Westford IDDE Program Update for Permit Year 6

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Per *Section 2.3.4.8* of the 2016 Small MS4 General Permit and the Town of Westford's Illicit Discharge Detection and Elimination (IDDE) Program, the Town must investigate each catchment associated with an outfall or interconnection within the Town's MS4 for possible illicit discharges or connections. The source of any illicit discharge identified during dry or wet weather must be isolated, confirmed, or removed.

1 Dry Weather Outfall Screening Overview

As mapping is improved during catchment investigations and other IDDE Program field work, dry weather outfall screening must be conducted at newly mapped Town-owned MS4 outfalls/interconnections. During Permit Year 6 (PY6) field work, any newly mapped MS4 outfalls, as well as those remaining from previous field efforts, were investigated. In total, Tighe & Bond and Westford DPW staff investigated 11 outfalls in the PY6 field effort. This included gathering outfall inventory data and sampling at outfalls, if dry weather flow was present. Results from these outfalls are detailed below.

Tighe & Bond will deliver an updated geodatabase and GIS maps to the Town with the results of the outfall investigation and dry weather sampling, including photographs of the outfalls investigated, additional outfall attributes, water quality field screening and laboratory results. The PY6 dry weather outfall screening inspections and water quality screening results can be found in in **Attachment C**. The laboratory data for all PY6 water quality samples can be found in **Attachment D**.

1.1 Outfall Investigation Summary

The following summary provides a breakdown of the PY6 field work results:

- Eleven (11) outfalls were investigated. Of the 11:
  - Nine (9) outfalls were successfully screened for dry weather flow. The screening results are included in **Attachment C**. Of those:
    - Eight (8) of these were unmapped MS4 outfalls at the beginning of the field effort. See Section 1.3 for additional information.
    - Four (4) outfalls had dry weather flow and were sampled. See Section 1.2 for more information.
  - Two (2) outfalls were newly located and identified as needing dry weather outfall screening but could not be screened within the Permit Year 6 time frame. See Section 1.3 for more information.
- Four (4) outfalls were determined to be BMP structures or do not exist and should removed from the inventory. See Section 1.4 for additional information.

At the conclusion of this field effort, 99% of Westford's known MS4 outfalls have been screened and completed. The revised total number of MS4 outfalls in the inventory is 526.

1.2 Dry Weather Flow Sampling Results

Sampling was completed when flow was present at outfalls which had rainfall totals less than 0.10 inches in the last 24 hours. The four (4) outfalls with dry weather flow during the 2024 outfall investigations are listed in the table below.

Table 1-1
Outfalls where dry weather sampling was completed (April 2024)

Outfall ID	Location	Illicit Discharge	Date
New4.26_1	42 East Prescott	Unlikely	4/26/2024
New4.26_6	30 North Street	Unlikely	4/26/2024
New4.26_3	6 Deer Run Drive	Unlikely	4/26/2024
New4.26_4	8 Deer Run Drive	Unlikely	4/26/2024

The sampling results of the outfalls listed above are included in the Outfall Sampling Results tab of **Attachment C** and laboratory sampling reports are available in **Attachment D**. The outfall sampling results summary has a color-coded ranking system for the results of the outfall monitoring, which demonstrates the severity of the sampling results (i.e., a red result denotes a higher, potentially problematic concentration of a stormwater pollutant). The ranking system uses known EPA benchmarks for each pollutant analyzed. This system was used to understand the water quality at each outfall and will be used to determine the follow-up outfall prioritization required by Section 2.3.4.7.c of the General Permit.

An illicit discharge ranking of "unlikely", "potential", "suspect" or "obvious" has been given to each outfall with dry weather flow based on the likelihood that an illicit discharge exists, given the observations made in the field and the results of the lab sampling done. This system was used to determine follow-up outfall prioritization, as required by Section 2.3.4.7.c of the General Permit: an updated priority ranking of "low" or "high" has been given to each outfall depending on sampling results and the location's potential for the presence of an illicit discharge.

