WRIGHT-PIERCE
Engineering a Better Environment

Memorandum

Date: **9/21/2022**

Project No.: **20915A**

To: **Jason Rucker, Public Works Director**

From: **Christine Rinehart, PE and Britt Eckstrom, PE**

Subject: **Nitrogen Source Identification Report – Town of Rye, New Hampshire**

Appendix H, Part I.1.b of the 2017 General Permit for Stormwater Discharges from Small Separate Storm Sewer Systems in New Hampshire requires permitees with discharges to water quality limited waterbodies or their tributaries where nitrogen is the cause of impairment to develop a Nitrogen Source Identification Report. Appendix H requires permittees to complete a Nitrogen Source Identification Report within four years of the permit effective date. Per Appendix H, Part I.1.b.i, the report shall include the following elements:

1. Calculation of total MS4 area draining to the water quality limited water segments or their tributaries, incorporating updated mapping of the MS4 and catchment delineations produced pursuant to Part 2.3.4.6
2. All screening and monitoring results pursuant to Part 2.3.4.7.d., targeting the receiving water segment(s)
3. Impervious area and DCIA for the target catchment
4. Identification, delineation and prioritization of potential catchments with high nitrogen loading
5. Identification of potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment

The Town of Rye retained Wright-Pierce to prepare a Nitrogen Source Identification Report for the water quality limited waters in Rye impaired by Nitrogen. The purpose of this document is to meet the requirement in Appendix H section I.1.b.i of the NH MS4 General Permit to create a Nitrogen Source Identification Report.

Background

The Town's Stormwater Management Program identifies Back Channel (NHEST600031001-05) and Little Harbor (NHEST600031002-02) as water quality limited waters impaired by nitrogen. Little Harbor/Back Channel were listed as impaired for nitrogen on the 2012 303(d) list, subsequently, beginning with the 2014 303(d) list the New Hampshire Department of Environmental Services (NHDES) proposed removing total nitrogen impairments for several assessment zones, including those of Little Harbor/Back Channel. These assessments zones remained on the 303(d) list for total nitrogen until they were removed for total nitrogen in 2020/2022. According to the Town's Notice of Intent for coverage under the Small MS4 General Permit, there are no outfalls discharging to Back Channel and one outfall discharging to Little Harbor (later determined to be a privately-owned outfall); however, there are seven outfalls, listed in Table 1, that discharge to tributaries of Back Channel and Little Harbor. The outfall catchments are shown in Figure 1 in Attachment A.

Table 1 Target Outfall Catchments

Outfall ID	Receiving Water
E*04 - #1	Sagamore Creek
E*04 - #2	Sagamore Creek
E*04 - #3	Sagamore Creek
R*11 - #1	Witch Creek
R*01 - 1	Berry Brook
41 Morgan Ct.	Berry Brook
R*15 - #3	Berry Brook

MS4 Drainage Area

The data used for the area calculations was based on data prepared by a collaborative effort between UNH Stormwater Center, GRANIT, and NHDES. The raw data provided by this collaborative effort was town-wide data. Wright-Pierce selected a subset of this data consisting of the parcels located within the catchment areas of the seven outfalls discharging to the water quality limited waterbodies and their tributaries (listed in Table 1). The MS4 drainage area was calculated by adding the area of each parcel within the data subset. The entire parcel area was included in the calculation, even if only a small portion of the parcel was located within the catchment area. The referenced data subset is included in Attachment B. The total MS4 area draining to the tributaries of the water quality limited receiving waterbodies is approximately 189 acres.

Screening and Monitoring Data

Pursuant to Part 2.3.4.7.d of the NH MS4 General Permit, the Town completed dry weather inspections of the seven outfalls discharging to the tributaries of the water quality limited receiving waterbodies on various dates in summer 2020 and spring 2021. Dry weather flow was present and sampled at one of the seven outfalls (R*11 - #1, 19 Frontier), which was sampled on June 8, 2021 and resampled for E. coli against the initial enterococci test on June 22, 2021. Screening and monitoring results are included in Attachment C.

Impervious Area and Directly Connected Impervious Area (DCIA)

For the purpose of this report, the analysis did not distinguish between impervious cover area and directly connected impervious area (DCIA). The Town of Rye will assess priority areas for treatment and will select those with verified DCIA for BMP implementation. Similar to the MS4 drainage area calculation, the impervious cover areas for the targeted catchments were calculated using a subset of the data provided by the collaborative efforts between UNH Stormwater Center, GRANIT, and NH Department of Environmental Services (see Attachment B). The impervious cover area within the seven targeted catchments is approximately 21 acres.

