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IDDE Report Permit Year 5

# Illicit Discharge Detection and Elimination (IDDE) Report

Permit Year 5

PREPARED FOR



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# 1

## Executive Summary

This Illicit Discharge Detection and Elimination (IDDE) Report for Permit Year 5 (July 1, 2022-June 30, 2023) has been developed by VHB for the Massachusetts Department of Conservation and Recreation (DCR) to track progress towards the requirements of the United States Environmental Protection Agency's (EPA) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereafter referred to as the "2016 Massachusetts MS4 Permit" or "MS4 Permit." This report documents the progress of the IDDE program, developed to fulfill Minimum Control Measure 3 of the MS4 Permit. The goal of the IDDE program is for DCR to systematically identify and eliminate sources of non-stormwater discharges to its storm sewer system and implement procedures to prevent such discharges.

Activities under the IDDE program include the screening of regulated outfalls<sup>1</sup>, catchment investigations, and illicit discharge removal. During this permit year, the Project Team of VHB and subconsultant Stacy DePasquale Engineering, Inc (SDE) completed the following IDDE program tasks:

- regulated outfall screening in dry and wet weather,

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<sup>1</sup> "regulated outfalls" refers to both outfalls and interconnections included in DCR's Outfall/Interconnection inventory pursuant to the MS4 permit part 2.3.4.7.a.i.

- catchment investigation screening and sampling for High priority outfalls, and
- desktop analysis and follow-up catchment investigation field work (e.g., dye testing and illicit discharge removal) focused on Problem and Highest priority Outfalls.

**Table 1** summarizes the screening conducted in Permit Year 5. The Project Team identified two illicit discharges in Permit Year 5. One illicit discharge was removed, and one illicit discharge requires additional drainage system work to properly close and will be completed as part of a larger rehabilitation project that targets several other sewer lines in the area. This work, including the removal of the illicit discharge, is scheduled to be complete by Fall 2023. **Table 1** summarizes the regulated outfall screening conducted in Permit Year 5.

**Table 1 Permit Year 5 Screening and Sampling Summary**

Screening Activity	Details	Permit Years 1 - 4	Permit Year 5	Total
	Regulated Outfalls Included in IDDE Program	-	-	1,378 <sup>1</sup>
Dry Weather	Regulated Outfalls Screened	1,299 <sup>2</sup>	18	1,317
Wet Weather	Regulated Outfalls Screened	8 <sup>3</sup>	3	11
Illicit Discharges	Discharges Identified	1	2	3
	Gallons of Sewage Removed per Day	0	15 <sup>4</sup>	15 <sup>5</sup>

Notes:

1 – The number of regulated outfalls continues to be updated as field work and desktop review identify additional outfalls and interconnections or changes to the regulated status of an outfall or interconnection.

2 – The number of regulated outfalls previously screened has decreased from the number reported in Permit Year 4 due to updated outfall ownership.

3 – The number of regulated outfalls previously screened for wet weather has decreased from 10 to 8. In Permit Year 5, it was discovered that 2 outfalls which had been previously marked as DCR owned are not owned by DCR.

4 – When sewer is identified as the source of the illicit discharge, the gallons of sewage removed per illicit discharge per day is estimated by multiplying the assumed daily sewage flow to the location of the illicit discharge multiplied by the estimated exfiltration ratio from the damaged infrastructure. Average sewage flow to the illicit discharge location is calculated by multiplying the approximate population serviced by the sewershed upstream of the illicit discharge location by the most appropriate typical wastewater flow rate according to population category and/or building use (e.g., residential, commercial, industrial, etc.). See Section 4 for the specific calculations performed for each illicit discharge removal.

5 – All illicit discharges with an unknown quantity of sewage removed or those where sewer is not the source of the illicit discharge are excluded from this total.

As required by the permit, each regulated outfall was assigned a prioritization category - problem, high, low, or excluded<sup>2</sup> - as part of the Year 1 update to the IDDE plan. In order to update priorities prior to performing catchment investigations, these categories were reviewed to reflect results from this year's sampling. Regulated outfalls where dry weather sampling results indicated likely sewer inputs are ranked at the top (Highest) of the High priority outfalls category for investigation. **Table 2** summarizes the updated outfall prioritization.

**Table 2      Regulated Outfall Prioritization**

Prioritization Category	# of Regulated Outfalls
Problem	20 <sup>1</sup>
High (Highest)	10
High	1,222
Low	126
Excluded	222
Total	1,600
<i>Included in the IDDE Program<sup>2</sup></i>	<i>1,378</i>

1 – The number of Problem outfalls increased from 15 in Permit Year 4 due to updated Problem outfall ownership information. Several Problem outfall locations were determined to be municipally owned in Permit Year 5. These single outfall catchments were re-delineated to the DCR interconnection points upstream of the original, single outfall. In most cases, there were more than one DCR interconnection point per each of the original Problem outfalls.

2 – Regulated outfalls that do not have a prioritization category of "Excluded."

In Permit Year 5, VHB and SDE focused on completing investigations on regulated outfalls that were identified as Problem and Highest priority and on making steady progress on High priority outfall investigations (**Table 3**). Actions taken on Problem and Highest priority outfall investigations primarily included desktop analysis, coordination with municipalities, dye testing, and illicit discharge removal. These are discussed in greater detail in Section 3 of this report. Actions taken on High priority outfalls primarily included initial dry weather investigations.

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<sup>2</sup> The terms "Problem outfalls," "Highest priority outfalls," "High priority outfalls," and "Low priority outfalls" refer to both outfalls and interconnections included in DCR's Outfall/Interconnection inventory pursuant to the MS4 permit part 2.3.4.7.a.i.

**Table 3 Catchment Investigations Completed**

Regulated Outfall Priority Category	Total	In Progress	Permit Year 5 Completed	Total Completed
Problem	20	15	1	5
Highest	10	8	1	1
High	1,222	37	7	9
Low	126	1	0	0

VHB spent considerable time this year fine tuning field workflows and data quality assurance protocols and performing desktop reviews of catchments to prepare for larger field work tasks once the Problem and Highest priority outfalls are addressed.

