John O'Meara, P.E
Executive Director

TO: **Tyler Sonoga, ARC Technical Committee Chair**

FROM: **Emily Levine, Technical Committee Coordinator**

DATE: **February 25, 2025**

SUBJECT: **2024 IDEP Investigation Summary**

In 2024, ARC staff continued to work on illicit discharge investigations, conducted in-stream sampling, and began the process of screening all outfalls owned by ARC communities. These projects were in accordance with the Rouge River Collaborative Illicit Discharge Elimination Plan and the 2024 ARC Technical Committee budget.

TC1: Illicit Discharge Investigations

Illicit discharge investigations were initiated and have been on-going since the outfall screening efforts conducted in 2018 and 2019, as well as sampling done in compliance with the collaborative TMDL plan in 2022. The results of the investigations are summarized in Table 1. More detail on each can be found in the investigation reports which were sent to the communities (Attachment A).

Table 1. Status and Results of Illicit Discharge Investigations

Permittee	Outfall ID	Status	Result
Beverly Hills	BV51	Closed	No illicit connection/human source identified
Livonia	L1619	Ongoing	Further investigation required
Novi	NO20	Closed	No illicit connection/human source identified
Birmingham	BH32	Ongoing	Further investigation required

In 2025, ARC staff will continue source investigations on the above outstanding issues as well as additional high priority outfalls identified during 2025 in accordance with the Collaborative IDEP Plan and as directed by the Technical Committee.

TC2: Outfall Dry Weather Screening

Outfall dry weather screening efforts have begun in compliance with the Collaborative IDEP requirements that are anticipated to be approved by EGLE. To support screening all ARC community outfalls, ARC staff have compiled updated outfall data provided by ARC communities and developed a screening protocol to be used to screen outfalls. This will allow for consistency and collaboration among ARC communities to achieve the goal of dry weather screening all outfalls with maximum efficiency. By using GIS to collect outfall screening data, we will be able to easily manage data and ensure that all outfalls are screened in a consistent manner. In 2024, the ARC began screening outfalls and 46 outfalls have been screened so far (Table 2). A summary table of the 2024 dry weather screening is provided in Attachment B.

Table 2. Outfall screening status by community

IDEP Plan Permittee	No. of Outfalls	No. of Outfalls Screened in 2024
Beverly Hills	54	
Bingham Farms	15	
Birmingham	32	4
Bloomfield Hills	64	
Bloomfield Twp.		
Canton Twp.	54	
Dearborn Heights	66	
Farmington	29	
Farmington Hills	135	
Franklin	7	
Garden City	1	1
Henry Ford College	2	
Inkster	10	10
Lathrup Village	8	
Livonia	753	15
Melvindale	2	
Northville	68	
Northville Twp.		
Novi	35	2
Oak Park	1	
Plymouth	29	15
Plymouth Twp.		
Redford Twp.	1	
Southfield	72	
Troy	113	
Walled Lake	15	
Wayne	98	
West Bloomfield Twp	13	
Westland	561	1
Total	**2238**	**46**

TC3: Collaborative TMDL

No activity budgeted in 2024. Revisions were made to the ARC Collaborative TMDL Plan in response to EGLE comments and negotiations with EGLE.

TC4: In-Stream Investigational Sampling

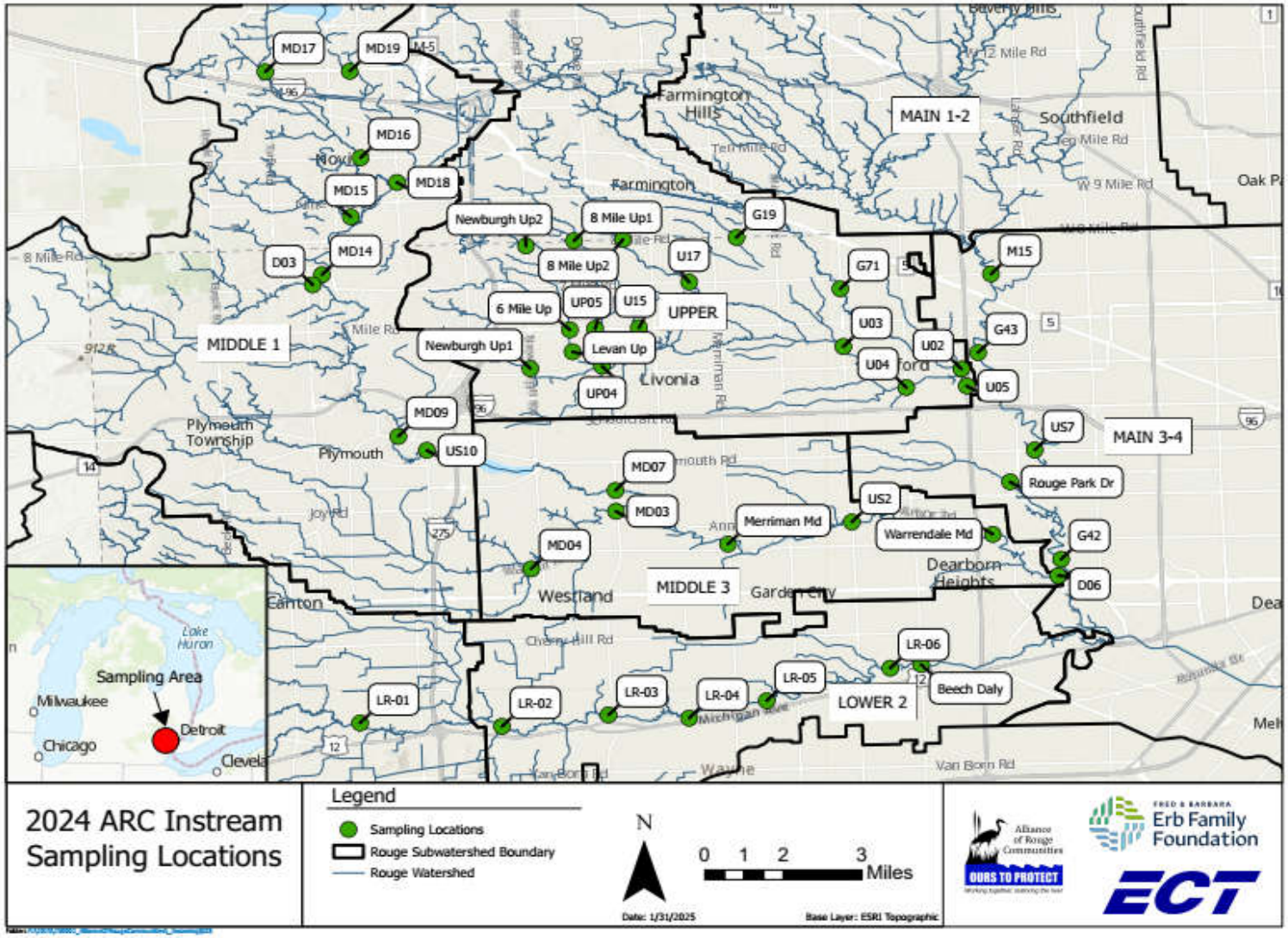
In the fall of 2023, the ARC received funding from the Erb Family Foundation to perform investigational *E.coli* sampling to identify where sanitary sewage is entering the Rouge River and provide training to municipal staff on how to comply with their stormwater permit. In 2024, ARC staff prepared a sampling plan, secured lab services, recorded rainfall data and collected instream grab

