

RACER Trust

# PFOS Discharge Point Prioritization

**Buick City, Flint, Michigan**

January 27, 2026

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## Acronyms and Abbreviations

ACO	administrative consent order
ArcGIS	Arc Geographic Information System
DP	Discharge Point
g/yr	grams per year
ICAP	Interim Corrective Action Plan
LiDAR	Light Detection and Ranging
MAWN	Michigan Automated Weather Network
ng/L	nanograms per liter
NLCD	National Land Cover Database
NRCS	National Resources Conservation Service
PFOS	perfluorooctanesulfonic acid
SCS	Soil Conservation Service
the Site	the Buick City Site located in Flint, Michigan
USDA	United States Department of Agriculture

# 1 Introduction

This report summarizes the evaluation completed to prioritize the perfluorooctanesulfonic acid (PFOS) impacts associated with the 15 storm sewers servicing the Buick City Site (the Site) with Discharge Points (DPs or outfalls) to the Flint River located in Flint, Michigan (**Figure 1**).

# 2 Prioritization Overview

The DPs are prioritized based on the current PFOS mass discharge. The PFOS mass discharge is calculated using both the dry and wet weather sample data collected since the modification to that storm sewer was completed. The development of the DP Priority List includes data collected from all discharge characterization activities conducted at the Site including the most recent sampling event for each outfall conducted in 2025. This prioritization evaluation is used to support estimation of PFOS mass loading reductions as described in Paragraph 3.9 of the Administrative Consent Order between EGLE Water Resources Division and RACER (ACO).

Dry weather PFOS mass discharge was calculated using base flow rates measured at each outfall during dry weather conditions. In order to calculate wet weather PFOS mass discharge, a stormwater runoff analysis (Section 3) was completed to determine the annual stormwater runoff volumes for each drainage area. This information was then used to calculate the annual wet weather flow volumes which, in combination with dry weather discharge, was used (in combination with the PFOS sampling data) to calculate the annual PFOS mass discharge for each drainage area.

Note that the mass discharge calculations presented in this report are based on concentration and flow data collected at the outfall where it discharges to the Flint River. In most cases, as the drainage areas extend both upgradient and downgradient of the Buick City site, there is the potential for non-RACER related sources to contribute PFOS to each outfall. At this time, potential non-RACER related sources have not been considered in the discharge calculations. As corrective actions are completed and more data is collected, non-RACER related contributions will be evaluated, as appropriate. If non-RACER related contributions are identified and quantified, the mass loading calculations presented herein would be corrected for these contributions.

# 3 Stormwater Runoff Analysis

The TR-55 Urban Hydrology for Small Watersheds Soil Conservation Service (SCS) Runoff Curve Number Method published by the USDA and NRCS was used to develop approximate the annual stormwater runoff volumes and determine the average annual wet weather durations for 15 stormwater outfalls (001, 002, 003, 004, 004A, 005, 005A, 006, 007, 007A, 008, 010, 011, 012, and 013) to the Flint River.

## 3.1 Rainfall

Rainfall data from the Flint, MI weather station at the Applewood Estate collected through Enviro-Weather formerly Michigan Automated Weather Network (MAWN) was used to complete the analysis. The weather station is located approximately 2 miles southeast of the Site. The rainfall data for complete years 2013-2024 was utilized for the analysis. The rainfall data was reviewed to determine individual wet-weather events assuming an inter-

event period of 6 hours (i.e. a minimum of 6 hours was required between wet weather events to qualify as a separate event when calculating runoff volumes). Average annual rainfall statistics are provided in **Appendix A**.

This analysis determined that the annual average wet weather duration was 720 hours over the timeframe evaluated. The remainder of the year is considered dry weather, therefore the annual average dry weather duration is 8040 hours.

## 3.2 Hydrology

The hydrologic information for the 15 outfall locations was gathered from several sources. The drainage area to each outfall was based on Genesee County Light Detection and Ranging (LiDAR) elevation data, available stormwater network connectivity, and historic knowledge of the site. **Figure 1** shows the drainage area boundaries developed in Arc Geographic Information System (ArcGIS) software. The SCS runoff curve number method requires a composite runoff curve number in addition to the drainage area in order to calculate stormwater runoff volume. The composite curve number value is based on hydrologic soil group, land cover type, and percent impervious. The National Resources Conservation Service (NRCS) soil survey was used to determine the soil type and corresponding hydrologic soil group, A, B, C or D. The 2024 National Land Cover Database (NLCD) was used to assign land use and percent impervious values at the Site. **Figure 2** shows the land cover assignments in the Outfall drainage areas. . The land cover types used in the NLCD are converted to TR-55 cover types based on the cover description and the percent impervious. The runoff curve numbers applicable to the drainage areas are summarized in **Table 1** and presented on **Figure 3**.

The SCS Runoff equation, Equation 1, was used to determine the approximate stormwater runoff volume for each wet-weather event during the 2013-2024 period.

### Equation 1: SCS Runoff Equation

$$\text{Runoff Volume} = A * (P - 0.2*S)^2 / (P + 0.8*S)$$

$$S = (1000 / CN) - 10$$

A = Tributary Area

P = Precipitation

S = Potential Maximum Retention after Runoff Begins

CN = Runoff Curve Number

The approximate calculated annual runoff volume for the 15 outfalls is provided in **Appendix A**. The calculated stormwater runoff volumes were determined based on several conservative assumptions. The entire drainage area is assumed to be directly connected to the outfall piping (with the exception of areas identified as having no direct connection as shown of **Figures 1 through 3**) although confirmation of all connections from the off-site properties has not been verified. The drainage areas extend to the edge of the Flint River potentially including areas that may flow overland to the river. The approach to the high-level stormwater runoff analysis made conservative assumptions which can lead to slight overprediction of the stormwater runoff volumes but avoids the potential for underprediction. The average annual stormwater runoff volume was used to determine the approximate PFOS loading to the Flint River.