DCR will continue to focus on Problem and Highest priority outfalls in Permit Year 6 to meet the Permit Year 7 deadline pursuant to the MS4 permit part 2.3.4.8.a and to expeditiously address the potential of illicit discharges in these catchments. DCR will also continue to follow up on potential illicit discharges that are identified outside the scope of the IDDE screening and sampling including those identified from public reports and those reported by DCR staff during regular drainage asset inspection and maintenance.

# 2

## Regulated Outfall Screening

In accordance with the MS4 Permit, DCR must screen all regulated outfalls during dry weather conditions and use the results of the screening to develop an outfall ranking priority order and catchment investigation completion schedule for screening regulated outfalls pursuant to part 2.3.4.7.b of the MS4 Permit.

The MS4 Permit requires all regulated outfalls (excluding Problem and Excluded outfalls) to be screened for the presence of dry weather flow. The regulated outfall screening in Permit Year 5 focused on completing dry weather screening for regulated outfalls that had not been mapped in the previous year and regulated outfalls where follow-up from previous years was required (e.g., regulated outfalls that could not be located, accessed, and/or sampled when initially visited). A total of 18 regulated outfalls were screened for the presence of dry weather flow.<sup>3</sup>

DCR then ranked the regulated outfalls as Problem, High priority, Low priority, or Excluded to update the regulated outfall ranking. DCR added the Highest priority sub-category to the High priority category to allow DCR to better track the regulated outfalls with screening results indicating the need for more immediate attention but were not initially classified as Problem Outfalls at the start of the permit. Due to the statewide nature of the regulated

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<sup>3</sup> Dry weather flow is defined as flow occurring when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and no significant snow melt is occurring.



outfalls, DCR has developed a web map<sup>4</sup> to show the location of the areas investigated, which includes the field and lab sample results for the regulated outfalls with dry weather flow (for more information on regulated outfall-specific locations, please contact DCR Stormwater Unit).

## 2.1 Dry Weather Screening and Sampling

The goal of regulated outfall screening was to identify regulated outfalls with dry weather flow, sample for the required parameters, and review the priority ranking of the regulated outfall based on sampling results. **Table 3** summarizes the status of the dry weather screening. While dry weather screening of known regulated outfalls on DCR regulated properties was completed to meet the Permit Year 3 deadline, DCR has continued to identify interconnections and map outfalls, and therefore has performed additional screening this year.

**Table 3 Dry Weather Screening and Sampling**

	Previously Screened	Permit Year 5 Screening	Total	% of Total <sup>1</sup>
Regulated Outfalls Screened	1,299 <sup>2</sup>	18	1,317	96%
Regulated Outfalls with Dry Weather Flow	103	1	104	8%

Notes:

1 – Regulated outfalls with completed dry weather screening compared to the total number regulated outfalls included in the IDDE program (1,378 outfalls)

2 – The number of regulated outfalls previously screened has decreased from the number reported in Permit Year 4 due to updated outfall ownership.

In accordance with DCR's IDDE Plan procedures developed to meet the requirements in the MA MS4 permit (Part 2.3.4.7.b.iii.4.b), the field teams performed field measurements and collected samples for lab analysis to analyze dry weather flow. Field measurements included ammonia, chlorine, conductivity, salinity, surfactants (detergents), and temperature. Samples were also analyzed for the applicable parameters in the lab based on the MS4 permit requirements, which states that samples shall be analyzed for *Escherichia coli* (E. coli) for outfalls discharging to a freshwater receiving waterbody or *Enterococcus* for a saline or brackish receiving waterbody and the receiving waterbody's pollutant of concern<sup>5</sup>.

<sup>4</sup> IDDE Report Webmap address: <https://vhb.maps.arcgis.com/apps/webappviewer/index.html?id=87a35a2683aa4478a07ade7ffb7c1b2a>

<sup>5</sup> Where the discharge is directly into a water quality limited water or a water subject to an approved TMDL as indicated in Appendix F of the MS4 permit; the sample shall be analyzed for the pollutant of concern identified as the cause of the impairment as specified in Appendix G of the MS4 permit.



## 2.2 Outfall Prioritization Categories Review

The results of dry weather screening must be reviewed and used to update the regulated outfall prioritization categories each year. **Table 4** summarizes the regulated outfall prioritization categories, and the sections below discuss the results in further detail. For regulated outfalls with no dry weather flow, the outfall remained in the same priority category unless there was new information regarding the location or ownership of the regulated outfall. If new data indicate that a regulated outfall is either not a DCR-owned outfall, does not exist, or updated mapping precludes it from the IDDE program (e.g., updated mapping indicates that what was once mapped as an MS4 outfall is a cross culvert outlet), the regulated outfall was removed entirely from the total regulated outfall inventory. For regulated outfalls with dry weather flow, VHB and SDE reviewed the results and recommended next steps based on sampling results, the sewage indicator criteria included in the MS4 permit, and DCR's IDDE plan. This review included determining if a higher priority category was appropriate for a particular regulated outfall.

**Table 4 Regulated Outfall Prioritization**

Prioritization Category	# of Regulated Outfalls	
	Permit Year 4	Permit Year 5
Problem	15	20
Highest	9	10
High	1,183	1,222
Low	130	126
Excluded	219	222
Total	1,556	1,600
<i>Included in the IDDE Program<sup>1</sup></i>	<i>1,337</i>	<i>1,378</i>

1 – Regulated outfalls that do not have a prioritization category of "Excluded."

