



CITY OF HOT SPRINGS

Utilities Department

780 Adams Street

Hot Springs, Arkansas 71901

August 16, 2021

Mr. Alan J. York, Associate Director
Ms. Leslie Allen-Daniel, Enforcement Coordinator
Arkansas Energy & Environment Office of Water Quality
5301 Northshore Drive
North Little Rock, Arkansas 72118

RE: Permit No. AR0033880, AFIN 26-00145
Hot Springs Utilities – Request for Bacteria Sampling and a Communications Plan

Dear Mr. York and Ms. Allen-Daniel,

In response to your letters of July 2, 2021 and August 3, 2021, thank you for your suggestions. I offer the following response.

1. **Standard Operation Procedure – Methodology for estimating the volume of SSOs.** Exhibit A (attached) is added to the SOP. I have researched methods used by numerous wastewater providers. The methodology I am proposing is widely used. Additionally, I am in the process of developing a field worksheet for estimating SSO volumes. Additionally, we will install a measuring device close to the rim of MH 1750 to assist personnel in measuring the height of the overflow plume.
2. **Standard Operation Procedure – Field Reporting.** Upstream MH 1749 is at elevation 311; MH 1750 is at elevation 310. Beginning now we will monitor MH 1749 with each SSO event.
3. **Standard Operation Procedure – Public Notification.** Hot Springs Utilities will include additional locations for the signage as suggested (see revised Exhibit B).
4. **Standard Operation Procedure – Sampling and Testing.** Hot Springs Utilities will include addition sampling and testing sites under conditions where the presence of E coli exceeds the 126 cfu/100 ml (see revised Exhibit B).

In addition to the above, we have included a proposed Water Quality Assessment (attached) fulfilling the original letter dated July 2, 2021, from Leslie Allen-Daniel.

The revised timeline for Gulpha Basin improvements is as follows:

Gulpha Basin Remediation for MH 1750				
Task	Services Description	Estimated Start Date	Estimated Finish Date	Status
1	Hydraulic Model Update	3/1/2021	7/16/2021	
1.1	Update Model with latest CHS GIS	3/1/2021	3/29/2021	Complete
	Refine Grinder Pump and Pressurized Main			
1.2	modeling	3/30/2021	4/20/2021	Complete
	Update model population and non-res flow			
1.3	data	5/21/2021	6/11/2021	Complete
1.4	Input data from CIP "As builts"	3/30/2021	7/16/2021	Complete
2	Model Recalibration	7/19/2021	9/20/2021	
2.1	Dry Weather Flow Calibration	7/19/2021	8/9/2021	Complete
2.2	Wet Weather Flow Calibration	8/9/2021	9/20/2021	Ongoing
3	Interim Model Update/Recal Meeting	9/23/2021	9/23/2021	Scheduled
4	Gulpha Basin Alternative Evaluation	9/27/2021	11/8/2021	Scheduled
	Interim Gulpha Basin Alternative Evaluation			
5	Meeting	11/11/2021	11/11/2021	Scheduled
6	Final Technical Memorandum	11/12/2021	12/3/2021	Scheduled
8	Final Design	1/3/2022	1/6/2023	Scheduled
9	Permitting & Property Acquisition	1/9/2023	6/5/2023	Scheduled
10	Bidding, Award, & Construction	7/3/2023	6/3/2025	Scheduled

Sincerely,



Monty Ledbetter
Utility Director

Attachments: Exhibit A Standard Operating Procedure
Exhibit B Sampling Sites, and Public Notification (signage and CodeRED)
Exhibit C SSO Containment Plan (installed)
Water Quality Assessment from FTN

Cc: Stacie Wassell, Deputy Associate Director, DEQ, Wassell@adeq.state.ar.us
Richard Healey, OWO Enforcement Branch Manager, healeyr@adeq.state.ar.us
Terry Paul, Environmental Health Chief, ADH, terry.paul@arkansas.gov
Bill Burrough, City Manager, City of Hot Springs, AR, bburrough@cityhs.net
Todd Piller, Capital Projects Manager, City of Hot Springs, AR tpiller@cityhs.net
Gary Carnahan, City Engineer, City of Hot Springs, AR, gcarnahan@cityhs.net
Harold Mauldin, Wastewater Facilities Operations Manager, City of Hot Springs, AR, hmauldin@cityhs.net
Craig Johnson, P.E., Crist Engineers, cjohnson@cristengineers.com

EXHIBIT A


STANDARD OPERATING PROCEDURE

SOP Title:	Manhole 1750 Sanitary Sewer Overflow Standard Operating Procedure		
SOP CODE:	6459.662.61-2021.07	CATEGORY:	SSO RESPONSE

OBJECTIVE	To provide clear and complete instructions for responding to sanitary sewer overflows at Manhole 1750 in particular.
BACKGROUND	Manhole 1750 has a history of overflows during periods of wet weather due to the hydraulic design combined with unidentified I&I in the Gulpha Sewer Basin. Any SSO during dry weather would likely be due to a blockage or equipment failure at the Gulpha Lift Station.
SAFETY PROCEDURES	Personnel responding to any SSO must wear appropriate personal protective equipment (PPE) to prevent contact with raw sewage. PPE may include: rubber gloves, rubber boots, impermeable coveralls and protective headwear with splash shield.
POTENTIAL HAZARDS	Manhole 1750 is located (117 Catherine Heights Rd.) near Gulpha Creek, which flows into Spencer Bay and on to Lake Catherine. SSO contamination impacts the water quality of an area used for recreational activities.
RESPONSE	<p>Upon notification from remote sensing equipment, notification by the remote float auto-dialer, SCADA, other staff, or public notification, personnel responding to an SSO may encounter an emergency situation that requires immediate action. The first responders to the site during normal business hours will be Wastewater Collection crews. After hours, On-Call personnel will respond and call for back up personnel as needed.</p> <p>Responding personnel will:</p> <ol style="list-style-type: none"> 1. Determine whether the spill has reached Gulpha Creek 2. Notify testing laboratory to acquire testing samples should the spill reach Gulpha Creek* 3. Post ADH signs at locations shown in Exhibit A for Sample Site 1, should the spill reach Gulpha Creek 4. Provide a CodeRED in accordance with Public Notification requirement in this SOP for effected area as outlined in the notification boundary shown in Exhibit A. 5. Determine the cause of the problem (blockage, equipment failure at Gulpha Lift Station, wet weather I&I) 6. Determine what additional resources may be needed (equipment and materials). 7. Document any necessary information needed for reporting requirements. 8. Take photos of the impacted area. 9. Estimate the release volume based on size of the sewer, weather conditions and the extent of the release. 10. Report spill in accordance with Office of Water Quality, DEQ reporting requirements. <p>*Should testing agency not be available for immediate sampling, City of Hot Springs laboratory personnel will acquire a sample and hold in accordance with testing protocol and provide a chain of custody to the testing laboratory for further handling.</p>