## 4 Establishing Current Annual Flow Volumes

### 4.1 Annual Dry Weather Flow Volume

Thirteen of the 15 Site storm sewers have groundwater infiltration which results in a continuous dry weather flow (also known as baseflow). The dry weather flows at the Site storm sewers have been determined using one of the following methods: 1) volumetric capture at the discharge point, 2) measuring flow at manholes using flow meters (discrete events or flow studies), or 3) estimating flow based on outfall diameter and visual observations. Dry weather flow measurements have been collected at the storm sewers multiple times during the last six years as part of Site investigation activities.

The dry weather flows used for prioritization are primarily from the most recent (2023 and/or 2025) volumetric capture data as it is the most accurate method and reflects current Site conditions. However, due to the conditions at some outfalls volumetric capture was not possible; therefore, flow meter data and/or estimated flows are used as noted in **Table 2**. Moving forward, a consistent flow measurement methodology will be employed to estimate flows at each outfall. The methodology will be consistent for each outfall (not necessarily across all outfalls) and will be based on the outfall diameter, construction, access, and flow conditions and is summarized on **Table 2**.

The annual dry weather flow volume for each drainage area is determined by calculating the dry weather flow that occurs during average dry weather duration of 8040 hours. A summary of the annual dry weather flow volumes for each outfall is presented on **Table 2**.

### 4.2 Annual Wet Weather Flow Volume

The annual wet weather flow volume is calculated by adding the annual stormwater runoff volume for the drainage area (**Appendix A**) to the baseflow (where it exists) during the average annual wet weather duration of 720 hours. A summary of the annual wet weather flow volumes for each outfall is presented on **Table 2**.

## 5 Determining Current PFOS Concentration

The concentrations used to calculate the dry and wet weather PFOS mass loading were determined by evaluating the available dataset for each DP in conjunction with timeline of modifications made to the storm sewer. As part of ongoing Site remediation activities, numerous modifications to Site storm sewers have been completed in recent years. These activities include installing plugs and bulkheads in sewers, rerouting storm sewers, taking treatment systems offline, and filling onsite manhole structures that may connect to sewer mains. These changes to the storm sewer systems have changed the PFOS concentrations at the DP. **Table 2** presents a summary of the most recent sewer modifications that occurred during the period where PFOS samples were collected from each outfall.

At outfalls where modifications have been completed only the samples collected since the most recent modification were evaluated to determine the current mass loading. However, at outfalls where no samples have been collected since the modifications were complete or where no modifications were made, the most recent sample was used. In the event that multiple dry weather samples were collected since the modifications were completed the data set was evaluated to determine whether using the most recent sample or an average of the

samples is more appropriate. When multiple wet weather samples were collected since modifications were completed, the average of the samples was used due to the variation in the amount of precipitation during wet weather events.

## 6 Mass Loading Analysis

The dry and wet weather samples being used for the PFOS mass loading calculations are presented on **Table 2** and are summarized below.

### 6.1 Outfall 001

No modifications have been made to the Outfall 001 storm sewer since 2018 when PFOS discharge characterization began at the Site. Two dry weather samples were collected from April 2019 to August 2025 and PFOS concentrations ranged from 30 ng/L to 30.6 ng/L. Three wet weather samples were collected from April 2019 to October 2025 and concentrations of PFOS ranged from 7.9 ng/L to 30 ng/L with the most recent sample detecting PFOS at a concentration of 21.2 ng/L. Based on the variability in the sampling data, sample averages were used to determine current PFOS mass loadings at Outfall 001.

The annual dry weather PFOS mass loading is 4.4 grams per year (g/yr) and the annual wet weather mass loading is 2.4 g/yr. The total annual PFOS mass loading at the Outfall 001 DP is currently 6.8 g/yr.

### 6.2 Outfall 002

Modifications were made to the Outfall 002 storm sewer between May 2020 and April 2022. In 2020, Site storm sewer reroute activities were completed which rerouted a portion of the Outfall 003 drainage area into the Outfall 002 storm sewer. On April 21, 2022 grout was injected at a manhole due to infiltration at a connection joint. Five dry weather samples were collected post modifications, from April 2022 to August 2025 and concentrations ranged from 21 ng/L to 1,100 ng/L with the most recent sample detecting PFOS at a concentration of 1,100 ng/L. Due to increasing trends, the most recent PFOS concentration was used to determine the current dry weather PFOS mass loading at Outfall 002. One wet weather sample was collected post modifications in October 2025 at a PFOS concentration of 44.3 ng/L.

The annual dry weather PFOS mass loading is 16 g/yr and the annual wet weather mass loading is 5.73 g/yr. The total annual PFOS mass loading at the Outfall 002 DP is currently 22 g/yr.

### 6.3 Outfall 003

Modifications were made to the Outfall 003 storm sewer from May 2020 to 2025. In 2020 six bulkheads/plugs were installed as part of Site storm sewer reroute activities to eliminate LNAPL migration, reduce hydraulic pressure in the abandoned portions, and eliminate cross connections. In February 2023, the oil interceptor #2 was decommissioned. Ashley made additional modifications to Outfall 003 in 2025. One dry weather sample was collected post modifications in August 2025 at a PFOS concentration of 45.8 ng/L. One wet weather sample was collected post modifications in October 2025 at a PFOS concentration of 40.3 ng/L.

