



Tennessee Department of Environment and Conservation
 Division of Water Resources
 William R. Snodgrass Tennessee Tower,
 312 Rosa L. Parks Avenue, 11th Floor, Nashville, Tennessee 37243
 1-888-891-8332 (TDEC)

Phase II Small Municipal Separate Storm Sewer System (MS4) Annual Report

1. MS4 Information

Name of MS4: City of Springfield		MS4 Permit Number: TNS077640
Contact Person: Kenny Morris		Email Address: kenny.morris@springfieldtn.gov
Telephone: (615) 469-4336		MS4 Program Web Address: https://www.springfieldtn.gov/338/Public-Works-Storm-Water-Management
Mailing Address: 2809 Clinard Drive		
City: Springfield	State: TN	ZIP code: 37172

What is the current population of your MS4? 17,277 (2019 US Census Bureau Estimate)

What is the reporting period for this annual report? July 1 2020 to June 30 2021

2. Discharges to Waterbodies with Unavailable Parameters or Exceptional Tennessee Waters (Section 3.1)

- A. Does your MS4 discharge into waters with unavailable parameters (previously referred to as impaired) for pathogens, nutrients, siltation or other parameters related to stormwater runoff from urbanized areas as listed on TN's most current 303(d) list and/or according to the on-line state GIS mapping tool (tdeconline.tn.gov/dwr/)? If yes, attach a list. Yes No
- B. Are there established and approved TMDLs (<http://www.tn.gov/environment/article/wr-ws-tennessees-total-maximum-daily-load-tmdl-program>) with waste load allocations for MS4 discharges in your jurisdiction? If yes, attach a list. Yes No
- C. Does your MS4 discharge to any Exceptional Tennessee Waters (ETWs - http://environment-online.tn.gov:8080/pls/enf_reports/f?p=9034:34304:4880790061142)? If yes, attach a list. Yes No
- D. Are you implementing specific Best Management Practices (BMPs) to control pollutant discharges to waterbodies with unavailable parameters or ETWs? If yes, describe the specific practices: Construction plans are reviewed to ensure TDEC approved Best Management Practices are incorporated into the planning process. Construction sites are monitored and inspected monthly until final stabilization is achieved. Yes No

3. Public Education/Outreach and Involvement/Participation (Sections 4.2.1 and 4.2.2)

- A. Have you developed a Public Information and Education plan (PIE)? Yes No
- B. Is your public education program targeting specific pollutants and sources, such as Hot Spots? If yes, describe the specific pollutants and/or sources targeted by your public education program: Information on the City's website targets prevention of illicit discharges with tips for homeowners. Pamphlets are distributed to targeted audiences including homeowners, agriculture and the construction industry. Yes No
- C. Do you have a webpage dedicated to your stormwater program? If yes, provide a link/URL: https://www.springfieldtn.gov/338/Public-Works-Storm-Water-Management Yes No

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- D. Summarize how you advertise and publicize your public education, outreach, involvement and participation opportunities: City website and social media.
- E. Summarize the public education, outreach, involvement and participation activities you completed during this reporting period: The City completed one highly successful city-wide clean-up event involving more than 100 participants and resulting in over 3 tons of litter and debris collected. The City also participates in the Tennessee Stormwater Association's social media campaign.
- F. Summarize any specific successful outcome(s) (e.g., citizen involvement, pollutant reduction, water quality improvement, etc.) fully or partially attributable to your public education and participation program during this reporting period: Increase in the number of citizen reports of illicit discharges or other stormwater concerns. Although several reports resulted in no action being required, the implication is that there is an increased awareness of the City's stormwater management program and how to request assistance and/or report an issue.

4. Illicit Discharge Detection and Elimination (Section 4.2.3)

- A. Have you developed and do you continue to update a storm sewer system map that shows the location of system outfalls where the municipal storm sewer system discharges into waters of the state or conveyances owned or operated by another MS4? Yes No
- B. If yes, does the map include inputs into the storm sewer collection system, such as the inlets, catch basins, drop structures or other defined contributing points to the sewershed of that outfall, and general direction of stormwater flow? Yes No
- C. How many outfalls have you identified in your storm sewer system? 75 (Updated from prior years reporting as a result of new information)
- D. Do you have an ordinance, or other regulatory mechanism, that prohibits non-stormwater discharges into your storm sewer system? Yes No
- E. Have you implemented a plan to detect, identify and eliminate non-stormwater discharges, including illegal disposal, throughout the storm sewer system? If yes, provide a summary: Dry weather outfall screening and Hot Spot inspections. Yes No
- F. How many illicit discharge related complaints were received this reporting period? 17
- G. How many illicit discharge investigations were performed this reporting period? 17
- H. Of those investigations performed, how many resulted in valid illicit discharges that were addressed and/or eliminated? 14

5. Construction Site Stormwater Runoff Pollutant Control (Section 4.2.4)

- A. Do you have an ordinance or other regulatory mechanism requiring:
 - Construction site operators to implement appropriate erosion prevention and sediment control BMPs consistent with those described in the TDEC EPSC Handbook? Yes No
 - Construction site operators to control wastes such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste? Yes No
 - Design storm and special conditions for unavailable parameters waters or Exceptional Tennessee Waters consistent with those of the current Tennessee Construction General Permit (TNR100000)? Yes No

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- B. Do you have specific procedures for construction site plan (including erosion prevention and sediment BMPs) review and approval? Yes No
- C. Do you have sanctions to enforce compliance? Yes No
- D. Do you hold pre-construction meetings with operators of priority construction activities and inspect priority construction sites at least monthly? Yes No
- E. How many construction sites disturbing at least one acre or greater were active in your jurisdiction this reporting period? 16
- F. How many active priority and non-priority construction sites were inspected this reporting period? 16
- G. How many construction related complaints were received this reporting period? 5

6. Permanent Stormwater Management at New Development and Redevelopment Projects (Section 4.2.5)

- A. Do you have a regulatory mechanism (e.g. ordinance) requiring permanent stormwater pollutant removal for development and redevelopment projects? If no, have you submitted an Implementation Plan to the Division? Yes No
 Yes No
- B. Do you have an ordinance or other regulatory mechanism requiring:
 - Site plan review and approval of new and re-development projects? Yes No
 - A process to ensure stormwater control measures (SCMs) are properly installed and maintained? Yes No
 - Permanent water quality riparian buffers? If yes, specify requirements: Attachment 2 is an extract from the City's Stormwater Management Ordinance. In the case that the provisions set forth in the City Ordinance are overlapping or contradictory with the Construction General Permit, the provision which imposes a higher or more restrictive standard shall be followed. Yes No
- C. What is the threshold for development and redevelopment project plans plan review (e.g., all projects, projects disturbing greater than one acre, etc.)? Projects disturbing equal to or greater than 10,000 square feet.
- D. How many development and redevelopment project plans were reviewed for this reporting period? 22
- E. How many development and redevelopment project plans were approved? 18
- F. How many permanent stormwater related complaints were received this reporting period? 0
- G. How many enforcement actions were taken to address improper installation or maintenance? 4
- H. Do you have a system to inventory and track the status of all public and private SCMs installed on development and redevelopment projects? Yes No
- I. Does your program include an off-site stormwater mitigation or payment into public stormwater fund? If yes, specify. _____ Yes No

7. Stormwater Management for Municipal Operations (Section 4.2.6)

- A. As applicable, have stormwater related operation and maintenance plans that include information related to maintenance activities, schedules and the proper disposal of waste from structural and non-structural stormwater controls been developed and implemented at the following municipal operations:
 - Streets, roads, highways? Yes No
 - Municipal parking lots? Yes No

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- | | | |
|---|---|---------------------------------|
| Maintenance and storage yards? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| Fleet or maintenance shops with outdoor storage areas? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| Salt and storage locations? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| Snow disposal areas? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| Waste disposal, storage, and transfer stations? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
|
B. Do you have a training program for employees responsible for municipal operations at facilities within the jurisdiction that handle, generate and/or store materials which constitute a potential pollutant of concern for MS4s? |
<input checked="" type="checkbox"/> Yes |
<input type="checkbox"/> No |
| If yes, are new applicable employees trained within six months, and existing applicable employees trained and/or retrained within the permit term? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |

8. Reviewing and Updating Stormwater Management Programs (Section 4.4)

- A. Describe any revisions to your program implemented during this reporting period including but not limited to:
- Modifications or replacement of an ineffective activity/control measure. Updated comprehensive Stormwater Management Plan to include adding SOP's as appendices for IDDE, municipal operations and monitoring programs. Implemented updated monitoring plan.
- Changes to the program as required by the division to satisfy permit requirements. Updated PIE plan; developed tracking mechanism for public involvement and participation; performed and documented employee illicit discharge training; revised project plan review checklists; performed and documented P2 training.
- Information (e.g. additional acreage, outfalls, BMPs) on newly annexed areas and any resulting updates to your program. None
- B. In preparation for this annual report, have you performed an overall assessment of your stormwater management program effectiveness? If yes, summarize the assessment results, and any modifications and improvements scheduled to be implemented in the next reporting period. The enforcement response plan legally allows the City to employ progressive enforcement actions in response to violations and repeat violators, however it lacks sufficient detail for certain administrative actions. Procedures to fully implement the ERP are under development and legal review, and will strengthen the City's response to certain stormwater violations.
- | | | |
|--|---|-----------------------------|
| | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
|--|---|-----------------------------|

9. Enforcement Response Plan (Section 4.5)

- A. Have you implemented an enforcement response plan that includes progressive enforcement actions to address non-compliance, and allows the maximum penalties specified in TCA 68-221-1106? If no, explain. _____ Yes No
- B. As applicable, identify which of the following types of enforcement actions (or their equivalent) were used during this reporting period; indicate the number of actions, the minimum measure (e.g., construction, illicit discharge, permanent stormwater management), and note those for which you do not have authority:

<u>Action</u>	<u>Construction</u>	<u>Permanent Stormwater</u>	<u>Illicit Discharge</u>	<u>In Your ERP?</u>	
Verbal warnings	# <u>3</u>	# <u>0</u>	# <u>12</u>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Written notices	# <u>9</u>	# <u>4</u>	# <u>3</u>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Citations with administrative penalties	# <u>0</u>	# <u>0</u>	# <u>0</u>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Stop work orders	# <u>0</u>	# <u>0</u>	# <u>0</u>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Withholding of plan approvals or other authorizations	# <u>1</u>	# <u>0</u>	# <u>0</u>	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Additional Measures	# <u>0</u>	# <u>0</u>	# <u>0</u>	Describe: _____	

- C. Do you track instances of non-compliance and related enforcement documentation? Yes No
- D. What were the most common types of non-compliance instances documented during this reporting period? Failure to maintain construction site BMP's in accordance with SWPPP. Discharges of lawn litter into streets, curb & gutter, or ditches.

10. Monitoring, Recordkeeping and reporting (Section 5)

- A. Summarize any analytical monitoring activities (e.g., planning, collection, evaluation of results) performed during this reporting period. E. coli sampling was performed June 4 - June 23, 2021. A comprehensive analysis of the potential sources of impairment is incomplete at this time. A benthic-macroinvertebrate survey was performed during the week of 21 - 25 June. Sampling results are not available at this time.
- B. Summarize any non-analytical monitoring activities (e.g., planning, collection, evaluation of results) performed during this reporting period. Visual stream assessments were conducted June 9 - 25, 2021 using the Maryland Department of Natural Resources' Stream Corridor Assessment Survey. Any unusual conditions identified were promptly investigated.
- C. If applicable, are monitoring records for activities performed during this reporting period submitted with this report. Yes No

11. Certification

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This report must be signed by a ranking elected official or by a duly authorized representative of that person. See signatory requirements in sub-part 6.7.2 of the permit.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the 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."

Ryan Martin <hr style="border: 0; border-top: 1px solid black; margin-top: 5px;"/> Printed Name and Title	 <hr style="border: 0; border-top: 1px solid black; margin-top: 5px;"/> Signature	9/10/2021 <hr style="border: 0; border-top: 1px solid black; margin-top: 5px;"/> Date
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Annual reports must be submitted by September 30 of each calendar year (Section 5.4) to the appropriate Environmental Field Office (EFO), identified in the table below:

EFO	Street Address	City	Zip Code	Telephone
Chattanooga	1301 Riverfront Pkwy, Suite 206	Chattanooga	37402	(423) 634-5745
Columbia	1421 Hampshire Pike	Columbia	38401	(931) 380-3371
Cookeville	1221 South Willow Ave.	Cookeville	38506	(931) 520-6688
Jackson	1625 Hollywood Drive	Jackson	38305	(731) 512-1300
Johnson City	2305 Silverdale Road	Johnson City	37601	(423) 854-5400
Knoxville	3711 Middlebrook Pike	Knoxville	37921	(865) 594-6035
Memphis	8383 Wolf Lake Drive	Bartlett	38133	(901) 371-3000
Nashville	711 R S Gass Boulevard	Nashville	37216	(615) 687-7000

2A. Discharges to Waters with Unavailable Parameters

Waterbody ID	Waterbody Name	Size	Cause for Impairment	Potential source of Impairment
TN05130206003_0300	Peppers Branch	4.2	ALTERATION IN STREAM-SIDE OR LITTORAL VEGETATIVE COVERS SEDIMENTATION/SILTATION	GRAZING IN RIPARIAN OR SHORELINE ZONES
TN05130206003_1100	Wartrace Creek	0.72	FLOW REGIME MODIFICATION TEMPERATURE	DAM OR IMPOUNDMENT
TN05130206003_1150	Wartrace Creek	6.32	ALTERATION IN STREAM-SIDE OR LITTORAL VEGETATIVE COVERS SEDIMENTATION/SILTATION	MUNICIPAL (URBANIZED HIGH DENSITY AREA)
TN05130206003_1200	Black Branch	1.87	OTHER ANTHROPOGENIC SUBSTRATE ALTERATIONS	MUNICIPAL (URBANIZED HIGH DENSITY AREA)
TN05130206003_1300	Carr Creek	2.9	ESCHERICHIA COLI (E. COLI)	SANITARY SEWER OVERFLOWS (COLLECTION SYSTEM FAILURES)
TN05130206003_1350	Carr Creek	7.8	ESCHERICHIA COLI (E. COLI)	SANITARY SEWER OVERFLOWS (COLLECTION SYSTEM FAILURES)
TN05130206003_1355	Carr Creek	11.3	NITRATE/NITRITE (NITRITE + NITRATE AS N) PHOSPHORUS, TOTAL ESCHERICHIA COLI (E. COLI)	SANITARY SEWER OVERFLOWS (COLLECTION SYSTEM FAILURES)
TN05130206003_3000	Sulphur Fork	1.9	PHOSPHORUS, TOTAL DISSOLVED OXYGEN SEDIMENTATION/SILTATION ESCHERICHIA COLI (E. COLI)	MUNICIPAL POINT SOURCE DISCHARGES MUNICIPAL (URBANIZED HIGH DENSITY AREA) SANITARY SEWER OVERFLOWS (COLLECTION SYSTEM FAILURES)
TN05130206003_4000	Sulphur Fork	8.6	ESCHERICHIA COLI (E. COLI)	SANITARY SEWER OVERFLOWS (COLLECTION SYSTEM FAILURES) MUNICIPAL (URBANIZED HIGH DENSITY AREA)

6.5 Waterway Buffer

New development and significant redevelopment adjacent to the floodplain or floodway of storm water conveyance (waterways), with a drainage area greater than 40 acres, shall include waterway buffers (buffers) on proposed plans. The buffer along waterways shall be an area where the surface is left in a natural state and not disturbed by construction or post-construction activity.

- 6.5.1 In areas where a floodplain and floodway have been determined and accepted by the Department of Public Works the buffer shall be the width of the floodway plus at least 50 feet perpendicular from the floodway on each side of the waterway.
- 6.5.2 In areas where a floodplain and floodway have not been determined and accepted by the Department of Public Works and if the waterway on the United States Geological Quadrangle map is a “blue line” or intermittent “blue line” stream with a drainage area less than one square mile, the buffer shall be at least 30 feet perpendicular from each side of the stream bank of the waterway under “bank full” conditions. For drainage areas greater than or equal to one square mile and less than or equal to two square miles the buffer shall be 45 feet perpendicular from each side of the stream of the waterway under “bank full” conditions. For drainage areas greater than two squares mile the buffer shall be 60 feet perpendicular from each side of the stream of the waterway under “bank full” conditions. Ponds connected to community waters shall have a 25 foot buffer from the elevation of normal pool. Wetlands shall have a 25 foot buffer from the delineation line.



Tennessee Stormwater Association June 2021 Report

From Ripley PR



TN Stormwater Association June 2021 Facebook Ads Report

		Impressions	Post Interactions*	Link Clicks	Total Clicks**		
July	Use less fertilizer on your lawn! It will grow just as green, but you'll reduce toxic runoff that pollutes waterways.	217,088	4	183	312		
July Instagram	Use less fertilizer on your lawn! It will grow just as green, but you'll reduce toxic runoff that pollutes waterways.	170,321	24	228	254		
July	Are you composting yard waste and vegetable scraps? You should be. Grow a great garden while protecting aquatic life.	189,531	2	124	221		
July Instagram	Are you composting yard waste and vegetable scraps? You should be. Grow a great garden while protecting aquatic life.	212,601	8	262	304		
August	Dealing with old cleaning supplies, paint and used oil can be a hassle. They cannot be thrown in the trash or washed down the drain. Check out where hazardous waste is collected in your area. The wildlife in our lakes and rivers will thank you!	92,644	6	52	153		

August Instagram	Dealing with old cleaning supplies, paint and used oil can be a hassle. They cannot be thrown in the trash or washed down the drain. Check out where hazardous waste is collected in your area. The wildlife in our lakes and rivers will thank you!	86,165	12	133	119		
August	Did you know each day, more than 500 million plastic straws are used and discarded in the U.S. alone. Straws are the #5 item found during litter clean ups. Do you really need that straw? Think before you use!	78,588	3	39	111		
August Instagram	Did you know each day, more than 500 million plastic straws are used and discarded in the U.S. alone. Straws are the #5 item found during litter clean ups. Do you really need that straw? Think before you use!	21,006	6	25	32		
September FB	Still using Styrofoam? Wind or rain transports foam to storm drains and water bodies, where it breaks into small pieces that are nearly impossible to remove. What steps are you taking in order to reduce foam use?	63,913	0	33	88		

September Instagram	Still using Styrofoam? Wind or rain transports foam to storm drains and water bodies, where it breaks into small pieces that are nearly impossible to remove. What steps are you taking in order to reduce foam use?	52,585	1	96	116		
September FB	YOUR RIVER. YOUR IMPACT. One person CAN make a difference. Take one step today to reduce your household use of plastics. Then another next month. And then another. What are you doing to reduce plastics in your home?	130,839	5	79	143		
September Instagram	YOUR RIVER. YOUR IMPACT. One person CAN make a difference. Take one step today to reduce your household use of plastics. Then another next month. And then another. What are you doing to reduce plastics in your home?	53,638	1	75	85		
October FB	Fertilize much? Fertilize too much? Over-applied lawn care products can wash into our storm drains and pollute our waterways. Apply fertilizers sparingly this spring.	55,156	1	27	59		

October Instagram	Fertilize much? Fertilize too much? Over-applied lawn care products can wash into our storm drains and pollute our waterways. Apply fertilizers sparingly this spring.	44,656	8	47	55		
October FB	Do you have an area in your yard that receives a lot of rain or has standing water? How about planting a native plant rain garden? Rain gardens attract birds and butterflies plus remove pollutants from the water.	52,757	2	35	80		
October Instagram	Do you have an area in your yard that receives a lot of rain or has standing water? How about planting a native plant rain garden? Rain gardens attract birds and butterflies plus remove pollutants from the water.	50,228	8	59	68		
November FB	How do you feel when you see someone toss litter from their car? Did you know Tennessee has strict litter laws? Report litter from vehicles to 1-877-8-LITTER (877-854-8837).	63,235	2	22	37		
November Instagram	How do you feel when you see someone toss litter from their car? Did you know Tennessee has strict litter laws? Report litter from vehicles to 1-877-8-LITTER (877-854-8837).	49,179	7	10	26		

December FB	Everyone knows dogs are a man's best friend, but did you know that 40% of people do not pick up their "best friend's" poop? Dog poop is 57 percent more toxic than human waste, and can harbor bacteria and parasites that cause illness in humans when it seeps into waterways? Do your part and pick it up.	62,176	11	0	62		
December Instagram	Everyone knows dogs are a man's best friend, but did you know that 40% of people do not pick up their "best friend's" poop? Dog poop is 57 percent more toxic than human waste, and can harbor bacteria and parasites that cause illness in humans when it seeps into waterways? Do your part and pick it up.	59,258	4	0	24		
December FB	Does your auto repair shop dispose of their oil and other contaminants properly or does it run down the storm drain? Know before you go. Only you can help prevent stormwater pollution!	40,093	2	1	33		
December Instagram	Does your auto repair shop dispose of their oil and other contaminants properly or does it run down the storm drain? Know before you go. Only you can help prevent stormwater pollution!	37,026	3	0	16		

