Illicit Discharge Detection and Elimination (IDDE) Plan

City of Dover, NH

Permit Year 5

EPA NPDES Permit Number NHR041000

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Illicit Discharge Detection and Elimination Plan

Tables

Appendices

1 IDDE Program Implementation Timeline

Table 1-1. IDDE Program Implementation Timeline

IDDE Program Requirement	Completion Date from Effective Date of Permit					
	1 Year	1.5 Years	2 Years	3 Years	7 Years	10 Years
Written IDDE Program Plan	X					
SSO Inventory	X					
Initial Outfall Ranking	X					
Written Catchment Investigation Procedure		X				
Phase I Mapping			X			
Phase II Mapping						X
IDDE Regulatory Mechanism or By-law (if not already in place)				X		
Dry Weather Outfall Screening				X		
Follow-up Ranking of Outfalls and Interconnections				X		
Catchment Investigations – Problem Outfalls					X	
Catchment Investigations – all Problem, High and Low Priority Outfalls						X

2 Authority and Statement of IDDE Responsibilities

2.1 Legal Authority

The City of Dover has adopted a Section 121-2 of the Dover City Ordinances (Adopted by the City Council on 11-30-1988 as Ord. No. 25-88*; Amended on 06-11-2008 by Ord. No. 2008.05.28-004; Amendments noted where applicable) with adequate legal authority to:

- Prohibit illicit discharges
- Investigate suspected illicit discharges
- Eliminate illicit discharges, including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4 system
- Implement appropriate enforcement procedures and actions.

The City of Dove will periodically review its current ordinances and related land use regulations and policies for consistency with the 2017 MS4 Permit.

2.2 Statement of Responsibilities

The City of Dover, Community Services Department is the lead municipal department responsible for implementing the IDDE program. Other agencies or departments with responsibility for aspects of the program include but are not limited to the Planning Department and the Code Enforcement Department.

3 Stormwater System Mapping

A copy of the existing storm system map is provided in **Appendix B**.

The MS4 Permit requires the storm system map to be updated in two phases as outlined below. The City of Dover Community Services Department is responsible for updating the stormwater system mapping pursuant to the 2017 MS4 Permit. The City of Dover will report on the progress towards completion of the storm system map in each annual report. Updates to the stormwater mapping will be included in **Appendix B**.

3.1 Phase I Mapping

Phase I mapping must be completed within two (2) years of the effective date of the permit (July 1, 2020) and include the information per Part 2.3.4.5.a of the MS4 Permit and include the following information:

- Outfalls and receiving waters (previously required by the MS4-2003 permit)
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- Municipally owned stormwater treatment structures
- Water bodies identified by name and indication of all use impairments as identified on the most recent EPA approved New Hampshire Integrated List of Waters report
- Initial catchment delineations. Topographic contours and drainage system information may be used to produce initial catchment delineations.

The City of Dover has completed the following updates to its stormwater mapping to meet the Phase I requirements:

- Outfalls and receiving waters (previously required by the MS4-2003 permit)
- Open channel conveyances and pipe networks
- Interconnections with other MS4s and other storm sewer systems
- Most municipally owned stormwater treatment structures
- Water bodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of Waters report

3.2 Phase II Mapping

Phase II mapping must be completed within ten (10) years of the effective date of the permit (July 1, 2028) and include the information per Part 2.3.4.5.b of the MS4 Permit. Although not a requirement at this time, information required as part of this mapping is completed to the best of our current knowledge. Mapping is continually being revised and updated.

4 Sanitary Sewer Overflows (SSOs)

The City of Dover has no Sanitary Sewer Overflows (SSOs).

5 Assessment and Priority Ranking of Outfalls

The MS4 Permit requires an assessment and priority ranking of outfalls in terms of their potential to have illicit discharges related public health significance. The ranking helps determine the priority order for performing IDDE investigations and meeting permit milestones.

5.1 Outfall Catchment Delineations

The City of Dover has prioritized and done dry weather investigations for all known publicly owned outfalls and interconnections. When indications of illicit connections are detected, the catchment is delineated and investigated. This will be the same process used for wet weather investigations where all known publicly owned outfalls and interconnections are tested, and where signs of illicit connections are found, the catchments will be clearly delineated. Because all outfalls and interconnections will be investigated, the City of Dover has prioritized all catchment areas and minimized effort to eliminate or deprioritize by a more thorough delineation exercise.

5.2 Outfall and Interconnection Inventory and Initial Ranking

The Community Services Department has identified over 400 outfalls and interconnections and has ranked all as high priority. Dry weather investigations have been preformed at all outfalls and wet weather investigations at each of these outfalls will commence in the summer of 2022. Because the city has elected to treat all catchments as high priority, the city is not going through a more thorough outfall ranking exercise.

See Appendix C for an outfall inventory and priority ranking matrix.

6 Dry Weather Outfall Screening and Sampling

Dry weather flow is a common indicator of potential illicit connections. The MS4 Permit requires all outfalls/interconnections (excluding Problem and Excluded Outfalls) to be inspected for the presence of dry weather flow. The Community Services Department is responsible for conducting dry weather outfall screening, starting with High Priority outfalls, followed by Low Priority outfalls, based on the initial priority rankings described in the previous section by the end of Year 3.

Dry weather outfall Screening and Sampling shall be completed in accordance with Part 2.3.4.7.b of the MS4 Permit. Plans and procedures for such screening and sampling shall be incorporated into this plan.

6.1 Interpreting Outfall Sampling Results

Outfall analytical data from dry weather sampling can be used to help identify the major type or source of discharge. The following table shows values identified by the U.S. EPA and the Center for Watershed Protection as typical screening values for select parameters. These represent the typical concentration (or value) of each parameter expected to be found in stormwater. Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges.

Benchmark Field Measurements for Select Parameters

Analyte or Parameter	Concentration Levels Indicating Need for Further Investigation
Ammonia	**>0.5 mg/L**
Specific conductance	**>600 µS/cm**
Surfactants	**>0.25 mg/L**
Total Chlorine	**>0.02 mg/L**
Indicator Bacteria: ***E.coli*** ***Enterococcus***	***E.coli*: the most probable number should not exceed 88/100 mL (level for designated swimming beaches) or 406/100mL (for recreational waters)** ***Enterococcus:* the most probable number should not exceed 104/100 mL (level for designated coastal beaches)**
Salinity	**NA**
Temperature	**NA**
Pollutants of concern: ***Nitrogen***	**TBD**

Further catchment investigation is required when one of the following scenarios is occurs:
• 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.

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8 Catchment Investigations

Once stormwater outfalls with evidence of illicit discharges have been identified, various methods can be used to trace the source of the potential discharge within the outfall catchment area. Catchment investigation techniques include but are not limited to review of maps, historic plans, and records; manhole observation; dry and wet weather sampling; video inspection; smoke testing; and dye testing.

This section outlines a systematic procedure to investigate outfall catchments and identify the source(s) of potential illicit discharges. Information and data collected as part of the catchment investigations will be reported in each annual report.

8.1 Map and Record Review

The City of Dover will review relevant mapping and historic plans and records to identify areas within the catchment with higher potential for illicit connections. The following information will be reviewed:

- Plans related to the construction of the drainage network
- Prior work on the storm drains
- Health Department or other municipal data on septic system failures or required upgrades
- Records related to septic system breakouts, SSOs, and sanitary sewer surcharges

8.2 System Vulnerability Factors

As outlined in Appendix C of this plan, each catchment has been ranks as problem, high priority or low priority. Follow-up outfall testing will be conducted per this plan. If a bacteria hit occurs, the following catchment research shall be conducted and documented. Based on the Map and Records review, City of Dover will identify any of the following System Vulnerability Factors (SVFs). SVFs indicate a risk of sanitary or septic system inputs to the MS4 under wet weather conditions.

The City of Dover SVF inventory based on the following factors, will be incorporated into the Outfall and Catchment investigation table in Appendix C as outfall testing is completed:

- History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages.
- Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs.
- Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints.
- Common or twin-invert manholes serving storm and sanitary sewer alignments.
- Common trench construction serving both storm and sanitary sewer alignments.
- Crossings of storm and sanitary sewer alignments.
- Sanitary sewer alignments known or suspected to have been constructed with an underdrain system.

- Areas formerly served by combined sewer systems.
- Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure, directly piped connections between storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through Inflow/Infiltration Analyses, Sanitary Sewer Evaluation Surveys, or other infrastructure investigations.
- Areas formerly served by combined sewer systems.
- Any storm drain infrastructure greater than 40 years old in medium and densely developed areas.
- Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance).
- History of multiple health department actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance). Training

8.3 Dry Weather Catchment Investigation (Manhole Inspections)

After initial dry weather outfall sampling, the City of Dover will implement a dry weather storm drain network investigation that involves systematically and progressively observing, sampling and evaluating upstream catchbasins and key junction manholes in the MS4 to determine the approximate location of suspected illicit discharges.

The Community Services Department will be responsible for implementing the dry weather manhole inspection program and making updates as necessary. Infrastructure information will be incorporated into the storm system map, and catchment delineations will be refined based on the field investigation, where necessary. The SVF inventory will also be updated based on information obtained during the field investigations, where necessary.

Several important terms related to the dry weather manhole inspection program are defined by the MS4 Permit as follows:

- **Junction Manhole** is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.

- **Key Junction Manholes** are those junction manholes that can represent one or more junction manholes without compromising adequate implementation of the illicit discharge program. Adequate implementation of the illicit discharge program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the permittee's ability to determine the possible presence of an upstream illicit discharge. A permittee may exclude a junction manhole located upstream from another located in the immediate vicinity or that is serving a drainage alignment with no potential for illicit connections.

For all catchments identified for investigation, during dry weather, field crews will systematically inspect

key junction manholes for evidence of illicit discharges and confirm or identify potential system vulnerability factors. This program involves progressive inspection and sampling at manholes in the storm drain network to isolate and eliminate illicit discharges.

The manhole inspection methodology will be conducted in one of two ways (or a combination of both):

- By working progressively up from the outfall and inspecting key junction manholes along the way, or
- By working progressively down from the upper parts of the catchment toward the outfall and inspecting key junction manholes along the way.

For most catchments, manhole inspections will proceed from the outfall moving up into the system. However, the decision to move up or down the system depends on the nature of the drainage system and the surrounding land use and the availability of information on the catchment and drainage system. Moving up the system can begin immediately when an illicit discharge is detected at an outfall, and only a map of the storm drain system is required. Moving down the system requires more advance preparation and reliable drainage system information on the upstream segments of the storm drain system, but may be more efficient if the sources of illicit discharges are believed to be located in the upstream portions of the catchment area. Once a manhole inspection methodology has been selected, investigations will continue systematically through the catchment.

Inspection of key junction manholes will proceed as follows:

1. Manholes will be opened and inspected for visual and olfactory evidence of illicit connections.

2. If flow is observed, a sample will be collected and analyzed at a minimum for ammonia, chlorine, and surfactants.

3. Where sampling results or visual or olfactory evidence indicate potential illicit discharges, the area draining to the junction manhole will be flagged for further upstream manhole investigation and/or isolation and confirmation of sources.

4. Subsequent key junction manhole inspections will proceed until the location of suspected illicit discharges can be isolated to a pipe segment between two manholes.

5. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling.

8.4 Wet Weather Catchment Investigation (Outfall Sampling)

Where a minimum of one (1) System Vulnerability Factor (SVF) is identified based on previous information or the catchment investigation, a wet weather investigation must also be conducted at the associated outfall. The Community Services Department will be responsible for implementing the wet weather outfall sampling program and making updates as necessary.

Outfalls will be inspected and sampled 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.
Wet weather outfall sampling will proceed as follows:

1. Wet weather sampling will occur during or after a storm event of sufficient depth or intensity to produce a stormwater discharge at the outfall.
    a. To the extent feasible, sampling should occur during the spring (March through June) when groundwater levels are relatively high.
    b. There is no specific rainfall amount that will trigger sampling, although minimum storm event intensities that are likely to trigger sanitary sewer interconnections are preferred.
    c. Sampling during the initial period of discharge ("first flush") will be avoided.

2. If wet weather outfall sampling indicates a potential illicit discharge in the form of one of the following scenarios; 1) Olfactory or visual evidence of sewage, 2) 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 3) Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine; then additional wet weather source sampling will be performed, as warranted, or source isolation and confirmation procedures will be followed as described in Source Isolation and Confirmation

3. If wet weather outfall sampling does not identify evidence of illicit discharges as described above, and no evidence of an illicit discharge is found during dry weather manhole inspections, catchment investigations will be considered complete.

8.5 Source Isolation and Confirmation

Once the source of an illicit discharge is approximated between two manholes, more detailed investigation techniques will be used to isolate and confirm the source of the illicit discharge. The following methods may be used in isolating and confirming the source of illicit discharges:

- Sandbagging
- Smoke Testing
- Dye Testing
- CCTV/Video Inspections
- Optical Brightener Monitoring
- IDDE Canines.

Public notification is an important aspect of a detailed source investigation program. Prior to smoke testing, dye testing, or TV inspections, the Community Services Department will notify property owners in the affected area.

8.6 Illicit Discharge Removal

When the specific source of an illicit discharge is identified, the City of Dover will exercise its authority as necessary to require its removal. The annual report will include the status of IDDE investigation and removal activities including the following information for each confirmed source:

- The location of the discharge and its source(s)
- A description of the discharge
- The method of discovery
- Date of discovery
- Date of elimination, mitigation or enforcement action
- Estimate of the volume of flow removed.

8.6.1 Confirmatory Outfall Screening

Within one (1) year of removal of all identified illicit discharges within a catchment area, confirmatory outfall or interconnection screening will be conducted. The confirmatory screening will be conducted in dry weather unless System Vulnerability Factors have been identified, in which case both dry weather and wet weather confirmatory screening will be conducted. If confirmatory screening indicates evidence of additional illicit discharges, the catchment will be scheduled for additional investigation. Confirmatory screening is not required in catchments where no illicit discharges or System Vulnerability Factors have been identified and no previous screening indicated suspicious flows.

