

Wayne County Illicit Discharge Elimination Program
ARC IDEP Services 2016 Report
March 8, 2017

Summary

Wayne County performed source identification advanced investigation within the City of Plymouth as well as field screen/water quality sampling at 18 locations within three priority areas as identified in the ARC Collaborative IDEP Plan. The source identification work with the City of Plymouth has identified five specific street segments that will be televised by the City. Residential dye-testing will be performed by Wayne County and the City at select homes in addition to and likely as a result of the televising.

The results of the field screening suggest that future source identification advanced investigations should be focused on areas tributary to sites L51A and D62A.1. Additional field screening, upstream of sites G94A and D62A, is also recommended to further refine areas for future source identification advanced investigations.

Introduction

Wayne County Department of Public Services, Water Quality Management Division (WQMD) utilized IDEP Field Investigation funding (ARC 2016 Budget TC3) allocated to Wayne County to perform source identification advanced investigation in the City of Plymouth, perform field screening in priority areas identified by the ARC Technical Committee, and provide written and oral summaries of activities at ARC Technical Committee meetings and for the ARC's Annual Report.

Source Identification Advanced Investigations (Task 1a)

WQMD worked with ARC staff and the City of Plymouth to perform manhole inspections, sample collection and lab data analysis of tributary storm sewer segments to the Harvey Street and Park Street municipal separate storm sewer systems (MS4) to either target them or eliminate them for closed circuit televising and/or residential dye testing. The Harvey Street MS4 is tributary to Byron Creek which flows into the South Branch of Tonquish Creek. The Park Street MS4 discharges into the Middle Branch of the Rouge River.

Harvey Street – August 2016

Storm sewer manholes on Harvey Street from the Byron Street intersection to Linden were investigated for dry weather flow on August 4, 2016. Four of the 12 manholes investigated had dry weather flow and samples were taken. Evidence of sanitary debris was observed in the Palmer Street inlet (see Figure 1). The evidence reconfirms there are illicit connections to the storm sewer on Palmer identified during a previous investigation. Manholes on Beech Street, where evidence of sewage was previously detected, were not accessible on August 4, 2016. Two inlets, Simpson east, and Linden west, had *E. coli* concentrations in excess of 1,000 most probable number (MPN)/100 ml (see Appendix A, Table 1 for results).

Figure 1: Sanitary Debris in the Palmer Street Inlet



Park Street – August 2016

On August 4, 2016, WQMD conducted dry weather screening of storm sewer manholes beginning with Mill Street at Union and proceeding upstream on the north inlet, and also upstream on Ameila Street, which drains into the Mill/Union Street manhole through the west inlet. There was dry weather flow in the Mill Street storm sewer and heavy dry weather flow in the Amelia Street storm sewer. Four samples were collected and all four have *E.coli* concentrations in excess of 1,000 MPN/100 ml (see Appendix A, Table 1).

Harvey Street – November 2016

Storm sewer manholes on Simpson, Linden and Jener streets within the Harvey Street MS4 area were investigated for dry weather flow on November 11, 2016. Four of the 6 manholes investigated had dry weather flow and samples were taken. The Linden/Jener manhole had two inlets with *E. coli* concentrations in excess of 1,000 MPN (see Appendix A, Table 2 for results). None of the manholes investigated had visible evidence of sanitary debris.

Park Street – November 2016

Storm sewer manholes on Mill and Amelia streets within the Park Street MS4 area were also investigated for dry weather flow on November 11, 2016. Four of the 8 manholes investigated had dry weather flow and samples were taken. The manhole adjacent to 141 N. Mill had an *E. coli* concentration in excess of 1,000 MPN (see Appendix A, Table 2 for results). This manhole also had a noticeable film and odor suggestive of sanitary sewage.

Recommendations/Investigation Plan

The WQMD and ARC staff met with the City of Plymouth, on December 5, 2016, to review the storm sewer investigation results and developed a plan for follow up activities. The investigation plan the parties devised is as follows:

Harvey Street

The City will arrange for a contractor to televise the following storm sewer segments:

- Palmer Street west of Harvey Street to the terminal manhole east of McKinley Street,
- Beech Street west of Harvey Street to the terminal manhole east of McKinley Street,
- Linden Street west of Harvey Street to the terminal manhole east of Herald Street,
- Jener Street from the Linden/Jener Street intersection north on Jener Street to first manhole upstream.