The annual dry weather PFOS mass loading is 6.27 g/yr and the annual wet weather mass loading is 6.66 g/yr. The total annual PFOS mass loading at the Outfall 003 DP is currently 12.9 g/yr.

## 6.4 Outfall 004

Modifications were made to the Outfall 004 storm sewer in April of 2022 when the Outfall 003/004 treatment system was decommissioned. Three dry weather samples were collected post modifications, from July 2022 to August 2025 and concentrations of PFOS ranged from 6.9 ng/L to 35 ng/L with the most recent sample detecting PFOS at a concentration of 29.5 ng/L. Based on the variability in the concentrations, the average concentration was used to determine current dry weather PFOS mass loading at Outfall 004. One wet weather sample was collected post modifications in October 2025 at a PFOS concentration of 19.6 ng/L.

The annual dry weather PFOS mass loading is 1.18 g/yr and the annual wet weather mass loading is 0.340 g/yr. The total annual PFOS mass loading at the Outfall 004 DP is currently 1.52 g/yr.

## 6.5 Outfall 004A

No modifications have been made to the Outfall 004A storm sewer. One dry weather sample was collected in December 2023 at a PFOS concentration of 19 ng/L. Three wet weather samples were collected from June 2019 to October 2025 and concentrations of PFOS ranged from 9.76 ng/L to 46 l ng/L (l lab qualifier indicates there was matrix interference with the internal standard) with the most recent sample detecting PFOS at a concentration of 9.76 ng/L. Based on the variability in the concentrations, the average concentration was used to determine the current wet weather PFOS mass loading at Outfall 004A.

The annual dry weather PFOS mass loading is 0.17 g/yr and the annual wet weather mass loading is 0.064 g/yr. The total annual PFOS mass loading at the Outfall 004A DP is currently 0.24 g/yr.

## 6.6 Outfall 005

No modifications have been made to the Outfall 005 storm sewer. Nine dry weather samples were collected from November 2018 to August 2025 and PFOS concentrations ranged from 22 ng/L to 56.8 ng/L with the most recent sample detecting PFOS at 56.8 ng/L. Four wet weather samples were collected from June 2019 to October 2025 and concentrations of PFOS ranged from 19.9 ng/L to 51 ng/L with the most recent sample detecting PFOS at a concentration of 19.9 ng/L. Based on the variability in concentrations, average concentrations were used to determine current PFOS mass loadings at Outfall 005.

The annual dry weather PFOS mass loading is 0.95 g/yr and the annual wet weather mass loading is 1.7 g/yr. The total annual PFOS mass loading at the Outfall 005 DP is currently 2.6 g/yr.

## 6.7 Outfall 005A

No modifications have been made to the Outfall 005A storm sewer since 2018 when PFOS discharge characterization began at the Site. Two dry weather samples were collected in December 2023 and August 2025 and PFOS concentrations ranged from 5.58 ng/L to 14 ng/L with the most recent sample detecting PFOS at a concentration of 5.58 ng/L. Two wet weather samples were collected in April 2019 and October 2025 and PFOS concentrations ranged from < 1.9 ng/L to 9.36 ng/L with the most recent sample detecting PFOS at a

concentration of 9.36 ng/L. Based on the variability in concentrations, average concentrations were used to determine current PFOS mass loadings at Outfall 005A.

The annual dry weather PFOS mass loading is 0.20 g/yr and the annual wet weather mass loading is 0.073 g/yr. The total annual PFOS mass loading at the Outfall 005A DP is currently 0.27 g/yr.

## 6.8 Outfall 006

Modifications have been made to the Outfall 006 storm sewer in December of 2022 when four plugs/ physical disconnections were completed at manholes to address the Site's contribution of metals and PFAS impacts identified in the storm sewer. One dry weather sample was collected post modifications in December 2023 at a PFOS concentration of 150 ng/L. No wet weather samples were collected post modifications, therefore baseline pre modification wet weather PFOS data was used. Two baseline wet weather samples were collected in April 2019 and October 2019 and PFOS concentrations ranged from 11 ng/L to 106 ng/L with the most recent sample detecting PFOS at a concentration of 106 ng/L. Based on the variability in concentrations, average concentrations were used to determine the baseline wet weather PFOS mass loading at Outfall 006.

The annual dry weather PFOS mass loading is 2.2 g/yr and the annual wet weather mass loading is 1.1 g/yr. Wet weather mass loading is based on baseline wet weather PFOS concentrations (with the current drainage area and 2025 wet weather flow) since no current PFOS data is available. The total annual PFOS mass loading at the Outfall 006 DP is currently 3.3 g/yr.

## 6.9 Outfall 007

Modifications have been made to the Outfall 007 storm sewer in December of 2022 when a plug/ physical disconnection was found leaking and a physical disconnection was completed immediately west of the plug. Three dry weather samples were collected post modifications from January 2023 to August 2025 and PFOS concentrations ranged from 86 ng/L to 990 ng/L with the most recent sample detecting PFOS at a concentration of 86 ng/L. Based on the variability in concentrations, average concentrations were used to determine current dry weather PFOS mass loading at Outfall 007. One wet weather sample was collected post modifications in October 2025 at a PFOS concentration of 752 ng/L.

The annual dry weather PFOS mass loading is 2.3 g/yr and the annual wet weather mass loading is 0.95 g/yr. The total annual PFOS mass loading at the Outfall 007 DP is currently 3.3 g/yr.