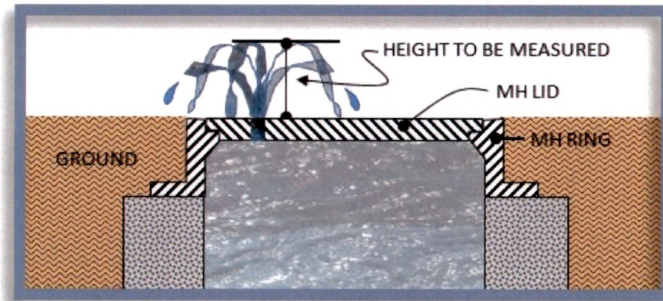
CONTAINMENT	<p>Containment of an overflow is the responder's first priority. The methods used will vary on a case by case basis. The Manager, Crew Leader and maintenance responders will:</p> <ul style="list-style-type: none"> • Identify and obtain the necessary equipment and materials needed to contain the overflow. • Take immediate steps to contain the overflow (block path toward receiving water, recover with vacuum truck). • Determine whether additional containment measures are needed.
CORRECTION OF OVERFLOW	<p>The time required to correct the cause of the overflow depends on the determined cause. In the case of Manhole 1750, the most frequent cause is wet weather initiated I&I and the current hydraulic limitations of the collection and pumping system.</p> <p>Responding crews must begin by investigating upstream manholes and the downstream lift station for evidence of blockage or equipment failure. When necessary, contractor services may be requested as an additional resource to abate the overflow.</p>
SAMPLING AND TESTING	<p>Upon response to the spill and validation that the spill is entering Gulpha Creek, the following sampling and testing will be initiated for Fecal Coliform Bacteria and <i>E. Coli</i>.</p> <ol style="list-style-type: none"> 1. Sampling shall occur at the locations shown on Exhibit A. 2. First series of test shall be for Sample Site 1. 3. Results shall be made available to the City of Hot Springs within three (3) calendar days of the event from the testing laboratory. 4. Should the <i>E.Coli</i> test result exceed 126 cfu/100ml at Sample Site 1 as shown on Exhibit A, ADH signs will be posted for Sample Site 3, Sample Site 4, and Sample Site 5. 5. A second series of tests will be scheduled and conducted for Sample Site 2, Sample Site 3, Sample Site 4, and Sample Site 5 until two consecutive results for <i>E.Coli</i> are equal to or less than 126 cfu/100ml are achieved, at which time the testing will cease, concluding safe bacteriological standards recommended by EPA. 6. ADH Signs shall be removed upon demonstration of safe bacteriological testing. 7. City of Hot Springs shall email all test results to DEQ's Office of Water Quality, Enforcement Branch at water-enforcement-report@adeq.state.ar.us upon receipt from the testing laboratory. <p>Testing shall be conducted at approved Department of Environmental Quality laboratory.</p>
RECOVERY/CLEANUP	<p>Cleanup will be completed for all SSOs following containment and correction of the overflow. The recovery efforts will be directed at returning the affected to a pre-release condition as quickly and efficiently as possible. Cleanup activities will vary depending on the situation. Actions selected will be performed thoroughly. The general process is as follows:</p> <ul style="list-style-type: none"> • Response crew will use appropriate PPE during cleanup and recovery • Affected area will be cleaned as much as possible using rakes, shovels, hand picker tools and vacuum equipment. • Affected overflow area will be evaluated for appropriate disinfection. This may include applying lime to absorb liquid and raise the pH to reduce pathogens, applying a non-hazardous bio-enzymatic bacteria consuming product to reduce impact of pathogens on receiving waters. • Maintain, as far as possible, an appropriate buffer zone between limited areas and the waters of the state and the United States. • The immediate area around the overflow site will be inspected to ensure that no visual residue remains, including solids, papers, and rags, etc. • If flushing is warranted and ultimately performed, then all solids and debris must be collected and disposed of properly. • All wash-down water must be returned to the sewer system.

<p>ADDITIONAL RESOURCES</p>	<p>If the maintenance crew is unable to contain and clean up the affected area with typical maintenance equipment, then the next step will be to bring in contractor or other construction support. The following steps will be taken by on-call management:</p> <ul style="list-style-type: none"> • Assess and mark the boundaries of the suspected area for all utility service locations (marking materials such as white paint will be used to mark the boundaries, and "Locate" will be written to indicate the area). • Call (811) CALL BEFORE YOU DIG. • Determine the additional resources and type of construction crew required to perform the task(s). • Call for the additional resources using existing approved contact lists as deemed necessary. • Enlist appropriate contract services. • Manage actions taken by the additional construction crew to clean up the affected area. • Ensure actions are documented following the SSO reporting procedures.
<p>FIELD REPORTING</p>	<p>Responding personnel will collect accurate and complete field data required to be submitted to DEQ. The following information will be documented:</p> <ul style="list-style-type: none"> • Date and time of notification (SCADA, Public Notification, Staff Report) • Date and time of dispatch • Date and time of arrival • Date and time of departure • Date and time of release ended (estimated as close as possible) • Location • Downstream Gulpha Pump Station status • Probable Cause • Estimated release • Visual impact observed • Actions to repair/mitigate
<p>REGULATORY REPORTING</p>	<p>Shawn Davis, Wastewater Collection Manager or his designate will report the SSO to the Arkansas Energy and Environment Department, Office of Water Quality within 24 hours. The Online Sanitary Sewer Overflow (SSO) Reporting Form can be found at</p> <p>https://www.adeq.state.ar.us/water/enforcement/sso/submit.aspx</p> <p>This initial 24-hour report should include the following information:</p> <ul style="list-style-type: none"> • Permit Number • Location of overflow (manhole number or street address) • The receiving water (if applicable) • Cause of overflow (if known) • Estimated volume of overflow • Total duration of the overflow <p>If the "total duration of the overflow" is not known when the 24-hour SSO online report is submitted, then a follow-up report (5-day report) giving a detailed account of the overflow and the steps taken to resolve it must be submitted within 5 days of the overflow's discovery. This report can be submitted by email at ssoadeq@adeq.state.ar.us or by <u>mail</u> (include Attn: Water Quality Enforcement).</p> <p>A sample of the spill shall be taken prior to confluence of the receiving stream for Fecal Coliform Bacteria and <i>E.coli</i>. Results of the testing shall be reported to the DEQ's Office of Water Quality, Enforcement Branch within three calendar days of the event sampled. Test results will be emailed to water-enforcement-report@adeq.state.ar.us</p> <p>Sample locations are shown in Exhibit A.</p>

<p>PUBLIC NOTIFICATION</p>	<p>When SSO spill reaches Gulpha Creek, City of Hot Springs Utilities will take measures inform those affected by the possible impact on water quality. The methods of public notification include:</p> <ol style="list-style-type: none"> 1. Signs will be posted at locations as shown in Exhibit A upon first response to the spill advising against human contact with the affected water in accordance with this SOP. Signs will be removed when testing concludes bacteriological standards are achieved in accordance the sampling and testing section in this SOP. <p>Sign content shall be as follows:</p> <p style="text-align: center;"> HEALTH ADVISORY WATER QUALITY IN THIS AREA MAY BE UNSAFE SWIM AT YOUR OWN RISK Arkansas Department of Health  4815 West Markham Street • Little Rock Arkansas 72205-3867 Environmental Health (501)661-2171 Epidemiology (501)661-2893 </p> <ol style="list-style-type: none"> 2. A CodeRED alert will be sent to the population living in close proximity to the water bodies in accordance with boundary shown on Exhibit A. <p><u>ADVISORY</u> <i>As of [date and time] a NO SWIMMING Advisory has been issued for the Gulpha Creek/Spencer Bay area due to a wastewater overflow. Hot Springs Utilities will monitor the water quality in the area until it is safe for human contact. If you have any questions, you may contact Hot Springs Utilities at (501) 321-6200</i> </p> <ol style="list-style-type: none"> 3. Upon satisfaction of <i>E.Coli</i> testing as outlined in Sampling and Testing section of the SOP the Recission of Advisory shall be provided. <p><u>RECISSION OF ADVISORY</u> <i>The NO SWIMMING Advisory issued on [date and time] for the Gulpha Creek/Spencer Bay area has been canceled. The Bacteriological survey indicates that the water is safe for recreational activities. If you have any questions you may contact Hot Springs Utilities at (501) 321-6200</i> </p>										
<p>ASSOCIATED EQUIPMENT</p>	<p>The following equipment may be deployed for responding to any SSO:</p> <table border="0"> <tr> <td>1. Flusher/Vac Truck</td><td>6. Shovels</td></tr> <tr> <td>2. Backhoe</td><td>7. Rakes</td></tr> <tr> <td>3. Dump Truck</td><td>8. Trash Pickers/Grabbers</td></tr> <tr> <td>4. Crew Trucks</td><td>9. Trash Bags</td></tr> <tr> <td>5. Confined Space Entry Equipment</td><td></td></tr> </table>	1. Flusher/Vac Truck	6. Shovels	2. Backhoe	7. Rakes	3. Dump Truck	8. Trash Pickers/Grabbers	4. Crew Trucks	9. Trash Bags	5. Confined Space Entry Equipment	
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<p>PPE</p>	<p>The following personal protective equipment may be required when responding to any SSO:</p> <table border="0"> <tr> <td>• Hard Hats</td><td>• Rubber gloves</td></tr> <tr> <td>• Safety Glasses/Goggles</td><td>• Rubber Boots</td></tr> <tr> <td>• Face Shield</td><td>• Protective Body Suit</td></tr> <tr> <td>• Ear/Noise Protection</td><td>• Respirators</td></tr> </table>	• Hard Hats	• Rubber gloves	• Safety Glasses/Goggles	• Rubber Boots	• Face Shield	• Protective Body Suit	• Ear/Noise Protection	• Respirators		
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The following pages are tools for responding personnel to use in estimating SSO amounts. The information is largely derived from the Sewer Spill Estimation Guide developed by the Orange County Area Waste Discharge Requirements Steering Committee, Orange County, CA.

