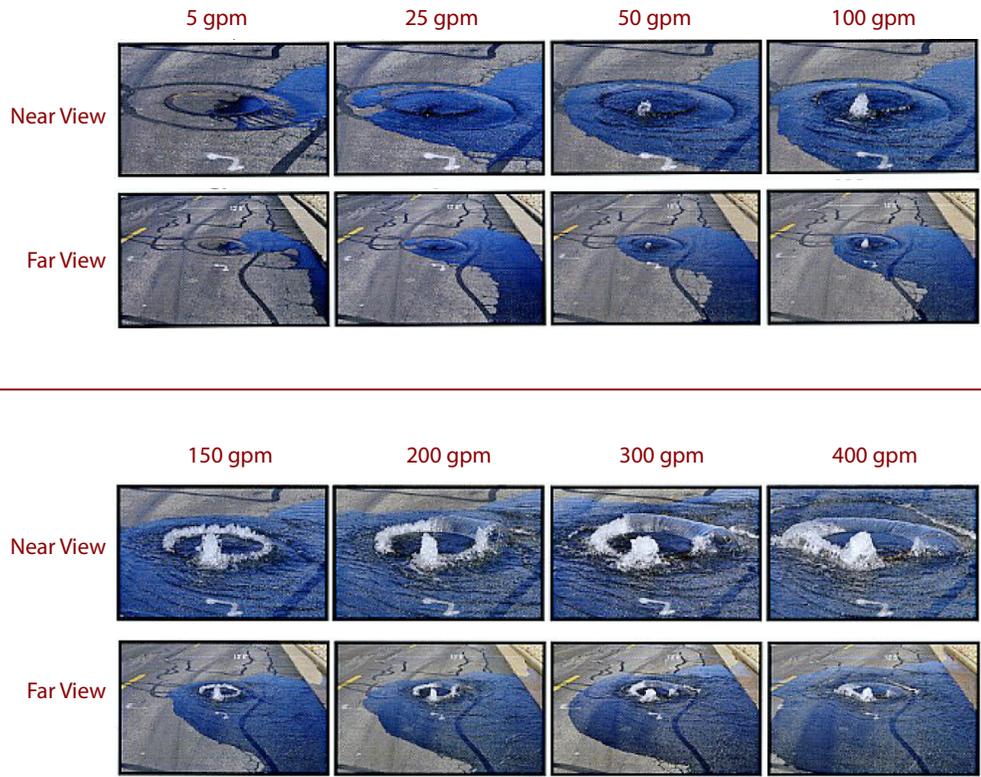
If yes, describe how you determined the amount of rainfall in the observed spill?

STEP 6: Calculate the estimated SSO volume by subtracting the rainfall from the SSO volume:

$$\frac{\text{_____ gallons}}{\text{Estimated SSO Volume}} - \frac{\text{_____ gallons}}{\text{Rainfall}} = \frac{\text{_____ gallons}}{\text{Total Estimated SSO Volume}}$$

Compare the SSO to reference images below to estimate flow rate of the current overflow. **NOTE: If the manhole cover in your picture has vent holes or more than one pry hole, do not use these pictures for comparison.**

Describe which reference photo(s) were used and any additional factors that influenced applying the reference photo data to the actual SSO:



SSCSC Manhole Overflow Gauge: CWEA Southern Section Collections Systems Committee
Overflow Simulation courtesy of Eastern Municipal Water District

Flow Rate Based on Photo Comparison: _____ gallons per minute (gpm)

Start Date and Time	1.
End Date and Time	2.
SSO Event Total Time Elapsed (subtract Line 1 from Line 2. Show in minutes.)	3.
Average Flow Rate GPM (Account for diurnal flow pattern)	4.
Total Volume Estimated Using Duration and Flow Method (Line 3 x Line 4)	5.

SSO Date: _____ Location: _____

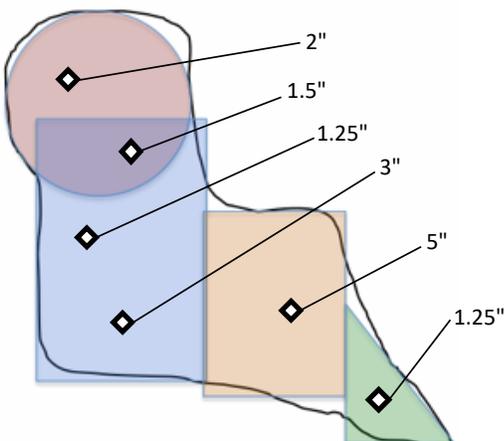
STEP 1: Describe spill area surface: Asphalt Concrete Dirt Landscape Inside Building

Other: _____

STEP 2: Draw/sketch the outline (footprint) of the spill. Then break the footprint down into recognizable shapes. See example below.

1. Sketch the outline of the spill (black line)
2. Break the sketch down into recognizable shapes (circles, squares, etc.) as well as you can.
3. Determine the volume of each shape. (note: in this example, after the volume of the circle is determined, multiply it by approximately 65% so that the overlap area won't be counted twice.
4. If the spill is of varying depths, take several measurements at different depths and find the average. If the spill affects a dry unimproved area such as a field or dirt parking lot, determine the aread of the wetted ground in the same manner as you would on a hard surface. Using a round-point shovel, dig down into the soil until you find dry soil. Do this in several locations within the wetted area and measure the depth of the wet soil. Average the measurement/thicknes of the wet soil and determine the average depth of the wet soil.

Example (right): $2'' + 1.5'' + 1.25'' + 3'' + 5'' + 1.25'' = 14.0''$
 $14.0'' \div 6 \text{ measurements} = 2.33''$
Average Depth = 2.33" (0.194')



STEP 3: Calculate the area of the footprint by completing the table below for each shape in Step 2.

If two shapes overlap, select one of the two shapes and estimate the percentage of that shape that does not overlap. Enter that percentage in the % Not Overlapping column. This will ensure that the overlap area is only counted once. Refer to the example on the previous page.

Rectangles	Length	X	Width	X	% Not Overlapping*	=	Area	X	Depth	=	Volume
	ft	X	ft	X	%	=	ft ²	X	ft	=	ft ³
	ft	X	ft	X	%	=	ft ²	X	ft	=	ft ³
	ft	X	ft	X	%	=	ft ²	X	ft	=	ft ³

Triangles	Base	X	Height	÷	X	% Not Overlapping*	=	Area	X	Depth	=	Volume
	ft	X	ft	÷ 2	X	%	=	ft ²	X	ft	=	ft ³
	ft	X	ft	÷ 2	X	%	=	ft ²	X	ft	=	ft ³
	ft	X	ft	÷ 2	X	%	=	ft ²	X	ft	=	ft ³

Circles	π	X	Radius	X	Radius	X	% Not Overlapping*	=	Area	X	Depth	=	Volume
	3.14	X	ft	X	ft	X	%	=	ft ²	X	ft	=	ft ³
	3.14	X	ft	X	ft	X	%	=	ft ²	X	ft	=	ft ³
	3.14	X	ft	X	ft	X	%	=	ft ²	X	ft	=	ft ³

Total Spill Volume (sum of all three tables above): _____ ft³

STEP 4: Convert from cubic feet to gallons by multiplying by 7.48.

_____ ft³ x 7.48 gallons = _____ gallons
 spill volume in cubic feet **Total estimated volume**

Volume Estimation: Upstream Connections Method

SSO Date: _____ Location: _____

STEP 1: Determine the number of Equivalent Dwelling Units (EDUs) for this SSO: _____ EDUs
 NOTE: A single-family residential home = 1 EDU. For commercial buildings, refer to agency documentation.

STEP 2: This volume estimation method utilizes daily usage data based on flow rate studies of several jurisdictions in California. Column A shows how an average daily of usage of 180 gallons per day is distributed during each 6-hour period. Adjust the table as necessary to accurately represent the actual data.

Complete Column E by entering the number of minutes the SSO was active during each 6-hour time period. Multiply column D times Column E to calculate the gallons spilled during each time period. Add the numbers in Column F together for the Total Estimated SSO Volume per EDU.

Time Period	Flow Rate Per EDU				SSO	
	A	B	C	D	E	F
	Gallons per Period	Hours per period	A ÷ B = Gallons per Hour	C ÷ 60 = Gallons per Minute	Minutes SSO was active during period	D × E = Gallons spilled per period
6am-noon	72	6	12	0.20		
noon-6pm	36	6	6	0.10		
6pm-midnight	54	6	9	0.15		
midnight-6am	18	6	3	0.05		
Total Estimated SSO Volume per EDU:						

STEP 3: Multiply the Estimated SSO Volume per EDU from Step 2 by the number of EDUs from Step 1.

$$\frac{\text{_____ gallons}}{\text{Volume per EDU}} \times \frac{\text{_____}}{\text{\# of EDUs}} = \frac{\text{_____ gallons}}{\text{Estimated SSO Volume}}$$

STEP 4: Adjust SSO volume as necessary considering other factors, such as activity that would cause a fluctuating flow rate (doing laundry, taking showers, etc.). Explain rationale below and indicate adjusted SSO estimate (attach a separate page if necessary).

Total Estimated SSO Volume: _____ gallons

INSERT TAB:
Backup Forms

Complete this form only if there is a backup into a residence or business.

Instructions to Field Crew:

1. Take photo of each form before giving it to the customer for documentation.
2. Tear forms listed below out of this workbook and hand to customer. *Leave the First Responder Form (F-2) in this workbook, do not give to Customer.*
3. Check each item below that was provided to the customer.
4. Have customer sign below.

Forms/Documents:

- Form F-3: Lodging Authorization
- Form F-4: Customer Information Letter
- Form F-5: Your Responsibilities as a Private Property Owner
- Form F-6: Claim Form

Forms Provided to: _____
Customer Name

Customer Signature

Date

Check here if customer declines to sign:

Forms Provided by: _____
Employee Name

Initial

Instruction to Assistant Operations Manager:

Send photos, including the photo of the Lodging Authorization
and a copy of the First Responder form to the City Risk Management Office.

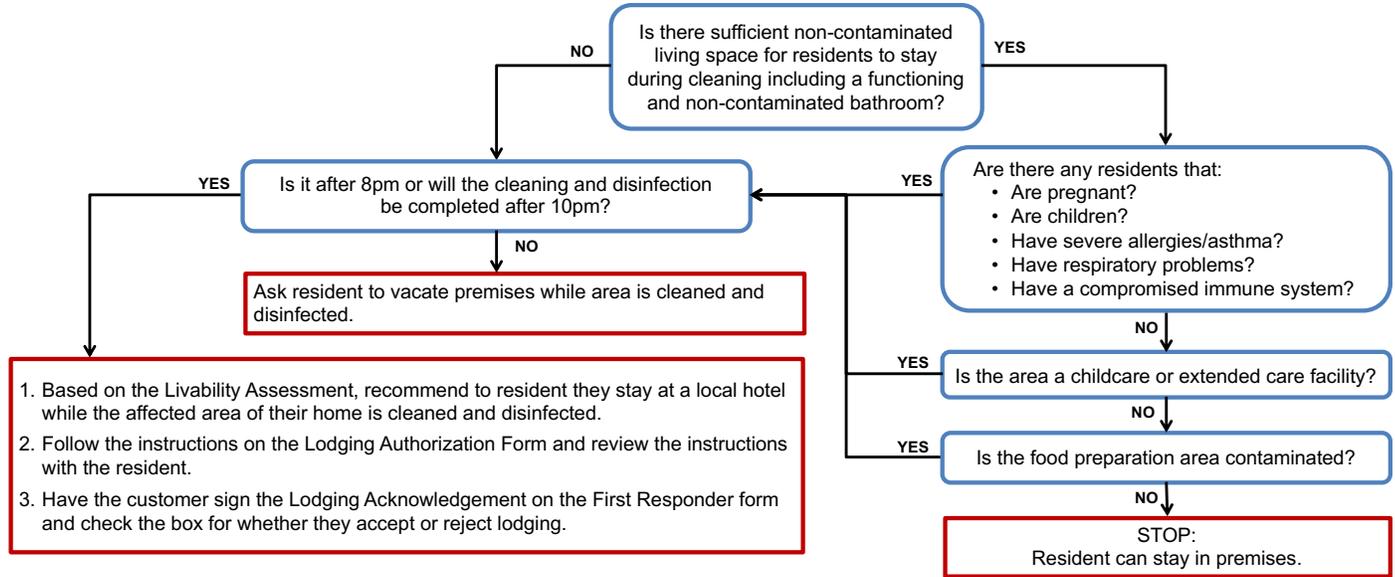
Complete this form only if there is a backup into a residence or business.

Fill out this form as completely as possible.
 Ask customer if you may enter the home. If so, take photos of all damaged and undamaged areas.

PERSON COMPLETING THIS FORM:		PHONE:	
Name: _____		DATE:	
Title: _____		TIME:	
TIME STAFF ARRIVED ON-SITE:			
DID THE CUSTOMER CALL A CONTRACTOR FOR CLEANING SERVICE? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, provide name and contact number:			
RESIDENT NAME: <input type="checkbox"/> Owner <input type="checkbox"/> Renter ADDRESS: PHONE:	IF RENT, PROPERTY MANAGER(S): OWNER: ADDRESS: PHONE:		
# OF PEOPLE LIVING AT RESIDENCE:			
Approximate Age of Home:	# of Bathrooms:	# of Rooms Affected:	
Numbers of Photographs or Videos Taken: <input type="checkbox"/> Photographs <input type="checkbox"/> Video <input type="checkbox"/> Customer did not provide or allow photographs		Where are photos/video stored?	
Is nearest upstream manhole visibly higher than the drain/fixture that overflowed? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Does property have a Property Line Cleanout or BPD?		<input type="checkbox"/> Cleanout	<input type="checkbox"/> BPD
		<input type="checkbox"/> Neither	<input type="checkbox"/> Unknown
If yes, was the Property Line Cleanout/BPD operational at the time of the overflow?		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Unknown
Have there ever been any previous spills at this location?		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Unknown
Has the resident had any plumbing work done recently?		<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Unknown
<i>If YES, please describe:</i>			

GO TO Page 2

LIVABILITY ASSESSMENT



Temporary lodging was offered by the City and either (check one): Accepted Rejected

SANITARY SEWER LINE BLOCKAGE LOCATION

PLEASE CHECK THE BOXES THAT DESCRIBE YOUR OBSERVATIONS:

Customer Cleanout Was: <input type="checkbox"/> Non-Existent <input type="checkbox"/> Full <input type="checkbox"/> Empty	Agency Owned/Maintained Cleanout was: <input type="checkbox"/> Non-Existent <input type="checkbox"/> Full <input type="checkbox"/> Empty
--	---

On the diagram below, indicate the location of the sewer line and where the problem occurred.



Recommended Follow-Up Action(s):

Did sewage go under buildings? Yes No Unsure

INSTRUCTIONS TO EMPLOYEE:

1. Review this form with the customer and instruct them to read and select, in order of preference, which of the hotels below they wish to stay at.
2. During business hours contact the Risk Management Office, or after hours contact the Assistant Operations Manager, who will contact the selected hotel and use the City credit card to authorize one (1) night's lodging.
3. Explain to customer that additional nights and other incidentals will be addressed by the Risk Management Office.
4. Instruct the customer that this emergency authorization is for **LODGING ONLY – NO FOOD, MINIBAR, MOVIE, PHONE or Other Charges.**
5. Have the customer sign the Acknowledgement section of this form.
6. Complete the voucher information and sign. Please note that an unsigned voucher will not be honored at the hotels.
7. Give the bottom copy of this form to the customer.

INSTRUCTIONS TO RESIDENT:

The City of Petaluma recommends that you temporarily relocate to a local hotel for your safety and convenience while your residence is being cleaned. Please note that this emergency authorization is granted under the following conditions:

1. This authorization provides for one (1) nights' lodging at the hotel selected below.
2. The authorization is good for **room and tax ONLY.**
3. Additional nights, other allowances, and special circumstances may be discussed by contacting the Risk Management Office at (707) 778-4360.

CUSTOMER ACKNOWLEDGEMENT:

I/we have read and understood the terms and conditions governing this offer of temporary relocation and agree to abide by them as described above.

Customer Name (please print): _____

Customer Address: _____

Phone # where customer may be reached: _____

Customer Signature: _____ Date: _____

Check here to decline this offer of temporary relocation. Customer Signature: _____

Good for one (1) night's stay on (date): _____ Number of affected residents: _____

City of Petaluma Representative's Name: _____ Phone Number: _____

This voucher is valid at the following hotels:

Petaluma Best Western
200 S Mcdowell Blvd Petaluma CA
(707) 763-0994

Days Inn
8141 Redwood Blvd Novato CA
(415) 897-7111

Quality Inn
5100 Montero Way Petaluma CA
(707) 664-1155

Dear Property Owner:

We recognize that sewer back flow incidents can be stressful. The City has prepared this brief set of instructions to help you minimize the impact of the loss by responding promptly to the situation.

The City is not responsible for cleanup charges or damages caused by blockages in the property owner's sewer line or caused by code violations. At this time, the City is investigating the cause of the loss and does not assume liability for damages. However, if our investigation determines the City is responsible for this incident, the costs you incur for reasonable and necessary cleanup will be included in the settlement of your claim. Regardless of whether you or the City is responsible for the loss, it is up to you to arrange for the repair of your property and to present a claim for consideration.

You or the property owner should immediately contact a firm for clean-up of the affected areas. If you do not know of a company to call for service, the following 24-hour emergency restoration companies are available to respond: *

Restoration Company	Contact
Britannia Cal Pacific	(650) 742-6490
Four-Star Cleaning and Restoration	(800) 255-3333
Ideal Drying	(800) 379-6881
Restoration Elements	(800) 739-2031
ServiceMaster Disaster Restoration	(800) 439-8833
TMB	(707) 252-5480

* This list is provided as a resource only. The City does not require or endorse the use of any of these firms. This list is not to be construed as exclusive, comprehensive or limiting in any way. Qualified contractors can be found in the Yellow Pages under "Water Damage Restoration" or "Fire & Water Damage Restoration". However, be sure you hire a firm with experience in sewer backups and enough resources to get the job done quickly.

What you need to do now:

- Minimize the impact of the loss by responding promptly to the situation.
- Do not attempt to clean the area yourself, let the cleaning and restoration company handle this.
- Keep people and pets away from the affected area(s) until cleanup has been completed.
- Turn off any appliances that use water.
- Turn off heating/air conditioning systems.
- Do not remove items from the area – the cleaning and restoration company will handle this.
- If you had recent plumbing work done, contact your plumber or contractor and inform them of this incident.
- File your claim with the City Risk Management Office, 11 English Street, Petaluma, CA 94952, (707) 778-4360, as soon as practical. The California Government Code, Sections 900 -960, requires filing a written claim and outlines specific timelines and notice procedures that must be used.

Notificación Legal Importante: para su protección, lea cuidadosamente, consiga una traducción confiable o consulte con su abogado.

Estimado Propietario:

Reconocemos que los incidentes del estancamiento de los desagües pueden ser estresantes. La Ciudad preparó estas instrucciones breves para ayudarle a minimizar el impacto de la pérdida al responder rápidamente a la situación.

La Ciudad no es responsable por los gastos de limpieza o daños causados por los bloqueos en la línea de desagües en la propiedad o por violaciones a los códigos. Por lo pronto, la Ciudad está investigando la causa de la pérdida y no asume ninguna responsabilidad por los daños. Si nuestra investigación determina que la Ciudad es responsable de este incidente, los gastos que usted incurra para una limpieza necesaria y razonable serán incluidos en el acuerdo de su reclamo. Sin importar si usted o la Ciudad son responsables por la pérdida, es su responsabilidad hacer los arreglos para la limpieza y reparación de la propiedad, y presentar un reclamo para que sea considerado.

Usted o el propietario deberán contactar de inmediato a una empresa para que se realice la limpieza de las áreas afectadas. Si no sabe de ninguna empresa para contactar, las siguientes empresas de restauración con servicio de emergencia las 24 horas están disponibles:

Restoration Company	Contact
Britannia Cal Pacific	(650) 742-6490
Four-Star Cleaning and Restoration	(800) 255-3333
Ideal Drying	(800) 379-6881
Restoration Elements	(800) 739-2031
ServiceMaster Disaster Restoration	(800) 439-8833
TMB	(707) 252-5480

* Esta lista se proporciona como un recurso solamente. La Ciudad no requiere que use estas empresas. Esta lista no es para que se interprete como exclusiva, integral o limitante en cualquier forma. Se puede encontrar contratistas calificados para este trabajo en las Páginas Amarillas en la sección "Water Damage Restoration" o "Fire & Damage Restoration". Asegúrese de contratar una empresa con experiencia en estancamientos de desagües y con suficientes recursos para poder realizar el trabajo rápidamente.

Lo que tiene que hacer ahora:

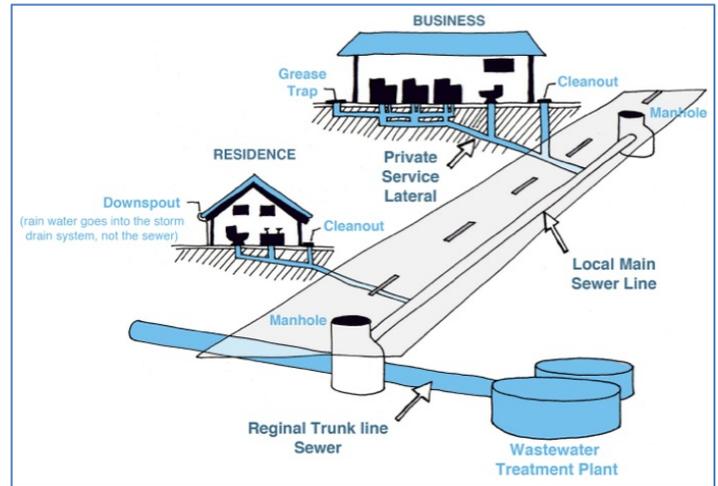
- Contacte a una empresa de restauración para la limpieza y la extracción de superficies afectadas.
- No intente limpiar el área usted mismo, permita que la empresa que contrate se encargue de ello.
- Mantenga a las personas y las mascotas alejadas de las áreas afectadas.
- Apague los sistemas de calefacción o aire acondicionado.
- Apague cualquier aparato que utilice agua.
- Evite que cualquier material llegue a las rejillas del piso para prevenir la contaminación.
- No quite nada en el área afectada, la empresa que contrate se encargará de esto.
- Si recientemente le hicieron trabajos de plomería, comuníquese con el plomero o el contratista.
- Contacte a la compañía de seguros de vivienda para presentar un reclamo.
- Mande su reclamo al the Oficina de Gestión de Riesgos de la Ciudad, 11 English Street, Petaluma, CA 94952, (707) 778-4360, lo más pronto posible. El Código del Gobierno de California, Secciones 900 a 960, requiere que se presente un reclamo por escrito y estipula plazos de tiempo y procedimientos de notificación específicos que se deben utilizar.

How a Sewer System Works

A property owner's sewer pipes are called **service laterals** and are connected to larger local main and regional trunk lines. Service laterals run from the connection at the home to the connection with the public sewer. These laterals are the responsibility of the property owner and must be maintained by the property owner.

How do sewage spills happen?

Sewage spills occur when the wastewater in underground pipes overflows through a manhole, cleanout, or broken pipe. Most spills are relatively small and can be stopped and cleaned up quickly, but left unattended they can cause health hazards, damage to homes and businesses, and threaten the environment, local waterways, and beaches. Common causes of sewage spills include grease build-up, tree roots, broken/cracked pipes, missing or broken cleanout caps, undersized sewers, and groundwater/rainwater entering the sewer system through pipe defects and illegal connections.



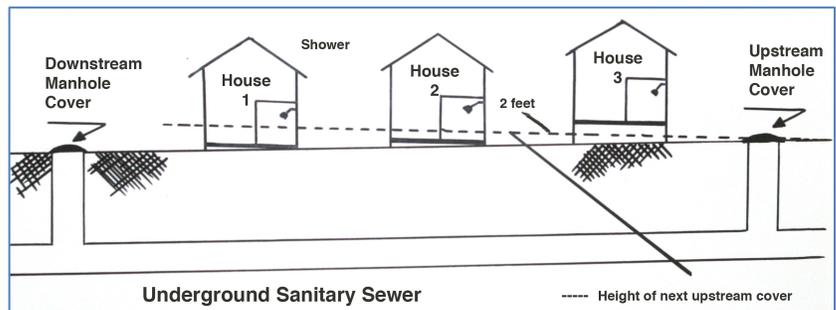
Prevent most sewage backups with a Backflow Prevention Device

This type of device can help prevent sewage backups into homes and businesses. If you don't already have a Backflow Prevention Device, contact a professional plumber or contractor to install one as soon as possible.

Is my home required to have a backflow prevention device?

Section 710.1 of the Uniform Plumbing Code (U.P.C.) states: "Drainage piping serving fixtures which have flood level rims located below the elevation of the next upstream manhole cover or private sewer serving such drainage piping **shall** be protected from backflow of sewage by installing an approved type of backwater valve." The intent of Section 710.1 is to protect the building interior from mainline sewer overflows or surcharges.

Additionally, U.P.C. 710.6 states: "Backwater valves **shall** be located where they will be accessible for inspection and repair at all times and, unless continuously exposed, shall be enclosed in a masonry pit fitted with an adequately sized removable cover."



Spill cleanup inside the home:

For large clean ups, a professional cleaning firm should be contacted to clean up impacted areas, If you hire a contractor, it is recommended to get estimates from more than one company. Sometimes, homeowner’s insurance will pay for the necessary cleaning due to sewer backups. Not all policies have this coverage, so check with your agent.

If you decide to clean up a small spill inside your home, protect yourself from contamination by observing the following safety measures. Those persons whose resistance to infection is compromised should not attempt this type of clean up.

Seek immediate attention if you become injured or ill during or after the cleanup process.