samples at 37 sites. Sampling was performed weekly for 20 consecutive weeks within the Middle, Upper, and Main branches of the Rouge River.

Concurrently, the WCDPS collected instream grab samples at 7 sites within the Lower Branch. This sampling was performed for 17 weeks. The sampling began in May and was completed in mid-September. A total of 859 individual *E.coli* samples were taken regardless of weather conditions. See Figure 1 for all sample locations.

Working collaboratively with WCDPS-ESD, geometric means were calculated from sampling data from each of the 44 sites and partitioned based on dry and wet-weather conditions. These findings indicated significant increases in *E. coli* levels during wet weather, as well as certain areas where the geometric mean for *E. coli* was over 1,000 MPN/100mL during dry weather. A detailed summary report is provided in Attachment C.

Figure 1. 2024 ARC Instream Sampling Location



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Attachment A
Community-specific Investigation Reports

John O'Meara, P.E.
Executive Director

Alliance of Rouge Communities
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TO: **Neil Johnson, Village of Beverly Hills Director of Public Services**

FROM: **Emily Levine, ARC Staff**

DATE: **February 25, 2025**

SUBJECT: **IDEP Investigation Results: Outfall BV51 (Sleepy Hollow Lane)**

ARC staff continued illicit discharge investigation on storm drain outfall BV51 in response to findings from the 2018 outfall screening and subsequent investigations. Our investigations did not reveal the source of *E. coli* entering the drain and no illicit connection has been identified.

The outfall drains a portion of Sleepy Hollow Lane, Fiddlers Cove Road, and Metamora Lane. The receiving water is an unnamed tributary of the Rouge River (Figure 1).

Background

Outfall BV51 was investigated due to the high *E. coli* concentrations found during the outfall survey conducted in 2018. At that time, the *E. coli* concentration was 3,076 MPN/100 ml which can be indicative of an illicit discharge containing sanitary sewage. ARC staff reinspected the outfall in 2019 and 2020 and found elevated *E. coli* and human *Bacteroides* concentrations (See Table 1). There were no physical signs (ex: odor, staining, debris, organic growth) of a sewage discharge to the storm drain in the outfall or any of the manholes. Likewise, there were no obvious signs of animal fecal impacts to the drain.

In 2021 and 2022, ARC staff coordinated with the Oakland County Water Resources Commissioner (OCWRC) to televise the drain. The drains from BV51-1 to the outfall, BV51-1 to BV51-2, and the drain from BV51-3 to BV51-2 were televised. BV51-2 is buried. A tap was identified in the storm drain between the outfall and BV51-1 that was believed to be a possible illicit connection, although no staining or evidence of sewage was observed (Figure 2).

In 2021, ARC staff coordinated with the Village of Beverly Hills to dye test 31349 Sleepy Hollow Lane. The dye testing revealed that all three bathrooms in the house were correctly connected to the sanitary drain and no dye was observed entering the storm drain. In 2023, ARC staff coordinated with the Village of Beverly Hills to dye test 31403 Sleepy Hollow Lane. No illicit connections were found. In addition, the manhole BV51-2 was dug up by the city staff and inspected by ARC staff, with no signs of illicit connections identified.

Table 1. Sampling Results (*E. coli* in MPN/100 mL and Human *Bacteroides* in gene copies/100 ml)

	E. coli	***E. coli***	***E. coli***	***E. coli***	***E. coli***	**Human *Bacteroides***	***E. coli***	**Human *Bacteroides***
	7/9/18	**8/15/19**	**9/19/19**	**8/19/20**	**9/15/20**	**9/15/20**	**11/17/20**	**11/17/20**
BV51-0	3,076	201	>24,196	573	>24,196	72,000	1,081	<354

Results

In 2024, ARC staff inspected BV51-1 on three occasions during dry weather conditions. During each inspection, there were no signs of an illicit discharge and dry weather flow was barely a trickle or sometimes non-existent. The trickle of water was not enough to sample.

Conclusions and Recommendations

Work to date indicates that no illicit connection has been identified upstream of BV51. This drainage area has been thoroughly investigated with no signs of illicit discharges identified. Although elevated *E. coli* was identified at the outfall, its source remains unknown. No further investigation is planned at this point, as no areas remain to investigate.

This work is being completed as outlined in the Rouge River Collaborative IDEP Plan in compliance with the Village's MS4 permit and as a result of your ARC membership. If you have any questions, I can be reached at 313-963-6600 or elevine@ectinc.com.

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Figure 1. Storm Drain and Sampling Locations

Figure 2. Tap to Storm Drain at 14.2 ft east of BV51-0

John O'Meara, PE
Executive Director

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TO: **Doug Moore, City of Livonia**

FROM: **Emily Levine, ARC Staff**

DATE: **February 25, 2025**

SUBJECT: **IDEP Investigation Results: Outfall L1619**

ARC staff continued the illicit discharge investigation on storm drain outfall L1619 in response to findings from the 2018 outfall screening and subsequent investigations conducted by Wayne County. Our investigations have not identified an illicit connection and further investigation is recommended.