### 2.2.1 Problem Outfalls

Fifteen outfalls were identified as Problem outfalls in Permit Year 1 based on historical issues. After reviewing the ownership of these fifteen outfalls in Permit Years 4 and 5, several of these outfalls were determined to be municipally owned. As such, DCR re-delineated these Problem outfall catchments to align with DCR's upstream interconnection points. This increased the total number of Problem outfalls from fifteen to twenty since DCR is often interconnected upstream of the original Problem outfall in more than one location. Part 2.3.4.7.b of the MS4 Permit indicates that the permittee should move right to catchment investigations for these regulated outfalls even if they were not dry weather screened. The investigation of fifteen of these twenty regulated outfalls is still ongoing, with five being complete, and is discussed in **Section 3, Catchment Investigations**. The catchment



investigations and wet weather sampling, if appropriate, needs to be completed within 7 years of the permit effective date (July 1, 2025).<sup>6</sup>

### 2.2.2 Highest Priority Outfalls

Currently, there are ten regulated outfalls categorized as Highest priority. The Highest priority category was developed by DCR to reflect where dry weather sampling results met the likely sewer input indicators<sup>7</sup> to prioritize their investigation. Permit Year 5 dry weather screening detected likely sewer input in the one outfall with dry weather flow and therefore that outfall was reprioritized as Highest.

DCR will strive to complete catchment investigation of Highest priority catchments and perform wet weather sampling, if appropriate, in the same schedule as the Problem outfalls but depending upon when the potential sewer inputs are identified and the complexity of the system an alternative schedule may be needed. See **Section 3.2** for more information.

### 2.2.3 High Priority Outfalls

The High priority outfalls screened this year either had no flow or results did not indicate elevated concentrations of pollutants. Since they still discharge to receiving waters with specific listed impairments these outfalls will remain classified as High priority. In Permit Year 5, updated data gathered through DCR field visits caused the number of High priority outfalls to increase to 1,222 from the 1,183 reported in Permit Year 4.

DCR is required to complete catchment investigation of High priority catchments and perform wet weather sampling, if appropriate, within 10 years of the permit effective date (July 1, 2028).

### 2.2.4 Low Priority Outfalls

The Low priority outfalls screened this year were initially categorized as Low priority and the screening did not indicate signs of illicit connections. Therefore, these outfalls remain categorized as Low priority. In Permit Year 5, 126 Low Priority outfalls are reported.

Catchment investigations for Low Priority outfalls must be completed within 10 years of the permit effective date (July 1, 2028).

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<sup>6</sup> MS4 Permit Part 2.3.4.8.a

<sup>7</sup> As defined in the MS4 permit, likely sewage input indicators are any of the following:

- Olfactory or visual evidence of sewage,
- Ammonia  $\geq 0.5$  mg/L, surfactants  $\geq 0.25$  mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia  $\geq 0.5$  mg/L, surfactants  $\geq 0.25$  mg/L, and detectable levels of chlorine (0.02 mg/L).



### 2.2.5 Excluded Outfalls

Regulated outfalls with no potential for illicit discharges may be excluded from the IDDE program. The permit identifies that drainage from the following categories below can be excluded:

- › Roadway drainage in undeveloped areas with no dwellings and no sanitary sewers,
- › Drainage for athletic fields, parks, or undeveloped green space and associated parking without services, or
- › Cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land.

DCR has identified regulated outfalls that are excluded from the IDDE program as those located away from sanitary sewer systems, in undeveloped areas based on land use, and not in proximity to a DCR building with restrooms. In Permit Year 5, three additional outfalls were either newly mapped or identified as Excluded through desktop analysis. The total number of excluded outfalls reported in Permit Year 5 is 222. DCR will continue to refine excluded outfall status through catchment investigations and desktop analysis.

# 3

## Catchment Investigations

DCR must perform catchment investigations on all non-excluded regulated outfalls as part of the IDDE program. Pursuant to the MS4 permit Part 2.3.4.8.b.ii, the field crews conducted dry weather catchment investigations by opening key junction manholes upstream of the regulated outfalls. If flow was observed in a particular pipe, the flow was sampled in accordance with DCR's IDDE Plan. If there were signs of potential intermittent flow at a pipe, a sandbag was placed for a minimum of 48 hours to capture intermittent flows. In order to complete a catchment investigation, DCR must perform wet weather screening if the catchment includes any System Vulnerability Factors (SVFs) based on previous information or the catchment investigation. DCR has continued to refine its catchment investigation procedures as documented in the IDDE Plan. The dry weather catchment investigation data and wet weather screening data are available in a public web map<sup>8</sup>.

Problem outfall investigations must begin within two years and be completed within seven years of the permit effective date. The permit requires that all catchment investigations be completed within ten years of the permit effective date.

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<sup>8</sup> IDDE Report Webmap address: <https://vhb.maps.arcgis.com/apps/webappviewer/index.html?id=87a35a2683aa4478a07ade7ffb7c1b2a>

In Permit Year 5, effort was split between completing investigations on regulated outfalls that were identified as Problem and Highest priority outfalls and on making steady progress on High priority outfall investigations. DCR was able to complete the investigation of one Problem outfall in Permit Year 5 and the remaining Problem outfall investigations are ongoing. Catchment investigations, if not yet completed, will proceed based on regulated outfall priority. **Table 5** summarizes the status of the catchment investigations and further detail is provided in the sections below.

**Table 5 Catchment Investigations Completed**

Outfall Category	In Progress	Completed	
		Year 5	Overall
Problem	15	1	5
Highest Priority	8	1	1
High Priority	40	7	7
Low Priority	1	0	1

### 3.1 Problem Outfalls Catchment Investigations

Before the permit took effect, DCR had identified Problem outfalls in six areas based on historic information or ongoing issues. Catchments associated with these areas were prioritized for investigation. The following sections describe each of the areas with Problem outfalls. Each section identifies catchments by the final outfall regardless of whether DCR owns the outfall or instead interconnects upstream of the final outfall. For simplicity we have included historical screening and sampling information regarding the investigation, but highlighted the work this year.