Other Tips:

- Keep children and pets out of the affected area.
- Turn off heating/air conditioning systems
- Wear rubber boots, rubber gloves, and goggles during cleanup.
- Discard items that cannot be washed and disinfected (such as: mattresses, rugs, cosmetics, toys, etc.)
- Remove and discard drywall and insulation that has been contaminated with sewage or flood waters.
- Thoroughly clean all hard surfaces (such as flooring, concrete, molding, wood and metal furniture, countertops, appliances, sinks and other plumbing fixtures) with hot water and laundry or dish detergent.
- Help the drying process with fans, air conditioning units, and dehumidifiers.
- After completing cleanup, wash your hands with soap and water. Use water that has been boiled for 1 minute (allow the water to cool before washing your hands) OR use water that has been disinfected (solution of 1/8 teaspoon of household bleach per 1 gallon of water). Let it stand for 30 min. If water is cloudy, use ¼ teaspoon of household bleach per 1 gallon of water.
- Wash clothes worn during cleanup in hot water & detergent (wash apart from uncontaminated clothes).
- Wash clothes contaminated with sewage in hot water and detergent. Consider using a Laundromat until your onsite wastewater system has been professionally inspected and serviced.

Spill cleanup outside the home:

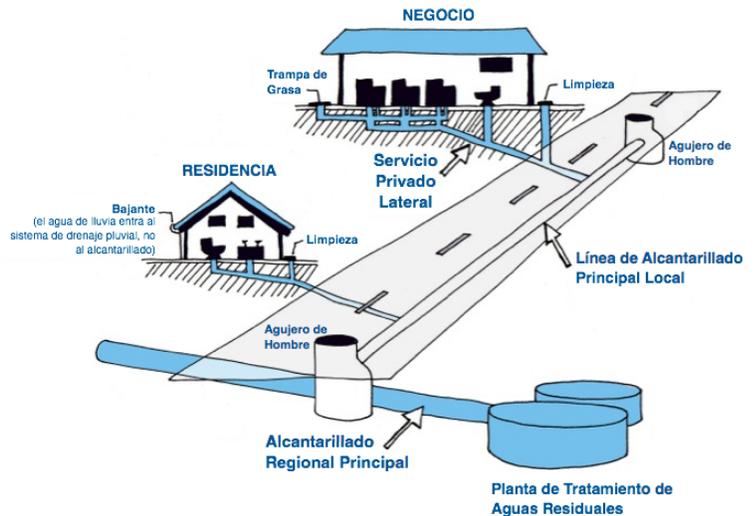
- Keep children and pets out of the affected area until cleanup has been completed.
- Wear rubber boots, rubber gloves, and goggles during cleanup of affected area.
- Clean up sewage solids (fecal material) and place in properly functioning toilet or double bag and place in garbage container.
- On hard surfaces areas such as asphalt or concrete, it is safe to use a 2% bleach solution, or ½ cup of bleach to 5 gallons of water, but don’t allow it to reach a storm drain as the bleach can harm the environment.
- After cleanup, wash hands with soap and water. Use water that has been boiled for 1 minute (allow to cool before washing your hands) OR use water that has been disinfected (solution of 1/8 teaspoon of household bleach per 1 gallon of water). Let it stand for 30 min. If water is cloudy, use ¼ teaspoon of household bleach per 1 gallon of water.
- Wash clothes worn during cleanup in hot water and detergent (wash apart from uncontaminated clothes).
- Wash clothes contaminated with sewage in hot water and detergent. Consider using a laundromat until your onsite wastewater system has been professionally inspected and serviced.

Cómo funciona un sistema de alcantarillado

Las tuberías de alcantarillado de un propietario se denominan servicios laterales y están conectadas a líneas troncales principales y regionales locales más grandes. Los servicios laterales se ejecutan desde la conexión en el hogar hasta la conexión con el sistema de alcantarillado del Distrito. Estos laterales son responsabilidad del propietario y deben ser mantenidos por el propietario.

¿Cómo ocurren los derrames de aguas residuales?

Los derrames de aguas residuales ocurren cuando las aguas residuales en las tuberías subterráneas se desbordan a través de un pozo de acceso, limpieza o tubería rota. La mayoría de los derrames son relativamente pequeños y se pueden detener y limpiar rápidamente, pero si se los deja desatendidos, pueden causar riesgos para la salud, dañar viviendas y negocios y amenazar el medio ambiente, las vías fluviales locales y las playas. Las causas comunes de derrames de aguas residuales incluyen acumulación de grasa, raíces de árboles, tuberías rotas / agrietadas, tapas de limpieza faltantes o rotas, alcantarillas de tamaño insuficiente y aguas subterráneas / pluviales que ingresan al sistema de alcantarillado a través de defectos en las tuberías y conexiones ilegales.



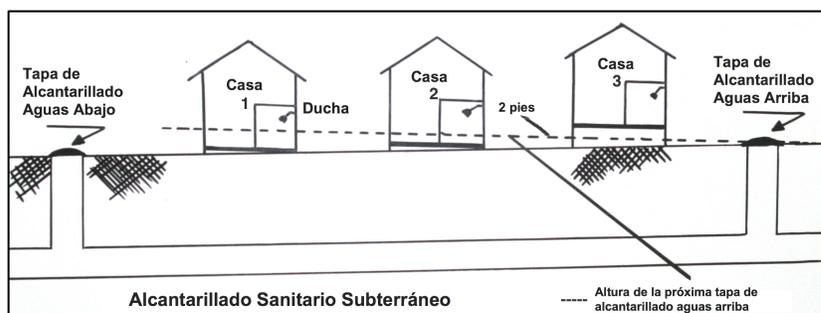
Prevenga la mayoría de las copias de seguridad de aguas residuales con un dispositivo de prevención de reflujo

Este tipo de dispositivo puede ayudar a prevenir las copias de seguridad de aguas residuales en hogares y empresas. Si aún no tiene un dispositivo de prevención de reflujo, comuníquese con un plomero o contratista profesional para instalar uno lo antes posible.

¿Se requiere que mi hogar tenga un dispositivo de prevención de reflujo?

La Sección 710.1 del Código Uniforme de Plomería (UPC) establece: “Los accesorios de tuberías de drenaje que tienen llantas de nivel de inundación ubicadas debajo de la elevación de la siguiente boca de alcantarilla corriente arriba o la alcantarilla privada que atiende dicha tubería de drenaje deben protegerse contra el reflujo de aguas residuales al instalar un tipo de válvula de evacuación”. La intención de la Sección 710.1 es proteger el interior del edificio de los desagües o sobrecargas de alcantarillado de la línea principal.

Adicionalmente, U.P.C. 710.6 dice: Las válvulas de aguas residuales deben ubicarse donde puedan ser inspeccionadas y reparadas en todo momento y, a menos que estén continuamente expuestas, deben estar encerradas en un pozo de mampostería equipado con una cubierta removible del tamaño adecuado.



Limpieza de derrames dentro de la casa:

Para grandes limpiezas, se debe contactar a una empresa de limpieza profesional para limpiar las áreas afectadas. Si contrata a un contratista, se recomienda obtener estimaciones de más de una compañía. A veces, el seguro del propietario de vivienda pagará la limpieza necesaria debido a las reservas de alcantarillado. No todas las pólizas tienen esta cobertura, así que consulte con su agente.

Si decide limpiar un pequeño derrame dentro de su casa, protéjase de la contaminación observando las siguientes medidas de seguridad. Aquellas personas cuya resistencia a la infección esté comprometida no deben intentar este tipo de limpieza.

Otros consejos:

- Mantenga a los niños y mascotas fuera del área afectada.
- Apague los sistemas de calefacción / aire acondicionado
- Use botas de goma, guantes de goma y gafas durante la limpieza.
- Deseche los artículos que no se puedan lavar y desinfectar (como: colchones, alfombras, cosméticos, juguetes, etc.)
- Retire y deseche los paneles de yeso y el aislamiento contaminado con aguas residuales o aguas de inundación.
- Limpie a fondo todas las superficies duras (como pisos, concreto, molduras, muebles de madera y metal, mostradores, electrodomésticos, fregaderos y otros accesorios de plomería) con agua caliente y ropa o detergente para platos.
- Ayude al proceso de secado con ventiladores, unidades de aire acondicionado y deshumidificadores.
- Después de completar la limpieza, lávese las manos con agua y jabón. Use agua que haya sido hervida por 1 minuto (deje que el agua se enfríe antes de lavarse las manos) O use agua que haya sido desinfectada (solución de 1/8 cucharadita de lejía doméstica por 1 galón de agua). Dejar reposar durante 30 min. Si el agua está turbia, use ¼ cucharadita de lejía de uso doméstico por 1 galón de agua.
- Lave la ropa usada durante la limpieza con agua caliente y detergente (lave aparte de la ropa no contaminada).
- Lavar la ropa contaminada con aguas residuales en agua caliente y detergente. Considere usar una lavandería hasta que su sistema de aguas residuales en el sitio haya sido inspeccionado y reparado profesionalmente.

Busque atención inmediata si se lesiona o se enferma durante o después del proceso de limpieza.

Limpieza de derrames fuera de la casa:

- Mantenga a los niños y las mascotas fuera del área afectada hasta que se haya completado la limpieza.
- Use botas de goma, guantes de goma y gafas protectoras durante la limpieza del área afectada.
- Limpie los sólidos de alcantarillado (material fecal) y colóquelos en un inodoro o bolsa doble que funcione correctamente y colóquelos en un contenedor de basura.
- En áreas de superficies duras como el asfalto o el concreto, es seguro usar una solución de lejía al 2%, o ½ taza de lejía a 5 galones de agua, pero no permita que llegue a un drenaje de tormenta ya que la lejía puede dañar la ambiente.
- Después de la limpieza, lávese las manos con agua y jabón. Use agua que haya sido hervida por 1 minuto (deje enfriar antes de lavarse las manos) O use agua que haya sido desinfectada (solución de 1/8 cucharadita de cloro por 1 galón de agua). Dejar reposar durante 30 min. Si el agua está turbia, use ¼ cucharadita de lejía de uso doméstico por 1 galón de agua.
- Lave la ropa usada durante la limpieza con agua caliente y detergente (lave aparte de la ropa no contaminada).
- Lavar la ropa contaminada con aguas residuales en agua caliente y detergente. Considere usar una lavandería hasta que su sistema de aguas residuales en el sitio haya sido inspeccionado y reparado profesionalmente.



CITY OF PETALUMA

POST OFFICE BOX 61
PETALUMA, CA 94953-0061

Teresa Barrett
Mayor

D'Lynda Fischer
Mike Healy
Gabe Kearney
Dave King
Kevin McDonnell
Kathy Miller
Councilmembers

CLAIM FORM

Claims for death, injury to person or to personal property must be filed not later than six months after the occurrence. All other claims for damages must be filed not later than one year after the occurrence. (Government Code section 911.2.)

The undersigned hereby presents the following claim against the City of Petaluma in accordance with the provisions of Government Code section 910, et seq.

1. **NAME OF CLAIMANT:** _____ **DATE:** _____

CLAIMANT'S ADDRESS: _____

CITY: _____ **ZIP:** _____

PHONE: _____

E-MAIL: _____

2. **MAILING ADDRESS:** _____

CITY: _____ **ZIP:** _____

3. **DATE OF INCIDENT:** _____ **TIME OF INCIDENT:** _____

LOCATION OF INCIDENT: _____

4. **DESCRIPTION OF THE INCIDENT OR ACCIDENT:**

(Include your reason(s) for believing that the City is liable for your loss(es):

5. **DESCRIPTION OF ALL INJURIES OR DAMAGES WHICH YOU BELIEVE YOU HAVE INCURRED AS A RESULT OF THE INCIDENT:**

City Clerk
11 English Street
Petaluma, CA 94952

Phone (707) 778-4360
Fax (707) 778-4554

E-Mail:
cityclerk@ci.petaluma.ca.us

6. NAME(S) OF ANY CITY EMPLOYEE(S) CAUSING THE DAMAGES THAT YOU ARE CLAIMING, IF KNOWN:

7. DOLLAR AMOUNT OF ALL DAMAGES YOU ARE CLAIMING IF LESS THAN \$10,000:

(Attach all estimates that are available)

8. IF DOLLAR AMOUNT OF ALL DAMAGES IS GREATER THAN \$10,000, PLEASE INDICATE :

- Case would be limited (less than \$25,000)
- Case would be unlimited (greater than \$25,000)

9. IF CLAIM IS FOR INDEMNITY, ON WHAT DATE WERE YOU SERVED WITH THE UNDERLYING LAWSUIT:

- PRESENTATION OF A FALSE CLAIM WITH AN INTENT TO DEFRAUD IS A FELONY (PENAL CODE SECTION 72).
- CLAIMS ARE SUBJECT TO DISCLOSURE UNDER GOVERNMENT CODE SECTION 6250 ET SEQ. (POWAY UNIFIED SCHOOL DISTRICT V. SUPERIOR COURT) (1998) 62 CAL. APP. 4TH 1496.

SIGNATURE OF CLAIMANT: _____

PRINT NAME: _____ DATE: _____

RETURN COMPLETED FORM TO:

OFFICE OF THE CITY CLERK
CITY OF PETALUMA
11 ENGLISH STREET
PETALUMA, CA 94952

MAIL FORM TO:

OFFICE OF THE CITY CLERK
CITY OF PETALUMA
POST OFFICE BOX 61
PETALUMA, CA 94952

INSERT TAB:
Failure Analysis

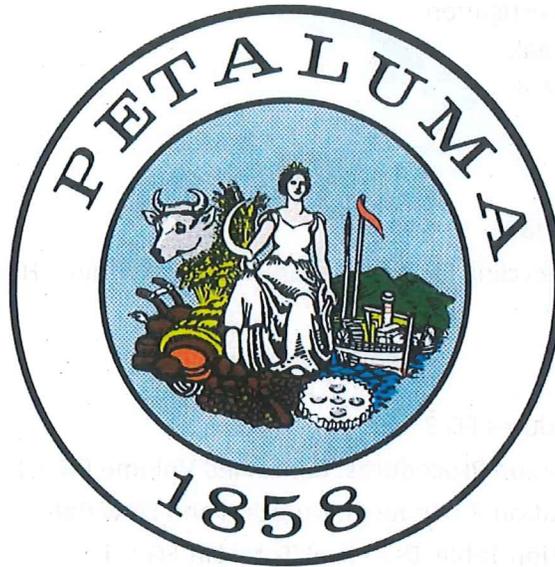
To be completed by the Assistant Operations Manager

Incident Report #		Prepared By	
SSO/Backup Information			
Cause			
Summary of Historical SSOs/Backups/Service Calls/Other Problems			
Date	Cause	Date Last Cleaned	Crew
Records Reviewed By:		Record Review Date:	
Summary of CCTV Information			
CCTV Inspection Date		Tape Name/Number	
CCTV Tape Reviewed By		CCTV Review Date	
Observations			

Go to Side B

Recommendations					
✓	Type	Specific Actions	Who is Responsible?	Completion Deadline	Who Will Verify Completion?
	No Changes or Repairs Required	n/a	n/a	n/a	n/a
	Repair(s)				
	Construction				
	Capital Improvement(s)				
	Change(s) to Maintenance Procedures				
	Change(s) to Overflow Response Procedures				
	Training				
	Misc.				
Comments/Notes:					
Reviewed by:				Review Date:	

CITY OF PETALUMA



PIPS FORCE MAIN CONTINGENCY PLAN

To be used in conjunction with the Sanitary Sewer Overflow and
Backup Response Plan

December 2014

NUTE ENGINEERING
907 Mission Ave
San Rafael, CA 94901

CITY OF PETALUMA

PIPS FORCE MAIN - CONTINGENCY PLAN

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Notice

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City Personnel Emergency Contacts

Emergency Contractors

Pumper Trucks

Trash Pump Rental

Pipe Rental

Pipe Purchase

Bag Stop Insertion

Road Ramp

APPENDIX B – TECHNICAL MEMORANDUM, November 3, 2014

APPENDIX C – ROUTE MAPS AND PIPS FORCE MAIN PROFILE

CITY OF PETALUMA – PIPS FORCE MAIN CONTINGENCY PLAN – LEAK INVESTIGATION

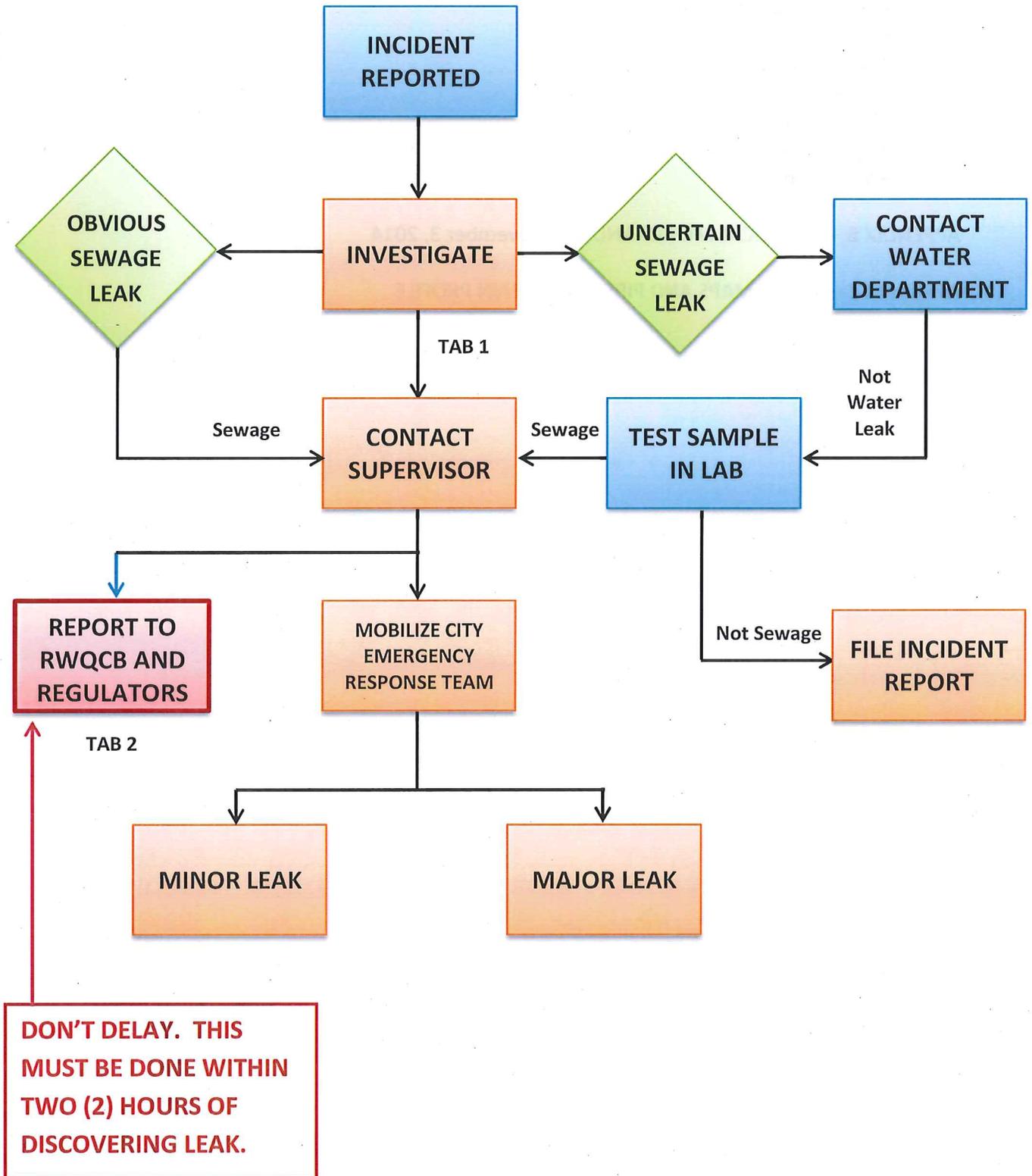


Diagram 1
August 18, 2014

CITY OF PETALUMA – PIPS FORCE MAIN CONTINGENCY PLAN - MINOR LEAK

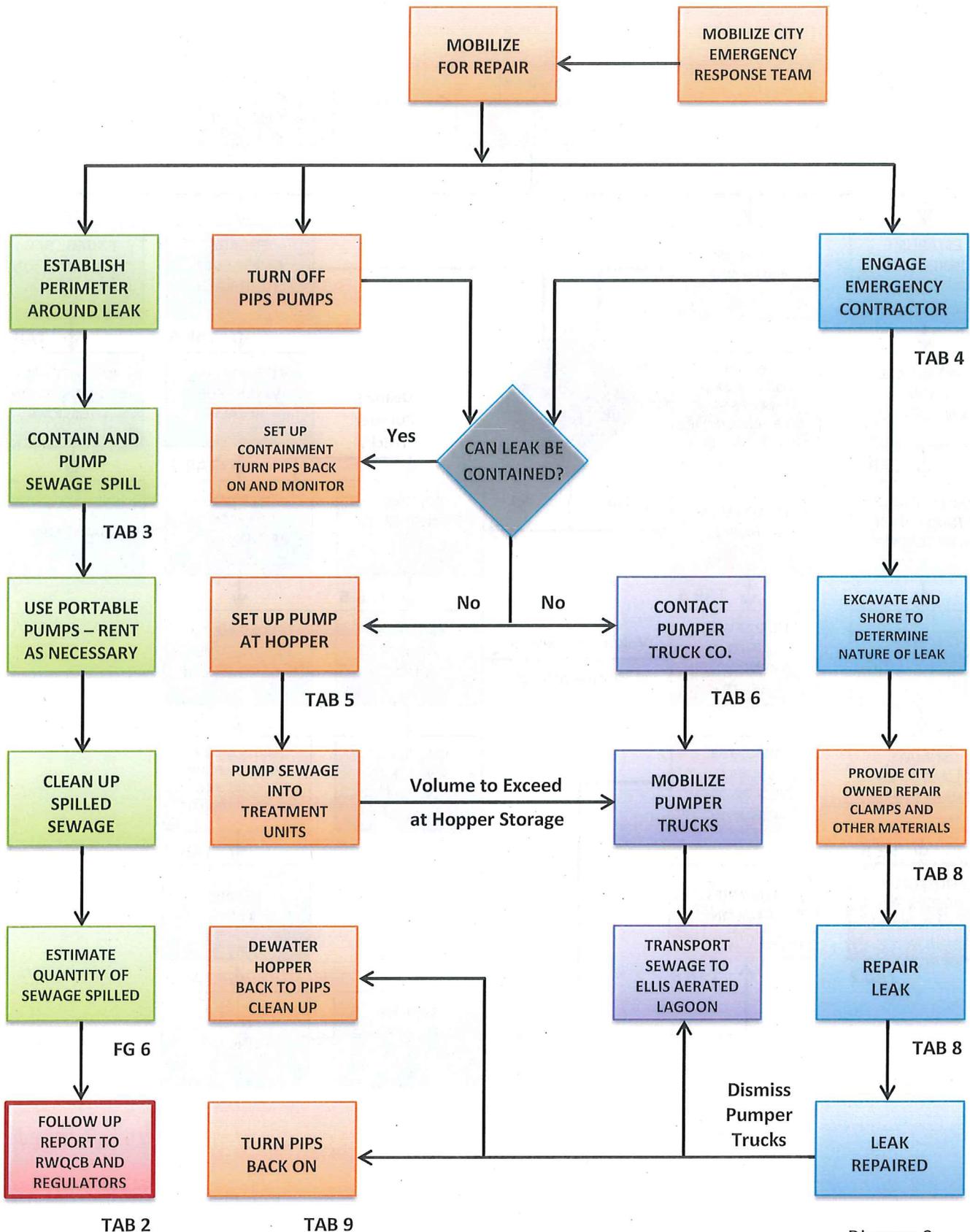


Diagram 2
June 24, 2015

CITY OF PETALUMA – PIPS FORCE MAIN CONTINGENCY PLAN - MAJOR LEAK

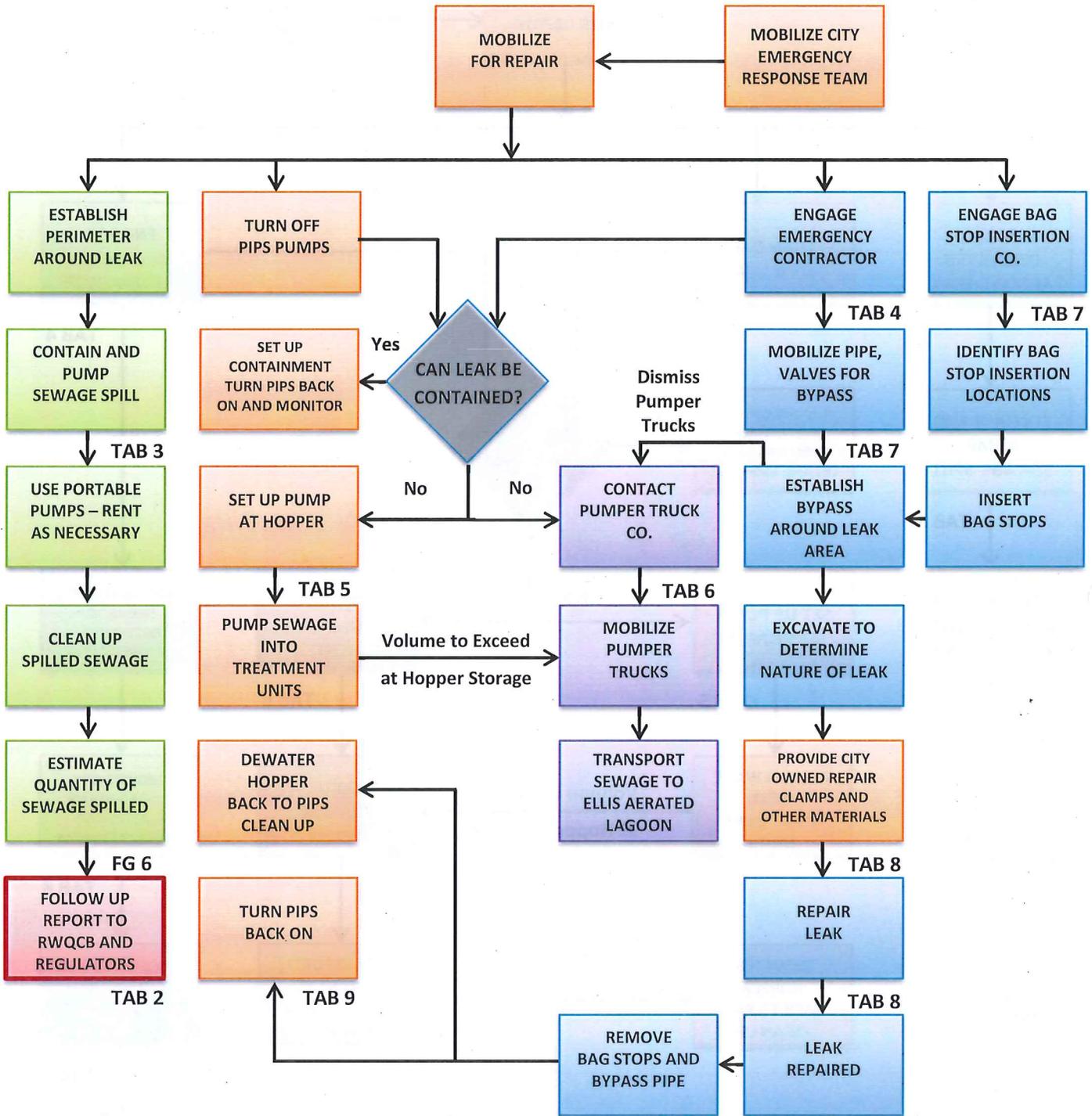


Diagram 3
June 24, 2015

TAB 1 – LEAK INVESTIGATION

- 1.1 Investigate site of reported leak – Make sure you have a set of system maps with you. Make a note of the street, street address and nearby manhole numbers.
- 1.2 Report to your operation's supervisor the severity of the leak. If necessary call for backup.
- 1.3 Post signs, barricades, cones and tape to secure perimeter around the leak.
- 1.4 Check system map to see if there is a gravity sewer or force main in the vicinity. If a gravity sewer is nearby open the manholes on either side of the leak to determine if the sewer is plugged. The leak may be from a blocked lateral so check for cleanouts on the lateral and open it to see if the lateral is plugged. If you determine that a gravity sewer is leaking proceed to clear the blockage.
- 1.5 If a force main is in the vicinity check the leaking water to see if it looks like sewage. Sometimes small leaks can travel laterally through the soil and come out in places away from above the actual pipeline.
- 1.6 If the water does not look like sewage call the City water department.
- 1.7 If there is still a question about sewage take a sample and have lab test for MBAS, caffeine or ammonia.
- 1.8 Attempt to quantify the amount of the leak for the report to the RWQCB. See guidance in the City's Sanitary Sewer Overflow and Backup response Plan – Field Guide.
- 1.9 If sewage is leaking from the PIPS force main proceed to mobilize the emergency response team.