LOSS FROM PICK AND VENT-HOLE SSOs

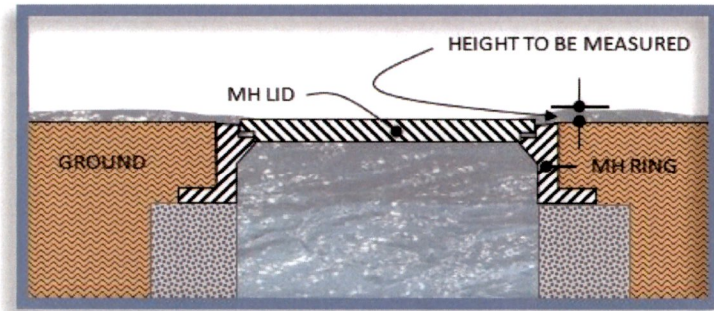


To estimate an SSO from a pick or vent-holes, measure the height of the wastewater plume exiting the hole(s). Find the height and hole diameter on the manhole pick or vent-hole chart to determine the flow rate. Multiply the flow rate time the number of holes that are discharging wastewater. Once the volume (gpm) has been determined, multiply the gpm by the duration of the SSO in minutes.

Pick and Vent Hole Estimation Chart (24" Cover)											
Vent/Pick Hole Diameter (Inches)	Water Height (Inches)		Water Height (Feet)	Gallons per Minute	Gallons per Hour	Vent /Pick Hole Diameter (Inches)	Water Height (Inches)		Water Height (Feet)	Gallons per Minute	Gallons per Hour
0.50	1/16	0.063	0.005	0.23	14	0.75	1/16	0.063	0.005	0.51	31
0.50	1/8	0.125	0.010	0.33	20	0.75	1/8	0.125	0.010	0.72	43
0.50	1/4	0.250	0.021	0.47	28	0.75	1/4	0.250	0.021	1.02	61
0.50	1/2	0.500	0.042	0.66	40	0.75	1/2	0.500	0.042	1.44	86
0.50	3/4	0.750	0.063	0.81	49	0.75	3/4	0.750	0.053	1.77	106
0.50	1	1.000	0.083	0.94	56	0.75	1	1.000	0.083	2.04	122
0.50	1 1/4	1.250	0.104	1.05	63	0.75	1 1/4	1.250	0.104	2.28	137
0.50	1 3/8	1.375	0.115	1.10	66	0.75	1 3/8	1.375	0.115	2.39	143
0.50	1 1/2	1.500	0.125	1.15	69	0.75	1 1/2	1.500	0.125	2.50	150
0.50	1 5/8	1.625	0.135	1.20	72	0.75	1 5/8	1.625	0.135	2.60	156
0.50	1 3/4	1.750	0.146	1.24	74	0.75	1 3/4	1.750	0.146	2.7	162
0.50	2	2.000	0.167	1.33	80	0.75	2	2.000	0.167	2.89	173
0.50	2 1/4	2.25	0.188	1.41	85	0.75	2 1/4	2.250	0.188	3.06	184
0.50	2 1/2	2.50	0.208	1.48	89	0.75	2 1/2	2.500	0.208	3.23	194
0.50	2 3/4	2.75	0.229	1.56	94	0.75	2 3/4	2.750	0.229	3.38	203
0.50	3	3.00	0.250	1.62	97	0.75	3	3.000	0.250	3.53	212
0.50	3 1/4	3.25	0.271	1.69	101	0.75	3 1/4	3.250	0.271	3.66	220
0.50	3 1/2	3.50	0.292	1.75	105	0.75	3 1/2	3.500	0.292	3.82	229
0.50	3 3/4	3.75	0.313	1.82	109	0.75	3 3/4	3.750	0.313	3.95	237
0.50	4	4.00	0.333	1.88	113	0.75	4	4.000	0.333	4.08	245

Example: The measured height of the plume exiting the vent hole is 1 inch from a 1/2" hole and there are four vent holes. The total volume per minute would be 0.94 gpm (from chart above) or 3.76 gpm total (0.94 gpm x 4 holes). If the SSO lasted one hour, the total wastewater lost would be 226 gallons (3.76 gpm x 60 minutes = 225.6 gallons).

LOSS AROUND EDGE OF NON-VENTED COVER



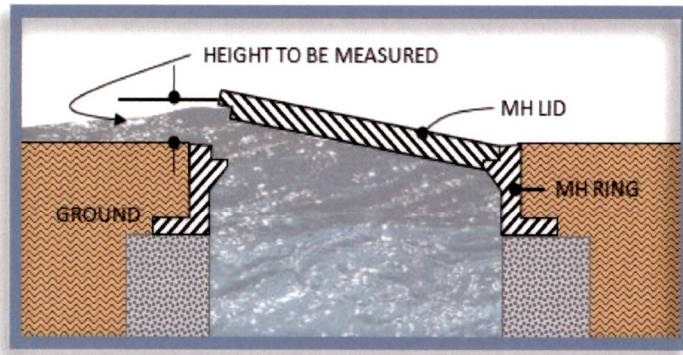
To estimate an SSO from a where wastewater is escaping from around the perimeter of the manhole cover, measure the observed height of the wastewater plume exiting the cover. Find the manhole diameter. Use the chart below to estimate volume of SSO. Wastewater escaping from vent/pick holes must be accounted for separately using Pick and Vent Hole Estimation Chart.

Estimated SSO Flow Out of Manhole with Cover in Place

24 Inch Cover						
Height of Spout above MH Rim (inches)	SSO Flow		Minimum Sewer Size in Which Flow is Possible	Height of Spout above MH Rim (inches)	SSO Flow	
	GPM	MGD			GPM	MGD
1/4	1	0.001		5	148	0.240
1/2	3	0.004		5 1/4	166	0.266
3/4	6	0.008		5 1/2	185	0.294
1	9	0.013		5 3/4	204	0.322
1 1/4	12	0.018		6	244	0.352
1 1/2	16	0.024		6 1/4	265	0.382
1 3/4	21	0.030		6 1/2	286	0.412
2	25	0.037		6 3/4	308	0.444
2 1/4	31	0.045		7	331	0.476
2 1/2	28	0.054		7 1/4	354	0.509
2 3/4	45	0.065		7 1/2	377	0.543
3	54	0.077		7 3/4	401	0.578
3 1/4	64	0.092		8	426	0.613
3 1/2	64	0.107		8 1/4	451	0.649
3 3/4	75	0.125		8 1/2	476	0.686
4	87	0.145		8 3/4	502	0.723
4 1/4	100	0.166		9	529	0.761
4 1/2	115	0.189				
4 3/4	131	0.214				

Example: The measured height of the plume exiting a 24" manhole is 1 inch. The total volume would be 12 gpm from around the manhole cover. Calculate the total exiting from vent/pick hole(s) and add to the total lost around the ring. if the SSO lasted 1 hour (60 minutes), multiply 12 gpm x 60 minutes = 780 gallons per hour + amount lost through pick/vent holes.