Prioritization of Catchments with High Nitrogen Loading

Nitrogen loads for each target catchment were estimated using the data provided by the collaborative effort as previously described. A previous report, prepared by the UNH Stormwater Center and the NH Department of

Environmental Services, titled, "Pollutant Hot Spots – Priority Ranked Parcel Summary Report", dated, November 2021, describes the methodology for estimating pollutant loading: A Geographic Information System (GIS) analysis of the municipality of Rye, NH was performed in 2019 using publicly available GIS layers, including parcel boundaries, conservation areas, land use, and impervious cover (IC) coupled with the pollutant load export rates found in Table 2-1 of Appendix F of the NH MS4 permit. The analysis yielded estimated total nitrogen (TN) loading "hot spot" data per parcel. The analysis conducted for this memo, added the estimated nitrogen load per year for each parcel within the target catchment and divided the total by the MS4 drainage area to determine the estimated total nitrogen load (pounds per year) per acre.

The MS4 drainage area, impervious cover area, and the total nitrogen load in pounds per year for each of the seven targeted catchments is summarized in Table 2. The outfall catchments are prioritized by greatest total nitrogen load (pounds per year per acre).

Table 2 MS4 Drainage Area, Impervious Cover Area, and Total Nitrogen Load for Target Catchments

Outfall ID	MS4 Drainage Area (acre)	Impervious Cover Area (acre)	Total Nitrogen Load (pounds per year)	Total Nitrogen Load (pounds per year per acre)	Ranking
E*04 - #3	2.0	0.53	9.21	4.61	1
E*04 - #2	7.17	1.73	30.95	4.32	2
E*04 - #1	4.24	0.86	16.13	3.80	3
41 Morgan Ct.	2.05	0.34	6.44	3.14	4
R*11 - #1	142.68	15.57	336.38	2.36	5
R*01 - 1	8.79	0.89	20.19	2.30	6
R*15 - #3	21.98	0.88	33.92	1.54	7
Total	188.91	20.8	453.22	--	--