#### 3.1.1 Stacey Brook (2 outfalls; Follow-up ongoing)

The storm drainage area under review, which is comprised of two outfalls (outfalls 38017 and 37114.1), is located around Stacey Brook in Lynn and Swampscott, MA. Stacey Brook flows underground through a 6-foot culvert and discharges through an outfall on Red Rock Beach and ultimately into Nahant Bay. DCR's drainage network to these outfalls is mostly limited to Lynn Shore Drive, Red Rock Beach, and the landscaped areas between the roadway and beach; it also includes a portion of Eastern Ave and Humphrey Street. DCR's drainage interconnects to outfall 38017, which is owned by Swampscott, at manhole 25416 and at catch basin 666668502. DCR's drainage interconnects to outfall 37114.1, which is owned by Lynn, at manhole 25418 and at a blind connection downstream of catch basin 666667101. These outfalls were flagged as Problem Outfalls based on previous sampling results indicating high bacteria (both *E. Coli* and *Enterococcus*) as well as the presence of pharmaceutical indicators that suggested the presence of human waste. It was not initially clear which outfall had been sampled so both outfalls were classified as Problem Outfalls.

The catchment investigation of these outfalls occurred over several days in May and June 2019.

For outfall 38017, sampling results from the catchment investigation narrowed the area of interest for potential illicit discharge to the infrastructure along Humphrey Street in Swampscott (Outfall 38017). The contributing DCR drainage infrastructure was CCTVed and did not show any signs of illicit connection or dry weather flows, but the dry weather flows in non-DCR owned pipes continued to show elevated parameters. Based on the investigation it was determined that the flow could be coming from one of the Swampscott residences adjacent to the area of interest.

DCR sent a letter to the Town of Swampscott in November 2019 with a summary of the sampling results and requested that Swampscott dye-test the several residences. COVID remote working impacted DCR's meeting with Swampscott. DCR sent a second letter to the Town of Swampscott in February 2022 with the summary of sampling results and again requested that Swampscott perform dye-testing on residences. DCR has yet to receive a response from Swampscott and will send an additional letter in Permit Year 6 requesting a response to the 2022 letter.

In June 2023, two of the four DCR pipes that interconnect into Swampscott outfall 38017 (Pipe 12640 and Pipe 12649) were sampled during wet weather. Sampling results did not exceed the MS4 permit thresholds indicating there was no illicit input. In Permit Year 6, the remaining DCR interconnecting pipes will be screened during wet weather to determine whether there is any illicit input originating from DCR drainage. DCR will then follow up with Swampscott and share the most recent sampling results.

The second outfall (37114.1), located in Lynn, was screened during dry weather; no signs of a potential illicit discharge were found. In permit year 6, the interconnecting DCR pipes will be screened during wet weather. If the wet weather investigation also does not find signs of a potential illicit discharge, this catchment investigation will be closed.

### **3.1.2 Morrissey Boulevard (1 outfall; Follow-up ongoing)**

The storm drainage system is located along Morrissey Boulevard in Dorchester and includes one outfall. The outfall drains to the mouth of the Neponset River and ultimately Dorchester Bay. This outfall (21850) was flagged as a Problem outfall based on previous sampling results from both the Boston Water and Sewer Commission (BWSC) and DCR, which showed elevated levels of *Enterococcus*. BWSC shares sampling data with DCR on an annual basis in locations where its system interconnects with DCR's system.

The catchment investigation occurred over several days in July 2019. Based on sampling results, the areas of interest were narrowed to the intersection of Morrissey Boulevard and Tenean Street and near the intersection of Morrissey Boulevard and McKone Street. DCR performed follow-up investigations of the infrastructure in the areas of interest and bricked off the connections from several pipes that were identified during CCTV investigation but not included on the map and were confirmed to be abandoned by CCTV investigation.

In order to further confirm the source of the dry weather flow and since there are BWSC sewer lines intersecting the DCR stormwater infrastructure, DCR reached out to BWSC in November 2019 with a summary of sampling results and a request to share information and

investigate some of the adjacent sewer lines. DCR sent a follow-up request to BWSC in April 2021. BWSC sent a letter to DCR in response in May 2022 (dated February 2022) noting BWSC plans to reinspect a manhole in dry weather and will dye test two previously un-dye tested buildings in the area. A May 2023 email from BWSC indicated that additional screening and dye testing had not yet identified any illicit input into the drainage system and that a more formal response with sampling and dye testing results would be sent as soon as remainder of the investigation was completed. DCR is awaiting the response from BWSC on the results of these tests. The formal results of the tests by BWSC and additional dry weather screening are needed so DCR can determine the next steps required to complete the investigation, which includes wet weather sampling and could potentially include additional dry weather screening and dye testing. DCR will continue to coordinate with BWSC to complete this investigation in Permit Year 6.

### **3.1.3 Tenean Beach (1 outfall; Investigation complete)**

The storm drainage system is located immediately south of Tenean Beach in Dorchester. The system extends from the parking area and through the park to one outfall draining to the mouth of the Neponset River and ultimately Dorchester Bay. This outfall (18257) was flagged as a Problem Outfall based on previous sampling results showing elevated levels of *Enterococcus*.

The catchment investigation occurred over several days in July 2019, September 2019, and February 2020. The July 2019 investigation narrowed the areas of interest to two previously unmapped pipes and two catch basins. DCR determined the two unmapped pipes were no longer in use. DCR capped the two pipes. The catch basins and surrounding infrastructure were reviewed by DCR staff and it was confirmed that there were no illicit connections. DCR then cleaned the entire drainage system. To confirm there was no longer potential illicit discharges, samples were taken from two catch basins in September 2019 following the cleaning and sampling results showed a decrease in *Enterococcus*.

To close out the problem outfall catchment investigation per the permit, DCR performed dry weather screening of the outfall in February 2020, which was the soonest available dry weather screening window after DCR conducted all follow-up actions. Since sampling results at the outfall did not exceed MS4 sewer input indicators, the catchment had been fully reviewed, and no SVFs have been identified in this area to require wet weather screening, the outfall catchment investigation for this drainage system is now considered complete.