LOSS FROM TILTED COVER



To estimate the volume of a spill that occurs when the SSO pressure only lifts one side of the cover, calculate the area (in square feet) from where the wastewater is escaping and the velocity (in square feet per second). The velocity is estimated from visual observation with 2 ft/sec or less being a small velocity, 4 to 5 ft/sec being a medium velocity and 7 ft/sec or higher being a large velocity. Velocities above 7 ft/sec may be strong enough to blow the cover off. Next, multiply the duration (in seconds) that the SSO occurred. Finally, multiply by 7.48 (gallons per cubic foot) to determine the volume of the SSO in gallons.

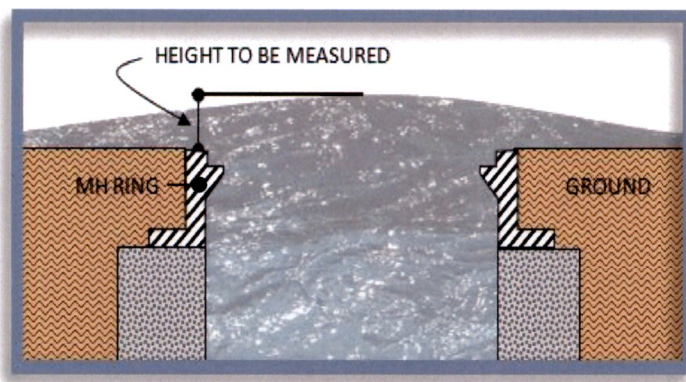
$$\text{Volume} = \text{Area (sq. ft.)} \times \text{Velocity (ft/sec)} \times \text{Time (seconds)} \times 7.48 \text{ (gal/cu. ft)}$$

Area Calculation Chart	
Height of Flow (Inches)	24 Inch Manhole (Square Feet)
0.5	0.131
1	0.262
1.5	0.393
2	0.524
2.5	0.655
A3	0.786
3.5	0.917
4	1.048

Example: The measured height of the plume exiting the side of a 24-inch manhole is 2 inches. Using the above chart, a 2-inch plume from one side provides 0.524 square feet of area. The velocity is estimated at 4-feet/second (visual observation) with a duration of 1 hour. The total estimated SSO is 56,441 gallons (0.524 sq. ft x 4 ft/sec x 60 minutes x 7.48).

To estimate velocity, drop a small floating object into the flow and time how long it takes to travel a measured distance.

LOSS FROM A MANHOLE WITHOUT A LID IN PLACE



Typically, when an SSO reaches 7 cubic feet per second (approximately 3,000 gpm or about 4.32 MGD), the flow is sufficient to blow the manhole cover off. To estimate the volume, take several measurements from the surface close to the manhole ring to the top of the plume and average the findings. Find the average height of the plume on the Area Calculation Chart to determine the rate of flow exiting the manhole. Multiply the flow rate expressed in gallons per minute by the duration of the SSO in minutes to determine the total volume of the SSO.

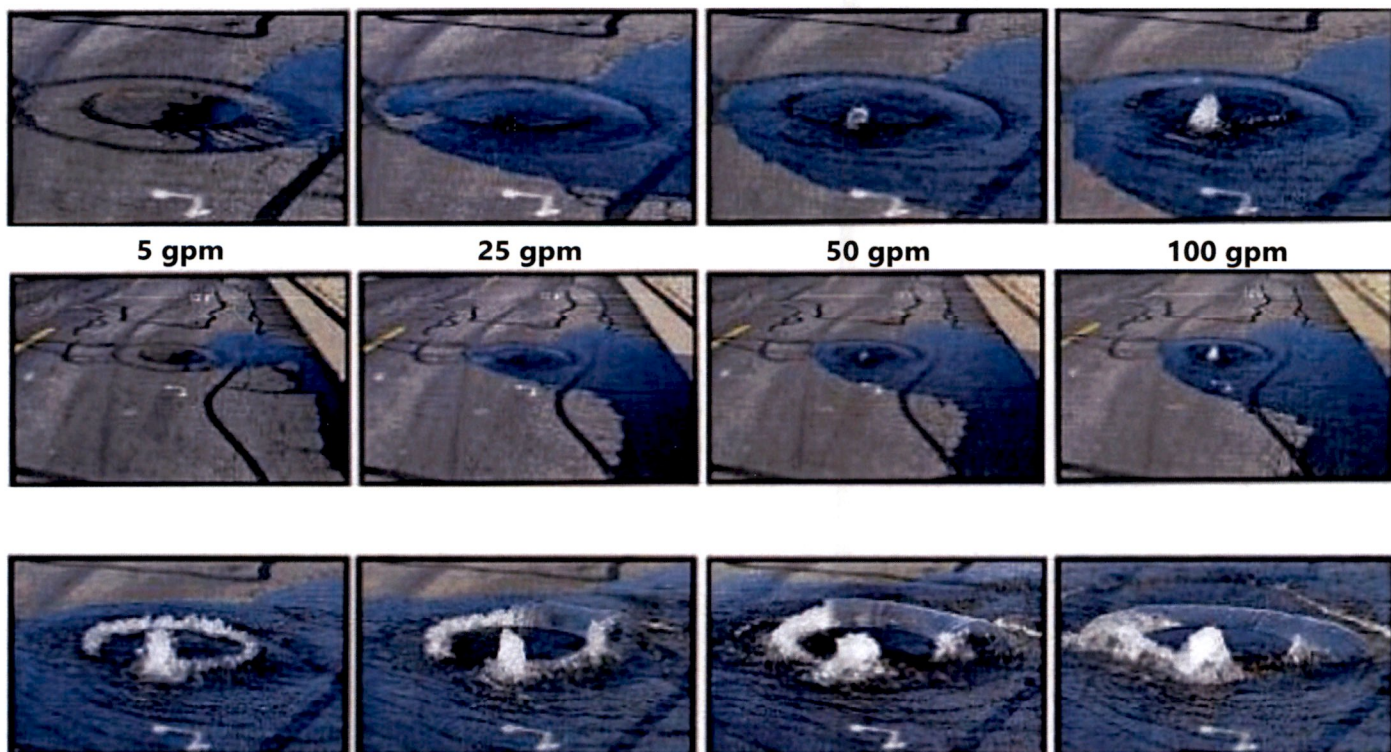
Example: If the average height of the plume exiting a 24" manhole is 2 inches on the chart, the flow in gallons would be

24 Inch Cover							
Height of Spout above MH Rim (inches)	SSO Flow		Minimum Sewer Size in Which Flow is Possible	Height of Spout above MH Rim (inches)	SSO Flow		Minimum Sewer Size in Which Flow is Possible
	GPM	MGD			GPM	MGD	
1/8	58	0.04		1 5/8	2,396	3.45	18
1/4	62	0.09		1 3/4	2,799	4.03	
3/8	111	0.16		1 7/8	3,132	4.51	
1/2	160	0.23		2	3,444	4.96	21
5/8	215	0.31	6	2 1/8	3,750	5.40	
3/4	354	0.51	8	2 1/4	3,986	5.74	
7/8	569	0.82	10	2 3/8	4,215	6.07	
1	799	1.15	12	2 1/2	4,437	6.39	
1 1/8	1,035	1.49		2 5/8	4,569	6.58	24
1 1/4	1,340	1.93	15	2 3/4	4,687	6.75	
1 3/8	1,660	2.39		2 7/8	4,799	6.91	
1 1/2	1,986	2.86		3	4,910	7.07	

PICTORIAL REFERENCE

Currently there are two pictorial charts widely used to assist with estimating SSO Volumes displayed below. To use either of these Pictorial references, select the picture that most accurately represents the SSO being estimated. Use the gpm associated with the picture multiplied by the duration of the SSO to estimate the spill volume.