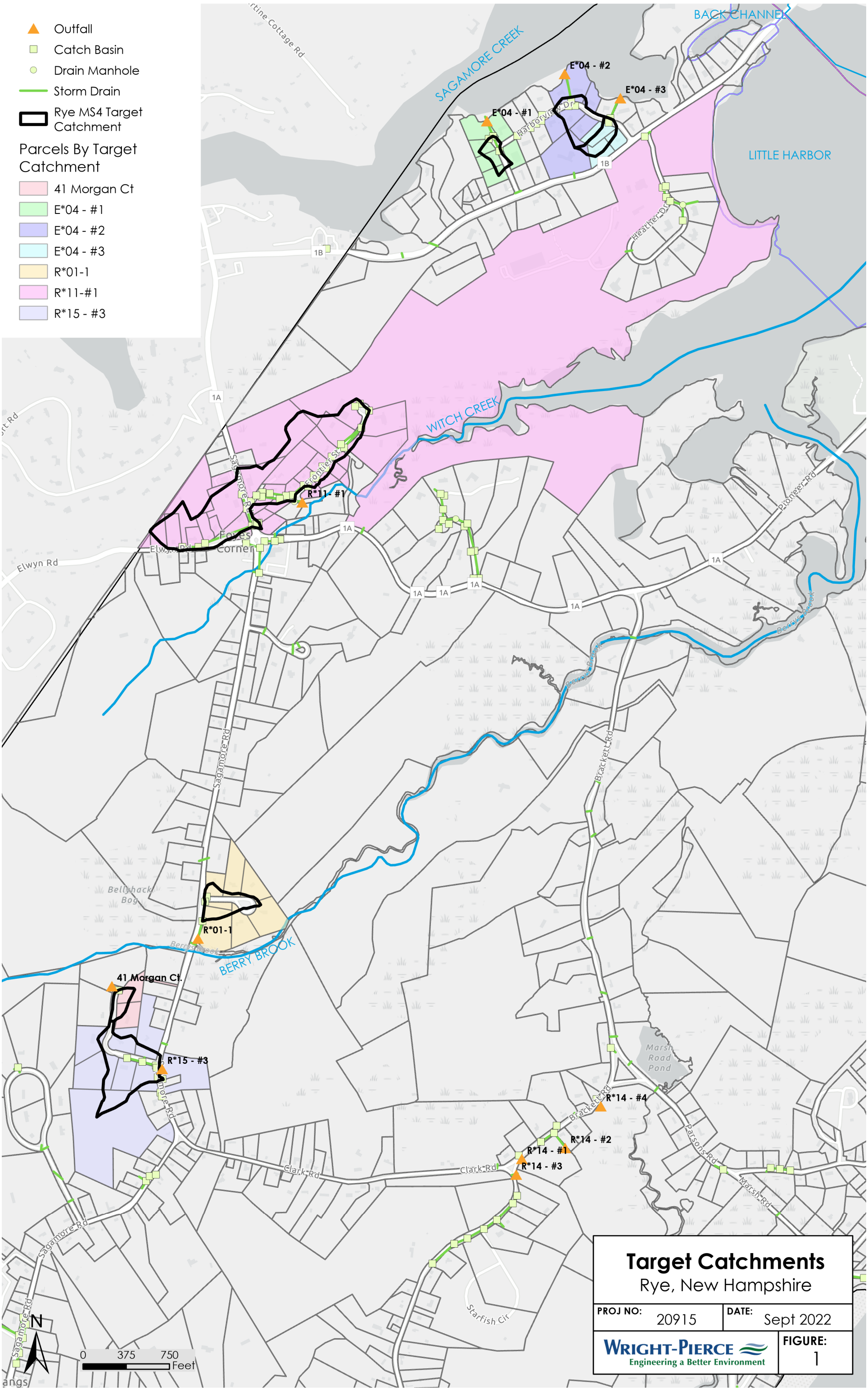
Potential Retrofit Opportunities

All of the parcels within the targeted catchments are privately-owned, except for one parcel in catchment R*15 - #3, which results in limited potential retrofit opportunities. The municipally owned parcel in catchment R*15 - #3 is currently undeveloped; however, only a very small portion of this parcel actually discharges to the catchment. Potential retrofit opportunities would likely be limited to stormwater BMPs that will fit within the road right-of-way. Potential BMPs, could include retrofitting existing catch basins, installing linear best management practices, or proprietary units in-line with the storm drain infrastructure during capital improvement projects including reconstruction of the roadways and drainage improvements.

Attachments

- Attachment A
  - Figure 1 Target Catchments
- Attachment B
  - Data subset
- Attachment C
  - Stormwater Outfall Inspections and IDDES Sampling Results

Attachment A
Figure 1 Target Catchments



Target Catchments

Rye, New Hampshire

PROJ NO: 20915	DATE: Sept 2022
WRIGHT-PIERCE Engineering a Better Environment	FIGURE: 1

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Attachment B
Data Subset

Subset of Data for Target Catchments to Support Nitrogen Source Identification Report, Rye, New Hampshire
Based on data prepared by a collaborative effort between UNH Stormwater Center, GRANIT, and NH Department of Environmental Services