8.7 Follow-up Screening

Upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary), each outfall or interconnection will be scheduled for follow-up screening within five (5) years, or sooner based on the catchment's illicit discharge priority. Ongoing screening will consist of dry weather screening and sampling. Ongoing wet weather screening and sampling will also be conducted at outfalls where wet weather screening was required due to System Vulnerability Factors. All sampling results will be reported in the annual report.

8.8 Illicit Discharge Detection and Elimination Training

The City of Dover will implement a training program to employees involved in IDDE program about the program, including how to recognize illicit discharges. The permittee shall report on the frequency and type of employee training in the annual report.

9 Progress Reporting

The progress and success of the IDDE program will be evaluated on an annual basis. The evaluation will be documented in the annual report and will include the following indicators of program progress:

- Number of SSOs and illicit discharges identified and removed
- Number and percent of total outfall catchments served by the MS4 evaluated using the catchment investigation procedure
- Number of dry weather outfall inspections/screenings
- Number of wet weather outfall inspections/sampling events
- Estimate of the volume of sewage removed, as applicable
- Number of employees trained annually.

The success of the IDDE program will be measured by the IDDE activities completed within the required permit timelines.

Appendix A

Legal Authority (IDDE Bylaw or Ordinance)

Chapter 121. Sewers and Water

Article I. Sewer Use

§ 121-2. Prohibited acts; connection to public sewer required.

A. It shall be unlawful for any person to place, deposit or permit to be deposited any sewage, human or animal excrement, garbage or other objectionable waste on public or private property within the City of Dover or in any area under the jurisdiction of said City.

B. It shall be unlawful to discharge to any natural outlet within the City of Dover or in any area under the jurisdiction of said City any wastewater, except where suitable treatment has been provided in accordance with subsequent provisions of this article.

C. Except as hereinafter provided, it shall be unlawful to construct or maintain any privy, privy vault, septic tank, cesspool or other facility intended or used for the disposal of sewage.

D. The owners of all houses, buildings or properties used for human occupancy, employment, recreation or other purposes situated within the City and abutting on any street, alley or right-of-way in which there is now located or may in the future be located a public sanitary sewer of the City are hereby required at their expense to install suitable toilet facilities therein and to connect such facilities directly with the proper public sewer in accordance with the provisions of this article within 90 days after date of official notice to do so, provided that said public sewer is within 100 feet of the building.

E. No person shall maliciously, willfully or negligently break, damage, destroy, uncover, deface or tamper with any structure, appurtenance or equipment which is a part of the municipal wastewater works. Any person violating this provision shall be subject to immediate arrest under charge of disorderly conduct.

Appendix B

Storm System Mapping

CITY OF DOVER NEW HAMPSHIRE

New Hampshire DES
303(d) Impaired Water
2016 Not Adopted

Beach Area	Rivers Streams	Lakes Ponds	NH DES Category Description
			3-ND, 3-PAR, 3-PNR - No data, insufficient data or limited data exists.
			Category 4 (4B) - There is an impairment by pollutant and a TMDL has been approved and completed. Or there is an impairment by a non-pollutant.
			Category 5-M - There is an impairment by pollutant which will require a TMDL.
			Category 5-F - There is an impairment by pollutant which will require a TMDL. This impairment causes poor water quality and is considered severe.

HUC 12 Watershed Boundary

Base Features

Municipal Boundary

2010 Urban Area

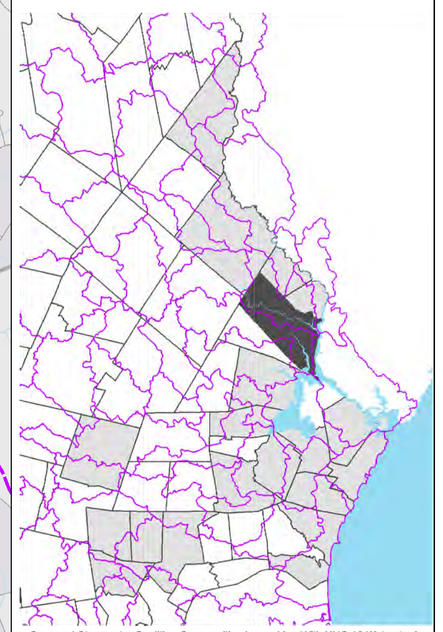
Boston, MA--NH--RI
Dover--Rochester, NH--ME
Epping, NH
Portsmouth, NH--ME

Water Features

Surface Waterbody
Stream, River

Roads by Legislative Class

Class I & II Roads
Class IV Urban Compact Road
Class V Local Road
Private



Seacoast Stormwater Coalition Communities Locus Map With HUC 12 Watersheds

Surface Water Quality Assessments 305(b) and 303(d)

The Surface Water Quality Assessment Program produces two surface water quality documents every two years, the "305(b) Report" and the "303(d) List". As the two documents use the same data, the 305(b) Report and 303(d) List were combined into one Integrated Report starting in 2002. The Integrated Report describes the quality of New Hampshire's surface waters and an analysis of the extent to which all such waters provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water.

The Federal Water Pollution Control Act (PL92-500), commonly called the Clean Water Act (CWA)], as last reauthorized by the Water Quality Act of 1987, requires each state to submit two surface water quality documents to the US Environmental Protection Agency (EPA) every two years. Section 305(b) of the CWA requires submittal of a report (commonly called the "305(b) Report"), that describes the quality of its surface waters and an analysis of the extent to which all such waters provide for the protection and propagation of a balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water.

The second document is typically called the "303(d) List," which is so named because it is a requirement of Section 303(d) of the CWA. The 303(d) List includes surface waters that are:

-> Impaired or threatened by a pollutant or pollutant(s).
-> Not expected to meet water quality standards within a reasonable time even after application of best available technology standards for point sources or best management practices for nonpoint sources.
-> Require development and implementation of a comprehensive water quality study (a Total Maximum Daily Load (TMDL) study) which is designed to meet water quality standards.

Data Sources

Base features from NH GRANIT database. Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Earth Systems Research Center (ESRC), under contract to the Office of Strategic Initiatives (OSI), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. Neither OSI nor ESRC make any claim as to the validity or reliability or to any implied uses of these data.

Data Disclaimer

Data should be used for planning purposes only. Data were derived from various sources and were updated at different timeframes, with varying levels of accuracy. Please notify SRPC or RPC of any errors or omissions.

N W E S

0 0.25 0.5 1 Miles

ROCKINGHAM PLANNING COMMISSION
Rockingham County Conservation District
Strafford REGIONAL PLANNING COMMISSION
NH Department of Environmental Services
NH GRANIT

Drainage System

- Outfalls
- Ditches
- Swales
- Storm Manholes
- Catch Basins
- Drain Lines
- Drainage Pond

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

City of Dover, NH makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Appendix C

Outfall Inventory and Priority Ranking Matrix

Receiving Water	Outfall ID	City Reference	Previous Screening Results Indicate Likely Sewer Input? [1]	Receiving Water Body Impairment? [2]	Discharging to Area of Concern to Public Health? [3]	Frequency of Past Discharge Complaints	Density of Generating Sites [4]	Development/ Infrastructure [5]	Historic Combined Sewers or Septic? [6]	Aging Septic? [7]	Culverted Streams? [8]	Additional Characteristics	Score	Priority Ranking	History of unaddressed SSO in the catchment area, including due to rain events, high water table and blockages.	Common or twin-invert manholes serving storm and sanitary sewer	Common trench construction (within 4 feet) serving both storm sewer and sanitary sewer alignments	Crossing of storm and sanitary sewer where sewer is shallower than storm drain	Sanitary sewer alignments know or suspected to have been constructed with an underdrain system	Inadequate sanitary sewer level of service resulting in regular surcharging, customer back-ups, or frequent customer complaints (known aging septic^7 within catchment area - same as history of SSO)	Area formally (with-in last 40 years) served by combined sewer systems	Area with known infrastructure defects and leaking
Information Source			Outfall inspections and sample results	Impaired Waters List	Maps	Town Staff	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual Observation	Town Staff, GIS Maps	Land Use, Town Staff	GIS and Storm System Maps	Other			Town Staff	Maps	Maps	Maps/Asset Management Program	Maps	Town Staff	Town Staff	Town Staff
Scoring Criteria			Yes = 10 (Problem Outfall) No = 0	Yes = 10 (impairment listed as high priority in permit) No = 0	Yes = 10 No = 0	Frequent = 3 Occasional = 2 None = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	Yes = 3 No = 0	Yes = 3 No = 0	Yes = 3 No = 0	TBD			Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
	OUTF-001		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-002		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-003		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-004		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-006		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-007		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-017		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-019		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-027		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-028		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-029		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-031		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-032		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-033		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-034		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-045		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-046		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-047		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-048		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-049		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-050		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-051		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-052		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-053		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-054		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-055		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-056		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-057		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-058		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
E*01-01 BELLAMY RIVER NORTH	OUTF-059		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-060		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-061		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-062		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-065		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-066		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-067		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-068		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-069		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
E*01-03 BELLAMY RIVER SOUTH CLEMENT POINT	OUTF-075		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-076		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-077		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-078		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-079		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-080		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
E*01-04 BELLAMY RIVER SOUTH	OUTF-081		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-086		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-087		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
E*06-14 LOWER LITTLE BAY MARINA SZ	OUTF-088		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-089		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-090		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-091		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-092		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-093		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-094		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
E*01-01 UPPER PISCATAQUA RIVER-NH-NORTH	OUTF-095		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-096		0	10	0	0	2	0	0	0	0		12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-097		0	10	0	0	2	0	0	0	0		12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-098		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-099		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-100		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-101		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-105		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-106		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-107		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
E*01-02 DOVER WWTF SZ-NH	OUTF-108		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-109		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
E*01-03 UPPER PISCATAQUA RIVER-NH-SOUTH	OUTF-110		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-113		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
I*02 COCHECO RIVER - WATSON WALDRON DAM	OUTF-114		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-115		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
I*04 COCHECO RIVER - CENTRAL AVE DAM	OUTF-116		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-118		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-122		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-123		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-124		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-128		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-129		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-130		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-131		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-132		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-133		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-134		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-135		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no

	OUTF-136		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-137		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-138		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-139		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-140		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-141		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-142		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-143		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-144		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-145		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-146		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
I*02 BELLAMY RIVER - SAWYERS MILL DAM POND	OUTF-147		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-153		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-154		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-161		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-162		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-163		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-164		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-165		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-166		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-167		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-168		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-170		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-171		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-172		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-174		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-175		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-176		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-180		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-180		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-181		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-182		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-183		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-184		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-185		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-186		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-187		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-188		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-189		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-190		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-191		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-192		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-193		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
L*03 WILLAND POND	OUTF-194		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-195		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-196		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
L*02 BELLAMY RESERVOIR	OUTF-197		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-198		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-199		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*02 BLACKWATER BROOK-CLARK BROOK	OUTF-200		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-202		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-203		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-204		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*03 COCHECO RIVER - UNNAMED BROOK	OUTF-211		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*05 COCHECO RIVER	OUTF-212		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-213		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-214		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-215		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-216		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-217		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-218		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-219		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-220		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-232		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-233		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-235		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*06 INDIAN BROOK	OUTF-236		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-237		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-238		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-239		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-240		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-243		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-244		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-246		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*14 UNNAMED TRIB. TO COCHECO RIVER, DOVER (FROM LANDFILL)	OUTF-247		0	10	0	0	2	0	0	0	0	landfill	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-248		0	10	0	0	2	0	0	0	0	landfill	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*15 BERRY BROOK	OUTF-249		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-250		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-254		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-255		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-256		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-257		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-261		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-267		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-268		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-269		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-270		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-271		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-272		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-273		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-276		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-277		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-279		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-280		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-281		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-282		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-283		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*16 JACKSON BROOK	OUTF-284		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-285		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-289		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-292		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-293		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-294		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-295		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-296		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no

	OUTF-297		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-298		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-299		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-303		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-307		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-308		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-309		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-310		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-311		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-312		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*13 JOHNSON CREEK - GARISH BROOK	OUTF-313		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-315		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-316		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-317		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-318		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-319		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-320		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-321		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-322		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-323		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-324		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-325		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*08 BELLAMY RIVER - KELLY BROOK - KNOX MARSH BROOK	OUTF-326		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-327		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-328		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-329		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-330		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-331		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-332		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-333		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-334		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-335		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-336		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-338		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-339		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-340		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*09 BELLAMY RIVER - UNNAMED BROOK	OUTF-341		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-343		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-345		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-346		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-347		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-348		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*11 VARNEY BROOK - CANNEY BROOK	OUTF-361		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-362		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-363		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-377		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-378		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-379		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-380		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-381		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-382		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-383		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-384		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-385		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-386		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-387		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-388		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-389		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-390		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*13 GARRISON BROOK	OUTF-391		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-392		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-393		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-396		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-397		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-398		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*17 JOHNSON CREEK	OUTF-399		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-400		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-401		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-402		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-403		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-404		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-405		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-406		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-407		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*18 UNNAMED BROOK	OUTF-408		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-409		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-410		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-411		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-412		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-413		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*07 EMERSON BROOK	OUTF-414		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-435		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*12 UNNAMED TRIBUTARY	OUTF-436		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
R*23 UNNAMED BROOK	OUTF-437		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-438		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-439		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-440		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-441		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-442		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-444		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-445		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-446		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-447		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-448		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-449		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-450		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-451		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
I*05 Knox Marsh Brook	OUTF-452		0	10	0	0	2	0	0	0	0	None	12	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-453		0	10	0	0	2	0	0	0	1	None	13	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-454		0	10	0	0	2	0	0	0	2	None	14	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-455		0	10	0	0	2	0	0	0	3	None	15	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-456		0	10	0	0	2	0	0	0	4	None	16	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-457		0	10	0	0	2	0	0	0	5	None	17	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-458		0	10	0	0	2	0	0	0	6	None	18	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-459		0	10	0	0	2	0	0	0	7	None	19	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no