Example: If the selected picture shows 300 gpm and the duration is 55 minutes, the total estimated spill volume would be 16,500 gallons (300 gpm x 55 minutes).



150 gpm



200 gpm



300 gpm



400 gpm



Disclaimer:

This pictorial reference was developed by the California Water Environment Association, Southern Section Collection Systems Committee.

Reference Sheet for Estimating Sewer Spills

From the UC San Diego Overflow Emergency Response Field Guide



5 gpm



25 gpm



50 gpm



100 gpm



150 gpm



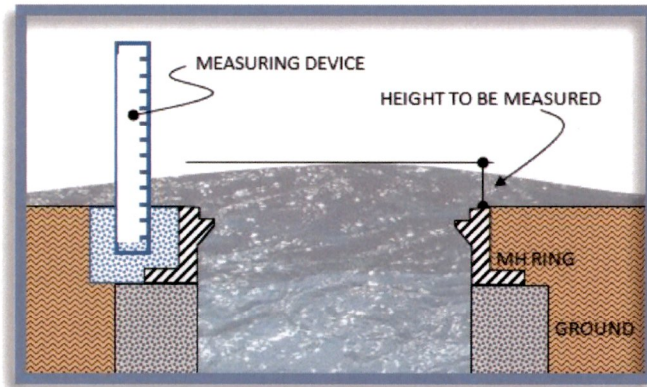
200 gpm



225 gpm

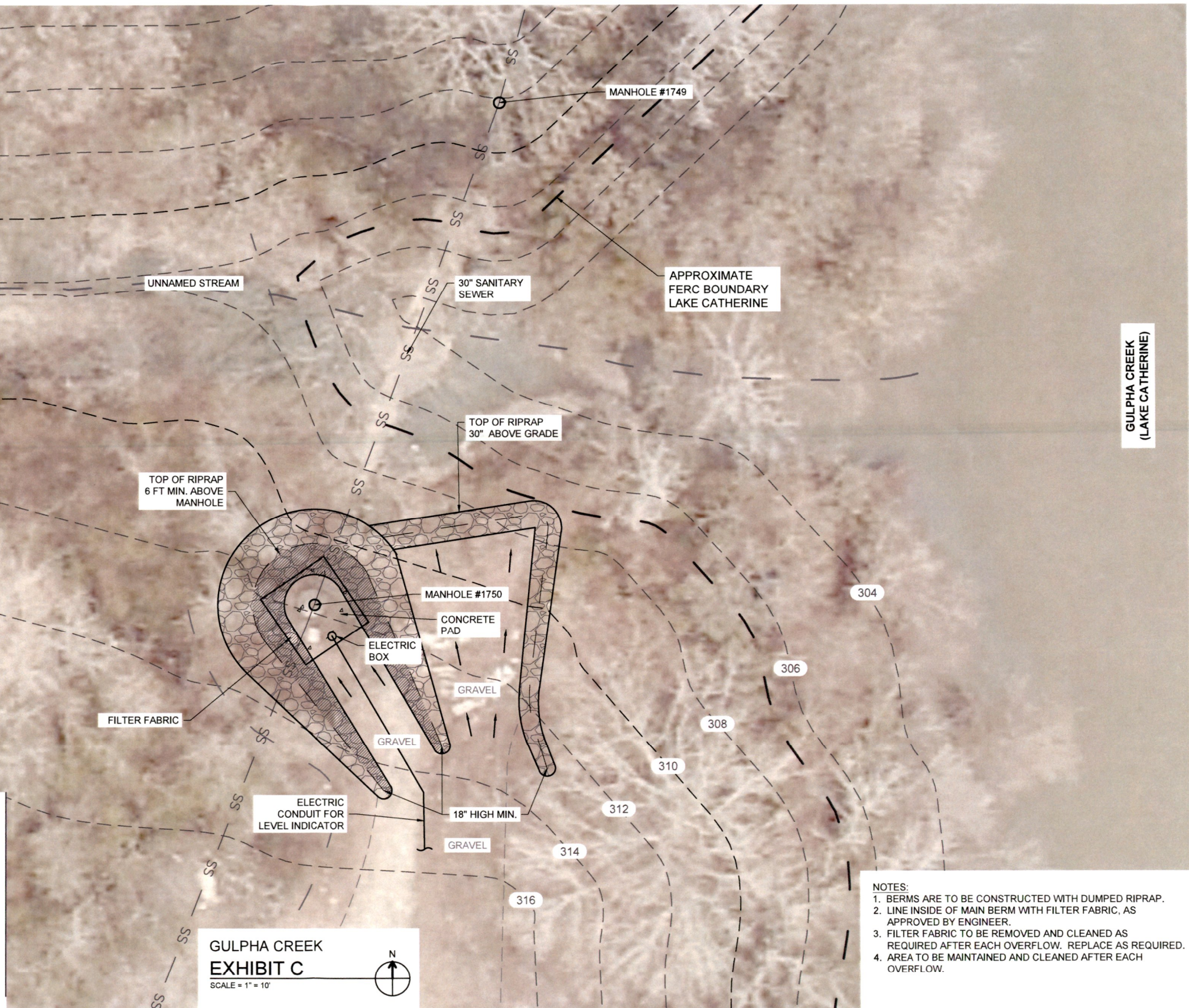
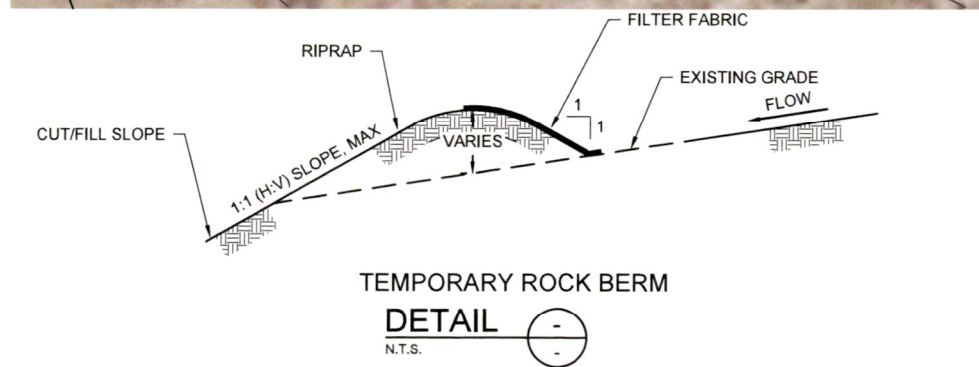
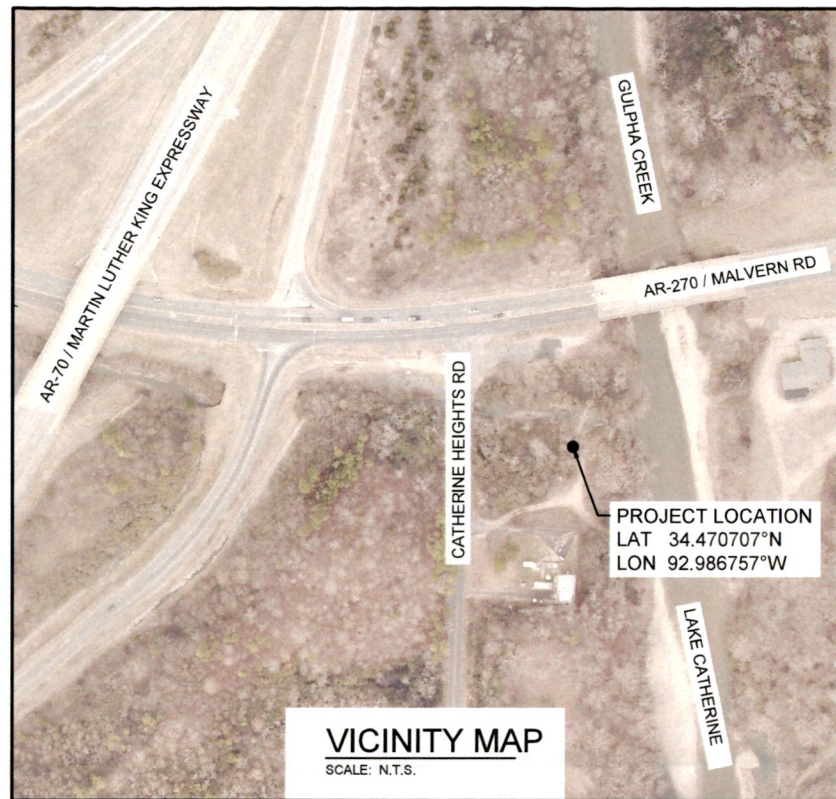
250 gpm