TAB 2 – REGULATORY NOTIFICATION

Regulatory notification instructions are found in the City of Petaluma – Sanitary Sewer Overflow and Backup Response Plan.

2.1 SEE ATTACHED FORMS

Refer to the Guide to Reporting to Regulatory Authorities for notification instructions and the list of agencies which need to be notified.

Contents:

Guide to Reporting to Regulatory Authorities.....	RN-1
CI WQS Website Screenshot.....	RN-2
Fax Reporting Form: to Water Board.....	RN-3
Fax Reporting Form: to Local Health Agency.....	RN-4

**IMPORTANT: INITIAL NOTIFICATION OF A SSO MUST BE COMPLETED
WITHIN TWO (2) HOURS OF DISCOVERING A LEAK**

2.2 PUBLIC RELATIONS

It is important for employees to communicate effectively with the public including homeowners and residents, especially in sewage overflow or backup situations. How we communicate - on the phone, in writing, or in person – is how we are perceived. Good communication with the public results in greater confidence in our ability to address the problem satisfactorily, less chance of having the people making and prolonging a claims process, and less chance of him/her exaggerating the damage done to their property.

As a representative of the City, you will occasionally have to deal with an irate homeowner. A calm reasonable homeowner can become unreasonable and irate should he/she perceive us as being indifferent, uncaring, unresponsive, or incompetent. Although sometimes difficult, effective management of a sewage overflow or backup situation is critical. If it is not managed well, the situation can get out of hand and the City can end up with a costly prolonged battle. We want the public to be assured that the City is responsive and their best interest is a top priority.

2.3 FOLLOWUP WITHIN 24 HOURS

As soon as possible, but no later than twenty-four (24) hours after becoming aware of a discharge to a drainage channel or surface water, the City Staff shall submit to the Regional Water Quality Control Board a certification that the State Office of Emergency Services and the County Health Officers have been notified of the discharge.

2.4 SANITARY SEWER OVERFLOW REPORTING

Category 1 Discharge:- Discharge of sewage resulting from a failure in City's sewer system that: equal or exceed 1000 gallons; result in a discharge to a drainage channel and/or surface water; or a discharge to a storm drainpipe that was not fully captured and returned to the sanitary sewer system.

Category 2 Discharge: Any other discharge resulting from a failure in the City's sanitary sewer system.

2.5 SSO REPORTING TIME FRAMES

Category 1 SSOs, in addition to the above initial notification requirements, shall be reported **as soon as: the City Staff has knowledge of the discharge; reporting is possible; and reporting can be provided without substantially impeding cleanup or other emergency measures.** Initial reporting of Category 1 SSOs must be reported to the Online SSO System as soon as possible but no later than three (3) business days after the District is made aware of the SSO. A final certified report must be completed within fifteen (15) calendar days from the conclusion of the SSO response and remediation.

Category 2 SSOs must be reported to the Online SSO Database within thirty (30) days after the end of the calendar month in which the SSO occurs.

2.6 SSO ELECTRONIC REPORTING SYSTEM (ERS)

After a SSO event staff must submit SSO reports through the State Water Board's web-based SSO ERS at <http://ciwqs.waterboards.ca.gov/ciwqs/>. The Director of Public Works, The Director of Field Maintenance and Operations, and the Asst. Superintendent of Public Works are authorized to report on the State SSO ERS.

2.7 ANNUAL REPORT

An annual report for the January 1 to December 31 reporting year must be submitted no later than March 15 of the following year. At a minimum, the annual report must include the following:

One or more charts showing trends in the number, volume, and causes of SSOs, and by location of SSOs, experienced during the reporting year.

Discussion or any data and potential deficiencies/redundancies in the monitoring system of reporting program.

The report must be certified and signed by either a principal executive officer or a ranking elected official. The report must be certified with the following statement:

"I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Submit one paper copy (required) of the report and one electronic PDF copy (requested but not required).

ELLIS CREEK WATER RECYCLING FACILITY
ORAL SPILL REPORT
WITHIN 2 HOURS OF THE EVENT

Call Matt Pierce: Blackberry 249-3197, Personal Cell 415-272-4099 -OR-
Margaret Orr: Blackberry 849-6528, Personal Cell 843-1326, Home 843-4016

OFFICE OF EMERGENCY SERVICES (OES): 1-800-852-7550

Name of person from OES contacted: _____

Time of spill: _____ Date of spill: _____

Time of phone call: _____ Date of phone call: _____

Description of what spilled: _____

Location of spill: _____

Estimated volume (gallons) of spill: _____

Reason for the spill: _____

Description of response: _____

How was the cleanup handled? _____

Responsibility for the spill resides with: _____

Did spill reach any waters of the State? _____

Waters of the State include: wetlands, creeks and/or any watershed that flows to a larger water body.

OES Number: _____

REGIONAL WATER QUALITY CONTROL BOARD ELECTRONIC REPORT:

<http://www.wbers.net/Default.aspx> User Name: PetalumaMWTP Password: outfall

If electronic reporting is not possible then call the spill hotline at (510) 622-2369

Time of Phone call to RWQCB: _____ Message left with whom: _____

LOCAL HEALTH DEPARTMENT: (707) 565-6565

Time of Phone call to CDPH: _____ Message left with whom: _____

Signature of Reporting Person

(Date)

Back-up Attachments: Yes No

TAB 3 – SPILL CONTAINMENT

3.1 Refer to the City's Sanitary Sewer Overflow and Backup Response Plan – Field Guide. The following procedures are attached.

FG 3 - Containment Procedures

FG 4.1 – Flow Volume Estimation Procedures: Contained Volume

FG 4.3 – Flow Volume Estimation Procedures: Duration and Flow Rate

FG 5.1 - Bypass Pump Selection Table: 0-25 Feet Total Lift

For additional procedures refer to the Sanitary Sewer Overflow and Backup Response Plan

3.2 Trash Pump Rental Companies (See Appendix A)

3.3 Post Notices – see attached Notice

NOTICE

CITY OF PETALUMA

EMERGENCY PUMPING

**THE CITY OF PETALUMA HAS INSTALLED
EMERGENCY PUMPS TO ALLOW REPAIR OF
ITS SEWER LINE**

**PLEASE EXERCISE CAUTION AND STAY
AWAY FROM THE PUMPS AND PIPES**

**CONTACT CITY OF PETALUMA PUBLIC WORKS AT
707-778-4546**

The overflow must be contained. Containment becomes more difficult if the overflow reaches the storm drain system or drainage way since the overflow can rapidly contaminate receiving waters such as creeks, streams, rivers, and other water bodies. During dry weather, the storm drain system can be used to store the overflow if it can be plugged downstream of the overflow or if the downstream storm drain pump station can be deactivated.

Options for containing overflow

Overflow onto ground	<ul style="list-style-type: none"> • Rubber mats at catch basin or inlet • Sand bags in gutter • Dig earthen trench
Overflow in building	<ul style="list-style-type: none"> • Evacuate affected people if necessary • Use sand bags/plastic sheeting if necessary • Avoid electrical shock - have power turned off
Overflow into storm drain/drainage way	<ul style="list-style-type: none"> • Trace overflow in storm drainage system to downstream end point • Plug all affected storm system outlets and coordinate with appropriate personnel for strategy to contain spill • Turn off storm water pump station

Required equipment for containing overflow

Overflow onto ground and in buildings	<ul style="list-style-type: none"> • Rubber mats • Sand bags • Plastic sheets • Bypass pumps and pipe/hose
Overflow into storm drain/drainage way	<ul style="list-style-type: none"> • Plugs • Bypass pump
Overflow at pump station	<ul style="list-style-type: none"> • Emergency generator • Bypass pump

Refer to Regulatory Notifications Packet to begin preliminary notifications.

The volume of some small spills can be estimated using this method if the overflow is contained in one area and if it is not raining. In addition, the shape, dimensions, and depth of the spilled wastewater are needed. The shape and dimensions are used to calculate the area of the spills and the depth is used to calculate the volume.

- Step 1 Sketch the shape of the contained sewage
- Step 2 Measure or pace off the dimensions.
- Step 3 Measure the depth in several locations. Calculate an average depth for the entire area by adding all measured depths together and dividing by the number of measurements taken.
- Step 4 Convert the dimensions, including depth to feet.
- Step 5 Calculate the area using the following formulas:
 Rectangle Area = length x width
 Circle Area = diameter x diameter x 0.785
 Triangle Area = base x height x 0.5
- Step 6 Multiply the area times the depth
- Step 7 Multiply the volume by 7.48 to convert the area to gallons

<p>EXAMPLE:</p> <div style="text-align: center;"> </div> <p>Volume = 100' x 100' x 0.5' x 7.48 Volume = 37,400 gallons</p>	<p>EXAMPLE:</p> <div style="text-align: center;"> </div> <p>Volume = 100' x 100' x 0.5' x .785 x 7.48 Volume = 37,400 gallons</p>
--	---

In this method, separate estimates are made for the overflow duration and flow rate.

Flow Rate: There are four methods to estimate the overflow rate:

- 1: SSO Flow Estimation Form: Pictures presented in this procedure manual show sewage flowing from a maintenance hole at different rates. The observations of staff members are used to select the appropriate value from the pictures.
2. Tabulated Values: Table 1, Table 2 and Table 3 contain tabulated values for different maintenance hole overflows.
3. Open Channel Flow: Overflows often run into nearby ditched, channels, gutters, etc. Flow can be quantified by measuring the cross sectional area and velocity of the overflow. First measure the depth of flow and the dimensions of the channel. Then measure the velocity by dropping a floating object into the flow and measuring the time it takes to travel a set distance. The resulting velocity will be in the units of feet per second. Several measurements should be taken and the average flow rate should be used in volume estimates. Calculate the flow into the channel using the following formula:

$$\text{Flow (gal/min)} = \text{Velocity (ft/sec)} \times \text{Area (ft}^2\text{)} \times 449$$

4. Pump Stations: Sewer pump stations often have flow or pump run time data available through the SCADA system. Pump curves may need to be obtained to determine pump discharge rates.

Overflow Duration: The start and end times of the overflow can be estimated by staff or public bystanders who saw the overflow begin and/or end. Flow meters and information from the SCADA system can be useful in estimating overflow duration.

Volume Calculation: The overflow volume can be estimated with the following equation:

$$\text{Volume (gal)} = \text{Flow Rate (gal/min)} \times \text{Duration (min)}$$

Bypass Pump Selection Table: 0-25 Feet Total Lift

Bypass Pump Selection Table
0-25 feet total lift

Pipe size (in)	Flowrate (gpm)	50	100	150	200	250	300	350	400	450	500	600	700	800	900	1000
18	4500	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"
18	4000	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"
18	3500	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"
18	3000	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"
18	2500	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"
15	2000	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"
15	1500	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"
15	1000	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"
10	750	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"
8	500	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"
8	400	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"
6	300	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"
4	200	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"
4	100	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"
4	50	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"

Pipe Size (in)	Avg Flowrate (gpm)
4	270
6	314
8	486
10	764
12	1667
15	2153
18	4444

Assumptions

- All losses are ignored except for frictional losses.
- Velocity heads are zero because of low speeds.
- Pump curves are from www.rainforrent.com.
 - 3" pump DV-80 @ 2800 rpm
 - 4" pump DV-100 @ 2200 rpm
 - 6" pump DV-150 @ 2200 rpm
 - 8" pump DV-200 @ 1900 rpm
- Hose diameter is same as pump size.
- Fire hose roughness coefficient C=120
- Inlet and outlet pressures are at atmospheric pressure.
- Average flowrates for pipe diameters are calculated using average slopes.
- Maximum 25 feet suction lift.

TAB 4 - MOBILIZE EMERGENCY CONTRACTOR

- 4.1 If the leak is sewage is from the PIPS force main it will be necessary to dig down to the force main and make a repair.
- 4.2 Keep your operation's supervisor advised about steps being taken
- 4.3 Call one of the City's on call contractors mobilize to excavate down to the pipe and safely shore the excavation. (See Appendix A)
- 4.4 Have office issue Emergency Purchase Order
- 4.5 Meet Contractor's superintendent at the job site and direct contractor to establish the necessary work perimeter and traffic controls.
- 4.6 The emergency contractor may be able to assist with the spill containment.
- 4.7 Provide Emergency Contractor with a copy of the system map and show him location of the manholes on the PIPS force main and on nearby gravity sewers – mark with green paint. Ground water and any sewage must be pumped to a gravity sewer.

TAB 5 – STORAGE IN HOPPER TREATMENT UNITS

- 5.1 Turn off PIPS pump station
- 5.2 Mobilize City pump and connecting hoses are stored at Hopper. The City pump is diesel engine driven similar to the attached catalog cut. Depending how it is connected the pump capacity will be around 3,000 gpm.
- 5.3 Bypass flow from manhole in front of PIPS to the various abandoned structures at the Hopper treatment plant using rental pump – see diagram.
- 5.3 See attached for the storage volumes available in each structure with 2' freeboard and the expected hourly flow.
- 5.4 Estimate time to complete repair –request time estimate from with emergency contractor
- 5.5 Estimate the amount of time structures can hold flow based on time of day and PIPS flow meter (See chart)
- 5.6 The expected sewage flows at Hopper are as follows:
- | | |
|--|--|
| Average dry weather flow – non rainy periods | 4.5 - 5.0 mgd
3,130 gpm – 3,475 gpm |
| Peak dry weather flow | 4,300 gpm – 4,700 gpm |
| Flow during heaviest rain 3/20/2011 | 22 - 25 mgd
15,920 gpm – 17,375 gpm |
- 5.7 If time to repair appears to exceed the emergency storage time proceed to mobilize pumper trucks - Tab 6.
- 5.8 If pumper trucks will be insufficient and the repair time will be prolonged install bag stops and establish bypass around leak area – Tab 7.
- 5.9 IMPORTANT – Regulators will expect the City to make a maximum effort to contain the sewage spill so in a major sewage spill event it will be important to show a good faith effort and continue to store flow in the Hopper structures.**

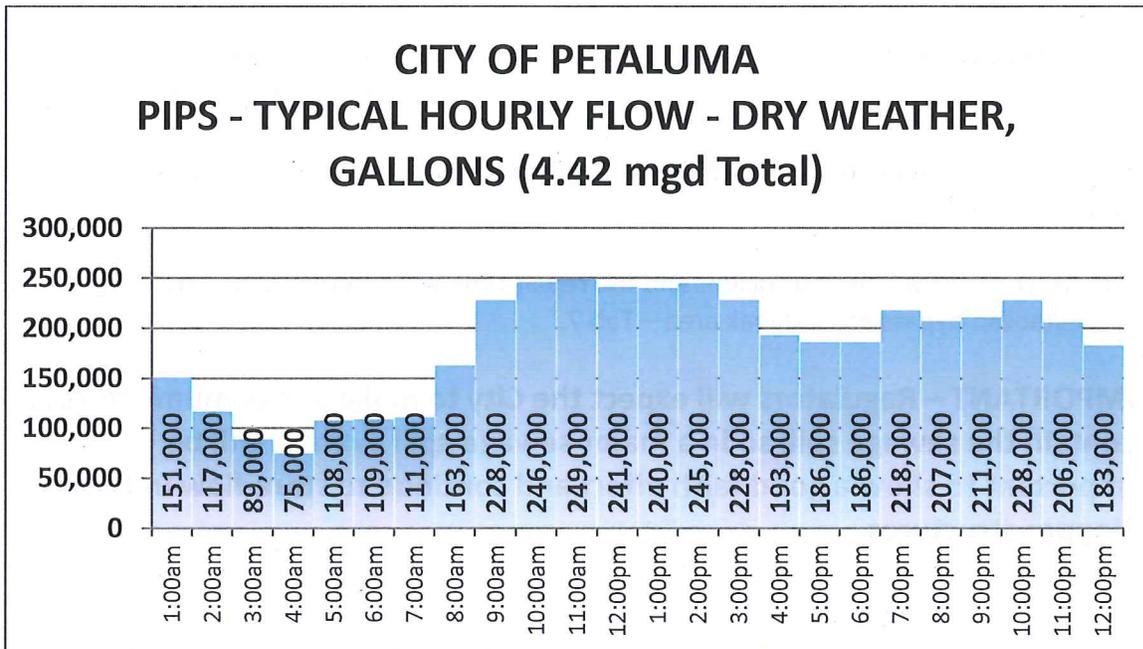
STORAGE AT HOPPER – WORK TIME CALCULATOR

CALCULATE AVAILABLE WORK TIME WHEN USING STORAGE AT HOPPER. IF TIME THREATENS TO EXCEED STORAGE TIME MOBILIZE PUMPER TRUCKS

1. AVAILABLE STORAGE VOLUMES IN THE ABANDONED STRUCTURES OF THE OLD HOPPER TREATMENT PLANT ASSUMING 2' OF FREEBOARD

Headworks, motor room and pump room	122,500 gallons
Primary sedimentation including grit chamber, preservation and sludge pump pit (assuming holes were cut through the walls)	203,609 gallons
Aeration tanks	1,010,000 gallons
Secondary sedimentation tank	316,600 gallons
Chlorine contact chamber	<u>135,800 gallons</u>
TOTAL	1,800,000 gallons

2. EXPECTED HOURLY FLOW AT PIPS – ADD HOURLY FLOWS TO DETERMINE AVAILABLE WORK TIME BASED ON AVAILABLE STORAGE BEING USED



AC DEU

Priming Assisted Centrifugal Pump w/Autostart

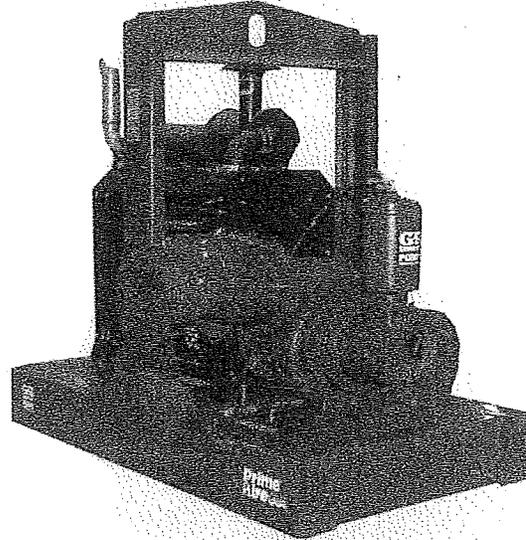


Model PA10A60-4045H

Size 10" x 10"



Total Head		Capacity of Pump in U.S. Gallons per Minute (GPM) at Continuous Performance				
P.S.I.	Feet	780	780	780	780	780
60.7	140	780	780	780	780	780
52.0	120	1590	1840	1920	1920	1920
43.4	100	1840	2400	2820	3020	3020
34.7	80	1920	2520	3020	3500	3620
26.0	60	2020	2580	3100	3630	3820
17.3	40	2100	2640	3180	3720	3920
8.7	20	2180	2700	3260	3820	4030
Suction Lift		24'	20'	15'	10'	5'



PUMP SPECIFICATIONS

Size: 10" x 10" (254 mm x 254 mm) Flanged.
 Casing: Gray Iron 30.
 Maximum Operating Pressure 98 psi (676 kPa).
 Semi-Open Type, Two Vane Impeller: Ductile Iron 65-45-12.
 Handles 3.25" (82,6 mm) Diameter Spherical Solids.
 Suction Spool: Gray Iron 30.
 Impeller Shaft: Stainless Steel 17-4 PH.
 Externally Adjustable Front Wear Ring: Ductile Iron 80-55-06.
 Intermediate: Gray Iron 30.
 Seal Plate: Gray Iron 30.
 Seal: Mechanical, Oil-Lubricated, Double Floating, Self-Aligning. Silicon Carbide Rotating and Stationary Faces. Stainless Steel 316 Stationary Seat. Fluorocarbon Elastomers (DuPont Viton® or Equivalent). Stainless Steel 316 Cage and Spring. Maximum Temperature of Liquid Pumped, 160°F (71°C).
 Priming Chamber: Gray Iron 30 Housing w/Stainless Steel Float and Linkage.
 Discharge Check Valve: Ductile Iron Housing w/Buna-N Flapper.
 Radial Bearing: Open Single Ball.
 Thrust Bearing: Open Double Ball.
 Bearing and Seal Cavity Lubrication: SAE 30 Non-Detergent Oil.
 Gaskets: Resistant Synthetic Rubber, PTFE, Cork, Vegetable Fiber, and Compressed Synthetic Fibers.
 O-Rings: Buna-N.
 Hardware: Standard Plated Steel.
 Bearing and Seal Cavity Oil Level Sight Gauges.
 *Consult Factory for Applications Exceeding Maximum Pressure and/or Temperature Indicated.
 Standard Equipment: Gear-Driven Air Compressor. Hoisting Bail. Combination Skid Base w/Fuel Tank. Strainer. Single Ball Type Float Switch.
 **
 Optional Equipment: Battery. Heated. G-R Hard Iron Impeller. NPT Threaded Flanges. High Speed (55 MPH/89 KM/H) Tandem Axle Pneumatic-Tired Wheel Kit w/wo DOT-Approved Lights and Electric Brakes. Over-the-Road Trailer (Meets DOT and Transport Canada Requirements) Available w/Either Electric or Hydraulic Surge Brakes, Running Lights, Trailer Jack Stands and Safety Chains/Cables. Heated Priming Chamber Kit. Suction Vacuum and Discharge Pressure Gauge Kit. EPS w/Submersible Transducer Liquid Level Sensor.**
 **50 Ft. (15 m) Standard Length; Dual Switches and Alternate Cable Lengths Available From the Factory.

WARNING!
 Do not use in explosive atmosphere or for pumping volatile flammable liquids.

ENGINE SPECIFICATIONS

Model: John Deere 4045H "Power Tech".
 Type: Four Cylinder, Turbocharged, Charge Air Cooled, Enclosed, Liquid Cooled Diesel Engine.
 Displacement: 275 Cu. In. (4,5 liters).
 Governor: Electronic Isochronous.
 Lubrication: Forced Circulation.
 Air Cleaner: Dry Type.
 Oil Reservoir: 15.5 U.S. Qts. (14,7 liters) Dry; 14.5 U.S. Qts. (13,7 liters) Refill.
 Fuel Tank: 110 U.S. Gals. (416 liters).
 Full Load Operating Time: 17.8 Hrs.
 Starter: 12V Electric.
 Standard Features: Low Oil Pressure and High Coolant Temperature Safety Shut Down Switches. Autostart Instrument Panel Includes: Tachometer, Voltmeter, Hourmeter, Coolant Temperature Gauge, Oil Pressure Gauge, Manual/Stop/Auto Key Switch, 10 Amp Pushbutton Circuit Breaker, Startup Warning Delay. Muffler w/Weather Cap. Throttle Control.