### **3.1.4 Wollaston Beach (7 outfalls; Follow-up ongoing)**

DCR investigated seven catchments along Wollaston Beach in Quincy, MA. The infrastructure for each of the catchments was generally located along Quincy Shore Drive and the beach. All of the outfalls drain directly to Quincy Bay. These outfalls were flagged as Problem outfalls based on previous sampling results showing elevated levels of *Enterococcus*.

Five of the outfalls originally identified as Problem Outfalls were determined to likely be owned by the City of Quincy. DCR drainage interconnects upstream in the system. The ownership of the outfalls and interconnections from DCR drainage is being officially confirmed via a memorandum of understanding (MOU) between DCR and the City of Quincy.



that is currently being drafted. Despite the pending status of the MOU, the upstream interconnections, which in many cases include more than one per each of the original Problem outfalls, and their respective catchments were broken out of the original Problem Outfall catchments. These catchments will remain categorized as Problem since they drain to the outfalls historically showing elevated levels of *Enterococcus*.

The catchment investigations occurred in November 2019 and February 2020. The November investigation was cut short due to weather and the next favorable weather window was not until February 2020. The November and February investigations narrowed the area of interest to three outfalls (outfalls 17661, 90000.1, and 34509.3) with the remaining four not showing signs of potential illicit discharges based on the sewer input indicators outlined in the MS4 Permit. However, due to the tidal conditions of the area, much of the system could not be sampled due to standing water.

For the interconnections upstream of outfall 17661 and outfall 90000.1, where potential suspect flow was sampled coming from DCR infrastructure, a subsequent CCTV investigation in August 2020, during which the pipes were de-watered, showed no flow coming from DCR infrastructure and no illicit connections were found indicating that the sampling results from the 2019 dry weather investigation likely sampled stagnant, standing water in the pipes. As such, DCR will repeat the dry weather catchment investigation making sure to not capture stagnant water. If dry weather screening does not show signs of illicit discharge, DCR will perform wet weather screening. Otherwise, DCR will perform additional follow-up, such as dye testing or CCTV, to locate the source of any potential non-stormwater flows.

In Permit Year 5, two catchments (outfall 34509.3 and outfall 34507.3) were screened and sampled during wet weather. The wet weather sampling results for these two catchments did not exceed the permit thresholds and thus were cleared of any wet weather illicit input. Since both the dry and wet weather screening results for Outfall 34507.3 did not show any signs of illicit input, its catchment investigation is considered complete. Although Outfall 34509.3 did not show signs of illicit input during wet weather, its dry weather screening results from 2020 did exceed the MS4 permit thresholds. Since the screening occurred in 2020 and wet weather screening did not indicate the presence of an illicit discharge, this catchment will be re-screened during dry weather in Permit Year 6 to determine whether the 2020 results are accurate. If the results of the screening in Permit Year 6 do not show evidence of illicit input, this catchment investigation can be closed. Otherwise, DCR will perform additional follow-up, such as dye testing or CCTV, to locate the source of any potential non-stormwater flows.

For the remaining outfalls (outfall 34500.30, outfall 38020.00, and outfall 37221.10), the initial screening results from 2019 and 2020 were inconclusive due to standing water. In Permit Year 6, DCR will conduct additional dry weather screening investigations at the lowest tide feasible. If the results of these future investigations remain inconclusive due to standing water in the pipes, DCR will de-water and CCTV the catchments to determine whether non-stormwater flow is present.

### **3.1.5 Neponset Valley Parkway (1 outfall; Investigation complete)**

Outfall 17289 was included in the Problem outfall list in Permit Year 1, but DCR is not aware of historical sampling data indicating potential illicit discharges at this location. DCR

completed both the dry weather screening and wet weather sampling in November 2021 and January 2022, respectively. There was no evidence of illicit discharge during either of these investigations. The catchment investigation for the location is considered complete.

### 3.1.6 Western Avenue (3 outfalls; 1 investigation on-going, 2 investigations complete)

Four outfalls in this location were included in the Permit Year 1 Problem outfall list but DCR is not aware of historical sampling data indicating potential illicit discharges. During review of the outfall locations in the database, we determined that Outfall 19738 was a duplicate of Outfall 19739 and therefore there were only three outfalls to follow up on in this area. Outfall 19738 was removed from DCR's database.

DCR reviewed outfall 19379 to update mapping in this location. As a result of this work, DCR discovered that the outfall pipe (66671867) needed to be replaced. DCR is planning to replace this pipe once an environmental permit for the work is granted. Once the infrastructure is replaced, DCR will complete the catchment investigation.


For the remaining two outfalls (19105 and 19377), the catchment investigations were completed in June 2021; there was no flow present. There are no known SVFs in this location and the catchment investigation for these locations is considered complete.

### 3.1.7 Problem Catchment Investigation Summary Table


The table below summarizes the status of the Problem Outfalls and the actions taken during Permit Year 4 to identify if the discharge includes illicit flows.

**Table 6 Problem Outfalls Catchment Investigations Summary**

Receiving Water (ID), Area/ Town; Outfall	Catchment Investigation Status <sup>1</sup>		Permit Year 5 Investigation Actions	DCR's Next Steps
	Dry Weather	Wet Weather		
Nahant Bay (MA93-24); Stacey Brook, Lynn and Swampscott				
Stacey Brook 1 (2 interconnections to MH-25416, 2 interconnections to CB-666668502, drains to Outfall 38017)	Complete	In Progress	DCR wet weather screened 2 of the 4 interconnection points in this catchment and did not find indication of illicit discharges.	DCR will complete wet weather screening, inform Swampscott of the most recent catchment screening results, and recommend Swampscott conduct dye testing.
Stacey Brook 2 (4 interconnections to MH-25418, 1 blind interconnection downstream of CB-666667101, drains to Outfall 37114.1)	Complete	In Progress	DCR attempted to conduct wet weather screen at the interconnection points; however, the rain stopped before reaching structure.	Wet weather screening is needed to complete catchment investigation.

