Madison District Public Schools

MADISON DISTRICT PUBLIC SCHOOLS
Prepare. Aspire. Succeed.

Illicit Discharge Elimination Program
2021 Storm Sewer / Outfall Investigations

DLZ
ARCHITECTURE • ENGINEERING • PLANNING
SURVEYING • CONSTRUCTION SERVICES

INNOVATIVE IDEAS
EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

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Appendices

Executive Summary

As part of the Madison District Public Schools' Phase II Storm Water Permit obligations (in collaboration with the City of Madison Heights and Lamphere Schools), the District has committed to: 1) developing a storm sewer and outfall/discharge point map that identifies the discharge points to the City or County separate storm sewer system, and 2) monitoring these District-owned discharge points at least every 5 years to identify any potential illicit discharges or connections.

Field investigations were conducted by DLZ-Michigan, Inc. (DLZ) staff on July 29. The following schools/sites were investigated as part of this study:

- Madison Preparatory, 25601 Couzens (MP)
- Wilkinson Middle School, 26524 John R Road (WM)
- Madison Elementary School/Early Childhood Center, 27107 Hales (ME)
- Madison High School, 915 E. 11 Mile Road (MHS)

All storm sewer manholes and catch basins (that could be found) were GPS located in 2016 and a field survey form was generated for each structure on an iPad. A photo was taken of each structure as well. 2021 field data updates and photos of each structure are enclosed in this report.

Each structure has an identification number and coded according to which school/site it is located within. For instance, 'MP01' is located at Madison Preparatory School.

Each structure was rated 'Good', 'Fair', or 'Poor' based on site observations.

The storm sewer investigations included visual inspection of the manholes, catch basins, and outfalls/discharge points during dry-weather flow. *Dry-weather flow* is defined the by Michigan Department of Environment, Great Lakes, and Energy (EGLE) as a forty-eight (48) hour period without any precipitation. Stagnant water was observed in several of the manhole structures, which can be an indication that the downstream sewer is blocked with debris or sediment.

The following outfalls/discharge points are identified within the District:

- MP06 at Madison Preparatory School
- WM07 at Wilkinson Middle School
- ME12 at Madison Elementary School
- MHS04 at Madison High School
- MHS09 at Madison High School

3 samples were collected for laboratory analysis of E. *coli* (which is indicative of human or animal fecal matter entering the storm sewer system.

The Michigan Water Quality Standard for E. coli is as follows:

- E. coli = 1,000 colonies/100 mL at any given time for waters of the state.

Refer to the table below for more information on the location of where the sample was collected and reason for collecting the sample.

Table 1.1 - Sample Collection

Structure ID	Sample Collection Site	Reason for Collection	Test Results	Source of E. coli
WM07 Outfall	Manhole on northern end of parking lot – discharges to City's storm sewer system	Outlet to City's storm sewer; dry-weather flow present	E. coli = 290 colonies/100 mL of water	Unknown
WM01	Manhole on western end of parking lot	Dry-weather flow present	E. coli = 470 colonies/100 mL of water	Unknown
MHS09 Outfall	Manhole on southeast parking lot – discharges to City's storm sewer system	Outlet to City's storm sewer; dry-weather flow present	E. coli = 440 colonies/100 mL of water	Unknown

It is unknown at this time what is causing these levels of E. coli. We propose to re-sample in a couple years to assess if the E. coli levels are increasing or decreasing. However, since the levels are well below the state water quality standard, no immediate response is required.

General Recommendations

1. A few manholes showed evidence of surcharging (structures where groundwater seepage is entering the system and creating damage to the structure). These manholes should be rehabilitated as funding allows. See Table 1.2 and the storm sewer map for specific locations.

2. A few catch basins were partially or completely filled with dirt and debris. These structures should be cleaned out as soon as possible. See Table 1.2 and the storm sewer maps for specific locations.

Structure-Specific Recommendations

Below is s a table of structures that were rated 'Fair' or 'Poor' during our field investigations. Cleaning and/or rehabilitation is required at the following locations:

Table 1.2 – Structure-Specific Ratings & Recommendations

Outfall ID	Rating	Reason for Rating	Recommendations
MP04	Poor	Mineral Deposits/Surcharging present	Rehab of manhole
WM01	Fair	Minor Mineral Deposits/Surcharging present	Rehab of manhole
WM04	Poor	Minor Mineral Deposits/Surcharging present	Rehab of manhole

Outfall ID	Rating	Reason for Rating	Recommendations
WM05	Poor	Mineral Deposits/Surcharging present	Rehab of manhole
WM06	Fair	Mineral Deposits/Surcharging present	Rehab of manhole
MHS04	Fair	25% filled with dirt/debris	Clean out culvert
MHS15	Fair	Minimal infiltration	Rehab of manhole
MHS22	Poor	Mineral Deposits/Surcharging present	Rehab of manhole
MHS26	Poor	Mineral Deposits/Surcharging present	Rehab of manhole
MHS30	Poor	Can't locate – buried under sediment	Clean out manhole
MHS31	Fair	50% filled with dirt/debris	Clean out manhole

Procedure

A. Dry-Weather Inspections

As a first step, dry-weather inspections 48 hours after the last rain event were conducted at all the District-owned storm sewer structures. Visual and qualitative observations such as odor, clarity, floatables, stains, etc. were made to determine if more extensive sampling was needed. If a flow was observed, and if it was highly turbid, had a distinct odor, or if floatables were present, samples were collected and sent to a commercial lab for analysis and the structure was scheduled for further investigation.