JOHN DEERE PUBLISHED PERFORMANCE:
 Maximum Gross BHP (Intermittent Duty)
 140 (104 kW) @ 2400 RPM



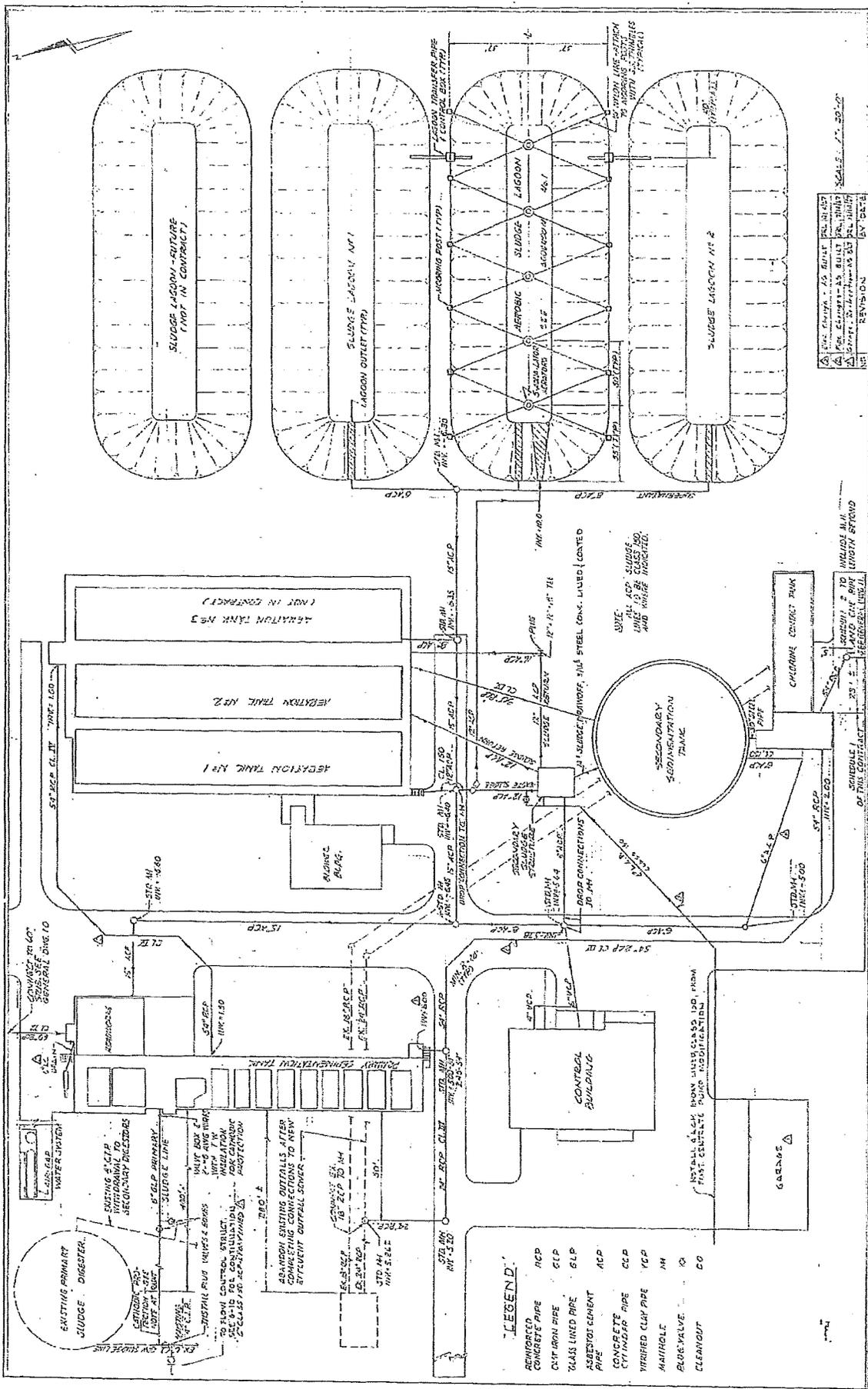
THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO

GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA

www.grpumps.com

Specifications Subject to Change Without Notice

Printed in U.S.A.



LEGEND:

- REINFORCED CONCRETE PIPE
- CAST IRON PIPE
- GLASS LINED PIPE
- ASBESTOS CEMENT PIPE
- CONCRETE CYPHAR PIPE
- WIRE MESH PIPE
- MAINT HOLE
- BLIND VALVE
- CLEANOUT
- ACP
- GLP
- GLP
- ACP
- CCP
- YCP
- MH
- CO
- CO

GENERAL NOTES:

1. SEE GENERAL SPECIFICATIONS FOR ALL MATERIALS AND WORKMANSHIP.
2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE CALIFORNIA BUILDING CODE AND THE CALIFORNIA PLUMBING CODE.
3. ALL DIMENSIONS ARE UNLESS OTHERWISE SPECIFIED.
4. ALL ELEVATIONS ARE UNLESS OTHERWISE SPECIFIED.
5. ALL PIPING SHALL BE 150# STEEL UNLESS OTHERWISE SPECIFIED.
6. ALL PIPING SHALL BE 150# STEEL UNLESS OTHERWISE SPECIFIED.
7. ALL PIPING SHALL BE 150# STEEL UNLESS OTHERWISE SPECIFIED.
8. ALL PIPING SHALL BE 150# STEEL UNLESS OTHERWISE SPECIFIED.
9. ALL PIPING SHALL BE 150# STEEL UNLESS OTHERWISE SPECIFIED.
10. ALL PIPING SHALL BE 150# STEEL UNLESS OTHERWISE SPECIFIED.

REVISIONS:

NO.	REVISION	BY	DATE
1	AS SHOWN	J.P.M.	5/15/66
2	AS SHOWN	J.P.M.	5/15/66
3	AS SHOWN	J.P.M.	5/15/66
4	AS SHOWN	J.P.M.	5/15/66
5	AS SHOWN	J.P.M.	5/15/66
6	AS SHOWN	J.P.M.	5/15/66
7	AS SHOWN	J.P.M.	5/15/66
8	AS SHOWN	J.P.M.	5/15/66
9	AS SHOWN	J.P.M.	5/15/66
10	AS SHOWN	J.P.M.	5/15/66

PROJECT INFORMATION:

CITY OF PETALUMA, SONOMA COUNTY, CALIFORNIA
 WATER POLLUTION CONTROL PLANT
 AEROBIC SLUDGE LAGOON LAYOUT
 SEWERS & SLUDGE PIPING
 SCALE: 1" = 20'-0"

DATE: MAY 15, 1966
BY: J.P.M.
CHECKED BY: J.P.M.
APPROVED BY: J.P.M.

DESIGN FACTORS:

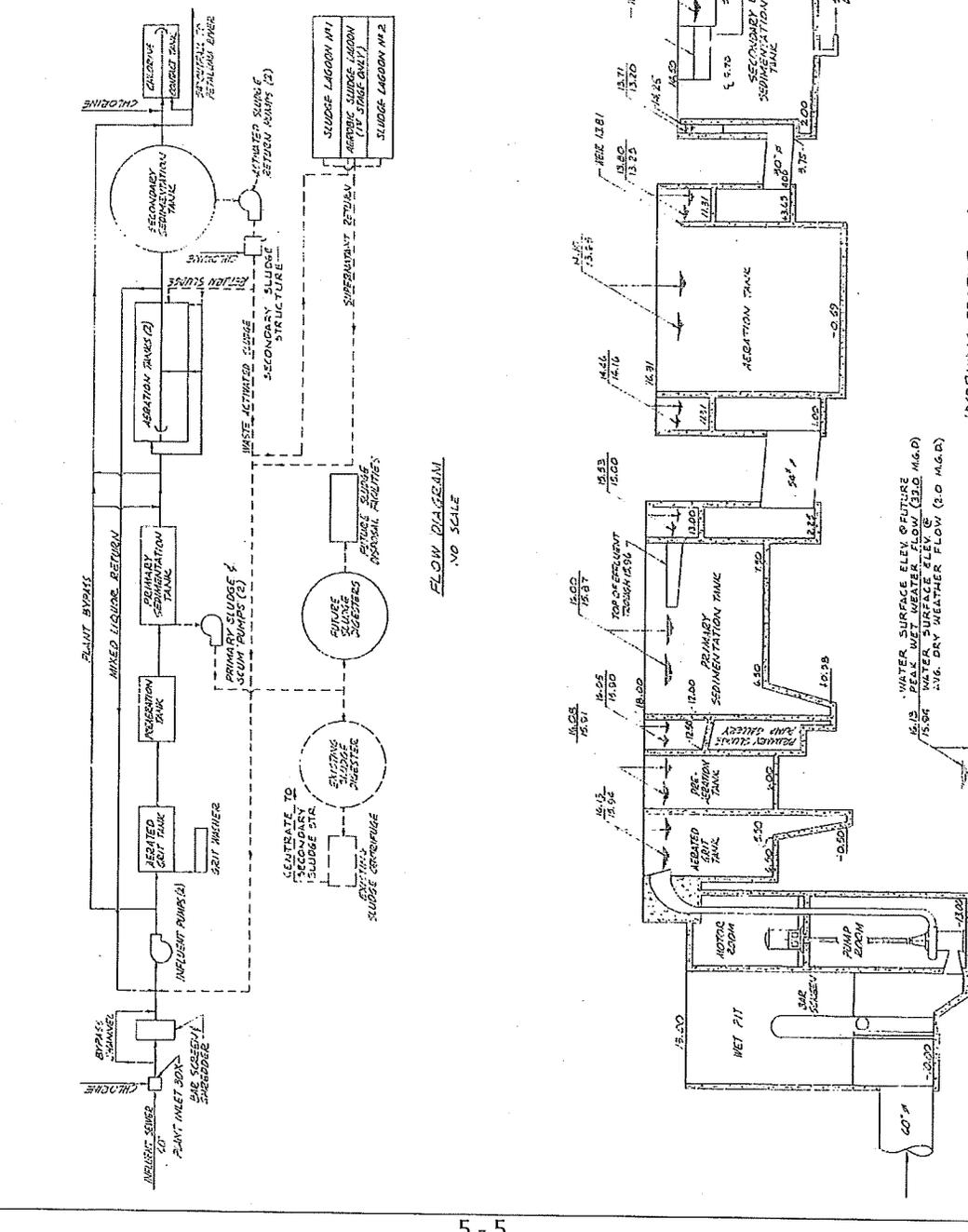
ADAPTATION TANKS	INITIAL DESIGN	FINAL DESIGN
Volume, cu. ft.	10,000	10,000
Retention Time, hours	1.0	1.0
Surface Area, sq. ft.	1,000	1,000
Flow Rate, cfs	1.0	1.0
Flow Velocity, ft./min.	1.0	1.0
Flow Velocity, ft./sec.	1.0	1.0
Flow Velocity, ft./hr.	1.0	1.0
Flow Velocity, ft./day	1.0	1.0
Flow Velocity, ft./month	1.0	1.0
Flow Velocity, ft./year	1.0	1.0
Flow Velocity, ft./decade	1.0	1.0
Flow Velocity, ft./century	1.0	1.0
Flow Velocity, ft./millennium	1.0	1.0

ADAPTATION TANKS	INITIAL DESIGN	FINAL DESIGN
Volume, cu. ft.	10,000	10,000
Retention Time, hours	1.0	1.0
Surface Area, sq. ft.	1,000	1,000
Flow Rate, cfs	1.0	1.0
Flow Velocity, ft./min.	1.0	1.0
Flow Velocity, ft./sec.	1.0	1.0
Flow Velocity, ft./hr.	1.0	1.0
Flow Velocity, ft./day	1.0	1.0
Flow Velocity, ft./month	1.0	1.0
Flow Velocity, ft./year	1.0	1.0
Flow Velocity, ft./decade	1.0	1.0
Flow Velocity, ft./century	1.0	1.0
Flow Velocity, ft./millennium	1.0	1.0

ADAPTATION TANKS	INITIAL DESIGN	FINAL DESIGN
Volume, cu. ft.	10,000	10,000
Retention Time, hours	1.0	1.0
Surface Area, sq. ft.	1,000	1,000
Flow Rate, cfs	1.0	1.0
Flow Velocity, ft./min.	1.0	1.0
Flow Velocity, ft./sec.	1.0	1.0
Flow Velocity, ft./hr.	1.0	1.0
Flow Velocity, ft./day	1.0	1.0
Flow Velocity, ft./month	1.0	1.0
Flow Velocity, ft./year	1.0	1.0
Flow Velocity, ft./decade	1.0	1.0
Flow Velocity, ft./century	1.0	1.0
Flow Velocity, ft./millennium	1.0	1.0

ADAPTATION TANKS	INITIAL DESIGN	FINAL DESIGN
Volume, cu. ft.	10,000	10,000
Retention Time, hours	1.0	1.0
Surface Area, sq. ft.	1,000	1,000
Flow Rate, cfs	1.0	1.0
Flow Velocity, ft./min.	1.0	1.0
Flow Velocity, ft./sec.	1.0	1.0
Flow Velocity, ft./hr.	1.0	1.0
Flow Velocity, ft./day	1.0	1.0
Flow Velocity, ft./month	1.0	1.0
Flow Velocity, ft./year	1.0	1.0
Flow Velocity, ft./decade	1.0	1.0
Flow Velocity, ft./century	1.0	1.0
Flow Velocity, ft./millennium	1.0	1.0

ADAPTATION TANKS	INITIAL DESIGN	FINAL DESIGN
Volume, cu. ft.	10,000	10,000
Retention Time, hours	1.0	1.0
Surface Area, sq. ft.	1,000	1,000
Flow Rate, cfs	1.0	1.0
Flow Velocity, ft./min.	1.0	1.0
Flow Velocity, ft./sec.	1.0	1.0
Flow Velocity, ft./hr.	1.0	1.0
Flow Velocity, ft./day	1.0	1.0
Flow Velocity, ft./month	1.0	1.0
Flow Velocity, ft./year	1.0	1.0
Flow Velocity, ft./decade	1.0	1.0
Flow Velocity, ft./century	1.0	1.0
Flow Velocity, ft./millennium	1.0	1.0



HYDRAULIC PROFILE
SCALE: 1" = 10' V, 1" = 100' H

WATER SURFACE ELEV. OF FUTURE
WATER SURFACE ELEV. OF (32.0 M.G.D.)
AVG. DRY WEATHER FLOW (2.0 M.G.D.)

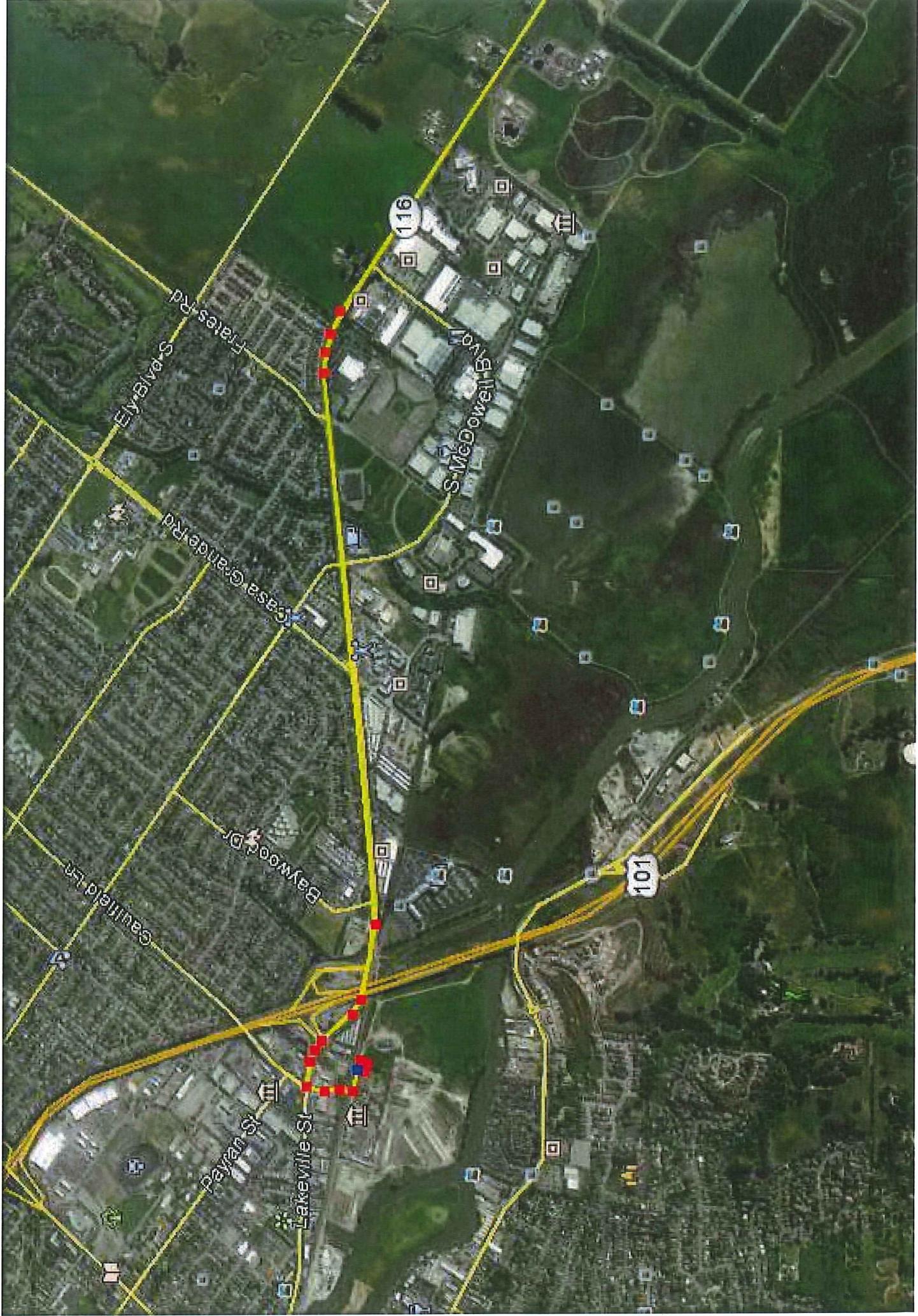
FLOW SHEET & DESIGN DATA

NO.	DESCRIPTION	DESIGN DATA
1	PLANT INFLUENT TANK	15 x 10 x 10 STD
2	PLANT AERATION TANK	15 x 15 x 10 STD
3	PLANT PRIMARY SEDIMENTATION TANK	15 x 15 x 10 STD
4	PLANT SECONDARY SEDIMENTATION TANK	15 x 15 x 10 STD
5	PLANT SLUDGE LAGOON #1	15 x 15 x 10 STD
6	PLANT SLUDGE LAGOON #2	15 x 15 x 10 STD
7	PLANT WET PIT	15 x 15 x 10 STD
8	PLANT SLUDGE STORAGE	15 x 15 x 10 STD
9	PLANT PUMP ROOM	15 x 15 x 10 STD
10	PLANT WASTE WATER TREATMENT PLANT	15 x 15 x 10 STD

GENERAL NOTES:
1. ALL ELEVATIONS ARE IN FEET ABOVE SEA LEVEL UNLESS OTHERWISE NOTED.
2. FLOW DIRECTIONS ARE INDICATED BY ARROWS.
3. TANK DIMENSIONS ARE IN FEET.
4. TANK VOLUMES ARE IN CU. FT.
5. TANK RETENTION TIMES ARE IN HOURS.
6. TANK SURFACE AREAS ARE IN SQ. FT.
7. TANK FLOWS ARE IN CFS.
8. TANK FLOW VELOCITIES ARE IN FT./MIN.
9. TANK FLOW VELOCITIES ARE IN FT./SEC.
10. TANK FLOW VELOCITIES ARE IN FT./HR.
11. TANK FLOW VELOCITIES ARE IN FT./DAY.
12. TANK FLOW VELOCITIES ARE IN FT./MONTH.
13. TANK FLOW VELOCITIES ARE IN FT./YEAR.
14. TANK FLOW VELOCITIES ARE IN FT./DECADE.
15. TANK FLOW VELOCITIES ARE IN FT./CENTURY.
16. TANK FLOW VELOCITIES ARE IN FT./MILLENNIUM.

TAB 6 – MOBILIZE PUMPER TRUCKS

- 6.1 Consult with team supervisor regarding the need for pumper trucks for containing the spill, dewatering excavation, PIPS manholes and force main when it is cut. Pumper trucks may be needed for additional bypass pumping.
- 6.2 Pumper trucks come in various sizes, the maximum size is 5,000 gallons and is difficult to maneuver in tight spaces. It takes time to fill a pumper truck so sufficient trucks should be ordered and sufficient suction points should be identified.
- 6.3 Direct pumper trucks to discharge into one of the aerated lagoons at the Ellis Creek Water Recycling Facility.
- 6.4 Pumper truck route to the aerated lagoon – See attached map. Round trip from PIPS to the aerated lagoon is about 8 miles.
- 6.5 Contact one or more of the pumper truck companies. (See Appendix A)



TAB 7 – INSTALLATION OF BYPASS PIPELINE

- 7.1 Installation of an aboveground pipeline to isolate a section of the PIPS force main to make a repair is a major undertaking and will take time. Three alternatives are described below.
- 7.2 Bypass Pipeline Alternatives – see attached maps

Alternative A – Bypass a specific section of the PIPS force main

Alternative B – Bypass the westerly half of the PIPS force main between the PIPS and Cader Lane or between PIPS and Manhole X09000

Alternative C – Bypass the easterly half of the PIPS force main between Cader Lane or Manhole X09000 and the Ellis Creek Water Recycling Facility

Alternative D – Bypass entire PIPS force main between the PIPS and the Ellis Creek Water Recycling Facility

Table 7-1: Bypass Alternatives Requirements				
BYPASS ALTERNATIVE	A	B	C	D
Repair Section	Individual Sections	West of Cader Lane	East of Cader Lane	Entire Force Main
# of Bag Stops	2	1	1	0
# of Portable Pumps @ 3,000 gpm ea	0 Use PIPS	2	0 Use PIPS	2
Bypass Pipe, Total Length in Feet				
12" Single	3,000	--	--	--
12" Double	6,000	11,200	12,000	21,000
18" Single	3,000	5,600	6,000	10,500

- 7.3 Decide on which bypass pipeline alternative to install. Proceed to appropriate Section.
- 7.4 Mobilize emergency contractor to install a bypass pipeline around repair area.
- 7.5 See Appendix A for list of emergency contractors, pump rental, pipe rental, bag stop installers.

- 7.A **Alternative A – Install bypass pipeline to isolate a specific section of PIPS force main**
- 7.A.1 Alternative A requires installation of two bag stops in access manholes, one upstream and one downstream of repair section and a bypass pipe between the next upstream and downstream manholes. PIPS provides the pumping and no portable pumps are necessary.
- 7.A.2 Check force main manholes to confirm that standpipes are available. If there are no standpipes it will be necessary to modify the manholes as shown on the attached sketch to allow installation of bag stops and bypass pipe.
- 7.A.3 Mobilize bag stop contractor – see list in Appendix A
- 7.A.4 Measure length of bypass pipe necessary and order a suitable length of 12” or 18” diameter portable pipe – see Appendix A for list for rental companies of pipe and road ramps
- 7.A.5 Layout and connect the bypass pipe between upstream and downstream manholes. Install signs, barricades, road ramps and stiles over walking paths as necessary.
- 7.A.6 Turn off PIPS and install bypass pipe on standpipes between manholes upstream and downstream of bag stop manholes
- 7.A.7 Turn off PIPS and Install bag stops through standpipes on the manholes on either side of repair section
- 7.A.8 Turn PIPS back on to pump through bypass pipe.
- 7.A.9 Make repair – See Tab 8
- 7.A.10 Once repair is made turn PIPS off and remove upstream bag stop in upstream manhole
- 7.A.11 Prior to backfilling repair turn PIPS back on and observe repair to make sure it is not leaking
- 7.A.12 If repair is not leaking turn off PIPS and remove other bag stop and remove bypass pipe
- 7.A.13 Restore normal pumping through PIPS – See Tab 9



INSTALL BAG STOPS IN
MANHOLE STANDPIPES

INSTALL DOUBLE
BYPASS PIPES

ALTERNATIVE A - BYPASS SPECIFIC
SECTION OF THE PIPS FORCE MAIN,
REQUIRES STANDPIPES IN FOUR
FORCE MAIN MANHOLES

- BAG STOPS: 2
- PUMPING: PIPS
- BYPASS PIPE: DOUBLE 10" OR 12",
6,000 LF LENGTH
- STANDPIPE MANHOLES: 4
- SET UP TIME: 3 TO 4 WEEKS

PIPS FORCE MAIN BYPASS ALTERNATIVE A TYPICAL INSTALLATION

7.B Alternative B – Bypass the westerly half of the PIPS force main between the PIPS and Cader Lane or between PIPS and Manhole X09000

- 7.B.1 Alternative B requires installation of a bag stop at the force main manhole at Cader Lane, positioning of portable pumps to pump from manholes on the gravity sewer east of Highway 101 through an above ground bypass pipeline to force main Manhole X 09000 – see attached maps for alternative routes for the temporary pipeline.
- 7.B.2 Check force main manholes to confirm that standpipes are available. If there are no standpipes it will be necessary to modify the manholes as shown on the attached sketch to allow installation of bag stops and bypass pipe.
- 7.B.3 Mobilize bag stop contractor – see list in Appendix A
- 7.B.4 Measure length of bypass pipe necessary. Use two parallel 12” diameter portable pipes or a single 18” diameter portable pipe. See Appendix A for list of rental companies for pipe and road ramps.
- 7.B.5 Layout the aboveground bypass pipe(s) on the selected route together – see attached map for Alternatives B-1, B-2 or B-3. Install signs, barricades, road ramps and stiles over walking paths as necessary.
- 7.B.6 Order two engine driven portable pumps each with a 3,000 gpm capacity. Position pumps at manhole A06000 on the gravity sewer. If the pumps are near residential units order extra quiet pumps. Connect pump discharges to the bypass pipe
- 7.B.7 Turn off PIPS and connect bypass pipe to the standpipe at either force main Manhole X09000.
- 7.B.8 Turn off PIPS and install bag stop at the force main manhole at Cader Lane or Manhole X09000. Monitor water level in upstream sewers. Add additional portable pumps as necessary to maintain water level below overflow point.
- 7.B.9 Make repair – see Tab 8
- 7.B.10 Prior to backfilling repair turn PIPS back on and observe repair to make sure it is not leaking
- 7.B.11 If repair is not leaking turn off PIPS and remove bag stop and disconnect bypass pipe from manhole standpipe
- 7.B.12 Restore normal pumping through PIPS – see Tab 9



INSTALL 2 PORTABLE PUMPS

INSTALL DOUBLE 12" BYPASS PIPES

INSTALL BAG STOP

ALTERNATIVE B-1 - BYPASS THE WESTERLY HALF OF THE PIPS FORCE MAIN BETWEEN THE PIPS AND CADER LANE OR BETWEEN THE PIPS AND MANHOLE X09000. ROUTE BYPASS PIPES THROUGH CORPORATE CIRCLE. PLACE PORTABLE PUMPS AT MANHOLE A 06000.