Background

Outfall L1619 was investigated due to the high *E. coli* concentrations found during the outfall survey conducted in 2018. At that time, the *E. coli* concentration was 15,531 MPN/100 ml which is indicative of an illicit discharge containing sanitary sewage. Wayne County conducted follow-up investigations, which narrowed down the source to being upstream of a manhole located in the grass along the north side of Seven Mile Road, near a Chicken Shack restaurant (Figure 1). *E. coli* and Human *Bacteroides/*(DNA) levels at this manhole had been found to be elevated (Table 1).

Televising of the drain was done along 7 Mile Road in 2022. No signs of illicit connections were identified, and additional investigation was determined to be necessary. ECT worked with Wayne County to conduct additional sampling and dye testing in 2023. Elevated *E. coli* and human DNA were found in the manhole located in the grassy area southeast of the car wash (which is up-system of the Chicken Shack manhole, see Table 1). Dye testing showed all buildings in the vicinity, except for the car wash, to be correctly connected. The dye from the car wash inspection could not be found in either the storm or sanitary sewer lines.

2024 Results

In 2024 additional dye testing was performed at the car wash, as the previous dye testing results there had been inconclusive. These results found that the car wash was correctly connected. However, during this inspection, suspicious staining and animal feces were observed in the manhole southwest of the car wash. The City assisted with televising that manhole and it was concluded that once viewed more carefully, the staining appeared to be natural discoloration.

A more complete map of the storm drain in this area was made available, leading to additional sampling (Figure 1). These sample results showed elevated *E. coli* with low human DNA, indicating that the source of *E. coli* is likely from animals.

Table 1. Sampling Results (*E. coli* in MPN/100 mL and Human *Bacteroides* in gene copies/100 ml)

		L1619	29050 Dardanella	Seven Mile WC MS4 East	Chicken Shack Manhole	MH SE of car wash in grassy area	MH SW of car wash next to tree	MH near 7 Mile SE of car wash	MH in front of hydroponics store	MH in U Haul lot
E. coli	**7/16/2018**	15,531								
E. coli	**12/9/2020**	630	<100							
E. coli	**12/16/2020**			61	2,000					
E. coli	**11/10/2021**	3,076			1,616					
Human DNA	**11/10/2021**	95			1,541,053					
E. coli	**7/18/2023**				96	97	160	31		
E. coli	**8/10/2023**				6,867	9,208		31		
Human DNA	**8/10/2023**				736	816				
E. coli	**9/19/2024**					9,804	15,531		9,208	11,199
Human DNA	**9/19/2024**					below detection limit 200				below detection limit 200
E. coli	**10/17/2024**					11,199				5,172
Human DNA	**10/17/2024**					286				below detection limit 200

Conclusions and Recommendations

One additional set of samples is recommended in order to confirm that the *E. coli* source is likely from animals and this investigation can be closed.

This work is being completed as outlined in the Rouge River Collaborative IDEP Plan in compliance with the City's MS4 permit and as a result of your ARC membership. If you have any questions, you can reach me at 248-763-1407 or elevine@ectinc.com.

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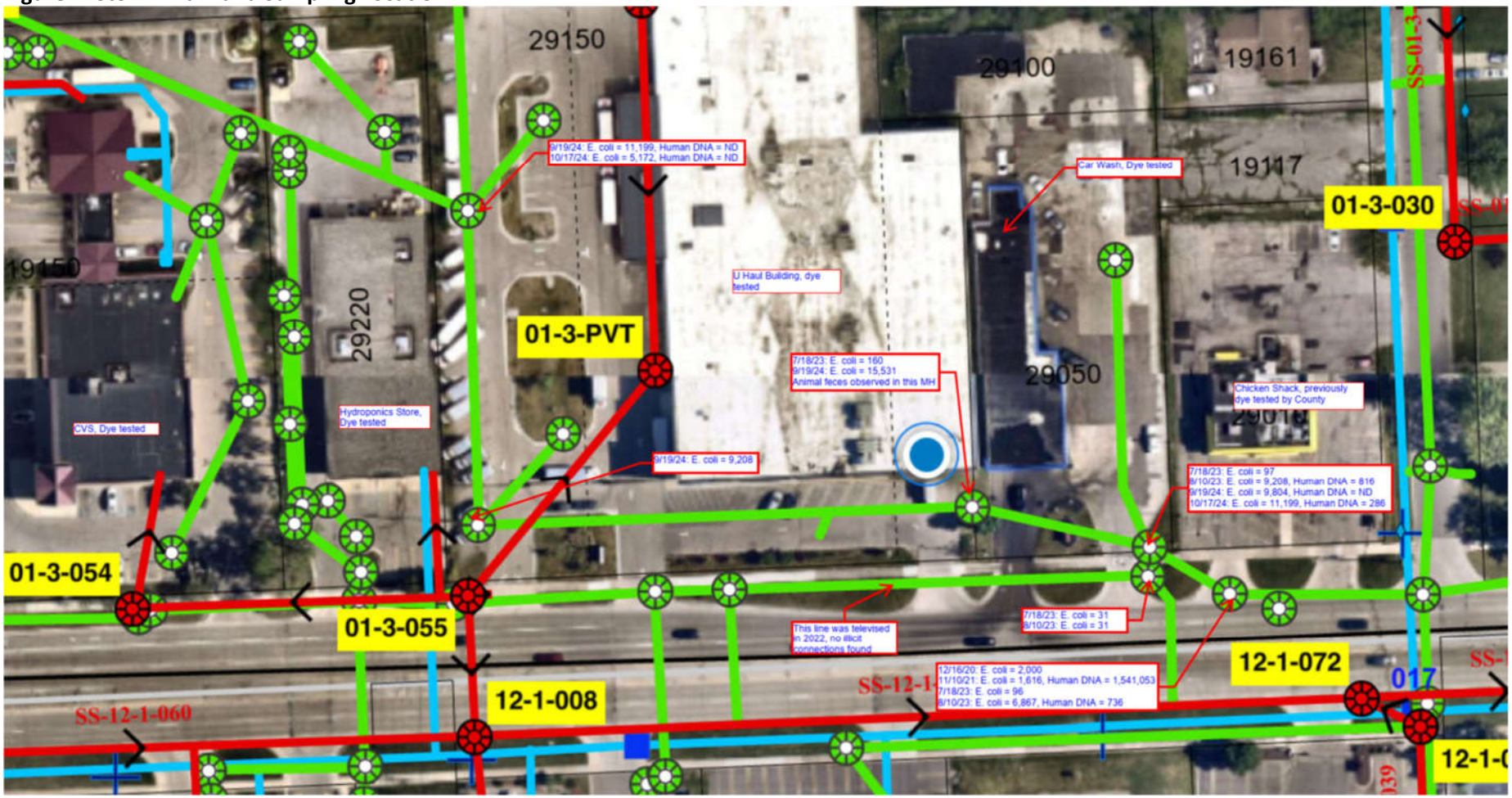
Figure 1. Storm Drain and Sampling Location