MS4_ID	NH_GIS_ID *	PID	Town_Owned_Flag	MS4_Flag	Area_Ac	IC_Ac	TN_Load_LbYr	TN_Load_LbYrAc	Street_Address
41 Morgan Ct	08187-022-002-000	022-002-000	0	1	1.01	0.17	3.39		35 Morgan Court, Rye, NH
41 Morgan Ct	08187-022-001-000	022-001-000	0	1	1.04	0.17	3.05		41 Morgan Court, Rye, NH
					2.05	**0.34**	**6.44**	**3.14**	
E*04 - #1	08187-024-043-000	024-043-000	0	1	0.62	0.29	4.45		71 Harborview Drive, Rye, NH
E*04 - #1	08187-024-056-000	024-056-000	0	1	0.7	0.2	3.39		74 Harborview Drive, Rye, NH
E*04 - #1	08187-024-044-000	024-044-000	0	1	0.54	0.14	2.4		65 Harborview Drive, Rye, NH
E*04 - #1	08187-024-046-000	024-046-000	0	1	0.73	0.13	2.6		53 Harborview Drive, Rye, NH
E*04 - #1	08187-024-042-000	024-042-000	0	1	0.62	0.1	2.06		77 Harborview Drive, Rye, NH
E*04 - #1	08187-024-045-000	024-045-000	0	1	1.03	0	1.23		59 Harborview Drive, Rye, NH
					4.24	**0.86**	**16.13**	**3.80**	
E*04 - #2	08187-024-059-000	024-059-000	0	1	2.76	0.75	13.05		85 Wentworth Road, Rye, NH
E*04 - #2	08187-024-052-000	024-052-000	0	1	0.6	0.21	3.44		24 Harborview Drive, Rye, NH
E*04 - #2	08187-024-051-000	024-051-000	0	1	0.63	0.2	3.31		12 Harborview Drive, Rye, NH
E*04 - #2	08187-026-003-000	026-003-000	0	1	0.63	0.16	2.77		29 Harborview Drive, Rye, NH
E*04 - #2	08187-026-004-000	026-004-000	0	1	1.3	0.15	3.54		23 Harborview Drive, Rye, NH
E*04 - #2	08187-024-053-000	024-053-000	0	1	0.71	0.14	2.61		34 Harborview Drive, Rye, NH
E*04 - #2	08187-026-005-000	026-005-000	0	1	0.54	0.12	2.23		17 Harborview Drive, Rye, NH
					7.17	**1.73**	**30.95**	**4.32**	
E*04 - #3	08187-024-050-000	024-050-000	0	1	0.75	0.2	3.47		6 Harborview Drive, Rye, NH
E*04 - #3	08187-024-060-000	024-060-000	0	1	0.76	0.2	3.46		71 Wentworth Road, Rye, NH
E*04 - #3	08187-024-049-000	024-049-000	0	1	0.49	0.13	2.28		2 Harborview Drive, Rye, NH
					2	**0.53**	**9.21**	**4.61**	
R*01-1	08187-022-053-000	022-053-000	0	1	2.17	0.26	4.88		236 Sagamore Road, Rye, NH
R*01-1	08187-022-051-000	022-051-000	0	1	1.26	0.15	2.9		13 Berrys Brook Lane, Rye, NH
R*01-1	08187-022-047-000	022-047-000	0	1	0.75	0.14	2.76		220 Sagamore Road, Rye, NH
R*01-1	08187-022-052-000	022-052-000	0	1	0.26	0	0.32		0 Berrys Brook Lane, Rye, NH
R*01-1	08187-022-048-000	022-048-000	0	1	1.46	0.13	3.41		10 Berrys Brook Lane, Rye, NH
R*01-1	08187-022-049-000	022-049-000	0	1	1.15	0.12	2.97		16 Berrys Brook Lane, Rye, NH
R*01-1	08187-022-050-000	022-050-000	0	1	1.74	0.09	2.95		19 Berrys Brook Lane, Rye, NH
					8.79	**0.89**	**20.19**	**2.30**	
R*11-#1	08187-024-021-000	024-021-000	0	1	0.89	0.58	6.35		25 Sagamore Road, Rye, NH
R*11-#1	08187-024-074-000	024-074-000	0	1	1.36	0.52	8.84		14 Sagamore Road, Rye, NH
R*11-#1	08187-024-023-000	024-023-000	0	1	0.46	0.43	6.39		13 Sagamore Road, Rye, NH

Subset of Data for Target Catchments to Support Nitrogen Source Identification Report, Rye, New Hampshire
Based on data prepared by a collaborative effort between UNH Stormwater Center, GRANIT, and NH Department of Environmental Services