- BAG STOPS: 1
- PUMPING: 2 PORTABLE PUMPS
- BYPASS PIPE: DOUBLE 12", 10,000 LF LENGTH
- STANDPIPE MANHOLES: 2
- SET UP TIME: 3 TO 4 WEEKS

PIPS FORCE MAIN BYPASS ALTERNATIVE B-1



INSTALL 2
PORTABLE PUMPS

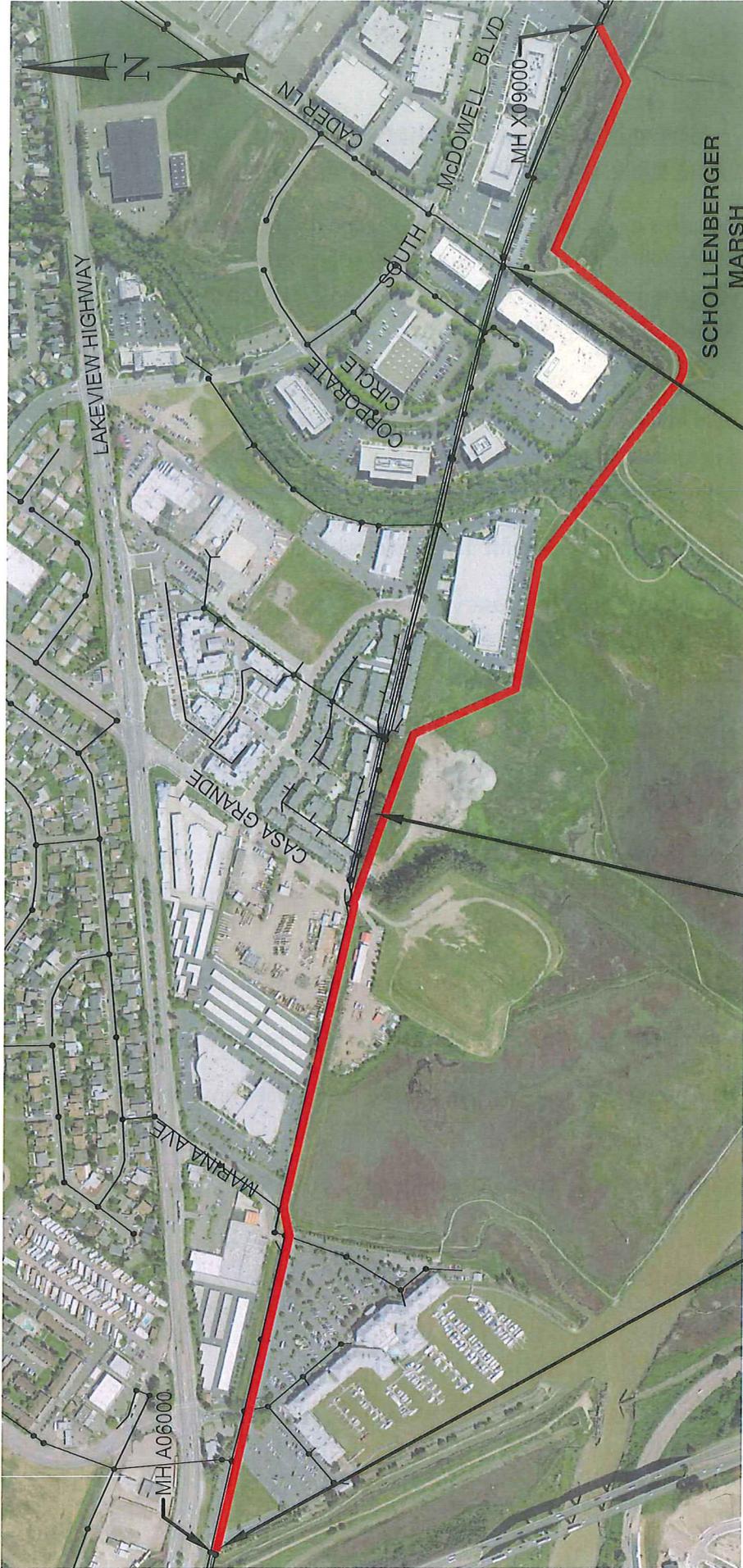
INSTALL DOUBLE 12"
BYPASS PIPES

INSTALL BAG STOP

ALTERNATIVE B-2 - BYPASS THE WESTERLY HALF OF THE PIPS FORCE MAIN BETWEEN THE PIPS AND CADER LANE OR BETWEEN THE PIPS AND MANHOLE X09000. ROUTE BYPASS PIPES ALONG ADOBE CREEK AND SCHOLLENBERGER MARSH. PLACE PORTABLE PUMPS AT MANHOLE A06000.

- BAG STOPS: 1
- PUMPING: 2 PORTABLE PUMPS
- BYPASS PIPE: DOUBLE 12", 11,600 LF LENGTH
- STANDPIPE MANHOLES: 2
- SET UP TIME: 3 TO 4 WEEKS

PIPS FORCE MAIN BYPASS ALTERNATIVE B-2



INSTALL 2
PORTABLE PUMPS

INSTALL DOUBLE 12"
BYPASS PIPES

INSTALL BAG STOP

ALTERNATIVE B-3 - BYPASS THE WESTERLY HALF OF THE PIPS FORCE MAIN BETWEEN THE PIPS AND CADER LANE OR BETWEEN THE PIPS AND MANHOLE X09000. ROUTE BYPASS PIPES THROUGH SCHOLLENBERGER MARSH. PLACE PORTABLE PUMPS AT MANHOLE A06000.

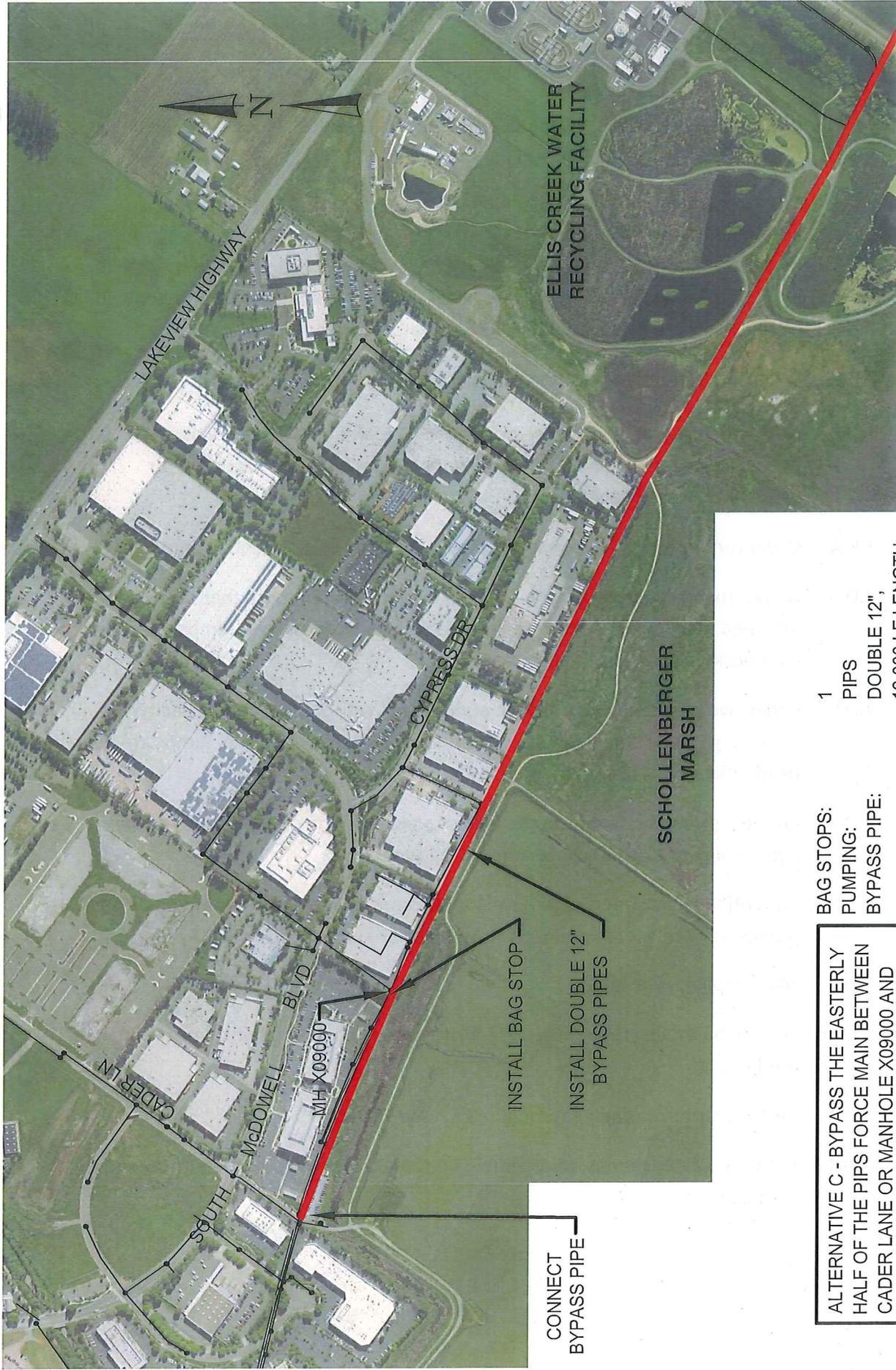
BAG STOPS:
PUMPING:
BYPASS PIPE:
STANDPIPE MANHOLES:
SET UP TIME:

- 1
- 2 PORTABLE PUMPS
- DOUBLE 12",
- 11,200 LF LENGTH
- 3 TO 4 WEEKS

PIPS FORCE MAIN BYPASS ALTERNATIVE B-3

7.C Alternative C – Bypass the easterly half of the PIPS force main between Cader Lane or Manhole X09000 and the Ellis Creek Water Recycling Facility

- 7.C.1 Alternative C requires installation of a bag stop at the force main manhole at Cader Lane or at Manhole X09000, and installation of an aboveground bypass pipeline from force main Manhole X 09000 or Manhole X10000 to the Ellis Creek Water Recycling Facility. PIPS will provide the bypass pumping – see attached map
- 7.C.2 Check force main manholes to confirm that standpipes are available. If there are no standpipes it will be necessary to modify the manhole as shown on the attached sketch to allow installation of bag stops and bypass pipe.
- 7.C.3 Mobilize bag stop contractor – see list in Appendix A
- 7.C.4 Measure length of bypass pipe necessary. Use two parallel 12” diameter portable pipes or a single 18” diameter portable pipe. See Appendix A for list of pipe rental companies
- 7.C.5 Layout and connect together the aboveground bypass pipe(s) on the selected route – see attached map for Alternative C. Install signs, barricades, road ramps and stiles over walking paths as necessary.
- 7.C.6 Turn off PIPS and connect bypass pipe to the standpipe at either force main Manhole X08000 at Cader Lane or Manhole X09000. Position discharge end of bypass pipe to discharge into aerated lagoon.
- 7.C.7 Turn off PIPS and install bag stop at the force main Manhole X09000 or X10000
- 7.C.8 Turn PIPS back on and pump through bypass pipe. Make repair – see Tab 8
- 7.C.9 Prior to backfilling repair remove bag stop and turn PIPS back on and observe repair to make sure it is not leaking
- 7.C.10 If repair is not leaking turn off PIPS disconnect bypass pipe form manhole standpipe
- 7.C.11 Restore normal pumping through PIPS – see Tab 9



PIPS FORCE MAIN BYPASS ALTERNATIVE C

- BAG STOPS: 1
- PUMPING: PIPS
- BYPASS PIPE: DOUBLE 12", 12,000 LF LENGTH
- STANDPIPE MANHOLES: 2
- SET UP TIME: 3 TO 4 WEEKS

ALTERNATIVE C - BYPASS THE EASTERLY HALF OF THE PIPS FORCE MAIN BETWEEN CADER LANE OR MANHOLE X09000 AND THE ELLIS CREEK WATER RECYCLING FACILITY.

7.D Alternative D – Bypass entire PIPS force main between the PIPS and the Ellis Creek Water Recycling Facility

- 7.D.1 Alternative D requires the positioning of portable pumps to pump from manholes on the gravity sewer east of Highway 101 through an above ground bypass pipeline all the way to the Ellis Creek Water Recycling Facility. Once the bypass pipe is installed it will allow repair anywhere along the PIPS force main from PIPS to the valve at the Ellis Creek Water Recycling Facility.
- 7.D.2 See attached map for location of bypass pipe
- 7.D.3 Measure length of bypass pipe necessary. Use two parallel 12" diameter portable pipes or a single 18" diameter portable pipe – see Table 7-1 for estimated pipeline lengths
- 7.D.4 Order rental bypass pipes – see Appendix A for list of pipe rental companies
- 7.D.5 Layout the aboveground bypass pipe(s) on the selected route together – see attached map for Alternative D. Install signs, barricades, road ramps and stiles over walking paths as necessary.
- 7.D.6 Order two engine driven portable pumps each with a 3,000 gpm capacity. Position pumps at manhole A06000 on the gravity sewer. If the pumps are near residential units order extra quiet pumps.
- 7.D.7 Connect pump discharges to the bypass pipe. Position discharge end of the bypass pipe to discharge into aerated lagoon.
- 7.D.8 Turn off PIPS. Monitor water level in upstream sewers. Add additional portable pumps as necessary to maintain water level below overflow point.
- 7.D.9 Make repair – see Tab 8
- 7.D.10 Prior to backfilling repair turn PIPS back on and observe repair to make sure it is not leaking
- 7.D.11 Restore normal pumping through PIPS – see Tab 9
- 7.D.12 Return portable pumps, disassemble portable bypass pipe and return to rental company



PIPS FORCE MAIN BYPASS ALTERNATIVE D

INSTALL 2
PORTABLE PUMPS

INSTALL DOUBLE 12"
BYPASS PIPES

- BAG STOPS: 0
- PUMPING: 2 PORTABLE PUMPS
- BYPASS PIPE: DOUBLE 12", 21,000 LF LENGTH
- STANDPIPE MANHOLES: 0
- SET UP TIME: 7 DAYS

ALTERNATIVE D - BYPASS THE ENTIRE PIPS FORCE MAIN BETWEEN THE PIPS AND THE ELLIS CREEK WATER RECYCLING FACILITY. PLACE PORTABLE PUMPS AT MANHOLE A06000.

7.E Temporary pump arrangement west of Baywood Drive at the Marina Business Center/Sheraton Hotel parking lot

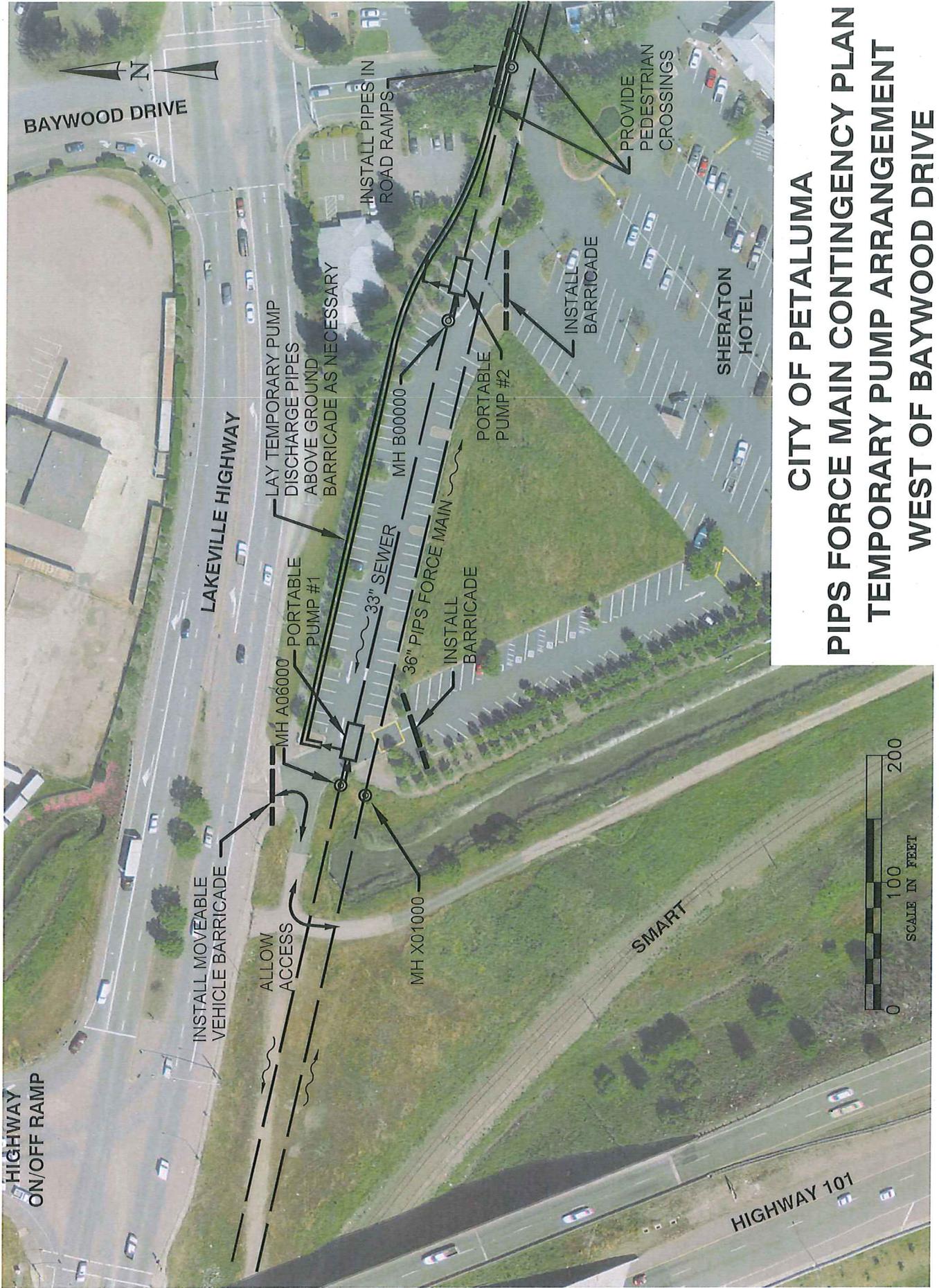
7.E.1 Notify businesses regarding the need to close off some parking and to set up temporary pumps and piping. Contacts include:

Marina Business Center – Administration - 707-778-1900

Harbor Master – 707-778-4489

Sheraton Hotel – 707-283-2888

7.E.2 Post signs notifying the public of parking lot closure - see NOTICE (Tab 3)



CITY OF PETALUMA
PIPS FORCE MAIN CONTINGENCY PLAN
TEMPORARY PUMP ARRANGEMENT
WEST OF BAYWOOD DRIVE

FIGURE 3-1



7.F Temporary Road Ramps – see attached

- 7.F.1 Provide barricades and install temporary road ramps and pedestrian crossings over the discharge pipes – see contact information in Appendix A.

Godwin Temporary Road Ramps

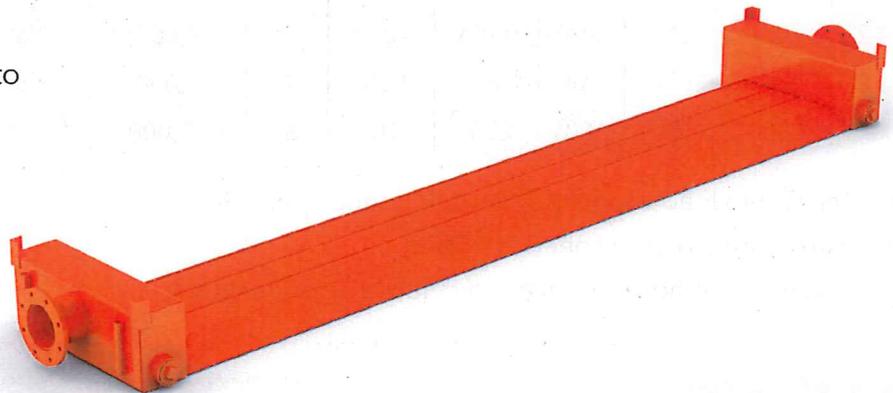
For use with 4-, 6-, 8-, 12-, 18- and 24-inch pipelines, Godwin road ramps provide a temporary crossing for low-traffic industrial, mining, commercial and residential areas where providing vehicular access over a pipeline is required.

Providing everything from pumps, valves and hoses to light towers, generators and road ramps, we can completely outfit your temporary and long-term project site needs.



Features

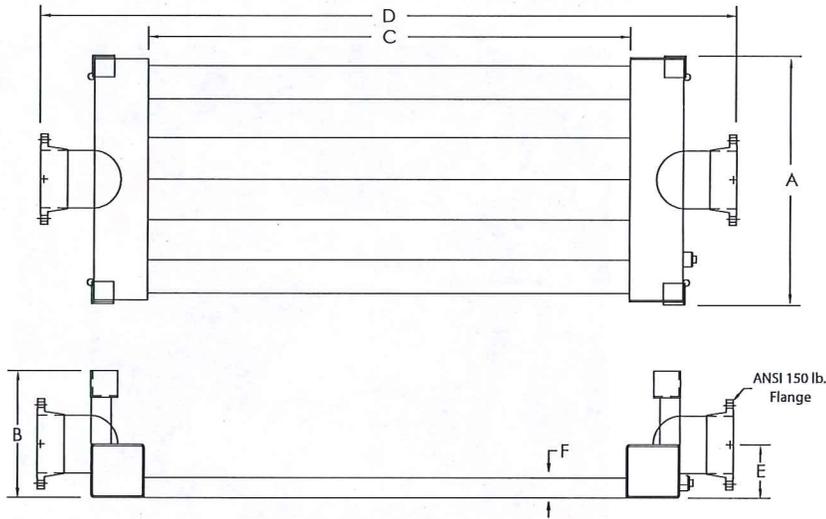
- Sturdy structural steel construction
- Passable vehicle width of 12 feet (15 feet for 24-inch model)
- Low profile for easy crossing
- Capable of passing solids and fitted with 150 lb. flanged inlet and outlet connections
- Drain valve provides capability to drain ramp after use
- Sturdy, stackable construction enables easy storage



Applications

Godwin road ramps are designed to provide easy crossing of a pipeline in low-traffic areas and can be used in a series to re-route traffic patterns.

Drawing



Specifications

Size	A	B	C	D	E	F	Max. Capacity (GPM)	Solids Passing	Approx. Weight (lbs.)	Est. Equiv. Length	Pressure Rating (psi)
4"	24 ³ / ₄ "	14 ¹ / ₂ "	144"	166"	6 ¹ / ₈ "	3"	500	2 ¹ / ₂ "	650	60'	100
6"	30 ³ / ₄ "	15 ¹ / ₂ "	144"	172"	6 ¹ / ₈ "	3"	1,000	2 ¹ / ₂ "	850	90'	75
8"	36 ¹ / ₂ "	19"	144"	176"	8"	3"	2,000	2 ¹ / ₂ "	1,900	120'	50
12"	61"	24"	144"	180 ¹ / ₂ "	10 ¹ / ₂ "	3"	4,000	2 ¹ / ₂ "	2,300	180'	50
18"	95"	30 ¹ / ₄ "	144"	188 ¹ / ₂ "	13 ⁵ / ₈ "	4"	7,000	3 ¹ / ₂ "	5,000	270'	25
24"	98"	36"	180"	233"	18"	6"	12,000	3 ¹ / ₂ "	7,000	360'	25

- Maximum load capacity of 21,600 pounds per axle
- Maximum crossing speed is 5 MPH
- Custom configurations are available upon request



Dewatering Solutions
84 Floodgate Road
Bridgeport, NJ 08014
Tel +1.856.467.3636
www.godwinpumps.com

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www.godwinpumps.com

TAB 8 – LEAK REPAIR PROCEDURES

- 8.1 The PIPS force main is nominal 36" diameter with cement lining and coating. The outside diameter of the concrete coating is approximately 39.5". If the coating is removed down to the steel the outside diameter of the steel cylinder should be 37.5".
- 8.2 The pipe depth varies from 5' to 12' deep. Consult the attached profile and the project plans. The project plans were prepared prior to development so the ground line may be incorrect.
- 8.3 Check City inventory and locate repair materials. See attached list of available repair materials.
- 8.4 **Full Circle Clamp Repair** – The full circle clamp must be sized to either fit the outside diameter of the force man or if the concrete pipe coating is removed the full circle clamp must fit the steel cylinder (see diameters in 8.1 above). Full circle clamps are manufactured specific to the OD of the pipe being repaired with very little play. A full circle clamp sized for the OD of the PIPS force main should be in stock (check City inventory).

If the proper sized full circle clamp is not available contact:

Romac Industries Inc.: (209) 601-1087

Smith Blair: (800) 643-9705, emergency: (903) 277-9398

- 8.5 **Carbon Fiber Wrap** – Carbon fiber wrap systems are available which may be easier to use than a full circle clamp. Companies which provide carbon fiber wrap systems are:

Team Industrial Services

Trans Wrap™ - Carbon Fiber Pipeline Repair System: (800) 328-0090

The pipe must be not leaking and the surface must be clean and dry. Follow the manufacturer's instructions.

- 8.6 **Weld Repair** – Where indicated it may be possible to repair the pipe by welding a joint or a patch. The steel cylinder is thin so the welding must be done by a very experienced welder.
- 8.7 **Repair completion**
 - 8.7.1 Check visually for any leakage with one of the PIPS pumps
 - 8.7.2 Fix any leaks: Tighten bolts on full circle clamp. Fix weld as necessary.
 - 8.7.3 Prior to backfilling put PIPS back into service – Tab 9

- 8.7.4 Before recoating repair install cathodic test station – see details
- 8.7.5 Full circle clamp - Wrap entire full circle clamp including all bolts and exposed 8.7.2 metal with two layers of 35 mil polyethylene tape
- 8.7.6 Weld repair - Repair coating over weld repair with concrete.
- 8.7.7 Backfill pipe, pull shoring, repave and restore ground surface
- 8.7.8 Remove barricades and cleanup all work sites

TAB 9 – RESTORE NORMAL PUMPING THRU PIPS FORCE MAIN

- 9.1 Confirm that repair is complete and watertight – See 8.7.1.
- 9.2 Start the smallest pump and check for any anomalies.
- 9.3 If no anomalies return PIPS to regular pump program.
- 9.4 Check air release valves along PIPS force main to make sure trapped air is vented from the high points.
- 9.5 Pump sewage stored in emergency storage basins back to the PIPS wet well.
- 9.6 Inspect emergency storage basins for residual solids that could cause odors. Clean out storage basins as necessary.