275 gpm



At Manhole 1750 Hot Springs Utilities will install a measuring device as close to the rim of the manhole to assist personnel in measuring the height of the overflow plume.

P:\2020 Projects\2026 - CHS PWO No. 01 ADEE-DEQ CAO Negotiation and CAP\06 - CADD\02 - Civil\Gulpha Creek\Gulpha Creek Exhibit.dwg 8/16/2021 1:39 PM



- NOTES:**
1. BERMS ARE TO BE CONSTRUCTED WITH DUMPED RIPRAP.
 2. LINE INSIDE OF MAIN BERM WITH FILTER FABRIC, AS APPROVED BY ENGINEER.
 3. FILTER FABRIC TO BE REMOVED AND CLEANED AS REQUIRED AFTER EACH OVERFLOW. REPLACE AS REQUIRED.
 4. AREA TO BE MAINTAINED AND CLEANED AFTER EACH OVERFLOW.

CRIST ENGINEERS, INC.
CONSULTING ENGINEERS LITTLE ROCK, ARKANSAS



0 10'
1" = 10'-0"

DATE: JUL. 2021

HOT SPRINGS, ARKANSAS
UTILITIES DEPARTMENT
GULPHA CREEK
EXHIBIT C

Exhibit B





**WATER QUALITY ASSESMENT PLAN FOR
SANITARY SEWER OVERFLOWS
FROM MANHOLE 1750
NEAR GULPHA CREEK IN HOT SPRINGS, AR**

August 16, 2021

WATER QUALITY ASSESMENT PLAN FOR
SANITARY SEWER OVERFLOWS
FROM MANHOLE 1750
NEAR GULPHA CREEK IN HOT SPRINGS, AR

Prepared for

Crist Engineers
205 Executive Court
Little Rock, AR 72205

Prepared by

FTN Associates, Ltd.
3 Innwood Circle, Suite 220
Little Rock, AR 72211

FTN No. 05370-2672-001

August 16, 2021

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ATTACHMENT

ATTACHMENT 1	City of Hot Springs Standard Operating Procedure (SOP) – updated as of August 16, 2021
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1.0 INTRODUCTION

This Water Quality Assessment Plan (WQAP) serves as additional documentation for the procedures that FTN Associates, Ltd. (FTN) will follow to assist the City of Hot Springs Utilities Department (City of Hot Springs) with assessing potential health concerns when sanitary sewer overflows (SSO) occur at Manhole 1750 near Gulpha Creek in Hot Springs, Arkansas. The primary documentation for the overall activities that will occur in response to a SSO at Manhole 1750 is a Standard Operating Procedure (SOP) that the City of Hot Springs is submitting to the Arkansas Department of Energy and Environment Division of Environmental Quality (DEQ) on August 16, 2021. A copy of the SOP is included as Attachment 1 to this WQAP.

The SOP includes background information regarding Manhole 1750, including its location just west of Gulpha Creek and south of Malvern Avenue (see map that is labeled as Exhibit B in the SOP). Exhibit B in the SOP also shows the sampling locations where water quality data will be collected. Water quality sampling is the activity for which FTN will provide assistance.

2.0 SAMPLING AND ANALYSIS PROCEDURES

2.1 Sampling Locations and Parameters

The section of the SOP labeled “SAMPLING AND TESTING” notes that water quality sampling will occur at the three sampling locations shown on Exhibit B upon validation that a spill is entering Gulpha Creek. Site 2 is the upstream site in Gulpha Creek, Site 3 is the downstream site in Gulpha Creek, and Site 1 represents water from the SSO before it reaches Gulpha Creek.

Although the SOP discusses sampling only for fecal coliforms and *E. coli*, the samples at Site 1, Site 2, and Site 3 will be analyzed for the parameters in Table 2.1. As each sample is collected, turbidity (in NTU), temperature, pH, conductivity, and dissolved oxygen (DO) will be measured *in situ*. The laboratory will provide the *E. coli* results to the City of Hot Springs within three calendar days of when the samples were collected; results for other parameters will be provided to the City of Hot Springs within 14 calendar days of when the lab receives the samples. The City of Hot Springs will submit each set of results to DEQ upon receipt from the laboratory.

Table 2.1. Water chemistry parameters to be measured by the laboratory.

Parameter*	Sample container	Preservation	Maximum holding time	Analytical method
Sulfate	Plastic	4°C	28 days	EPA 300.0
Chloride	Plastic	4°C	28 days	EPA 300.0
TDS	Plastic	4°C	7 days	SM 2540 C-1997
TSS	Plastic	4°C, HNO ₃	6 months	SM 2540 D-1997
Total Alkalinity	Plastic	4°C	14 days	SM 2320 B-2011
CBOD 5 day	Plastic	4°C	48 hours	SM 5210 B-2001
NH ₄ as N	Plastic	4°C, H ₂ SO ₄	28 days	SM 4500-NH ₃ H-1997
NO ₂ + NO ₃ as N	Plastic	4°C, H ₂ SO ₄	28 days	SM 4500-NO ₃ F-2000
TKN as N	Plastic	4°C, H ₂ SO ₄	28 days	SM 4500-P, G-1999
Ortho-phosphorus as P	Plastic	4°C	48 hours	SM 4500-P, G-1999
Total phosphorus as P	Glass	4°C, H ₂ SO ₄	28 days	SM 4500-9
Chlorophyll <i>a</i>	Dark Plastic	4°C	24 hours unfiltered	EPA 445.0
<i>E. coli</i>	Dark Plastic	4°C	6 hours	EPA 1603

* TDS = total dissolved solids, TSS = total suspended solids, CBOD = carbonaceous biochemical oxygen demand, NH₄ = ammonium, NO₂ = nitrite, NO₃ = nitrate, TKN = total Kjeldahl nitrogen

2.2 Re-sampling for *E. coli*

Re-sampling for *E. coli* will be conducted in accordance with the SOP (Attachment 1).

2.3 Sampling Methods

Personnel responding to any SSO must wear appropriate personal protective equipment (PPE) to prevent contact with raw sewage. PPE may include: rubber gloves, rubber boots, impermeable coveralls and protective headwear with splash shield.

Water samples in Gulpha Creek will be collected in an area of flow near mid-channel, if the stream is flowing, rather than in an eddy or stagnant pool near the edge of the channel. Field Sampling personnel may walk into the stream as long as the samples are collected upstream of any disturbance created by the sampler walking on the stream bottom. If excessive flow precludes sampling near mid-channel due to safety concerns, samples may be collected by an extendable sampling dipper as close to mid-channel as feasible.