B. Data Collection Procedure

Data for each storm sewer structure we located was gathered in an electronic form stored on an iPad. Each structure was GPS-located for the development of a GIS map of the District's system. Photos were also taken of each structure that convey the conditions of these structures. Field observations were identified on the electronic form, such as:

- Structure ID
- Location of structure – GPS point, school/site name, and crossroads
- Date of field investigation/observation
- Crew members
- Size, material, condition, and blockage of pipes
- Whether or not dry-weather flow was observed
- Additional observations and comments

If dry-weather flow was observed, comments regarding the color, odor, and measurement of flow were noted on the form. See the attached field investigation forms for more details.

C. Storm Sewer Sampling

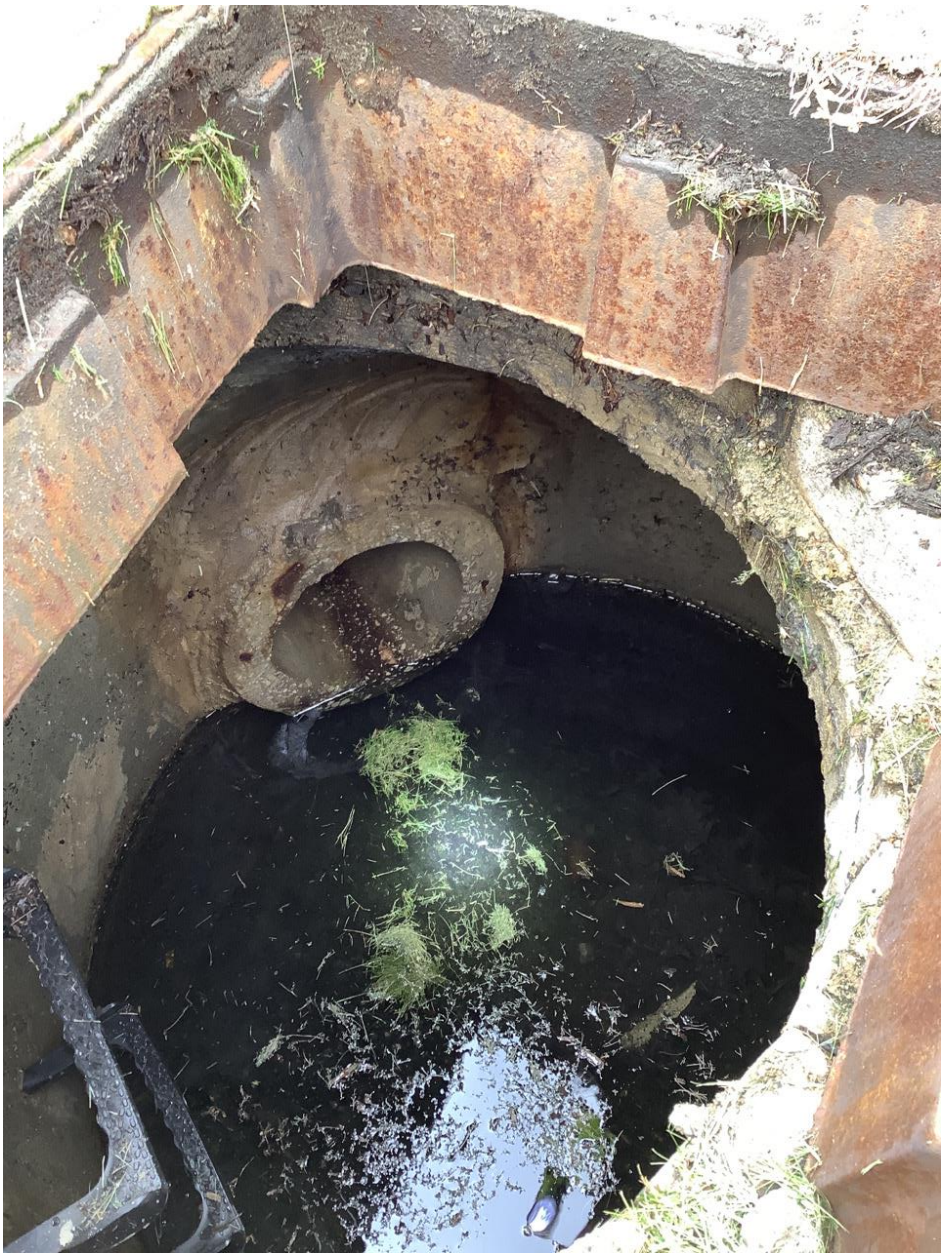
If flow was observed, a sample of the discharge was collected for laboratory analysis of Escherichia Coli (E. coli).

Elevated levels of these parameters may indicate the presence of an illicit connection or discharge.