APPENDIX A

RESOURCES AND CONTACTS

City Personnel Emergency Contacts

Emergency Contractors

Pumper Trucks

Trash Pump Rental

Pipe Rental

Pipe Purchase

Bag Stop Insertion

Road Ramp

Appendix A – Resources And Contacts

CITY PERSONNEL EMERGENCY CONTACTS

City of Petaluma	publicworks@ci.petaluma.ca.us
Matt Pierce 202 N. McDowell Blvd Petaluma, CA 94954 Phone: (707) 776-3726 Fax: (707) 778-4508	Patrick Dirrane 202 N. McDowell Blvd Petaluma, CA 94954 Phone: (707) 778-4561 Fax: (707) 778-4508

EMERGENCY CONTRACTOR

Maggiara & Ghilotti	http://maggiara-ghilotti.com/
Mark Greving 555 Dubois Street San Rafael, CA 94901 Phone: (415) 459-8640 Fax: (415) 459-2065	
Michael Paul Co.	
1200 Casa Grande Road Petaluma, CA 94954 Phone: (707) 769-1006 Fax: (707) 769-0650	
Goebel Mechanical aka Global Paving, Grading and Underground	
Greg Goebel 227 Howard St. Petaluma, CA 94952 Phone: (707) 763-0888 Cell: (707) 974-1237	
Team Ghilotti	
2531 Petaluma Blvd South Petaluma, CA 94952 Phone: (707) 763-8700	

Appendix A – Resources And Contacts

PUMPER TRUCK

Roy's Sewer Service 577 Portal Street Cotati, CA 94931 Phone: (415) 892-5480	Team Ghilotti 2531 Petaluma Blvd South Petaluma, CA 94952 Phone: (707) 763-8700
Fremouw Environmental Services 6940 Tremont Road Dixon, CA 95620 Phone: (800) 559-3274 Marty Mosley Direct: N/A Mobile: (209) 602-6976 mmosley@hazwasteremoval.com Brittan Thomas Direct: N/A E.R. Mobile: (530) 723-8466 bthomas@hazwasteremoval.com	
Industrial Carting Curtis Michelini P.O. Box 2638 Rohnert Park, Ca 94927 Cell: (707) 396-0473 Home: (707) 528-2171	

TRASH PUMP RENTAL

Pac Machine Company http://www.pacmachine.com 5326 Gateway Plaza Drive Benicia, CA 94510 USA Phone: (707) 746-4940	
Rain for Rent (800) 742 7246 info@rainforrent.com 5301 Live Oak Avenue Oakley, CA 94561 Phone: (925) 679-2803 Fax: (925) 679-2839	390 West Kentucky Woodland, CA 95695 Phone: (530) 662-1024

Appendix A – Resources And Contacts

TRASH PUMP RENTAL (continued)

Hertz Equipment Rental <http://www.hertzequip.com>

Hertz Equipment Rental (Store 9741)

5500 Commerce Boulevard
Rohnert Park, CA 94928
Phone: (707) 586-4444
Fax: (707) 586-4417

Hertz Equipment Rental (Store 9745)

2400 San Pablo Dam Road
San Pablo, CA 94806
Phone: (510) 307-4444
Fax: (510) 232-2256

Hertz Equipment Rental (Store 9740)

5750 Paradise Drive
Corte Madera, CA 94925
Phone: (415) 924-4444
Fax: (415) 924-5946

Hertz Equipment Rental (Store 9748)

5251 Industrial Way
Benicia, CA 94510
Phone: (707) 747-4444
Fax: (707) 747-4460

PIPE RENTAL

Rain for Rent [\(800\) 742 7246](tel:8007427246) info@rainforrent.com

5301 Live Oak Avenue
Oakley, CA 94561
Phone: (925) 679-2803
Fax: (925) 679-2839

390 West Kentucky
Woodland, CA 95695
Phone: (530) 662-1024

Pac Machine Company <http://www.pacmachine.com>

5326 Gateway Plaza Drive
Benicia, CA 94510 USA
Phone: (707) 746-4940

PIPE PURCHASE

HDPE pipe can be purchased from P&F Distributors

P&F Distributors <http://www.pfdistributors.com/>

511 Tunnel Ave
Brisbane, CA 94005
Phone: (415) 467-4630
Fax: (415) 467-1010

Appendix A – Resources And Contacts

BAG STOP INSERTION

Team Industrial Services www.teamindustrialservices.com

4650 E. Second Street, Suite E
Benicia, CA 94510
Phone: (707) 751-5850

ROAD RAMP

Pac Machine Company <http://www.pacmachine.com>

5326 Gateway Plaza Drive
Benicia, CA 94510 USA
Phone: (707) 746-4940

Rain for Rent [\(800\) 742 7246](tel:8007427246) info@rainforrent.com

5301 Live Oak Avenue
Oakley, CA 94561
Phone: (925) 679-2803
Fax: (925) 679-2839

APPENDIX B

TECHNICAL MEMORANDUM

November 3, 2014

November 3, 2014

TECHNICAL MEMORANDUM (Updated 11/3/14)

**CITY OF PETALUMA
PIPS FORCE MAIN CONTINGENCY PLAN
BYPASS ALTERNATIVES**

Prepared by: Mark Wilson, David Stier and Ed Nute

As a part of the Contingency Plan for the plant influent pump station (PIPS) force main it will be necessary to identify one or more methods to bypass around the section of pipe which has developed a leak and needs to be repaired. It is assumed that in order to repair a leak the PIPS will need to be turned off and the force main will need to be shut down and dewatered.

If the leak is small and can be temporarily contained at the site it might be possible to make the necessary excavation and install shoring during the day and then schedule the actual repair at night during low flows when the PIPS can be turned off. Additional time can be provided by setting up pumps and storing flows in the existing structures at the Hopper plant and/or by utilizing pumper trucks.

However, if the repair is going to take more time and it becomes necessary to make a longer shut down of the force main a formal bypass arrangement will need to be installed. This could take time depending on the availability of the necessary pipe and equipment.

The purpose of this Technical Memorandum is to outline alternatives for setting up a pipeline bypass around the various sections of the force main. The bypass alternatives were analyzed for dry weather flows. During wet weather additional pumps and bypass pipes will be necessary.

BYPASS REQUIREMENTS

In order to accommodate the PIPS average dry weather flow the bypass pipe will need to be either an 18" diameter pipe or two parallel 12" diameter pipes. The present ADWF is around 4.5 mgd and will require a peak pumping capacity of around 4,400 gpm. A single 12" bypass pipe would produce a velocity of around 12 feet per second (fps), which is well above the recommended force main velocity. However, if two parallel 12" pipes are used the velocity for half the flow will be around 6 fps. Two parallel 10" pipes could only be used if the distances are short.

Where the pipe(s) must cross a travelled way a temporary road ramp will need to be rented to allow vehicle access. If the pipe crosses a walking path a wooden stile can be constructed. The bypass pipe would be aboveground so appropriate signs, barricades and possible security guards will be necessary.

During wet weather it will be necessary to install additional bypass pipes and additional portable pumps, which will require pipe manifolds and possibly multiple reentry points into the downstream PIPS force main.

ALTERNATIVE BYPASS METHODS

The following are possible alternatives bypass methods for the PIPS force main. A summary of the alternative bypass pipe routes is given in Table 1 and shown on the attached figures.

Alternative A – Install bypass around a single section of force main to be repaired. In this alternative the repair section will need to be isolated by installing temporary plugs such as bag stops in the manholes on either side of the leak together with a bypass pipe running between the two manholes upstream and downstream of the bag stops. The distance between manholes varies but near the south end of the PIPS force main the manholes are further apart and the distance could be over 3,000 feet. This bypass alternative will require installation of standpipes on the 20" diameter outlets in at least four force main manholes to allow installation of the bag stops and the bypass pipe connections on either side. Portable pumps are not necessary since the PIPS would pump through the bypass pipe.

Without knowing which section of force main will need to be repaired it will not be possible to know which manholes to reconstruct with the 20" standpipe. This means that in order to anticipate a repair anywhere along the force main virtually all 12 manholes will need to be reconstructed with a standpipe. It would be very difficult to extend the 20" standpipes during emergency conditions unless the leak is minor and can be contained during the standpipe installation. If the repair location is in the vicinity of Corporate Circle the route of the bypass pipe would take it through some busy parking areas which will be very disruptive to the public. In this section Alternative B-2 or B-3 would be a better choice.

Alternative B (Repair in westerly half of force main) – Pump from manholes on the existing gravity sewer paralleling the PIPS force main around a westerly repair section. For this bypass portable pumps will be placed with their suction pipes in manhole A06000 east of Highway 101 and the SMART tracks. In order to work the gravity sewer will need to flow backwards from the PIPS to the suctions of the portable pumps. A 12" pump can pump around 4,000 gpm to 5,000 gpm. At least two pumps will be necessary to provide reliability and redundancy.

The water level in the manhole will need to be kept low enough to prevent any sewage backups in the upstream sewer system. Elevations have been taken and have identified low manholes on East Court in the vicinity of Maselli's hardware.

A bag stop would need to be installed at Cader Lane and the bypass pipe would need to discharge into the one of the downstream manhole on the PIPS force main behind the buildings at 2100 and 2080 South McDowell Blvd. These manholes would need to be modified to allow installation of the bag stop and connection to the bypass pipe. This will allow a repair to be made in the westerly half of the force main.

From this location there are three possible routes for the bypass pipe which would divert the flow to Cader Lane. In Alternative B-1 the buildings and parking areas along Corporate Circle make it difficult to route a pipeline through this area. The least obstructed pipeline route will be around the west side of the buildings along the edge of the marsh and on private property up to the existing easements north of Casa Grande Road. Three bypass pipe routing alternatives are shown on the following attached figures.

Alternative B-1 – Bypass pipe through Corporate Circle – Distance = 6,500 feet

Alternative B-2 – Bypass pipe through Adobe Creek and Shollenberger Marsh – Distance = 7,300 feet

Alternative B-3 – Bypass pipe around all buildings and through the Schollenberger Marsh – distance = 7,100 feet

The number of temporary road crossing ramps will depend on the route selected.

Alternative C (Repair in the eastern half of the force main) – Bypass around east end of PIPS force main. If a repair must be made in the east end of the PIPS force main, i.e. in the section east of Cader Lane, a bypass pipe could be installed from Cader Lane to discharge to the nearest aeration pond at the Ellis Creek Water Recycling Facility. The same manholes at Cader Lane and behind 2100 and 2080 South McDowell could be used for this bypass arrangement. Portable pumps would not be necessary since the PIPS would be pumping through the bypass pipes.

The distance is 6,000 feet and the manhole at Cader Lane would need to be modified with a standpipe to allow connection of the bypass pipe. The standpipe could be designed with a side outlet crossing Cader Lane to avoid the need for a temporary road ramp.

If a leak occurs in the section of force main between Cader Lane and the first manhole to the east the temporary bypass pipe will need to connect to a standpipe in the next manhole to the east. This means that at least three manholes will need to be modified in this area.

Alternative D – Bypass entire PIPS force main using portable pumps – With a long enough bypass pipe the portable pumps described in Alternative B could be used to pump all the way to the nearest aeration pond at the Ellis Creek plant. The distance would be around 12,000 feet. This would allow the access to the entire length of the PIPS force main to make repairs.

Alternative E – Bypass entire PIPS force main using PIPS to pump the flow – As described below it will take a matter of one or two weeks to set up bag stops. In order to expedite installation of a bypass the bypass pipe could be connected directly to the discharge pipe at PIPS and the aboveground bypass pipe could be strung out as far as the nearest aeration pond at the Ellis Creek plant. This alternative will require that the bypass pipes cross the Caltrans right of way and be threaded through an empty casing under the SMART tracks, if it is in place. The total distance is around 13,300 feet, which if double 12” pipes are used totals 26,600 feet of pipe. In order to implement Alternative E emergency connections in PIPS or on the PIPS force main need to be available for the bypass pipe.

MEANS AND METHODS

Table 1 lists the length of bypass pipe, number of bypass pumps and other equipment and materials necessary for the alternative bypass arrangements described above. Also shown in Table 1 are the required pumping heads for the various bypass pipe sizes.

Table 2 provides estimates of the costs of advance construction on the force main to facilitate setting up the bypass. Also included in Table 2 are estimates of the cost of setting up the bypass assuming a one week rental of the equipment and materials and the time involved. The various elements necessary for installing a bypass are discussed below.

Bypassing PIPS by Pumping from the Parallel Gravity Sewer - Alternatives B and D involve using portable pumps to pump from one or more manholes along the gravity sewer which runs parallel to the PIPS force main east of Highway 101 and the SMART tracks. The best manhole for the portable pump suction is manhole A06000 located next to the ditch just east of the Highway 101 right of way. This manhole is very deep and will need to surcharge so the pump suction can cause the gravity sewer to flow backwards from the PIPS. The manhole at Baywood Drive and those further to the east are not as deep and the necessary surcharge level might cause sewage to overflow somewhere in the system.

The pumps will need to keep water level in the gravity sewers low enough to prevent sewage overflows or backups in the upstream sewer system. Elevations have been taken and have identified low manhole rims on East Court in the vicinity of Maselli's hardware. There may be other low manholes in the system which will need to be monitored while the temporary pumping is taking place. Reliance on portable pumps on the gravity sewer is not as safe as using PIPS for the bypass pumping as described in Alternative E.

Rental of Portable Pumps – Portable pumps which are rented for the force main bypass should be engine driven, self-priming and have a capacity of at least 4,000 gpm. Two pumps should be rented in order to provide the necessary reliability and redundancy. The necessary suction and discharge hosing and connections will also need to be rented. If the pumps must be positioned near residential development the quiet models should be provided.

Prior to renting the pumps the discharge head pressure will need to be checked. If small bypass pipes are used the pumps will need a high discharge head. Use of double 10" bypass pipes creates very high pumping heads as shown in Table 1.

Stopping the Flow – Unless the entire force main is bypassed as described in Alternatives D and E it will be necessary to stop the flow somewhere along the force main while the repair is being made. Stopping the flow somewhere in the middle of the force main will reduce the length of bypass pipe needed. The PIPS force main does not have any in-line valves to allow isolation of individual sections. The only way to stop the flow will be to insert a bag stop, line stop or cut in a permanent valve as described below.

- **Bag Stops** – Team Industries Inc. of Benicia can provide bag stops for 36" diameter pipes, which can be inserted through a 20" standpipe. It will take 3 – 4 days (routine) to secure the necessary

installation equipment or 24 to 48 hours (expedited) and one long day to install the bag stop and one day to remove it. This assumes that the bag is already acquired and ready to go. Otherwise it will take 2-3 weeks (routine) is to fabricate the bag or 7-10 days on an expedited basis, There will be additional charges to expedite the installation and/or fabrication of the bag on a priority basis.

The cost of a bag stop installation including the cost of the bag stop is around \$35,000. The bag stop is generally a one use installation because it can be damaged during extraction. If the City were to pre-purchase one or more bag stops there would be no fabrication time and the emergency installation time to stop the flow would be greatly reduced. The cost of a bag stop if it were pre-purchased by the City is \$18,200.

- **Line Stops** – A line stop is a mechanical device that is inserted through a flange on the pipeline that will stop the flow. A minimum flange diameter of 24" is necessary for installation of a 36" diameter line stop. According to Team Industries there is limited availability of 36" line stops and one might not be readily available if needed in an emergency.

In order to install a line stop an 8' x 8' pit will need to be dug and shored and a 24" hot tap will need to be made into the force main. The installation cost of the hot tap and line stop for a 36" pipeline is around \$60,000 plus the cost of excavation and shoring. Once the line stop is removed the shoring will need to be removed and the ground surface restored. The total cost of a single line stop installation could be over \$100,000.

- **Permanent Valve and Standpipe Assembly** – Installation of a permanent valve and standpipe assembly somewhere in the middle of the force main would eliminate the need for insertion of a bag stop or line stop and would provide rapid isolation of a section of the pipe. If one valve assembly is inserted it should be located near Cader Lane, which would divide the force main into two long segments. Two valve assemblies to divide the force main into three segments would be better and allow use of shorter lengths of bypass pipe. The second valve assembly could be inserted somewhere between Marina Ave and Casa Grande Road.

At the present time the only way to insert a valve in the force main is to excavate and shore a pit and then cut out a section of pipe and replace it with a section with a valve. On a 36" diameter line this represents a substantial construction project which could require more than a 12 hour shut down of the flow assuming all goes well. The estimated cost of each permanent valve installation is over \$120,000 without a concrete vault. If a vault is necessary the costs would be considerable higher. It is recommended that the valve assembly include 24" tees on each side to act as standpipes for connection of the bypass pipe. Otherwise two standpipe manholes would need to be constructed on either side of the valve to allow connections of the bypass pipes.

Rental of Bypass Pipe – Portable pipe is used in agriculture and for emergency situations and can be rented from several companies. The most common sizes are 10" and 12" diameter. The lengths of 10" and 12" diameter pipe sections will vary from 10' to 40'. Individual sections can be connected using Bauer quick couplers or Victaulic couplings. Plastic Yelomine pipe might also be available. Where large quantities of pipe are needed the rental company will need to source pipe from their subsidiary companies.

Alternative A will require the bypass pipe to cover a distance of up to 3,000 feet. Alternative E requires a bypass pipe to cover a distance of 13,200 feet. Two parallel 12" pipes will be necessary for the dry weather flow. As discussed below 10" and 12" irrigation type pipe is readily available and easy to install.

- 10" pipe is available in 40' long lengths with Victaulic couplings. 12" pipe comes in 10' long lengths and is connected with a Bauer type couplings. The short lengths of these pipe sections are light and can be connected together relatively quickly, depending on the amount of labor applied to the job. The irrigation industry uses a lot of both 10" and 12" pipe so it should be readily available.
- 18" pipe is available as HDPE pipe which comes in 50' lengths, each of which will weigh over 1,200 pounds. Connection of pipe sections together requires equipment to move and drag the pipe and one or more fusing machines. It takes about 40 minutes to fuse together two joints on an 18" diameter HDPE pipe. Thus it will take 67 hours to fuse together a 5,000 foot long length of HDPE pipe, which is more than eight - 8 hour days. Rental of several fusing machines would speed up the fusing process.
- A thin wall roll out pipe is used in the irrigation industry. This pipe is light weight and available in 12" and 18" diameter and comes in 670' or 1320' long lengths. The wall thicknesses can be up to 15 mils. However, the pipe is only good for about 6' of pressure, which will make it unsuitable for this application. Furthermore, use of this very thin wall pipe may be suitable for plowed fields but could be very risky in an urban environment. The ground must be smooth without projecting rocks so the pipe does not tear. The pipe could also be subject to vandalism. A type of tape is available to make repairs.

Table 1 provides the lengths and pumping head for 10", 12" and 18" pipe used in the various alternatives. Double 10" pipes require the highest pumping heads and beyond a distance of 3,000 feet it is probably unsuitable.

Rental of Road Ramps – Road ramps can be rented which will allow traffic to cross without a large hump to drive over. Road ramps are 12' wide and are painted orange to warn the traffic. Some road ramps are not suitable for sewage as they tend to plug up. It might be better to simply bury the bypass pipe under roads and restore the road when the pipe is removed.

Construction of Manhole Standpipes – The existing force main manholes are 5' in diameter with an upper cone section. The 20" diameter flanged connections to the force main are near the bottom of their manholes. There are two functions of the manholes on the force main; one type is on high points and has an air release valve (ARV) and the other type is on the low points and has a 4" diameter valve for a drain. As originally designed the ARV was connected directly to the top of the blind flange.

However in a 1999 project the ARV connections were modified by installing a welded steel insert inside the 20" standpipe terminating with a rolled section of steel conforming to the curvature of the top of the pipeline. It is assumed that the purpose of this modification was to facilitate the cleaning of the 2" pipe connection. The standpipe being 20" diameter probably accumulated grease that made it difficult to clean and maintain the ARVs. This insert may be difficult to remove.

If the blind flange is opened and the insert is removed sewage will exit the force main requiring that it be pumped back into a manhole on a nearby gravity sewer. In order to facilitate insertion of a bag stop the manhole cone will need to be replaced with a 5' diameter barrel section with a larger casting and lid.

The ARV manholes are located at high points and there should not be any need to extend the standpipe any higher since the water level in the force main can be lowered when the PIPS is turned off. The ARV with its insert can be left in place and the larger manhole barrel will facilitate the opening of the blind flange.

The manholes at the drains are deeper and apparently do not have inserts. In these manholes the standpipe should be extended higher in the rebuilt manhole so they are easier to access without dealing with much sewage when they are removed.

In order to prepare for an emergency it is recommended that the cones on the manholes where a bag stop or bypass pipe connections are required be replaced with a 5' diameter barrel section and large diameter casting on top to facilitate access. For the drain manholes the barrel section should be replaced and the 20" diameter standpipe should be extended to reduce the amount of sewage that escapes when the blind flange is opened.

If it is necessary to use these standpipes during an emergency it will take additional time to install the bypass pipe. It is estimated that to replace the manhole cone and cover, install a 20" diameter standpipe and deal with the sewage from the force main will cost about \$20,000 each.

SUMMARY OF ALTERNATIVES

If a leak develops in the PIPS force main it will be necessary to shut off the flow while the repair is made. A bypass will need to be installed if the repair cannot be completed overnight when the PIPS can be turned off and excess flows can be stored in the old Hopper St. plant structures or removed by tanker truck. The selection of the appropriate and most economical bypass alternative will depend on the type and urgency of the leak.

If the leak can be contained long enough to fabricate the necessary bag stops then Alternatives A, B or C can be used. However, if the leak is urgent Alternatives D or E will need to be used with 12" pipe which

can be strung out and connected vary rapidly. If one or two permanent valve and standpipe assemblies are inserted into the force main the time required to construct the bypass will be greatly reduced and modification of the existing standpipe manholes will not be necessary.

The following is a summary of the bypass alternatives.

- Individual sections of the force main could be isolated using two bag stops and a bypass pipe as described in Alternative A. Four manholes will need to be modified with flanged standpipes and an up to 3,000 feet long double bypass pipe will be necessary.
- It is possible to bypass longer sections of the PIPS force main using portable pumps as described in Alternatives B and D or using the PIPS itself in Alternatives A, C and E. In Alternatives B-1, B-2 and B-3 a total of three manholes in the vicinity of Cader Lane will need to be modified with a standpipe to allow insertion of a bag stop and connection of the bypass pipe. The distance for the bypass pipe will range from 6,500 feet to 7,300 feet depending on the route of the aboveground bypass pipe. The main difficulty in routing the bypass pipe is in the vicinity of Corporate Circle where there are numerous buildings and parking lots. Because of this it is recommended that the bypass pipe follow the route of Alternatives B-2 or B-3 and be routed around the back of the buildings adjacent to the marsh.
- Alternative C involves bypassing the easterly half of the PIPS force main by installing a bag stop in a manhole to the east of Cader Lane and uses the PIPS to pump through an above ground bypass pipe to a discharge into one of the aerated lagoons at the Ellis Creek Water Recycling Facility.
- In Alternatives D and E the entire PIPS force main can be bypassed using portable pumps and without the use of any bag stops. However the distance will be around 12,000 and 13,200 feet of double 12" pipes requiring a total of 24,000 and 26,400 feet of bypass pipe respectively.
- Considering the long lead time to secure and install the bag stops required in the above alternatives it may be more expedient to string out bypass pipe all the way from the PIPS to the Ellis Creek plant as described in Alternative E. Using double 12" irrigation pipe will be a lot faster than fusing 18" HDPE pipe. However, this alternative will require crossing Caltrans right of way and installing the bypass pipe through an empty casing under the SMART tracks, assuming it exists.
- Installation of permanent valve and standpipe assemblies would greatly facilitate the installation of the necessary bypass piping for a force main repair.

ESTIMATED COSTS AND BYPASS INSTALLATION TIMES

Table 2 provides estimates of the costs to install the alternative bypasses and also provides an estimate of the installation times. Also given in Table 2 are estimated costs of advance preparations which will reduce costs and shorten the bypass setup time when an emergency occurs. These cost and time

estimates are very preliminary and will depend on the exact situation, the City's advance preparation and the availability of the emergency equipment and materials. The following observations are made:

- Setting up bypasses using bag stops can take up to 4 weeks unless the procedure is expedited at additional cost, in which case the time can be shortened to about 2 weeks.
- Pre-purchase of one or two bag stops will shorten the time for their installation.
- Alternatives D and E which do not involve bag stops but require long lengths of bypass pipe can be implemented in less time depending on the amount of labor applied to the job of connecting the pipe sections. If a casing under the SMART tracks does not exist Alternative E would not be viable.
- Installation of one or two valve and standpipe assemblies in the force main will shorten the length and time for setting up the bypass pipes. Valves would also eliminate the need for modification of the existing force main manholes to provide a standpipe and eliminate the need for inserting a bag stop to shut off the flow.
- Use of portable pumps which pump from the gravity sewer in Alternatives B and D are not as reliable as using PIPS in Alternative E. When portable pumps are used the sewage level in upstream sewers will need to be carefully monitored.

RECOMMENDATION

The selection of the best bypass alternative to implement under emergency conditions will depend on the City's investment in advance preparations. In order to facilitate installation of a bypass to make a repair it is recommended that the City install one or more valve and standpipe assemblies in the force main. With valves in the line the bypass pipe can be very quickly setup along the routes described in Alternatives B or C.