Water samples will be collected at all locations using the direct grab method. Water grab samples will be collected from mid-depth of the water column using the actual sample container as the collection device, where practical. The container cap will be removed, the container will be slowly submerged, opening first, into the water and inverted so the opening is upright, allowing the water to run slowly into the container until filled. The filled container will be quickly returned to the surface and capped. Skimming the surface of the water or suspending bottom sediments during collection will be avoided. In cases where preservative has been added to the sampling containers, a bulk water sample will be collected in a transfer sampling container (to be provided by the laboratory) as described above and then transferred into the pre-preserved sampling bottles so as not to allow flow-back for preserved samples. Once capped, the sample container will be inverted several times to ensure sufficient mixing of sample and preservatives. Water samples will be placed on ice upon collection and delivered to the laboratory. If the laboratory is not open when sample collection is completed (e.g., after business hours), the samples will be kept on ice and analyzed by the laboratory even if actual holding times exceed the allowable holding times in Table 2.1. Any analyses conducted outside of the allowable holding times will be noted by the laboratory in its report of the results.

In situ parameters will be measured following the collection of water chemistry samples. The sampler will collect *in situ* measurements in the same approximate location as the water chemistry samples using a properly calibrated multi-parameter water quality sonde.

Water samples will be collected in Gulpha Creek beginning downstream and working upstream.

3.0 REFERENCES

- DEQ. 2020. *Assessment Methodology for the Preparation of the 2020 Integrated Water Quality Monitoring and Assessment Report*. Arkansas Department of Energy and Environment Division of Environmental Quality, Office of Water Quality. Accessed online at [www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2020/2020 AM Final.pdf](http://www.adeq.state.ar.us/water/planning/integrated/303d/pdfs/2020/2020%20AM%20Final.pdf)
- APCEC. 2020. *Regulation No. 2, Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas*. Arkansas Pollution Control and Ecology Commission. Effective date February 13, 2020. Accessed online at https://www.adeq.state.ar.us/regs/files/reg02_final_200124.pdf

ATTACHMENT 1

City of Hot Springs Standard Operating Procedure (SOP)

STANDARD OPERATING PROCEDURE

SOP Title:	Manhole 1750 Sanitary Sewer Overflow		
SOP CODE:	6459.662.61-2021.07	CATEGORY:	SSO RESPONSE

OBJECTIVE	To provide clear and complete instructions for responding to sanitary sewer overflows at Manhole 1750 in particular.
BACKGROUND	Manhole 1750 has a history of overflows during periods of wet weather due to the hydraulic design combined with unidentified I&I in the Gulpha Sewer Basin. Any SSO during dry weather would likely be due to a blockage or equipment failure at the Gulpha Lift Station.
SAFETY PROCEDURES	Personnel responding to any SSO must wear appropriate personal protective equipment (PPE) to prevent contact with raw sewage. PPE may include: rubber gloves, rubber boots, impermeable coveralls and protective headwear with splash shield.
POTENTIAL HAZARDS	Manhole 1750 is located (117 Catherine Heights Rd.) near Gulpha Creek, which flows into Spencer Bay and on to Lake Catherine. SSO contamination impacts the water quality of an area used for recreational activities.
RESPONSE	<p>Upon notification from remote sensing equipment, notification by the remote float auto-dialer, SCADA, other staff, or public notification, personnel responding to an SSO may encounter an emergency situation that requires immediate action. The first responders to the site during normal business hours will be Wastewater Collection crews. After hours, On-Call personnel will respond and call for back up personnel as needed.</p> <p>Responding personnel will:</p> <ol style="list-style-type: none"> 1. Determine whether the spill has reached Gulpha Creek 2. Notify testing laboratory to acquire testing samples should the spill reach Gulpha Creek* 3. Post ADH signs at locations shown in Exhibit A for Sample Site 1, should the spill reach Gulpha Creek 4. Provide a CodeRED in accordance with Public Notification requirement in this SOP for effected area as outlined in the notification boundary shown in Exhibit A. 5. Determine the cause of the problem (blockage, equipment failure at Gulpha Lift Station, wet weather I&I) 6. Determine what additional resources may be needed (equipment and materials). 7. Document any necessary information needed for reporting requirements. 8. Take photos of the impacted area. 9. Estimate the release volume based on size of the sewer, weather conditions and the extent of the release. 10. Report spill in accordance with Office of Water Quality, DEQ reporting requirements. <p>*Should testing agency not be available for immediate sampling, City of Hot Springs laboratory personnel will acquire a sample and hold in accordance with testing protocol and provide a chain of custody to the testing laboratory for further handling.</p>
CONTAINMENT	<p>Containment of an overflow is the responder's first priority. The methods used will vary on a case by case basis. The Manager, Crew Leader and maintenance responders will:</p> <ol style="list-style-type: none"> 1. Identify and obtain the necessary equipment and materials needed to contain the overflow. 2. Take immediate steps to contain the overflow (block path toward receiving water, recover with vacuum truck). 3. Determine whether additional containment measures are needed.

CORRECTION OF OVERFLOW	<p>The time required to correct the cause of the overflow depends on the determined cause. In the case of Manhole 1750, the most frequent cause is wet weather initiated I&I and the current hydraulic limitations of the collection and pumping system.</p> <p>Responding crews must begin by investigating upstream manholes and the downstream lift station for evidence of blockage or equipment failure. When necessary, contractor services may be requested as an additional resource to abate the overflow.</p>
SAMPLING AND TESTING	<p>Upon response to the spill and validation that the spill is entering Gulpha Creek, the following sampling and testing will be initiated for Fecal Coliform Bacteria and <i>E. Coli</i>.</p> <ol style="list-style-type: none"> 1. Sampling shall occur at the locations shown on Exhibit A. 2. First series of test shall be for Sample Site 1. 3. Results shall be made available to the City of Hot Springs within three (3) calendar days of the event from the testing laboratory. 4. Should the <i>E.Coli</i> test result exceed 126 cfu/100ml at Sample Site 1 as shown on Exhibit A, ADH signs will be posted for Sample Site 3, Sample Site 4, and Sample Site 5. 5. A second series of tests will be scheduled and conducted for Sample Site 2, Sample Site 3, Sample Site 4, and Sample Site 5 until two consecutive results for <i>E.Coli</i> are equal to or less than 126 cfu/100ml are achieved, at which time the testing will cease, concluding safe bacteriological standards recommended by EPA. 6. ADH Signs shall be removed upon demonstration of safe bacteriological testing. 7. City of Hot Springs shall email all test results to DEQ's Office of Water Quality, Enforcement Branch at water-enforcement-report@adeq.state.ar.us upon receipt from the testing laboratory. <p>Testing shall be conducted at approved Department of Environmental Quality laboratory.</p>
RECOVERY/CLEANUP	<p>Cleanup will be completed for all SSOs following containment and correction of the overflow. The recovery efforts will be directed at returning the affected to a pre-release condition as quickly and efficiently as possible. Cleanup activities will vary depending on the situation. Actions selected will be performed thoroughly. The general process is as follows:</p> <ol style="list-style-type: none"> 1. Response crew will use appropriate PPE during cleanup and recovery 2. Affected area will be cleaned as much as possible using rakes, shovels, hand picker tools and vacuum equipment. 3. Affected overflow area will be evaluated for appropriate disinfection. This may include applying lime to absorb liquid and raise the pH to reduce pathogens, applying a non-hazardous bio-enzymatic bacteria consuming product to reduce impact of pathogens on receiving waters. 4. Maintain, as far as possible, an appropriate buffer zone between limited areas and the waters of the state and the United States. 5. The immediate area around the overflow site will be inspected to ensure that no visual residue remains, including solids, papers, and rags, etc. 6. If flushing is warranted and ultimately performed, then all solids and debris must be collected and disposed of properly. 7. All wash-down water must be returned to the sewer system.
ADDITIONAL RESOURCES	<p>If the maintenance crew is unable to contain and clean up the affected area with typical maintenance equipment, then the next step will be to bring in contractor or other construction support. The following steps will be taken by on-call management:</p> <ol style="list-style-type: none"> 1. Assess and mark the boundaries of the suspected area for all utility service locations (marking materials such as white paint will be used to mark the boundaries, and "Locate" will be written to indicate the area). 2. Call (811) CALL BEFORE YOU DIG. 3. Determine the additional resources and type of construction crew required to perform the task(s).