 Receiving Water (ID), Area/ Town; Outfall	Catchment Investigation Status <sup>1</sup>		Permit Year 5 Investigation Actions	DCR's Next Steps
	Dry Weather	Wet Weather		
Neponset River (MA73-04); Morrissey Boulevard, Dorchester				
Morrissey Blvd 1 (OF-21850)	In Progress	Not Started	BWSC conducted additional dry weather screening and dye testing in the catchment. A 5/2/2023 email from BWSC indicated that additional field work had not yet found indication of illicit discharges or leaking sewers in the area and that BWSC would develop an official response outlining the screening results and share with DCR.	DCR is awaiting an official response from BWSC outlining the results of their dry weather screening and dye testing. After receiving a response, DCR will review the data and formulate plan to close the catchment investigation.
Tenean Beach 1 (OF-18257)	Complete	Not Required (No SVFs)	DCR completed the Problem outfall catchment investigation prior to Permit Year 5.	<b>Catchment investigation is complete.</b>
Quincy Bay (MA70-05); Wollaston Beach, Quincy				
Wollaston Beach 1 (OF-34509.3)	In Progress	Complete	DCR conducted wet weather screening, which did not show evidence of illicit discharges.	DCR will re-conduct dry weather screening at the outfall to determine if indication of illicit discharges are still present and use additional follow-up (e.g., dye testing or CCTV) to narrow down the source if signs of illicit discharges are found.
Wollaston Beach 2 (OF-34507.3)	Complete	Complete	DCR conducted wet weather screening, which did not show evidence of illicit flows. DCR completed the catchment investigation.	<b>Catchment is investigation complete.</b>
Wollaston Beach 3 (4 interconnections to MH-34502.3, drains to OF-17661)	In Progress	Not Started	DCR updated catchment boundaries based on additional ownership information.	DCR will re-screen the catchment during dry weather at low tide, making sure not to sample stagnant water. If indication of illicit discharges is found, DCR will conduct additional follow-up measures, such as dye testing or CCTV, to identify its source.

 <b>Receiving Water (ID), Area/ Town; Outfall</b>	<b>Catchment Investigation Status<sup>1</sup></b>		<b>Permit Year 5 Investigation Actions</b>	<b>DCR's Next Steps</b>
	<b>Dry Weather</b>	<b>Wet Weather</b>		
Wollaston Beach 4 (3 interconnections to MH-34497.3, 1 interconnection to MH-34454.3, 1 interconnection to MH-29946, drains to OF-34500.3)	In Progress	Not Started	DCR updated catchment boundaries based on additional ownership information.	DCR will re-screen the catchment during dry weather at low tide, making sure not to sample stagnant water. If indication of illicit discharges is found, DCR will conduct additional follow-up measures, such as dye testing or CCTV, to identify its source.
Wollaston Beach 5 (MH-37223.1, MH-666667017 interconnects to OF-38020)	In Progress	Not Started	DCR updated catchment boundaries based on additional ownership information.	DCR will re-screen the catchment during dry weather at low tide. If the results of the investigation remain inconclusive due to standing water, DCR will conduct additional follow-up measures, such as de-watering and CCTV, to determine if indication of illicit discharges is present.
Wollaston Beach 6 (MH-37193 interconnects to OF-37221.1)	In Progress	Not Started	DCR updated catchment boundaries based on additional ownership information.	DCR will re-screen the catchment during dry weather at low tide. If the results of the investigation remain inconclusive due to standing water, DCR will conduct additional follow-up measures, such as de-watering and CCTV, to determine if indication of illicit discharges is present.
Wollaston Beach 7 (MH-37195.00, MH-6002.40 interconnects to OF-90000.1)	In Progress	Not Started	DCR updated catchment boundaries based on additional ownership information.	DCR will re-screen the catchment during dry weather at low tide, making sure not to sample stagnant water. If indication of illicit discharges is found, DCR will conduct additional follow-up measures, such as dye testing or CCTV, to identify its source.
Neponset River (MA73-02); Neponset Valley Parkway, Boston				
Neponset (OF-17289)	Complete	Complete	DCR completed the Problem outfall catchment investigation prior to Permit Year 5.	<b>Catchment investigation is complete.</b>

 Receiving Water (ID), Area/ Town; Outfall	Catchment Investigation Status <sup>1</sup>		Permit Year 5 Investigation Actions	DCR's Next Steps
	Dry Weather	Wet Weather		
Charles River (MA72-36); Western Avenue, Cambridge				
Western Ave 1 (OF-19105)	Complete	Not Required (No SVFs)	DCR completed the Problem outfall catchment investigation prior to Permit Year 5	<b>Catchment investigation is complete.</b>
Western Ave 2 (OF-19377)	Complete	Not Required (No SVFs)	DCR completed the Problem outfall catchment investigation prior to Permit Year 5.	<b>Catchment investigation is complete.</b>
Western Ave 4 (OF-19379)	Not Started	Not Required (No SVFs)	DCR developed plans to replace drainage infrastructure in the catchment and therefore DCR has held off on further investigation until the work is complete.	DCR will replace the drainage infrastructure at this location and continue the catchment investigation process.

1 – Catchment Investigation Status descriptions:

**Not Started:** Investigation has not begun.

**In Progress:** Investigation is on-going.

**Complete:** Investigation is complete and either no suspect flow has been identified or suspect flow has been identified and removed as a result of the investigation.





## 3.2 Highest Priority Catchment Investigations

In addition to investigating Problem Outfalls, DCR focused on Highest Priority Outfalls in Permit Year 5. As of this report, DCR has begun dry weather investigations for nine of the ten Highest Priority catchments. A summary of the actions performed for the Highest Priority catchments are included in Table 7.