MS4_ID	NH_GIS_ID *	PID	Town_Owned_Flag	MS4_Flag	Area_Ac	IC_Ac	TN_Load_LbYr	TN_Load_LbYrAc	Street_Address
R*11-#1	08187-024-022-000	024-022-000	0	1	2.02	0.42	7.98		15 Sagamore Road, Rye, NH
R*11-#1	08187-024-090-000	024-090-000	0	1	0.58	0.29	4.42		30 Sagamore Road, Rye, NH
R*11-#1	08187-024-061-009	024-061-009	0	1	1.96	0.26	5.37		53 Frontier Street, Rye, NH
R*11-#1	08187-024-061-010	024-061-010	0	1	2.59	0.21	5.55		47 Frontier Street, Rye, NH
R*11-#1	08187-024-061-011	024-061-011	0	1	1.23	0.17	3.68		46 Frontier Street, Rye, NH
R*11-#1	08187-024-075-000	024-075-000	0	1	1.82	0.16	4.25		6 Frontier Street, Rye, NH
R*11-#1	08187-024-017-000	024-017-000	0	1	0.51	0.11	2.01		15 Elwyn Road, Rye, NH
R*11-#1	08187-024-080-000	024-080-000	0	1	0.92	0.1	2.43		40 Frontier Street, Rye, NH
R*11-#1	08187-024-019-000	024-019-000	0	1	0.29	0.1	1.6		5 Elwyn Road, Rye, NH
R*11-#1	08187-024-077-000	024-077-000	0	1	0.34	0.1	1.65		16 Frontier Street, Rye, NH
R*11-#1	08187-024-085-000	024-085-000	0	1	0.38	0.09	1.64		25 Frontier Street, Rye, NH
R*11-#1	08187-024-079-000	024-079-000	0	1	0.4	0.08	1.56		32 Frontier Street, Rye, NH
R*11-#1	08187-024-088-000	024-088-000	0	1	0.34	0.08	1.46		3 Frontier Street, Rye, NH
R*11-#1	08187-024-015-000	024-015-000	0	1	0.84	0.08	2.03		29 Elwyn Road, Rye, NH
R*11-#1	08187-024-014-000	024-014-000	0	1	0.68	0.08	1.79		37 Elwyn Road, Rye, NH
R*11-#1	08187-024-078-000	024-078-000	0	1	0.38	0.07	1.33		26 Frontier Street, Rye, NH
R*11-#1	08187-024-084-000	024-084-000	0	1	0.38	0.07	1.33		29 Frontier Street, Rye, NH
R*11-#1	08187-024-083-000	024-083-000	0	1	0.37	0.06	1.25		35 Frontier Street, Rye, NH
R*11-#1	08187-024-089-000	024-089-000	0	1	0.31	0.06	1.18		26 Sagamore Road, Rye, NH
R*11-#1	08187-024-018-000	024-018-000	0	1	0.56	0.06	1.39		9 Elwyn Road, Rye, NH
R*11-#1	08187-024-087-000	024-087-000	0	1	0.34	0.05	1.04		15 Frontier Street, Rye, NH
R*11-#1	08187-024-076-000	024-076-000	0	1	0.37	0.05	1.07		10 Frontier Street, Rye, NH
R*11-#1	08187-024-016-000	024-016-000	0	1	3.23	0	7.56		19 Elwyn Road, Rye, NH
R*11-#1	08187-024-013-000	024-013-000	0	1	0.13	0	0.15		0 Elwyn Road, Rye, NH
R*11-#1	08187-024-082-000	024-082-000	0	1	0.46	0	0.55		7 Old Ferry Landing, Rye, NH
R*11-#1	08187-024-061-026	024-061-026	0	1	112.79	11.09	241.1		60 Wentworth Road, Rye, NH
R*11-#1	08187-024-072-000	024-072-000	0	1	5.75	0.2	9.43		4 Sagamore Road, Rye, NH
					142.68	**15.57**	**336.38**	**2.36**	
R*15 - #3	08187-018-049-000	018-049-000	0	1	1.55	0.2	3.76		30 Morgan Court, Rye, NH
R*15 - #3	08187-018-048-000	018-048-000	0	1	2.31	0.14	3.86		24 Morgan Court, Rye, NH
R*15 - #3	08187-022-003-000	022-003-000	0	1	1.05	0.12	2.8		29 Morgan Court, Rye, NH
R*15 - #3	08187-019-064-000	019-064-000	0	1	10.49	0.12	13.87		361 Sagamore Road, Rye, NH
R*15 - #3	08187-019-068-000	019-068-000	0	1	1.02	0.11	2.61		18 Morgan Court, Rye, NH
R*15 - #3	08187-022-004-000	022-004-000	0	1	2.03	0.11	3.81		309 Sagamore Road, Rye, NH
R*15 - #3	08187-019-067-000	019-067-000	0	1	1.08	0.08	2.34		12 Morgan Court, Rye, NH
R*15 - #3	08187-019-069-000	019-069-000	1	1	2.45	0	0.87		0 Sagamore Road, Rye, NH
					21.98	**0.88**	**33.92**	**1.54**	
				Totals	**188.91**	**20.8**	**453.22**		