John O'Meara, P.E.
Executive Director

Alliance of Rouge Communities
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TO: **Rebecca Runkel**

FROM: **Emily Levine, ARC Staff**

DATE: **February 25, 2025**

SUBJECT: **IDEP Investigation Results: Outfall NO20**

ARC staff conducted an illicit discharge investigation on storm drain outfall NO20 in response to findings from the ARC's 2022 outfall screening conducted in accordance with the ARC's Collaborative TMDL Plan. Our investigations suggested that the adjacent school was the source of the elevated *E. coli*. The City of Novi followed up with the School District and the District's environmental consultant, Arch Environmental Group.

Arch Environmental Group was able to dye test the school and provided their report afterwards. They found that the school is correctly connected to the sanitary system and no illicit discharges were identified. They concluded that the source of *E. coli* was related to animal habitation, as well as stagnant pooling water where bacteria might develop before entering the storm system.

Background

Outfall NO20 was investigated due to high *E. coli* concentration (11,119 MPN/100 ml) found during an outfall screening conducted in 2022. There was no observed color, odor, turbidity, or other unusual characteristics noted during the initial screening.

The outfall drains Willowbrook Drive and its adjoining roads. The receiving water is a tributary of the Middle Branch of the Rouge (See Figure 1). ARC staff reinspected outfall NO20 throughout 2023 and found varying *E. coli* results (Table 1). Due to the timing of the school year in correlation with these results, it was determined that the nearby school should be dye tested

Table 1. Sampling Results

Structure		NO20	NO20-3	NO20-4 Oak	NO20-4 Willow
Location		Outfall on south side of the creek, west of Willowbrook Dr.	Manhole at the northeast corner of Willowbrook and Oak Tree Road	Manhole next to driveway of 40440 Oak Tree Road	Manhole in the sidewalk on east side of Willowbrook Dr, south of Oak Tree Road
9/1/2022	***E. coli***	11,199			
5/22/23	***E. coli***	882			
	Human *Bacteroides*	9,284			
7/20/23	***E. coli***	31	218	158	109
8/10/23	***E. coli***	98	41	20	
8/29/23	***E. coli***	10	31	10	30
9/11/23	***E. coli***	583	537	10	512
	Human *Bacteroides*	240	240		667

Conclusions and Recommendations

Dye testing completed by the School District's consultant in 2024 indicate that no illicit connections were found at the school. This information, in addition to the many sample events with low *E. coli* and low Human *Bacteroides* levels allow for the conclusion that no illicit connections are present in this drainage area and this investigation can be closed.

This work is being completed as outlined in the Rouge River Collaborative IDEP Plan in compliance with the City's MS4 permit and as a result of your ARC membership. If you have any questions, I can be reached at 313-963-6600 or elevine@ectinc.com.

Attachment: Figure 1. Storm Drain and Sampling Location

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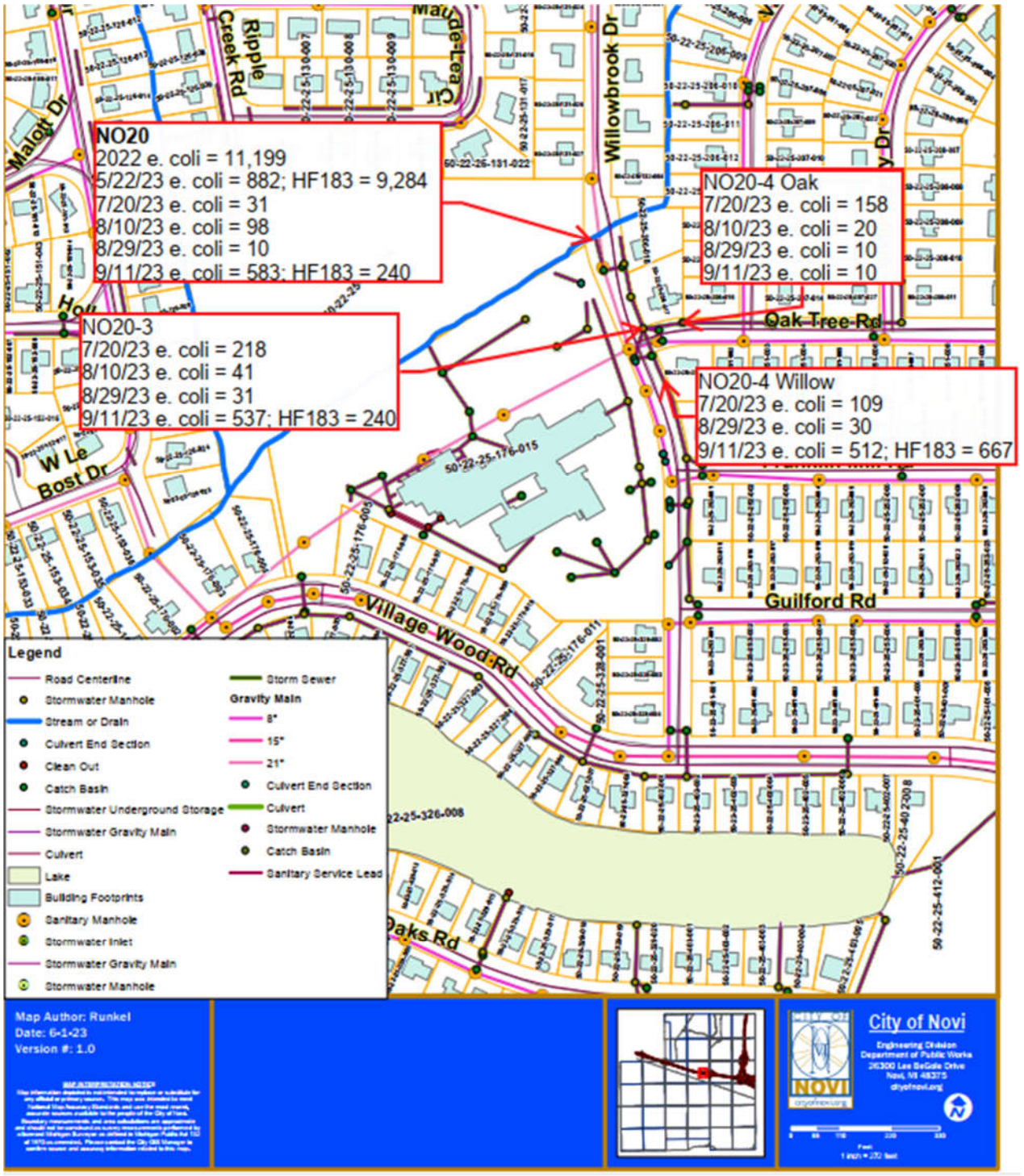
Figure 1. Storm Drain and Sampling Locations