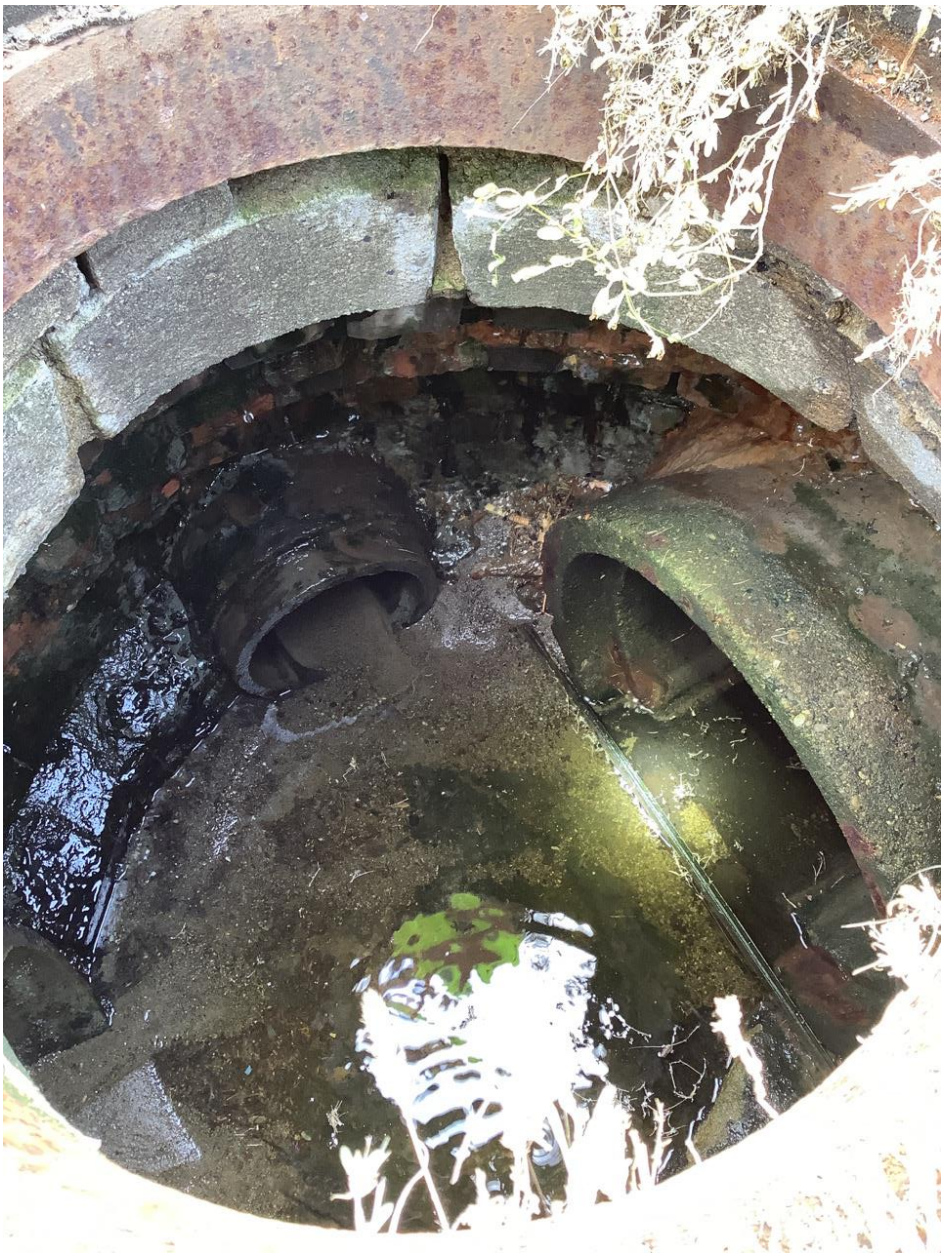
See attached storm sewer structure/outfall photos and laboratory analysis testing results for details.

Structure ID	date_	school	Crossroads	blockage	condition	size	type	comments	dwf_yn
MP04	2021-07-29 13:31	Madison Prep	Hudson/Couzens	0	fair	36	RCP	Evidence of infiltration - needs repair	yes
WM07 - Outfall	2021-07-29 14:11	Wilkinson MS	John R/E Greig	0	good	36	RCP	Dry-weather flow	yes
WM04	2021-07-29 14:24	Wilkinson MS	John R/E Greig	0	poor	12	Clay	Surcharging, mineral deposits present	
WM05	2021-07-29 14:27	Wilkinson MS	John R/E Greig		poor	12	Clay	Surcharging, mineral deposits present	
WM06	2021-07-29 14:39	Wilkinson MS	John R/E Greig		fair	12	Clay	Dry-weather flow	
WM01	2021-07-29 14:43	Wilkinson MS	John R/E Greig	0	fair	12	RCP		
ME12 - Outfall	2021-07-29 15:03	Madison Elem	Hales/E University	0	good	36	RCP	Water in MH - sampled for E coli	no
MHS04 - Outfall	2021-07-29 15:12	Madison HS	11 Mile Rd	25	fair	12	RCP	Leaf/sediment debris - needs cleaning	no
MHS46	2021-07-29 15:18	Madison HS	John R	0	good	12	RCP	Storm MH repaired; no issues	no
MHS09 - Outfall	2021-07-29 15:25	Madison HS	John R Rd	0	good	36	RCP	24" PVC draining to North; dry-weather flow	yes
MHS12	2021-07-29 15:28	Madison HS	John R	0	good	15	RCP	Stagnant water in pipe	no
MHS15	2021-07-29 15:31	Madison HS	John R Rd	0	fair	24	RCP	Minimal infiltration	no
MHS22	2021-07-29 15:36	Madison HS	John R	0	poor	36	RCP	Infiltration- repair needed	no
MHS26	2021-07-29 15:39	Madison HS	John R Rd	0	poor	12	RCP	Infiltration- needs repair	
MHS31	2021-07-29 15:45	Madison HS	John R	100	poor	10	Clay	Can’t locate - buried under sediment	
MHS30	2021-07-29 15:49	Madison HS	John R	50	fair	10	Clay	Needs cleaning	no