	OUTF-460		0	10	0	0	2	0	0	0	8	None	20	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-461		0	10	0	0	2	0	0	0	9	None	21	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-462		0	10	0	0	2	0	0	0	10	None	22	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-463		0	10	0	0	2	0	0	0	11	None	23	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-465		0	10	0	0	2	0	0	0	12	None	24	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-466		0	10	0	0	2	0	0	0	13	None	25	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-467		0	10	0	0	2	0	0	0	14	None	26	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-468		0	10	0	0	2	0	0	0	15	None	27	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-469		0	10	0	0	2	0	0	0	16	None	28	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-470		0	10	0	0	2	0	0	0	17	None	29	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-471		0	10	0	0	2	0	0	0	18	None	30	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-472		0	10	0	0	2	0	0	0	19	None	31	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-473		0	10	0	0	2	0	0	0	20	None	32	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-474		0	10	0	0	2	0	0	0	21	None	33	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-475		0	10	0	0	2	0	0	0	22	None	34	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-476		0	10	0	0	2	0	0	0	23	None	35	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-477		0	10	0	0	2	0	0	0	24	None	36	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-478		0	10	0	0	2	0	0	0	25	None	37	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-479		0	10	0	0	2	0	0	0	26	None	38	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-480		0	10	0	0	2	0	0	0	27	None	39	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-481		0	10	0	0	2	0	0	0	28	None	40	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-486		0	10	0	0	2	0	0	0	29	None	41	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-487		0	10	0	0	2	0	0	0	30	None	42	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-488		0	10	0	0	2	0	0	0	31	None	43	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-489		0	10	0	0	2	0	0	0	32	None	44	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-490		0	10	0	0	2	0	0	0	33	None	45	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-492		0	10	0	0	2	0	0	0	34	None	46	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-493		0	10	0	0	2	0	0	0	35	None	47	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-494		0	10	0	0	2	0	0	0	36	None	48	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-495		0	10	0	0	2	0	0	0	37	None	49	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-496		0	10	0	0	2	0	0	0	38	None	50	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-497		0	10	0	0	2	0	0	0	39	None	51	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-498		0	10	0	0	2	0	0	0	40	None	52	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-499		0	10	0	0	2	0	0	0	41	None	53	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-500		0	10	0	0	2	0	0	0	42	None	54	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-501		0	10	0	0	2	0	0	0	43	None	55	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-507		0	10	0	0	2	0	0	0	44	None	56	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-508		0	10	0	0	2	0	0	0	45	None	57	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-509		0	10	0	0	2	0	0	0	46	None	58	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-510		0	10	0	0	2	0	0	0	47	None	59	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-511		0	10	0	0	2	0	0	0	48	None	60	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-514		0	10	0	0	2	0	0	0	49	None	61	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-515		0	10	0	0	2	0	0	0	50	None	62	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-525		0	10	0	0	2	0	0	0	51	None	63	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-526		0	10	0	0	2	0	0	0	52	None	64	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-537		0	10	0	0	2	0	0	0	53	None	65	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-538		0	10	0	0	2	0	0	0	54	None	66	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-539		0	10	0	0	2	0	0	0	55	None	67	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-540		0	10	0	0	2	0	0	0	56	None	68	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-549		0	10	0	0	2	0	0	0	57	None	69	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-550		0	10	0	0	2	0	0	0	58	None	70	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-551		0	10	0	0	2	0	0	0	59	None	71	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-561		0	10	0	0	2	0	0	0	60	None	72	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-568		0	10	0	0	2	0	0	0	61	None	73	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-569		0	10	0	0	2	0	0	0	62	None	74	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-570		0	10	0	0	2	0	0	0	63	None	75	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-572		0	10	0	0	2	0	0	0	64	None	76	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-573		0	10	0	0	2	0	0	0	65	None	77	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-576		0	10	0	0	2	0	0	0	66	None	78	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-577		0	10	0	0	2	0	0	0	67	None	79	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-578		0	10	0	0	2	0	0	0	68	None	80	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-579		0	10	0	0	2	0	0	0	69	None	81	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-580		0	10	0	0	2	0	0	0	70	None	82	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-583		0	10	0	0	2	0	0	0	71	None	83	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-584		0	10	0	0	2	0	0	0	72	None	84	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-585		0	10	0	0	2	0	0	0	73	None	85	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-586		0	10	0	0	2	0	0	0	74	None	86	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-587		0	10	0	0	2	0	0	0	75	None	87	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-592		0	10	0	0	2	0	0	0	76	None	88	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-594		0	10	0	0	2	0	0	0	77	None	89	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-595		0	10	0	0	2	0	0	0	78	None	90	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-596		0	10	0	0	2	0	0	0	79	None	91	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-597		0	10	0	0	2	0	0	0	80	None	92	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-599		0	10	0	0	2	0	0	0	81	None	93	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-604		0	10	0	0	2	0	0	0	82	None	94	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-606		0	10	0	0	2	0	0	0	83	None	95	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-607		0	10	0	0	2	0	0	0	84	None	96	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-608		0	10	0	0	2	0	0	0	85	None	97	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-609		0	10	0	0	2	0	0	0	86	None	98	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-611		0	10	0	0	2	0	0	0	87	None	99	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-612		0	10	0	0	2	0	0	0	88	None	100	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
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	OUTF-614		0	10	0	0	2	0	0	0	90	None	102	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-615		0	10	0	0	2	0	0	0	91	None	103	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-616		0	10	0	0	2	0	0	0	92	None	104	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-617		0	10	0	0	2	0	0	0	93	None	105	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-618		0	10	0	0	2	0	0	0	94	None	106	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-619		0	10	0	0	2	0	0	0	95	None	107	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-620		0	10	0	0	2	0	0	0	96	None	108	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-621		0	10	0	0	2	0	0	0	97	None	109	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-622		0	10	0	0	2	0	0	0	98	None	110	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-623		0	10	0	0	2	0	0	0	99	None	111	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-624		0	10	0	0	2	0	0	0	100	None	112	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-625		0	10	0	0	2	0	0	0	101	None	113	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-626		0	10	0	0	2	0	0	0	102	None	114	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-629		0	10	0	0	2	0	0	0	103	None	115	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-630		0	10	0	0	2	0	0	0	104	None	116	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-631		0	10	0	0	2	0	0	0	105	None	117	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-632		0	10	0	0	2	0	0	0	106	None	118	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-633		0	10	0	0	2	0	0	0	107	None	119	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-635		0	10	0	0	2	0	0	0	108	None	120	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-636		0	10	0	0	2	0	0	0	109	None	121	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-637		0	10	0	0	2	0	0	0	110	None	122	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-638		0	10	0	0	2	0	0	0	111	None	123	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-644		0	10	0	0	2	0	0	0	112	None	124	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-649		0	10	0	0	2	0	0	0	113	None	125	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-650		0	10	0	0	2	0	0	0	114	None	126	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-652		0	10	0	0	2	0	0	0	115	None	127	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-653		0	10	0	0	2	0	0	0	116	None	128	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no

	OUTF-654		0	10	0	0	2	0	0	0	117	None	129	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-655		0	10	0	0	2	0	0	0	118	None	130	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-657		0	10	0	0	2	0	0	0	119	None	131	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-658		0	10	0	0	2	0	0	0	120	None	132	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-659		0	10	0	0	2	0	0	0	121	None	133	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-660		0	10	0	0	2	0	0	0	122	None	134	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-661		0	10	0	0	2	0	0	0	123	None	135	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-663		0	10	0	0	2	0	0	0	124	None	136	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-664		0	10	0	0	2	0	0	0	125	None	137	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-665		0	10	0	0	2	0	0	0	126	None	138	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-666		0	10	0	0	2	0	0	0	127	None	139	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-667		0	10	0	0	2	0	0	0	128	None	140	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-668		0	10	0	0	2	0	0	0	129	None	141	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-669		0	10	0	0	2	0	0	0	130	None	142	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-670		0	10	0	0	2	0	0	0	131	None	143	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-677		0	10	0	0	2	0	0	0	132	None	144	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-679		0	10	0	0	2	0	0	0	133	None	145	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-680		0	10	0	0	2	0	0	0	134	None	146	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-681		0	10	0	0	2	0	0	0	135	None	147	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-682		0	10	0	0	2	0	0	0	136	None	148	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-683		0	10	0	0	2	0	0	0	137	None	149	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-684		0	10	0	0	2	0	0	0	138	None	150	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-685		0	10	0	0	2	0	0	0	139	None	151	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-686		0	10	0	0	2	0	0	0	140	None	152	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-687		0	10	0	0	2	0	0	0	141	None	153	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-688		0	10	0	0	2	0	0	0	142	None	154	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-689		0	10	0	0	2	0	0	0	143	None	155	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-690		0	10	0	0	2	0	0	0	144	None	156	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-691		0	10	0	0	2	0	0	0	145	None	157	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-692		0	10	0	0	2	0	0	0	146	None	158	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-693		0	10	0	0	2	0	0	0	147	None	159	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-694		0	10	0	0	2	0	0	0	148	None	160	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-695		0	10	0	0	2	0	0	0	149	None	161	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-696		0	10	0	0	2	0	0	0	150	None	162	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-697		0	10	0	0	2	0	0	0	151	None	163	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-698		0	10	0	0	2	0	0	0	152	None	164	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-699		0	10	0	0	2	0	0	0	153	None	165	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-700		0	10	0	0	2	0	0	0	154	None	166	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-704		0	10	0	0	2	0	0	0	155	None	167	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-705		0	10	0	0	2	0	0	0	156	None	168	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-706		0	10	0	0	2	0	0	0	157	None	169	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-707		0	10	0	0	2	0	0	0	158	None	170	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-708		0	10	0	0	2	0	0	0	159	None	171	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-709		0	10	0	0	2	0	0	0	160	None	172	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-710		0	10	0	0	2	0	0	0	161	None	173	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-711		0	10	0	0	2	0	0	0	162	None	174	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-712		0	10	0	0	2	0	0	0	163	None	175	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-713		0	10	0	0	2	0	0	0	164	None	176	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-714		0	10	0	0	2	0	0	0	165	None	177	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-721		0	10	0	0	2	0	0	0	166	None	178	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-737		0	10	0	0	2	0	0	0	167	None	179	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no
	OUTF-738		0	10	0	0	2	0	0	0	168	None	180	High Priority	no	none	Unknown	Unknown	Unknown	no	no	no

Appendix D

Field Forms, Sample Bottle Labels, and Chain of Custody Forms

(N/A - information included in SOP)

Standard Operating Procedure

for IDDE Catchment Investigation Procedure

Purpose

This document outlines the protocols for sample collection, use of field kits, storage and conveyance of samples, field data collection and storage, and catchment investigation in accordance with the City of Dover, NH Illicit Discharge Detection and Elimination (IDDE) Plan.

- **<u>Sample Collection Requirements</u>**
  - All samples are to be collected during 'dry weather conditions' which is defined as less than 0.1 inches of rainfall over the previous 24-hour period and no significant snow melt is occurring.
  - Prioritized outfalls are to be sampled first. Priority and ranking are determined according to the predetermined 'Outfall Assessment and Priority Ranking Procedure' outlined in the permit [Section 2.3.4.7] when dry weather discharge is observed at an outfall location. For purposes of this procedure dry weather discharge is considered any discharge from the outfall or interconnection that exceeds 50 gallons per day or 0.035 gallons per minute. Effectively what this means is that flow should be sufficient to collect the sample volume required within 5 minutes.
  - All sampling personnel are to don proper personal protective equipment (PPE) during the sampling procedure (gloves, proper footwear, pants, etc.)
  - Once the sampling is complete, samples are collected and transported to the laboratory in ice-filled coolers, and processed or refrigerators to maintain a temperature of 4°C. All samples are labeled and results recorded and saved in electronic and paper form. Samples that need to be sent to an external laboratory are labeled and packed in ice-filled coolers throughout transport to the laboratory. A chain-of-custody form template is included in the appendices. All laboratory samples documented so as to include:

    - Date of sampling event
    - Unique identification numbers that correspond to date and location of each sample
    - Unique field identification name
    - Sample analyses to be performed by the laboratory for each sample
    - Names and signatures of all persons handling the samples in the field and in the laboratory.

Materials Needed

Sampling (field)

- About 500 ml of water sample for all analyses.
- The *E. coli* sample should be taken separately.
- 3- 200 ml sterile HDPE sample bottles

- YSI sonde with appropriate sensors.
- Permanent marker for labeling.

Surfactant Screening (lab)

- Untreated (non-bleached) paper for sample collection and testing. Standard yellow Post-It Notes are perfect as they are small, inexpensive, and most importantly, they do not contain optical brighteners and fluoresce under UV light.
- 365 nm UV flashlight ("black" light). This flashlight, for example, is 365 nm, rechargeable, and includes UV safety glasses. Note: many UV flashlights are 395 nm and may work but less effectively.
- *Optional but suggested:* UV enhancing safety glasses to protect eyes for prolonged exposure to UV light.

1. **Field Kits**
   - Field kits will contain:
     - YSI handheld sampling device and appropriate sensors
     - Sample collection containers
     - Nitrile gloves
     - Data collection tablet/iPad
   - Field kit maintenance:
     - After each day of sampling, all field kit supplies are to be replenished and sampling equipment is to be properly cleaned.
       - Refer to **YSI Pro Plus User Manual Page 58** for maintenance procedure.