John O'Meara, P.E.
Executive Director

Alliance of Rouge Communities
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TO: **Cory Borton, City of Birmingham**

FROM: **Emily Levine, Technical Committee Coordinator**

DATE: **February 25, 2025**

SUBJECT: **IDEP Investigation Results: Outfall BH32 (Willits Street)**

ARC staff have reopened an illicit discharge investigation on storm sewer outfall BH32. This investigation was initially conducted in response to findings from the ARC's 2018 outfall screening. In 2019, the ARC determined that there was no illicit discharge at this site. However, during an audit in 2024, EGLE requested that this site be resampled for human DNA. Human DNA sample results have indicated that further investigation is warranted at this site.

Background

The outfall drains a portion of Willits Street via a separate storm sewer which is located west of Old Woodward and north of Maple Rd. The receiving water is the Main Branch of the Rouge River.

Outfall BH32 was investigated due to the high *E. coli* concentrations found during the outfall survey conducted in 2018. At that time, the *E. coli* concentration was 12,997 MPN/100 ml which can be indicative of an illicit discharge containing sanitary sewage. The evidence from the 2019 investigation indicated that sanitary sewage discharge was not impacting the storm drain. Rather, the elevated *E. coli* was likely from animal sources. Therefore, no further investigations were conducted at that time.

2024 Results

ARC staff reinspected the outfall and the tributary storm sewer one-time 2024. *E. coli* results were 1,112 MPN/100mL and human DNA results were 2,128 GC/100mL. Bubbles were observed at the outfall, but no odor or other signs of illicit discharges were observed. The City of Birmingham collected additional samples at the manholes upstream of this outfall and a manhole with elevated *E. coli* was identified.

Conclusions and Recommendations

Additional sampling with the possibility of dye testing and/or televising is recommended along Willits Street to further attempt to identify a source of human DNA to this outfall.

This work is being completed as outlined in the Rouge River Collaborative IDEP Plan in compliance with the City's MS4 permit and as a result of your ARC membership. If you have any questions, I can be reached at 313-963-6600 or elevine@ectinc.com.