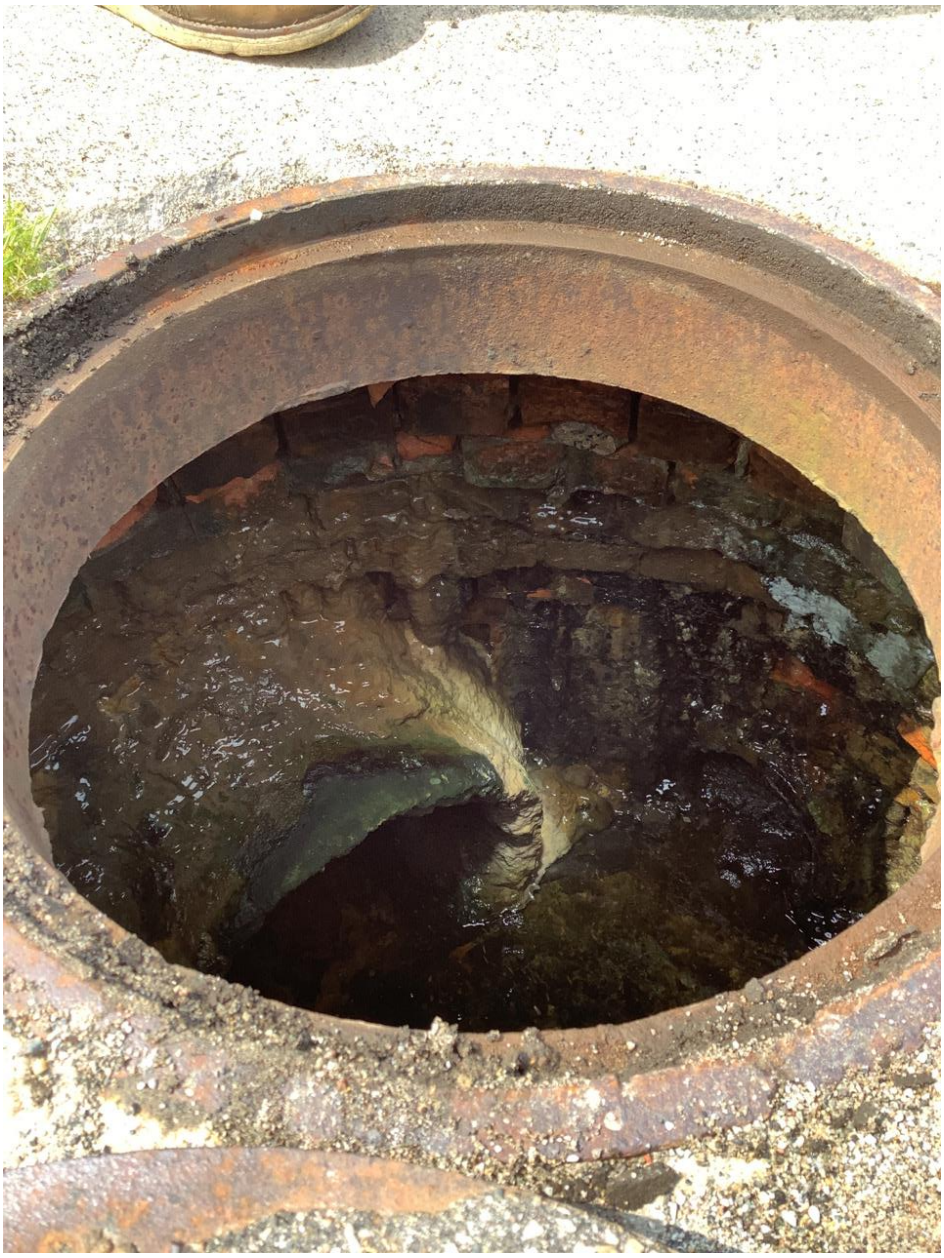
Structure ID	color	Photo	turbidity	odor	additional comments
MP04	clear		clear	None	
WM07 - Outfall	clear		clear		Sample collected for E coli
WM04					Evidence of infiltration- needs repair
WM05					Evidence of infiltration- needs repair
WM06					Evidence of infiltration- needs repair
WM01				None	sample collected for E coli
ME12 - Outfall					
MHS04 - Outfall					
MHS46		X			
MHS09 - Outfall	clear		clear	None	Sample collected for E coli
MHS12		X			
MHS15					
MHS22		X			
MHS26		X			
MHS31		X			
MHS30		X			