2. **Sample Storage and Conveyance**
   - *E. coli/ Enterococcus* samples are to be tested upon return from the field. Maximum holding time is 6 hours. (per EPA CFR Title 40, Chapter 1, Subchapter D, part 136) (per NEMI 9221 A, B, C, F).
   - The maximum hold time for all samples will be 6 hours.
   - Samples will be transported and held at 34-39°F (1-4° C) until testing occurs.
     - This is most simply done using a cooler containing ice packs. Do not allow the ice packs to come into direct contact with the sample containers.
     - A liquid thermometer should be kept in the cooler to allow for easy temperature monitoring. *We recommend affixing the thermometer to the inside of the cooler.

3. **Field Data Collection and Storage**
   - All field data will be collected using the Survey123 data collection software on a tablet/iPad. See attachment.
   - In the event that a tablet is unavailable, all the information will be collected on a paper form containing the same information.
   - Collected information will include:
     - Outfall number

    - Outfall location
    - Date and time of sampling
    - Weather conditions
    - Time since last rainfall (hours)
    - Amount of last rainfall (inches)
    - Receiving water
    - Shape, dimensions, physical condition, and material of outfall pipe
    - Spatial location (coordinates provided by Survey123 or similar application)
- Data collected on the YSI handheld device will be uploaded into a spreadsheet and connected to the data point in the Survey123 map.
    - Refer to **YSI Pro Plus User Manual Pages 52-53** for data management procedure

1. Sampling Procedure

Locate outfall to be sampled. If the outfall is inaccessible, follow the stormwater drainage map to the next accessible upstream access point for sampling.

a. Document outfall number and complete the field data collection form using the tablet/iPad Survey 123 form (template form included as an appendix).
b. To start, Label your sterile *E. coli* (freshwater) or *Enterococci* (coastal) bottle and two additional sample bottles/containers with the date, time, and name of outfall/ location.
c. Fill each sample bottle separately.
d. Take the sample bottle and unscrew the top.
    i. Hold the bottle cap facing down so nothing can get onto the underside of the lid.
    ii. Do NOT touch the underside of the lid to avoid transferring bacteria.
    iii. Do NOT set it down on the ground because something could get on it.
    iv. By following these steps, you greatly reduce the chance of bacteria getting into the bottle, so you will not get a false positive.
e. Fill the bottle from the outfall making sure to not get any sand, sediment, or debris in the container.
    i. A very important note: the E. coli/enterococci *samples must be run within six hours of them being taken. Make sure to plan enough time to run all the bacteria samples in the lab when done sampling.*
f. Next, take your two other sample bottles/containers and fill them the same way but making sure to fill them to the 200 mL mark.

2. Conduct a field test using the YSI Pro Plus sonde

a. Turn on the meter by pressing the green circle button.
b. When the screen comes on, it should show at least a temperature reading in degrees Celsius or Fahrenheit depending on your chosen options, a barometric pressure reading in mmhg, and a specific conductivity reading in us/cm.
c. The end of the cord attached to the meter should have a small metal port that is covered with a red cap. It is important to leave the red cap on until a probe is inserted into the port. The cap will keep water and debris from entering the hole and damaging or destroying the sensor port.
d. The next step is to make sure that both the conductivity and salinity results are being displayed. To turn these on is a two-step process.
    - First you click the probe button and then select setup. Look at the row that says conductivity and see if it says on or off next to it. If it says on, then you are all set but if it says off, click on conductivity. The next screen has a box that just be clicked to turn on conductivity. Click the box and it will turn it on. Then press escape to return to the main screen where the results are displayed.
    - Probe → Setup → Conductivity → Escape to return to main screen.
    - To turn on salinity, click the probe button. Then scroll down to display. From there scroll down to conductivity and click it. Then scroll down to salinity and click that as well. In this screen you will see three options. You want to scroll down to ppt and click that. Then press the escape button which will take you back to the main menu.
    - Probe → Display → Conductivity → Salinity → PPT→ Escape
e. Attach the ammonia (NH3) sensor to the probe by removing the red cap at the end and screwing the sensor into it. Caution, nothing should be forced in or screwed in with abnormal tightness. This could strip or damage the connections and ruin the instrument. If properly aligned the sensor should easily be installed and fall into alignment without much effort.
    - Then click the probe button and choose setup.
    - Scroll down to ISE1 and then choose NH3. Then press the escape button which will take you back to the main menu.
    - Probe→ Setup→ ISE1→ NH3→ Escape
f. The YSI screen should now have the following units displayed.
    - The temperature in degrees Celsius/fahrenheit
    - The barometric pressure in mmHg
    - The conductivity in us/cm
    - The salinity in ppt
    - The ammonia in mg/L
g. If there are multiple dashed lines or strange symbols through some of the result areas, don't worry about it for now. It just means that nothing is detected yet. If dashed lines or strange symbols are not replaced by real numbers when you start sampling, then there is a problem. If symbols are not replaced, start by repeating

step 2d and try again.

h. Now take the end of the cord with the sensor and submerge it in one of the water sample bottles. The important things to note here are that the sensor is fully submerged and that the two holes near where the cord begins are fully submerged as well. You may have to jiggle the sensor to keep refreshing the sample within the probe. If the water level is too shallow such that the probe cannot be fully submerged, then you will have to add more sample water.
i. It may take a few minutes for all of the readings on the YSI screen to stabilize. If the numbers keep jumping back and forth within a small range, you can take the average or one of the numbers it keeps stopping on.
j. Record the ammonia, specific conductivity, salinity, and temperature on your tablet or field sheet making sure to note the units for each parameter.
k. Once you are done sampling with the YSI meter, take off the metal cage, and then rinse the whole sensor area with DI or distilled water. Make sure to get water into the two holes at the top of the probe.
l. You have gathered all the data and samples you will need for this outfall. You can move onto the next outfall sample. Remember, the *E.coli* samples must be run within six hours of collection.

3. Lab Test Procedure for *E. Coli* (*fresh water*) / *Enterococci* (*salt or brackish water*):

a. In the lab, take your *E. coli* sample bottle and make sure your sample is 100 ml exactly. If you need to pour off some sample to get to 100 ml, be sure to shake the sample first.
b. One packet of reagent will then be added to the sample. The cap is then replaced, and a swirling motion is performed until the reagent is dissolved into the sample. The reagent will have a hard time dissolving into an ice-cold sample, so be sure to let it sit for a short time.
    i. For freshwater samples use Colilert, Brackish or saltwater samples will be run with Enterolert.
c. Prep your Quanti-tray by writing on the back the sample name, location or other indicator and the date and time the sample was run. Use a soft tip sharpie so that you do not break through to one of the wells.
d. Open the Quanti-tray by holding it in one hand and squeezing the sides, you can gently pull the tab if you need to. Be careful not to touch the inside of the tray. Gently tap the side to remove excess air bubbles.
e. The sample is then carefully poured into the tray and placed onto the rubber sealer mat.
f. The tray and sealer mat are then put through the sealer which should have been warming up for a few minutes. You will know it is ready when you have a green light.
g. Place the tray and the rubber mat with the backing of the Quanti-tray facing up and the opening of the Quanti-tray facing out.
h. Let the sealer grab the tray and pick it up a few seconds later from the back of the sealer.
i. Once the sample tray comes out of the sealer it must be incubated:
    i. For Colilert- put the Quanti-tray in the incubator at 95°F (35°C) +/- 0.5°C for 24 hours.
    ii. For Enterolert- put the Quanti-tray in the incubator at 106°F (41°C) +/-0.5°C for 24 hours.
j. AFTER the 24-hour incubation period:
    i. Take tray out of incubator.
    ii. If there is no color that indicates that no total coliforms are present.
    iii. To check for *E. coli / enterococci* you will need to use a UV light to see how many wells fluoresce. Sometimes it is tricky to decide if what you are seeing is a positive. Use the comparator to help.
    iv. Mark the number of wells with positive reaction on your datasheet.
    v. Calculate the Most Probable Number (MPN) using the IDEXX 51-Well Quanti-Tray MPN Table or the IDEXX MPN generator software found at: https://www.idexx.com/en/water/resources/mpn-generator/

IDEXX
51-Well Quanti-Tray®
MPN Table

No. of wells giving positive reaction	MPN per 100 ml sample	95% Confidence Limits	
		Lower	Upper
0	<1.0	0.0	3.7
1	1.0	0.3	5.6
2	2.0	0.6	7.3
3	3.1	1.1	9.0
4	4.2	1.7	10.7
5	5.3	2.3	12.3
6	6.4	3.0	13.9
7	7.5	3.7	15.5
8	8.7	4.5	17.1
9	9.9	5.3	18.8
10	11.1	6.1	20.5
11	12.4	7.0	22.1
12	13.7	7.9	23.9
13	15.0	8.8	25.7
14	16.4	9.8	27.5
15	17.8	10.8	29.4
16	19.2	11.9	31.3
17	20.7	13.0	33.3
18	22.2	14.1	35.2
19	23.8	15.3	37.3
20	25.4	16.5	39.4
21	27.1	17.7	41.6
22	28.8	19.0	43.9
23	30.6	20.4	46.3
24	32.4	21.8	48.7
25	34.4	23.3	51.2
26	36.4	24.7	53.9
27	38.4	26.4	56.6
28	40.6	28.0	59.5
29	42.9	29.7	62.5
30	45.3	31.5	65.6
31	47.8	33.4	69.0
32	50.4	35.4	72.5
33	53.1	37.5	76.2
34	56.0	39.7	80.1
35	59.1	42.0	84.4
36	62.4	44.6	88.8
37	65.9	47.2	93.7
38	69.7	50.0	99.0
39	73.8	53.1	104.8
40	78.2	56.4	111.2
41	83.1	59.9	118.3
42	88.5	63.9	126.2
43	94.5	68.2	135.4
44	101.3	73.1	146.0
45	109.1	78.6	158.7
46	118.4	85.0	174.5
47	129.8	92.7	195.0
48	144.5	102.3	224.1
49	165.2	115.2	272.2
50	200.5	135.8	387.6
51	> 200.5	146.1	infinite

IDEXX Sales and Technical Support
1-800-321-0207 or 1-207-856-0496
www.idexx.com/water

4. **Lab Test Procedure for Surfactant Screening**
    a. All UV testing should be performed in a dark room for best results.
    b. Prepare two reference papers to provide a clear positive and negative reference for comparing to samples. Run one reference paper under tap water and apply a known surfactant with optical brighteners to the other (most laundry detergents work well). The positive reference should be confirmed to fluoresce (bright bluish glow) under UV light. Label papers as "Ref. Pos." and "Ref. Neg." or similar.
    c. Label a Post-It Note (or selected sampling paper) with the sample ID at the top of the paper.
    d. Note that samples that are dried fluoresce brighter than wet samples.
    e. Apply the sample to the paper and allow to dry for best results. Simply pouring some of the sample onto the paper is sufficient.
    f. Put on your safety glasses if you are using them and turn off the lights.
    g. Expose the sample paper and references to UV light.
    h. Determine if the sample is *positive*, *negative*, or *retest*.
        i. *Positive* – the sample will definitely fluoresce (glow) a bright bluish color and will resemble the positive laundry soap reference.
        ii. *Negative* – the sample is dull with no glow and resembles the negative reference with tap water.
        iii. *Retest* – may occur with some contamination and is not clearly positive or negative. Retest with the same sample or another sample may need to be collected.
    i. Turn on the lights, record the result, and dispose of the sample paper.
    j. Keep the positive and negative reference samples for future tests.

Threshold conditions:

The following are thresholds generally related to common water quality limits. Fecal Indicator Bacteria results that are above threshold conditions will require further catchment investigation. See catchment investigation procedure in the IDDE plan.

Test	EPA Benchmark	Concentration Levels Indicating Need for Further Investigation	Remarks
E.coli	> 235 E. coli/100 mL	>4000 *E. coli*/100 mL	Undiluted wastewater will generally have *E. coli* levels an order of magnitude or more, higher than the EPA benchmark. Pet waste, wildlife sources and regrowth of bacteria in storm drains have been shown to contribute to elevated *E. coli* levels above the benchmark.
Ammonia	> 0.5 mg/L	>0.5 mg/L	In the absence of other wastewater indicators, follow-up investigation is performed when the ammonia concentration is 0.5 mg/L or higher. If other wastewater indicators are present, then a 0.25 mg/L benchmark is used. Decomposing vegetation under anoxic conditions can release ammonia to water, which can be misleading.
Surfactants	> 0.25 mg/L	Presence	Detection of low concentrations (0.1- 0.3 mg/L) of surfactants is common at stormwater outfalls. Most detections are not correlated with other wastewater indicators and do not lead to a definite source. These detections may be attributable to outdoor vehicle or building washing.
Total Chlorine	> Reporting Limit	>0.50 mg/L	The field test used for total chlorine analysis is sufficiently sensitive to detect municipal potable water sources diluted by groundwater or runoff approximately 3 to 10 fold, depending on the strength of the potable chlorine residual and type of chlorination used. Total chlorine is a decent indicator of treated drinking water leaks and potentially graywater sources, but may also be permitted non-stormwater discharges. If high levels are consistently identified in a sample without other wastewater indicators,

			such as bacteria or ammonia, then discussions with water utility should precede comprehensive investigation of drainage area.
Specific Conductance	N/A	>600 µS/cm	Specific conductance alone is not a reliable indicator of wastewater contamination. Road salt and metals from pipe corrosion often result in levels in the 1,000-5,000 µS/cm range. However, flows contaminated with wastewater generally have specific conductance above 600 µS/cm. Very high level (>5,000 µS/cm) may indicate an industrial illicit connection.
Total Phosphorus	N/A	>0.3 mg/l	Phosphorus alone is not a reliable indicator of wastewater sources. High levels of phosphorus may be present in stormwater discharges due to erosion in the drainage area or other natural sources. Treated drinking water may also be high in phosphorus to meet anti-corrosion requirements in drinking water distribution systems and may be identified during dry weather sampling if a water line flushing activity or other drinking water discharge is present in the storm drain system.
Total Nitrogen	N/A		Naturally occurring levels of nitrate and total nitrogen vary substantially across the country, and statistical analyses of water quality data suggest that appropriate reference levels range from 0.12 to 2.2 mg/L total N.