## 6.10 Outfall 007A

No modifications have been made to the Outfall 007A storm sewer. No dry weather samples were collected due to no flow being present at Outfall 007A during dry weather conditions. Two wet weather samples were collected in May 2021 and June 2021 and PFOS concentrations ranged from < 2.1 ng/L to 3.3 ng/L with the most recent sample detecting PFOS at a concentration of 3.3 ng/L. Based on the variability in concentrations, average concentrations were used to determine current wet weather PFOS mass loading at Outfall 007A.

The annual dry weather PFOS mass loading is 0 g/yr and the annual wet weather mass loading is 0.008 g/yr. The total annual PFOS mass loading at the Outfall 007A DP is currently 0.008 g/yr.

## 6.11 Outfall 008

Modifications have been made to the Outfall 008 storm sewer in December of 2022 when a plug/ physical disconnection was completed in a lateral as part of Site PFAS investigation activities to minimize the Site's contribution to the storm sewer. No dry or wet weather samples were collected post modifications due to no flow being present at Outfall 008. Outfall 008 currently has a half inch of sediment in the discharge pipe, when the sediment has been removed the outfall will be reassessed for flow.

The annual dry weather PFOS mass loading is 0 g/yr and the annual wet weather mass loading is 0 g/yr. The total annual PFOS mass loading at the Outfall 008 DP is currently 0 g/yr.

## 6.12 Outfall 010

Modifications have been made to the Outfall 010 storm sewer from May 2021 to September 2021. On May 19, 2021 a manhole was filled with concrete and on September 14, 2021 a bulkhead was installed. Seven dry weather samples were collected post modifications from September 2021 to August 2025 and PFOS concentrations ranged from 550 ng/L to 4,900 ng/L with the most recent sample detecting PFOS at a concentration of 3,600 ng/L. Based on the variability in concentrations, average concentrations were used to determine current dry weather PFOS mass loading at Outfall 010. One wet weather sample was collected post modifications in October 2025 at a PFOS concentration of 2,030 ng/L.

The annual dry weather PFOS mass loading is 40 g/yr and the annual wet weather mass loading is 13.8 g/yr. The total annual PFOS mass loading at the Outfall 010 DP is currently 54 g/yr.

## 6.13 Outfall 011

Modifications have been made to the Outfall 011 storm sewer from June 2020 to January 2022. In 2020 and 2021 five bulkheads/ plugs were completed in laterals to address PFAS impacts and infiltration into the Outfall 011 storm sewer. In 2022 a bulkhead was installed where Outfall 009 discharges into a vault to address PFAS impacted discharge. Five dry weather samples were collected post modifications from February 2023 to August 2025 and PFOS concentrations ranged from 4,000 ng/L to 79,000 ng/L with the most recent sample detecting PFOS at a concentration of 14,900 ng/L. Based on the variability in concentrations, average concentrations were used to determine current dry weather PFOS mass loading at Outfall 011. One wet weather sample was collected post modifications in October 2025 at a PFOS concentration of 1,660 ng/L.

The annual dry weather PFOS mass loading is 1,023 g/yr and the annual wet weather mass loading is 37.9 g/yr. The total annual PFOS mass loading at the Outfall 011 DP is currently 1,061 g/yr.

## 6.14 Outfall 012

No modifications have been made to the Outfall 012 storm sewer. Three dry weather samples were collected from March 2021 to August 2025 and PFOS concentrations ranged from 12 ng/L to 23.6 ng/L with the most recent sample detecting PFOS at a concentration of 23.6 ng/L. Due to increasing trends, the most recent PFOS concentrations were used to determine current dry weather PFOS mass loading at Outfall 012. Three wet weather samples were collected from March 2021 to October 2025 and PFOS concentrations ranged from 6.5 ng/L to 15

ng/L with the most recent sample detecting PFOS at a concentration of 15 ng/L. Based on the variability in concentrations, average concentrations were used to determine current wet weather PFOS mass loading at Outfall 012.

The annual dry weather PFOS mass loading is 1.08 g/yr and the annual wet weather mass loading is 0.21 g/yr. The total annual PFOS mass loading at the Outfall 012 DP is currently 1.3 g/yr.

## 6.15 Outfall 013

Modifications have been made to the Outfall 013 storm sewer from June 2020 to September 2021. In June 2020 a manhole was bulkheaded to address PFAS impacts in the storm sewer. The bulkhead leaked after construction and a physical lateral disconnection was then completed just north of the bulkhead in September 2021. Two dry weather samples were collected post modifications from December 2023 to August 2025 and PFOS concentrations ranged from 740 ng/L to 1,150 ng/L with the most recent sample detecting PFOS at a concentration of 1,150 ng/L. Due to increasing trends, the most recent PFOS concentration was used to determine PFOS mass loading at Outfall 013. One wet weather sample was collected post modifications in October 2025 at a PFOS concentration of 96.4 ng/L.

The annual dry weather PFOS mass loading is 141 g/yr and the annual wet weather mass loading is 11.5 g/yr. The total annual PFOS mass loading at the Outfall 013 DP is currently 152 g/yr.

## 7 Outfall Prioritization

**Table 2** presents the prioritization of the outfalls based on the current annual PFOS mass loading to the Flint River.

The ICAP will be prepared to address meeting the loading reductions for the Site as required by Paragraph 3.9 of the ACO consent order.