Based on the televising work the WQMD staff may perform residential dye-testing of select homes with assistance from the City.

Mill Street

The City will arrange for a contractor to televise the following storm sewer segments:

- Amelia Street west of Mill Street upstream to the Farmer Street intersection,

The City will also survey residences along Mill Street between Union Street and Plymouth Road and make contact with property owners to coordinate access for dye testing. The WQMD will perform the dye testing with the assistance from the City of Plymouth staff.

Field Screening Priority Areas (Task 1b)

Under this task the WQMD identified 18 sites for monitoring, procured lab services, collected water samples and provided data management and analysis. Samples collected were analyzed for *E. coli*. dissolved oxygen, conductivity, water temperature and visual observations were also recorded at each site. The sites sampled were within established priority areas within the ARC's Collaborative IDEP. The purpose of the sampling was to help further isolate/refine source identification priority areas for future collaborative IDEP advanced investigations. Figures 1 and 2 (below) identify the sites that were sampled. The samples were collected from within the Lower 1, Middle 1-Tonquish Creek, and the Upper Rouge (Beitz Drain). The communities where the sampling occurred are: Canton Township, Superior Township, Plymouth Township, Cities of Plymouth and Livonia. The sampling was performed during dry weather (48 hours or more without precipitation greater than 0.10 inches) over two days, November 14-15, 2016 (see Appendix B for results). Two of the 18 sites sampled had *E. coli* concentrations exceeding 1,000 MPN/100ml. These sites were:

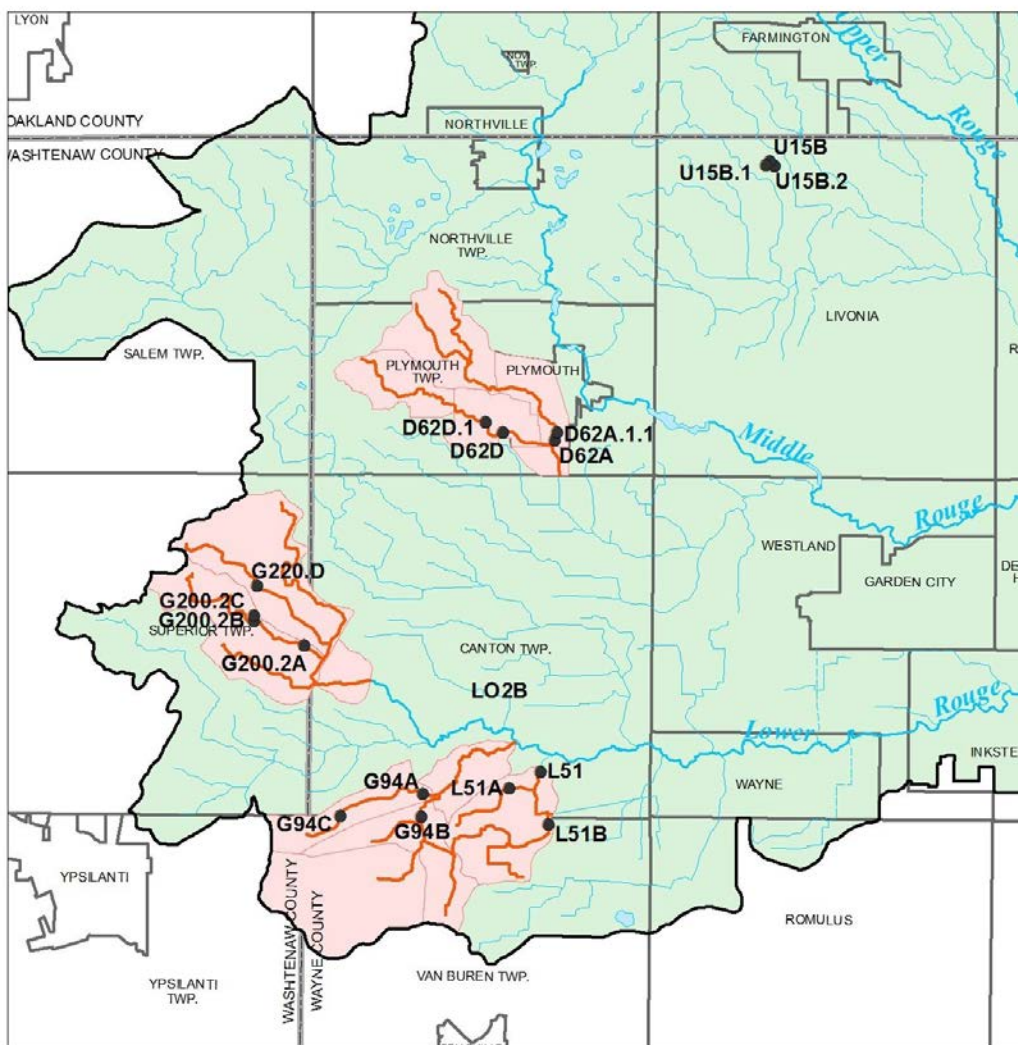
- Site L51A - Fisher-Leng Drain (tributary to the McKinstry Drain) at Sheldon Rd, Canton Township. *E.coli* count of 14,136 MPN/100 ml.
- Site D62A.1 - North Branch Tonquish Creek at Hartsough Street, City of Plymouth. *E.coli* count of 1,112 MPN/100 ml.