Per Section 2.3.4.7.a.ii of the General Permit, likely sewage input indicators include any of the following:

- Olfactory or visual evidence of sewage.
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water; or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

The General Permit also requires that discharges that may cause or contribute to an in-stream exceedance of surface water quality standards should be considered a high priority for catchment investigations.

Characteristics of Likely Sewer Input: No location met EPA's criteria for a likely sewer input:

- Outfall **New4.26_4** had chlorine levels greater than the EPA benchmark, which may indicate potable water source inputs. However, it is unlikely that there is a sewer input to this outfall, as levels of ammonia, surfactants, and E.coli were non-detect or below EPA's benchmarks. This outfall has been ranked as **high priority for catchment investigations**.
- While outfalls **New4.26_6** and **New4.26_3** had levels of ammonia and chlorine that were at or above EPA benchmarks, it is unlikely that there is sewer input to these outfalls because conductivity and E.coli concentrations were below the EPA

benchmarks, and surfactants was non-detect. These two outfalls have been ranked as **high priority for catchment investigations**.

1.3 Outfalls Not Previously Mapped

Tighe & Bond found ten (10) unmapped MS4 outfalls while reviewing record drawings in preparation for catchment investigations. Eight (8) of these outfalls were located, inventoried, and added to the mapping. The remaining two (2) outfalls (New4.24 and New5.13) were discovered during post-processing after fieldwork was completed and will be investigated in Permit Year 7. These outfalls are listed in Table 1-2. Refer to **Attachment C** for the dry weather outfall inventory and inspection data from Permit Year 6.

Table 1-2
Outfalls Not Previously Mapped

Outfall ID	Street
New4.26_1	42 East Prescott
New4.26_2A	Misty Lane
New4.26_2B	Misty Lane
New4.26_3	6 Deer Run Drive
New4.26_4	8 Deer Run Drive
New4.26_5	6 Baldwin Road
New4.26_6	30 North Street
New4.24	Magnolia Dr near Greenbier Drive
New5.13	34 Kirsi Circle
New5.21	8 Crest Drive

1.4 Outfalls to Reclassify

Four (4) mapped outfalls investigated during the Permit Year 6 field work were determined to be either inlets or outlets to a BMP, or the outfall did not exist. Table 1-3 contains a list of outfalls recommended to be reclassified or removed from the Town's inventory because of the reasons mentioned. These structures should be reviewed and confirmed by the Town before final removal.

Table 1-3
Outfalls to be Removed from the Outfall Inventory (Permit Year 6)

Outfall ID	Street	Reason
OF_421	4 Indigo Lane	BMP outlet
New_21	4 Indigo Lane	BMP inlet
OF_549	3 Gooseneck Lane	BMP inlet
New_PPP	7 Anne Teresa Way	Does not exist. Duplicate point of UNK-9

2 Catchment Investigation Overview

In Permit Year 6, Tighe & Bond conducted catchment investigations with Town staff to inspect key junction manholes (KJMH) building off the work completed in previous permit years. The investigations were completed in accordance with the written Catchment Investigation Procedures developed in 2019, attached to the Town's IDDE Plan. The summary below describes the work completed in Permit Year 6.

Per Section 2.3.4.8.c.ii of the General Permit, the Town must inspect KJMHs and gather catchment information on the locations of MS4 pipes, manholes, and the extent of the contributing catchment for each MS4 catchment. During dry weather, KJMHs shall be opened and inspected systematically for visual and olfactory evidence of illicit connections (e.g., excrement, toilet paper, gray filamentous bacterial growth, or sanitary products present). If flow is observed, it shall be sampled for ammonia, chlorine, and surfactants. Where sampling results or visual or olfactory evidence indicate potential illicit discharges or SSOs[1], the area draining to the junction manhole shall be flagged for further upstream investigation. Key junction and subsequent manhole investigations will proceed until the location of suspected illicit discharges or SSOs can be isolated to a pipe segment between two manholes. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling. **Attachment B** includes tables with PY6 catchment investigations and dry weather screening inspection data.