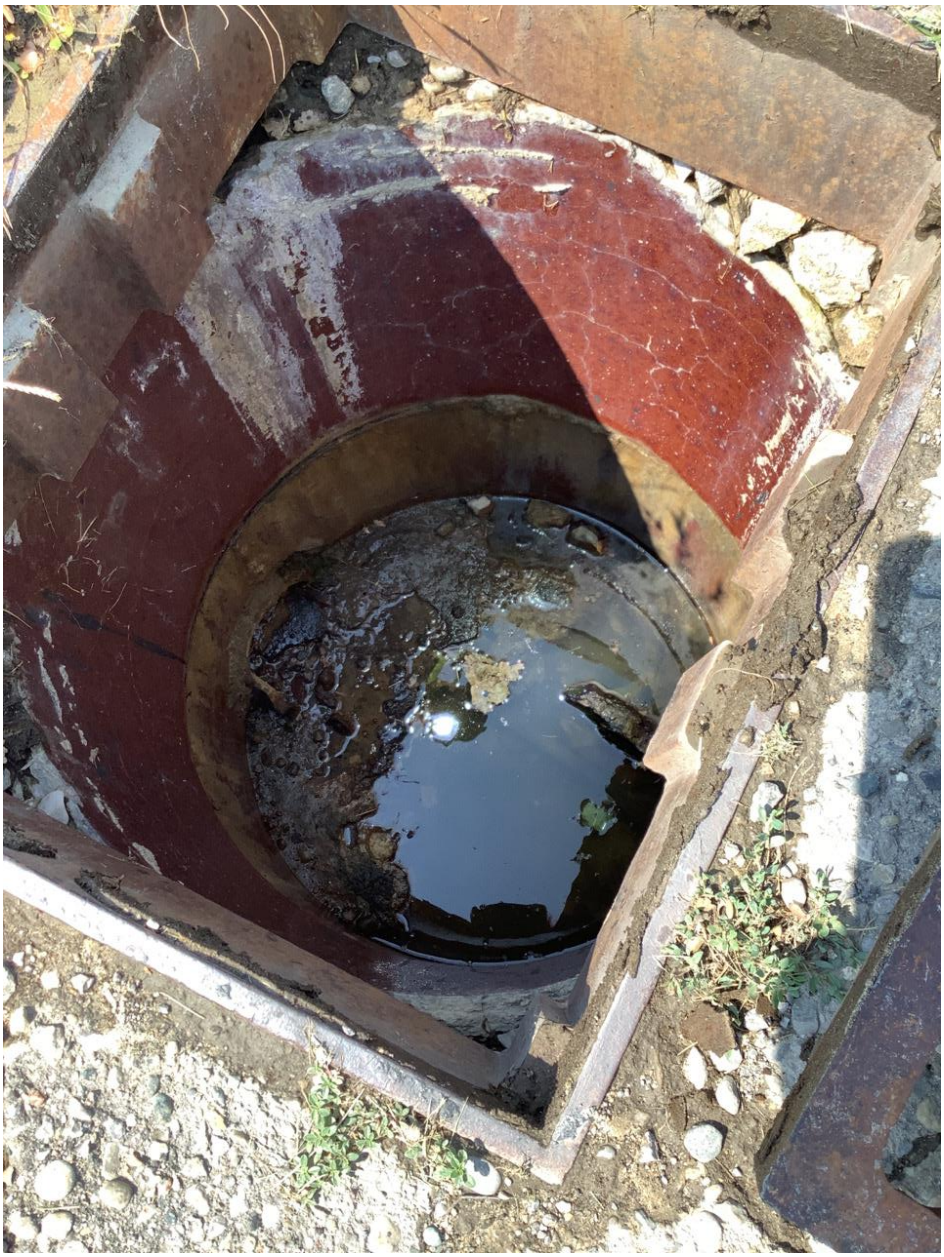
MHS12 – No issues at this time



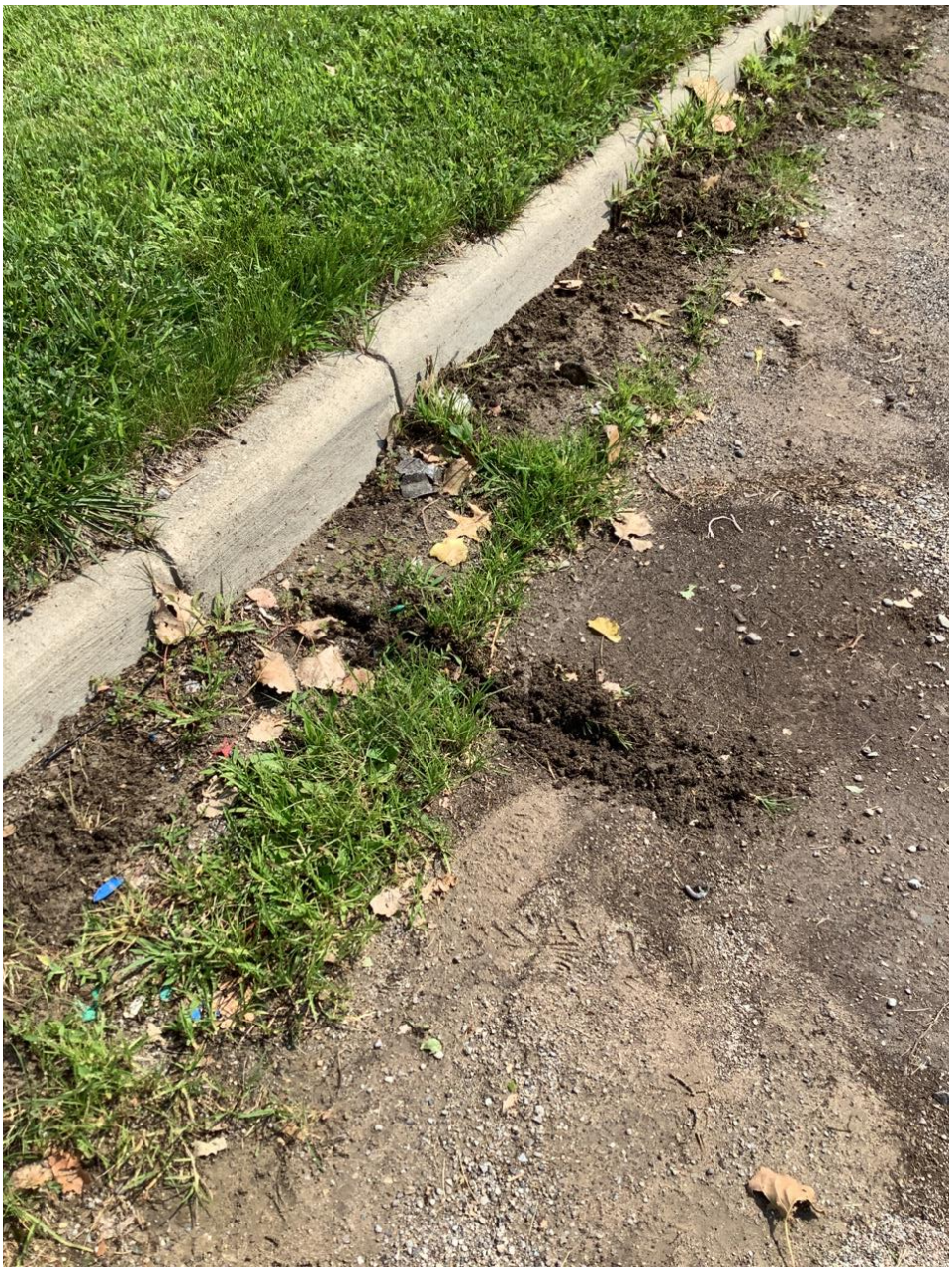
MHS22 – Evidence of Infiltration into manhole- repairs recommended