January FB	Ice melting chemicals commonly contain toxic chemicals that contribute to our waterway pollution. Consider using plain rock salt this winter to keep those nasty chemicals out of our drinking water.	91,191	39	32	80		
January Instagram	Ice melting chemicals commonly contain toxic chemicals that contribute to our waterway pollution. Consider using plain rock salt this winter to keep those nasty chemicals out of our drinking water.	79,086	25	18	48		
February Instagram	YOUR RIVER. YOUR IMPACT. One person CAN make a difference. Take one step today to reduce your household use of plastics. Then another next month. And then another. What are you doing to reduce plastics in your home?	91,928	11	28	57		
February FB	Litter, litter everywhere, looks like people just don't care. Do your part and pick it up before it ends up in our rivers, streams and lakes. What are you doing to help prevent litter?	69,007	7	33	95		
February Instagram	Litter, litter everywhere, looks like people just don't care. Do your part and pick it up before it ends up in our rivers, streams and lakes. What are you doing to help prevent litter?	34,470	7	7	24		

March FB	Does your auto repair shop dispose of their oil and other contaminants properly or does it run down the storm drain? Know before you go. Only you can help prevent stormwater pollution!	64,679	4	40	57		
March Instagram	Does your auto repair shop dispose of their oil and other contaminants properly or does it run down the storm drain? Know before you go. Only you can help prevent stormwater pollution!	47,070	0	40	64		
March FB	Did you know that the Tennessee River is polluted with microplastics and plastic bags are the main culprit? What about taking your reusable bags to the store each and every time? Forget your bags? Don't worry, practice makes perfect!	50,371	4	35	114		
March Instagram	Did you know that the Tennessee River is polluted with microplastics and plastic bags are the main culprit? What about taking your reusable bags to the store each and every time? Forget your bags? Don't worry, practice makes perfect!	42,298	2	72	87		
April Facebook	Does your auto repair shop dispose of their oil and other contaminants properly or does it run down the storm drain? Know before you go. Only you can help prevent stormwater pollution!	54,990	0	36	65		

April Instagram	Does your auto repair shop dispose of their oil and other contaminants properly or does it run down the storm drain? Know before you go. Only you can help prevent stormwater pollution!	43,340	2	84	65		
April Facebook	Did you know that the Tennessee River is polluted with microplastics and plastic bags are the main culprit? What about taking your reusable bags to the store each and every time? Forget your bags? Don't worry, practice makes perfect!	44,818	3	31	146		
April Instagram	Did you know that the Tennessee River is polluted with microplastics and plastic bags are the main culprit? What about taking your reusable bags to the store each and every time? Forget your bags? Don't worry, practice makes perfect!	44,610	3	28	135		
May Facebook	Love your beautiful garden, flowers and house plants? Treat them with love and water them with captured water from a rain barrel. It's easy to install and provides free, unchlorinated water.	47,823	3	28	46		
May Instagram	Love your beautiful garden, flowers and house plants? Treat them with love and water them with captured water from a rain barrel. It's easy to install and provides free, unchlorinated water.	35,303	3	0	8		

May Facebook	The Tennessee Stormwater Association Non-Profit Professional Organization Seeking to Improve Water Quality & Create Value for Its Members.	43,103	0	0	25		
May Instagram	The Tennessee Stormwater Association Non-Profit Professional Organization Seeking to Improve Water Quality & Create Value for Its Members.	34,913	2	0	12		
June FB	A clean car is a happy car, but do you know if your car wash disposes of contaminated water properly? Know before you go!	39,447	2	36	72		
June Instagram	A clean car is a happy car, but do you know if your car wash disposes of contaminated water properly? Know before you go!	37,757	0	67	72		
June FB	Everyone knows dogs are man's best friends, but did you know that 40% of people do not pick up their best friend's poop? Doggie doo is 57% more toxic than human waste and can harbor bacteria and parasites that cause illness when it seeps into waterways. Do your part and pick it up.	30,651	7	19	53		

June Instagram	Everyone knows dogs are man's best friends, but did you know that 40% of people do not pick up their best friend's poop? Doggie doo is 57% more toxic than human waste and can harbor bacteria and parasites that cause illness when it seeps into waterways. Do your part and pick it up.	27,308	5	27	53		
		2,801,683	237	2,078	3,598		
Reach in Top DMAs		Middle	West & North West	East & North East	South East	Total Reach Among Top DMAs	Percentage of Reach in Top DMAs
July	Use less fertilizer on your lawn! It will grow just as green, but you'll reduce toxic runoff that pollutes waterways.	58,110	56,161	37,336	15,993	167,600	77%
July Instagram	Use less fertilizer on your lawn! It will grow just as green, but you'll reduce toxic runoff that pollutes waterways.	53,109	32,413	20,721	10,953	117,196	69%
July	Are you composting yard waste and vegetable scraps? You should be. Grow a great garden while protecting aquatic life.	40,288	52,847	36,281	16,685	146,101	77%
July Instagram	Are you composting yard waste and vegetable scraps? You should be. Grow a great garden while protecting aquatic life.	60,663	31,526	25,127	13,269	130,585	61%

August	Dealing with old cleaning supplies, paint and used oil can be a hassle. They cannot be thrown in the trash or washed down the drain. Check out where hazardous waste is collected in your area. The wildlife in our lakes and rivers will thank you!	21,310	24,705	17,561	7,229	70,805	76%
August Instagram	Dealing with old cleaning supplies, paint and used oil can be a hassle. They cannot be thrown in the trash or washed down the drain. Check out where hazardous waste is collected in your area. The wildlife in our lakes and rivers will thank you!	25,461	13,749	9,889	5,133	54,232	63%
August	Did you know each day, more than 500 million plastic straws are used and discarded in the U.S. alone. Straws are the #5 item found during litter clean ups. Do you really need that straw? Think before you use!	16,551	24,843	14,684	6,079	62,157	79%
August Instagram	Did you know each day, more than 500 million plastic straws are used and discarded in the U.S. alone. Straws are the #5 item found during litter clean ups. Do you really need that straw? Think before you use!	14,754	9,119	5,291	2,786	31,950	152%

September FB	Still using Styrofoam? Wind or rain transports foam to storm drains and water bodies, where it breaks into small pieces that are nearly impossible to remove. What steps are you taking in order to reduce foam use?	14,728	18,325	12,222	4,971	45,275	71%
September Instagram	Still using Styrofoam? Wind or rain transports foam to storm drains and water bodies, where it breaks into small pieces that are nearly impossible to remove. What steps are you taking in order to reduce foam use?	12,011	6,796	4,177	2,264	13,237	25%
September FB	YOUR RIVER. YOUR IMPACT. One person CAN make a difference. Take one step today to reduce your household use of plastics. Then another next month. And then another. What are you doing to reduce plastics in your home?	28,978	34,089	22,649	9,479	95,195	73%
September Instagram	YOUR RIVER. YOUR IMPACT. One person CAN make a difference. Take one step today to reduce your household use of plastics. Then another next month. And then another. What are you doing to reduce plastics in your home?	44,656	5,701	4,750	2,648	57,755	108%

October FB	Fertilize much? Fertilize too much? Over-applied lawn care products can wash into our storm drains and pollute our waterways. Apply fertilizers sparingly this spring.	10,741	14,956	7,945	3,686	37,328	68%
October Instagram	Fertilize much? Fertilize too much? Over-applied lawn care products can wash into our storm drains and pollute our waterways. Apply fertilizers sparingly this spring.	9,731	4,753	3,776	1,828	20,088	45%
October FB	Do you have an area in your yard that receives a lot of rain or has standing water? How about planting a native plant rain garden? Rain gardens attract birds and butterflies plus remove pollutants from the water.	11,749	12,469	8,527	3,879	36,624	69%
October Instagram	Do you have an area in your yard that receives a lot of rain or has standing water? How about planting a native plant rain garden? Rain gardens attract birds and butterflies plus remove pollutants from the water.	12,638	5,317	5,267	2,887	26,109	52%
November FB	How do you feel when you see someone toss litter from their car? Did you know Tennessee has strict litter laws? Report litter from vehicles to 1-877-8-LITTER (877-854-8837).	17,701	8,960	13,067	6,037	45,765	72%

November Instagram	How do you feel when you see someone toss litter from their car? Did you know Tennessee has strict litter laws? Report litter from vehicles to 1-877-8-LITTER (877-854-8837).	10,732	5,124	4,500	2,194	22,550	46%
December FB	Everyone knows dogs are a man's best friend, but did you know that 40% of people do not pick up their "best friend's" poop? Dog poop is 57 percent more toxic than human waste, and can harbor bacteria and parasites that cause illness in humans when it seeps into waterways? Do your part and pick it up.	15,535	9,948	8,805	4,428	38,716	62%
December Instagram	Everyone knows dogs are a man's best friend, but did you know that 40% of people do not pick up their "best friend's" poop? Dog poop is 57 percent more toxic than human waste, and can harbor bacteria and parasites that cause illness in humans when it seeps into waterways? Do your part and pick it up.	28,015	5,476	6,177	3,140	42,808	72%
December FB	Does your auto repair shop dispose of their oil and other contaminants properly or does it run down the storm drain? Know before you go. Only you can help prevent stormwater pollution!	10,331	7,675	6,244	3,129	27,379	68%

December Instagram	Does your auto repair shop dispose of their oil and other contaminants properly or does it run down the storm drain? Know before you go. Only you can help prevent stormwater pollution!	8,660	3,836	4,156	2,116	18,768	51%
January FB	Ice melting chemicals commonly contain toxic chemicals that contribute to our waterway pollution. Consider using plain rock salt this winter to keep those nasty chemicals out of our drinking water.	23,383	14,863	14,735	7,214	60,195	66%
January Instagram	Ice melting chemicals commonly contain toxic chemicals that contribute to our waterway pollution. Consider using plain rock salt this winter to keep those nasty chemicals out of our drinking water.	18,406	9,104	8,609	4,357	40,476	51%
February Instagram	YOUR RIVER. YOUR IMPACT. One person CAN make a difference. Take one step today to reduce your household use of plastics. Then another next month. And then another. What are you doing to reduce plastics in your home?	29,073	15,619	15,939	8,269	68,900	75%
February FB	Litter, litter everywhere, looks like people just don't care. Do your part and pick it up before it ends up in our rivers, streams and lakes. What are you doing to help prevent litter?	17,540	11,426	9,537	5,034	43,537	63%

February Instagram	Litter, litter everywhere, looks like people just don't care. Do your part and pick it up before it ends up in our rivers, streams and lakes. What are you doing to help prevent litter?	8,908	3,981	3,510	1,846	18,245	53%
March FB	Does your auto repair shop dispose of their oil and other contaminants properly or does it run down the storm drain? Know before you go. Only you can help prevent stormwater pollution!	15,619	13,954	11,628	5,672	46,873	72%
March Instagram	Does your auto repair shop dispose of their oil and other contaminants properly or does it run down the storm drain? Know before you go. Only you can help prevent stormwater pollution!	10,250	4,785	4,808	2,589	22,432	48%
March FB	Did you know that the Tennessee River is polluted with microplastics and plastic bags are the main culprit? What about taking your reusable bags to the store each and every time? Forget your bags? Don't worry, practice makes perfect!	11,174	13,953	8,470	4,635	38,232	76%
March Instagram	Did you know that the Tennessee River is polluted with microplastics and plastic bags are the main culprit? What about taking your reusable bags to the store each and every time? Forget your bags? Don't worry, practice makes perfect!	7,619	3,771	3,090	1,756	16,236	38%

April Facebook	Does your auto repair shop dispose of their oil and other contaminants properly or does it run down the storm drain? Know before you go. Only you can help prevent stormwater pollution!	13,153	15,252	10,094	4,434	42,933	78%
April Instagram	Does your auto repair shop dispose of their oil and other contaminants properly or does it run down the storm drain? Know before you go. Only you can help prevent stormwater pollution!	10,397	5,275	3,660	2,125	21,457	50%
April Facebook	Did you know that the Tennessee River is polluted with microplastics and plastic bags are the main culprit? What about taking your reusable bags to the store each and every time? Forget your bags? Don't worry, practice makes perfect!	9,489	12,454	7,321	3,571	32,835	73%
April Instagram	Did you know that the Tennessee River is polluted with microplastics and plastic bags are the main culprit? What about taking your reusable bags to the store each and every time? Forget your bags? Don't worry, practice makes perfect!	10,049	12,385	7,953	3,732	34,119	76%
May Facebook	Love your beautiful garden, flowers and house plants? Treat them with love and water them with captured water from a rain barrel. It's easy to install and provides free, unchlorinated water.	10,624	10,733	7,656	3,503	32,516	68%

May Instagram	Love your beautiful garden, flowers and house plants? Treat them with love and water them with captured water from a rain barrel. It's easy to install and provides free, unchlorinated water.	5,301	3,249	2,607	1,263	12,420	35%
May Facebook	The Tennessee Stormwater Association Non-Profit Professional Organization Seeking to Improve Water Quality & Create Value for Its Members.	9,665	13,145	7,562	3,395	33,767	78%
May Instagram	The Tennessee Stormwater Association Non-Profit Professional Organization Seeking to Improve Water Quality & Create Value for Its Members.	5,327	3,224	2,151	1,130	11,832	34%
June Facebook	A clean car is a happy car, but do you know if your car wash disposes of contaminated water properly? Know before you go!	6,763	9,629	7,091	2,553	26,036	66%
June Instagram	A clean car is a happy car, but do you know if your car wash disposes of contaminated water properly? Know before you go!	4,922	3,959	2,673	1,225	12,779	34%

June Facebook	Everyone knows dogs are man's best friends, but did you know that 40% of people do not pick up their best friend's poop? Doggie doo is 57% more toxic than human waste and can harbor bacteria and parasites that cause illness when it seeps into waterways. Do your part and pick it up.	7,000	5,832	6,808	2,304	21,944	72%
June Instagram	Everyone knows dogs are man's best friends, but did you know that 40% of people do not pick up their best friend's poop? Doggie doo is 57% more toxic than human waste and can harbor bacteria and parasites that cause illness when it seeps into waterways. Do your part and pick it up.	2,488	1,346	1,328	656	5,818	21%
	Total	751,591	576,727	426,382	197,105	1,951,805	

* Post Interactions include: Reactions (likes, loves, laughs, etc.), comments, shares and page likes

** Total clicks include clicks on any part of the ad



August 2, 2021

Mr. Kenny Morris, Stormwater Coordinator
Department of Public Works
City of Springfield
2809 Clinard Drive
Springfield, Tennessee 37172

Dear Mr. Morris:

Subject: Phase II MS4 Monitoring
Analytical Stream Monitoring, *E. coli* Sampling
City of Springfield, Robertson County, Tennessee
CEC Project 312-080.0002

Civil & Environmental Consultants, Inc. (CEC) performed *E. coli* sampling on Sulphur Fork 3000 (TN05130206003_3000), Sulphur Fork 4000 (TN05130206003_4000), and Carr Creek 1350 (TN05130206003_1350) for the City of Springfield per our contract dated June 2, 2021. During the sampling period from June 4 through June 23, 2021, Carr Creek 1355 (TN05130206003_1355) was dry on each occasion resulting in no sample collection.

The General Water Quality Criteria of Tennessee, which establishes thresholds for the various use classifications for streams in Tennessee, lists a geometric mean exceedance of 126 CFU/100 mL as impairment for recreational use. In other words, exceeding an *E. coli* concentration of 126 CFU/100 mL for the geometric mean indicates the stream does not meet the recreational use classification. The *E. coli* threshold for the recreational use classification is the lowest allowable *E. coli* threshold for designated uses. Table 1 presents the geometric mean results from the *E. coli* sampling.

Table 1. *E. coli* Sampling Geometric Mean by Waterbody

Waterbody Name	Geometric Mean Value (MPN*/100 mL)
Sulphur Fork 3000	2369.2
Sulphur Fork 4000	309.4
Carr Creek 1350	448.8

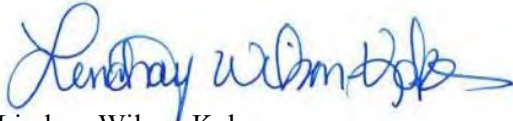
**Colony Forming Units (CFU) and Most Probable Number (MPN) are equivalent values. TDEC's General Water Quality Criteria references the unit CFU which is the actual colony count from the surface of a Petri dish. Pace Analytical National Center for Testing & Innovation, where collected samples are analyzed, reports sampling results in MPN/100 mL which is the statistical probability of the number of organisms.*

Mr. Morris – The City of Springfield
CEC Project 312-080.0002
Page 2
August 2, 2021

Please contact Lindsay Wilson-Kokes at 615-333-7797 or lwilsonkokes@cecinc.com if you should have any questions regarding this deliverable.

Sincerely,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.



Lindsay Wilson-Kokes
Project Manager

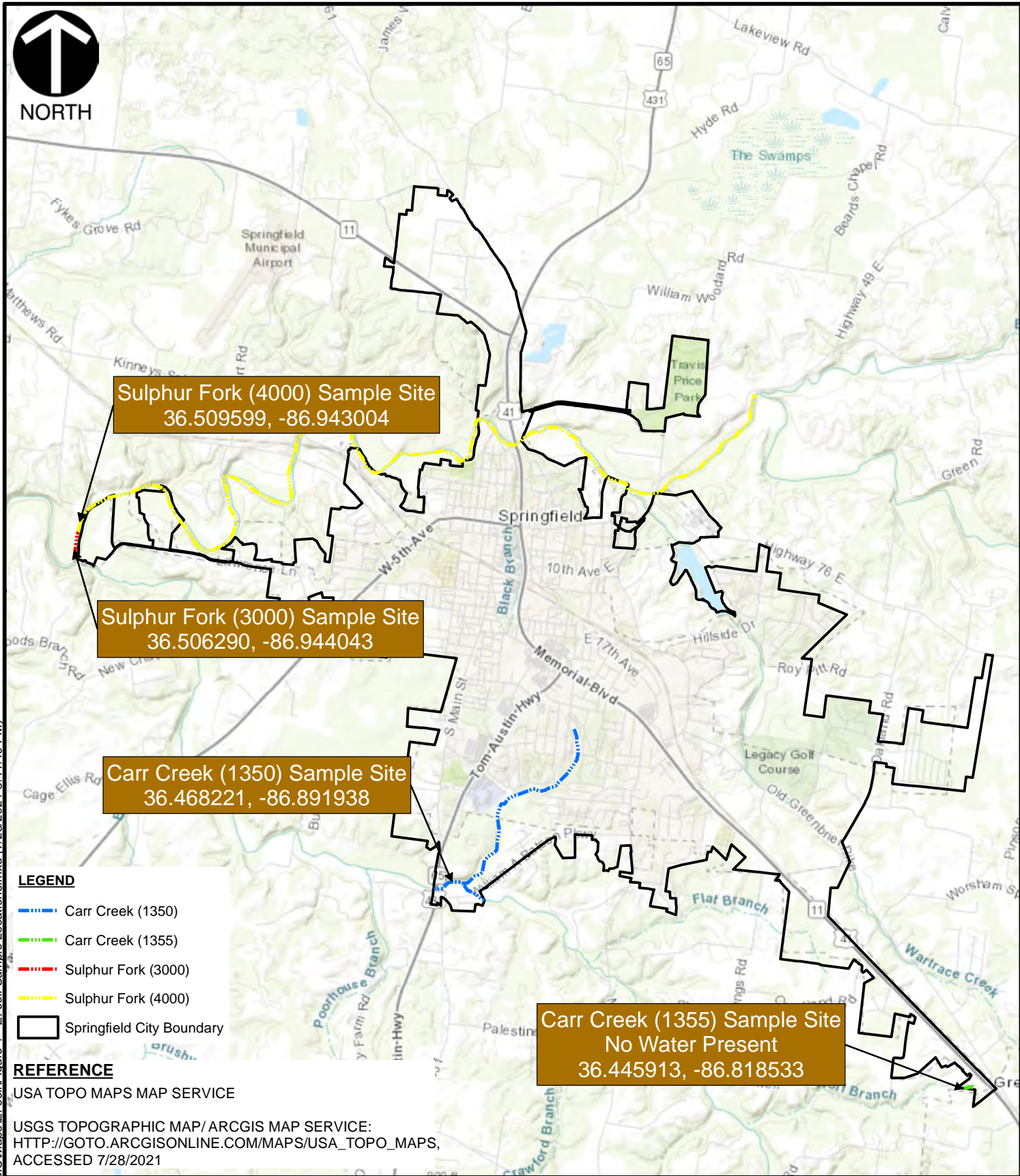


Steven E. Casey, P.E., CPESC
Vice President

Enclosures: Attachment A – Figure 1 – E. coli Sampling Locations Map
 Attachment B – Summary of Sampling Results
 Attachment C – Photographic Documentation
 Attachment D – Field Data Sheets
 Attachment E – Lab Results

ATTACHMENT A

FIGURE 1 - E. COLI SAMPLING LOCATIONS MAP



LEGEND

- - - - Carr Creek (1350)
- - - - Carr Creek (1355)
- - - - Sulphur Fork (3000)
- - - - Sulphur Fork (4000)
- Springfield City Boundary

REFERENCE

USA TOPO MAPS MAP SERVICE

USGS TOPOGRAPHIC MAP/ ARCGIS MAP SERVICE:
HTTP://GOTO.ARCGISONLINE.COM/MAPS/USA_TOPO_MAPS,
ACCESSED 7/28/2021



Civil & Environmental Consultants, Inc.