In accordance with the Town's MS4 Catchment Investigation Procedures and the MS4 Permit *Section 2.3.4.8.c.ii.1.c*, outfall catchments that do not include a junction manhole (e.g., the catchment may be small and only contain a number of individual catch basins) do not require dry weather key junction structure inspections; the dry weather screening completed at the catchment's outfall fulfills the intent of the manhole inspection requirement when screening does not indicate the presence of a potential illicit discharge. For catchments that meet these criteria and do not require wet weather screening, the catchment investigation is considered complete. The total number of catchments that fell into this category is listed in Table 2-1.

The Town must also document the presence or absence of SVFs[2] for each catchment. Catchments with a minimum of one (1) SVF are subject to wet weather sampling requirements of Section 2.3.4.8.c.ii.2, and the Town must inspect and sample the associated outfall under wet weather conditions to the extent necessary to determine whether wet weather-induced high flows in sanitary sewers or high groundwater in areas served by septic systems result in discharges of sanitary flow to the MS4. An SVF review was conducted for all outfall catchments selected for investigation in PY6 to determine if they had SVFs and therefore met the criteria for wet weather screening. The catchments identified as having one or more SVFs are listed in the Wet Weather List tab in **Attachment B**.

During Permit Year 6 Tighe & Bond, with Town staff, conducted dry weather catchment investigations over ten (10) days starting in December 2023 through May 2024. Field work was put on hold during winter months due to snow accumulation and unconducive weather conditions. Field inspections were conducted on key junction structures (KJ) and additional

[1] Likely sewer input indicators include olfactory or visual evidence of sewage; Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water; or Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.
[2] A list of SVFs is included in Section 2.3.4.8.c of the General Permit.

follow-up structure as needed. Terminal structures (TS) were either field verified or verified via Town provided record drawings. A mapbook of the targeted catchments investigated was created by Tighe & Bond, and included for reference in **Attachment A**. The maps have notes that include:

- Structures investigated including terminal structures confirmed
  - *Terminal Structures: most upstream structures in the catchment area*
- Callouts of mapping markups, where staff found discrepancies between the mapping and in-field conditions (like structure locations) that should be updated in GIS.
- Callouts of sampling results for structures found with flow
- Completion status of dry weather investigations, SVF, wet weather investigations, catchment investigations
  - *Dry Weather Investigation: Represents the outfall screening status during dry weather.*
  - *SVF: Notes if a System Vulnerability Factor (SVF) is present.*
  - *Wet Weather Investigation: The outfall screening status during wet weather.*
  - *Catchment Investigation: If the catchment area can be considered complete for dry weather, wet weather, and key junction inspection status.*
- Any other field notes about access or maintenance issues.

2.1 Catchment Investigation Results

During the dry weather catchment investigation effort, sixty-seven (67) structures (manholes or catch basins) were visited, forty (40) of which were key junction structures and twenty-seven (27) of which did not meet the criteria for a key junction structure. Of the key junction structures, twenty-four (24) were observed with dry weather flow and all were sampled. And of the non-key junction structures, seventeen (17) were observed with dry weather flow and sampled. Some of the structures sampled had dry weather flow from multiple inlets and therefore multiple samples were taken. A total of forty-eight (48) dry weather samples were taken during the ten days of catchment investigation fieldwork.

To categorize the catchment investigation as complete, both the key junction structure inspection and wet weather outfall inspection, if required for the catchment, must be completed. A summary of the total catchments successfully screened and completed in Permit Year 6 is provided in Table 2-1. The number of catchment investigations completed includes both catchments successfully investigated and additional catchment areas identified as not having key junction manholes and no SVF. See **Attachment B** for the summary of field notes on each catchment investigated including inspection observations, screening results, and maintenance needs.

Table 2-1
Summary of Permit Year 6 Complete Catchment Investigations

Catchment Investigation Status	Number of Catchments
Catchment Investigation Complete	51
No Key Junction Manhole, Mapping Confirmed, Investigation Complete	30
Total	**81**

Based on the PY6 field work:

- Eighty-one (81) catchments can be considered complete.
- Eleven (11) outfall catchments were successfully investigated but determined to have SVFs. While the dry weather catchment investigation can be considered complete, these catchments are marked as incomplete until wet weather screening is conducted.