# Tables

Table 1  
 Runoff Curve Numbers  
 RACER Trust  
 Buick City  
 Flint, Michigan



Cover Description			Curve Numbers for Hydrologic Soil Groups						
Cover Type	Hydraulic Condition	Average Percent Impervious	A	B	C	D	B/C	B/D	C/D
Woods	Fair	--	36	60	73	79	66.5	69.5	76
Wetland - Woods	Poor	--	45	66	77	83	71.5	74.5	80
Open space	Fair	--	49	69	79	84	74	76.5	81.5
Urban - Commercial and Business	--	85	89	92	94	95	93	93.5	94.5
Urban - Industrial	--	72	81	88	91	93	89.5	90.5	92
Residential 1/8ac	--	65	77	85	90	92	87.5	88.5	91
Residential 1/4ac	--	38	61	75	83	87	79	81	85
Residential 1/3ac	--	30	57	72	81	86	76.5	79	83.5
Residential 1/2ac	--	25	54	70	80	85	75	77.5	82.5
Residential 1ac	--	20	51	68	79	84	73.5	76	81.5
Residential 2ac	--	12	46	65	77	82	71	73.5	79.5
Open Water	--	--	100	100	100	100	100	100	100
Dirt	Impervious Areas	--	72	82	87	89	84.5	85.5	88

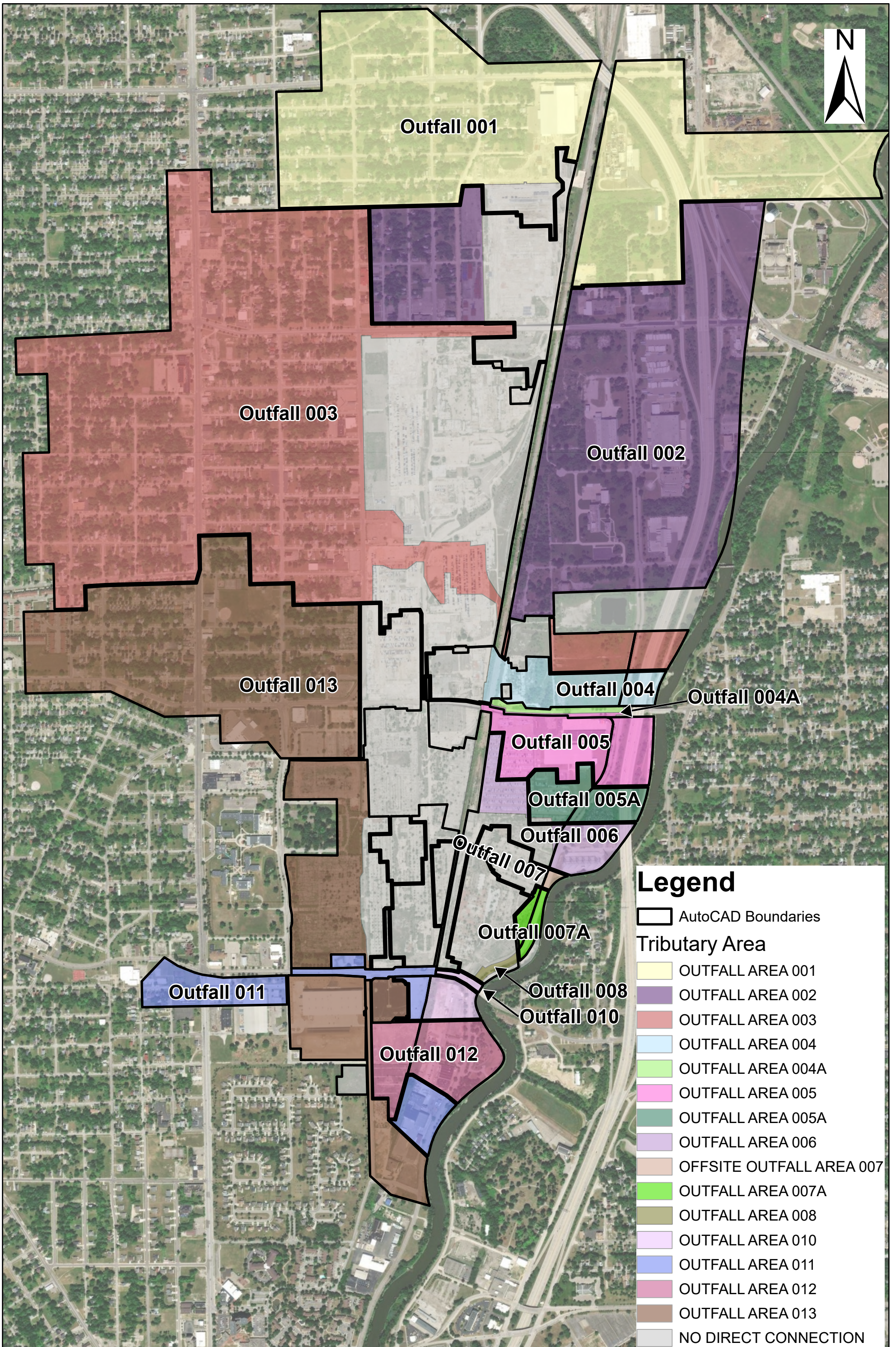
Source: *Urban Hydrology for Small Watersheds TR-55, 1986*