117 Seaboard Lane, Ste. E100 Franklin, Tennessee

615-333-7797 • 800-763-2326

www.cecinc.com

CITY OF SPRINGFIELD
PHASE II MS4 ANALYTICAL MONITORING
SPRINGFIELD, ROBERTSON COUNTY, TN

E. COLI SAMPLING LOCATIONS

DRAWN BY:	LWK	CHECKED BY:	JLW	APPROVED BY:	SEC	FIGURE NO:
DATE:	7/28/2021	SCALE:	1" = 5,417'	PROJECT NO:	312-080	1

ISVR-NA-SHI-P:310-0001312-080-GIS/Maps/E_coli/Figure 1 - E. coli Sample Locations.mxd (7/28/2021 3:44:40 PM)

ATTACHMENT B

SUMMARY OF SAMPLING RESULTS

Springfield E. coli Monitoring 2021

CEC Project# 312-080
June 2021

Stream	Date	6/4/2021	6/10/2021	6/17/2021	6/18/2021	6/23/2021	Minimum	Arithmetic Mean	Maximum
	Weather	Sunny 75°F	Cloudy 78°F	Sunny 82°F	Mostly Sunny 88°F	Mostly Sunny 77°F			
	Personnel	LWK; AHB	LWK; KGA	LWK; KGA	LWK; JN	LWK; JS			
Carr Creek 1350	Sample Time	9:50 AM	11:45 AM	10:50 AM	12:45 PM	11:10 AM	9:50 A.M.	-	12:45 P.M.
	Temp (°C)	17.8	20.7	21.5	24.3	20.8	17.8	21.0	24.3
	DO (mg/L)	10.13	10.00	10.10	10.57	10.47	10.00	10.25	10.57
	pH	7.81	7.91	7.89	7.94	7.87	7.81	7.88	7.94
	Cond. (µS/cm)*	268	-	-	-	-	268	268	268
	Area (ft ²)	18.9	8.6	7.9	7.5	6.4	6.4	9.9	18.9
	Flow (ft ³ /s)	37.5	12.7	11.1	7.8	6.1	6.1	15.0	37.5
	E. coli (MPN/100mL)	310.6	307.6	544.6	730.8	478.6	307.6	474.4	730.8
									Geometric Mean 448.8

*Conductivity unavailable on Days 2 - 5.

Springfield E. coli Monitoring 2021

CEC Project# 312-080

June 2021

Stream	Date	6/4/2021	6/10/2021	6/17/2021	6/18/2021	6/23/2021	Minimum	Arithmetic Mean	Maximum
	Weather	Sunny 76°F	Cloudy 76°F	Sunny 82°F	Mostly Sunny 88°F	Mostly Sunny 75°F			
	Personnel	LWK; AHB	LWK; KGA	LWK; KGA	LWK; JN	LWK; JS			
Sulphur Fork 3000	Sample Time	10:40 AM	10:00 AM	9:20 AM	10:50 AM	9:45 AM	9:20 A.M.	-	10:50 A.M.
	Temp (°C)	18.9	20.9	21.1	22.7	20.7	18.9	20.9	22.7
	DO (mg/L)	9.46	9.28	9.40	9.63	9.28	9.28	9.41	9.63
	pH	7.70	7.79	7.98	7.96	7.93	7.70	7.87	7.98
	Cond. (µS/cm)*	348	-	-	-	-	348	348	348
	Area (ft ²)	-	77.7	79.5	78.6	65.9	65.9	75.4	79.5
	Flow (ft ³ /s)**	-	68.8	73.0	70.5	49.5	49.5	65.5	73.0
	E. coli (MPN/100mL)	2950.0	520.0	15150.0	2920.0	1100.0	520.0	4528.0	15150.0
									Geometric Mean 2369.2

*Conductivity unavailable on Days 2 - 5.

**Flow data not collected on Day 1 due to safety concerns associated with high flow conditions.

Springfield E. coli Monitoring 2021

CEC Project# 312-080

June 2021

Stream	Date	6/4/2021	6/10/2021	6/17/2021	6/18/2021	6/23/2021	Minimum	Arithmetic Mean	Maximum
	Weather	Sunny 76°F	Cloudy 76°F	Sunny 82°F	Mostly Sunny 88°F	Sunny 72°F			
	Personnel	LWK; AHB	LWK; KGA	LWK; KGA	LWK; JN	LWK; JS			
Sulphur Fork 4000	Sample Time	11:10 AM	10:50 AM	10:10 AM	12:00 PM	10:30 AM	10:10 A.M.	-	12:00 P.M.
	Temp (°C)	19.1	21.2	21.4	23.5	21.1	19.1	21.3	23.5
	DO (mg/L)	9.59	10.00	10.15	10.96	10.14	9.59	10.17	10.96
	pH	7.84	7.96	8.04	8.09	8.07	7.84	8.00	8.09
	Cond. (µS/cm)*	325	-	-	-	-	325	325	325
	Area (ft ²)	-	61.2	62.9	67.3	49.4	49.4	60.2	67.3
	Flow (ft ³ /s)**	-	74.3	77.7	60.9	42.2	42.2	63.8	77.7
	E. coli (MPN/100mL)***	2950.0	100.0	310.0	310.0	100.0	100.0	754.0	2950.0
									Geometric Mean 309.4

*Conductivity unavailable on Days 2 - 5.

**Flow data not collected on Day 1 due to safety concerns associated with high flow conditions.

***Sample results from Day 2 (June 10, 2021) were reported at <100 MPN/100mL at a 1:100 dilution, which was the recommended dilution factor, by the lab, based on the sample results from Day 1. For the purpose of calculating the geometric mean, the sample will be considered as having a concentration of 100.

ATTACHMENT C

PHOTOGRAPHIC DOCUMENTATION



Upstream Carr Creek (1350)
June 23, 2021



Downstream Carr Creek (1350)
June 23, 2021



Upstream Carr Creek (1355)
June 10, 2021



Downstream Carr Creek (1355)
June 4, 2021



Upstream Sulphur Fork (3000)
June 18, 2021



Downstream Sulphur Fork (3000)
June 18, 2021



Upstream Sulphur Fork (4000)
June 10, 2021



Downstream Sulphur Fork (4000)
June 10, 2021

ATTACHMENT D
FIELD DATA SHEETS



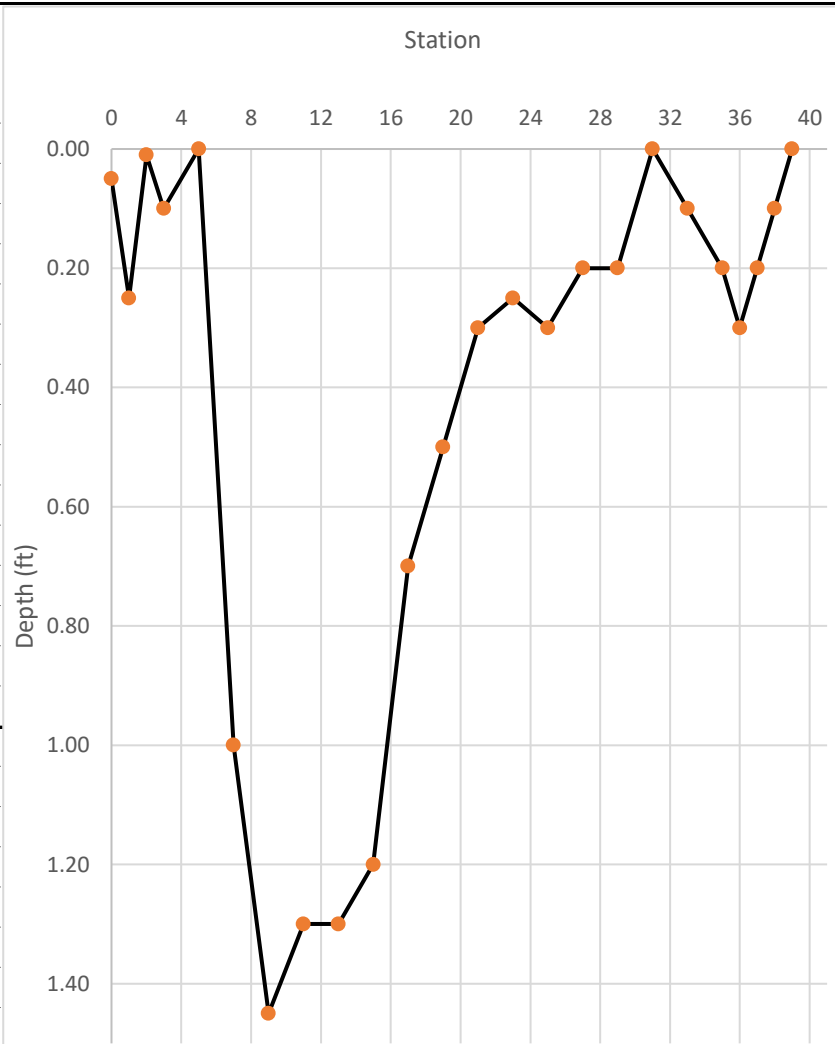
E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Carr Creek 1350	DATE/WEATHER	6/4/2021; Sunny, 75°F
SAMPLES TAKEN	4 (no dilution and 1:100)	EVENT FREQUENCY	1 of 5
NOTES	36.468221, -86.891938	FIELD REPRESENTATIVE	LWK and AHB

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
9:50	17.8	10.13	7.81	268	18.9	37.5

STREAM CROSS SECTION MEASUREMENTS					STREAM CROSS SECTION DIAGRAM	
Station (ft)	Depth of Water (ft)	Velocity (ft/s)	Area (sq ft)	Flow (cfs)	Station	
0	0.05	0.00	0.00	0.00	0	0.00
1	0.25	0.57	0.15	0.09	4	0.10
2	0.01	0.45	0.13	0.06	8	0.20
3	0.10	0.65	0.06	0.04	12	0.30
5	0.00	0.00	0.10	0.00	16	0.40
7	1.00	1.78	1.00	1.78	20	0.50
9	1.45	2.35	2.45	5.76	24	0.60
11	1.30	2.62	2.75	7.21	28	0.70
13	1.30	2.62	2.60	6.81	32	0.80
15	1.20	2.62	2.50	6.55	36	0.90
17	0.70	2.95	1.90	5.61	40	1.00
19	0.50	1.68	1.20	2.02		1.10
21	0.30	0.27	0.80	0.22		1.20
23	0.25	0.16	0.55	0.09		1.30
25	0.30	0.56	0.55	0.31		1.40
27	0.20	0.51	0.50	0.26		
29	0.20	0.48	0.40	0.19		
31	0.00	0.00	0.20	0.00		
33	0.10	0.15	0.10	0.02		
35	0.20	0.40	0.30	0.12		
36	0.30	0.55	0.25	0.14		
37	0.20	0.74	0.25	0.19		
38	0.10	0.71	0.15	0.11		
39	0.00	0.00	0.05	0.00		





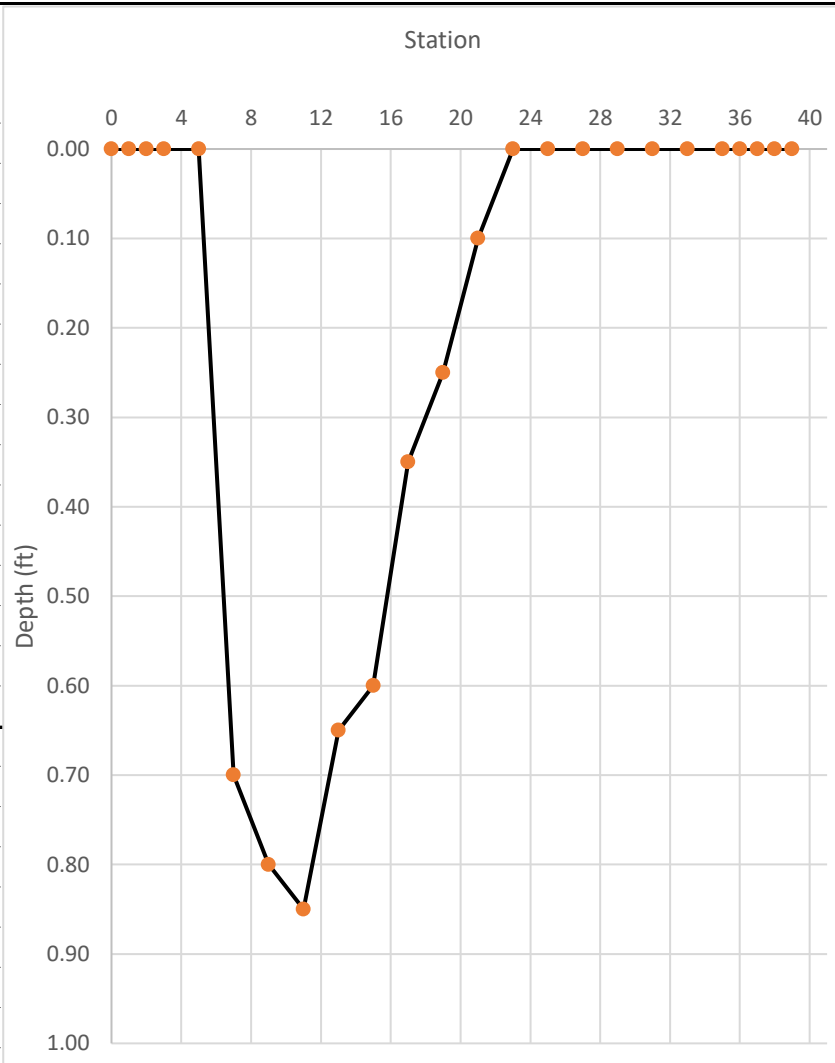
E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Carr Creek 1350	DATE/WEATHER	6/10/2021; Cloudy, 78°F
SAMPLES TAKEN	2 (no dilution)	EVENT FREQUENCY	2 of 5
NOTES	36.468221, -86.891938	FIELD REPRESENTATIVE	LWK and KGA

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
11:45	20.7	10.00	7.91	N/A	8.6	12.7

STREAM CROSS SECTION MEASUREMENTS					STREAM CROSS SECTION DIAGRAM	
Station (ft)	Depth of Water (ft)	Velocity (ft/s)	Area (sq ft)	Flow (cfs)	Station	Depth (ft)
0	0.00	0.00	0.00	0.00	0	0.00
1	0.00	0.00	0.00	0.00	4	0.00
2	0.00	0.00	0.00	0.00	8	0.00
3	0.00	0.00	0.00	0.00	12	0.00
5	0.00	0.00	0.00	0.00	16	0.00
7	0.70	0.55	0.70	0.39	20	0.10
9	0.80	1.18	1.50	1.77	24	0.25
11	0.85	1.45	1.65	2.39	28	0.35
13	0.65	2.39	1.50	3.59	32	0.45
15	0.60	2.20	1.25	2.75	36	0.55
17	0.35	1.42	0.95	1.35	40	0.65
19	0.25	0.64	0.60	0.38	0	0.70
21	0.10	0.14	0.35	0.05	4	0.75
23	0.00	0.00	0.10	0.00	8	0.80
25	0.00	0.00	0.00	0.00	12	0.85
27	0.00	0.00	0.00	0.00	16	0.85
29	0.00	0.00	0.00	0.00	20	0.85
31	0.00	0.00	0.00	0.00	24	0.85
33	0.00	0.00	0.00	0.00	28	0.85
35	0.00	0.00	0.00	0.00	32	0.85
36	0.00	0.00	0.00	0.00	36	0.85
37	0.00	0.00	0.00	0.00	40	0.85
38	0.00	0.00	0.00	0.00	0	0.85
39	0.00	0.00	0.00	0.00	4	0.85





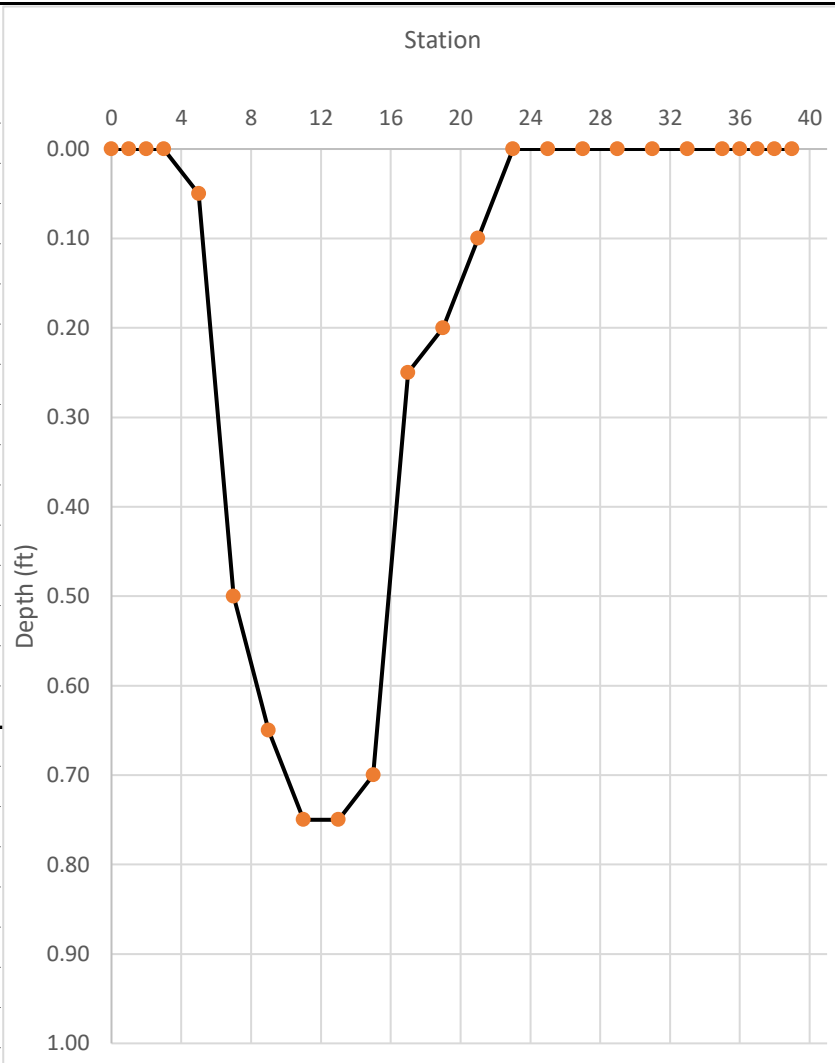
E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Carr Creek 1350	DATE/WEATHER	6/17/2021; Sunny, 82° F
SAMPLES TAKEN	2 (no dilution)	EVENT FREQUENCY	3 of 5
NOTES	36.468221, -86.891938	FIELD REPRESENTATIVE	LWK and KGA

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
10:50	21.5	10.10	7.89	N/A	7.9	11.1

STREAM CROSS SECTION MEASUREMENTS					STREAM CROSS SECTION DIAGRAM	
Station (ft)	Depth of Water (ft)	Velocity (ft/s)	Area (sq ft)	Flow (cfs)	Station	Depth (ft)
0	0.00	0.00	0.00	0.00	0	0.00
1	0.00	0.00	0.00	0.00	4	0.00
2	0.00	0.00	0.00	0.00	8	0.00
3	0.00	0.00	0.00	0.00	12	0.00
5	0.05	0.00	0.05	0.00	16	0.00
7	0.50	0.08	0.55	0.04	20	0.00
9	0.65	0.57	1.15	0.66	24	0.00
11	0.75	2.47	1.40	3.46	28	0.00
13	0.75	2.44	1.50	3.66	32	0.00
15	0.70	2.14	1.45	3.10	36	0.00
17	0.25	0.19	0.95	0.18	40	0.00
19	0.20	0.09	0.45	0.04		
21	0.10	0.00	0.30	0.00		
23	0.00	0.00	0.10	0.00		
25	0.00	0.00	0.00	0.00		
27	0.00	0.00	0.00	0.00		
29	0.00	0.00	0.00	0.00		
31	0.00	0.00	0.00	0.00		
33	0.00	0.00	0.00	0.00		
35	0.00	0.00	0.00	0.00		
36	0.00	0.00	0.00	0.00		
37	0.00	0.00	0.00	0.00		
38	0.00	0.00	0.00	0.00		
39	0.00	0.00	0.00	0.00		