4. Catchment Investigation Procedure

- Upon completion of the Return Sampling Procedure and the isolation of an area of illicit discharge a catchment investigation can be conducted.

1. Use the developed stormwater system map, historic plans and records, and other available data sources to identify locations of prior sewer/storm drain construction and maintenance, previous system failures, sanitary sewer surcharges, SSOs, and septic system breakouts within the area identified by the Return Sampling Procedure.
2. Please refer to the 'Return Sampling Procedure' in Section 1 for 'manhole

inspection methodology'.

3. Once the source of the illicit discharge is identified, convey the information to the appropriate team to remediate the discharge.

USER MANUALS

Ammonia, Chlorine, Conductivity, Salinity, Temperature
YSI Pro Plus: https://www.ysi.com/File%20Library/Documents/Manuals/605596-YSI-ProPlus-User-Manual-RevD.pdf

E. coli/ Enterococci
Quanti-Tray Sealer: https://123.idexx.com/resource-library/water/quanti-tray-sealer-plusmanual-en.pdf

Colilert: https://www.idexx.com/files/colilert-procedure-en.pdf

Enterolert: https://www.idexx.com/files/enterolert-procedure-en.pdf

TABLES AND SOFTWARE

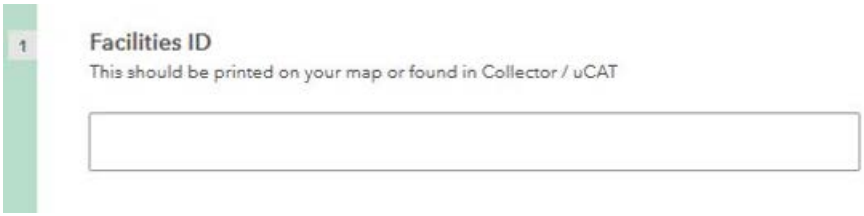
IDEXX 51-Well MPN table: https://www.idexx.com/files/qt51mpntable.pdf

IDEXX MPN generator software: https://www.idexx.com/en/water/resources/mpn-generator/

Appendix: Survey 123 questions

MS4 2020 Dry Weather Inspections

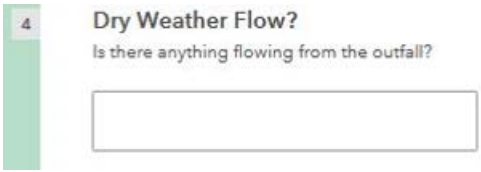
1) Facilities ID



2) Reason for Inspection
    a. Initial Inspection
    b. Follow-up Inspection
    c. Dry Run
    d. Other

3) Is Outfall Accessible?
    a. Yes
    b. No

4) Dry Weather Flow?
    a. No – No signs of dry weather flow
    b. No – Signs of dry weather flow
    c. Yes – Is flowing
    d. Other

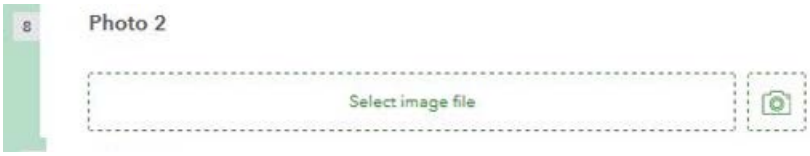


5) Characteristics of Flow
    a. Example – color sheen, foam, odor, sediment, cloudiness, etc.

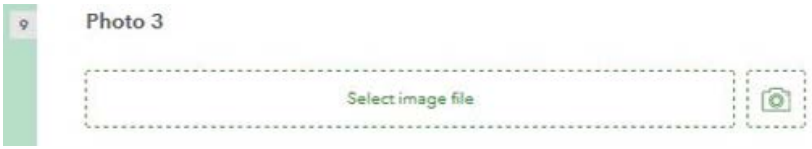
6) Characteristics of outfall
    a. Example – physical condition

7) Photo 1

8) Photo 2

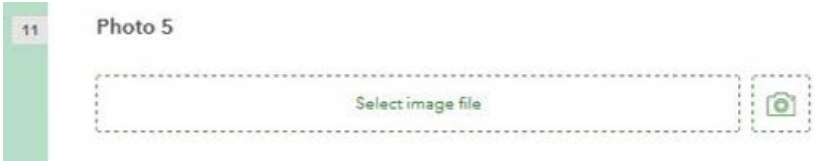


9) Photo 3



10) Photo 4

11) Photo 5



12) Notes

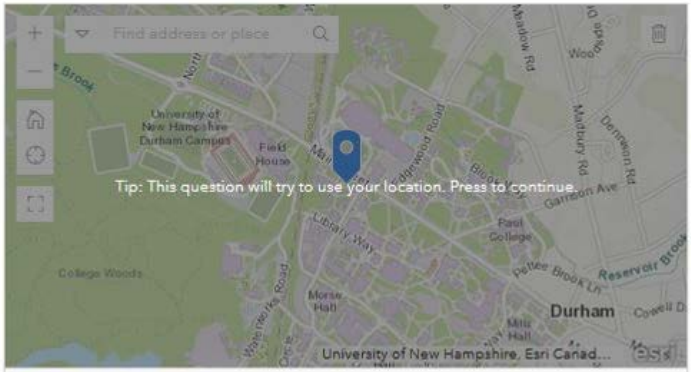
13) Date/Time

14) Inspector Name

15) Map Location

15

Map Location



Lat: -70.93501 Lon: 43.13784

Submit

Appendix E

Water Quality Analysis Instructions, User's Manuals and Standard Operating Procedures

Appendix F

IDDE Employee Training Record

Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

City of Dover

Date	Type of Training	Participants
6/17/20	Dry Weather Screening training (to be implemented in following year) Shown at Seacoast Stormwater Coalition	Engineering Staff responsible for the IDDE program creation.
Fall 2020 and Spring 2021	Watched NHDES created IDDE dry weather sampling videos as part of finalizing and implementing Dry Weather Sampling process. Also, gave full presentation to Town of Exeter Staff and Seacoast Stormwater Coalition	Environmental Projects Manager, Utility Supervisor and Deputy Director of Community Services
Fall 2021	City of Dover and UNH Stormwater Center lead an IDDE training for Seacoast Stormwater Communities	Environmental Projects Manager, Utility Supervisor, and Deputy Director of Community Services
June 2022	UNH Storwater Center provided City of Dover Employees with training on observing potential IDDE concerns, collecting Data, and testing collected samples. Training was based on the full SRF plan.	Engineering staff, Superintendent of Utilities and Deputy Director of Community Services
July 2022	Intern was brought on to manage the wet weather sampling for the city. She was trained on observing potential IDDE concerns, collecting Data, and testing collected samples. Training was based on the full SRF plan.	Engineering Intern

Appendix G

Dover IDDE Final Report_5-23-2022

CWSRF IDDE Nonpoint Source Planning Project

May 23, 2022

Prepared for:

RFQ# B20056 - City of Dover CWSRF IDDE Nonpoint Source Planning Project
Purchasing/Finance Office
City of Dover
288 Central Ave 2nd. Floor
Dover NH 03820

Prepared by:

UNH Stormwater Center
University of New Hampshire
35 Colovos Rd
Durham, NH 03824

Table of Contents

Statement of Project Requirements

This project was targeted to help fulfil conditions associated with section 2.3.4.6. Written Illicit Discharge Detection and Elimination Program of the NH MS4 permit. In particular there was a need to fulfill components related to section 2.3.4.6.c. Program Procedures – where electronic and hardcopy procedures were developed in accordance with the requirements and timelines of the permit. Due to the fact that indicator bacteria species are difficult to screen and accurately relate to illicit sanitary sewer connections the project team also developed an alternative sampling procedure for fecal indicator bacteria (FIB) and pollutants of concern in accordance with the procedures in 40 CFR §136. This alternative process and the guidance presented here will help communities fulfill dry and wet weather screening.

Tasks and Project Deliverables

Project Tasks and Deliverables include:

Task 1- Meetings with project stakeholders. UNHSC conducted meetings with the city and NHDES staff to maintain eligibility for CWSRF Planning Project compliance, including a project kick-off meeting, mid-level meeting and wrap up meeting. UNHSC also presented regular updates to the City of Dover staff, as well as the Seacoast Stormwater Coalition.

Task 2 – Collect and test sample outfalls. 743 outfalls were investigated across 6 permitted communities (Dover, Durham, Rollinsford, Rye, Somersworth and UNH). Of these outfalls 26 or 3.5% registered dry weather flow and were thus sampled for the suite of parameters outlined in the permit. Samples were also taken using innovative genomic methods for all 26 locations. Initial extractions failed due to either insufficient sample or extraction errors and they had to be resampled and run again. In total 52 samples were processed. Of the 26 sampled locations 3 came back with elevated FIB levels and had to be resampled. Genetic testing was rerun for these 3 locations. Two of the 3 locations came back below action thresholds for FIB however 1 location Outfall 340 in Dover repeatedly came back above the threshold and warranted further catchment investigation as outlined in Dover's IDDE catchment investigation procedure.

The Outfall summary table can be found here and is also included as an appendix to this report: https://unh.box.com/s/bqqnj48agwipq1pi1tjofpya8lw6oj8r

Additiona sampling summaries for the catchment investigation of outfall 340 in Dover, NH can be found here and is also included as an appendix to this report: https://unh.box.com/s/xls4v071r5h2l3yjxoqxun9velslipxq

Task 3 – Research, purchase and develop protocols for sampling kits and equipment for identification of other pollutants of concern as required by the MS4. The purpose of this task was to find reliable equipment and develop methods that are accurate, easy to successfully implement, and repeatable. A full set of equipment is available for use at the Dover field lab at

355 Mast Rd, Dover, NH. This equipment will be available for use during subsequent wet weather investigations or for loan to other communities. The City has agreed to either assist with conducting additional investigations as it did during dry weather inspections or lend the equipment to communities upon request. A summary of all the equipment and detailed specifications are available here and included as an attachment to this report: https://unh.box.com/s/3dvajbesvt3zi53i2ofijnjypvyy46ug

A current inventor list of equipment and materials are available here and included as an attachment to this report: https://unh.box.com/s/7lwiz85u1xbatuf3kwcg6tsbfppmo9zz This equipment list can also be used by other municipal staff to fully outfit their own outfall investigation field lab if desired.

Task 4 – Written IDDE procedures, to be consistent with other Seacoast Stormwater Coalition (SSC) created templates. Draft procedures were developed and refined continually throughout this process. A final copy of the procedures along with detailed operating procedures for all equipment have been developed and provided to the City of Dover staff, and NHDES for review and comment. Final documents can be found here and are also available as an attachment to this report: https://unh.box.com/s/jqf5uxwbbmxbp6m553ikxl0og4j2s5ch

Task 5 – IDDE training with individual communities and community representatives has been conducted throughout this project. In addition, several training resources were also developed by NHDES staff and posted to the NHDES Stormwater Blog. A final training was offered in cooperation with City staff and recorded.

Task 6 – Purchase of SCC shared equipment for members to use to complete IDDE testing requirements. As mentioned in Task 3 additional equipment has been purchased and will be available for use during subsequent wet weather investigations or for loan to other communities. The City has agreed to either assist with conducting additional investigations as it did during dry weather inspections or lend the equipment to communities upon request. A summary of all the equipment and detailed specifications are provided as an appendix

Lessons learned:

Many lessons were learned through the process of developing a comprehensive sampling program. To the extent we can assist others developing similar approaches the following insight is offered.

While some of the equipment is portable and can be taken in the field, measurements outside of temperature and pH were assessed back in the laboratory. Samples were collected in sterile containers and transported on ice back to the laboratory. Temperature and pH were assessed in the field.

IDEXX Quanti-Tray bacteria testing vs Genomics bacteria testing. The IDEXX testing equipment was assumed to have a lower resolution although adequate for screening purposes. The test turned out to be relatively inexpensive, replicable by trained staff and very reliable.

The Genomic sampling was assumed to be more accurate in identifying possible sources that would be actionable by municipal staff. The process, while studied and proven was not ready for wide-scale implementation. There were various components of the protocol that require quick information that the UNH facilities were not prepared to deliver on. The primary issue was quick information on the initial extraction processes. Initial samples were filtered and frozen at -80C to batch process and save overall costs on analyses. Initial extractions did not yield sufficient material for extraction purposes. Staff had to resample and filter more sample (originally 3 syringe volumes and subsequent 5 syringe volumes) for analysis. There were large time gaps between sample collection and subsequent resampling and communication gaps between field personnel and laboratory personnel.

In light of the reliability of the IDEXX methods particularly for screening purposes the recommendation is to rely on these protocols for screening and use the Genomic methods for targeted investigations. As Bill Boulanger, Deputy Director of Public Works for Dover, NH put it, "I want to be sure there is evidence of something if I am going to go through the process of investigating drains with smoke testing or cameras."

Testing for E. Coli vs. Enterococci

The IDEXX Quanti-Tray system to test for indicator bacterias uses Colilert for freshwater samples and Enterolert for saltwater samples. Since nearly all of the runoff or potential illicit discharge from outfalls is freshwater, samples were rarely conducted with Enterolert.

Enterococci are more resistent to higher chloride concentrations, which is why they are used in coastal waters, but most outfalls are outside of a tidal influence and convey only freshwater so the use of Enterococci is diminished. Moving forward another parameter to measure in the field may be salinity which can be measured the YSI ProPlus. This measure should dictate whether water samples are tested for E. Coli or Enterococci. 1,650 ppm (1.65 ppt using the YSI ProPlus) is the low threshold for water to be considered mildly brackish or outside of the commen background salinity threshold. Since E. Coli does not survive too well in brackish water, Salinity levels above 1,650 ppm should be tested for Enterococcus.