Attachment B
2024 Outfall Dry Weather Screening
Summary Table

ARC Collaborative IDEP

2024 Outfall Dry Weather Screening

Municipality	Outfall ID	ate & Tim	Inspector	Able to Locate Outfall	Size (inches)	Material	Damage	Staining	Vegetation	Flow	Sample	Odor	Color	Turbidity	Floatables	Sediment	Detergents	E. coli	Outfall Priority
Plymouth	PY19	11/8/24, 1	EL	Yes	12	Cement	None	No	None	None	No	None	None	None	None	Yes	No		D
Plymouth	PY20	11/8/24, 1	El	Yes	24	Cement	None	No	Some	None	No	None	None	None	None	No	No		D
Plymouth	PY21	11/8/24, 1	EL	Yes	12	Cement	None	No	Some	None	No	None	None	None	None	No	No		D
Plymouth	PY22	11/8/24, 1	EL	Yes	8	Other	None	No	Some	None	No	None	None	None	None	No	No		D
Plymouth	PY23	11/8/24, 1	EL	Yes	24	Cement	None	No	None	<1/2"	Yes	Sewage	None	None	None	No	No	2282	C
Plymouth	PY24	11/8/24, 1	EL	Yes	12	Cement	None	Yes	Some	Trickle	Yes	None	Other	None	None	No	No	10	D
Plymouth	PY25	11/8/24, 1	EL	Yes	12	Cement	None	No	None	None	No	None	None	None	None	No	No		D
Plymouth	PY18	11/8/24, 1	El	Yes	24	Cement	Spalling	Yes	None	<1/2"	Yes	Rancid / S	None	None	None	No	No	1314	C
Plymouth	PY27	11/8/24, 1	El	Yes	18	Cement	None	No	None	Trickle	Yes	None	None	None	None	Yes	No	728	D
Plymouth	PY15	11/8/24, 2	El	Yes	18	Cement	None	No	Excessive	None	No	Sewage	None	None	None	Yes	No		D
Plymouth	PY14	11/8/24, 2	El	Yes	12	Cement	None	No	Some	None	No	None	None	None	None	No	No		D
Plymouth	PY13	11/8/24, 2	El	Yes	18	Cement	None	No	Some	None	No	None	None	None	None	Yes			D
Plymouth	PY12	11/8/24, 2	El	Yes	8	Other	None		None	None	No	None	None	None	None	No	No		D
Plymouth	PY11	11/8/24, 2	El	Yes	48	Cement	Corrosion	No	None	>1"	Yes	None	None	None	None	No	No	4884	C
Plymouth	PY10	11/8/24, 2	El	Yes	8	Other	Other	No	Some	None	No	None	None	None	None	Yes	No		D
Birmingham	OF25-3-001	10/17/24,	EL	Yes	24	Cement	None	No	Some	<1/2"	Yes	None	None	None	None	No	No	1112	C
Birmingham	OF25-3-002	10/17/24,	EL	Yes	24	Cement	None	No	None	Trickle	Yes	None	None	None	None	No	No	61	D
Birmingham	OF25-3-003	10/17/24,	El	Yes	6	PVC	None	No	None	<1/4"	Yes	None	None	None	None	No	No	63	D
Birmingham	OF25-3-004	10/17/24,	El	Yes	6	PVC	None	No	None	None	No	None	None	None	None	No	No		D
Inkster	INK03	10/21/24,	El	Yes	36	Cement	None	No	None	None	No	None	None	None	None	No	No		D
Inkster	INK01	10/21/24,	El	Yes	36	Cement	None	No	None	None	No	None	None	None	None	No	No		D
Inkster	INK02	10/21/24,	El	Yes	36	Cement	Other	No	None	None	No	None	None	None	None	No	No		D
Inkster	INK04	10/21/24,	El	Yes	48	Cement	None	No	None	None	No	None	None	None	None	No	No		D
Inkster	INK05	10/21/24,	El	Yes	12	Cement	None	Yes	None	Trickle	Yes	None	None	None	None	No	No	10	D
Inkster	INK06	10/21/24,	El	Yes	12	CMP	None	No	None	Trickle	No	None	Gray	Cloudy	None	No	No		D
Inkster	INK07	10/21/24,	El	Yes	72	Cement	None	No	None	None	No	None	None	None	None	No	No		D
Inkster	INK08	10/21/24,	El	Yes	36	Cement	Other	No	None	None	No	None	None	None	None	No	No		D
Inkster	INK09	10/21/24,	El	Yes	72	Cement	None	No	None	None	No	None	None	None	None	No	No		D
Inkster	INK10	10/21/24,	El	Yes	36	CMP	None	No	None	None	No	Sewage	Gray	Cloudy	None	No	No		D
Garden City	11-2-101r	10/21/24,	El	Yes	72	Cement	None	No	None	None	No	None	None	None	None	No	No		D
Livonia	13203	6/4/24, 9:	El	Yes	36	Cement	None	No	None	Trickle	Yes	None	None	None	None	No	No	337	D
Livonia	13205	6/4/24, 9:	El	Yes	36	Cement	None	No	None	<1/2"	Yes	None	None	None	None	No	No	134	D
Livonia	13204	6/4/24, 10	El	No	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null
Livonia	13202	6/4/24, 10	El	No	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null
Livonia	M2008165	6/4/24, 10	El	No	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null
Livonia	M2008164	6/4/24, 10	El	No	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null
Livonia	M2008111	8/20/24, 1	El	Yes	6	Cement	None	No	None	None	No	None	None	None	None	No	No		D
Livonia	M2008110	8/20/24, 1	El	Yes	6	CMP	Corrosion	No	None	None	No	None	None	None	None	No	No		D
Livonia	M2008113	8/20/24, 1	El	Yes	6	Cement	None	No	None	None	No	None	None	None	None	No	No		D
Livonia	M2008112	8/20/24, 1	El	Yes	6	Cement	None	No	None	None	No	None	None	None	None	No	No		D
Livonia	14-33	9/4/24, 5:	El	Yes	8	Cement	None	Yes	None	None	No	None	None	None	None	No	No		D
Livonia	M2008106	9/4/24, 5:	El	Yes	12	Cement	None	No	Some	<1/4"	Yes	None	None	None	None	No	No	10	D
Livonia	M2008105	9/4/24, 5:	El	Yes	12	Cement	None	No	Some	<1/4"	Yes	None	None	None	None	No	No	10	D
Livonia	M2008104	9/4/24, 5:	El	Yes	24	Cement	None	No	Some	<1/2"	Yes	None	None	None	None	No	No	10	D
Livonia	M2008103	9/4/24, 5:	El	Yes	12	Cement	None	No	Some	None	No	None	None	None	None	No	No		D
Westland	SWOF-00143	8/20/24, 2	El	Yes	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null	Null

Attachment C
2024 Investigative Sampling
Summary Report

ARC Investigational Sampling 2024

Background

In the fall of 2023, the Alliance of Rouge Communities (ARC) received funding from the Erb Family Foundation to perform investigational *E.coli* sampling to identify where sanitary sewage is entering the Rouge River and provide training to municipal staff on how to comply with their stormwater permit. The grant project goals include:

- Increase understanding of water quality in Wayne County's portion of the Rouge River.
- Identify storm drains that are discharging sanitary sewage from unknown sources.
- Identify the next steps needed to investigate the sources of illicit discharges.
- Increase municipal staff and leadership's understanding of the requirements of the municipal stormwater permit.
- Provide networking opportunities and collaborate with Southeast Michigan Council of Governments (SEMCOG) to bring the training to the rest of southeast Michigan.

The investigational sampling component of the Erb grant is consistent with the regional investigational sampling work plan developed by the GLWA Watershed Hub. The investigational sampling performed by ARC staff in 2024 was performed in the Middle, Upper, and Main branches of the Rouge River, within the Rouge Valley Sewage Disposal System (RVSDS) service area. This sampling compliments and builds upon the sampling that was performed by Wayne County Department of Public Services (WCDPS) - Environmental Services Division (WCDPS-ESD) in the Lower branch of the Rouge River in support of the Lower Rouge Water Trail effort and within the RVSDS service area. WCDPS-ESD initiated the Lower Rouge Water Trail water quality monitoring effort in 2019, which continued in the 2024 season. The data collected is included in the results and next steps.

Results

The ARC prepared a sampling plan, secured lab services, recorded rainfall data and collected instream grab samples at 37 sites. Sampling was performed weekly for 20 consecutive weeks within the Middle, Upper, and Main branches of the Rouge River. The WCDPS collected instream grab samples at 7 sites within the Lower Branch. Sampling was performed for 17 weeks. The sampling began in May and was completed in mid-September. A total of 859 individual *E.coli* samples were taken regardless of weather conditions. Table 1 presents the individual site and sampling event results. Red cells indicate samples above 1,000 Most Probable Number (MPN)/100ml. The Lower Rouge sample results are reported in Colony Forming Units (CFU)/100mL *E. coli*, which is a different analytical method and the results are similar. For the results discussed, the results are discussed in MPN/100mL.