Figure 1:2016 IDEP Field Screening Sampling Locations

Site ID	Sites for ARC IDEP follow up upstream of Site G200	Branch	Community
G200.2A	Upstream of Dunhill at Cherry Hill	Lower1	Superior Township
G200.2B	Gotfredson North of Cherry Hill and G200.2B	Lower 1	Superior Township
G200.2C	Godfredson North of Cherry Hill	Lower 1	Superior Township
G200.3A	Napier/Cherry Hill	Lower 1	Canton Township
G220.D	Ford/Gotfredson Rd	Lower 1	Superior Township
	Sites for ARC IDEP follow up upstream of Site L51		
L51	McKinstry Drain	Lower 1	Canton Township
L51A	McKinstry Drain at Sheldon Rd	Lower 1	Canton Township
L51B	McKinstry Drain at Belleville Rd	Lower 1	Canton Township
	Sites for ARC IDEP follow up upstream of Site G94A		
G94A	Sines & Arnold Drain at Beck Rd	Lower 1	Canton Township
G94B	Sines & Arnold at Denton Rd	Lower 1	Canton Township
G94C	Sines & Arnold at Mott Rd	Lower 1	Canton Township
	Sites for ARC IDEP follow up upstream of Site U15B		
U15B	Beitz Drain at Wayne Rd Bicentennial Park	Upper	Livonia
U15B.1	unknown drainage to west of U51B	Upper	Livonia
U15B.2	unknown drainage to north of U51B	Upper	Livonia
	Sites for ARC IDEP follow up upstream of Site D62		
D62D	South Branch Tonquish at JoAnn west of Sheldon Rd	Middle 1	Plymouth Township
D62D.1	South Branch Tonquish at Canton Center west of Sheldon Rd	Middle 1	Plymouth Township
D62A	North Branch Tonquish Creek at ford St	Middle 1	Plymouth
D62A.1.1	North Branch Tonquish Creek at Hartsough	Middle 1	Plymouth

The results of the sampling suggest that future source identification advanced investigations should be focused on areas tributary to sites L51A and D62A.1. Additional monitoring, upstream of sites G94A and D62A is also recommended in further refining areas for future source identification advanced investigations.

Figure 2: Field Screening Sampling Locations Map



Reporting (Task 3)

Written progress summaries of IDEP activities were provided with each quarterly invoice, and this final report summary was prepared for the ARC's Annual Report.