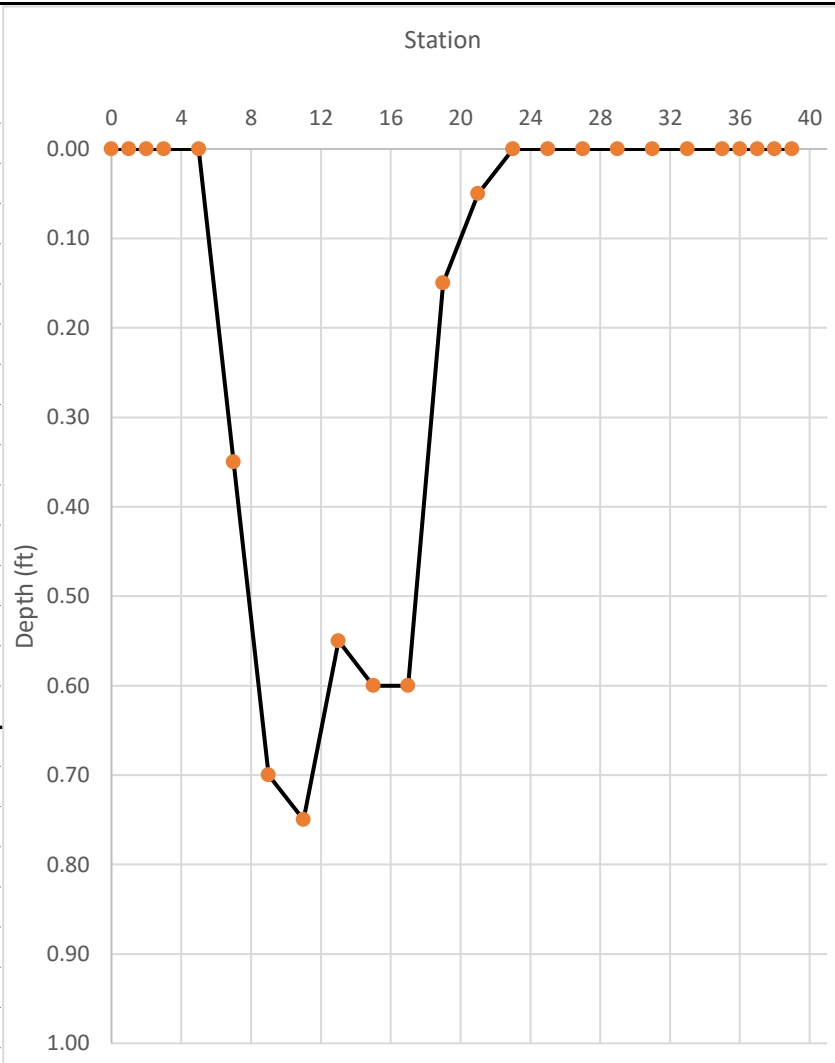
E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Carr Creek 1350	DATE/WEATHER	6/18/2021; Mostly Sunny, 88° F
SAMPLES TAKEN	2 (no dilution)	EVENT FREQUENCY	4 of 5
NOTES	36.468221, -86.891938	FIELD REPRESENTATIVE	LWK and JN

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
12:45	24.3	10.57	7.94	N/A	7.5	7.8

STREAM CROSS SECTION MEASUREMENTS					STREAM CROSS SECTION DIAGRAM	
Station (ft)	Depth of Water (ft)	Velocity (ft/s)	Area (sq ft)	Flow (cfs)	Station	Depth (ft)
0	0.00	0.00	0.00	0.00	0	0.00
1	0.00	0.00	0.00	0.00	4	0.00
2	0.00	0.00	0.00	0.00	8	0.00
3	0.00	0.00	0.00	0.00	12	0.00
5	0.00	0.00	0.00	0.00	16	0.00
7	0.35	0.03	0.35	0.01	20	0.00
9	0.70	0.18	1.05	0.19	24	0.05
11	0.75	0.92	1.45	1.33	28	0.15
13	0.55	2.17	1.30	2.82	32	0.35
15	0.60	1.81	1.15	2.08	36	0.55
17	0.60	1.06	1.20	1.27	40	0.60
19	0.15	0.06	0.75	0.05	0	0.70
21	0.05	0.00	0.20	0.00	4	0.75
23	0.00	0.00	0.05	0.00	8	0.55
25	0.00	0.00	0.00	0.00	12	0.55
27	0.00	0.00	0.00	0.00	16	0.60
29	0.00	0.00	0.00	0.00	20	0.60
31	0.00	0.00	0.00	0.00	24	0.60
33	0.00	0.00	0.00	0.00	28	0.60
35	0.00	0.00	0.00	0.00	32	0.60
36	0.00	0.00	0.00	0.00	36	0.60
37	0.00	0.00	0.00	0.00	40	0.60
38	0.00	0.00	0.00	0.00	0	0.60
39	0.00	0.00	0.00	0.00	4	0.60





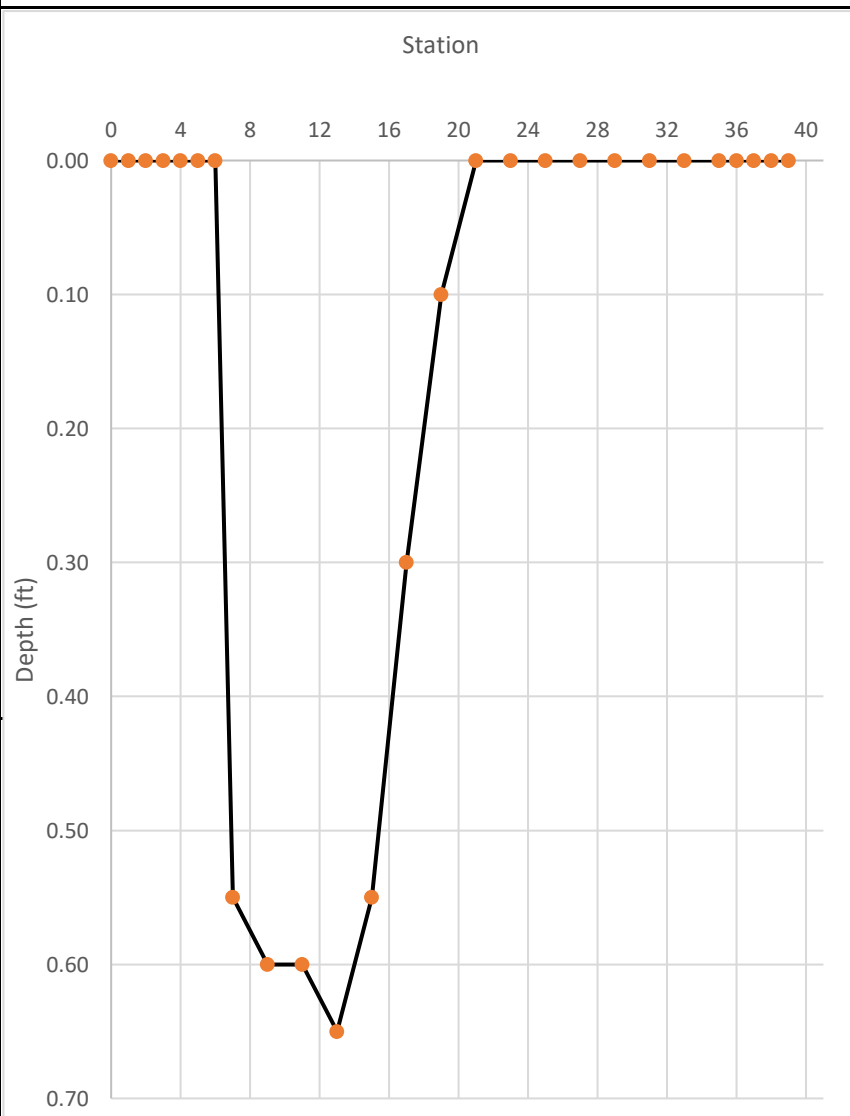
E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Carr Creek 1350	DATE/WEATHER	6/23/2021; Mostly Sunny, 77° F
SAMPLES TAKEN	2 (no dilution)	EVENT FREQUENCY	5 of 5
NOTES	36.468221, -86.891938	FIELD REPRESENTATIVE	LWK and JS

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
11:10	20.8	10.47	7.87	N/A	6.4	6.1

STREAM CROSS SECTION MEASUREMENTS					STREAM CROSS SECTION DIAGRAM	
Station (ft)	Depth of Water (ft)	Velocity (ft/s)	Area (sq ft)	Flow (cfs)	Station	
0	0.00	0.00	0.00	0.00	0	0
1	0.00	0.00	0.00	0.00	4	4
2	0.00	0.00	0.00	0.00	8	8
3	0.00	0.00	0.00	0.00	12	12
4	0.00	0.00	0.00	0.00	16	16
5	0.00	0.00	0.00	0.00	20	20
6	0.00	0.00	0.00	0.00	24	24
7	0.55	0.12	0.28	0.03	28	28
9	0.60	0.52	1.15	0.60	32	32
11	0.60	0.85	1.20	1.02	36	36
13	0.65	2.01	1.25	2.51	40	40
15	0.55	1.51	1.20	1.81		
17	0.30	0.19	0.85	0.16		
19	0.10	0.00	0.40	0.00		
21	0.00	0.00	0.10	0.00		
23	0.00	0.00	0.00	0.00		
25	0.00	0.00	0.00	0.00		
27	0.00	0.00	0.00	0.00		
29	0.00	0.00	0.00	0.00		
31	0.00	0.00	0.00	0.00		
33	0.00	0.00	0.00	0.00		
35	0.00	0.00	0.00	0.00		
36	0.00	0.00	0.00	0.00		
37	0.00	0.00	0.00	0.00		
38	0.00	0.00	0.00	0.00		
39	0.00	0.00	0.00	0.00		





E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Sulphur Fork 3000	DATE/WEATHER	6/4/2021; Sunny, 76°F
SAMPLES TAKEN	4 (no dilution and 1:100)	EVENT FREQUENCY	1 of 5
NOTES	36.506290, -86.944043; Water too swift to traverse	FIELD REPRESENTATIVE	LWK and AHB

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
10:40	18.9	9.46	7.70	348	-	-

STREAM CROSS SECTION MEASUREMENTS					STREAM CROSS SECTION DIAGRAM				
Station (ft)	Depth of Water (ft)	Velocity (ft/s)	Area (sq ft)	Flow (cfs)	Station				
NOT RECORDED DUE TO HIGH FLOW CONDITIONS					0	4	8	12	16
					0.00				
					0.10				
					0.20				
					0.30				
					0.40				
					0.50				
					0.60				
					0.70				
					0.80				
					0.90				
					1.00				



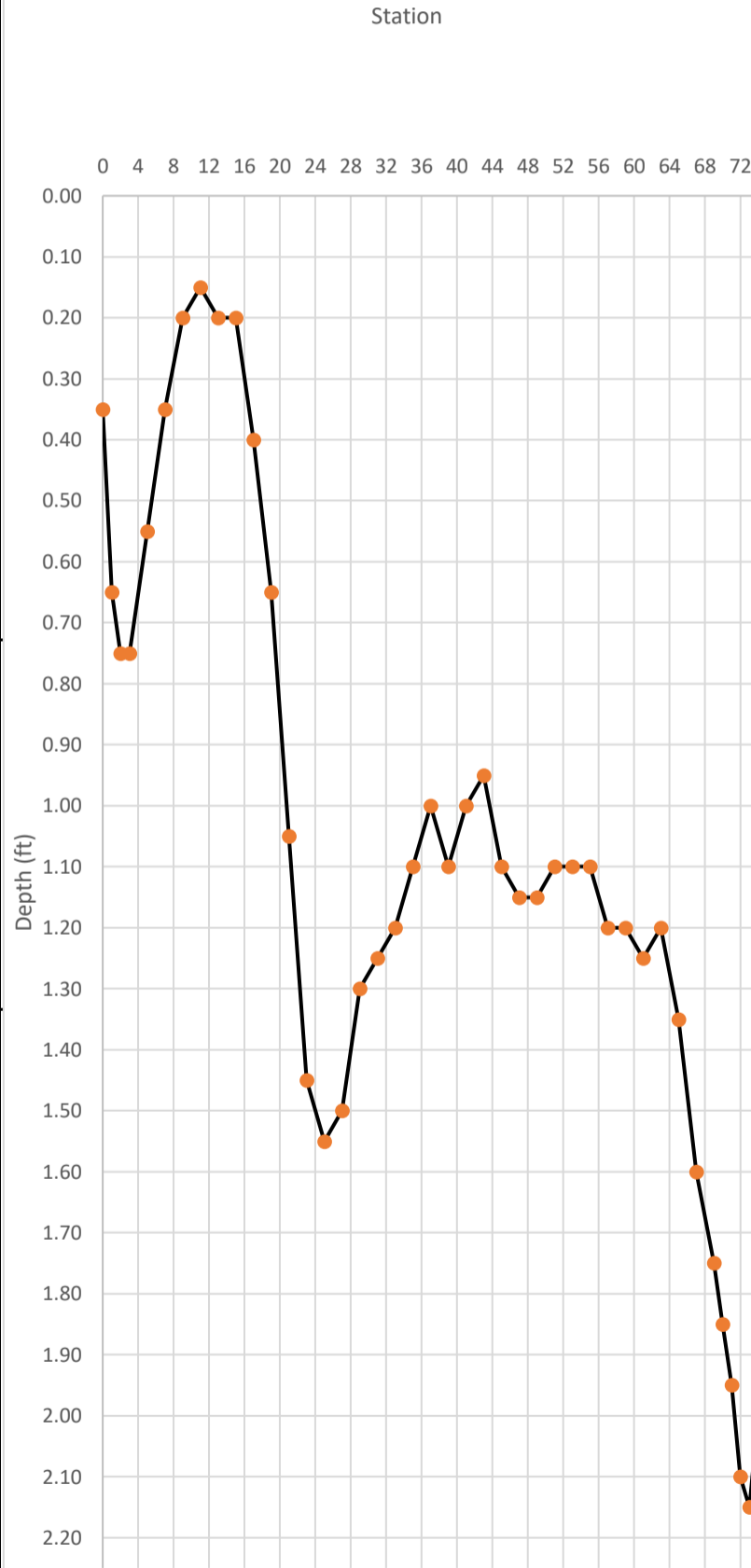
E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Sulphur Fork 3000	DATE/WEATHER	6/10/2021; Cloudy, 76°F
SAMPLES TAKEN	2 (1:100 Dilution)	EVENT FREQUENCY	2 of 5
NOTES	36.506290, -86.944043	FIELD REPRESENTATIVE	LWK and KGA

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
10:00	20.9	9.28	7.79	N/A	77.7	68.8

STREAM CROSS SECTION MEASUREMENTS					STREAM CROSS SECTION DIAGRAM	
Station (ft)	Depth of Water (ft)	Velocity (ft/s)	Area (sq ft)	Flow (cfs)	Station	
0	0.35	0.07	0.00	0.00		
1	0.65	0.18	0.50	0.09		
2	0.75	0.32	0.70	0.22		
3	0.75	0.41	0.75	0.31		
5	0.55	0.47	1.30	0.61		
7	0.35	0.47	0.90	0.42		
9	0.20	0.47	0.55	0.26		
11	0.15	0.47	0.35	0.16		
13	0.20	0.14	0.35	0.05		
15	0.20	0.27	0.40	0.11		
17	0.40	0.38	0.60	0.23		
19	0.65	0.80	1.05	0.84		
21	1.05	0.51	1.70	0.87		
23	1.45	0.53	2.50	1.33		
25	1.55	0.67	3.00	2.01		
27	1.50	0.66	3.05	2.01		
29	1.30	0.65	2.80	1.82		
31	1.25	0.70	2.55	1.79		
33	1.20	0.75	2.45	1.84		
35	1.10	0.87	2.30	2.00		
37	1.00	1.09	2.10	2.29		
39	1.10	1.13	2.10	2.37		
41	1.00	1.17	2.10	2.46		
43	0.95	1.03	1.95	2.01		
45	1.10	1.13	2.05	2.32		
47	1.15	1.16	2.25	2.61		
49	1.15	1.27	2.30	2.92		
51	1.10	1.28	2.25	2.88		
53	1.10	1.25	2.20	2.75		
55	1.10	1.22	2.20	2.68		
57	1.20	1.23	2.30	2.83		
59	1.20	1.15	2.40	2.76		
61	1.25	1.07	2.45	2.62		
63	1.20	1.05	2.45	2.57		
65	1.35	0.86	2.55	2.19		
67	1.60	0.86	2.95	2.54		
69	1.75	0.90	3.35	3.02		
70	1.85	0.93	1.80	1.67		
71	1.95	0.82	1.90	1.56		
72	2.10	0.82	2.03	1.66		
73	2.15	0.75	2.13	1.59		
74	2.00	0.75	2.08	1.56		





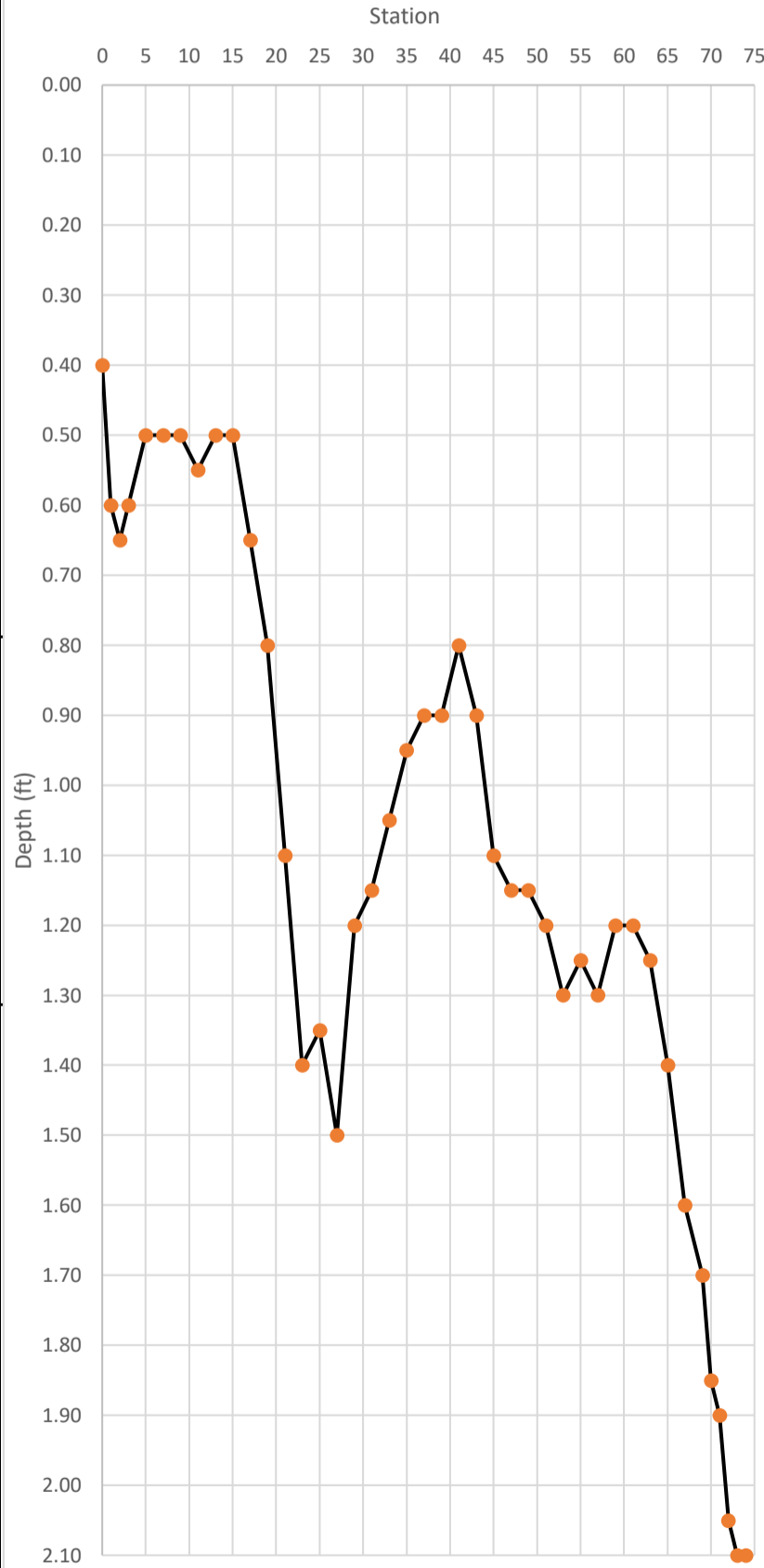
E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Sulphur Fork 3000	DATE/WEATHER	6/17/2021; Sunny, 82°F
SAMPLES TAKEN	2 (1:100 Dilution)	EVENT FREQUENCY	3 of 5
NOTES	36.506290, -86.944043	FIELD REPRESENTATIVE	LWK and KGA

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
9:20	21.1	9.40	7.98	N/A	79.5	73.0