- Six (6) catchments are marked as incomplete because investigations were initiated but not completed. Additional dry weather catchment field work and/or mapping investigations are needed to complete these catchments. These catchments are identified as Revisit in **Attachment B**, along with additional notes.

Since Permit Year 4, 193 catchment investigations have been completed to date. The percentage of total catchments investigated assumes each MS4 outfall (526 total) has its own catchment, though the initial catchment delineations in the GIS mapping are not yet as refined as this.

2.2 In-situ Screening Results

Of the forty-eight (48) dry weather flow samples collected, **1 had water quality results that met EPA's criteria for a likely sewer input**[3]. All of the samples collected had benchmark exceedances for at least one parameter. More detailed information is included in **Attachment B** and bulleted below:

- CB-1710, pipe ID 1436 (north inlet) in catchment **OF_7** on Woodbine Terrace
  - Ammonia = 0.5 mg/L
  - Surfactants = 0.50 mg/L
  - Chlorine = 0.08 mg/L
  - No physical indicators observed in flow (no odor, no floatables).
  - Flow sampled at upstream CB-1714 was not in exceedance.
  - Sump pump discharge from home observed entering into CB-1713, located upstream of CB-1714.

  This structure had flow that met EPA's criteria for likely sewer input. The Town should revisit the area to determine possible sources of the dry weather flow.
- One location did not exceed MS4 threshold but did have elevated levels of surfactants: DMH-3970, south inlet coming from DMH-3968 (no pipe ID listed in GIS) in catchment **OF_179** on Misty Lane
  - Ammonia = 0.0 mg/L
  - Surfactants = 0.75 mg/L
  - Chlorine = 0.03 mg/L
  - No physical indicators observed in flow.
  - Upstream DMH-3968 was observed to be dry.
- Twenty-eight (28) samples had chlorine levels greater than or equal to the EPA benchmark of 0.02 mg/L, which may indicate potable water source inputs. However, none of these samples met the MS4 criteria for likely sewer input as levels of ammonia and surfactants, were non-detect or below EPA benchmarks. Sources of chlorine may include water main leaks or breaks, hydrant flushing, or chlorinated pool water discharges to the storm drain.
- Forty-eight (48) samples had surfactant levels greater than or equal to the EPA benchmark of 0.25 mg/L. Sources of surfactants or foaming agents in stormwater may include household detergents, consumer products, domestic wastewater, pesticides,

[3] MS4 likely sewer input indicators include olfactory or visual evidence of sewage; Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water; or Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

or resident car washing. It should be noted that surfactants were measured using a test kit including a color wheel where 0.25 was the lowest concentration (above 0). Overall, we were conservative in our readings, and if the final solution had a faint color, we recorded the sample as having a surfactants concentration of 0.25 mg/L.
- No samples had ammonia levels in exceedance of the EPA benchmark of 0.5 mg/L, with the exception of the sample in catchment OF_7.

2.3 SVF Analysis and Wet Weather Screening

As defined in the 2016 MS4 Permit, *Section 2.3.4.8.c.ii.2*, "*for all catchments with a minimum of one (1) SVF identified… The permittee shall inspect and sample under wet weather conditions*". System Vulnerability Factors (SVFs) are defined in *Section 2.3.4.8.c.i*. An initial analysis was completed for all outfall catchments selected for investigation to determine if they had SVFs and therefore met the criteria for wet weather screening (**Attachment B**).

The Town and Tighe & Bond continued the SVF analysis process during Permit Year 6 with the following results:

- Fourteen (14) outfall catchments were found to have one (1) or more SVFs and thus marked for wet weather screening.
- All other outfall catchments reviewed during PY6 were found to have no SVFs.

Refer to **Attachment B** for a complete list of catchments reviewed for SVFs and those marked for wet weather screening. No wet weather outfall screening field work was conducted during Permit Year 6 because the weather conditions did not meet the required criteria. The SVF analysis process and wet weather screening will continue into Permit Year 7 until all catchments have been reviewed and, if necessary, screening completed.