**Table 7 Highest Priority Outfalls Catchment Investigations Summary**


Receiving Water (ID), Area/ Town; Outfall	Catchment Investigation Status <sup>1</sup>		Permit Year 5 Investigation Actions	DCR's Next Steps
	Dry Weather	Wet Weather		
Mystic River and Tribs (MA71-03, MA71-02 & MA71-13) Mystic Valley Parkway, Medford				
OF-22724	Complete	Complete	DCR completed initial dry weather investigation and screened and sampled the outfall during wet weather. No indication of illicit discharge was found. Catchment investigation was completed.	Catchment investigation is complete.
OF-22021	In Progress	Not Started	DCR completed a second dry weather investigation after DCR lined the outfall pipe (pipe 280). The investigation found indications of potential non-stormwater flow at the downstream end pipe 280. DCR reviewed historic plansets for the area and identified abandoned pipes connected to the catchment that cross a sewer line north of the catchment and could potentially be the source of the illicit discharge input if the pipes were not properly plugged. DCR coordinated with the City of Medford to receive additional plans for the area and confirm the mapping of their sanitary sewer system in the area.	DCR will conduct dye testing on the sewer main in the area to identify the source of the potential non-stormwater flow. Once identified, DCR will take swift action to eliminate the source of the non-stormwater flow.

 <b>Receiving Water (ID), Area/ Town; Outfall</b>	<b>Catchment Investigation Status<sup>1</sup></b>		<b>Permit Year 5 Investigation Actions</b>	<b>DCR's Next Steps</b>
	<b>Dry Weather</b>	<b>Wet Weather</b>		
OF-22018	Complete	In Progress	DCR completed a second dry weather investigation after MWRA completed infrastructure repairs in the catchment. The dry weather investigation did not indicate possible non-stormwater input. DCR screened and sampled the outfall during wet weather and results indicated possible non-stormwater input. DCR coordinated with the City of Medford to receive additional plans for the area and confirm the mapping of their sanitary sewer system in the area.	DCR will conduct dye testing on the sewer main in the area to try to narrow the location of source of non-stormwater flow. After dye testing, DCR will plan for next steps.
OF-21979	In Progress	Not Started	DCR began a dry weather investigation in 2021, which found signs of non-stormwater flow in several areas of the catchment. Subsequent investigations were paused to better map drainage infrastructure within the catchment and determine catchment and outfall ownership. In Permit Year 5, DCR finalized mapping revisions in catchment and updated infrastructure ownership information.	DCR will update the catchment delineation to reflect updated drainage mapping and complete the dry weather catchment investigation. After completing the dry weather investigation, DCR will plan follow-up actions, such as dye testing or CCTV, to locate the source of the non-stormwater flow identified in 2021 and any additional non-stormwater flows that are discovered.

 Receiving Water (ID), Area/ Town; Outfall	Catchment Investigation Status <sup>1</sup>		Permit Year 5 Investigation Actions	DCR's Next Steps
	Dry Weather	Wet Weather		
Malden River (MA71-05) Mystic View Rd, Everett				
OF-27645	In Progress	Not Started	DCR obtained as-built plansets that showed the locations of sanitary sewer pipes and other utilities in the DCR catchment and adjacent shopping center. DCR confirmed that all buildings in the area known to connect to sanitary sewer were dye tested in Permit Year 4 and no connections were found to the drainage system. Additionally, DCR confirmed that there were no other utilities nor other pollutant sources shown in the plansets that could be the source of a potential illicit discharge to outfall 27645. DCR re-screened pipes in the catchment and confirmed the original sampling results from 2021 showing high ammonia and low bacteria levels are valid. DCR's field investigation and the as-built plansets confirmed that drainage pipes along Mystic View Road are at a lower elevation than the sanitary sewer pipes. This coupled with 2020 CCTV footage showing groundwater infiltration into the drainage pipes through the joints indicates that the source of the elevated ammonia levels could be from Everett-owned sanitary sewer leaching into the groundwater and infiltrating into DCR drainage pipes. DCR sent a letter to the City of Everett in February 2023 formally requesting that they conduct a CCTV survey of their sanitary sewer system in the area and share the results with DCR.	DCR to follow-up with the City of Everett on the letter and obtain a formal response from the City.



 Receiving Water (ID), Area/ Town; Outfall	Catchment Investigation Status <sup>1</sup>		Permit Year 5 Investigation Actions	DCR's Next Steps
	Dry Weather	Wet Weather		
Neponset River (MA73-02) Truman Parkway, Hyde Park				
OF-666666991	In Progress	Not Started	DCR conducted a follow-up dry weather investigation in December 2022, including sandbagging. Potential non-stormwater inputs were found in 2 pipe segments in the catchment.	DCR will plan locations for and schedule dye testing in catchment.
Lynn Harbor (MA93-52) Lynn Shore Reservation, Nahant				
OF-666667157	In Progress	Not Started	DCR conducted investigations that identified the source of sewer input into the drainage system at two different locations. The sewer input at the first location originated from abandoned pipes in an adjacent sewer manhole (SMH) that were not plugged properly and were discharging into the bedding/backfill material of the adjacent drainage pipe. At the second location, DCR used CCTV and dye testing to identify a crack in the sanitary sewer service line for the DCR Coastal Operations Building that was allowing sewage to infiltrate into the drainage system. DCR removed the sewer input at the first location by plugging the abandoned pipes in the adjacent SMH and installing a cementitious liner to prevent exfiltration through the masonry. DCR performed a confirmatory dye test that confirmed that this work eliminated the sewer input from the first location.	DCR will complete pipe repairs in the catchment to eliminate the sewer input from the second location. Repairs are scheduled to be completed by the end of October 2023. Once repairs are complete, DCR will repeat dry weather screening and if there are no signs of non-stormwater flow, will move on to wet weather sampling to close out the catchment investigation.
Dorchester Bay (MA70-03) Morrissey Boulevard, Boston				
MH-17701	In Progress	Not Started	DCR conducted a dry weather investigation over the course of five days and found signs of non-stormwater flow in several pipes throughout catchment.	DCR to review as-built plans for the area to determine likely sources of non-stormwater flows and to create a plan for dye testing the area.