TABLE 1
CITY OF PETALUMA

PIPS FORCE MAIN CONTINGENCY PLAN
ALTERNATIVE BYPASS PIPE INSTALLATIONS FOR ADWF = 4.5 MGD with peak flow = 4,400 gpm

ALTERNATIVE	A	B-1	B-2	B-3	C	D	E
Repair section	Individual segments between standpipe manholes	Force main west of Cader Lane	Force main west of Cader Lane	Force main west of Cader Lane	Force main east of Cader Lane	Entire force main	Entire force main
Description	Install bypass around pipe section being repaired	Install bypass pipe through Corporate Circle to Cader Lane	Install bypass pipe along Adobe Creek to Schollenberger marsh to Cader Lane	Install bypass pipe around south side of buildings to Schollenberger marsh to Cader Lane	Install bypass pipe from Cader Lane along north side of Schollenberger marsh to Ellis Creek WRF	Install bypass pipe around south side of buildings to Schollenberger marsh to Ellis Creek WRF	Install bypass pipe from PIPS through casing under SMART to Ellis Creek WRF
Bag stops	2	1	1	1	1	0	0
Bypass pipe Distance, feet	up to 3,000'	5,000'	5,800'	5,600'	6,000'	10,500'	13,200'
10" light steel or aluminum Head loss @2,200 gpm Pipe length required, feet	Double 10" 92'	Double 10" 154'	Double 10" 178'	Double 10" 172'	Double 10" 184'	Double 10" 323'	Double 10" 406'
12" Light steel or aluminum Head loss @ 2,200 gpm Pipe length required, feet	up to 6,000'	10,000'	11,600'	11,200'	12,000'	21,000'	26,400'
18" HDPE pipe Head loss @2,200 gpm Pipe length required, feet	Double 12" 38'	Double 12" 63'	Double 12" 73'	Double 12" 60'	Double 12" 76'	Double 12" 133'	Double 12" 167'***
Road ramps *	Varies - est. 4	8	4	2	2	2	4
Bypass pumps Number	PIPS	Portable 2	Portable 2	Portable 2	PIPS	Portable 2	PIPS
Minimum capacity each, gpm @ TDH	4,200	4,200	4,200	4,200	4,200	4,200	4,200
Force Main Manhole Modification Standpipe required, number	12	3	3	3	3	0	0

TABLE 2
CITY OF PETALUMA

PIPS FORCE MAIN CONTINGENCY PLAN
ALTERNATIVE BYPASS PIPE INSTALLATIONS FOR ADWF
ESTIMATED COSTS AND BYPASS INSTALLATION TIMES

ALTERNATIVE	A	B-1	B-2	B-3	C	D	E
Repair section	Individual segments between standpipe manholes	Force main west of Cader Lane	Force main west of Cader Lane	Force main west of Cader Lane	Force main east of Cader Lane	Entire force main	Entire force main
Description	Install bypass around pipe section being repaired	Install bypass pipe through Corporate Circle to Cader Lane	Install bypass pipe along Adobe Creek to Schollenberger marsh to Cader Lane	Install bypass pipe around south side of Schollenberger marsh to Cader Lane	Install bypass pipe from Cader Lane along north side of Schollenberger marsh to Ellis Creek WRF	Install bypass pipe around south side of buildings to Schollenberger marsh to Ellis Creek WRF	Install bypass pipe from PIPS through casing under SMART to Creek WRF
ESTIMATED OPTIONAL ADVANCE COSTS	\$240,000 2 @ \$18,200	\$60,000 1 @ \$18,200	\$60,000 1 @ \$18,200	\$60,000 1 @ \$18,200	\$60,000 1 @ \$18,200		\$50,000
Standpipes @ \$20,000 ea							
Prepurchase of bag stops							
Bypass pipe connections at PIPS							
Optional valve installation in force main							
ESTIMATED BYPASS COSTS PER WEEK	\$70,000	\$35,000	\$35,000	\$35,000	\$35,000	\$5,000	***
Bag Stop including installation @ \$35,000 ea.							
Portable pumps 2 @ \$2,500/wk	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$600	
Pump hoses and fittings	\$9,000	\$600	\$600	\$600	\$600	\$600	
10" bypass pipe rental (week) @ \$1,500/LF		\$45,000	\$52,200	\$50,400	\$54,000	\$94,500	\$118,800
12" bypass pipe rental (week) @ \$4,500/LF	\$1,600	\$5,300	\$6,200	\$6,000	\$6,400	\$11,200	\$14,100
Bypass pipe installation - 2 man crew @ \$80/hr **	\$1,400	\$2,800	\$1,400	\$1,400	\$700	\$700	\$1,400
Road ramps @ \$350/wk *	\$10,000	\$15,000	\$15,000	\$15,000	\$16,000	\$20,000	\$20,000
Freight (est.)	\$92,000	\$108,700	\$115,400	\$112,700	\$112,100	\$132,000	\$154,300
TOTAL ESTIMATED WEEKLY RENTAL COST							
ESTIMATED BYPASS INSTALLATION TIME - ROUTINE	2-3 weeks for bag stop fabrication, one week to install. Install bypass pipe concurrently. Total 3 to 4 weeks.	2-3 weeks for bag stop fabrication, one week to install. Install bypass pipe concurrently. Total 3 to 4 weeks.	2-3 weeks for bag stop fabrication, one week to install. Install bypass pipe concurrently. Total 3 to 4 weeks.	2-3 weeks for bag stop fabrication, one week to install. Install bypass pipe concurrently. Total 3 to 4 weeks.	2-3 weeks for bag stop fabrication, one week to install. Install bypass pipe concurrently. Total 3 to 4 weeks.	2 days for bypass pipe delivery and up to one week for connection depending on number of crews. Total 7 days.	2 days for bypass pipe delivery and up to one week for connection depending on number of crews. Total 7 days.
ESTIMATED BYPASS INSTALLATION TIME - EXPEDITED	Bag stop fabrication and installation can be expedited to 2 weeks at an extra cost of \$5,000+.	Bag stop fabrication and installation can be expedited to 2 weeks at an extra cost of \$5,000+.	Bag stop fabrication and installation can be expedited to 2 weeks at an extra cost of \$5,000+.	Bag stop fabrication and installation can be expedited to 2 weeks at an extra cost of \$5,000+.	Bag stop fabrication and installation can be expedited to 2 weeks at an extra cost of \$5,000+.	Expedite delivery add extra crews for bypass pipe installation. Total 4 - 5 days.	Expedite delivery add extra crews for bypass pipe installation. Total 5 - 6 days.
ESTIMATED BYPASS INSTALLATION TIME WITH VALVE	2-3 days for bypass pipe installation	2-3 days for bypass pipe installation	2-3 days for bypass pipe installation				

Notes:

- * Pipes can also be buried at road crossings
- ** 10" pipe can come in 40' lengths with Victaulic couplings. A good 2 man crew can connect two 40' long sections in 7-8 minutes (say 8 minutes) = 0.2 minutes per foot.
- ** 12" pipe can come in 10' lengths with Bauer type couplings. A good crew can connect two 10' long pipe sections in 3-4 minutes (say 4 minutes) = 0.4 minutes per foot.
- *** Check available pumping head and capacity of pumps in the PIPS.

APPENDIX C

ROUTE MAPS AND PIPS FORCE MAIN PROFILE

PIPS Force Main Contingency Plan



The City of Petaluma
Sonoma County, California



Notes :

1. For FM leak between XO2000 and XO 3000 place bag stops at each structure
2. Bypass Pumping to be stationed at XO2000. Place 200 feet of 6" hose to gravity sewer mh D0000 at Marina Ave.
3. Contractor to set up bypass pumping at.....

Legend

- MH Gravity
- ⊙ MH Force Main
- Force Main
- Gravity
- Other
- StormLinePublic



Civil & Sanitary Consultants
907 Mission Ave / San Rafael, CA 94901
P 415-453-4480 / F 415-453-0343

PIPS TO HWY 101

Project # 8352

PAGE 1 OF 5

Date: 8/13/2014

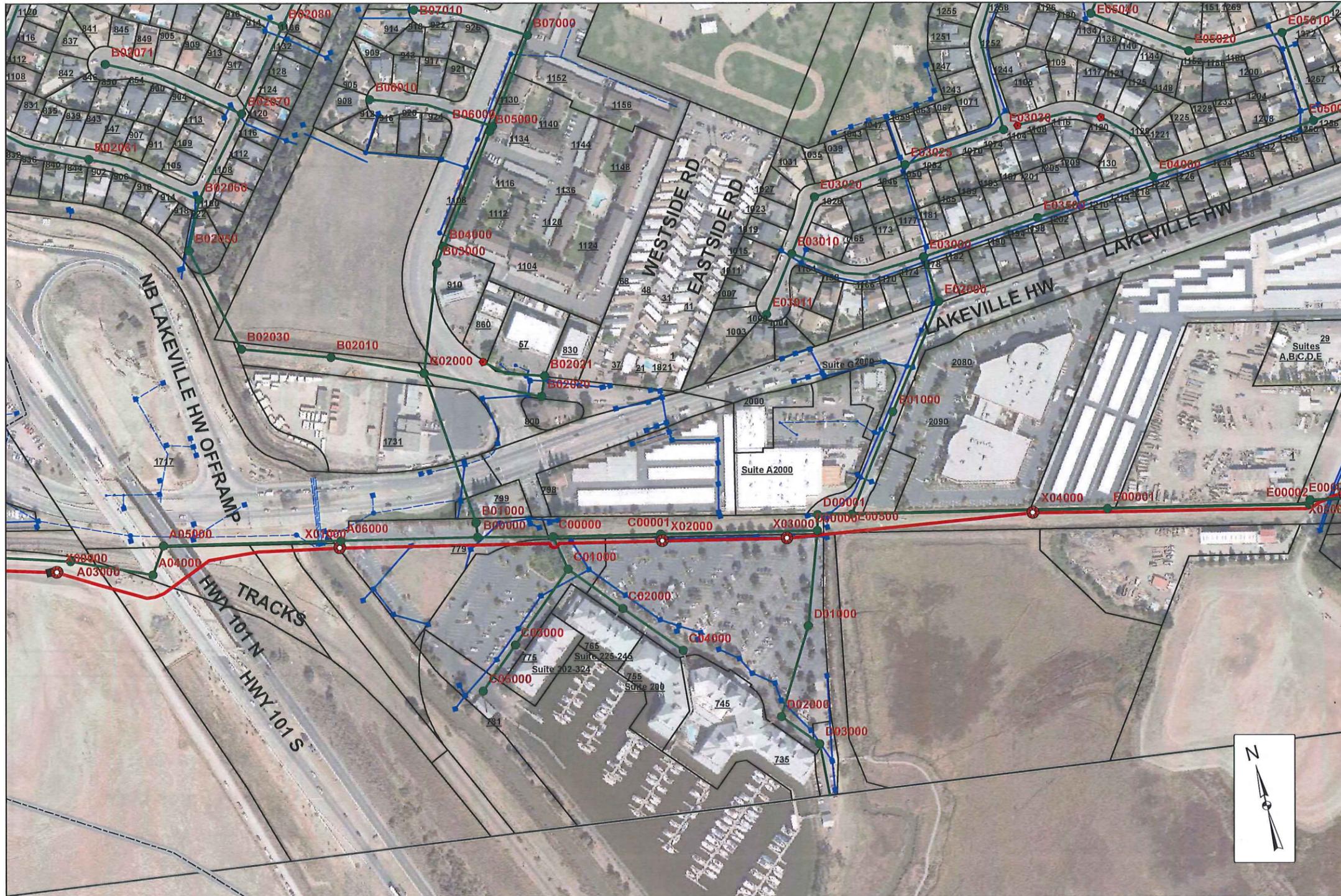


SCALE: 1 inch = 300 feet

PIPS Force Main Contingency Plan



The City of Petaluma
Sonoma County, California



Notes :

1. For FM leak between XO2000 and XO 3000 place bag stops at each structure
2. Bypass Pumping to be stationed at XO2000. Place 200 feet of 6" hose to gravity sewer mh D0000 at Marina Ave.
3. Contractor to set up bypass pumping at.....

Legend

- MH Gravity
- ⊙ MH Force Main
- Force Main
- Gravity
- Other
- StormLinePublic



Civil & Sanitary Consultants
907 Mission Ave / San Rafael, CA 94901
P 415-453-4480 / F 415-453-0343

HWY 101 to Casa Grande Rd

Project # 8352

PAGE 2 OF 5

Date: 8/13/2014

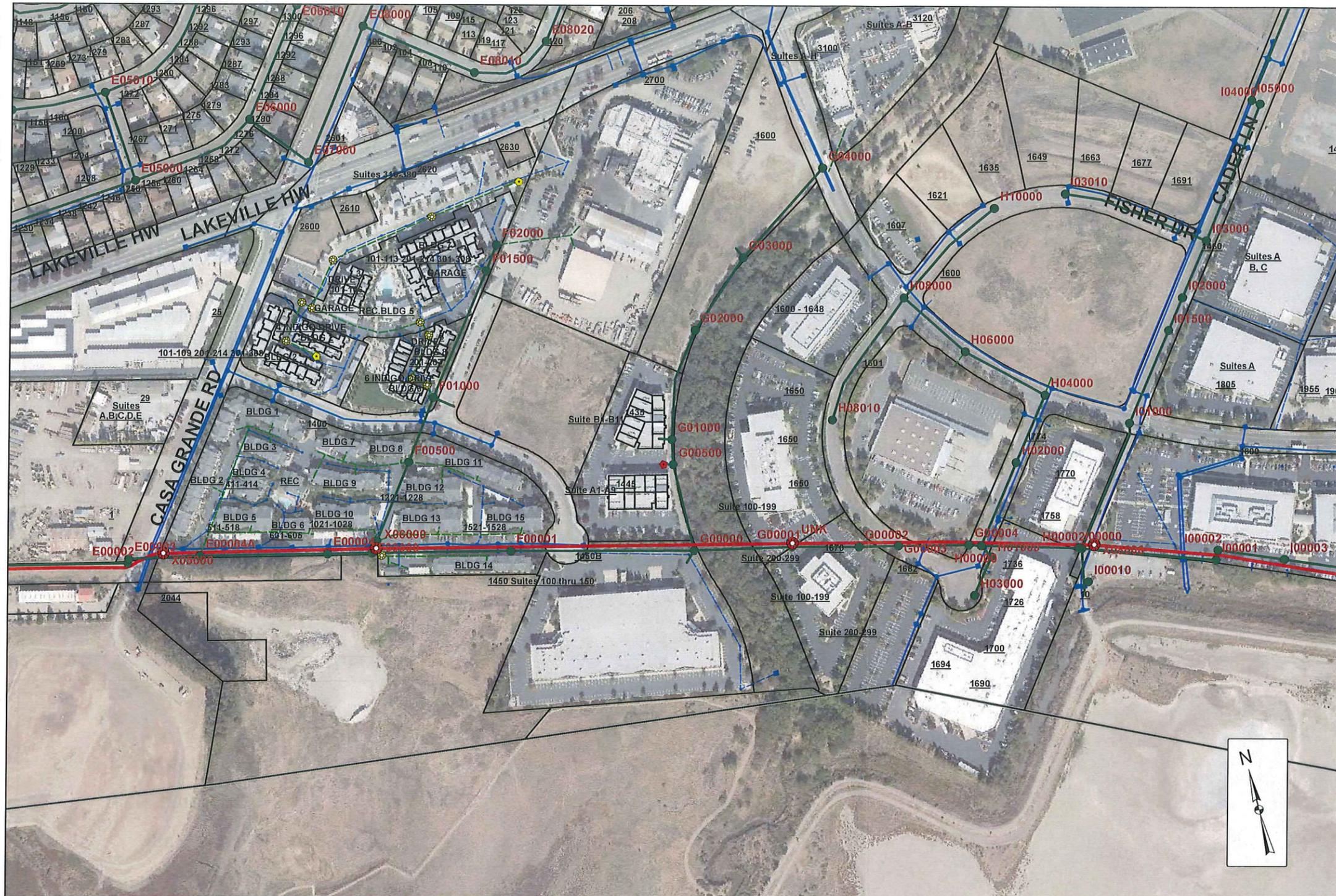


SCALE: 1 inch = 300 feet

PIPS Force Main Contingency Plan



The City of Petaluma
Sonoma County, California



Notes :

1. For FM leak between XO2000 and XO 3000 place bag stops at each structure
2. Bypass Pumping to be stationed at XO2000. Place 200 feet of 6" hose to gravity sewer mh D0000 at Marina Ave.
3. Contractor to set up bypass pumping at.....

Legend

- MH Gravity
- MH Force Main
- Force Main
- Gravity
- Other
- StormLinePublic



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907 Mission Ave / San Rafael, CA 94901
P 415-453-4480 / F 415-453-0343

Casa Grande Rd to Cader Ln

Project # 8352

PAGE 3 OF 5

Date: 8/13/2014



SCALE: 1 inch = 300 feet

PIPS Force Main Contingency Plan



The City of Petaluma
Sonoma County, California



Notes :

1. For FM leak between XO2000 and XO 3000 place bag stops at each structure
2. Bypass Pumping to be stationed at XO2000. Place 200 feet of 6" hose to gravity sewer mh D0000 at Marina Ave.
3. Contractor to set up bypass pumping at.....

Legend

- MH Gravity
- ⊕ MH Force Main
- Force Main
- Gravity
- Other
- StormLinePublic



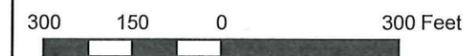
Civil & Sanitary Consultants
907 Mission Ave / San Rafael, CA 94901
P 415-453-4480 / F 415-453-0343

Schollenberger Park Rd to Treatment Plant

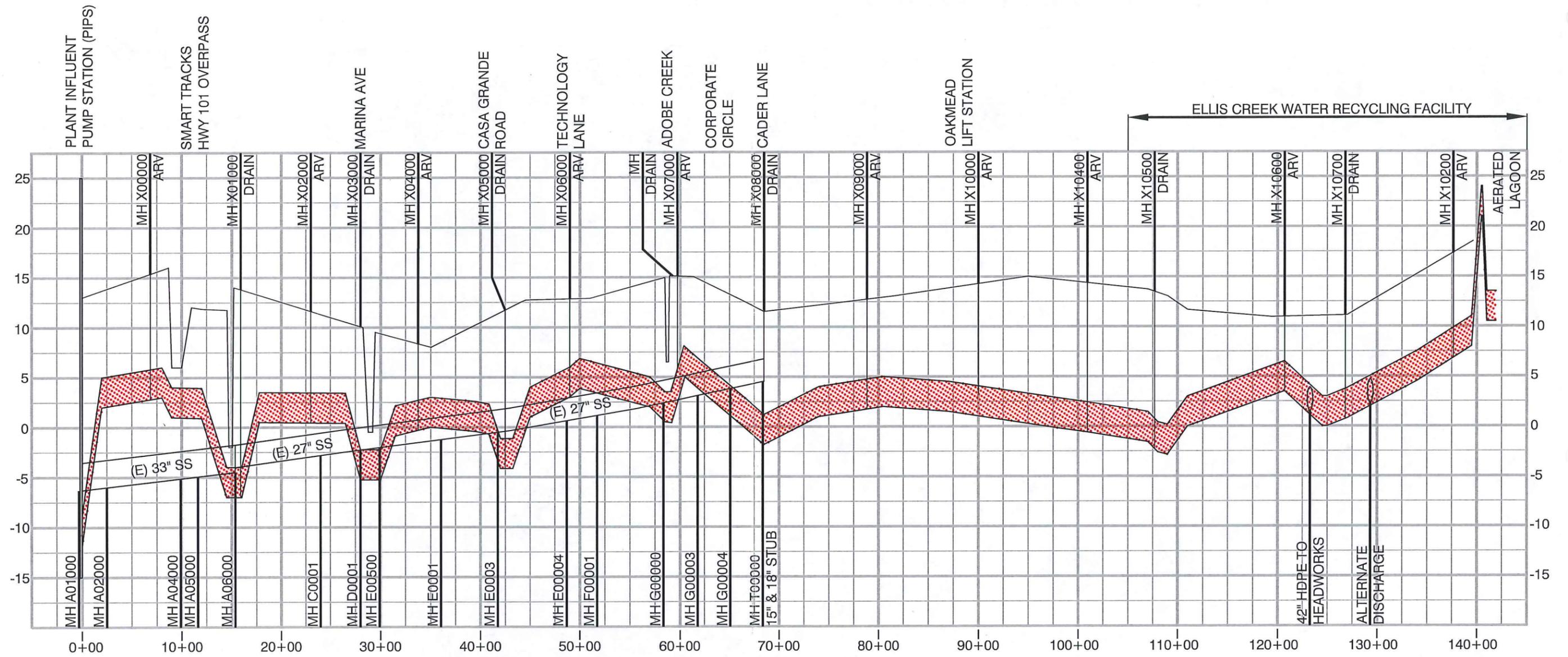
Project # 8352

PAGE 5 OF 5

Date: 8/13/2014



SCALE: 1 inch = 300 feet



CITY OF PETALUMA

EXISTING PIPS FORCE MAIN PROFILE

NUTE 907 MISSION AVENUE TEL 415-453-4480
 SAN RAFAEL, CALIFORNIA FAX 415-453-0343

City of Petaluma

**Sanitary Sewer Overflow (SSO) Sampling
Standard Operational Procedure**

SOP Approval:

Assistant Operations
Manager: _____ Date _____

Prepared by: _____ Date _____

Table of Contents

- 1. Purpose**
- 2. Scope and application**
- 3. Notifications and Reporting**
- 4. Definitions**
- 5. Safety**
- 6. Equipment and supplies**
- 7. Sample collection, preservation, and storage**
- 8. Procedure**
- 9. Quality assurance and acceptance limits**
- 10. Attachments**

1. Purpose

The purpose of this standard operating procedure (SOP) is to outline the procedure for collecting samples from sanitary sewer overflows (SSO). Water quality sampling and testing is required for SSOs of 50,000 gallons or greater to determine the extent and impact of the SSO. If an SSO occurs, sites to be sampled are at the spill area, upstream of the spill area, and downstream of the spill area. Samples are collected for various tests such as biochemical oxygen demand (BOD), ammonia, nitrogen, enterococcus, fecal coliforms, E-Coli, salinity, pH, temperature, and dissolved oxygen. Care must be exercised when taking SSO samples to prevent any contamination that would compromise the sample. The water quality sampling procedures must be implemented within 48 hours.

2. Scope and application

This SOP is applicable for collecting, preserving, transportation, and storing of SSO samples for testing. Sampling must occur when:

- A SSO of over 50,000 gallons occurs and reaches a body of water or ditch.
- Sampling must occur within 48 hours of the spill.
- Sampling must take place at three different sites: the spill area, upstream of the spill area, and downstream of the spill area.
- Sample bottles must be transported within the appropriate holding time frame to the City of Petaluma Water Quality Laboratory at 3890 Cypress Drive, Petaluma, CA 94954.

This SOP documents who to notify if an SSO occurs, the various locations of possible upstream and downstream SSO sampling sites, the sampling procedures for collecting and dropping the samples off to the lab, and what must be done by the sampler once they return to the field office.

3. Notifications and Reporting

Refer to the City of Petaluma's Overflow Emergency Response Plan (OERP) page #14 - 16.

When an SSO occurs, please contact one of the following field samplers starting with the first person on the list until you reach someone.

1. Chelsea Thompson – Environmental Services Analyst
Desk: 707-776-3728 Work Cell: 707-304-2574 Personal Cell: 707-293-5689
2. Dannielle Favela – Environmental Services Technician
Desk: 707-776-3663 Work Cell: 707-331-6475 Personal Cell: 805-453-5449
3. Nathan Davis – Environmental Services Technician
Desk: 707-778-4409 Work Cell: 707-331-9896 Personal Cell: 707-236-2634

4. Definitions

- Amber Bottles: Dark colored glass bottles used for sampling.
- Bacti Bottles: The plastic bottles 125 mL containing sodium thiosulfate ($\text{Na}_2\text{S}_2\text{O}_3$) that are used to collect coliforms (E-coli and Fecal) and enterococcus samples from various sites on the route.
- Chain of Custody (COC): A legal record (which may be a series of records) of each person who had possession of an environmental sample, from the person releasing the sample, to the person who collected the sample, to the person who analyzed the sample in the laboratory, to the person who witnessed the disposal of the sample.
- Instant Ice Pack: Single use packets that create instantaneous cooling by squeezing and shaking the contents inside the packet.
- Plastic Bottles: Sample bottles made of plastic.
- Preserved: Sample bottles containing acids or bases as a preservative.
- Sanitary Sewer Overflow (SSO): Any overflow, spill, release, discharge, or diversions of untreated or partially treated wastewater from a sanitary sewer system.
- Unpreserved: Sample bottles not containing any preservative.

5. Safety

- Obtaining a sample will depend if there is sufficient flow to collect a representative sample and whether severe weather or dangerous conditions exist. Do not sample if you feel unsafe.
- Be aware of your surroundings and have safe practices while working near traffic. If necessary, use construction cones to mark a safe working area.
- Do not sample alone. Sample in a group of two to ensure safety.
- When working on a shore or riverbank be aware of your surroundings and do not enter an unsafe situation that can cause a trip, slip, or fall.
- Wear personal protective equipment such as gloves to protect yourself and to prevent cross contamination when sampling.

6. Equipment and Supplies

- Time piece
- Clean sanitized water cooler(s) – Use as many as needed depending on the cooler size
- Designated ice packs (minimum of 4 per cooler)
- Clipboard with Chain of custody (COC), sample sites map, data sheet, and laminated sampling SOP
- GPS
- Pen

- (9) Sealed, sterile 125 ml bacti (Enterococcus, fecal, and E-Coli) bottles containing $\text{Na}_2\text{S}_2\text{O}_3$
- (3) One liter amber bottles containing H_2SO_4 for ammonia testing
- (3) 250ml plastic bottles unpreserved for BOD testing
- (3) 250ml plastic or amber bottles containing H_2SO_4 for nitrogen testing
- (3) One liter plastic or amber bottles unpreserved for salinity testing
- pH testing strips or calibrated pH meter
- Calibrated dissolved oxygen (DO) meter
- Temperature gun if meters not being used
- Sanitized sampling pole with cup
- Sanitized sample cup for pH/DO testing
- Deionized (DI) water for rinsing meters and sampling cups between sites
- Gloves

7. Sample Collection, Preservation and Storage

Samples are collected in various bottles for different tests and transported in a cooler containing ice packs. Below are the bottles and water quality measures needed for each of the three sampling sites. You will need three of each of the below items for one SSO sampling event.