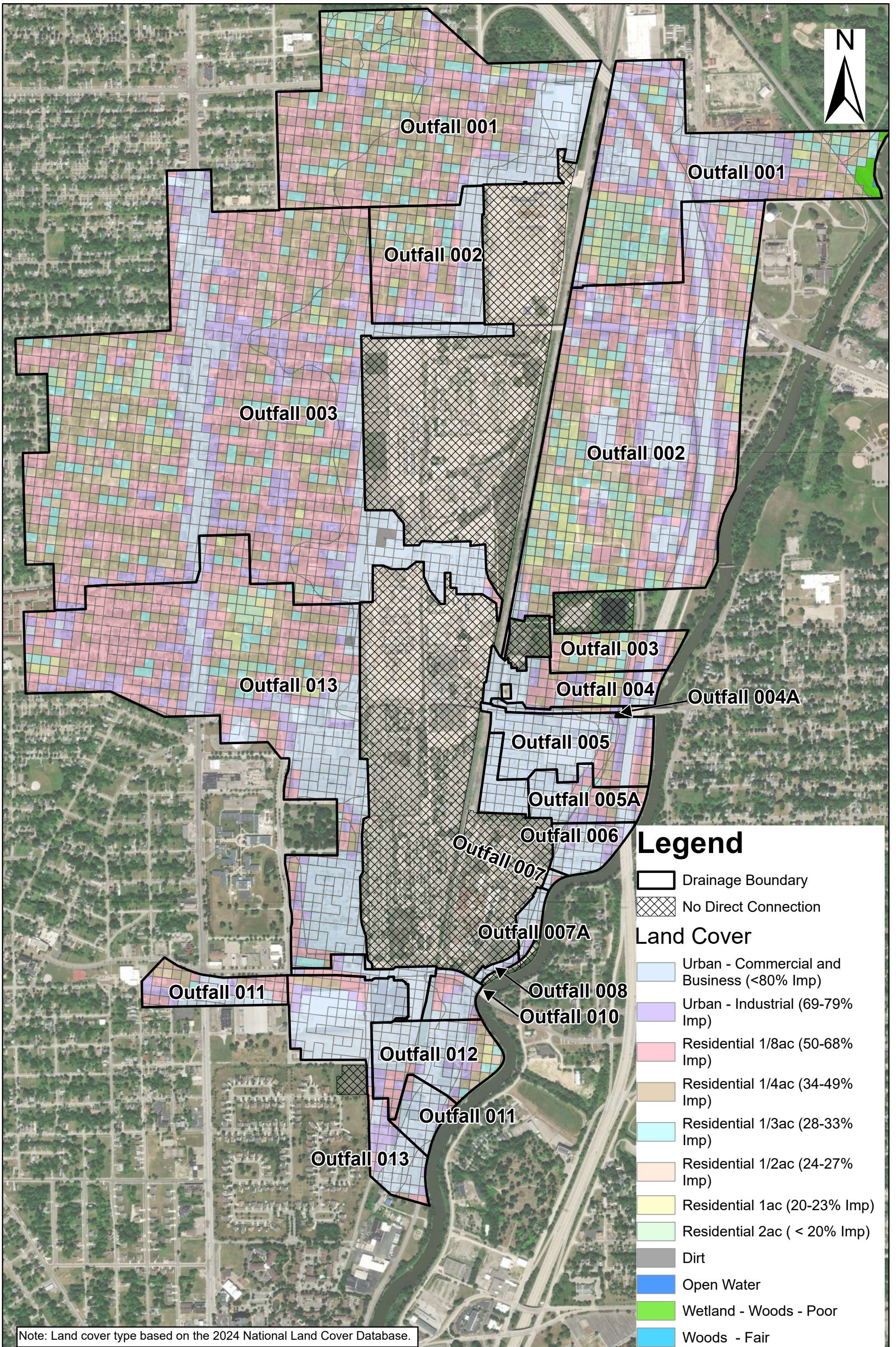
**Table 2**  
**Current Discharge Point Prioritization Data**  
**RACER Trust**  
**Buick City**  
**Flint, Michigan**