2.4 Mapping Needs

During investigations, some catchments were discovered to need additional mapping efforts to correct connections between mapped structures. Note that catchment investigations were done using preliminary catchment delineations and catchment delineations will be refined as catchment investigations continue in future permit years. Additional mapping field notes for the outfalls and catchments investigated were documented as data issue points in the Data Issue Layer in the Town's GIS. Drainage structures visited during this effort within these incomplete catchments are also shown in **Attachment A**.

2.5 Catchment Investigation Summary Spreadsheet

Inspection and screening data from the Permit Year 6 field effort are included in the enclosed Excel spreadsheet (**Attachment B**). The spreadsheet has three tabs, as described below. Note that all of this data, as well as photos, are also available in the Town's GIS mapping.

- **Catchments Visited Master Data** – A log of the screening completed at each KJMH, including notes on the presence of dry weather flow and possible source (if applicable), observations made during field inspections, any maintenance issues, and comments on whether the catchment is considered complete based on both wet weather and KJMH screenings.
- **KJMH Investigations** – A summary of the water quality screening results at each KJMH during dry weather for ammonia, chlorine, and surfactants. Screening results are presented with the pipe ID where flow was present and sampled. The in-situ monitoring was completed using test kits; no laboratory analysis was conducted. The KJMH investigations tab has a color-coded ranking system for the KJMH sampling results, which demonstrates the severity of the results (i.e., a red result denotes a

higher, potentially problematic concentration of a stormwater pollutant). The ranking system uses known EPA benchmarks for each pollutant analyzed. This system was used to better understand the water quality at each structure.

- **Wet Weather Summary** - A log of all the outfall catchments identified as having one or more SVF, requiring wet weather screening.

3 Recommendations and Next Steps

The following are recommendations for the Town, which can be completed by the Town or a Contractor in subsequent Permit Years:

- **The Town should revisit the locations** discussed in Section 1.3 and 2.1.
- **Continue to improve drainage mapping.** The Town should continue to improve its drainage system mapping during subsequent field investigations including reviewing mapping discrepancies in additional catchments. During field work, staff noted some discrepancies between the stormwater GIS mapping and the in-field conditions, such as structure locations and pipe connectivity. These modifications are included as markups to the mapbook, as well as field notes in the Data Issue Layer, and should be incorporated into the stormwater GIS.
- **Continue ongoing catchment investigations.** Per EPA's implementation schedule, the Town should continue to complete the remaining catchment investigations, including dry weather KJMH screening in subsequent Permit Years. As investigations are completed, the Town and Tighe & Bond staff should consider refining the current catchment delineations as mapping becomes more accurate.
- **Ongoing reporting and record keeping.** The work completed to date should be reported in each annual report. The Permit requires the following to be reported per *Section 2.3.4.9* referenced here:

  "Indicators of IDDE Program Progress
  The permittee shall define or describe indicators for tracking program success and evaluate and report on the overall effectiveness of the IDDE program in each annual report. At a minimum, the permittee shall document in each annual report:
    - *The number of SSOs and illicit discharges identified and removed,*
    - *The number and percent of total outfall catchments served by the MS4 evaluated using the catchment investigation procedure,*
    - *All dry weather and wet weather screening and sampling results and*
    - *The volume of sewage removed."*

Enclosures

Attachment A: Catchment Investigation Mapbook - includes a marked-up field work mapbook from PY6 catchment investigations (*delivered electronically*)

Attachment B: Catchment Investigation Data Summary **-** includes tables with PY6 catchment investigations and wet weather screening data (*delivered electronically*)

Attachment C: Dry Weather Outfall Screening Summary - includes all dry weather outfall screening inspections for PY6, as well as the in-situ and lab sampling data collected (*delivered electronically*)

Attachment D Dry Weather Outfall Screening Lab Sampling Results (*delivered electronically*)

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Attachment A
PY6 Catchment Investigation Field Work Mapbook

(delivered electronically)

Attachment B
PY6 Catchment Investigation Tracking
(delivered electronically)

Attachment C
PY6 Dry Weather Outfall Screening
(delivered electronically)

Attachment D
Lab Sampling Results
(delivered electronically)