STREAM CROSS SECTION MEASUREMENTS					STREAM CROSS SECTION DIAGRAM	
Station (ft)	Depth of Water (ft)	Velocity (ft/s)	Area (sq ft)	Flow (cfs)	Station	Depth (ft)
0	0.40	0.05	0.00	0.00	0	0.40
1	0.60	0.18	0.50	0.09	5	0.50
2	0.65	0.28	0.63	0.18	10	0.50
3	0.60	0.38	0.63	0.24	15	0.50
5	0.50	0.49	1.10	0.54	20	0.65
7	0.50	0.47	1.00	0.47	25	0.80
9	0.50	0.87	1.00	0.87	30	1.10
11	0.55	0.95	1.05	1.00	35	1.40
13	0.50	0.95	1.05	1.00	40	1.50
15	0.50	0.95	1.00	0.95	45	1.20
17	0.65	1.13	1.15	1.30	50	1.10
19	0.80	0.61	1.45	0.88	55	1.15
21	1.10	0.30	1.90	0.57	60	1.20
23	1.40	0.48	2.50	1.20	65	1.40
25	1.35	0.71	2.75	1.95	70	1.70
27	1.50	0.68	2.85	1.94	75	2.10
29	1.20	0.67	2.70	1.81		
31	1.15	1.06	2.35	2.49		
33	1.05	1.09	2.20	2.40		
35	0.95	1.13	2.00	2.26		
37	0.90	1.16	1.85	2.15		
39	0.90	1.21	1.80	2.18		
41	0.80	1.32	1.70	2.24		
43	0.90	1.21	1.70	2.06		
45	1.10	1.22	2.00	2.44		
47	1.15	1.26	2.25	2.84		
49	1.15	1.32	2.30	3.04		
51	1.20	1.24	2.35	2.91		
53	1.30	0.88	2.50	2.20		
55	1.25	0.98	2.55	2.50		
57	1.30	1.00	2.55	2.55		
59	1.20	1.01	2.50	2.53		
61	1.20	0.94	2.40	2.26		
63	1.25	0.94	2.45	2.30		
65	1.40	0.93	2.65	2.46		
67	1.60	0.96	3.00	2.88		
69	1.70	0.91	3.30	3.00		
70	1.85	0.93	1.78	1.65		
71	1.90	0.90	1.88	1.69		
72	2.05	0.85	1.98	1.68		
73	2.10	0.82	2.08	1.70		
74	2.10	0.75	2.10	1.58		





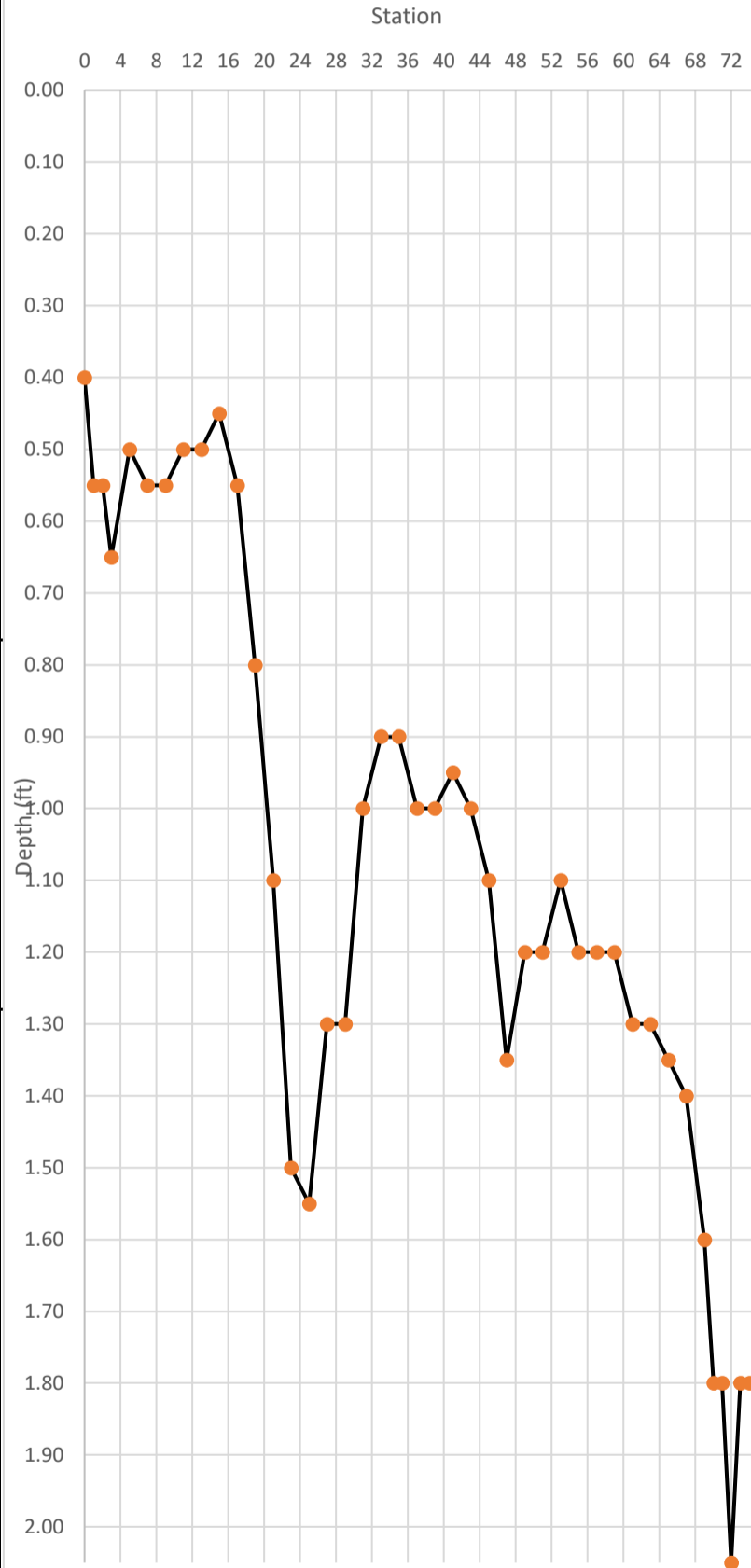
E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Sulphur Fork 3000	DATE/WEATHER	6/18/2021; Mostly Sunny, 88°F
SAMPLES TAKEN	2 (1:100 Dilution)	EVENT FREQUENCY	4 of 5
NOTES	36.506290, -86.944043	FIELD REPRESENTATIVE	LWK and JN

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
10:50	22.7	9.63	7.96	N/A	78.6	70.5

STREAM CROSS SECTION MEASUREMENTS					STREAM CROSS SECTION DIAGRAM	
Station (ft)	Depth of Water (ft)	Velocity (ft/s)	Area (sq ft)	Flow (cfs)		
0	0.40	0.00	0.00	0.00		
1	0.55	0.12	0.48	0.06		
2	0.55	0.23	0.55	0.13		
3	0.65	0.35	0.60	0.21		
5	0.50	0.36	1.15	0.41		
7	0.55	0.36	1.05	0.38		
9	0.55	0.71	1.10	0.78		
11	0.50	0.98	1.05	1.03		
13	0.50	0.99	1.00	0.99		
15	0.45	0.98	0.95	0.93		
17	0.55	1.10	1.00	1.10		
19	0.80	0.47	1.35	0.63		
21	1.10	0.42	1.90	0.80		
23	1.50	0.43	2.60	1.12		
25	1.55	0.60	3.05	1.83		
27	1.30	0.61	2.85	1.74		
29	1.30	0.64	2.60	1.66		
31	1.00	0.89	2.30	2.05		
33	0.90	0.97	1.90	1.84		
35	0.90	0.98	1.80	1.76		
37	1.00	1.00	1.90	1.90		
39	1.00	1.14	2.00	2.28		
41	0.95	1.20	1.95	2.34		
43	1.00	1.24	1.95	2.42		
45	1.10	1.31	2.10	2.75		
47	1.35	1.25	2.45	3.06		
49	1.20	1.25	2.55	3.19		
51	1.20	1.31	2.40	3.14		
53	1.10	1.23	2.30	2.83		
55	1.20	1.21	2.30	2.78		
57	1.20	1.19	2.40	2.86		
59	1.20	1.07	2.40	2.57		
61	1.30	0.88	2.50	2.20		
63	1.30	0.90	2.60	2.34		
65	1.35	0.85	2.65	2.25		
67	1.40	0.86	2.75	2.37		
69	1.60	0.83	3.00	2.49		
70	1.80	0.90	1.70	1.53		
71	1.80	0.75	1.80	1.35		
72	2.05	0.85	1.93	1.64		
73	1.80	0.75	1.93	1.44		
74	1.80	0.76	1.80	1.37		





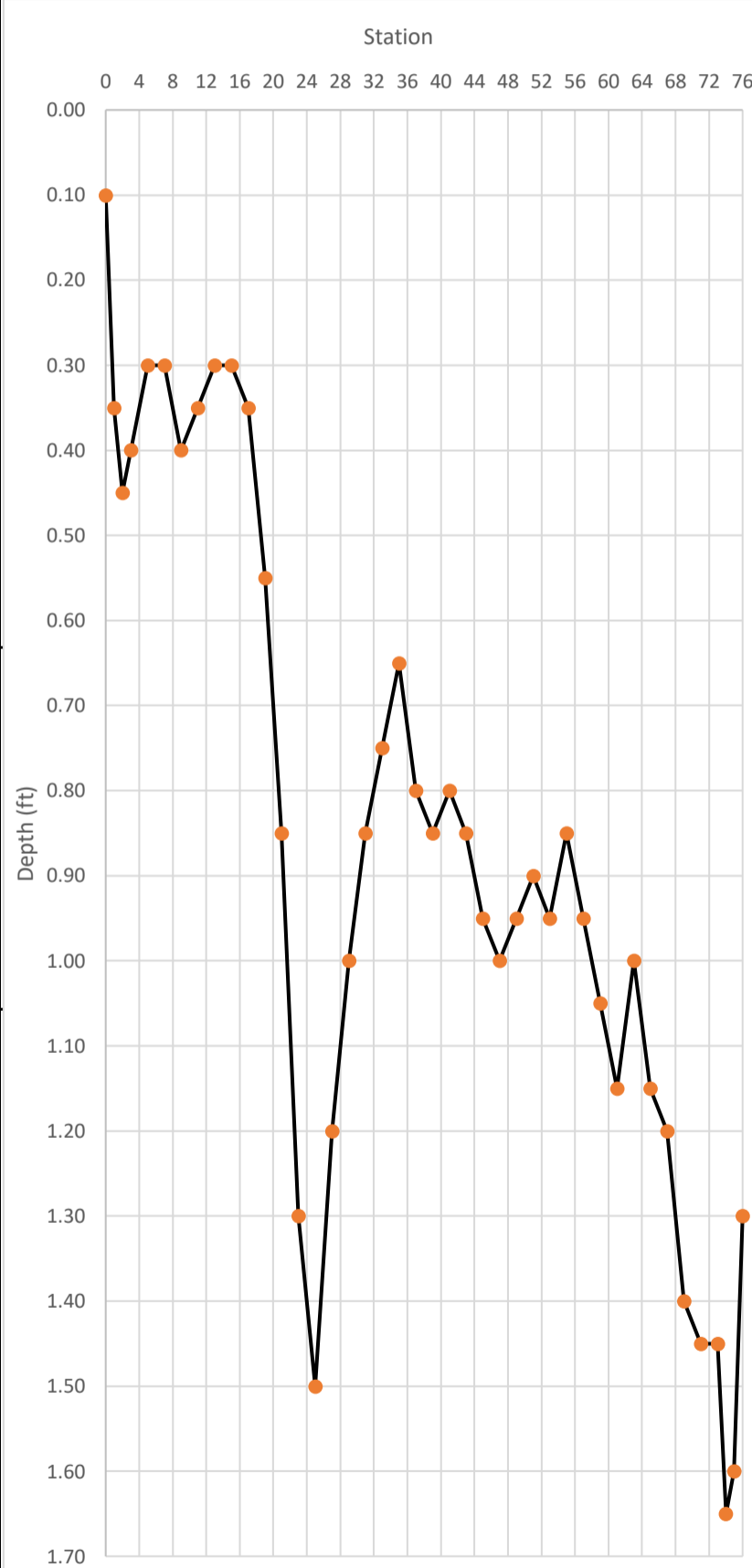
E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Sulphur Fork 3000	DATE/WEATHER	6/23/2021; Sunny, 72°F
SAMPLES TAKEN	2 (1:100 Dilution)	EVENT FREQUENCY	5 of 5
NOTES	36.506290, -86.944043	FIELD REPRESENTATIVE	LWK and JS

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
9:45	20.7	9.28	7.93	N/A	65.9	49.5

STREAM CROSS SECTION MEASUREMENTS					STREAM CROSS SECTION DIAGRAM	
Station (ft)	Depth of Water (ft)	Velocity (ft/s)	Area (sq ft)	Flow (cfs)	Station	Depth (ft)
0	0.10	0.00	0.00	0.00	0	0.10
1	0.35	0.17	0.23	0.04	4	0.35
2	0.45	0.29	0.40	0.12	8	0.45
3	0.40	0.30	0.43	0.13	12	0.40
5	0.30	0.31	0.70	0.22	16	0.30
7	0.30	0.31	0.60	0.19	20	0.30
9	0.40	0.57	0.70	0.40	24	0.40
11	0.35	0.57	0.75	0.43	28	0.35
13	0.30	0.55	0.65	0.36	32	0.30
15	0.30	0.58	0.60	0.35	36	0.30
17	0.35	0.59	0.65	0.38	40	0.35
19	0.55	0.35	0.90	0.32	44	0.55
21	0.85	0.30	1.40	0.42	48	0.85
23	1.30	0.54	2.15	1.16	52	1.30
25	1.50	0.52	2.80	1.46	56	1.50
27	1.20	0.51	2.70	1.38	60	1.20
29	1.00	0.72	2.20	1.58	64	1.00
31	0.85	0.83	1.85	1.54	68	0.85
33	0.75	0.80	1.60	1.28	72	0.75
35	0.65	0.91	1.40	1.27	74	0.65
37	0.80	0.94	1.45	1.36	75	0.80
39	0.85	0.98	1.65	1.62	76	0.85
41	0.80	1.03	1.65	1.70		
43	0.85	0.62	1.65	1.02		
45	0.95	0.85	1.80	1.53		
47	1.00	0.98	1.95	1.91		
49	0.95	1.18	1.95	2.30		
51	0.90	1.16	1.85	2.15		
53	0.95	1.12	1.85	2.07		
55	0.85	1.10	1.80	1.98		
57	0.95	0.93	1.80	1.67		
59	1.05	0.88	2.00	1.76		
61	1.15	0.81	2.20	1.78		
63	1.00	0.90	2.15	1.94		
65	1.15	0.77	2.15	1.66		
67	1.20	0.78	2.35	1.83		
69	1.40	0.72	2.60	1.87		
71	1.45	0.73	2.85	2.08		
73	1.45	0.71	2.90	2.06		
74	1.65	0.56	1.55	0.87		
75	1.60	0.61	1.63	0.99		
76	1.30	0.21	1.45	0.30		





E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Sulphur Fork 4000	DATE/WEATHER	6/4/2021; Sunny, 76°F
SAMPLES TAKEN	4 (no dilution and 1:100)	EVENT FREQUENCY	1 of 5
NOTES	36.509599, -86.943004; Water too swift to traverse	FIELD REPRESENTATIVE	LWK and AHB

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
11:10	19.1	9.59	7.84	325.3	-	-

STREAM CROSS SECTION MEASUREMENTS					STREAM CROSS SECTION DIAGRAM				
Station (ft)	Depth of Water (ft)	Velocity (ft/s)	Area (sq ft)	Flow (cfs)	Station				
NOT RECORDED DUE TO HIGH FLOW CONDITIONS					0	4	8	12	16
					0.00				
					0.10				
					0.20				
					0.30				
					0.40				
					0.50				
					0.60				
					0.70				
					0.80				
					0.90				
					1.00				

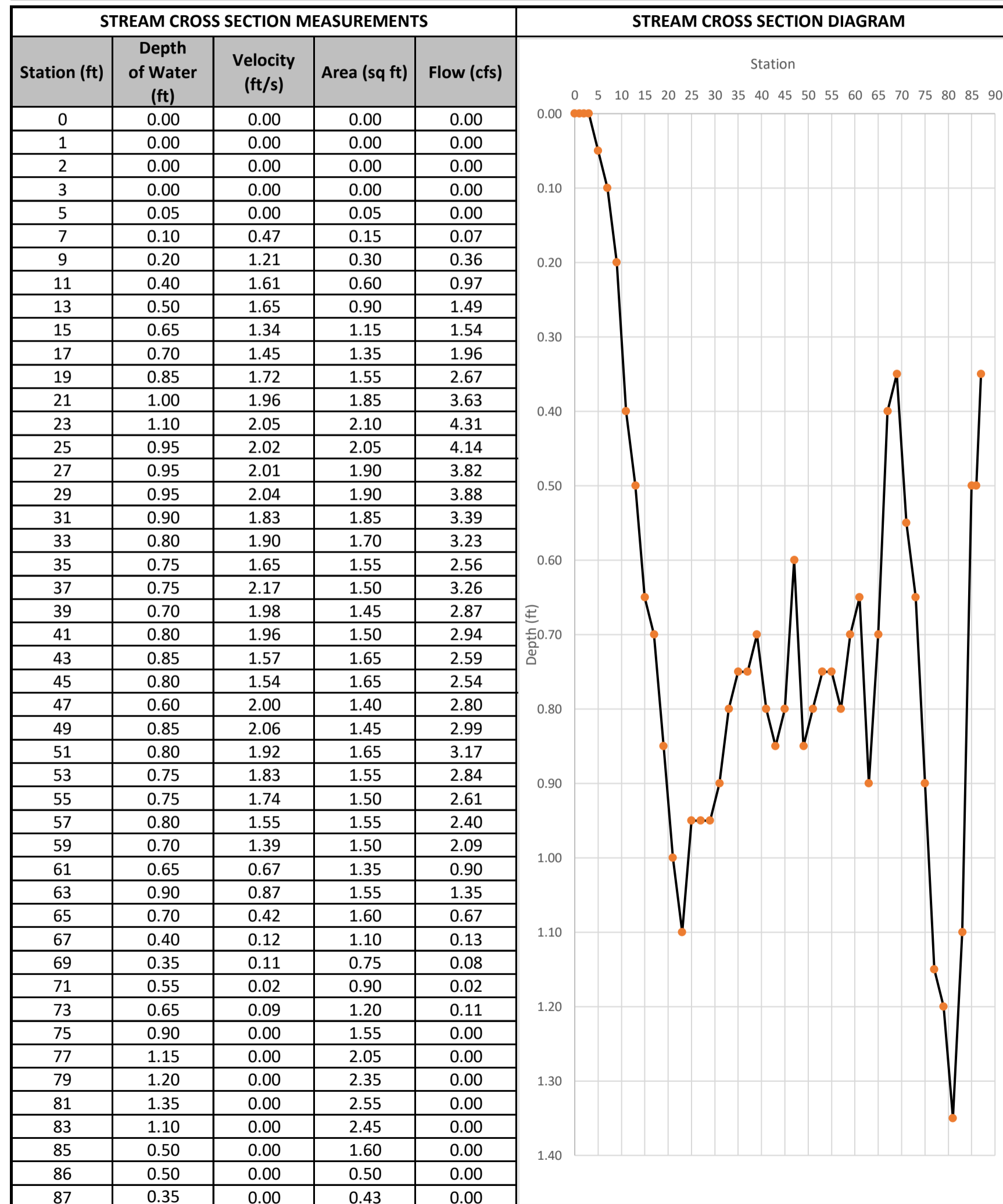


E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Sulphur Fork 4000	DATE/WEATHER	6/10/2021; Cloudy, 76°F
SAMPLES TAKEN	2 (1:100 Dilution)	EVENT FREQUENCY	2 of 5
NOTES	36.509599, -86.943004	FIELD REPRESENTATIVE	LWK and KGA

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
10:50	21.2	10.00	7.96	N/A	61.2	74.3