Obviously and not surprisingly the Rouge River has an *E. coli* challenge with all sites having at least one sample exceeding 1,000 MPN/100ml. Working collaboratively with WCDPS-ESD, geometric means were calculated from sampling data from each of the 44 sites and partitioned based on dry and wet-weather conditions. Dry-weather samples were defined as samples taken when there was ≤ 0.05 inches of rainfall over the previous 48 hours. Wet-weather samples were defined as samples taken when there was ≥ 0.25 inches of rainfall over 24 hours and preceded by a 48-hour dry period. Samples that did not meet these criteria were defined as "inter-weather" samples, where there was ≥ 0.05 inches of rainfall within 48 hours and ≤ 0.25 inches within 24 hours. Table 2 presents the geometric mean results partitioned by weather type. Red cells indicate geometric means above 1,000 MPN/100ml.

Table 1

		Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	GeoMean	Min.	Max.
Middle Rouge		MD17	228	120	132	199	52	63	213	181	171	4611	85	1017	96	631	41	84	820	73	10	158	N/A	160	10	4611
		MD19	10462	211	110	1187	537	132	52	1664	530	8164	1918	24196	5172	4352	285	226	3448	86	75	30	N/A	671	30	24196
		MD16	1145	146	538	474	677	583	703	1119	350	7701	345	4352	882	1785	158	644	7270	246	262	201	N/A	700	146	7701
		MD18	3255	384	1439	771	1187	933	1333	3076	602	9208	880	8164	420	1725	573	565	15531	546	683	487	N/A	1291	384	15531
		MD15	2064	259	1169	1354	906	479	1050	3076	504	14136	645	4106	785	2142	259	226	6131	464	279	529	N/A	996	226	14136
		MD14	1274	228	292	985	591	410	241	1455	4106	8664	1076	11199	3873	4352	233	379	12997	556	1664	187	N/A	1123	187	12997
		D03	1014	275	644	563	331	733	683	1421	404	17329	399	691	857	7701	171	609		295	624	228	N/A	706	171	17329
		MD09	738	97	86	414	121	213	160	2247	275	5475	1565	691	683	6488	189	158	12997	173	134	122	N/A	461	86	12997
		US10	1046	292	364	504	197	134	313	1968	213	6131	1145	631	1126	4884	109	990	5172	185	173	158	N/A	571	109	6131
		MD04	146	241	448	4611	405	327	1376	3873	1467	1414	12997	4106	12033	19863	723	404	2755	933	231	1124	N/A	1322	146	19863
		MD07	216	52	110	63	98	110	272	233	309	2851	496	504	243	644	243	1126	771	52	145	173	N/A	243	52	2851
		MD03	336	187	185	4884	768	341	2247	6131	521	708	19863	5475	15531	24196	512	988	9208	860	175	1414	N/A	1494	175	24196
		Merriman Rd	331	175	556	1785	373	369	1467	1664	355	987	8664	2282	9208	5172	399	441	5475	341	305	355	N/A	928	175	9208
		US2	275	86	3076	3448	132	262	1860	1872	457	187	11199	2143	14136	9208	275	441	12033	331	309	341	N/A	956	86	14136
		Warrendale Md	262	389	9804	3654	359	488	2382	3654	422	432	8164	4611	11199	4611	369	426	6131	243	199	292	N/A	1179	199	11199
		D06	228	389	12997	2909	345	417	1274	5794	512	369	15531	2359	17329	4106	331	305	3076	199	246	181	N/A	1082	181	17329
Upper Rouge	Bell	Newburgh UP 2	5794	189	573	988	4106	546	2064	11199	1333	24196	3654	14136	4352	5172	1935	175	24196	1670	368	833	N/A	2164	175	24196
		8 Mile UP 1	1860	213	295	573	813	712	767	1169	537	12997	2014	5475	663	2481	1210	98	14136	301	727	305	N/A	965	98	14136
		6 Mile UP	1467	583	2282	933	1483	712	1396	1414	404	15531	697	1664	663	985	1467	473	3654	767	432	379	N/A	1091	379	15531
		UP05	842	327	909	520	1017	2489	1187	15531	520	24196	3255	4611	1785	9804	327	496	24196	960	504	1017	N/A	1696	327	24196
		U15	1259	546	4106	1354	842	1723	2382	2489	1106	17329	1334	6867	1376	1624	1223	932	17329	1565	1904	2723	N/A	2069	546	17329
		Newburgh UP 1	816	374	6867	1597	2481	1187	3076	1782	1145	24196	1022	988	1354	2187	1354	7270	9804	471	1223	880	N/A	1849	374	24196
		Levan UP	496	282	1664	292	8164	749	1396	586	529	24196	677	2014	906	754	749	327	2613	487	959	789	N/A	998	282	24196
		UP04	1850	546	1137	1723	2359	1450	2143	5475	1918	24196	1935	1396	1281	1989	1850	2723	8164	1198	4611	820	N/A	2156	546	24196
	Tarabus	8 Mile UP 2	3255	2987	860	1236	2014	1187	1439	2909	1497	15531	1956	10462	410	2382	1043	738	11199	697	565	471	N/A	1755	410	15531
		G19	677	1726	1664	2481	318	695	3873	9208	359	2187	17329	602	2247	12997	399	1046	11199	6867	15531	14136	N/A	2457	318	17329
		U17	288	1334	816	6488	581	1450	3609	15531	1467	7701	19863	1153	6131	9804	1039	1017	24196	624	683	1723	N/A	2357	288	24196
		U03	432	408	798	5172	959	749	5475	19863	1187	2613	24196	2382	9804	12033	906	1250	24196	990	933	1414	N/A	2408	408	24196
		U04	884	609	6488	8664	1291	987	5475	17329	1234	1259	24196	4611	8664	6867	81	1291	24196	1223	1553	9804	N/A	2901	81	24196
	Upper	G71	565	389	880	4884	1274	884	3255	15531	691	1789	19863	1081	24196	12033	845	1314	24196	152	988	836	N/A	2029	152	24196
		U02	384	10	3654	6488	1106	1071	5794	17329	1050	1414	12997	1421	12033	4884	813	697	24196	884	754	404	N/A	1740	10	24196
		U05	631	455	3255	7270	908	860	3873	17329	1223	1333	24196	2489	11199	8664	1664	650	24196	882	657	1333	N/A	2465	455	24196
Main Rouge		M15	275	2098	3654	6488	384	583	2187	24196	798	933	24196	1658	7270	12033	703	1162	19863	573	563	573	N/A	2019	275	24196
		G43	250	450	7270	4611	410	594	2481	5172	759	638	15531	717	6131	15531	627	960	24196	512	557	801	N/A	1641	250	24196
		US7	420	388	9804	3255	473	631	4106	12997	1050	743	24196	1658	15531	6131	717	882	24196	620	435	285	N/A	1876	285	24196
		Rouge Park Dr	7701	1723	24196	24196	1421	3448	9208	24196	3255	1553	24196	24196	1187	24196	2014						N/A	6468	1187	24196
		G42	379	233	5172	14136	428	676	3654	19863	717	364	24196	3873	6867	19863	684	393	985	487	368	386	N/A	1570	233	24196
Lower Rouge		LR-01	N/A	120	230	770	530	510	1400	540	430	420	550	4400	64	300	N/A	N/A	N/A	290	340	370	540	435	64	4400
		LR-02	N/A	400	320	840	1200	700	2000	750	470	780	860	4600	98	510	N/A	N/A	N/A	370	520	510	700	651	98	4600
		LR-03	N/A	450	420	840	880	2100	2900	1000	810	660	1100	5500	200	610	N/A	N/A	N/A	550	610	790	3100	927	200	5500
		LR-04	N/A	2400	3700	2400	1400	2400	6100	5200	1500	1700	930	7300	180	1400	N/A	N/A	N/A	700	540	540	3400	1682	180	7300
		LR-05	N/A	520	1500	1600	960	930	8200	5200	500	1400	1200	4400	160	1200	N/A	N/A	N/A	520	450	590	2400	1153	160	8200
		LR-06	N/A	420	700	2900	1100	910	2000	910	930	740	1100	1800	170	1000	N/A	N/A	N/A	350	570	510	4900	904	170	4900
		Beech Daly	N/A	540	810	3900	960	1100	3300	1000	820	1000	810	1500	140	1300	N/A	N/A	N/A	510	700	590	3300	983	140	3900