 Receiving Water (ID), Area/ Town; Outfall	Catchment Investigation Status <sup>1</sup>		Permit Year 5 Investigation Actions	DCR's Next Steps
	Dry Weather	Wet Weather		
Neponset River (MA73-04)				
MH-666667098	In Progress	Not Started	DCR conducted a dry weather investigation and found signs of non-stormwater flow in one pipe segment immediately upstream of the interconnection into BWSC drainage.	DCR will review as-built plans for the area to determine likely sources of contamination and to create a plan for dye testing the area.

1 – Catchment Investigation Status descriptions:

**Not Started:** Investigation has not begun.

**In Progress:** Investigation is on-going.

**Complete:** Investigation is complete and either no suspect flow has been identified or suspect flow has been identified and removed as a result of the investigation.

### 3.3 High Priority Catchment Investigations

There were 37 High priority catchment investigations in progress and seven completed during Permit Year 5. Permit Year 5 activity on these catchments primarily consisted of dry weather investigations. DCR will continue to make progress on the active High priority catchment investigations when possible.

### 3.4 Low Priority Catchment Investigations

There was one Low priority catchment investigation in progress during Permit Year 5. The Low priority catchments will be completed following the completion of High priority catchments.

# 4

## Illicit Discharge Removal

Prior to Permit Year 5, DCR identified one source of illicit discharge into a drainage system draining into the Charles River during a field visit in Boston that was unrelated to the IDDE program and this illicit discharge was eliminated promptly. Two additional illicit discharges were identified during Permit Year 5 in a Highest priority catchment. One of the illicit discharges was eliminated promptly and the other required pipe lining and other maintenance work to make sure non-stormwater flows are not entering the drainage system. This maintenance work is scheduled to be complete by the end of Fall 2023. Below are the details for the three illicit discharges identified to date.

### **Illicit ID 1**

- › *Location:* Community Rowing, Boston (Charles River)
- › *Description:* two sinks (hand washing basins) discharging into a catch basin
- › *Method and date of discovery:* catchment investigation on 5/19/2021
- › *Date of elimination:* 6/7/2021
- › *Date of confirmatory Dry Weather Screening:* N/A<sup>9</sup>

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<sup>9</sup> The structure at which this illicit discharge was discovered did not have flow nor did any structures in the catchment show signs of an illicit discharge before the illicit connection was removed. This illicit discharge was discovered incidentally during the investigation, rather than being located as the result of detection through dry weather flow screening/sampling. As such, confirmatory screening was deemed unnecessary.

- › *Date of confirmatory Wet Weather Screening:* N/A<sup>12</sup>
- › *Mitigation or enforcement action or planned corrected measures and schedule for completing the illicit discharge removal:* N/A
- › *Estimated volume of sewage removed:* N/A. Sewage was not the source of the illicit discharge.

#### **Illicit ID 2**

- › *Location:* Lynn Shore Reservation, Nahant (Nahant Bay)
- › *Description:* Non-stormwater flow originated from abandoned pipes in adjacent Sewer Manhole (SMH), which services the DCR Coastal Operations Building, that were not properly plugged. Abandoned pipes discharged into backfill/bedding material of drainage pipe 66669193 and infiltrated through first two pipe joints downstream of Manhole 66666941.
- › *Method and date of discovery:* Dye testing on 12/14/2023
- › *Date of elimination:* 1/11/2023
- › *Date of confirmatory Dry Weather Screening:* Incomplete. Confirmatory dry weather screening will be performed after additional maintenance repairs in drainage system are completed. These repairs are still in progress. Confirmatory screening is scheduled for Fall 2023.
- › *Date of confirmatory Wet Weather Screening:* Incomplete. Scheduled for Fall 2023 or Spring 2024
- › *Mitigation or enforcement action or planned corrected measures and schedule for completing the illicit discharge removal:* Illicit discharge was eliminated by removing and capping abandoned pipe stubs in adjacent sanitary sewer manhole (SMH) and installing cementitious lining to prevent exfiltration through SMH masonry. Dye test completed after maintenance work confirmed the removal of the illicit discharge.
- › *Estimated volume of sewage removed:* 15 gallons/day
  - Formula:  $P \times WWR \times ER = \text{Volume of Sewage Removed (Gallons/Day)}$ 
    - **P** = 20 persons
      - *Average daily occupancy DCR Coastal Operations Building*
    - **WWR** = 5 gallons/person/day
      - *Assumed typical wastewater flow rates from DCR Coastal Operations Building*
    - **ER** = 0.15 gallons of wastewater exfiltration from illicit discharge/gallons of wastewater flow to illicit discharge
      - *DCR estimate based on dye test observations*

#### **Illicit ID 3**

- › *Location:* Lynn Shore Reservation, Nahant (Nahant Bay)
- › *Description:* Exfiltration from adjacent cracked sanitary sewer line
- › *Method and date of discovery:* CCTV on 4/17/2023
- › *Date of elimination:* Scheduled to be completed by Fall 2023
- › *Date of confirmatory Dry Weather Screening:* Incomplete. Scheduled for Fall 2023 or Spring 2024



- › *Date of confirmatory Wet Weather Screening:* Incomplete. Scheduled for Fall 2023 or Spring 2024
- › *Mitigation or enforcement action or planned corrected measures and schedule for completing the illicit discharge removal:* Illicit discharge will be removed by re-lining the cracked sanitary sewer line by Fall 2023
- › *Estimated volume of sewage removed:* To be determined. The illicit discharge has not yet been removed.