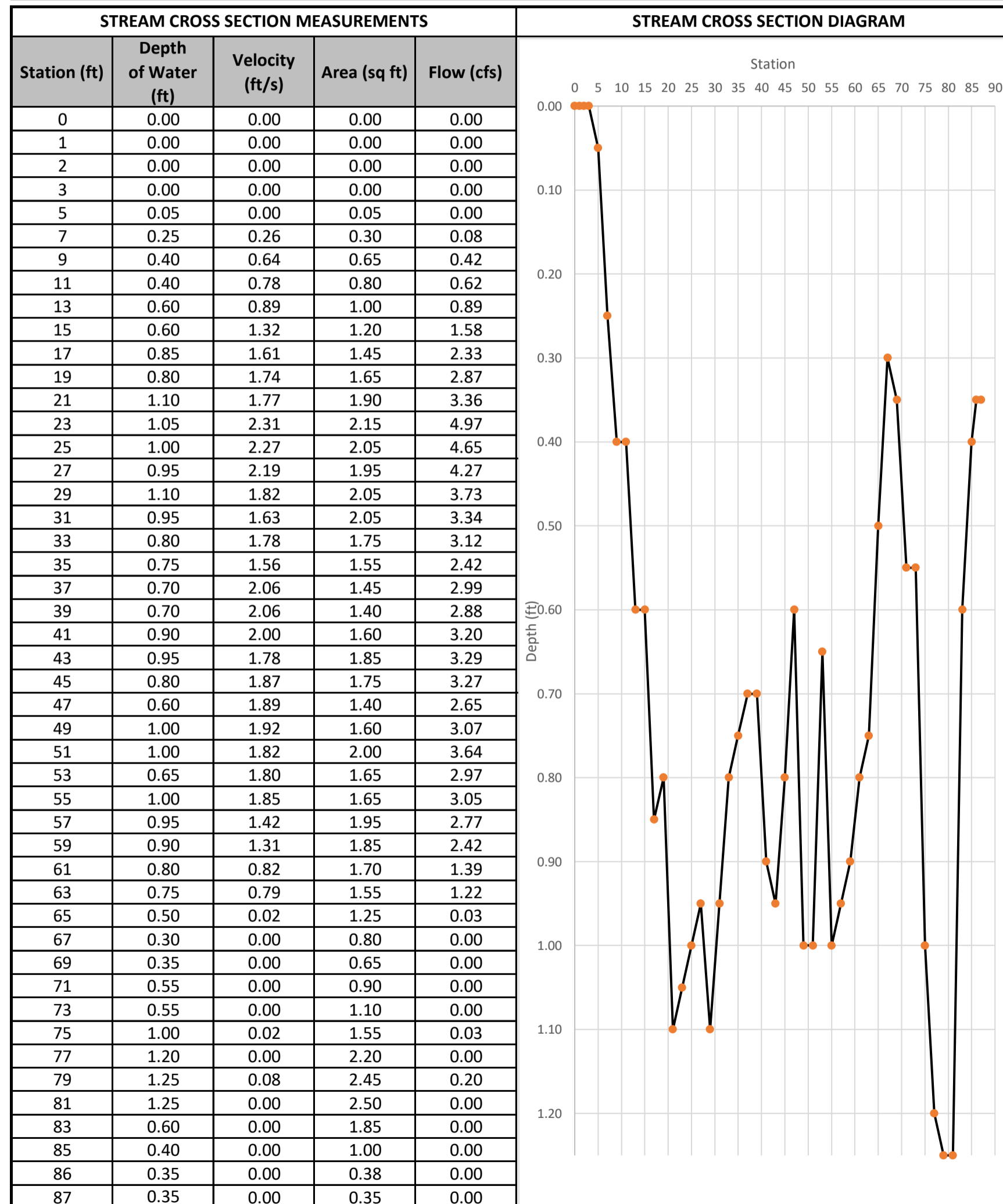


E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Sulphur Fork 4000	DATE/WEATHER	6/17/2021; Sunny, 82°F
SAMPLES TAKEN	2 (1:100 Dilution)	EVENT FREQUENCY	3 of 5
NOTES	36.509599, -86.943004	FIELD REPRESENTATIVE	LWK and KGA

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
10:10	21.4	10.15	8.04	N/A	62.9	77.7



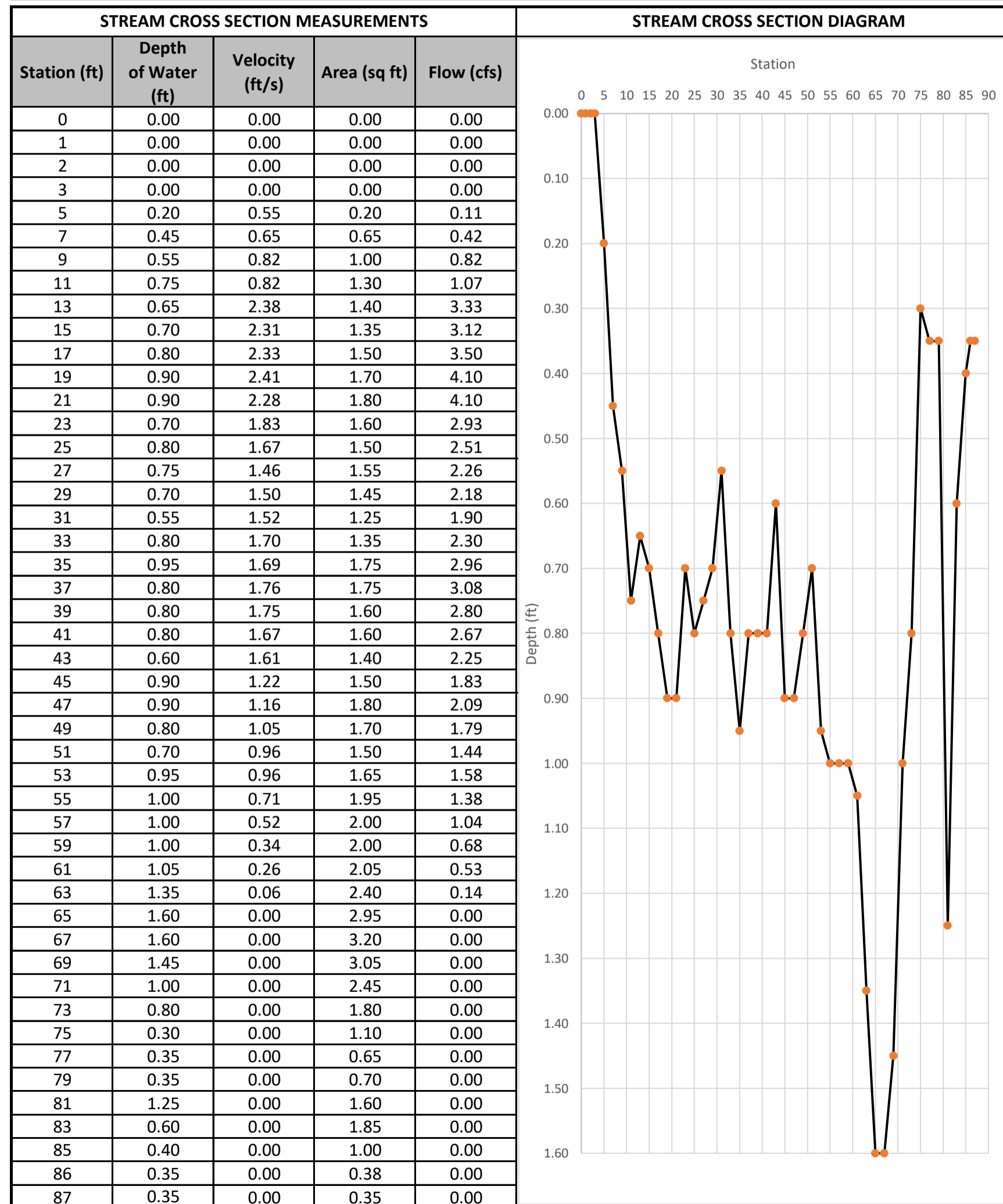


E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Sulphur Fork 4000	DATE/WEATHER	6/18/2021; Mostly Sunny, 88°F
SAMPLES TAKEN	4 (1:100 Dilution and Duplicate)	EVENT FREQUENCY	4 of 5
NOTES	36.506290, -86.944043	FIELD REPRESENTATIVE	LWK and JN

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
12:00	23.5	10.96	8.09	N/A	67.3	60.9





E. COLI SAMPLING FIELD INFORMATION LOG

Civil & Environmental Consultants, Inc. 117 Seaboard Lane Suite E-100 Franklin, Tennessee 37067

STREAM NAME	Sulphur Fork 4000	DATE/WEATHER	6/23/2021; Mostly Sunny, 75°F
SAMPLES TAKEN	4 (1:10 and 1:100 Dilutions)	EVENT FREQUENCY	5 of 5
NOTES	36.509599, -86.943004	FIELD REPRESENTATIVE	LWK and JS

Time Collected	°C	DO (mg/L)	pH	Conductivity (µs/cm)	Flow Area (sq ft)	Flow (cfs)
10:30	21.1	10.14	8.07	N/A	49.4	42.2

STREAM CROSS SECTION MEASUREMENTS					STREAM CROSS SECTION DIAGRAM
Station (ft)	Depth of Water (ft)	Velocity (ft/s)	Area (sq ft)	Flow (cfs)	
0	0.00	0.00	0.00	0.00	
1	0.00	0.00	0.00	0.00	
2	0.00	0.00	0.00	0.00	
3	0.00	0.00	0.00	0.00	
4	0.00	0.00	0.00	0.00	
5	0.00	0.00	0.00	0.00	
7	0.25	0.32	0.25	0.08	
9	0.20	0.46	0.45	0.21	
11	0.35	0.50	0.55	0.28	
13	0.50	1.16	0.85	0.99	
15	0.60	1.12	1.10	1.23	
17	0.60	1.23	1.20	1.48	
19	0.60	1.25	1.20	1.50	
21	0.65	1.27	1.25	1.59	
23	0.55	2.34	1.20	2.81	
25	0.40	2.13	0.95	2.02	
27	0.70	1.94	1.10	2.13	
29	0.30	1.81	1.00	1.81	
31	0.60	1.30	0.90	1.17	
33	0.50	1.11	1.10	1.22	
35	0.50	1.10	1.00	1.10	
37	0.55	0.92	1.05	0.97	
39	0.60	1.07	1.15	1.23	
41	0.60	1.12	1.20	1.34	
43	0.70	1.20	1.30	1.56	
45	0.70	1.21	1.40	1.69	
47	0.60	1.46	1.30	1.90	
49	0.50	1.52	1.10	1.67	
51	0.70	1.35	1.20	1.62	
53	0.75	1.22	1.45	1.77	
55	0.30	0.66	1.05	0.69	
57	0.70	0.91	1.00	0.91	
59	0.90	0.96	1.60	1.54	
61	0.70	0.90	1.60	1.44	
63	0.80	0.90	1.50	1.35	
65	0.85	0.86	1.65	1.42	
67	1.10	0.28	1.95	0.55	
69	1.20	0.18	2.30	0.41	
71	1.15	0.12	2.35	0.28	
73	1.55	0.09	2.70	0.24	
75	1.60	0.00	3.15	0.00	
77	1.70	0.00	3.30	0.00	
79	1.20	0.00	2.90	0.00	
81	0.40	0.00	1.60	0.00	
83	0.30	0.00	0.70	0.00	
84	0.30	0.00	0.30	0.00	
85	0.20	0.00	0.25	0.00	
86	0.10	0.00	0.15	0.00	
87	0.10	0.00	0.10	0.00	

ATTACHMENT E

LAB RESULTS

Civil & Environmental Consultants - TN

Sample Delivery Group: L1361719
Samples Received: 06/04/2021
Project Number:
Description: Springfield E. Coli

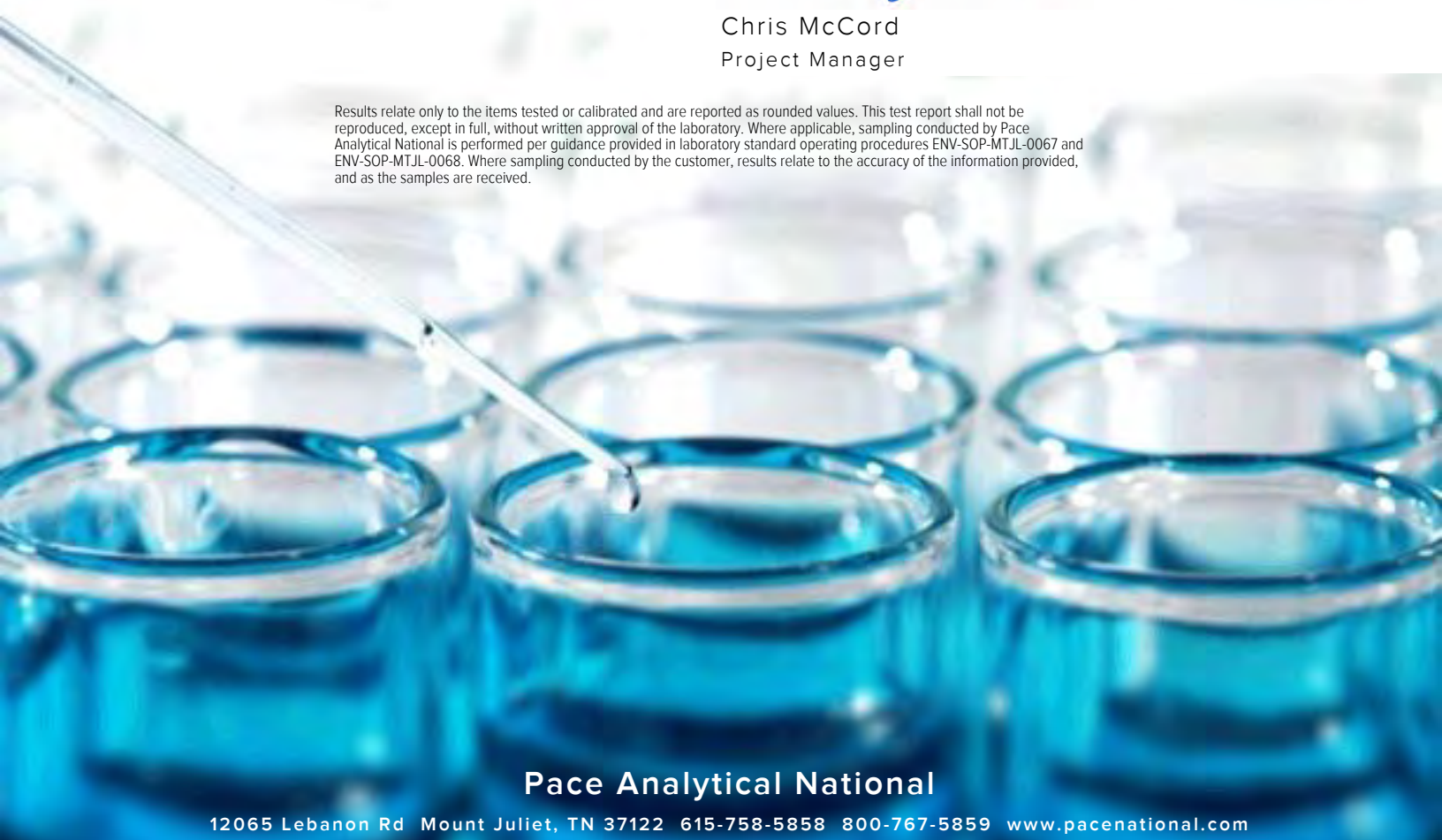
Report To: Lindsay Wilson-Kokes
117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Entire Report Reviewed By:



Chris McCord
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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SAMPLE SUMMARY

SULPHUR FORK_3000 L1361719-01 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/04/21 10:40

Received date/time
06/04/21 13:05

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1683184	2	06/04/21 14:55	06/04/21 14:55	HAB	Mt. Juliet, TN

100X SULPHUR FORK_3000 L1361719-02 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/04/21 10:40

Received date/time
06/04/21 13:05

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1683184	100	06/04/21 14:55	06/04/21 14:55	HAB	Mt. Juliet, TN

SULPHUR FORK_4000 L1361719-03 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/04/21 11:10

Received date/time
06/04/21 13:05

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1683184	2	06/04/21 14:55	06/04/21 14:55	HAB	Mt. Juliet, TN

100X SULPHUR FORK_4000 L1361719-04 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/04/21 11:10

Received date/time
06/04/21 13:05

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1683184	100	06/04/21 14:55	06/04/21 14:55	HAB	Mt. Juliet, TN

CARR CREEK_1350 L1361719-05 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/04/21 09:50

Received date/time
06/04/21 13:05

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1683184	2	06/04/21 14:55	06/04/21 14:55	HAB	Mt. Juliet, TN

100X CARR CREEK_1350 L1361719-06 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/04/21 09:50

Received date/time
06/04/21 13:05

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1683184	100	06/04/21 14:55	06/04/21 14:55	HAB	Mt. Juliet, TN

FIELD BLANK L1361719-07 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/04/21 12:00


Received date/time
06/04/21 13:05

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1683184	2	06/04/21 14:55	06/04/21 14:55	HAB	Mt. Juliet, TN



CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Chris McCord
Project Manager

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Gl
- ⁷ Al
- ⁸ Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	3972.6		2	06/04/2021 14:55	WG1683184

- ¹Cp
- ²Tc
- ³Ss
- ⁴Cn
- ⁵Sr
- ⁶Gl
- ⁷Al
- ⁸Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	2950		100	06/04/2021 14:55	WG1683184

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Gl
- ⁷ Al
- ⁸ Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	3465.8		2	06/04/2021 14:55	WG1683184

- ¹Cp
- ²Tc
- ³Ss
- ⁴Cn
- ⁵Sr
- ⁶Gl
- ⁷Al
- ⁸Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	2950		100	06/04/2021 14:55	WG1683184

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Gl
- ⁷ Al
- ⁸ Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	310.6		2	06/04/2021 14:55	WG1683184

- ¹Cp
- ²Tc
- ³Ss
- ⁴Cn
- ⁵Sr
- ⁶Gl
- ⁷Al
- ⁸Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	410		100	06/04/2021 14:55	WG1683184

- ¹Cp
- ²Tc
- ³Ss
- ⁴Cn
- ⁵Sr
- ⁶Gl
- ⁷Al
- ⁸Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<2		2	06/04/2021 14:55	WG1683184

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Gl
- ⁷ Al
- ⁸ Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

SDG	Sample Delivery Group.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.



Qualifier Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



Civil & Environmental Consultants - TN

Sample Delivery Group: L1364388
Samples Received: 06/10/2021
Project Number: 312-080
Description: Springfield E. Coli

Report To: Lindsay Wilson-Kokes
117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Entire Report Reviewed By:



Chris McCord
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

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SULFUR FORK 4000 L1364388-02	6	⁴ Cn
CARR CREEK_1350 L1364388-03	7	⁵ Sr
FIELD BLANK L1364388-04	8	
Gl: Glossary of Terms	9	⁶ Gl
Al: Accreditations & Locations	10	⁷ Al
Sc: Sample Chain of Custody	11	⁸ Sc

SAMPLE SUMMARY

SULFUR FORK 3000 L1364388-01 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/10/21 10:00

Received date/time
06/10/21 13:13

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1686499	100	06/10/21 15:25	06/10/21 15:25	HAB	Mt. Juliet, TN

SULFUR FORK 4000 L1364388-02 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/10/21 10:50

Received date/time
06/10/21 13:13

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1686499	100	06/10/21 15:25	06/10/21 15:25	HAB	Mt. Juliet, TN

CARR CREEK_1350 L1364388-03 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/10/21 11:45

Received date/time
06/10/21 13:13

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1686499	1	06/10/21 15:25	06/10/21 15:25	HAB	Mt. Juliet, TN

FIELD BLANK L1364388-04 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/10/21 11:50

Received date/time
06/10/21 13:13

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1686499	1	06/10/21 15:25	06/10/21 15:25	HAB	Mt. Juliet, TN

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

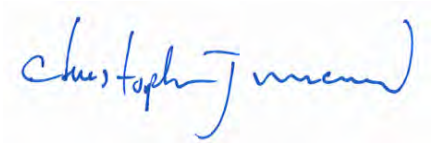
6 Gl

7 Al

8 Sc

CASE NARRATIVE

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Chris McCord
Project Manager

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Gl
- 7 Al
- 8 Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	520		100	06/10/2021 15:25	WG1686499

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Gl

⁷ Al

⁸ Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<100		100	06/10/2021 15:25	WG1686499

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Gl
- 7 Al
- 8 Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	307.6		1	06/10/2021 15:25	WG1686499

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Gl

⁷ Al

⁸ Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<1		1	06/10/2021 15:25	WG1686499

- ¹Cp
- ²Tc
- ³Ss
- ⁴Cn
- ⁵Sr
- ⁶Gl
- ⁷Al
- ⁸Sc

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Abbreviations and Definitions

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Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
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Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.



ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Gl

⁷ Al

⁸ Sc

Company Name/Address: Civil & Environmental Consultants - TN 117 Seaboard Ln. Suite E100 Franklin, TN 37067		Billing Information: Accounts Payable 117 Seaboard Ln. Suite E100 Franklin, TN 37067		Analysis / Container / Preservative		Chain of Custody Page ___ of ___					
Report to: Lindsay Wilson-Kokes		Email To: lwilsonkokes@cecinc.com		COLILERT Microbiological		Pres Chk					
Project Description: Springfield E. Coli		City/State Collected: Springfield, TN						Please Circle: PT MT CT ET			
Phone: 615-577-9313		Client Project # 312-080						Lab Project # CEC-SPRINGFIELDECOLI			
Collected by (print): Lindsay Wilson-Kokes		Site/Facility ID #						P.O. #			
Collected by (signature): <i>[Signature]</i>		Rush? (Lab MUST Be Notified) <input type="checkbox"/> Same Day <input type="checkbox"/> Five Day <input type="checkbox"/> Next Day <input type="checkbox"/> 5 Day (Rad Only) <input type="checkbox"/> Two Day <input type="checkbox"/> 10 Day (Rad Only) <input type="checkbox"/> Three Day						Quote #			
Immediately Packed on Ice N ___ Y <input checked="" type="checkbox"/>		Date Results Needed						No. of Cntrs			
Sample ID		Comp/Grab	Matrix *					Depth	Date	Time	
SULPHUR FORK 3000 SULPHUR Fork 3000		Grab	WW					Ø	6/10/21	1000	2 X
SULPHUR FORK 4000 SULPHUR Fork 4000			WW							1050	2 X
CARR CREEK 1350 CARR CREEK 1350			WW							1145	2 X
CARR CREEK 1355			WW				2 X				
FIELD BLANK		Grab	WW	Ø	6/10/21	1150	2 X				
* Matrix: SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - WasteWater DW - Drinking Water OT - Other _____		Remarks: ** Sulphur Fork 3000 + Sulphur Fork 4000 need 1:100 dilution. **				pH _____ Temp _____ Flow _____ Other _____		Sample Receipt Checklist COC Seal Present/Intact: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N COC Signed/Accurate: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Bottles arrive intact: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Correct bottles used: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Sufficient volume sent: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N If Applicable VOA Zero Headspace: <input type="checkbox"/> Y <input type="checkbox"/> N Preservation Correct/Checked: <input type="checkbox"/> Y <input type="checkbox"/> N RAD Screen <0.5 mR/hr: <input type="checkbox"/> Y <input type="checkbox"/> N			
Relinquished by: (Signature) <i>[Signature]</i>		Date: 6/10/21		Time: 1313		Received by: (Signature)		Trip Blank Received: Yes/No HCL/MeOH TBR			
Relinquished by: (Signature)		Date:		Time:		Received by: (Signature)		Temp: 16.0 °C Bottles Received: 8			
Relinquished by: (Signature)		Date:		Time:		Received for lab by: (Signature) <i>[Signature]</i>		Date: 6/10/21 Time: 1313			
								Hold: Condition: NCF / <input checked="" type="checkbox"/> OK			



12065 Lebanon Rd. Mount Juliet, TN 37122
Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: <https://info.pacelabs.com/hubfs/pas-standard-terms.pdf>

SDG # **61364308**
C010

Acctnum: **CEC**
Template: **T186515**
Prelogin: **P844134**
PM: **526 - Chris McCord**
PB: **Bf 4/26/21**
Shipped Via: **Courier**

Remarks	Sample # (lab only)
	-01
	-02
	-03
	-04

June 25, 2021

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Gl

7 Al

8 Sc

Civil & Environmental Consultants - TN

Sample Delivery Group: L1367502
Samples Received: 06/17/2021
Project Number: 312-080
Description: Springfield E. Coli

Report To: Lindsay Wilson-Kokes
117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Entire Report Reviewed By:



Chris McCord
Project Manager

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Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

ACCOUNT:

Civil & Environmental Consultants - TN

PROJECT:

312-080

SDG:

L1367502

DATE/TIME:

06/25/21 09:52

PAGE:

1 of 11

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Cn: Case Narrative	4	
Sr: Sample Results	5	³Ss
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SULPHUR FORK_4000 L1367502-02	6	⁴Cn
CARR CREEK_1350 L1367502-03	7	⁵Sr
FIELD BLANK L1367502-04	8	
Gl: Glossary of Terms	9	⁶Gl
Al: Accreditations & Locations	10	⁷Al
Sc: Sample Chain of Custody	11	⁸Sc

SAMPLE SUMMARY

SULPHUR FORK_3000 L1367502-01 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/17/21 09:20

Received date/time
06/17/21 12:16

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1690631	100	06/17/21 14:45	06/17/21 14:45	MEL	Mt. Juliet, TN

SULPHUR FORK_4000 L1367502-02 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/17/21 10:10

Received date/time
06/17/21 12:16

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1690631	100	06/17/21 14:45	06/17/21 14:45	MEL	Mt. Juliet, TN

CARR CREEK_1350 L1367502-03 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/17/21 10:50

Received date/time
06/17/21 12:16

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1690631	2	06/17/21 14:45	06/17/21 14:45	MEL	Mt. Juliet, TN

FIELD BLANK L1367502-04 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/17/21 11:00

Received date/time
06/17/21 12:16

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1690631	2	06/17/21 14:45	06/17/21 14:45	MEL	Mt. Juliet, TN

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr


6 Gl

7 Al

8 Sc

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Chris McCord
Project Manager

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Gl
- ⁷ Al
- ⁸ Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	15150		100	06/17/2021 14:45	WG1690631

- ¹Cp
- ²Tc
- ³Ss
- ⁴Cn
- ⁵Sr
- ⁶Gl
- ⁷Al
- ⁸Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	310		100	06/17/2021 14:45	WG1690631

- ¹Cp
- ²Tc
- ³Ss
- ⁴Cn
- ⁵Sr
- ⁶Gl
- ⁷Al
- ⁸Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	544.6		2	06/17/2021 14:45	WG1690631

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Gl

⁷ Al

⁸ Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<2		2	06/17/2021 14:45	WG1690631

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Gl

⁷ Al

⁸ Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

SDG	Sample Delivery Group.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

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Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

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¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Gl

⁷ Al

⁸ Sc

Civil & Environmental Consultants - TN

Sample Delivery Group: L1368113
Samples Received: 06/18/2021
Project Number: 312-080
Description: Springfield E. Coli

Report To: Lindsay Wilson-Kokes
117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Entire Report Reviewed By:



Chris McCord
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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SULPHUR FORK_4000 L1368113-02	6	⁴Cn
CARR CREEK_1350 L1368113-03	7	⁵Sr
FIELD BLANK L1368113-04	8	
DUPLICATE L1368113-05	9	⁶Gl
Gl: Glossary of Terms	10	
Al: Accreditations & Locations	11	⁷Al
Sc: Sample Chain of Custody	12	⁸Sc

SAMPLE SUMMARY

SULPHUR FORK_3000 L1368113-01 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/18/21 10:50

Received date/time
06/18/21 13:57

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1691401	100	06/18/21 15:50	06/18/21 15:50	MJG	Mt. Juliet, TN

SULPHUR FORK_4000 L1368113-02 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/18/21 12:00

Received date/time
06/18/21 13:57

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1691401	100	06/18/21 15:50	06/18/21 15:50	MJG	Mt. Juliet, TN

CARR CREEK_1350 L1368113-03 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/18/21 12:45

Received date/time
06/18/21 13:57

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1691401	2	06/18/21 15:50	06/18/21 15:50	MJG	Mt. Juliet, TN

FIELD BLANK L1368113-04 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/18/21 12:50

Received date/time
06/18/21 13:57

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1691401	2	06/18/21 15:50	06/18/21 15:50	MJG	Mt. Juliet, TN

DUPLICATE L1368113-05 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/18/21 12:00

Received date/time
06/18/21 13:57

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1691401	100	06/18/21 15:50	06/18/21 15:50	MJG	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr


⁶Gl

⁷Al

⁸Sc

CASE NARRATIVE

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Chris McCord
Project Manager

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Gl
- 7 Al
- 8 Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	2920		100	06/18/2021 15:50	WG1691401

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Gl
- 7 Al
- 8 Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	310		100	06/18/2021 15:50	WG1691401

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Gl

⁷ Al

⁸ Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	730.8		2	06/18/2021 15:50	WG1691401

- ¹Cp
- ²Tc
- ³Ss
- ⁴Cn
- ⁵Sr
- ⁶Gl
- ⁷Al
- ⁸Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<2		2	06/18/2021 15:50	WG1691401

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Gl
- 7 Al
- 8 Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	200		100	06/18/2021 15:50	WG1691401

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Gl
- 7 Al
- 8 Sc

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Qualifier Description

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ACCREDITATIONS & LOCATIONS

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Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio-VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



June 30, 2021

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Gl

7 Al

8 Sc

Civil & Environmental Consultants - TN

Sample Delivery Group: L1369846
Samples Received: 06/23/2021
Project Number: 312-080
Description: Springfield E. Coli

Report To: Lindsay Wilson-Kokes
117 Seaboard Ln.
Suite E100
Franklin, TN 37067

Entire Report Reviewed By:



Chris McCord
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

Pace Analytical National12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

ACCOUNT:

Civil & Environmental Consultants - TN

PROJECT:

312-080

SDG:

L1369846

DATE/TIME:

06/30/21 14:50

PAGE:

1 of 12

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Cn: Case Narrative	4	
Sr: Sample Results	5	³Ss
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SULPHUR FORK_4000(1:100) L1369846-02	6	⁴Cn
CARR CREEK_1350 L1369846-03	7	⁵Sr
SULPHUR FORK_4000 L1369846-04	8	
FIELD BLANK L1369846-05	9	⁶Gl
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Al: Accreditations & Locations	11	⁷Al
Sc: Sample Chain of Custody	12	⁸Sc

SAMPLE SUMMARY

SULPHUR FORK_3000 L1369846-01 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/23/21 09:45

Received date/time
06/23/21 12:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1693924	100	06/23/21 14:40	06/23/21 14:40	MEL	Mt. Juliet, TN

SULPHUR FORK_4000(1:100) L1369846-02 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/23/21 10:30

Received date/time
06/23/21 12:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1693924	100	06/23/21 14:40	06/23/21 14:40	MEL	Mt. Juliet, TN

CARR CREEK_1350 L1369846-03 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/23/21 11:10

Received date/time
06/23/21 12:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1693924	1	06/23/21 14:40	06/23/21 14:40	MEL	Mt. Juliet, TN

SULPHUR FORK_4000 L1369846-04 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/23/21 10:30

Received date/time
06/23/21 12:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1693924	1	06/23/21 14:40	06/23/21 14:40	MEL	Mt. Juliet, TN

FIELD BLANK L1369846-05 WW

Collected by
Lindsay
Wilson-Kokes

Collected date/time
06/23/21 11:20

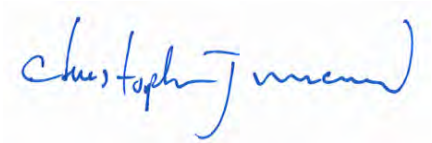
Received date/time
06/23/21 12:35

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method 9223B-2004	WG1693924	1	06/23/21 14:40	06/23/21 14:40	MEL	Mt. Juliet, TN



CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Chris McCord
Project Manager

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Gl
- ⁷ Al
- ⁸ Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	1100		100	06/23/2021 14:40	WG1693924

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Gl

⁷ Al

⁸ Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	100		100	06/23/2021 14:40	WG1693924

- ¹Cp
- ²Tc
- ³Ss
- ⁴Cn
- ⁵Sr
- ⁶Gl
- ⁷Al
- ⁸Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	478.6		1	06/23/2021 14:40	WG1693924

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Gl

⁷ Al

⁸ Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	142.1		1	06/23/2021 14:40	WG1693924

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Gl

⁷ Al

⁸ Sc

Microbiology by Method 9223B-2004

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
E.Coli	<1		1	06/23/2021 14:40	WG1693924

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Gl
- ⁷ Al
- ⁸ Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

SDG	Sample Delivery Group.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.



Qualifier Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey-NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio-VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA-Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

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* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Gl

⁷ Al

⁸ Sc

117 Seaboard Ln.
 Suite E100
 Franklin, TN 37067

117 Seaboard Ln.
 Suite E100
 Franklin, TN 37067

Report to:
Lindsay Wilson-Kokes

Email To: **lwilsonkokes@cecinc.com**

Project Description:
Springfield E. Coli

City/State Collected: **Springfield, TN**

Please Circle:
 PT MT CT ET

Phone: **615-577-9313**

Client Project #
312-080

Lab Project #
CEC-SPRINGFIELDECOLI

Collected by (print):
Lindsay Wilson-Kokes

Site/Facility ID #

P.O. #

Collected by (signature):
Lindsay Wilson-Kokes

Rush? (Lab MUST Be Notified)
 ___ Same Day ___ Five Day
 ___ Next Day ___ 5 Day (Rad Only)
 ___ Two Day ___ 10 Day (Rad Only)
 ___ Three Day

Quote #

Immediately Packed on Ice N ___ Y

Date Results Needed

No. of Cntrs

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	COLILERT Microbiological	Analysis / Container / Preservative	Chain of Custody
SULFUR FORK 3000 Sulphur Fork - 3000	Grab	WW	Ø	6/23/21	1035	2	X		
SULFUR FORK 4000 Sulphur Fork - 4000 (1:100)		WW			1030	2	X		
CARR CREEK 1350		WW			1110	2	X		
CARR CREEK 1355 Sulphur Fork - 4000		WW			1030	2	X		
FIELD BLANK		WW			1120	2	X		



12065 Lebanon Rd Mount Juliet, TN 37122
 Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: <https://info.pacelabs.com/hubs/pas-standard-terms.pdf>

SDG # **L1360846**
C161

Acctnum: **CEC**
 Template: **T186515**
 Prelogin: **P844132**
 PM: **526 - Chris McCord**
 PB: **BF 4/26/21**

Shipped Via: **Courier**

* Matrix:
 SS - Soil AIR - Air F - Filter
 GW - Groundwater B - Bioassay
 WW - WasteWater
 DW - Drinking Water
 OT - Other

Remarks: **Sulphur Fork - 3000 + Sulphur Fork - 4000 (1:100) pH ___ Temp ___ Flow ___ Other ___**
get a 1:100 dilution.

Sample Receipt Checklist	
COC Seal Present/Intact:	<input checked="" type="checkbox"/> NP <input type="checkbox"/> Y <input type="checkbox"/> N
COC Signed/Accurate:	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
Bottles arrive intact:	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
Correct bottles used:	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
Sufficient volume sent:	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N
If Applicable	
VOA Zero Headspace:	<input type="checkbox"/> Y <input type="checkbox"/> N
Preservation Correct/Checked:	<input type="checkbox"/> Y <input type="checkbox"/> N
RAD Screen <0.5 mR/hr:	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N

Relinquished by: (Signature)
Lindsay Wilson-Kokes

Date: **6/23/21** Time: **1235**

Received by: (Signature)

Trip Blank Received: Yes No
 HCL/MeOH TBR

Relinquished by: (Signature)

Date: Time:

Received by: (Signature)

Temp: **17.0°C** Bottles Received: **3.0 ± 0.3 = 3.0 10**

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date: Time:

Received for lab by: (Signature)
[Signature]

Date: **6/23/21** Time: **1235**

Hold: Condition: **NCF 100**

July 29, 2021

Mr. Kenny Morris, Stormwater Coordinator
 Department of Public Works
 City of Springfield
 2809 Clinard Drive
 Springfield, TN 37172

Dear Mr. Morris:

Subject: Phase II MS4 Monitoring
 2021 Visual Stream Assessment (VSA)
 City of Springfield, Robertson County, Tennessee
 CEC Project 312-080.0001

Civil & Environmental Consultants, Inc. (CEC) performed a Visual Stream Assessment (VSA) on the streams presented in Table 1 for the City of Springfield per our contract dated June 2, 2021. The VSA was conducted from June 9 – 25, 2021 using the Maryland Department of Natural Resources’ (DNR) Stream Corridor Assessment Survey (2001).

Visual survey locations have been logged into a geodatabase. Each location includes completed data fields, GPS location, and a photo (due to limited connectivity in some areas, photos are not available for all locations) (Figure 1). The geodatabase is included on the USB flash drive provided. The approximate mileage assessed for each stream is included in Table 1. If CEC encountered conditions that did not permit field crews to access a portion of a stream (i.e., “no trespassing” signs, property owner asking field crews to leave the property, etc.), CEC then documented the location and nature of the conditions.

Table 1. Streams with unavailable parameters for siltation, habitat alteration, pathogens and nutrients.

Waterbody Name	Impairment ¹	Waterbody I.D. #	Estimated Mileage Within City Limits
Black Branch	HA	(TN05130206003_1200)	1.9
Carr Creek	E	(TN05130206003_1350)	2.2
Carr Creek	E, TP, N	(TN05130206003_1355)	0.1
Peppers Branch	SS, HA	(TN05130206003_0300)	0.3
Sulphur Fork	SS, TP, E, DO	(TN05130206003_3000)	0.2
Sulphur Fork	E	(TN05130206003_4000)	1.3
Wartrace Creek	HA	(TN05130206003_1100)	0.3
Wartrace Creek	SS, HA	(TN05130206003_1150)	3.9
Total:			10.2

¹SS = Sedimentation/Siltation; HA = Habitat Alteration; TP = Total Phosphorus; N = Nitrates/Nitrites; E = *Escherichia coli*; DO = Dissolved Oxygen

Table 2 provides a summary of the number of locations for each feature type. In addition to recording VSA data, CEC mapped potential MS4 outfall points that were observed in the field during the VSA survey. A total of 75 potential MS4 outfalls were collected. Connectivity to the City’s infrastructure should be evaluated by the City to confirm the outfall status and/or compared to the City’s current outfall map.

Table 2. Summary of collected VSA data points by feature type.

Feature Type	Number of Locations
Channel Alteration	23
Erosion Site	49
Exposed Pipe	19
Fish Barrier	15
In/Near Stream Construction	1
Inadequate Buffer	26
Pipe Outfall*	22
Representative Site	32
Trash Dumping	4
Unusual Condition/Comment	31
Total	222

*Pipe Outfall symbols denote non-MS4 pipe outfalls observed during VSA. Outfalls that were assumed to be MS4 outfalls were denoted with a separate symbology.

Section 5 of the current MS4 Phase II Permit states that “MS4 monitoring programs are intended to provide data that, when combined with other MS4 information, identifies pollutant sources, and assists in determining the effectiveness of the Program in improving water quality. Both components (analytical and non-analytical) must include a process to evaluate monitoring results and take appropriate corrective action as applicable.”

Section 4.2.1 (Public Education and Outreach) of the current MS4 permit states that the public education/outreach program “must focus on the steps that the public (including residential, commercial, industrial or institutional stakeholders) can take to minimize the discharge of pollutants of concern to receiving streams.”

Stream monitoring results can also be utilized to engage with the public thereby helping to satisfy Section 4.2.2 of the MS4 permit, which states, “Permittees shall implement a public involvement/participation program. Elements of the program may include participation opportunities such as; ...local stormwater management work groups, ...riparian plantings or stream clean-up events, ...”

There were a few select locations that CEC wanted to bring to the City’s attention. These locations are described as follows:

1.0 BLACK BRANCH

1.1 In/Near Stream Construction

CEC field personnel observed active in-stream construction along Memorial Blvd. (U.S. 41). Erosion control measures did not appear to be maintained and/or may need to be upgraded to deter sedimentation in the stream. CEC recommends that the City inspect this location for potential corrective actions. This point is listed as an “In/Near Stream Construction” point (Object ID 1) in the geodatabase provided. Refer to Figure 2.



*Photo 1 - Aerial View of In/Near Stream Construction Site
(Red Diamond Indicates Construction Location)*



Photo 2 - View of Dewatering Activities



Photo 3 - View of In-Stream Construction

1.2 Streambank Erosion near E 17th Ave

CEC personnel noted a streambank erosion site of approximately 400 linear feet (LF) on the left descending bank. The current land use to the left of the stream is lawn (residential) and the land use to the right of the stream consists of small trees and shrubs (residential). Public education pertaining to small-scale, resident-led solutions such as leaving an unmowed vegetative strip or planting trees to create a riparian buffer can help alleviate streambank erosion and help satisfy Section 4.2.2 of the current MS4 permit. This point is listed as an “Erosion Site” point (Object ID 50) in the geodatabase provided. Refer to Figure 2.



*Photo 4 - Aerial View of Erosion Site
(Red Triangle Indicates Erosion Location)*



Photo 5 - View of the Erosion Site Along the Left Descending Bank



Photo 6 - View of the Erosion Site

2.0 PEPPERS BRANCH

2.1 Erosion Site near Legion Field

A streambank erosion site was observed near Legion Field along the left descending bank. The average exposed bank height was approximately 5 feet and continues for approximately 30-40 feet. This point is labeled as an “Erosion Site” point (Object ID 36) in the geodatabase provided. Refer to Figure 2.



*Photo 7 - Aerial View of Erosion Site
(Red Triangle Indicates Erosion Location)*



Photo 8 - View of Erosion Site

3.0 WARTRACE CREEK (1150)

3.1 Channel Alteration

Approximately 80 LF of stream is encapsulated inside a 20-inch HDPE pipe in a residential area south of Lakeside Drive. The encapsulated stream segment appears to allow access to the power line ROW; however, the outlet end of the encapsulated stream was noted as creating head cutting erosion of the stream channel. This point is a “Channel Alteration” point (Object ID 19) in the geodatabase provided. Refer to Figure 3.