	<ol style="list-style-type: none"> 4. Call for the additional resources using existing approved contact lists as deemed necessary. 5. Enlist appropriate contract services. 6. Manage actions taken by the additional construction crew to clean up the affected area. 7. Ensure actions are documented following the SSO reporting procedures.
FIELD REPORTING	<p>Responding personnel will collect accurate and complete field data required to be submitted to DEQ. The following information will be documented:</p> <ol style="list-style-type: none"> 1. Date and time of notification (SCADA, Public Notification, Staff Report) 2. Date and time of dispatch 3. Date and time of arrival 4. Date and time of departure 5. Date and time of release ended (estimated as close as possible) 6. Location 7. Downstream Gulpha Pump Station status 8. Probable Cause 9. Estimated release 10. Visual impact observed 11. Actions to repair/mitigate
REGULATORY REPORTING	<p>Shawn Davis, Wastewater Collection Manager or his designate will report the SSO to the Arkansas Energy and Environment Department, Office of Water Quality within 24 hours. The Online Sanitary Sewer Overflow (SSO) Reporting Form can be found at</p> <p>https://www.adeg.state.ar.us/water/enforcement/ss0/submit.aspx</p> <p>This initial 24-hour report should include the following information:</p> <ol style="list-style-type: none"> 1. Permit Number 2. Location of overflow (manhole number or street address) 3. The receiving water (if applicable) 4. Cause of overflow (if known) 5. Estimated volume of overflow 6. Total duration of the overflow <p>If the "total duration of the overflow" is not known when the 24-hour SSO online report is submitted, then a follow-up report (5-day report) giving a detailed account of the overflow and the steps taken to resolve it must be submitted within 5 days of the overflow's discovery. This report can be submitted by email at ssoadeg@adeq.state.ar.us or by mail (include Attn: Water Quality Enforcement).</p> <p>A sample of the spill shall be taken prior to confluence of the receiving stream for Fecal Coliform Bacteria and <i>E.coli</i>. Results of the testing shall be reported to the DEQ's Office of Water Quality, Enforcement Branch within three calendar days of the event sampled. Test results will be emailed to water-enforcement-report@adeq.state.ar.us</p> <p>Sample locations are shown in Exhibit A.</p>
PUBLIC NOTIFICATION	<p>When SSO spill reaches Gulpha Creek, City of Hot Springs Utilities will take measures inform those affected by the possible impact on water quality. The methods of public notification include:</p> <ol style="list-style-type: none"> 1. Signs will be posted at locations as shown in Exhibit A upon first response to the spill advising against human contact with the affected water in accordance with this SOP. Signs will be removed when testing concludes bacteriological standards are achieved in accordance the sampling and testing section in this SOP.

Sign content shall be as follows:

HEALTH ADVISORY
WATER QUALITY IN THIS AREA
MAY BE UNSAFE

SWIM AT YOUR OWN RISK



Arkansas Department of Health

4815 West Markham Street • Little Rock Arkansas 72205-3867

Environmental Health (501)661-2171

Epidemiology (501)661-2893

2. A **CodeRED** alert will be sent to the population living in close proximity to the water bodies in accordance with boundary shown on Exhibit A.

ADVISORY

*As of [date and time] a **NO SWIMMING** Advisory has been issued for the Gulpha Creek/Spencer Bay area due to a wastewater overflow. Hot Springs Utilities will monitor the water quality in the area until it is safe for human contact. **If you have any questions, you may contact Hot Springs Utilities at (501) 321-6200***

3. Upon satisfaction of *E.Coli* testing as outlined in Sampling and Testing section of the SOP the Recission of Advisory shall be provided.

RECISSION OF ADVISORY

*The **NO SWIMMING** Advisory issued on [date and time] for the Gulpha Creek/Spencer Bay area has been canceled. The Bacteriological survey indicates that the water is safe for recreational activities. **If you have any questions you may contact Hot Springs Utilities at (501) 321-6200***

ASSOCIATED EQUIPMENT

The following equipment may be deployed for responding to any SSO:

- | | |
|-----------------------------------|---------------------------|
| 1. Flusher/Vac Truck | 6. Shovels |
| 2. Backhoe | 7. Rakes |
| 3. Dump Truck | 8. Trash Pickers/Grabbers |
| 4. Crew Trucks | 9. Trash Bags |
| 5. Confined Space Entry Equipment | |

PPE

The following personal protective equipment may be required when responding to any SSO:

- | | |
|---------------------------|-------------------------|
| 1. Hard Hats | 5. Rubber gloves |
| 2. Safety Glasses/Goggles | 6. Rubber Boots |
| 3. Face Shield | 7. Protective Body Suit |
| 4. Ear/Noise Protection | 8. Respirators |

Exhibit B



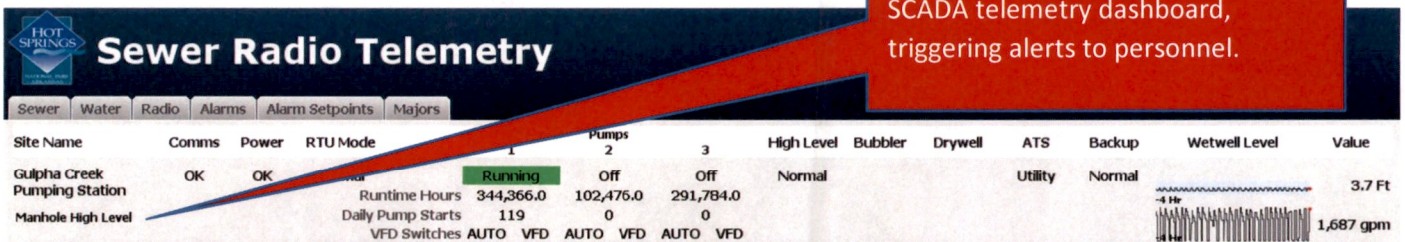


Hot Springs Utilities has constructed a ~ 5' high horseshoe-shaped berm around Manhole 1750. A pond liner is in place to help slow or prevent an SSO from flowing toward Gulpha Creek.



A float alarm has been installed at MH 1750. The alarm is linked to the Utilities SCADA system. When activated, alert messages go out to multiple phones associated the Sewer Radio Telemetry.

When the float alarm activates, the Manhole High Level turns red on the SCADA telemetry dashboard, triggering alerts to personnel.



Outside view of the horseshoe-shaped berm, approximately 5' in height.



The Arkansas Department of Health provided signage to post when test results for E coli exceeds 126 cfu/100 ml.



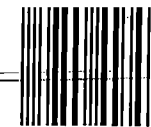
The contribution stream that flows into Gulpha Creek



Gulpha Creek



1000

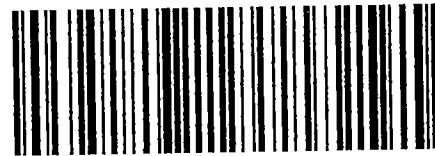


72118

FCM LG ENV
HOT SPRINGS NATIONAL PARK, A
71913
AUG 17, 21
AMOUNT
\$5.80
R2303s103483-14

PLACE STICKER AT TOP OF ENVELOPE TO THE RIGHT
OF THE RETURN ADDRESS, FOLD AT DOTTED LINE

CERTIFIED MAIL®



7021 0950 0001 3406 3900



City of Hot Springs Utilities Department
780 Adams Street
Hot Springs, Arkansas 71901

Ms. Leslie Allen-Daniel, Enforcement Coordinator
Mr. Alan York, Associate Director
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