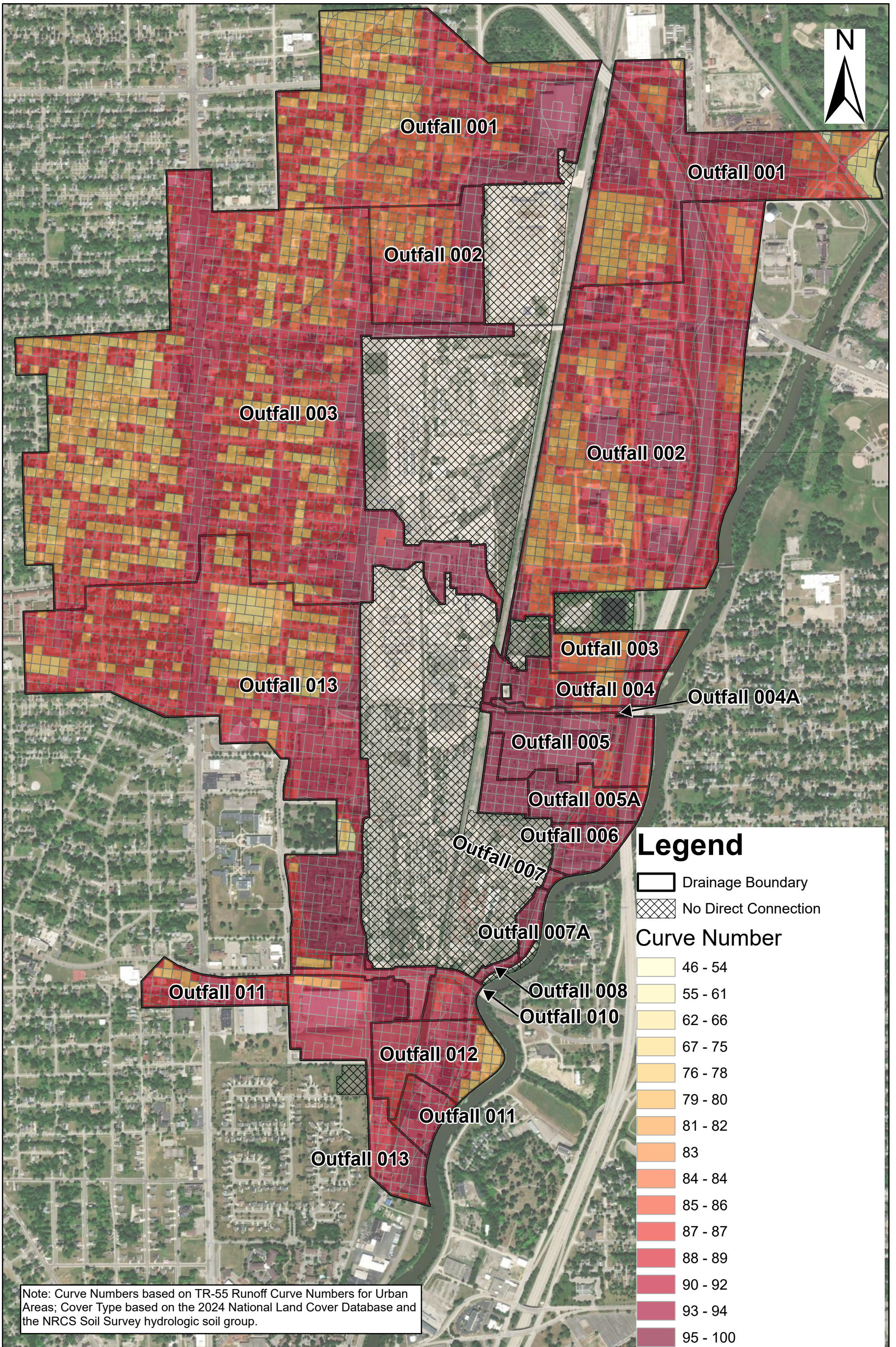


Ranking	Outfall	Dry/Wet	Flowrate (gpm)	Flowrate Year and Collection Method	Planned Flow Collection Method	PFOS Conc. Range (ng/L)	Selected PFOS	Conc. PFOS (ng/L)	Flow Rate (gal/yr)	Annual PFOS Loading (g/yr)	Total PFOS Mass Loading (g/yr)	Modification Notes
1	011	Dry	20	2023 calc./ 2024 flow study	bucket or equation	4,000-79,000	average	28,000	9,648,000	1,023	1,061	Modifications 6/2020 to 1/18/2022 (6/2020 plugs installed, 9/13/21 plugs installed, 12/6/21 plugs installed, 1/18/22 outfall 009 bulkheaded)
		Wet	--	--	--	--	one sample	1,660	6,034,296	37.9		
2	013	Dry	67	2022 flow meter	channel & bucket or equation	740-1,150	recent, increasing	1,150	32,320,800	141	152	Modification 6/26/2020 to 9/26/2021 (6/26/2020 bulkhead, 9/26/21 lateral disconnection)
		Wet	--	--	--	--	one sample	96.4	31,463,774	11.5		
3	010	Dry	10	estimate (sediment present)	equation	550-4,900	average	2,200	4,824,000	40	54	Modifications 5/19/2021 to 9/14/2021 (5/19/2021 MH filled with concrete, 9/14/21 MH bulkhead installed)
		Wet	--	--	--	--	one sample	2,030	1,795,245	13.8		
4	002	Dry	8	2025 sand bag channel & bucket	channel & bucket	21-1,100	recent, increasing	1,100	3,859,200	16	22	Modification 5/2020 to 4/20/2022 (storm sewer reroute)
		Wet	--	--	--	--	one sample	44.3	34,180,026	5.73		
5	003	Dry	75	2025 bucket	bucket	--	one sample	45.8	36,180,000	6.27	12.9	Modifications 5/2020 to 2025 (5/17/21 reroute complete, 6/14/22 plug installed, 2/2/23 oil interceptor #2 decommissioned, 2025 Ashley property modifications)
		Wet	--	--	--	--	one sample	40.3	43,689,297	6.66		
6	001	Dry	81	Dec. 2025 weir & bypass est.	equation	30-30.6	average	30	39,074,400	4.4	6.8	No modifications.
		Wet	--	--	--	--	7.9-30	average	20	31,475,529		
7	006	Dry	8	2022 bucket	quikrete channel & bucket	--	one sample	150	3,859,200	2.2	3.3 (utilizing baseline wet sample)	Modification 12/21/2022 (lateral disconnection)
		Wet	--	--	--	NA	average-baseline	59-baseline	4,826,240	1.1		
8	007	Dry	3.2	2023 bucket	weir & bucket	86-990	average	400	1,543,680	2.3	3.3	Modification 12/2022 (bulkhead repair)
		Wet	--	--	--	--	one sample	752	332,540	0.95		
9	005	Dry	14	2025 channel & bucket	channel & bucket	22-57	average	37	6,753,600	0.95	2.6	No modifications.
		Wet	--	--	--	19.9-111	average	55	8,066,893	1.7		
10	004	Dry	27	2025 bucket	bucket	6.9-35	average	24	13,024,800	1.18	1.52	Modification 4/5/2022 to 4/28/2022 (Outfall 003/004 treatment system decommissioned)
		Wet	--	--	--	--	one sample	19.6	4,576,338	0.340		
11	012	Dry	25	2023 bucket	channel & bucket	12-23.6	recent, increasing	23.6	12,060,000	1.08	1.3	No modifications.
		Wet	--	--	--	6.5-15	average	11	5,140,234	0.21		
12	005A	Dry	11	2023 bucket	bucket	5.58-14	average	9.8	5,306,400	0.20	0.27	No modifications.
		Wet	--	--	--	< 1.9-9.36	average	5.2	3,708,378	0.073		
13	004A	Dry	5	2023 bucket	equation	--	one sample	19	2,412,000	0.17	0.24	No modifications.
		Wet	--	--	--	9.76-46 l	average	23	735,037	0.064		
14	007A	Dry	Dry, 0	NA	NA	--	--	0	0	0	0.008	No modifications.
		Wet	--	--	--	--	< 2.1-3.3	average	2.2	986,462		
15	008	Dry	Dry, 0	NA	NA	--	--	0	0	0	0	Modification 12/21/2022
		Wet	--	--	--	--	dry	--	NA	322,440		