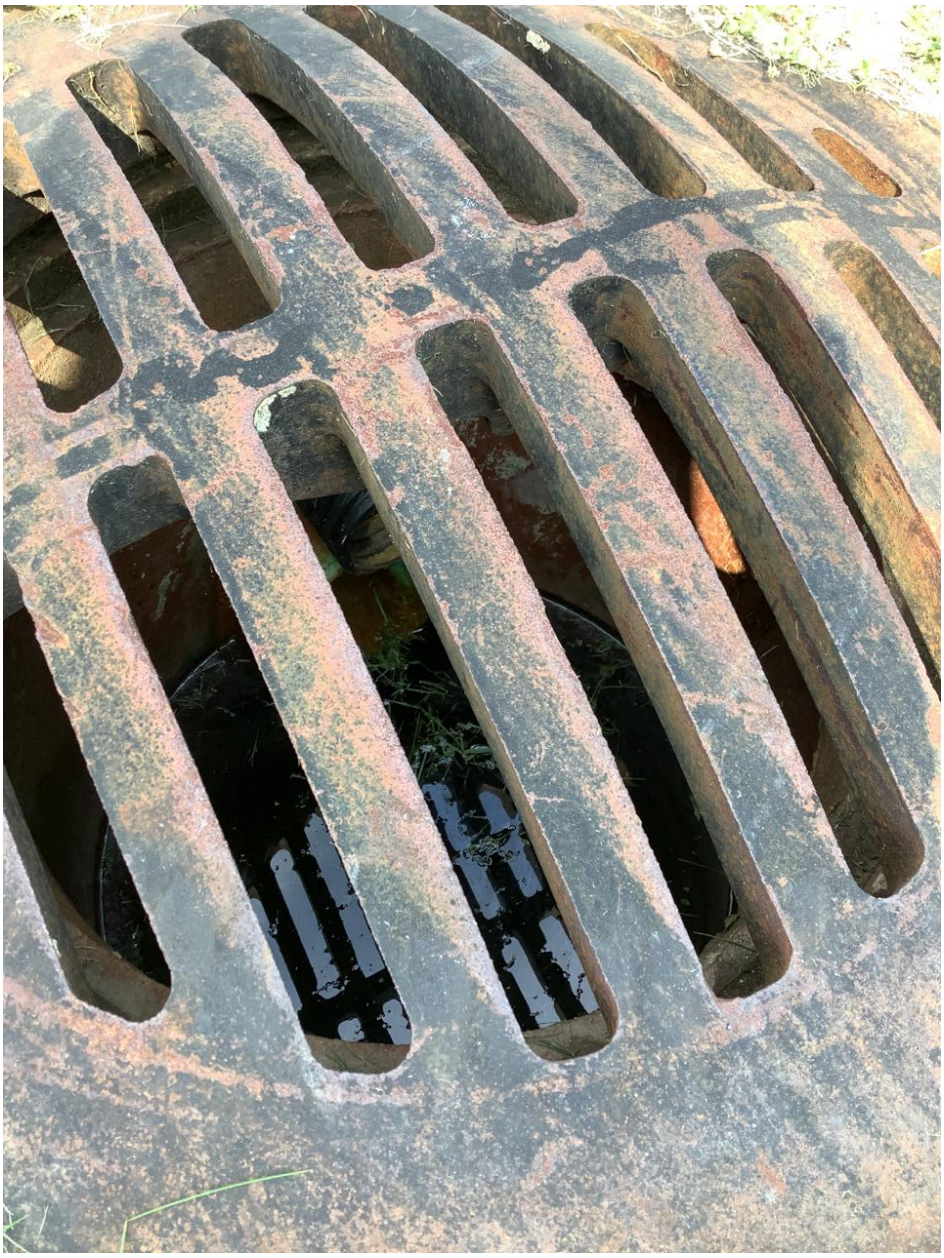
MHS26 – evidence of Infiltration into manhole – repairs needed



MHS30 – Needs cleaning



MHS31 – CB buried under sediment



MHS46 – Couldn’t open manhole

RTI LABORATORIES, INC.

RTI Laboratories
31628 Glendale St.
Livonia, MI 48150
TEL: (734) 422-8000
Website: www.rtilab.com

Monday, August 02, 2021

Laura Gruzwalski
DLZ-Michigan, Inc.
4494 Elizabeth Lake Road
Waterford Township, MI 48328
TEL: (248) 681-7800
FAX: (248) 681-2660

RE: MDPS 2021 MS$

Work Order #: 2107800

Dear Laura Gruzwalski:

There were no problems with the analytical events associated with this report unless noted in the Case Narrative.