Appendix A
2016 ARC IDEP Source Identification Investigations
City of Plymouth

- Table 1: August 2016 Results
- Table 2: November 2016 Results

TABLE 1
 CITY OF PLYMOUTH
 ARC IDEP
 2016 INVESTIGATIONS
 AUGUST 2016

Number	Date	Time (military)	investigation location	Site Location	Manhole	Inlet	<i>E. coli</i> (MPN/100 mL)	Total coliform (MPN/100 mL)	Ammonia (NH ₃) mg/L	Detergent (ppm)	Conductivity (mS/cm)	Observations	Sanitary Flow Evidence	Water body
1	8/4/2016	8:32	Harvey St	Simpson/Harvey	1	East Inlet	1670	>24196	NA	NA	NA	Flow in main north/south line on Harvey. Sample collected from east inlet. Flow from west inlet	no	Byron Creek
2	8/4/2016	9:35	Harvey St	Simpson/Harvey	1A	West Inlet	>10	657	NA	NA	NA	Flow in main north/south line on Harvey. Sample collected from first manhole upstream from Simpson/Harvey west inlet. Water clear.	no	Byron Creek
3	8/4/2016	NA	Harvey St	Ross	2	Both	NA	NA	NA	NA	NA	East inlet dry. West inlet trace flow from sprinkler. No samples collected	no	Byron Creek
4	8/4/2016	8:50	Harvey St	Hartsough	3A	West Inlet	NA	NA	NA	NA	NA	West inlet trickle flow. Not enough to sample.	no	Byron Creek
5	8/4/2016	8:50	Harvey St	Hartsough	3B	East Inlet	>10	7270	NA	NA	NA	Sample collected in first manhole east of Harvey on Hartsough. Blockage causing a lot of water backed up into manhole.	no	Byron Creek
6	8/4/2016		Harvey St	Palmer	4A	West Inlet	NA	NA	NA	NA	NA	previous sampling and inspection identified saanitary connection on Palmer to the west. (Photo taken)	yes	Byron Creek
7	8/4/2016		Harvey St	Palmer	4B	East Inlet	NA	NA	NA	NA	NA	East inlet dry	no	Byron Creek
8	8/4/2016		Harvey St	Sutherland	5A	West Inlet	NA	NA	NA	NA	NA	West inlet trickle flow. Not enough to sample.	no	Byron Creek
9	8/4/2016		Harvey St	Sutherland	5B	East Inlet	NA	NA	NA	NA	NA	East inlet trickle flow not enough to sample	no	Byron Creek
10	8/4/2016		Harvey St	Carol	6A	West Inlet	NA	NA	NA	NA	NA	West inlet trace flow, not enough to sample	no	Byron Creek
11	8/4/2016		Harvey St	Carol	6B	East Inlet	NA	NA	NA	NA	NA	East inlet dry	no	Byron Creek
12	8/4/2016		Harvey St	Linden	7A	West Inlet	11199	>24196	>0.25	0.25	0.849	Sample collected in first manhole west of Harvey.	no	Byron Creek
13	8/4/2016	9:55	Mill St	Mill	1	West Inlet	>24196	>24196	NA	NA	NA	High flow volume from both west and north inlets	no	Middle Rouge

TABLE 1
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 ARC IDEP
 2016 INVESTIGATIONS
 AUGUST 2016

Number	Date	Time (military)	investigation location	Site Location	Manhole	Inlet	<i>E. coli</i> (MPN/100 mL)	Total coliform (MPN/100 mL)	Ammonia (NH ₃) mg/L	Detergent (ppm)	Conductivity (mS/cm)	Obervations	Sanitary Flow Evidence	Water body
14	8/4/2016	9:50	Mill St	Mill	1	North inlet	12997	>24196	2	1	3.821	High flow volume from both west and north inlets	no	Middle Rouge
15	8/4/2016	10:10	Amelia St.	Ameila 103 Amelia	1	sump	1467	17329	NA	NA	NA	High flow in main line other inlets dry	no	Middle Rouge
16	8/4/2016	10:20	Amelia St.	Ameila 225 at Roe	2	sump	6405	>24196	NA	NA	NA	High flow from west. Catch basins are dry	no	Middle Rouge