Conclusions

The project demonstrates lower cost effective methods for municipal staff to develop capacity to conduct investigations on their own with readily available supplies and equipment. The benefits of developing local capacity is that future investigations can be conducted and administered in-house and the methods can be utilized for other permit obligations and compliance tasks.

Appendices

SC
UNH Stormwater Center
35 Colovos Road
Durham NH 03824
Voice: 603-436-2001
Fax: 603-430-2100

2020-2022 IDDE Sampling Summary

Town:	Dover	Rollinsford	Rye	Somersworth	Durham	UNH Campus	Totals
Outfalls screened:	447	2	6	8	1	84	548
Outfalls sampled:	6	1	6	2	1	11	27
Genomics samples taken:	12	2	12	4	0	22	52
Resample event(s):	2	0	1	0	0	0	3
Outfalls investigated:	1	0	0	0	0	0	1

Continued sampling: 1 Outfall: Outfall 340 in Dover, NH repetedly tested positive for fecal coliforms. Samples were taken up the drain line.

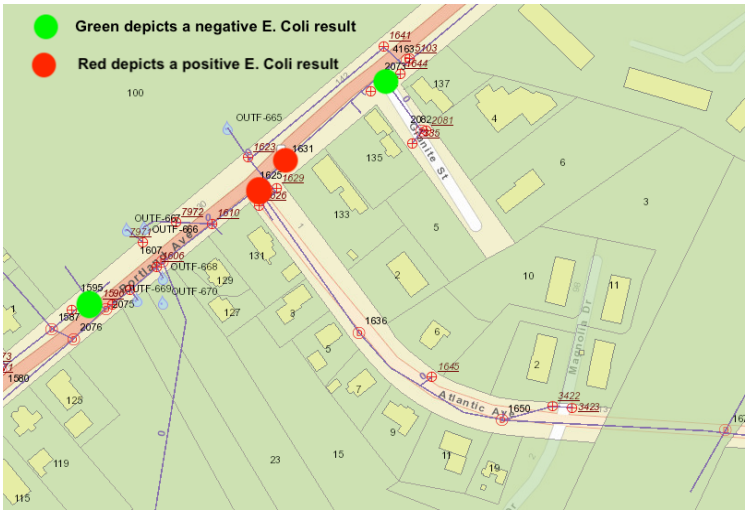
SC	UNH Stormwater Center 35 Colovos Road Durham NH 03824	Voice: 603-436-2001 Fax: 603-430-2100	OTF 340 IDDE Sampling	Dover, NH

Date:	Manholes sampled:	E. Coli results: (MPN (per 100 ml sample)	Notes:
8/10/21	Manhole 1595	20.7	Manhole 1595 had previously been attached to residential sewer lines. The problem was identified and fixed 10 years ago.
8/10/21	Manhole 1625	>200.5	
9/15/21	Manhole 1631	>200.5	Manhole 1631 contained flowing water but was only 0.25-0.5" deep Additionally, there was a distinct odor that could indicate sewage in the drain line on Portland Ave.
9/15/21	Manhole 1650	>200.5	Manhole 1650 contained more water and was moving much slower.
9/22/21	Manhole 2073	1	Manhole 2073 (on Portland Ave.) did not appear to be flowing.
9/22/21	Manhole 1687	>200.5	Manhole 1687 (on Atlantic) was flowing steadily.

Tentative conclusions:

The results listed above seem to provide sufficient evidence for a potential illicit discharge source between manholes 1631 and 2073 on the Portland Ave. There is a substantial difference in E. Coli test results between manholes 1631 and 2073 on the Portland Ave. drain line. Secondly, there was running water observed in manhole 1631, while the next manhole up the drain line (2073) contained no running water. These observations both having been during dry weather conditions suggests there may be a source of illicit discharge between the two manholes.

Findings displayed on a drain line map:



The E. Coli testing results suggest the issue lies under the stretch of road next to the pink bracket below (Between manholes 1631 & 2073)

IDDE Equipment Notes

All of the equipment used for the detection of potential illicit discharge is simple to use and easily understood with use of the correlating standard operating procedure. Reading results on the instruments is straight forward as well. There are helpful instructional videos made specifically for these tasks created by the NHDES. The only equipment that had issues was the Hach DR2800 spectrophotometer. These issues are currently being investigated and documented.

1. YSI Pro Plus Multiparameter Instrument (discontinued in early 2022, replaced by ProQuatro Multiparameter Meter)
    - Reliable, user friendly, easy to operate as well as durable.
    - batteries need to be changed infrequently
    - calibration fluid required for measuring Specific Conductance and Ammonium

The YSI Pro Plus is a field testing multi parameter instrument. It gives the ability to test a wide variety of contaminants and pollutants to a 0.01 mg/L resolution, given the necessary cables and sensors have been purchased. As it relates to this project, the device will be used to test ammonia, chlorine, conductivity, temperature and salinity. The YSI Pro Plus's ability to test a large number of required parameters, ability to perform an essentially countless amounts of tests with minimal recurring cost and its price point compared to similar competitors made it the best choice. (YSI, 2019)

The YSI Pro Plus is a handheld instrument that helps to complete most of the heavy lifting when testing water flowing from outfalls. The YSI Pro Plus measures temperature, barometric pressure, conductance, specific conductance, salinity, and Ammonia. The only steps that may require instruction are setting up parameters and/or calibrating the sensor.

Salinity is a very important parameter, since this reading determines whether the water samples taken are measured for E. Coli or Enterococci.

2. IDEXX Quanti-Tray Sealer
    - Straight forward to use

Fecal bacteria can be tested using the IDEXX Quanti-tray system. This system requires a temperature controlled 100 mL or larger field sample which is then mixed with the Colilert or Enterolert growth medium and testing mixes. The mixture is poured into the Quanti-tray pouch and sealed using a specialized tray sealer from IDEXX. Results can be visually observed in the sealed tray under a UV light, after a 24-hour incubation period. (IDEXX, 2019)

Once the Quanti-Tray sealer is plugged into the wall and turned on, the orange light will turn on while it heats up. When ready, the green light will turn on. The Quanti-Tray is loaded onto the enamel mat and set on the metal tray. Slide the Quanti-Tray into the machine until it is grabbed and fed through by the sealer.

3. Water bath/incubator
    - Both simple and easy to use
    - Used to incubate E. Coli/Enterococci samples

Both the water bath as well as incubator are used to incubate the Quanti-Tray once it has been sealed. Setting the temperature on the water bath is as simple as using up and down arrows to set a temperature which is digitally displayed.

The incubator is a Quincy Lab Inc. model 10-140 incubator. The incubator has a dial which is turned clockwise to initiate heating. Once the desired temperature is reached the dial is turned counterclockwise until the heating element light goes out.

4. Water quality test strips
    - Pool quality test strips test for
        - Total hardness
        - Total Chlorine
        - Free Chlorine
        - pH
        - Total alkalinity
    - Ammonia test strips test for
        - Ammonia
        - Ammonium

    Instructions for both test strips are printed on the bottles containing them.

5. Hach Pipette
    - Hach piston pipette (with tip ejector system, product BBP078)
    - Ensures accurate liquid measurements during TN/TP testing

    This pipette's volume range is perfect for running tests with the Hach TNT 826 & 843 test kits.
6. Hach DRB 1500 Digester
    - Sample digester

- Used for the Hach TNT 843 test kit (TP) & the Hach TNT 826 test kit (TN)

This product has a user-friendly display with only 3 control buttons. Users can edit temperature and run time. The machine will also save a digestion period under a label so that settings do not need to be altered every time.

7. Hach DR3900 Spectrophotometer
    - The Spectrophotometer measures for Total Nitrogen & Total Phosphorus

One detail to note when using a Hach Spectrophotometer is that it may require an update in order to make use of newer software which is compatible with test kits being used. While an older model was being used, DR2800, an update was required to run newer test software. Updates can be downloaded from the Hach website and delivered to the Spectrophotometer via USB flash drive.

Required Hach test kits include: Total Nitrogen TNT 826 test kit and Total Phosphorus TNT 843 test kit. Both test kits have instructions in the IDDE SOP as well as in the links at the bottom of this sheet.

Test kit trials were completed in order to create a calibration curve correlating the Hach test kits results with a local lab used frequently by the UNH Stormwater Center.

Strategies for improving methodology include:

1. Achieving recommended holding time (< 3 hours)
2. Test samples at recommended temperatures (water & reagents 59-77°F)

Recommended equipment additions:

1. Swing sampler: https://www.fishersci.com/shop/products/nasco-swing-samplers-2/p-4390491

Collecting water samples from an outfall is usually easy enough. It can be difficult to reach flowing water sometimes though. In these situations, a telescopic paint roller pole was used. This worked for the most part but wasn't the best tool for the job. It proved to be particularly problematic when attempting to sample water in manholes on drain lines.

USER MANUALS

Ammonia, Chlorine, Conductivity, Salinity, Temperature

YSI Pro Plus: https://www.ysi.com/File%20Library/Documents/Manuals/605596-YSI-ProPlus-User-Manual-RevD.pdf

E. Coli

Quanti-Tray Sealer: https://123.idexx.com/resource-library/water/quanti-tray-sealer-plusmanual-en.pdf

Colilert: https://www.idexx.com/files/colilert-procedure-en.pdf

Enterolert: https://www.idexx.com/files/enterolert-procedure-en.pdf

Total Nitrogen & Total Phosphorus

Hach TNT 843 test kit: https://www.hach.com/asset-get.download.jsa?id=19556239161

Hach TNT 826 test kit: https://www.hach.com/asset-get.download.jsa?id=19556239151

Hach Customer Support Line: 800-227-4224

Dover IDDE Equipment and Materials

Total Equipment Costs	$ 15,488.51
Total Consumable Costs per Sample	$ 80.70

**assuming all test are perfomed*

Test	Equipment	Consumable?	Unit Cost	Samples per unit	Cost per sample	Link
Sampling	200 mL sterile sample bottles	Yes	$ 199.43	48	$ 4.15	https://www.fishersci.com/shop/products/nalgene-wide-mouth-hdpe-sterile-sample-bottle-closure/(
	Nitrile gloves	Yes	$ 20.99	100	$ 0.21	https://www.amazon.com/Dealmed-Nitrile-Medical-Disposable-Latex-Free/dp/B011SP9FQA/ref=
	Permanent Marker	No	$ 6.93			https://www.amazon.com/Sharpie-Permanent-Markers-Fine-Pack/dp/B01MUR4TQG/ref=sxin_10
Ammonia Salinity Specific Conductance Temperature	YSI ProQuatro Multiparameter Meter	No	$1,197.00			https://www.ysi.com/proquatro
	605790-1 Conductivity/Temperature Sensor, 1 M	No	$1,510.95			https://www.ysi.com/proquatro
	Spec Cond standard	Yes	$ 30.63			https://www.hach.com/conductivity-standard-solution-1413-s-cm-kcl-250ml/product?id=7640207
Surfactants	365 nm UV flashlight	No	$ 28.99			https://www.amazon.com/Alonefire-Flashlight-Rechargeable-Ultraviolet-Blacklight/dp/B08B64B7
	Post-It Notes	Yes	$ 9.99	300	$ 0.03	https://www.amazon.com/Post-Americas-Favorite-Sticky-Canary/dp/B00006JNNE/ref=sr_1_6?dc
Total Chlorine	Hach 2745050 Free & Total Chlorine Test Strips	Yes	$ 26.67	50	$ 0.53	https://www.hach.com/free-total-chlorine-test-strips-0-10-mg-l/product?id=7640211603&callback
E. coli Enterococcus	IDEXX Quanti-Tray Sealer PLUS WQTSPLUS	No	$4,700.00			https://www.weberscientific.com/quanti-tray-and-quanti-tray-2000-from-idexx
	IDEXX 51-Well Quanti Tray	Yes	$ 125.00	100	$ 1.25	https://www.weberscientific.com/quanti-tray-and-quanti-tray-2000-from-idexx
	IDEXX Colilert	Yes	$ 158.36	20	$ 7.92	https://www.weberscientific.com/colilert-and-colisure-idexx
	IDEXX Enterolert	Yes	$ 145.72	20	$ 7.29	https://www.weberscientific.com/enterolert-rapid-enterococci-test-idexx
	Incubator	No	$ 539.00			https://www.fishersci.com/shop/products/incubators-37/S521081
	Pipette	No	$ 417.76			https://www.hach.com/pipette-variable-volume-1-0-5-0-ml/product?id=7640438315
	Pipette Tips	Yes	$ 44.86	75	$ 0.60	https://www.hach.com/pipette-tips-for-bbp065-1-0-5-0-ml-75-pk/product?id=7640438318
Total Nitrogen	Hach TN TNTplus, LR (1-16)	Yes	$ 121.66	25	$ 4.87	https://www.hach.com/nitrogen-total-tntplus-vial-test-lr-1-16-mg-l-n-25-tests/product?id=7640209
	Hach DRB 200 incubator	No	$2,195.88			https://www.hach.com/drb200-digital-reactor-block-for-tntplus-12x13mm-vial-wells-8x20-mm-via
	Hach DR3900 Spectrophotometer	No	$4,892.00			https://www.hach.com/dr3900-laboratory-vis-spectrophotometer-with-rfid-technology/product-par
Total Phosphorus	Hach TP TNTplus, LR Vial Test	Yes	$ 96.25	25	$ 3.85	https://www.hach.com/phosphorus-tntplus-lr-reactive-and-total/product?id=7640196815
Genomic Testing		Yes	$ 50.00	1	$ 50.00	

Standard Operating Procedure

for IDDE Catchment Investigation Procedure

Table of Contents:

Purpose

This document outlines the protocols for sample collection, use of field kits, storage and conveyance of samples, field data collection and storage, and catchment investigation in accordance with the City of Dover, NH Illicit Discharge Detection and Elimination (IDDE) Plan.