*Photo 9 - Aerial View of Channel Alteration
(Red Square Indicates Alteration Location)*



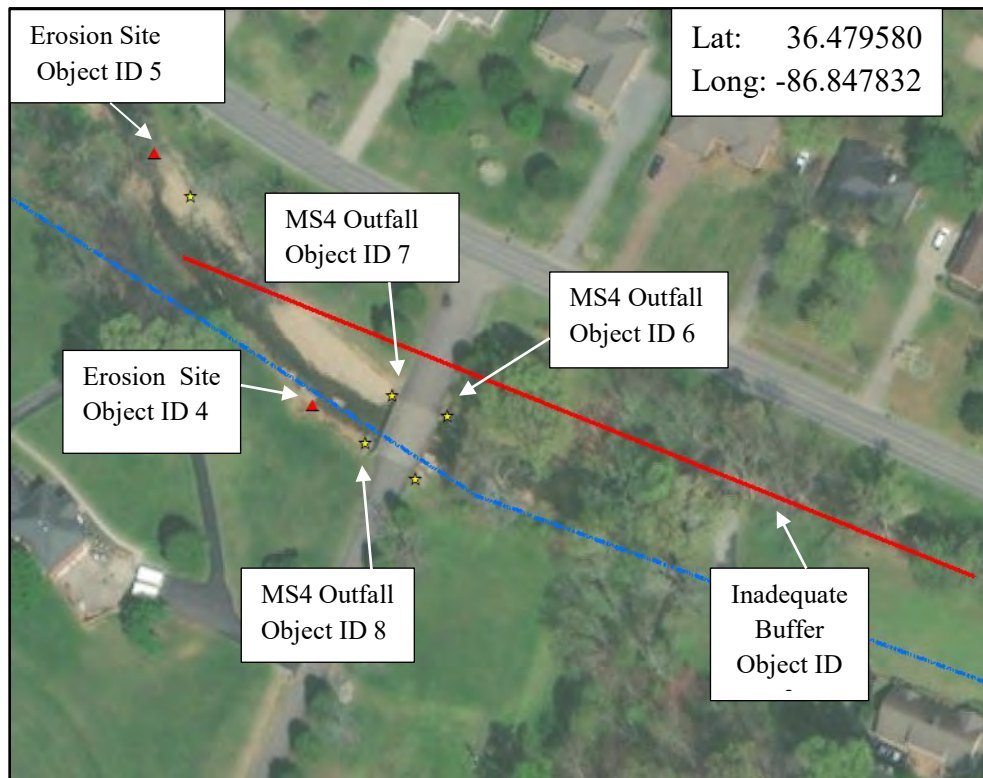
Photo 10 - View of Channel Alteration (Inlet)



Photo 11 - View of Channel Alteration (Outlet) with Head Cutting

3.2 Erosion Sites and Inadequate Buffer

Streambank erosion was documented near Old Greenbrier Pike. Erosion Site Object IDs 4 and 5 each represent down cutting of the streambank with an average exposed bank height of approximately 5 feet and a length of approximately 100 LF each. Erosion around and behind the concrete wing walls on Harmony Landing (MS4 Outfall Object IDs 6 – 8) were also observed. Additionally, an inadequate buffer (Object ID 3) of approximately 580 LF was documented at this location. Educational outreach describing the benefits to stream health by leaving an un-mowed, vegetative strip along the stream can help improve current conditions and help satisfy Section 4.2.1 and 4.2.2 of the current Phase II MS4 permit. CEC recommends that the City inspect this site for potential streambank stabilization. These points are “Erosion Site” points (Object IDs 4 and 5), “Inadequate Buffer” (Object ID 3) and “MS4 Outfall” (Object IDs 6 – 8) in the geodatabase provided. Refer to Figure 3.



*Photo 12 - Aerial View of Erosion Sites, Inadequate Buffer and MS4 Outfalls
(Red Triangles Indicate Erosion Site Locations, Red Line Indicates Inadequate Buffer
and Yellow Stars Indicate MS4 Outfall Locations)*



Photo 13 - View of Erosion Site (Object ID 4)



Photo 14 - View of Erosion Site (Object ID 5)



Photo 15 - View of Inadequate Buffer (Object ID 3)



Photo 16 - View of Streambank Erosion at MS4 Outfall (Object ID 6)



Photo 17 - View of Streambank Erosion at MS4 Outfall (Object ID 7)



Photo 18 - View of Streambank Erosion at MS4 Outfall (Object ID 8)

3.3 Erosion Sites near Golf Course

Two erosion sites were noted parallel to the Legacy Golf Course. Each erosion site location documents down cutting of the left descending bank with an average exposed bank height of 3-5 feet and continues for approximately 50 LF at each location. These points are “Erosion Site” points (Object IDs 6 and 7) in the geodatabase provided. Refer to Figure 3.



*Photo 19 - Aerial View of Erosion Sites
(Red Triangles Indicate Erosion Locations)*



Photo 20 - View of Erosion Site (Object ID 6)



Photo 21 - View of Erosion Site (Object ID 7)

3.4 Inadequate Buffer

An inadequate buffer of approximately 120 – 150 LF on both sides of the stream was noted due to the lack of vegetative cover along the slope. Overhead utilities are present at this location. This point is an “Inadequate Buffer” point (Object ID 15) in the geodatabase provided. Refer to Figure 3.



*Photo 22 - Aerial View of Exposed Pipe
(Red Line Indicates Inadequate Buffer Location)*



Photo 23 - View of Inadequate Buffer and Bare Bank

3.5 Pipe Outfall

CEC field personnel documented a pipe outfall with an unusual discharge and odor. The discharge was emanating from a 6-inch PVC pipe and was noted to be a clear/milky color with the odor of rotten eggs. Personnel from the City were present at the time of the discovery. CEC recommends that the City investigate the source of the discharge. This point is a “Pipe Outfall” point (Object ID 9) in the geodatabase provided. Refer to Figure 3.



*Photo 24 - Aerial View of the Pipe Outfall
(Red Circle Indicates Pipe Outfall Location)*



Photo 25 - View of the Pipe Outfall



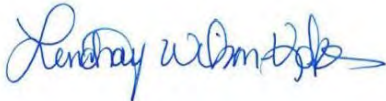
Photo 26 - View of the Unusual Discharge

4.0 CLOSING

CEC appreciates this opportunity to perform this VSA and provide this summary report. Please contact Lindsay Wilson-Kokes at 615-333-7797 or lwilsonkokes@cecinc.com if you should have any questions regarding this deliverable.

Sincerely,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.



Lindsay Wilson-Kokes
Project Manager

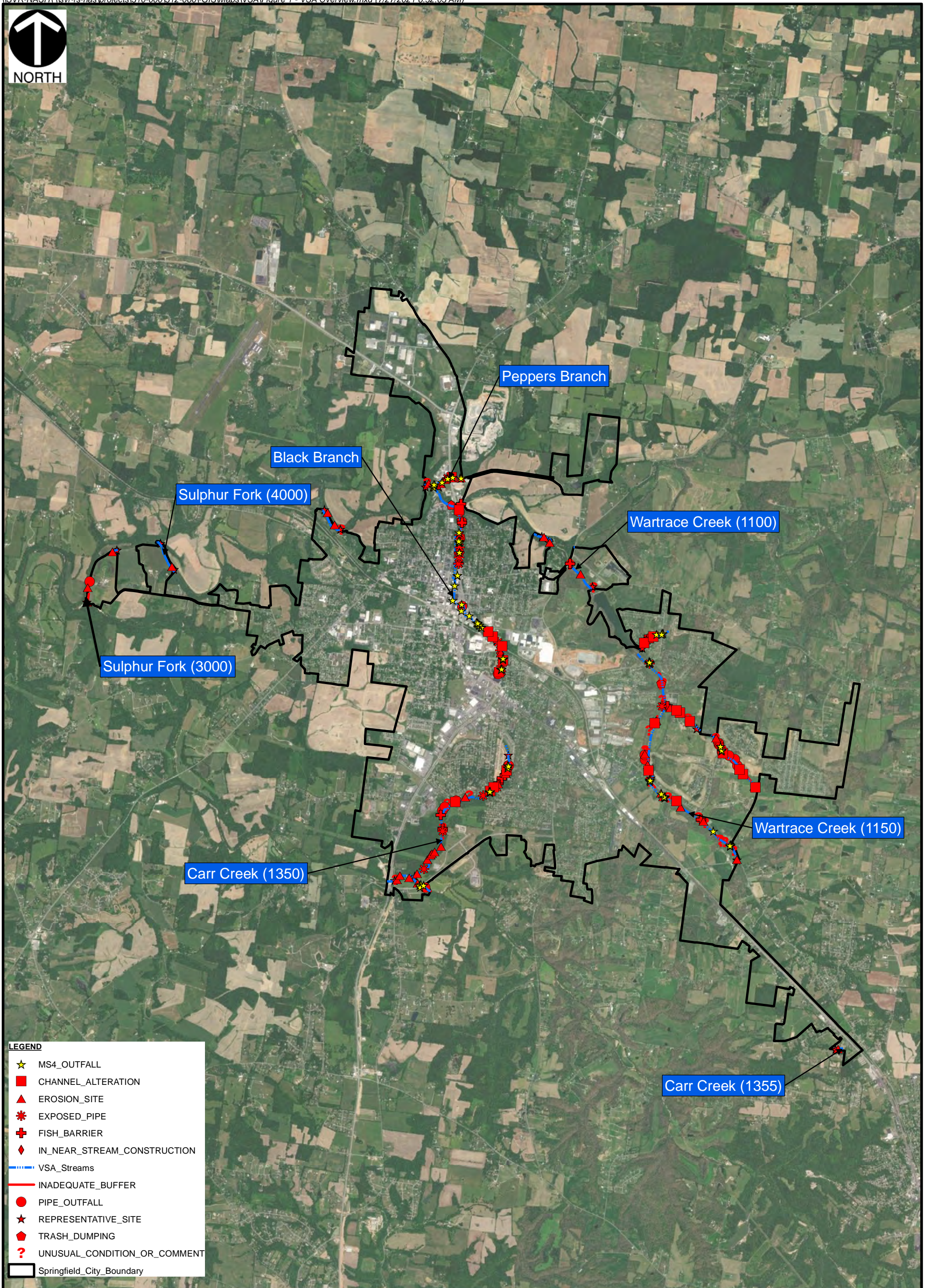


Steven E. Casey, P.E., CPESC
Vice President

Enclosures: Appendix A: Figures
Figure 1 – VSA Overview
Figure 2 – Black Branch and Peppers Branch
Figure 3 – Wartrace Creek (1150)
Appendix B: Maryland Department of Natural Resources' Stream Corridor
Assessment Survey Definitions
USB Flash Drive

APPENDIX A

FIGURES



LEGEND

- ★ MS4_OUTFALL
- CHANNEL_ALTERATION
- ▲ EROSION_SITE
- * EXPOSED_PIPE
- ⊕ FISH_BARRIER
- ◆ IN_NEAR_STREAM_CONSTRUCTION
- VSA_Streams
- INADEQUATE_BUFFER
- PIPE_OUTFALL
- ★ REPRESENTATIVE_SITE
- ◆ TRASH_DUMPING
- ? UNUSUAL_CONDITION_OR_COMMENT
- ▭ Springfield_City_Boundary

REFERENCES
 303(d) STREAM LAYER DATA SOURCE:
[HTTPS://TDEC.MAPS.ARCGIS.COM/APPS/WEBAPPVIEWER/INDEX.HTML?](https://tdec.maps.arcgis.com/apps/webappviewer/index.html?)

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CITY OF SPRINGFIELD
 PHASE II MS4 MONITORING
 VISUAL STREAM ASSESSMENT
 SPRINGFIELD, ROBERTSON COUNTY, TENNESSEE

VSA OVERVIEW

DRAWN BY:	LWK	CHECKED BY:	JLW	APPROVED BY: <small>* Hand signature on file</small>	SEC	FIGURE NO:	1
DATE:	7/27/2021	SCALE:	1" = 4,279'	PROJECT NO:	312-080		



Peppers Branch

EROSION_SITE
Object ID 36

IN_NEAR_STREAM_CONSTRUCTION
Object ID 1

Black Branch

EROSION_SITE
Object ID 50

LEGEND

- ★ MS4_OUTFALL
- CHANNEL_ALTERATION
- ▲ EROSION_SITE
- * EXPOSED_PIPE
- ⊕ FISH_BARRIER
- ◆ IN_NEAR_STREAM_CONSTRUCTION
- INADEQUATE_BUFFER
- PIPE_OUTFALL
- ★ REPRESENTATIVE_SITE
- ◆ TRASH_DUMPING
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- VSA_Streams
- ▭ Springfield_City_Boundary

REFERENCES
 303(d) STREAM LAYER DATA SOURCE:
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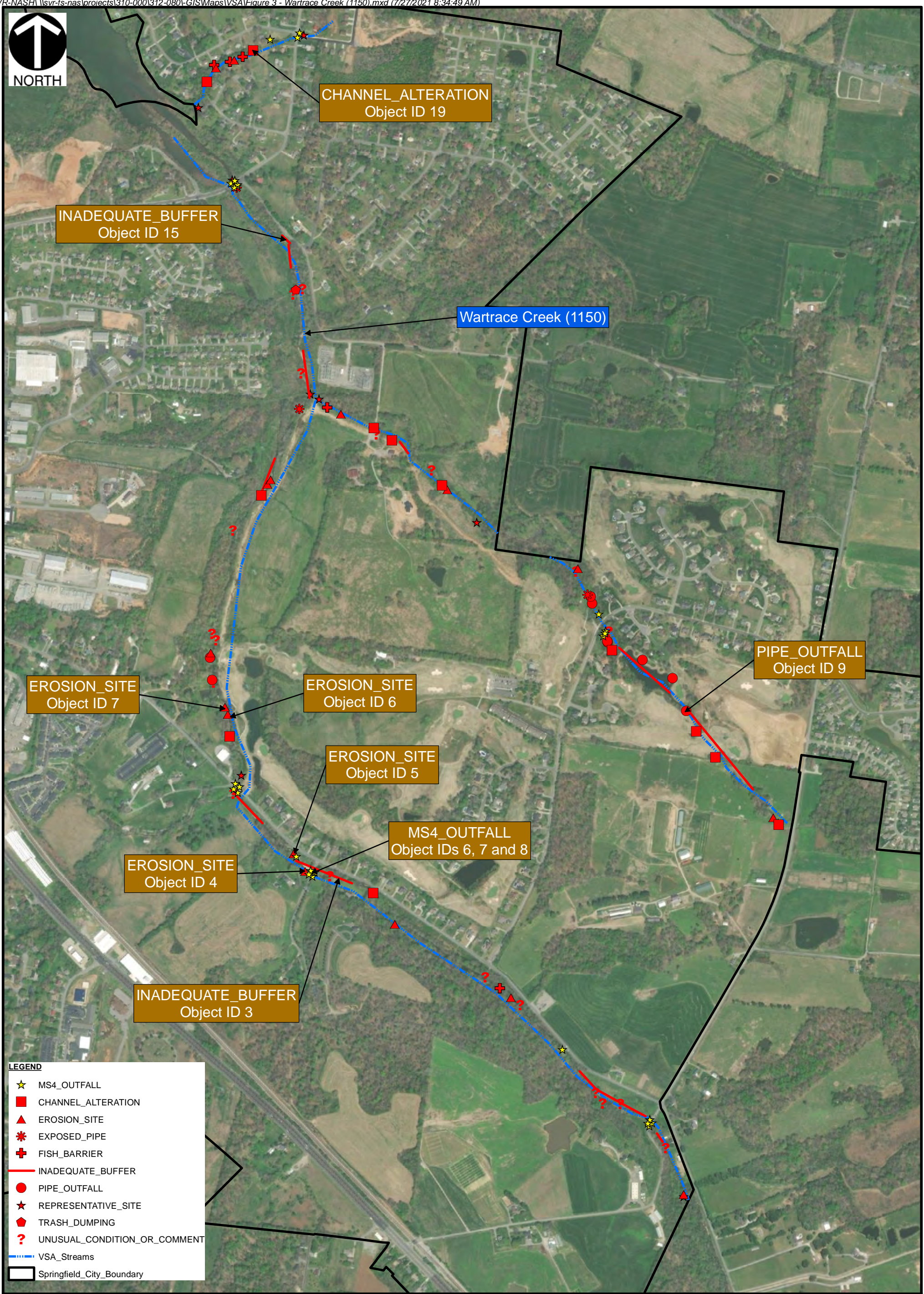
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BLACK BRANCH AND PEPPERS BRANCH

DRAWN BY:	LWK	CHECKED BY:	JLW	APPROVED BY:	<small>*Hand signature on file</small> SEC	FIGURE NO:	2
DATE:	7/27/2021	SCALE:	1" = 686'	PROJECT NO:	312-080		



LEGEND

- ★ MS4_OUTFALL
- CHANNEL_ALTERATION
- ▲ EROSION_SITE
- * EXPOSED_PIPE
- ⊕ FISH_BARRIER
- INADEQUATE_BUFFER
- PIPE_OUTFALL
- ★ REPRESENTATIVE_SITE
- ⬠ TRASH_DUMPING
- ? UNUSUAL_CONDITION_OR_COMMENT
- VSA_Streams
- ▭ Springfield_City_Boundary

REFERENCES
 303(d) STREAM LAYER DATA SOURCE:
[HTTPS://TDEC.MAPS.ARCGIS.COM/APPS/WEBAPPVIEWER/INDEX.HTML?](https://tdec.maps.arcgis.com/apps/webappviewer/index.html?)

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DRAWN BY:	LWK	CHECKED BY:	JLW
DATE:	7/27/2021	SCALE:	1" = 833'

CITY OF SPRINGFIELD
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 VISUAL STREAM ASSESSMENT
 SPRINGFIELD, ROBERTSON COUNTY, TENNESSEE

WARTRACE CREEK (1150)

APPROVED BY: <small>* Hand signature on file</small>	SEC	FIGURE NO: 3
PROJECT NO:	312-080	

APPENDIX B

MARYLAND DEPARTMENT OF NATURAL RESOURCES' STREAM CORRIDOR
ASSESSMENT SURVEY DEFINITIONS

MARYLAND DEPARTMENT OF NATURAL RESOURCES' STREAM CORRIDOR ASSESSMENT SURVEY DEFINITIONS¹

1. *Channel Alteration:* Channelization refers to the once common practice of dredging, straightening, and/or widening stream channels in an attempt to reduce flooding or to lower ground water table. Survey teams should look not only for stream reaches that are in concrete channels but for any areas where the stream has been significantly altered. A good indication of this is an unusually straight stream channel for a fairly long stretch. Channel alteration does not include road crossing unless a significant amount of stream channelization has occurred either upstream of downstream of the road crossing.
2. *Erosion Site:* Erosion is a natural process and necessary to maintain good aquatic habitat in a stream. Too much erosion, however, can have the opposite effect, destabilizing stream banks, destroying in-stream habitat and causing significant sediment pollution problems downstream. Severe erosion problems occur when either a stream's hydrology and/or sediment supply have been significantly altered. When conducting the SCA survey, you are primarily interested in identifying unstable stream reaches that are experiencing a significant amount of erosion along the stream's banks.
3. *Exposed Pipes:* Exposed pipes are any pipes that are either in the stream or along the stream's immediate banks that could be damaged by a high flow event. It does not include pipe outfalls where only the open end of the pipe is exposed. Exposed pipes do include: 1) manhole stacks in or along the stream's banks; 2) pipes that are exposed along the stream's banks; 3) pipes that run under the stream's bed and have been exposed by stream down-cutting; and 4) pipes that are built over a stream but are low enough that they could be affected by occasional high storm flows. Pipes that are placed along the support beams of a bridge or suspended high enough above the stream to not be affected by very large storm events should not be included in this survey unless they are leaking.
4. *Pipe Outfalls:* Pipe outfalls include any pipes or small manmade channels that discharge into the stream through the stream corridor. Pipe outfalls are considered a potential environmental problem in the survey because they can carry uncontrolled runoff and pollutants such as oil, heavy metals, and nutrients to a stream system. Any pipes or manmade channels that are designed to discharge into the stream are considered pipe outfalls and must be included in the survey. This includes pipes with openings outside of the immediate stream corridor, but which discharge into a channel which eventually enters the stream.
5. *Fish Barrier:* Fish migration barriers are anything in the stream that significantly interferes with the upstream movement of fish. Unimpeded upstream movement is important for resident fish species, many of which also move both up and down stream during different parts of their life cycle. Fish blockages can be caused by man-made structures such as dams or road culverts, and by natural features such as waterfalls or beaver dams.
6. *Inadequate Buffer:* Forested stream buffers are very important for maintaining healthy streams. Forest buffers help shade the stream, preventing excessive solar heating, and the

roots stabilize the stream banks. Forest buffers remove nutrients, sediment and other pollutants from runoff, while the leaves of trees are a major component of the stream's food web. Because of the importance of stream buffers, not only in maintaining healthy streams, but also in reducing nutrient loading to the stream. For the purpose of this study, a buffer is generally considered inadequate if it is less than 50 feet wide from the edge of the stream.

7. *In/Near Stream Construction:* In or near stream construction data sheets are used to document the locations of major disturbances located in or near the stream corridor at the time of the survey. If construction is seen in or near the stream, indicate the location on the survey map and look at the general condition of the stream near and downstream of the construction site. Survey teams should be on alert for evidence of inadequate sediment control measures or if sediment pollution from the site has affected the stream.
8. *Trash Dumping:* The trash dumping data sheets are used to record the location of places where large amounts of trash have been dumped inside the stream corridor or to note places where trash tends to accumulate. The main purpose of identifying where trash is being dumped in or near the stream is so that steps can be taken to limit access to these areas by vehicles if possible. A second reason for noting trash dumping sites is to assist community volunteer groups looking for possible sites to do stream clean-ups.
9. *Unusual Condition or Comment:* The unusual condition or comment data sheets are used by survey teams to record the location of anything out of the ordinary or to provide some additional written comments on a specific problem.
10. *Representative Site:* Representative site data sheets are used to document the general condition of both in-stream habitat and the condition of the adjacent stream corridor.

Reference:

1: "Stream Corridor Assessment Survey: SCA Survey Protocols." Watershed Restoration Division & Coastal Watershed Services, Maryland Dept. of Natural Resources.