Results of the Water Quality Monitoring Program for Coldwater Fisheries

Sudbury to Hudson Reliability Project

AUGUST – OCTOBER 2021

DECEMBER 2021

PREPARED FOR

Eversource Energy

PREPARED BY

SWCA Environmental Consultants

RESULTS OF THE WATER QUALITY MONITORING PROGRAM FOR COLDWATER FISHERIES

SUDBURY TO HUDSON RELIABILITY PROJECT

AUGUST – OCTOBER 2021

Prepared for

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SWCA Project No. 67849

December 2021

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1 INTRODUCTION

The Sudbury to Hudson Reliability Project (Project) consists of a new, approximately 9-mile-long transmission line between Eversource's existing Sudbury substation in Sudbury, Massachusetts, and the Hudson Light & Power Company's (HL&P) substation in Hudson, Massachusetts. The new underground transmission line will be installed in the municipalities of Sudbury, Hudson, Stow, and Marlborough, Massachusetts. Approximately 7.5 miles of the new transmission line will be installed within an inactive Massachusetts Bay Transportation Authority (MBTA) railroad right-of-way (ROW) which is to be converted into the Massachusetts Central Rail Trail (MCRT).

Special Condition Part I(q) of the Sudbury Order of Conditions (OOC) for the Project required baseline monitoring of flow and water quality for all Coldwater Fisheries Resources (CFR) crossed by the Project. SWCA has prepared this summary of the initial rounds of water quality monitoring for the two (2) crossings of CFR in Hop Brook and six (6) other streams or tributaries that contribute to CFR and are crossed by the Project (see Figures in Appendix A).

The following eight streams were included in this monitoring plan as requested by the Sudbury Conservation Commission:

- Hop Brook – Bridge 128 (400+30): ST 400 Perennial Stream and State-listed CFR;
- Unnamed Stream (527+30): ST 527 Intermittent Stream and local CFR;
- Dudley Brook (539+40): ST 540 Perennial and local CFR;
- Unnamed intermittent stream (560+82): ST 561 Intermittent and local CFR;
- Unnamed Intermittent stream (593+18): ST 591 Intermittent and local CFR;
- Intermittent Tributary to Hop Brook (700+50, 710+50): ST 700/710 Intermittent and local CFR;
- Hop Brook (Bridge 127) (725+00): ST 725 Perennial Stream and State-listed CFR; and
- Intermittent Tributary to Wash Brook (747+39): ST 747 Intermittent and local CFR.

2 WATER QUALITY MONITORING METHODS AND RESULTS

2.1 Surface Water Monitoring Methods

In accordance with the *Baseflow and Baseline Water Quality Monitoring Program for Cold Water Fisheries* proposed by SWCA dated August 25, 2021 and approved by the Sudbury Conservation Commission, the following parameters were monitored on a monthly basis:

- temperature, dissolved oxygen, as well as pH, specific conductivity, and oxygen reduction potential (ORP) measured with a YSI multi-meter;
- flow velocity with a Hach FH950 flow velocity meter;
- turbidity levels measured with a turbidity meter; and

- chlorine, hardness and alkalinity measured with field test strips.

Based on the Massachusetts Surface Water Quality Standards (SWQS) (314 CMR 4.00), CFRs have special designated criteria for dissolved oxygen and temperature. All other criteria are the same as those for warm water fisheries.

The following Table 1 includes ranges for temperature, dissolved oxygen and pH that are favorable to cold water fisheries. Table 2 indicates ranges for other surface water criteria that are favorable for freshwater fish.

Table 1. Surface Water Conditions for Cold Water Fisheries

Parameter[1]	Favorable Ranges for Cold Water Fisheries
Temperature	below 20ºC (up to 26ºC for 24 hours)
Dissolved Oxygen	min of 6 mg/L, up to 7 mg/L preferred
pH	6.5 - 8.3

Note: C = Celsius; mg/L = milligrams per liter

Source:

1: 314 CMR 4.00: Massachusetts Surface Water Quality Standards

Table 2. Surface Water Conditions for Freshwater Fish

Parameter	Favorable Ranges for Freshwater Stream or Fish
Specific Conductivity[1]	150 - 500 µs/cm
Turbidity[2]	"free from turbidity that would impair fish habitat"
Chlorine[3]	<4 mg/L
Alkalinity[4,5]	20 - 300 mg/L

Note: ORP = oxygen reduction potential; mg/L = milligrams per liter; µs/cm = microsiemens per centimeter; mV = millivolts

Sources:

1: EPA Volunteer Stream Monitoring: A Methods Manual

2: 314 CMR 4.00: Massachusetts Surface Water Quality Standards

3: EPA National Primary Drinking Water Regulations

4: UMass Dartmouth Northeast Regional Aquaculture Center NRAC Fact Sheet No. 170-1993.