- Ammonia – One liter amber bottle preserved with H_2SO_4 , hold time 28 days.
- BOD – 250ml plastic or amber bottle unpreserved, hold time 48 hours.
- Nitrogen – 250ml plastic or amber bottles preserved with H_2SO_4 , hold time 28 days.
- Enterococcus – 125ml bacti bottles preserved with $\text{Na}_2\text{S}_2\text{O}_3$, hold time 8 hours.
- Fecal coliforms– 125ml bacti bottles preserved with $\text{Na}_2\text{S}_2\text{O}_3$, hold time 8 hours.
- E-Coli – 125ml bacti bottles preserved with $\text{Na}_2\text{S}_2\text{O}_3$, hold time 24 hours.
- pH, temp, and DO taken in the field.

The sampler is responsible for the collection, transportation, and delivery of samples to the lab within eight hours after the samples are collected. The sampler must deliver the samples with a completed COC.

For samples after hours, notify the lab prior to bringing samples into the lab.

Procedure

- 8.1 At the field office, gather the needed equipment for the SSO sampling event
 - 8.1.1 Determine the location of the spill area and using the sample site map, choose the potential sampling areas upstream, downstream, and at the spill site.
 - 8.1.2 Fill designated cooler(s) with reusable or instant ice packs.
 - 8.1.3 Wipe cooler and ice packs with bleach prior to adding sample bottles.
 - 8.1.4 Grab necessary bottles and label with site name and location. You may want to have extra unlabeled bottles just in case an issue arises.

- 8.1.5 Prefill out the COC with the sample locations, type of container, preservative, matrix, and analysis requested listed. Fill in the date, sampler name, and sampler signature. Under project name list SSO and the location.
 - 8.1.6 If using a pH or DO meter, calibrate the meters and record the calibration results on the datasheet. If not using a meter, pack the pH field test strips and temperature gun.
 - 8.1.7 Ensure you have a map of the water sample site locations and this SOP or the field sampling guide.
- 8.2 While in the field taking SSO samples the sampler needs to take the following steps:
- 8.2.1 Upon arriving at a sampling site, park the truck and create a safe work zone.
 - 8.2.2 Bring the cooler and sampling equipment with all the appropriate bottles for the first site.
Note: Do NOT sample if the area is unsafe. Beware of your surroundings.
 - 8.2.3 On rainy days it may be necessary to use an umbrella to limit other possible sources of contamination.
 - 8.2.4 Take water quality samples.
 - 8.2.4.1 Put on gloves and using the sample pole, take a sample of the surface water and place into a sterile cup.
 - 8.2.4.2 Take pH and DO readings from the cup. If not using meters, use a field pH strip and follow the directions on the package and dip the strip into the sample cup and record your results on the datasheet. Use the temp gun and aim at the water in the cup, record the temperature in Celsius.
 - 8.2.4.3 If using meters, record the pH, temperature, DO in mg/L and % saturation on the data sheet.
 - 8.2.5 Before sampling, put on gloves before handling any bottles. If at any time your gloves become contaminated or rip, put on a new pair.
 - 8.2.6 Check the time and record the sampling time on the bottle.
 - 8.2.7 Using a sampling pole, gather a representative sample from the surface water away from the shore.
 - 8.2.8 Carefully open one sample bottle at a time and do not touch or contaminate the inside of the bottle or lid.
 - 8.2.9 Carefully pour the contents into the sample bottle and do not allow anything to overflow from the bottle because some bottles have preservatives in them.
 - 8.2.10 For the bacti bottles, fill them to the 100 mL mark. Shake the bottle to dissolve the sodium thiosulfate.
 - 8.2.11 Place all filled sample bottles in the cooler and activate the instant ice packs to keep the samples cold.
 - 8.2.12 Fill out the COC for this sample location with the date, sample time, and any additional notes if necessary.
 - 8.2.13 Proceed to the next sample location until all designated samples from the three sample sites have been collected. Sample sites = spill area, downstream of spill area, and upstream of spill area.
- 8.3 When delivering samples collected to the laboratory the sampler must do the following:

- 8.3.1 Once the last sample has been collected, deliver the samples to the City of Petaluma Water Quality Laboratory at 3890 Cypress Dr., Petaluma, CA. 94954.
Note: If another lab is analyzing the samples bring them back to the field office and prepare them for pick up.
- 8.3.2 Bring the cooler filled with samples into the laboratory micro room. One of the lab staff should be in the lab to receive samples.
- 8.3.3 Relinquish the cooler and samples to the lab staff by signing the bottom of the COC along with the date and time.
- 8.3.4 The lab will take the temperature of the samples with an IR thermometer and record results on the COC. They will sign the COC accepting the samples.
- 8.3.5 The lab will keep the top copy of the COC and return the bottom yellow copy for the sampler's records. If there is not a carbon copy the lab will provide the sampler with a copy of the COC.
- 8.4 After arriving back to the field office, the sampler must finish the following tasks:
 - 8.4.1 Clean out coolers, dispose of instant ice or clean reusable ice packs and place them in the freezer.
 - 8.4.2 Place cooler back in proper location.
 - 8.4.3 Safely store away pH and DO meters if used.
 - 8.4.4 Place the laminated sample site location and sampling guide on the cooler for next use.
 - 8.4.5 File the COC copy in its proper location.

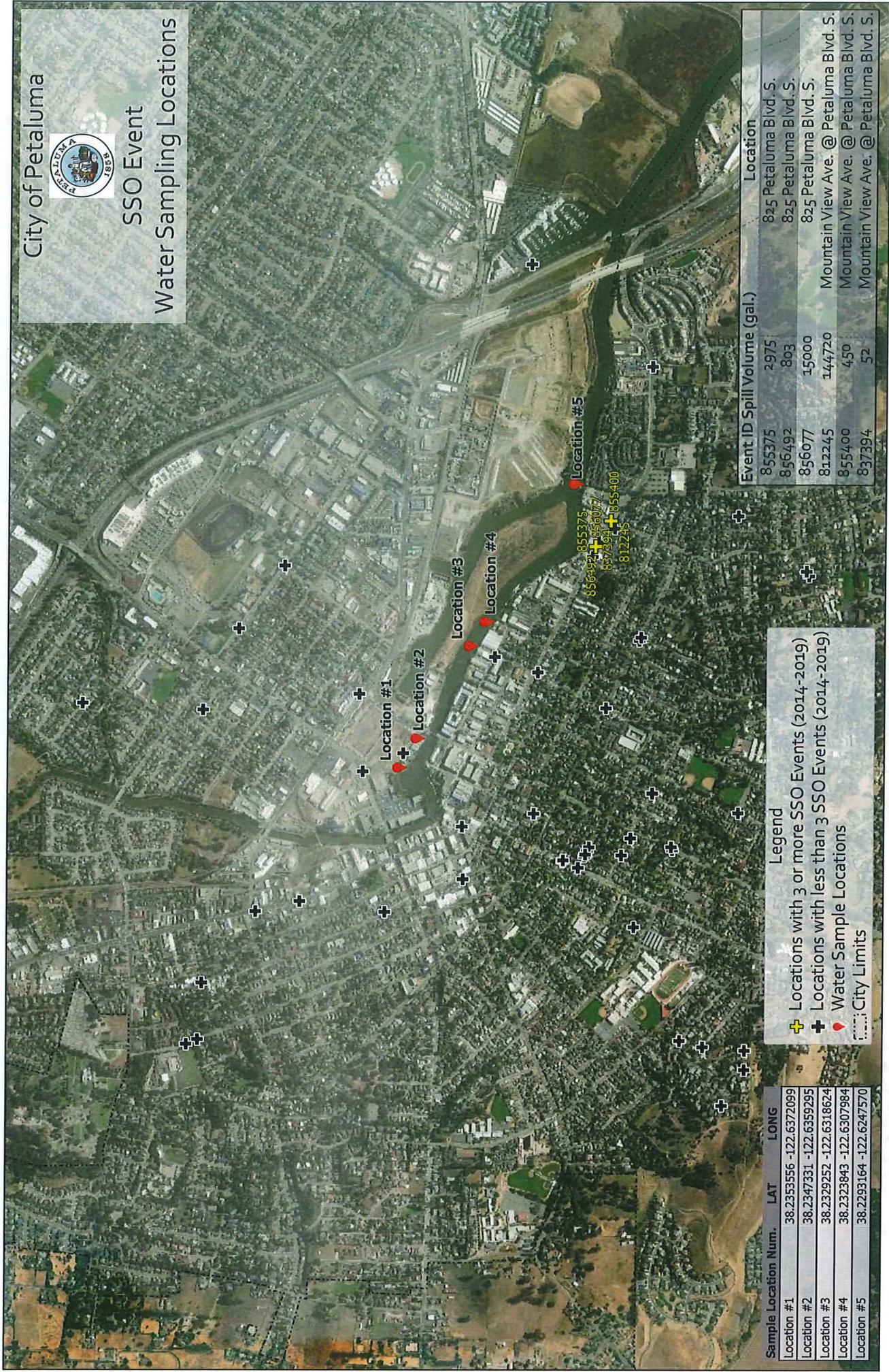
9. Attachments

- Sample location site map
- Sample COC
- pH meter field calibration SOP
- Emergency phone list and laboratory contacts sheet

City of Petaluma



SSO Event
Water Sampling Locations



Event ID	Spill Volume (gal.)	Location
855375	2975	825 Petaluma Blvd. S.
856492	803	825 Petaluma Blvd. S.
856077	15000	825 Petaluma Blvd. S.
812245	144720	Mountain View Ave. @ Petaluma Blvd. S.
855400	450	Mountain View Ave. @ Petaluma Blvd. S.
837394	52	Mountain View Ave. @ Petaluma Blvd. S.

Legend

- + Locations with 3 or more SSO Events (2014-2019)
- + Locations with less than 3 SSO Events (2014-2019)
- Water Sample Locations
- City Limits

Sample Location Num.	LAT	LONG
Location #1	38.2353556	-122.6372099
Location #2	38.2347331	-122.6359295
Location #3	38.2329252	-122.6318624
Location #4	38.2323843	-122.6307984
Location #5	38.2293164	-122.6247570



SAMPLE CHAIN OF CUSTODY

PROJECT NAME / PROJECT NUMBER: **SSO_Sampling Event Name** P.O. NUMBER: **N/A** LAB ORDER #

REPORT ATTN: **Chelsea Thompson**

CITY: **Petaluma** STATE: **CA** ZIP: **94954**

ATTN: **Chelsea Thompson**

SAMPLER (PRINT & SIGN NAME): **insert sampler's name**

EMAIL ADDRESS: **cthompson@cityofpetaluma.org**

PHONE NUMBER: **707-776-3728**

CALTEST SAMPLE #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX	CONTAINER TYPE/ AMOUNT**	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. OF GRAB	Enterococcus	Total Fecal Coliform	Total E-Coli Coliform	Ammonia	BOD	Nitrogen	Ammonia	TURN-AROUND TIME
	X/XX/XXXX	XX:XX	W	1-125mL BACT	NA2S2O3	Sample Site Name_ Upstream		GRAB	X							<input type="checkbox"/> STANDARD <input type="checkbox"/> RUSH
	X/XX/XXXX	XX:XX	W	1-125mL BACT	NA2S2O3	Sample Site Name_ Upstream		GRAB		X						DUE DATE: _____
	X/XX/XXXX	XX:XX	W	1-125mL BACT	NA2S2O3	Sample Site Name_ Upstream		GRAB			X					REGULATORY DRINKING WATER? Yes / No
	X/XX/XXXX	XX:XX	W	1-AL	H2SO4	Sample Site Name_ Upstream		GRAB				X				If Yes, write 10-digit PS Code(s) below:
	X/XX/XXXX	XX:XX	W	1-250mL Plastic	NONE	Sample Site Name_ Upstream		GRAB					X			
	X/XX/XXXX	XX:XX	W	1-250mL Plastic	H2SO4	Sample Site Name_ Upstream		GRAB						X		
	X/XX/XXXX	XX:XX	W	1-AL	NONE	Sample Site Name_ Upstream		GRAB							X	

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME	RELINQUISHED BY	DATE/TIME	RECEIVED BY

FOR LAB USE ONLY

TEMP: °C / °C SEALED: Y / N / N INTACT: Y / N / N ON ICE: Y / N / N REPORTING OPTIONS (Choose One): EMAIL MAIL BOTH

Samples: WC MICRO BIO MET SV VOA COMMENTS:

BD: BIO WC MET

SIL: HP PT QT VOA

W/HNO3 H2SO4 NaOH

PIL: HNO3 H2SO4 NaOH HCl

*MATRIX: W = Aqueous Nondrinking Water, Digested Metals; ML = Final Effluent, Minimum-Level/Low-Level R.L.; DW = Drinking Water; SL = Soil, Sludge, Solid; FP = Free Product

**CONTAINER TYPES: AL = Amber Liter, AHL = 500 mL Amber, PT = Pint (Plastic); QT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4oz. BACT; BT = Brass Tubex; VOA = 40mL VOA; OTC = Other Type Container



1885 N. KELLY ROAD, NAPA, CA 94558 (707) 238-4000 info@caltestlabs.com www.caltestlabs.com

SAMPLE CHAIN OF CUSTODY

PROJECT NAME / PROJECT NUMBER: **SSO_Sampling Event Name** P.O. NUMBER: **N/A**

REPORT ATTN: **Chelsea Thompson**

CITY: **Petaluma** STATE: **CA** ZIP: **94954**

ATTN: **Chelsea Thompson**

SAMPLER (PRINT & SIGN NAME): **insert sampler's name**

EMAIL ADDRESS: **cthompson@cityofpetaluma.org**

PHONE NUMBER: **707-776-3728**

CALTEST SAMPLE #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX*	CONTAINER TYPE/ AMOUNT**	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. or GRAB	Enterococcus	Total Fecal Coliform	Total E-Coli Coliform	Ammonia	BOD	Nitrogen	Ammonia
	X/XX/XXXX	XX:XX	W	1-125mL BACT	NA2S2O3	Sample Site Name_Spill Area		GRAB	X						
	X/XX/XXXX	XX:XX	W	1-125mL BACT	NA2S2O3	Sample Site Name_Spill Area		GRAB		X					
	X/XX/XXXX	XX:XX	W	1-125mL BACT	NA2S2O3	Sample Site Name_Spill Area		GRAB			X				
	X/XX/XXXX	XX:XX	W	1-AL	H2SO4	Sample Site Name_Spill Area		GRAB				X			
	X/XX/XXXX	XX:XX	W	1-250mL Plastic	NONE	Sample Site Name_Spill Area		GRAB					X		
	X/XX/XXXX	XX:XX	W	1-250mL Plastic	H2SO4	Sample Site Name_Spill Area		GRAB						X	
	X/XX/XXXX	XX:XX	W	1-AL	NONE	Sample Site Name_Spill Area		GRAB							X

REGULATORY DRINKING WATER? Yes / No

If Yes, write 10-digit PS Code(s) below:

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME	RELINQUISHED BY	DATE/TIME	RECEIVED BY

FOR LAB USE ONLY

TEMP: °C / °F

Samples: WC MICRO BIO MET SV VOA INTACT: Y / N ON ICE: Y / N

BD: BIO WC MET MET SV VOA

SIL: HP PT QT VOA

W/HNO3 H2SO4 NaOH

PIL: HNO3 H2SO4 NaOH HCl

REPORTING OPTIONS (Choose One): EMAIL MAIL BOTH

COMMENTS:

*MATRIX: W = Aqueous Nondrinking Water, Digested Metals; ML = Final Effluent, Minimum-Level/Low-Level R.L.; DW = Drinking Water; SL = Soil, Sludge, Solid; FP = Free Product

**CONTAINER TYPES: AL = Amber Litrer, AHL = 500 mL Amber; PT = Pint (Plastic); QT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4oz. BACT; BT = Brass Tube; VOA = 40mL VOA; OTC = Other Type Container



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SAMPLE CHAIN OF CUSTODY

PROJECT NAME / PROJECT NUMBER: **SSO_Sampling Event Name** P.O. NUMBER: **N/A**

CLIENT: **City of Petaluma** REPORT ATTN: **Chelsea Thompson**

MAILING ADDRESS: **3890 Cypress Drive** CITY: **Petaluma** STATE: **CA** ZIP: **94954**

BILLING ADDRESS: **3890 Cypress Drive** ATTN: **Chelsea Thompson**

PHONE NUMBER: **707-776-3728** EMAIL ADDRESS: **cthompson@cityofpetaluma.org** SAMPLER (PRINT & SIGN NAME): **insert sampler's name**

CALTEST SAMPLE #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX*	CONTAINER TYPE/ AMOUNT**	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. OF GRAB	Enterococcus	Total Fecal Coliform	Total E-Coli Coliform	Ammonia	BOD	Nitrogen	Ammonia	ANALYSES REQUESTED	LAB ORDER #	TURN-AROUND TIME
	X/XX/XXXX	XX:XX	W	1-125mL BACT	NA2S203	Sample Site Name_Downstream		GRAB	X									<input type="checkbox"/> STANDARD <input type="checkbox"/> RUSH
	X/XX/XXXX	XX:XX	W	1-125mL BACT	NA2S203	Sample Site Name_Downstream		GRAB		X								
	X/XX/XXXX	XX:XX	W	1-125mL BACT	NA2S203	Sample Site Name_Downstream		GRAB			X							
	X/XX/XXXX	XX:XX	W	1-AL	H2SO4	Sample Site Name_Downstream		GRAB				X						
	X/XX/XXXX	XX:XX	W	1-250mL Plastic	NONE	Sample Site Name_Downstream		GRAB					X					
	X/XX/XXXX	XX:XX	W	1-250mL Plastic	H2SO4	Sample Site Name_Downstream		GRAB						X				
	X/XX/XXXX	XX:XX	W	1-AL	NONE	Sample Site Name_Downstream		GRAB							X			

REGULATORY DRINKING WATER? Yes / No
If Yes, write 10-digit PS Code(s) below:

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME	RELINQUISHED BY	DATE/TIME	RECEIVED BY

FOR LAB USE ONLY

TEMP: °C / °C SEALED: Y / N INTACT: Y / N ON ICE: Y / N

Samples: WC MICRO BIO MET SV VOA REPORTING OPTIONS (Choose One): EMAIL MAIL BOTH

BD: BIO WC MET MET MET SV VOA COMMENTS:

SIL: HP PT QT VOA

W/HNO3 H2SO4 NaOH NaOH

PIL: HNO3 H2SO4 NaOH HCl

*MATRIX: W = Aqueous Nondrinking Water, Digested Metals; ML = Final Effluent, Minimum-Level/Low-Level; R.L. = Drinking Water; SL = Soil, Sludge, Solid; FP = Free Product

**CONTAINER TYPES: AL = Amber Liter, AHL = 500 mL Amber; PT = Pint (Plastic); QT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4oz. BACT; BT = Brass Tuber; VOA = 40mL VOA; OTC = Other Type Container

**City of Petaluma
Water Quality Laboratory**

**Standard Operating Procedure for
Method 4500 H⁺
pH Value Electrometric Method – Field Calibration**

SOP APPROVAL:

**Assistant Operations
Manager:** _____ **Date** _____

Prepared By: _____ **Date** _____

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METHOD 4500-H+ B
pH ELECTROMETRIC METHOD

1. SCOPE AND APPLICATION

1.1. This method is applicable to the determination of pH in water and wastewater samples.

2. DEFINITIONS

2.1. pH is the measure of hydrogen ion concentration in a solution. At a given temperature the intensity of the acidic or basic character of a solution is indicated by pH or hydrogen ion activity. It is defined by the formula $-\log[H^+]$.

2.2. Potentiometer is an instrument used in measuring electric potentials (electrometric forces).

3. SUMMARY OF THE METHOD

3.1. Electrometric pH measurement is the determination of hydrogen ion activity by potentiometric measurement using an electrode. Electromotive force (emf) within the electrode correlates linearly with pH. Measured emf is plotted against calibration buffers with known concentration and sample pH is extrapolated from this curve.

4. INTERFERENCES

4.1. pH measurements can be affected by temperature through mechanical effects that change the properties of the electrode causing long-term pH drift and by chemical effects due to equilibrium changes (because of this, buffers have a pH at a specified temperature).

5. SAFETY

5.1. Wear appropriate personal protective equipment including gloves and eye protection. Read the MSDS of any chemicals used in the method prior to performing the analysis.

6. WASTE MANAGEMENT AND POLLUTION PREVENTION

6.1. All pH buffers and aqueous waste can be disposed of down the drain.

7. EQUIPMENT AND SUPPLIES

7.1. Thermo Scientific Orion Star A121 pH meter

7.2. pH electrode(s) (part # 8107BNUMD or equivalent)

7.3. Electrode storage solution (part # Orion 910001)

7.4. Single use buffer packets pH 4.0 (part # To be entered)

7.5. Single use buffer packets pH 7.0 (part # To be entered)

7.6. Single use buffer packets pH 10.0 (part # To be entered)

8. SAMPLE COLLECTION, PRESERVATION AND STORAGE

8.1. Use resistant plastic or glass containers.

METHOD 4500-H+ B
pH ELECTROMETRIC METHOD

- 8.2. Begin analysis as soon as possible.
- 8.3. No preservation is required, and samples must be analyzed within 15 minutes of collection.

9. PROCEDURE

9.1. Orion Star A121 Setup

9.1.1. Connect the pH electrode and ATC to the A121 meter.

9.1.2. pH calibration setup

- 9.1.2.1. In pH measurement mode, press **setup**.
- 9.1.2.2. Press **Mode (enter)** twice.
- 9.1.2.3. Press **▲** to select automatic buffer recognition (AUTO).
- 9.1.2.4. With automatic chosen, press **Mode (enter)** Press **▲** to select USA for automatic buffer recognition.
- 9.1.2.5. Press **Mode (enter)** to save configuration and **measure** to return to measurement mode.

9.1.3. Read Type Selection

- 9.1.3.1. In measurement mode, press **setup**.
- 9.1.3.2. Press **▲** in setup until "4.0" is shown on the top line and "read" is shown on the lower line. Press **Mode (enter)**.
- 9.1.3.3. Press **▲** to select the measurement mode: CONT= Continuous.
- 9.1.3.4. Press **mode(enter)** to save selection.

9.2. Field calibration of Orion Star A121

- 9.2.1. Rinse the electrode with DI water and blot dry with a Kimwipe. Turn meter on by pressing **power**.
 - 9.2.1.1. If temperature is reading 25°C and does not have any changes check that the temperature part of the probe is inserted completely.
- 9.2.2. If the meter is not in pH mode, then press the **mode(enter)** key until the pH indicator is displayed.
- 9.2.3. Place pH electrode into single use pH 7.0 buffer packet and press **cal** key.
- 9.2.4. Once reading has stabilized the meter will read the accurate pH based on the temperature, and a small 7 will also appear next to the READY notation.
- 9.2.5. Press **cal** to accept pH value and move to the second calibration point.
- 9.2.6. Rinse the electrode, blot dry, and place in either single use pH 4.0 packet or 10.0 buffer packet.
- 9.2.7. Once the reading is stabilized (READY will be displayed) the meter will read the accurate pH based on the temperature, and a small 4 or 10 will be displayed next to the 7 when the value is accepted. Press **cal** key to accept and move to third calibration point.

METHOD 4500-H+ B
pH ELECTROMETRIC METHOD

- 9.2.8. Finally, rinse the electrode and place in the remaining single use pH buffer packet of 4.0 or 10.0. Once the reading is stabilized (READY will be displayed) the meter will read the accurate pH based on the temperature and a small 4 or 10 will be displayed next to the 7 when the value is accepted
- 9.2.9. After the final pH solution has been accepted, press the **mode(enter)** key to accept third point.
- 9.2.10. The slope will be displayed. Record the slope on the pH calibration section of the field sampling data sheet.
- 9.2.11. After calibration, the meter automatically advances to the measurement mode. The meter will indicate when it is stable by displaying READY.
- 9.2.12. Reread and record the measured pH values on the pH calibration section of the field sampling sheet for all three buffers.

9.3. Sample pH analysis using the Thermo Scientific Orion Star A121 pH meter

- 9.3.1. Collect the sample in a plastic or glass container.
- 9.3.2. Turn on calibrated meter by pressing **power**.
- 9.3.3. Rinse the electrode and blot dry.
- 9.3.4. Place the electrode in the sample.
- 9.3.5. The meter will display READY and the pH stops blinking when the pH has stabilized.
- 9.3.6. Record the pH and temperature on the field sampling data sheet.

10. REFERENCES

- 10.1. Standard Methods for the Examination of Water and Wastewater, 22nd Edition, 2012, Section 4-91.
- 10.2. Orion Star A100 Series Meter Literature, Rev. 00613, 2013. Thermo Scientific

City of Petaluma
Ellis Creek Water Recycling Facility
Water Quality Laboratory
3890 Cypress Drive, Petaluma, CA 94954

When bringing SSO samples into the Ellis Creek Water Quality Laboratory please call one of the below contacts starting from the top of the list and working your way down before bringing in a sample.

At the time of sample drop off, if no one is present in the laboratory, check the pretreatment office. If still no one is present, please call one of the below contacts in descending order.

1. Brittany Rossi Worthen – Senior Lab Analyst
Office: 707-778-4591 Work Cell: 707-291-6318 Personal Cell: 559-269-8594
2. Jesse McDermott – Lab Analyst
Office: 707-778-4487 Work Cell: 707-210-2362
3. Chelsea Thompson – Environmental Services Analyst
Office: 707-776-3728 Work Cell: 707-304-2574
4. Dannielle Favela – Environmental Services Technician
Office: 707-776-3663 Work Cell: 707-331-6475
5. Matt Pierce – Operations Supervisor
Office: 707-776-3726 Work Cell: 707-249-3197
6. Ben Conner – Mechanical & Electrical Maintenance Supervisor
Office: 707-776-3726 Work Cell: 707-975-5166
7. Matt Hischer – Environmental Compliance Instructor
Office: 707-778-4509 Work Cell: 707-331-6263
8. Dylan Smith – Environmental Services Technician
Office: 707-776-3726 Work Cell: 707-210-7743
9. Nate Davis – Environmental Services Technician
Office: 707-778-4409 Work Cell: 707-331-9896