This report may only be reproduced in its entirety. Individual pages, reproduced without supporting documentation, do not contain related information and may be misinterpreted by other data reviewers.

Quality control data is within laboratory defined or method specified acceptance limits except if noted.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Janet Hunter

Project Manager

RTI Laboratories, Inc. - Workorder Sample Summary

WO#: 2107800

Date Reported: 8/2/2021
Original

Client: DLZ-Michigan, Inc.

Project: MDPS 2021 MS$

Lab Sample ID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
2107800-001A	WM07		7/29/2021 10:00 AM	7/29/2021 1:38 PM	Water
2107800-002A	ME12		7/29/2021 11:00 AM	7/29/2021 1:38 PM	Water
2107800-003A	MHS09		7/29/2021 11:24 AM	7/29/2021 1:38 PM	Water

RTI Laboratories, Inc. - Case Narrative

WO#: 2107800

Date Reported: 8/2/2021
Original

Client: DLZ-Michigan, Inc.

Project: MDPS 2021 MS$

Concentrations reported with a J flag in the Qual field are values below the reporting limit (RL) but greater than the established method detection limit (MDL). There is greater uncertainty associated with these results and data should be considered as estimated. These analytes are not routinely reviewed nor narrated below as to their potential for being laboratory artifacts.

Concentrations reported with an E flag in the Qual field are values that exceed the upper quantification range. There is greater uncertainty associated with these results and data should be considered as estimated.

All sample analyses included a Method Blank, LCS/LCSD, MS/MSD, Duplicates, post digestion spikes, serial dilutions, and all method specified quality control, as applicable. All QC parameters were within established control limits except where noted on the QC report and/or below. Initial and continuing calibration results were within method specifications, except as noted below.

Any comments or problems with the analytical events associated with this report are noted below.

Sample Receipt:
Receipt No. 1: Samples were received at RTI Laboratories, Inc. via Client delivery on 07/29/2021. Total number of samples received is 3

Sample Analysis:
Samples were analyzed at RTI Laboratories for:
E. Coli, Total Coliforms QT - SM9223B

RTI Laboratories, Inc. - Analytical Report

WO#: 2107800

Date Reported: 8/2/2021
Original

Client:	DLZ-Michigan, Inc.	**Collection Date:**	7/29/2021 10:00:00 AM
Project:	MDPS 2021 MS$		
Lab ID:	2107800-001	**Matrix:**	Water
Client Sample ID:	WM07		

Analysis	Result	RL	Qual	Units	DF	Date Analyzed
E. Coli, Total Coliforms QT		**Method: SM9223B**				**Analyst: SAB**
Escherichia Coli	290	4.0		CFU/100ml	4	7/29/2021 2:23 PM

RTI Laboratories, Inc. - Analytical Report

WO#: 2107800

Date Reported: 8/2/2021
Original

Client:	DLZ-Michigan, Inc.	**Collection Date:**	7/29/2021 11:00:00 AM
Project:	MDPS 2021 MS$		
Lab ID:	2107800-002	**Matrix:**	Water
Client Sample ID:	ME12		

Analysis	Result	RL	Qual	Units	DF	Date Analyzed
E. Coli, Total Coliforms QT		**Method: SM9223B**				**Analyst: SAB**
Escherichia Coli	470	4.0		CFU/100ml	4	7/29/2021 2:23 PM

RTI Laboratories, Inc. - Analytical Report

WO#: 2107800

Date Reported: 8/2/2021
Original

Client:	DLZ-Michigan, Inc.	**Collection Date:**	7/29/2021 11:24:00 AM
Project:	MDPS 2021 MS$		
Lab ID:	2107800-003	**Matrix:**	Water
Client Sample ID:	MHS09		

Analysis	Result	RL	Qual	Units	DF	Date Analyzed
E. Coli, Total Coliforms QT		**Method: SM9223B**				**Analyst: SAB**
Escherichia Coli	440	4.0		CFU/100ml	4	7/29/2021 2:23 PM

RTI Laboratories, Inc. - DATES REPORT

WO#: 2107800

Date Reported: 8/2/2021
Original

Client: DLZ-Michigan, Inc.

Project: MDPS 2021 MS$

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
2107800-001A	WM07	7/29/2021 10:00 AM	Water				
				SM 9223B_MPN-E. Coli, Total Coliforms QT		7/29/2021 2:23 PM	7/29/2021 2:23 PM
2107800-002A	ME12	7/29/2021 11:00 AM	Water				
				SM 9223B_MPN-E. Coli, Total Coliforms QT		7/29/2021 2:23 PM	7/29/2021 2:23 PM
2107800-003A	MHS09	7/29/2021 11:24 AM	Water				
				SM 9223B_MPN-E. Coli, Total Coliforms QT		7/29/2021 2:23 PM	7/29/2021 2:23 PM

RTI Laboratories, Inc. - Definitions and Acronyms

WO#: 2107800

Date Reported: 8/2/2021
Original

DEFINITIONS:

DF: Dilution factor; the dilution factor applied to the prepared sample.

DUP: Duplicate; aliquots of a sample taken from the same container under laboratory conditions and processed and analyzed independently, used to calculate Precision (%RPD).

LCS: Laboratory Control Sample; prepared by adding a known amount of target analytes to a specified amount of clean matrix and prepared with the batch of samples, used to calculate Accuracy (%REC).