Criteria: > 1,000 MPN/100ml

N/A: No Sample

In heavily impacted, urbanized areas like the RVSDS area of the Rouge River the potential sources of *E.coli* are numerous, diverse and sample results can be highly variable, particularly between weather events. Gathering a larger dataset and calculating the geometric mean for each site, partitioned by weather type is intended to aid in prioritizing limited resources to identify and eliminate sources of human sewage. Top priority is to find and eliminate the sources impacting when the water resource will be used most by humans, specifically during dry weather.

Good news: all sites sampled and analyzed in the Middle Rouge had geomeans below the 1,000 MPN/100ml threshold in both dry and inter weather conditions (at least in 2024) and two of the 16 sites even had geomeans below the threshold during wet weather (see Table 2).

Within the Upper, six of 16 sites during dry and nine of 16 sites during inter-weather had geomeans below the threshold. All sites, not surprisingly, had geomeans above the threshold during wet weather.

Within the Main four of the five sites and three of the five sites had geomeans below the threshold and all sites were above the threshold.

The Lower had six of the seven sites below the threshold during dry weather and three of the seven during inter-weather below the threshold and surprisingly one of the seven below the threshold during wet weather.

Table 2

Geometric Means					
		Dry Weather	Inter Weather	Wet Weather	All Weather
Middle Rouge	MD17	62	134	450	160
	MD19	162	281	4303	671
	MD16	341	470	1758	700
	MD18	667	746	3289	1291
	MD15	415	707	2840	996
	MD14	593	499	3192	1123
	D03	379	567	1624	706
	MD09	167	174	2074	461
	US10	205	440	1812	571
	MD04	787	312	3624	1322
	MD07	182	139	428	243
	MD03	767	430	4694	1494
	Merriman Rd	538	278	2482	928
	US2	393	195	4332	956
	Warrendale Md	452	407	5097	1179
	D06	442	344	4414	1082
Upper Rouge	Bell	Newburgh UP 2	921	993	7501	2164
		8 Mile UP 1	472	423	2983	965
		6 Mile UP	663	1053	1829	1091
		UP05	755	891	5260	1696
		U15	1401	1646	3425	2069
		Newburgh UP 1	1423	1808	2430	1849
		Levan UP	857	878	1238	998
		UP04	1870	1143	3416	2156
	Tarabusi	8 Mile UP 2	919	1110	4213	1755
		G19	2036	1344	3612	2457
		U17	1452	1165	5154	2357
		U03	1393	714	6465	2408
		U04	1515	887	8783	2901
	Upper	G71	1052	715	5989	2029
		U02	1067	83	6843	1740
		U05	1380	544	7429	2465
Main Rouge	M15	824	1561	6603	2019
	G43	762	657	5388	1641
	US7	816	585	7107	1876
	Rouge Park Dr	3689	1723	13701	6468
	G42	710	303	6385	1570
Lower Rouge	LR-01	442	319	877	435
	LR-02	700	425	1311	651
	LR-03	911	738	1786	927
	LR-04	1456	1951	2382	1682
	LR-05	866	1368	3137	1153
	LR-06	745	1090	1483	904
	Beech Daly	848	1079	1635	983

Criteria: > 1,000 MPN/100ml

Dry Weather conditions = ≤0.05" of rainfall over the previous 48 hours
Wet Weather conditions = ≥0.25" of rainfall over the previous 24 hours
Inter Weather conditions = ≥0.05" within previous 48 hrs and ≤0.25" within previous 24 hrs

Next Steps

In addition to increasing the understanding of water quality in Wayne County's RVSDS area, this analysis will be used to guide stormwater outfall dry weather screening. Screening of outfalls with the capacity to analyze for the human biomarker (HF183) began in the fall of 2024 and will be a major effort through 2025. Given the wide spread nature of *E.coli* results, outfall screening will occur throughout the RVSDS area but will be focused in the areas upstream of the sites exceeding the threshold during dry weather (see Figure 1). During 2025, WDPS ESD plans to continue its water Lower Rouge water quality monitoring effort in support of the Lower Rouge Water Trail development. The data is also utilized to identify potential illicit discharge and investigative "hot spots" that may arise during the monitoring season.

Figure 1: Sampling locations in the Middle, Upper, Main & Lower Red sites indication geomeans above 1,000 MPN/100ml