TABLE 2
CITY OF PLYMOUTH
ARC IDEP
2016 INVESTIGATION
NOVEMBER 2016

#	Date	Time (military)	investigation location	Site Location	Manhole	Inlet	<i>E. coli</i> (MPN/100 mL)	Total coliform (MPN/100 mL)	Ammonia (NH ₃ mg/L)	Detergent (ppm)	Temp Degrees Celsius	Conductivity (mS/cm)	Observations	Sanitary Flow Evidence	Water body
1	11/11/2016	11:10	Simpson East 1	first manhole upstream of Simpson/Harvey	1		10	>24196	0	>0.25	13.2	0.747	Sampled at manhole outlet. Slight flow from east due to home construction site dewatering upstream	No	Byron Creek
2	11/11/2016	11:35	Simpson East 2	second manhole upstream of Simpson/Harvey	2		20	>24196	0	0.25	13.7	0.781	Sampled at manhole west inlet. Slight flow from south inlet due to home construction site dewatering	No	Byron Creek
3	11/11/2016	11:25	Simpson East 3	918 Simpson	3		NA	NA	NA	NA	NA	NA	No sample collected due to very low flow present	No	Byron Creek
4	11/11/2016	11:40	Simpson East 4	844 Simpson	4		NA	NA	NA	NA	NA	NA	No sample collected due to very low flow present	No	Byron Creek
5	11/11/2016	11:45	Linden West	Linden/Harvey	1		20	4884	NA	NA	15.1	0.952	Sampled at west inlet	No	Byron Creek
6	11/11/2016	12:00	Linden West 2	Linden/Jener	2		11199	>24196	0	0.25	15.1	0.955	Sampled at the manhole outlet	No	Byron Creek
7	11/11/2016	12:10	Linden West 2	Linden/Jener	2	1	107	>24196	NA	NA	NA	NA	Inlet from south catch basin inlet sampled. Intermittent flow from catch basin probably from sump pump. Asphalt repair at 1065 Linden downstream of this manhole	No	Byron Creek
8	11/11/2016	12:15	Linden West 2	Linden/Jener	2	2	6488	>24196	NA	NA	NA	NA	inlet from Jener Street (north side of manhole)	No	Byron Creek
9	11/11/2016	12:30	Jener North 1	650 Jener	1	sump	<10	5794	0	0.25	15.5	0.994	active flow from upstream. First manhole upstream of the Jener/Linden intersection. Catch basin inlets are dry	No	Byron Creek
10	11/11/2016	14:05	Amelia/Mill	141 N. Mill	1	sump	1529	2909	0	0.25	17.5	2.031	high flow in manhole. Inlet on northwest corner has trickle flow and black/with white film. Sewage odor present	Odor/film	Middle Rouge

TABLE 2
 CITY OF PLYMOUTH
 ARC IDEP
 2016 INVESTIGATION
 NOVEMBER 2016

#	Date	Time (military)	investigation location	Site Location	Manhole	Inlet	<i>E. coli</i> (MPN/100 mL)	Total coliform (MPN/100 mL)	Ammonia (NH ₃ mg/L)	Detergent (ppm)	Temp Degrees Celsius	Conductivity (mS/cm)	Observations	Sanitary Flow Evidence	Water body
11	11/11/2016	14:15	Amelia Street	Amelia/Rose	2		NA	NA	NA	NA	17.3	1.2183	Inlets from west and east dry. Flow is from north. Strong musty odor present, air warm in manhole. Sample not collected as no inlets contributing flow to manhole	No	Middle Rouge
12	11/11/2016	14:30	Amelia Street	Amelia/Main	3	sump	41	5172	NA	NA	NA	NA	<i>E. coli</i> sample only. Two inlets from Main Street with clear flow	No	Middle Rouge
13	11/11/2016	14:45	Amelia Street	Amelia (between Blanche and Main)	4		NA	NA	NA	NA	NA	NA	Moderate flow no odors, water clear. No sample collected	No	Middle Rouge
14	11/11/2016	14:50	Amelia Street	Amelia/Blanche	5	sump	30	631	0	0.25	NA	1.778	Moderate flow in manhole from north. Trickle flow from catch basin inlets. Small inlet from southeast has unusual discharge and musty odor.	No	Middle Rouge
15	11/11/2016	15:00	Amelia Street	Amelia/Farmer	6	sump	546	1081	0	>0.25	NA	1.76	No odors, warm ambient air in manhole. Sanitary sewer passes through this manhole	No	Middle Rouge
16	11/11/2016	15:05	Amelia Street	Amelia/Spring	7		NA	NA	NA	NA	NA	NA	Moderate low level flow in manhole. Clear flow from west inlet. All other inlets are dry. No sample collected flow level too low	No	Middle Rouge
17	11/11/2016	15:15	Amelia Street	Amelia/Liberty	8		NA	NA	NA	NA	NA	NA	No sample collected flow level too low. Trickle clear flow from two catch basin inlets	No	Middle Rouge