Sample Collection Requirements

- All samples are to be collected during 'dry weather conditions' which is defined as less than 0.1 inches of rainfall over the previous 24-hour period and no significant snow melt is occurring.
- Prioritized outfalls are to be sampled first. Priority and ranking are determined according to the predetermined 'Outfall Assessment and Priority Ranking Procedure' outlined in the permit [Section 2.3.4.7] when dry weather discharge is observed at an outfall location. For purposes of this procedure dry weather discharge is considered any discharge from the outfall or interconnection that exceeds 50 gallons per day or 0.035 gallons per minute. Effectively what this means is that flow should be sufficient to collect the sample volume required within 5 minutes.
- All sampling personnel are to don proper personal protective equipment (PPE) during the sampling procedure (gloves, proper footwear, pants, etc.)

Materials Needed

Sampling (field)

- About 300 ml of water sample for all analyses.
- The *E. coli* sample should be taken separately.
- 3- 120 ml sterile sampling bottles
- YSI sonde with appropriate sensors
- Millipore Sterivex Sterile Filter Unit
- Medex M/F luer lock plug
- BD 50 mL syringe
- Permanent marker for labeling
- Chlorine test strips

Surfactant Screening (lab)

- Untreated (non-bleached) paper for sample collection and testing. Standard yellow Post-It Notes are perfect as they are small, inexpensive, and most importantly, they do not contain optical brighteners and fluoresce under UV light.
- 365 nm UV flashlight ("black" light). This flashlight, for example, is 365 nm, rechargeable, and includes UV safety glasses. ***Note:*** many UV flashlights are 395 nm and may work but less effectively.
- *Optional but suggested:* UV enhancing safety glasses to protect eyes for prolonged exposure to UV light and to enhance the contrast for analysis.

Total Nitrogen and Phosphorus (lab)

- Hach digester (DRB 200)
- Hach Spectrophotometer (DR1900, DR2800, DR3900)
- Total Phosphorus TNT 843 test kit
- Total Kjeldahl Nitrogen (TKN) TNT 880 test kit & Nitrate TNT 836 test kit
- **OR** Total Nitrogen TNT 826 test kit
- 1-2 mL pipet(s)
- Distilled water
- Chem wipes
- At least 10 mL of water sample for all analyses

Field Kits

- Field kits will contain:
    - YSI handheld sampling device and appropriate sensors
    - Sample collection containers
    - Nitrile gloves
    - Data collection tablet/iPad or paper form
- Field kit maintenance:
    - After each day of sampling, all field kit supplies are to be replenished

and sampling equipment is to be properly cleaned.

- Refer to **YSI Pro Plus User Manual Page 58** for maintenance procedure.

Sample Storage and Conveyance

- *E. coli/ Enterococcus* samples are to be tested upon return from the field. **Maximum holding time is 6 hours**. (per EPA CFR Title 40, Chapter 1, Subchapter D, part 136) (per NEMI 9221 A, B, C, F).
- The maximum hold time for all samples will be 6 hours.
- The Nitrate TNT 836 test should be run **no later than 3 hours after sampling** for most accurate results. Store in a cool location. See the manual for instructions on preservation beyond this time period.
- Samples will be transported and held at 34-39°F (1-4° C) until testing occurs.
    - This is most simply done using a cooler containing ice packs. Do not allow the ice packs to come into direct contact with the sample containers. Containers can be kept in a plastic bag to reduce contamination.
    - A liquid thermometer should be kept in the cooler to allow for easy temperature monitoring. *We recommend affixing the thermometer to the inside of the cooler.

Field Data Collection and Storage

- All field data will be collected using the Survey123, or similar data collection software on a tablet/iPad. See Appendix A.
- In the event that a tablet is unavailable, all the information will be collected on a paper form containing the same information.
- Collected information will include:
    - Outfall number
    - Outfall location
    - Date and time of sampling
    - Weather conditions
    - Time since last rainfall (hours)
    - Amount of last rainfall (inches)
    - Receiving water
    - Shape, dimensions, physical condition, and material of outfall pipe
    - Spatial location (coordinates provided by Survey123 or similar application)
- Data collected on the YSI handheld device can be uploaded into a spreadsheet and connected to the data point in the Survey123 map.
    - Refer to **YSI Pro Plus User Manual Pages 52-53** for data management procedure

Sampling Procedure

Note: this protocol is written assuming samples will be collected in the field, labeled, **stored on ice**, and at a field lab. Samples will be transported and held at 34-39°F (1-4°C) until testing occurs. You can also take samples with the YSI Pro Plus in the flowing water stream.

Locate outfall to be sampled. If the outfall is inaccessible, follow the stormwater drainage map to the next accessible upstream access point for sampling.

a. Document outfall number and complete the field data collection form using the tablet/iPad Survey 123 form, or similar application/form (template form included in Appendix A).
b. To take the Genomic sample, fill the 50 mL syringe with water from the outfall
    i. Screw the Sterivex filter unit onto the front of the syringe, push the water through
    ii. Repeat 10 times or until no more water will pass through the filter unit
    iii. Cap each filter side with two medex M/F lock plugs and freeze until processed
c. To start, Label your sterile *E. coli* (freshwater) or *Enterococci* (coastal) bottle and two additional sample bottles/containers with the date, time, and name of outfall/ location.
d. Fill each sample bottle separately.
e. Take the sample bottle and unscrew the top.
    i. Hold the bottle cap facing down so nothing can get onto the underside of the lid.
    ii. Do **NOT** touch the underside of the lid to avoid transferring bacteria.
    iii. Do **NOT** set it down on the ground because something could get on it.
    iv. By following these steps, you greatly reduce the chance of bacteria getting into the bottle, so you will not get a false positive.
f. Fill the bottle from the outfall making sure to not get any sand, sediment, or debris in the container.
    i. A very important note: the E. coli/enterococci *samples must be run within six hours of them being taken. Make sure to plan enough time to run all the bacteria samples in the lab when done sampling.*
g. Next, take your two other sample bottles/containers and fill them the same way but making sure to fill them to the 200 mL mark.

Conduct a Field Test Using the YSI Pro Plus Sonde

This test is for ammonium, specific conductivity, salinity, and temperature

a. Turn on the meter by pressing the green circle button.
b. When the screen comes on, it should show at least a temperature reading in degrees Celsius or Fahrenheit depending on your chosen options, a barometric pressure reading in mmhg, and a specific conductivity reading in us/cm.
c. The end of the cord attached to the meter should have a small metal port that is covered with a red cap. It is important to leave the red cap on until a probe is inserted into the port. The cap will keep water and debris from entering the hole and damaging or destroying the sensor port.
d. The next step is to make sure that both the conductivity and salinity results are being displayed. To turn these on is a two-step process.
e. First, you click the probe button and then select setup. Look at the row that says

conductivity and see if it says on or off next to it. If it says on, then you are all set but if it says off, click on conductivity. The next screen has a box that just be clicked to turn on conductivity. Click the box and it will turn it on. Then press escape to return to the main screen where the results are displayed.

- Probe → Setup → Conductivity → Escape to return to main screen.
- To turn on salinity, click the probe button. Then scroll down to display. From there scroll down to conductivity and click it. Then scroll down to salinity and click that as well. In this screen you will see three options. You want to scroll down to ppt and click that. Then press the escape button which will take you back to the main menu.
- Probe → Display → Conductivity → Salinity → PPT→ Escape

f. Attach the ammonia (NH3) sensor to the probe by removing the red cap at the end and screwing the sensor into it. Caution, nothing should be forced in or screwed in with abnormal tightness. This could strip or damage the connections and ruin the instrument. If properly aligned the sensor should easily be installed and fall into alignment without much effort.
   - Then click the probe button and choose setup.
   - Scroll down to ISE1 and then choose NH3. Then press the escape button which will take you back to the main menu.
   - Probe→ Setup→ ISE1→ NH3→ Escape

g. The YSI screen should now have the following units displayed.
   - The temperature in degrees Celsius/Fahrenheit
   - The barometric pressure in mmHg
   - The conductivity in us/cm
   - The salinity in ppt
   - The ammonia in mg/L

h. If there are multiple dashed lines or strange symbols through some of the result areas, don't worry about it for now. It just means that nothing is detected yet. If dashed lines or strange symbols are not replaced by real numbers when you start sampling, then there is a problem. If symbols are not replaced, start by repeating step 2d and try again.

i. Now take the end of the cord with the sensor and submerge it in one of the water sample bottles. The important things to note here are that the sensor is fully submerged and that the two holes near where the cord begins are fully submerged as well. You may have to jiggle the sensor to keep refreshing the sample within the probe. If the water level is too shallow such that the probe cannot be fully submerged, then you will have to add more sample water.

j. It may take a few minutes for all of the readings on the YSI screen to stabilize. If the numbers keep jumping back and forth within a small range, you can take the average or one of the numbers it keeps stopping on.

k. Record the ammonia, specific conductivity, salinity, and temperature on your tablet or field sheet making sure to note the units for each parameter.

l. Once you are done sampling with the YSI meter, take off the metal cage, and then rinse the whole sensor area with DI or distilled water. Make sure to get water into

the two holes at the top of the probe.

m. You have gathered all the data and samples you will need for this outfall. You can move onto the next outfall sample. Remember, the *E.coli/Enterococci* samples must be run within six hours of collection.

Lab Test Procedure for *E. Coli* (*fresh water*) / *Enterococci* (*salt or brackish water*):

a. In the lab, take your *E. coli* sample bottle and make sure your sample is 100 ml exactly. If you need to pour off some sample to get to 100 ml, be sure to shake the sample first.
b. One packet of reagent will then be added to the sample. The cap is then replaced, and a swirling motion is performed until the reagent is dissolved into the sample. The reagent will have a hard time dissolving into an ice-cold sample, so be sure to let it sit for a short time.
    i. For freshwater samples use Colilert, Brackish or saltwater samples will be run with Enterolert.
c. Prep your Quanti-tray by writing on the back the sample name, location or other indicator and the date and time the sample was run. Use a soft tip sharpie so that you do not break through to one of the wells.
d. Open the Quanti-tray by holding it in one hand and squeezing the sides, you can gently pull the tab if you need to. Be careful not to touch the inside of the tray. Gently tap the side to remove excess air bubbles.
e. The sample is then carefully poured into the tray and placed onto the rubber sealer mat.
f. The tray and sealer mat are then put through the sealer which should have been warming up for a few minutes. You will know it is ready when you have a green light.
g. Place the tray and the rubber mat with the backing of the Quanti-tray facing up and the opening of the Quanti-tray facing out.
h. Let the sealer grab the tray and pick it up a few seconds later from the back of the sealer.
i. Once the sample tray comes out of the sealer it must be incubated:
    i. For Colilert- put the Quanti-tray in the incubator at 95°F (35°C) +/- 0.5°C for 24 hours.
    ii. For Enterolert- put the Quanti-tray in the incubator at 106°F (41°C) +/-0.5°C for 24 hours.
j. AFTER the 24-hour incubation period:
    i. Take tray out of incubator.
    ii. If there is no color that indicates that no total coliforms are present.
    iii. To check for *E. coli / Enterococci* you will need to use a UV light to see how many wells fluoresce. Sometimes it is tricky to decide if what you are seeing is a positive. Use the comparator to help.
    iv. Mark the number of wells with positive reaction on your datasheet.
    v. Calculate the Most Probable Number (MPN) using the IDEXX 51-Well Quanti-Tray MPN Table or the IDEXX MPN generator software found at: https://www.idexx.com/en/water/resources/mpn-generator/

IDEXX 51 Well Quanti-Tray MPN Table

IDEXX
51-Well Quanti-Tray®
MPN Table

No. of wells giving positive reaction	MPN per 100 ml sample	95% Confidence Limits	
		Lower	Upper
0	<1.0	0.0	3.7
1	1.0	0.3	5.6
2	2.0	0.6	7.3
3	3.1	1.1	9.0
4	4.2	1.7	10.7
5	5.3	2.3	12.3
6	6.4	3.0	13.9
7	7.5	3.7	15.5
8	8.7	4.5	17.1
9	9.9	5.3	18.8
10	11.1	6.1	20.5
11	12.4	7.0	22.1
12	13.7	7.9	23.9
13	15.0	8.8	25.7
14	16.4	9.8	27.5
15	17.8	10.8	29.4
16	19.2	11.9	31.3
17	20.7	13.0	33.3
18	22.2	14.1	35.2
19	23.8	15.3	37.3
20	25.4	16.5	39.4
21	27.1	17.7	41.6
22	28.8	19.0	43.9
23	30.6	20.4	46.3
24	32.4	21.8	48.7
25	34.4	23.3	51.2
26	36.4	24.7	53.9
27	38.4	26.4	56.6
28	40.6	28.0	59.5
29	42.9	29.7	62.5
30	45.3	31.5	65.6
31	47.8	33.4	69.0
32	50.4	35.4	72.5
33	53.1	37.5	76.2
34	56.0	39.7	80.1
35	59.1	42.0	84.4
36	62.4	44.6	88.8
37	65.9	47.2	93.7
38	69.7	50.0	99.0
39	73.8	53.1	104.8
40	78.2	56.4	111.2
41	83.1	59.9	118.3
42	88.5	63.9	126.2
43	94.5	68.2	135.4
44	101.3	73.1	146.0
45	109.1	78.6	158.7
46	118.4	85.0	174.5
47	129.8	92.7	195.0
48	144.5	102.3	224.1
49	165.2	115.2	272.2
50	200.5	135.8	387.6
51	> 200.5	146.1	infinite

IDEXX Sales and Technical Support
1-800-321-0207 or 1-207-856-0496
www.idexx.com/water

Lab Test Procedure for Surfactant Screening

a. All UV testing should be performed in a dark room for best results.
b. Prepare two reference papers to provide a clear positive and negative reference for comparing to samples. Run one reference paper under tap water and apply a known surfactant with optical brighteners to the other (most laundry detergents work well). The positive reference should be confirmed to fluoresce (bright bluish glow) under UV light. Label papers as "Ref. Pos." and "Ref. Neg." or similar.
c. Label a Post-It Note (or selected sampling paper) with the sample ID at the top of the paper.
d. Note that samples that are dried fluoresce brighter than wet samples.
e. Apply the sample to the paper and allow to dry for best results. Simply pouring some of the sample onto the paper is sufficient.
f. Put on your safety glasses if you are using them and turn off the lights.
g. Expose the sample paper and references to UV light.
h. Determine if the sample is *positive*, *negative*, or *retest*.
    i. *Positive* – the sample will definitely fluoresce (glow) a bright bluish color and will resemble the positive laundry soap reference.
    ii. *Negative* – the sample is dull with no glow and resembles the negative reference with tap water.
    iii. *Retest* – may occur with some contamination and is not clearly positive or negative. Retest with the same sample or another sample may need to be collected.
i. Turn on the lights, record the result, and dispose of the sample paper.
j. Keep the positive and negative reference samples for future tests.