Attachment C
Stormwater Outfall Inspections and IDDES Sampling Resutls

STORMWATER OUTFALL INSPECTIONS

Outfall ID.	Street No.	Street	GPS Latitude	GPS Longitude	Material	Shape	Size	Inspection Date	Inspector	Flow	Picture	Discharges To	Further Action	Tested
R*01-1	236	Sagamore Road	-70.74858	43.03653	PVC	Circular	8"	08/27/20	D. McCarthy	No	Berry Brook @ Sagamore #1	Berry Brook	No	
R*04-#1	345	West Road	-70.79905	42.98568	PVC	Circular	8"	08/27/20	D.McCarthy	No	South Road @ West #1	Baily's Brook	No	
O*02-15-#1	51	Fairhill Avenue	-70.72664	43.02852	HDPE	Circular	24"	08/27/20	D.McCarthy	No	Fairhill Road #1	Atlantic Ocean	No	
R*03-#1	598	Brackett Road	-70.74399	43.01897	HDPE	Circular	Twin 24"	08/27/20	D.McCarthy	No	Brackett #1	Parsons Creek	No	
R*03-#2	705	Brackett Road	-70.7455	43.01451	HDPE	Circular	12"	08/27/20	D.McCarthy	No	Brackett #2	Parsons Creek	No	
L*01 - #1	15	Bernard Drive	-70.7659	42.98665	HDPE	Circular	8"	08/31/20	D.McCarthy	No	Bernard #1	Ell Pond	No	
L*01 - #2	112	Perkins Road	-70.76982	42.98755	HDPE	Circular	8"	08/31/20	D.McCarthy	No	Perkins #1	Ell Pond	No	
L*01 - #3	112	Perkins Road	-70.76976	42.98757	HDPE	Circular	12"	08/31/20	D.McCarthy	Yes	Perkins #2	Ell Pond	Yes, Sample	06/09/21
E*04 - #1	53	Harbor View Drive	-70.73891	43.05590	HDPE	Circular	12"	08/08/20	D.McCarthy	No	Harbor View #1	Sagamore Creek	No	
E*04 - #2	53	Harbor View Drive	-70.73637	43.05700	Concrete	Circular	12"	08/08/20	D.McCarthy	No	Harbor View #2	Sagamore Creek	No	
E*04 - #3	53	Harbor View Drive	-70.73457	43.05641	Concrete	Circular	12"	08/08/20	D.McCarthy	No	Harbor View #3	Sagamore Creek	No	
R*14 - #1	1	Clarke Road	-70.73815	43.03121	Concrete	Circular	18"	09/10/20	D.McCarthy	No	Brackett at Clarke #1	Parsons Creek	No	
R*14 - #3	314	Brackett Road	-70.73834	43.03084	HDPE	Circular	12"	09/10/20	D.McCarthy	No	Brackett at Clarke #3	Parsons Creek	No	
O*03-01 - #1	1	South Road	-70.76473	42.97701	Clay	Circular	8"	07/31/20	D.McCarthy	Yes		Philbrick Beach	Yes, Sample	06/08/21
O*03-01 - #2	1	South Road	-70.76473	42.97701	Clay	Circular	6"	07/31/20	D.McCarthy	No		Philbrick Beach	No	
L&01 - #1	2	Foster Lane	-70.77084	42.98483	Steel	Circular	12"	07/31/20	D. McCarthy	Yes	KIMG 3026	Ell Pond	Yes, Sample	06/09/21
O*02-04 - #1		Wallis at Twin Culvert	-70.73484	43.02233	HDPE	Circular	12"	05/20/21	D. McCarthy	Yes	Outfalls/ Wallis #1	Parson Creek	Yes, Sample	06/08/21
O*02-04 - #1		Wallis at Single Culvert	-70.73419	43.02207	HDPE	Circular	15"	05/20/21	D. McCarthy	No	Outfalls / Wallis #2	Parson Creek	No	
	646	Central Road	-70.77035	42.98791	HDPE	Circular	24"	07/31/20	D.McCarthy	Yes	KIMG 3024	Un-named Pond	Yes, Sample	06/09/21
R*11- #1	19	Frontier Street	-70.74504	43.04888	PVC	Circular	16"	04/27/21	D. McCarthy	Yes	Outfalls/Frontier/#1	Witch Creek	Yes, Sample	06/08/21
R*14 - #2	270	Brackett Road	-70.73674	43.03146	Steel	Circular	12"	09/10/20	D. McCarthy	No		Parsons Creek	No	
L*01-#2	19	Sea Road	-70.7671	42.97839	HDPE	Circular	8"	01/11/21	J. Blaisdell	No	Outfalls/Sea Road #1	Ell Pond	No	
R*14 - #4	345	Brackett Road	-70.73557	43.03244	Steel	Circular	6"	04/28/21	D. McCarthy	No	Outfalls / Brackett #3	Parsons Creek	No	
S*22 - #1	55	Recreation Road	-70.76006	43.00391	HDPE	Circular	15"	05/03/21	D. McCarthy	No	Outfalls/Rec Rd. #1	Tributary to Rye Harbor	No	
R*15 - #3	318	Sagamore Road	-70.74979	43.03344	Steel	Circular	10"	05/04/21	D.Mccarthy	No	Outfalls/Sagamore at Morhan #1	Tributary to Berrys Brook	No	
R*15 - #1	6	Young Lane	-70.75353	40.02307	HDPE	Circular	15"	05/04/21	D. McCarthy	No	Outfalls/ Young Lane #1	Pond Tributary to Berrys Brook	No	
R*15 - #2	8	Young Lane	-70.75258	40.02307	HDPE	Circular	18"	05/04/21	D. McCarthy	No	Outfalls/Young Lane #2	Pond Tributary to Berrys Brook	No	
	52	Spring Road	-70.76527	42.99614	Conc.	Circular	15"	05/12/21	D.McCarthy	No	Outfalls/Spring Road #1	Swamp Trubutary to O*0000 - 11	No	
R*05-#1	120	Fern Avenue	-70.77915	43.00083	HDPE	Circular	12"	05/18/21	D. Barron	No	Outfalls/Fern Avenue #1	Tributary to Rye Harbor	No	
41 Morgan Ct.	41	Morgan Court	-70.75139	43.03542	Conc.	Circular	12"	05/20/21	D. McCarthy	No	Outfalls / Morgan Court #1	Tributary to Berry Brook	No	
R*04 - #1	651	South Road	-70.79905	42.98568	PVC	Circular	8"	05/26/21	D.McCarthy	No	Outfalls / South #4		No	
O*0000-11 -#1	2125	Ocean Boulevard	-70.75976	42.99267	CMP	Circular	18"	06/08/21	D.McCarthy	No		Tributary to Rye Harbor	No	