Appendix B
2016 ARC IDEP Field Screening

Data Table

2016 Water Quality Data
ARC IDEP

Site ID	Site Description	Date	Time	Dissolved Oxygen (mg/L)	Conductivity (mS/cm)	Water Temperature (°C)	<i>E. coli</i> (MPN)	Total Coliforms (MPN)	Watershed	Community	Water Clarity	Water Color	Odor	Visible Debris/Pollution	Precipitation	Comments
L51	McKinstry Drain/Michigan Ave	11/14/16	11:45	14.61	0.797	7.6	20	1850	Lower	Canton Township	Clear	Clear	None/Natural	None	None	Low flow, water clear, no outfall flow
L51A	Fisher-Leng Drain (McKinstry Drain tributary) /Sheldon Rd	11/14/16	12:00	11.36	0.676	6.9	14136	14136	Lower	Canton Township	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	The branch sampled was the Fisher/Lenge Drain, a tributary of the McKinstry. Low flow in drain. No outfall flow
L51B	McKinstry/Van Born Rd	11/14/16	12:20	NA	NA	NA	NA	NA	Lower	Canton Township	NA	NA	NA	NA	None	Drain overgrown with phragmites, too dry and no flow
G94A	Sines Drain/Beck Rd	11/14/16	12:30	11.32	0.854	5.1	97	908	Lower	Canton Township	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	logjam, rocks, no flowing outfalls
G94A.1	Sines Drain/Denton Rd	11/14/16	12:45	7.92	0.97	5.3	384	1081	Lower	Canton Township	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	clear, low flow, no flowing outfalls
G94A.2	Sines Drain/Mott Rd	11/14/16	12:55	6.87	1.004	6.5	121	1198	Lower	Canton Township	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	clear, low flow
G200.2	Parks Drain Dunhill Way and Hauk	11/14/16	13:15	14.35	0.538	4.6	74	1076	Lower	Canton Township	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	clear, low flow
G200.2A	Parks Drain/Cherry Hill	11/14/16	13:25	15.1	0.514	5.5	187	1664	Lower	Superior Township	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	clear low flow replicate taken here
G200.1A	Napier Rd/ Lower Rouge	11/14/16	13:40	9.35	0.614	7.7	30	748	Lower	Superior Township	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	clear, low flow
G200D	Ford/Gotfredson Rd Lower Rouge	11/14/16	13:50	13.43	0.62	7	73	1314	Lower	Superior Township	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	clear, low flow woody debris present
G200.2B	Parks Drain/ Gotfredson Rd	11/14/16	14:05	12.23	0.544	6.3	52	1904	Lower	Superior Township	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	clear, low flow
D62D.1	Canton Center/South BrTonquish Creek	11/15/16	11:00	12.79	0.717	6.7	10	620	Middle	Plymouth Township	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	clear, low flow large outfall flowing stormwater
D62D	JoAnn/South Br Tonquish Creek	11/15/16	11:15	12.06	0.702	6.7	146	2282	Middle	Plymouth Township	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	clear, medium flow
D62A.1	Hartsough/North Br Tonquish Creek	11/15/16	11:25	12.23	1.585	8.1	1112	14136	Middle	Plymouth City	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	clear, medium flow
D62A	Ford St/North Br Tonquish Creek	11/15/16	11:35	12.01	1.606	8.2	717	5475	Middle	Plymouth City	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	clear, medium flow
U15B	Bicentennial Park/Beitz Drain	11/15/16	12:00	3.91	0.628	6.6	41	650	Upper	Livonia	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	clear, low flow
U15B1	West Drainage upstream of U15B	11/15/16	12:10	1.13	0.624	6	20	810	Upper	Livonia	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	very low flow almost stagnant, natural sheen on wter from decaying leaves
U15B2	North Drainage upstream of U15B	11/15/16	12:15	NA	NA	NA	NA	NA	Upper	Livonia	NA	NA	None/Natural	Natural (leaves, limbs, weeds)	None	drainage is dry, no flow or water present. No sample