LCSD: A duplicate LCS sample, used to calculate both Accuracy (%REC) and Precision (%RPD)

MBLK: Method Blank; a sample of similar matrix that does not contain target analytes or interference that may impact the analytical results and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedure, used to assess and verify that the analytical process is free of contamination.

MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.

Mg/Kg or mg/L: Units of part per million (PPM) – milligram per Kilogram (W/W) or milligram per Liter (W/V).

MS: Matrix Spike; prepared by adding a known amount of target analytes to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available, used to calculate Accuracy (%REC)

MSD: A duplicate MS sample, used to calculate both Accuracy (%REC) and Precision (%RPD)

% REC: Percent Recovery of a known spike (SPK); a measure of accuracy expressed as a percentage of a measured (recovered) concentration compared to the known concentration (SPK) added to the sample. This is compared to the Low Limit and High Limit.

% RPD: Relative Percent Difference; a measure of precision expressed as a percentage of the difference between two duplicates relative to the average concentration. This is compared to the RPD Limit.

PL: Permit limit:; Not included on all reports. Used primarily for wastewater discharge permits.

PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a “J” qualifier.

Qual: Qualifier that applies to the analyte reported

RL: Reporting Limit: See PQL

SPK: Spike; used in the QC section for both SPK Value and SPK Ref Val

Ug/Kg or ug/L: Units of part per billion (PPB) – microgram per Kilogram (W/W) or microgram per Liter (W/V).

QUALIFIERS:

*/X: Reported value exceeds the maximum allowed concentration by regulation or permit

B: Analyte detected in the associated Method Blank at a concentration > RL.

E: Analyte concentration reported that exceeds the upper calibration standard. Greater uncertainty is associated with this result and data should be considered estimated.

H: Holding time for preparation or analysis has been exceeded

J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the established MDL. Greater uncertainty is associated with this result and data reported is estimated. These analytes are not routinely reviewed nor narrated as to their potential for being laboratory artifacts.

M: Manual Integration used to determine area response

ND: Analyte concentration is less than the Reporting Limit.

P: Second column RPD exceeds 40%

R: % RPD exceeds control limits

S: % REC exceeds control limits

T: MBLK result is greater than 1/2 of the LOQ

U: The analyte concentration is less than the DL.

CHAIN OF CUSTODY

PAGE | OF

RTI LABORATORIES

Environmental Sciences Division
31628 Glendale Street
Livonia MI, 48150

Materials Testing Division
33080 Industrial Road
Livonia, MI 48150

PHONE: (734) 422-8000
FAX: (734) 422-5342
www.rtilab.com

RTI WORK ORDER NO: 2107800

Please Include Email Address of Report Recipient !!!

SUBMITTING COMPANY: DLZ	REPORT TO (Name): Laura Gruzwalski	BILL TO: Laura Gruzwalski
PROJECT NAME: MDPS 2021 MS4 / PROJECT #: / QUOTE #:	COMPANY: DLZ	COMPANY: DLZ
SAMPLING LOCATION (STATE or COUNTRY): Madison Heights	ADDRESS: 4494 Elizabeth Lake Rd	ADDRESS: 4494 Elizabeth Lake Rd
SPECIAL INSTRUCTIONS / COMMENTS:	CITY, STATE, ZIP: Waterford, MI, 48328	CITY, STATE, ZIP: Waterford, MI 48328
	PHONE: 248-836-4053 / EMAIL (OR FAX IF NO EMAIL AVAILABLE): lgruzwalski@DLZ.com	P.O NUMBER:
SAMPLER'S PRINTED NAME: Carl Ramsey	SAMPLER'S SIGNATURE: Carl Ramsey	

ITEM NUMBER	SAMPLE I.D.	DATE SAMPLED	TIME SAMPLED (24-hour format)	MATRIX CODE (see codes below)	NBR OF BOTTLES	NBR OF CONTAINERS AND PRESERVATIVES: NONE	HCL	HNO_3	H_2SO_4	NaOH	Methanol	OTHER	TESTS REQUESTED	pH Acceptable? Y N n/a (Lab only)	COMMENTS: Methanol Preserved Weights, HOT Sample Notation, Additional Sample Description, Air Volume, etc.
1	WM07	7/29/21	10:00	W	1								E Coli		
2	ME12	7/29/21	11:00	W	1								E Coli		
3	MH509	7/29/21	11:24	W	1								E Coli		
4															
5															
6															
7															
8															
9															
10															

Relinquished By:	Date	Time	Received By:	Date	Time
Carl Ramsey	7/29/21	1:38		7-29-21	13:38

REPORT TRANSMITTAL DESIRED:

☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

ALL REPORTING IS VIA THE RTI "FLASHPOINT" ONLINE SYSTEM UNLESS OTHERWISE SPECIFIED

FOR LAB USE ONLY

Temp of samples: 9.8-12.0 °C On Wet Ice ? YES CR

Comments:

TURNAROUND DESIRED: Standard ☒ **RUSH:** Next BD ☐ 2nd BD ☐ 3rd BD ☐

Note: RUSH requests will incur surcharges!

Distribution: White - Lab; Pink - Field

See reverse side for Laboratory Terms and Conditions of Service

MATRIX CODES: A = AIR; DW = DRINKING WATER; GW = GROUNDWATER; L = LIQUID; O = OIL; WW = WASTE WATER; S = SOIL; SD = SOLID; SL = SLUDGE; SV = SOLVENT WASTE; W = WATER; WP = WIPE; SW = SURFACE WATER