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

IDDES Sampling Results

Town: Rye, NH
Sampling date: 6/8/21 & 6/9/21

Outfall i.d.	1 South	Culvert	19 Frontier	646 Central	2 Foster	112 Perkins
Date Sampled	6/8/21	6/8/21	6/8/21	6/9/21	6/9/21	6/9/21
Time Sampled	9:24 AM	9:43 AM	9:57 AM	11:01 AM	11:19	11:31 AM
Temperature (°F)	60	58.2	57.9	44.6	44.9	46.9
Barometric Pressure (mmHg)	756.7	756.7	756.7	755.2	755.2	755.2
Specific Conductance (US/cm)	2405	1402	552.4	522.5	515.6	656.9
Conductivity (US/cm)	2251	1227	472.6	409.9	394.1	503
Salinity (ppt)	1.24	0.71	0.27	0.25	0.26	0.33
NH4 (mg/L)	1.01	1.13	0.07	2.78	1.81	1.68
Total hardness (ppm)	250	100	100	100	100	100
Total Chlorine (ppm)	BDL (<0.02)	BDL (<0.02)	BDL (<0.02)	BDL (<0.02)	BDL (<0.02)	BDL (<0.02)
Free Chlorine (ppm)	1	BDL (<0.02)	BDL (<0.02)	BDL (<0.02)	BDL (<0.02)	BDL (<0.02)
pH	6.2	6.8	6.2	6.8	6.8	8.4
Total Alkalinity (ppm)	40	40	40	40	40	40
Surfactant (mg/L)	BDL (<0.25)	BDL (<0.25)	BDL (<0.25)	BDL (<0.25)	≥0.25	BDL (<0.25)
E. Coli MPN (per 100 ml sample)	NA	NA	NA	NA	NA	NA
Enterococci MPN (per 100 ml sample)	13.7	2	78.2	2	2	1
NH3 strip (mg/L)	BDL (<0.5)	BDL (<0.5)	BDL (<0.5)	BDL (<0.5)	BDL (<0.5)	BDL (<0.5)
Nitrite/Nitrate-N (mg/L)	1.3	9.9	1.2	5	1.2	1.4
Nitrogen, total (mg/L)	1.3	9.9	1.2	5.6	1.2	1.4
Total Kjeldahl Nitrogen [TKN] (mg/L)	BDL (<0.5)	BDL (<0.5)	BDL (<0.5)	0.5	BDL (<0.5)	BDL (<0.5)

Notes:
All sampling went according to plan.

Samples taken between 6/8 &9

BDL = Below detection limit
(Detection limits listed in parentheses)