Lab Test Procedure for Total Chlorine:

a. Chlorine test strips for a pool will work
b. Close test strips' lid immediately after use
c. Follow instructions on bottle of Chlorine test strips
d. Use excess sampled water to dip test strip
    a. Results usually visible in 10 seconds

Lab Test Procedure for Total Nitrogen

Note: There are two options when analyzing total Nitrogen. One is the TNT 826 and the other combines tests TNT 880 & TNT 836.

Total Nitrogen TNT 826 Test

a) Preheat the digester (DRB 200) to 120°C (248°F), select 30 minutes
b) Quickly add 1.3 mL of sample, 1.3 mL of solution A, and one tablet B to a reaction tube
c) Close tube immediately, do not invert
d) Place in the digester and heat for 30 minutes
e) Allow to cool to room temperature

f) Invert a few times
g) Carefully pipet 0.5 mL of digested sample into the test vial
h) Carefully add 0.2 mL of solution D
a) Invert a few times until no more streaks can be seen in liquid
b) Wait 15 minutes then thoroughly clean outside of vile with chem wipe
i) Insert vile into cell holder of Hach spectrophotometer. Scan barcode on vile to select test, push READ. Record TN reading

Nitrate TNT 836 Test

a) Carefully pipet 0.2 mL of water sample into vile from Nitrate TNT 836 test kit
b) Carefully add 1.0 mL of Solution A to the vile (be sure to adequately clean the pipet or use a separate pipet)
c) Close the vile
d) Invert a few times until no more streaks can be seen in liquid
e) Wait 15 minutes then thoroughly clean outside of vile with chem wipe
f) Insert vile into cell holder of Hach spectrophotometer. Scan barcode on vile to select test, push READ

Total Kjeldahl Nitrogen TNT 880 Test

a) Preheat the digester (DRB 200) to 100°C (212°F), select 60 minutes
b) In quick succession, carefully add the following to reaction tube:
    i) 1.3 mL of water sample
    ii) 1.3 mL of solution A
    iii) 1 tablet B
c) Immediately close reaction tube and do not invert
d) Insert vial into the digester and heat vile for 60 minutes at 100°C
e) Remove vial after step d) and wait for reaction tube to cool down to room temperature
f) Add 1 MicroCap C
g) Close reaction tube and invert a few times until all of the contents have been removed from MicroCap and no more streaks are seen
h) Slowly pipet 0.5 mL of the digested sample into vile 1 (red label)
i) Slowly pipet 0.2 mL of Solution D into vile 1 (red label)
j) Immediately close vile 1 and invert a few times
k) Slowly pipet 1.0 mL of undigested sample into vile 2 (green label)
l) Slowly pipet 0.2 mL of solution D into vile 2 (green label)
m) Immediately close vile 2 and invert a few times until no streaks are seen
n) Set reaction timer to 15 minutes
o) After 15 minutes thoroughly clean outside of vile 1 (red label) with chem wipe
p) Insert vile 1 (red label) into cell holder of Hach spectrophotometer. Scan barcode on vile to select test, push READ. Record reading
q) Remove vile 1 (red label) from cell holder
r) Thoroughly clean outside of vile 2 (green label) with chem wipe
s) Insert vile 2 (green label) into cell holder of Hach spectrophotometer. Scan barcode on vile to select test, push READ

t) Record readings. Report the value of Total Nitrogen (TN) for the IDDE screening.
Note: *If your spectrophotometer does not have the correct program after reading the barcode, you may update the machine's software via a USB drive and an update from the Hach website. Do a web search for "Hach DR XXXX software update," download the file for your instrument then read and follow the instructions.*

Lab Procedure for Total Phosphorus:

Total Phosphorus TNT 843 Test:

a) Preheat the digester to 100℃ (212℉) or to 120℃ (248℉)
b) Carefully remove the foil from the screwed-on DosiCap Zip A
c) Unscrew DosiCap Zip A
d) Carefully pipet 2.0 mL of sample
e) Immediately screw the DosiCap Zip A back on tight; fluting at the top
f) Shake vigorously 2-3x
g) Heat in the reactor for either 60 minutes at 100 (212℉) or for 30 minutes at 120℃ (248℉)
h) Allow to cool to room temperature
i) Shake vigorously 2-3x
j) Unscrew DosiCap Zip A
k) Pipet into the cooled vial: 0.2 mL of reagent B. Close reagent B immediately after use
l) Screw a grey colored DosiCap C on the vial
m) Invert a few times until the freeze-dried contents are completely dissolved
n) After 10 minutes, invert a few more times, thoroughly clean the outside of the vial and evaluate
o) Insert vile into cell holder of Hach spectrophotometer. Scan barcode on vile to select test, push READ

Threshold Conditions:

The following are thresholds generally related to common water quality limits. Fecal Indicator bacteria results that are above threshold conditions will require further catchment investigation. See catchment investigation procedure in the IDDE plan.

Test	EPA Benchmark	Concentration Levels Indicating Need for Further Investigation	Remarks
E.coli & Enterococcus	> 235 E. coli/100 mL	>4000 *E. coli*/100 mL	Undiluted wastewater will generally have *E. coli* levels an order of magnitude or more, higher than the EPA benchmark. Pet waste, wildlife sources and regrowth of bacteria in storm drains have been shown to contribute to elevated *E. coli* levels above the benchmark in

			freshwater. Sources of bacteria in storm drains which empty into salt or brackish water have been shown to contribute to elevated Enterococcus levels.
Ammonia	> 0.5 mg/L	>0.5 mg/L	In the absence of other wastewater indicators, follow-up investigation is performed when the ammonia concentration is 0.5 mg/L or higher. If other wastewater indicators are present, then a 0.25 mg/L benchmark is used. Decomposing vegetation under anoxic conditions can release ammonia to water, which can be misleading.
Surfactants	> 0.25 mg/L	Presence	Detection of low concentrations (0.1- 0.3 mg/L) of surfactants is common at stormwater outfalls. Most detections are not correlated with other wastewater indicators and do not lead to a definite source. These detections may be attributable to outdoor vehicle or building washing.
Total Chlorine	> Reporting Limit	>0.50 mg/L	The field test used for total chlorine analysis is sufficiently sensitive to detect municipal potable water sources diluted by groundwater or runoff approximately 3 to 10 fold, depending on the strength of the potable chlorine residual and type of chlorination used. Total chlorine is a decent indicator of treated drinking water leaks and potentially graywater sources, but may also be permitted non-stormwater discharges. If high levels are consistently identified in a sample without other wastewater indicators, such as bacteria or ammonia, then discussions with water utility should precede comprehensive investigation of drainage area.
Specific Conductance	N/A	>600 µS/cm	Specific conductance alone is not a reliable indicator of wastewater contamination. Road salt and metals from pipe corrosion often result in levels in the 1,000-5,000 µS/cm range. However, flows contaminated with wastewater generally have specific conductance above 600 µS/cm. Very high level (>5,000 µS/cm) may indicate an industrial illicit connection.

Total Phosphorus	N/A	>0.3 mg/l	Phosphorus alone is not a reliable indicator of wastewater sources. High levels of phosphorus may be present in stormwater discharges due to erosion in the drainage area or other natural sources. Treated drinking water may also be high in phosphorus to meet anti-corrosion requirements in drinking water distribution systems and may be identified during dry weather sampling if a water line flushing activity or other drinking water discharge is present in the storm drain system.
Total Nitrogen	N/A		Naturally occurring levels of nitrate and total nitrogen vary substantially across the country, and statistical analyses of water quality data suggest that appropriate reference levels range from 0.12 to 2.2 mg/L total N.
Salinity /Chloride	N/A	>2855 us/cm (Salinity) Or >860 mg/l (Chloride)	Use of road salts and/or fertilizers results in anthropogenic deposits of sodium chloride in water resources. Elevated chloride levels can be toxic to freshwater aquatic life.

User Manuals

Ammonia, Chlorine, Conductivity, Salinity, Temperature
YSI Pro Plus:
https://www.ysi.com/File%20Library/Documents/Manuals/605596-YSI-ProPlus-User-Manual-RevD.pdf

E. coli/ Enterococci
Quanti-Tray Sealer:
https://123.idexx.com/resource-library/water/quanti-tray-sealer-plusmanual-en.pdf

Colilert:
https://www.idexx.com/files/colilert-procedure-en.pdf

Enterolert:
https://www.idexx.com/files/enterolert-procedure-en.pdf

Total Nitrogen
Hach Nitrate TNT 836:
https://www.hach.com/asset-get.download.jsa?id=19556239158

Hach Total Kjeldahl Nitrogen TNT 880:
https://www.hach.com/asset-get.download.jsa?id=19556239178

OR

Hach Total Nitrogen TNT 826:
https://www.hach.com/asset-get.download.jsa?id=19556239151

Total Phosphorus

Hach Phosphorus Reactive (Orthophosphate) and Total TNT 843:
https://www.hach.com/asset-get.download.jsa?id=19556239161

Tables

IDEXX 51-Well MPN table:
https://www.idexx.com/files/qt51mpntable.pdf

IDEXX MPN generator software:
https://www.idexx.com/en/water/resources/mpn-generator/

Appendix:

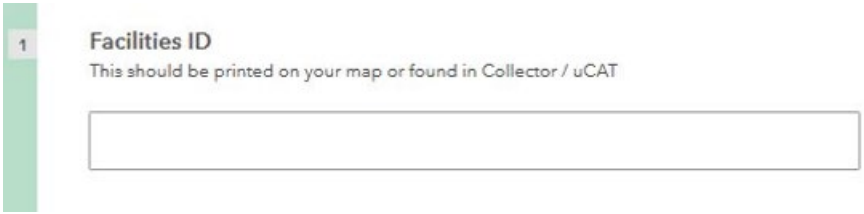
Appendix A – Software

Survey 123, developed by ArcGIS, was used to organize and develop data collection in the field. There are other survey websites and software that can be used in place of Survey 123. Below is an example of the information that was collected in a survey format.

Survey 123 questions

MS4 2020 Dry Weather Inspections

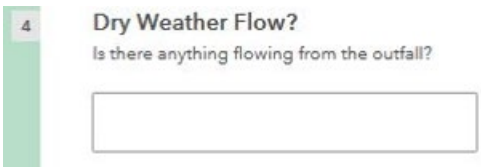
1) Facilities ID



2) Reason for Inspection
    a. Initial Inspection
    b. Follow-up Inspection
    c. Dry Run
    d. Other

3) Is Outfall Accessible?
    a. Yes
    b. No

4) Dry Weather Flow?
    a. No – No signs of dry weather flow
    b. No – Signs of dry weather flow
    c. Yes – Is flowing
    d. Other

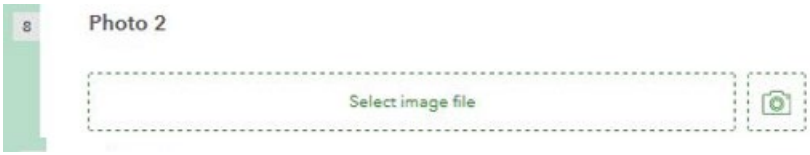


5) Characteristics of Flow
    a. Example – color sheen, foam, odor, sediment, cloudiness, etc.

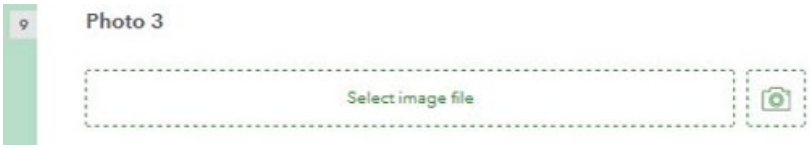
6) Characteristics of outfall
    a. Example – physical condition

7) Photo 1

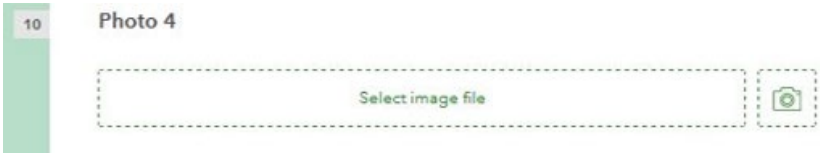
8) Photo 2



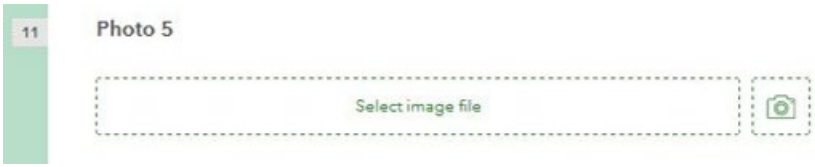
9) Photo 3



10) Photo 4



11) Photo 5



12) Notes

13) Date/Time

14) Inspector Name

15) Map Location