# Figures







# Appendix A

## TR-55 Analysis

**RACER TRUST - BUICK CITY**

**Flint, MI**

**TR-55 Analysis**

**Wet Weather Data**

			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Average
Annual Rainfall Depth, P		in	31.5	30.5	26.9	27.1	34.8	30.1	33.7	28.4	31.9	22.1	35.3	33.3	30.5
Annual Wet-Weather Duration		hr	764	629	599	691	852	784	830	590	630	655	866	755	720
Annual Dry-Weather Duration		hr	7996	8131	8161	8069	7908	7976	7930	8170	8130	8105	7894	8005	8040

**TR-55 Analysis**

			Outfall 001	Outfall 002	Outfall 003	Outfall 004	Outfall 004A	Outfall 005	Outfall 005A	Outfall 006	Offsite Outfall 007	Outfall 007A	Outfall 008	Outfall 010	Outfall 011	Outfall 012	Outfall 013
Composite Curve Number, CN			87.6	89.4	87.2	91.2	92.4	93.9	93.1	94.6	94.2	94.6	94.2	91.8	91.0	90.2	88.9
Potential Maximum Retention after Runoff Begins $S = (1000/CN) - 10$		in	1.4	1.2	1.5	1.0	0.8	0.6	0.7	0.6	0.6	0.6	0.6	0.9	1.0	1.1	1.2
Initial Abstraction $I_a = 0.2 * S$		in	0.3	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Tributary Area, A		ac	206.9	205.0	314.9	16.8	2.2	26.5	12.7	14.5	0.7	3.2	1.1	6.3	26.0	22.4	183.5
Runoff Volume, $V = A * (P - 0.2 * S)^2 / (P + 0.8 * S)$		cf															
2013			3,771,998	4,579,773	5,449,583	464,083	70,906	1,024,924	442,847	617,036	26,718	135,814	44,332	185,901	703,233	550,832	3,862,063
2014			4,023,972	4,798,970	5,841,059	477,388	72,139	1,028,346	447,389	615,238	26,735	135,497	44,373	190,106	724,766	572,483	4,068,130
2015			2,341,787	3,022,450	3,324,092	323,008	50,836	763,170	323,698	467,020	20,036	102,641	33,222	131,443	486,974	372,668	2,506,212
2016			2,262,930	2,867,693	3,232,456	303,593	47,749	720,694	304,615	442,957	18,953	97,308	31,421	123,435	457,937	351,687	2,388,285
2017			4,783,195	5,804,380	6,904,207	584,178	88,603	1,262,174	549,780	753,246	32,784	165,937	54,417	233,179	886,085	696,535	4,898,638
2018			3,575,299	4,342,877	5,162,569	439,085	66,921	962,840	417,093	578,176	25,072	127,291	41,605	175,668	665,590	522,002	3,662,815
2019			4,724,277	5,608,134	6,864,863	554,827	83,480	1,180,534	515,772	703,429	30,638	154,977	50,859	220,482	842,837	667,393	4,760,959
2020			3,830,840	4,646,996	5,530,855	468,120	71,100	1,016,805	441,888	608,424	26,439	133,998	43,881	186,971	709,933	557,770	3,921,905
2021			4,642,807	5,422,058	6,776,344	528,568	78,883	1,105,621	485,004	656,812	28,655	144,744	47,574	209,129	804,096	640,859	4,624,331
2022			1,754,332	2,195,469	2,514,808	230,117	35,985	538,641	228,600	330,138	14,147	72,540	23,455	93,286	347,427	267,943	1,834,834
2023			4,560,316	5,537,078	6,584,830	558,919	85,045	1,219,244	529,237	730,255	31,716	160,817	52,638	223,439	847,421	665,152	4,670,987
2024			4,610,065	5,453,954	6,706,257	538,602	81,029	1,148,277	500,997	685,466	29,823	150,991	49,502	213,984	818,297	648,423	4,634,059
Average			3,740,151	4,523,319	5,407,660	455,874	69,390	997,606	432,243	599,016	25,976	131,880	43,107	182,252	691,216	542,812	3,819,435

Notes:

Rainfall Data from the Flint, MI Station at the Applewood Estate collected through Enviro-weather formerly Michigan Automated Weather Network (MAWN). Station located approximately 2 miles SE of the Site.  
 Composite Curve Numbers based on TR-55 Runoff Curve Numbers for Urban Areas; Cover Type based on the 2024 National Land Cover Database cover type and the NRCS Soil Survey hydrologic soil group.  
 Runoff Volume calculated for each wet-weather event assuming an inter-event period of 6 hours, no runoff generated for storm events with a total depth less than the calculated initial abstraction.



**Approximate Annual Stormwater Runoff Volume**

**Oct  
2025**

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