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

IDDES Sampling Results

Town: Rye, NH
Sampling date: 6/8/21 & 6/9/21

Outfall i.d.	1 South	Culvert	19 Frontier	646 Central	2 Foster	112 Perkins
Date Sampled	6/8/21	6/8/21	6/8/21	6/9/21	6/9/21	6/9/21
Time Sampled	9:24 AM	9:43 AM	9:57 AM	11:01 AM	11:19	11:31 AM
Temperature (°F)	60	58.2	57.9	44.6	44.9	46.9
Barometric Pressure (mmHg)	756.7	756.7	756.7	755.2	755.2	755.2
Specific Conductance (US/cm)	2405	1402	552.4	522.5	515.6	656.9
Conductivity (US/cm)	2251	1227	472.6	409.9	394.1	503
Salinity (ppt)	1.24	0.71	0.27	0.25	0.26	0.33
NH4 (mg/L)	1.01	1.13	0.07	2.78	1.81	1.68
Total hardness (ppm)	250	100	100	100	100	100
Total Chlorine (ppm)	BDL (<0.02)	BDL (<0.02)	BDL (<0.02)	BDL (<0.02)	BDL (<0.02)	BDL (<0.02)
Free Chlorine (ppm)	1	BDL (<0.02)	BDL (<0.02)	BDL (<0.02)	BDL (<0.02)	BDL (<0.02)
pH	6.2	6.8	6.2	6.8	6.8	8.4
Total Alkalinity (ppm)	40	40	40	40	40	40
Surfactant (mg/L)	BDL (<0.25)	BDL (<0.25)	BDL (<0.25)	BDL (<0.25)	≥0.25	BDL (<0.25)
E. Coli MPN (per 100 ml sample)	NA	NA	NA	NA	NA	NA
Enterococci MPN (per 100 ml sample)	13.7	2	78.2	2	2	1
NH3 strip (mg/L)	BDL (<0.5)	BDL (<0.5)	BDL (<0.5)	BDL (<0.5)	BDL (<0.5)	BDL (<0.5)
Nitrite/Nitrate-N (mg/L)	1.3	9.9	1.2	5	1.2	1.4
Nitrogen, total (mg/L)	1.3	9.9	1.2	5.6	1.2	1.4
Total Kjeldahl Nitrogen [TKN] (mg/L)	BDL (<0.5)	BDL (<0.5)	BDL (<0.5)	0.5	BDL (<0.5)	BDL (<0.5)

Notes:
All sampling went according to plan.

Samples taken between 6/8 &9

Waiting for results of genomics testing to verify the presence of human contamination at outfall 19 Frontier.
This will determine whether the illicit discharge is a sewer connection

BDL = Below detection limit
(Detection limits listed in parentheses)

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

IDDES Sampling Results

Town: Rye, NH
Sampling date: 6/22/21

Outfall I.d.	19 Frontier
Date Sampled	6/22/21
Time Sampled	12:50 PM
Temperature (°F)	53
Barometric Pressure (mmHg)	749.4
Specific Conductance (US/cm)	695
Conductivity (US/cm)	622
Salinity (ppt)	0.34
NH4 (mg/L)	2.6
Total hardness (ppm)	100
Total Chlorine (ppm)	BDL (<0.02)
Free Chlorine (ppm)	BDL (<0.02)
pH	6.2
Total Alkalinity (ppm)	40
Surfactant	BDL (<0.25)
E. Coli MPN (per 100 ml sample)	<1.0
Enterococci MPN (per 100 ml sample)	NA
NH3 strip (mg/L)	BDL (<0.5)
Nitrite/Nitrate-N (mg/L)	NA
Nitrogen, total (mg/L)	NA
Total Kjeldahl Nitrogen [TKN] (mg/L)	NA

Notes: Resample was tested for E. Coli against the initial Enterococci tests.

No Nitrogen tests required for Indicator bacteria resample.

BDL = Below detection limit
(Detection limits listed in parentheses)

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- E.coli: Suitable levels for e.coli in fresh waters are a 30 day mean (126 cfu/100mL) and a single sample number (235 cfu/100mL – 575 cfu/100mL).

- Enterococci: Suitable levels for enterococci in marine waters are 35 cfu/100mL for a 30 day mean and 104 – 501 cfu/100mL for a single sample,

UNH Stormwater Center
IDDE Sample results
Town: Rye, New Hampshire

Outfall name	1 South	Culvert	19 Frontier	646 Central	2 Foster	112 Perkins
Location	Near Beach club	Behind Red Roof	Near Brit Bits	In private pond	Private yard	Beside road
Date Sampled	6/8/21	6/8/21	6/8/21	6/9/21	6/9/21	6/9/21
Time Sampled	9:24 am	9:43 am	9:57 am	11:01 am	11:19 am	11:31 am
Temperature (°F)	60	58.2	57.9	44.6	44.9	46.9
Barometric Pressure (mmHg)	756.7	756.7	756.7	755.2	755.2	755.2
Specific Conductance (US/cm)	2405	1402	552.4	522.5	515.6	656.9
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Salinity (ppt)	1.24	0.71	0.27	0.25	0.26	0.33
NH4 (mg/L)	1.01	1.13	0.07	2.78	1.81	1.68
Total hardness (ppm)	250	100	100	100	100	100
Total Chlorine (ppm)	0/0	0/0	0/0	0/0	0/0	0/0
Free Chlorine (ppm)	0	0	0	0	0	0
pH	6.2	6.8	6.2	6.8	6.8	8.4
Total Alkalinity (ppm)	40	40	40	40	40	40
Surfactant	Absent	Absent	Absent	Absent	Present	Absent
Enterococci MPN (per 100 ml sample)	13.7	2.0	78.2	2.0	2.0	1.0

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