5: EPA National Recommended Water Quality Criteria for Aquatic Life.

SWCA monitored these eight locations on August 30, September 30 and October 29, 2021. Temperature and dissolved oxygen can fluctuate naturally when the sun rises and enables aquatic plants to release more oxygen. Sampling was conducted in the same order of monitoring points and as a result, the sampling was conducted during roughly the same time of day at each location each month to help ensure comparability over time. The Table 3 attached to this report in Appendix B summarizes the data collected during each of these monitoring events. The individual field logs are also included in Appendix C.

2.2 Temperature

Results of the monitoring indicate that in August the temperatures exceeded 20 degrees Celsius for some of the monitoring points; however, since that monitoring event, all temperatures have dropped to within normal ranges for cold water fisheries at less than 20 degrees Celsius.

2.3 Dissolved Oxygen

Dissolved oxygen levels have been lower than the favorable value of 6 mg/L for a majority of the monitoring locations during the August monitoring event and even at some sampling locations into the September monitoring event as well. However, levels measured during the October monitoring event were above 6 mg/L for all locations other than the unnamed intermittent stream (station 561) upgradient side and Hop Brook Tributary (station 700) upgradient side. Levels of dissolved oxygen are increasing in all monitoring locations as the weather gets colder and the temperatures in the streams drop.

2.4 pH

Results of the monitoring indicate that in August the pH was lower than 6.5 for six of the monitoring points; however, since that monitoring event, most all of the pH levels have reported to be within normal ranges for cold water fisheries at 6.5-8.3. The unnamed stream (station 527) has continued to report a pH level below 6.5 for all three monitoring events.

2.5 Specific Conductivity

The monitoring parameter for specific conductivity reported typical concentrations for freshwater for all monitoring stations with the exception of the results from the Hop Brook Tributary (ST 700 and ST 710).

2.6 Turbidity

Turbidity levels are not specifically defined by a standard value in Massachusetts. Based on available information, for the purpose of this assessment, it can be assumed that a value of less than 5 NTU is favorable for freshwater, however the lower the better as typical groundwater is less than 1 NTU. Turbidity values reported for each station were less than 5 NTUs for all monitoring events except for all monitoring events at the Hop Brook Tributary (ST 700 and ST 710) and the unnamed stream (station 561) from the August event only.

2.7 Other Parameters

The stream flow velocities from the downgradient side to the upgradient side were comparable and consistent from month to month. The ORP, alkalinity, chlorine, and hardness levels from the downgradient side to the upgradient side were comparable. Alkalinity and chlorine levels were below the favorable levels for freshwater.

2.8 Total Nitrogen and Phosphorous

In accordance with the *Baseflow and Baseline Water Quality Monitoring Program for Cold Water Fisheries* (August 25, 2021), sampling of the two cold water fishery stream crossings would be conducted prior to construction as a single event. This will be repeated only once again after construction is completed. During the August monitoring event, SWCA collected surface water samples for laboratory analyses of total nitrogen and phosphorous from Hop Brook at both stream crossings within the Project. Surface water samples were collected from station 725 and station 400, both with upgradient and downgradient samples.

The samples were collected utilizing the sample collection cup attached to a string to collect a surface water sample from the middle of the channel. The samples were placed from the sample container into pre-cleaned laboratory containers, labeled, logged and submitted to a Massachusetts certified analytical laboratory for analysis within 48 hours of collection.

Results of the sampling indicate that total phosphorous values range between 0.11 and 0.15 milligrams per liter (mg/L). These concentrations are slightly above the EPA established goal for total phosphorus concentration of 0.10 mg/L, in order to limit cultural eutrophication of flowing water (USEPA 1986). Comparison of the upgradient and downgradient locations are consistent with one another.

The total nitrogen levels reported range from 1.6 mg/L to 2.0 mg/L. These concentrations are below the United States Environmental Protection Agency (EPA) Maximum Contaminant Level (MCL) of 10 mg/L, which was established for drinking water regulations (USEPA 2009). Comparison of the upgradient and downgradient locations are consistent with one another.

The laboratory report for this sampling is included in Appendix D.

3 REFERENCES

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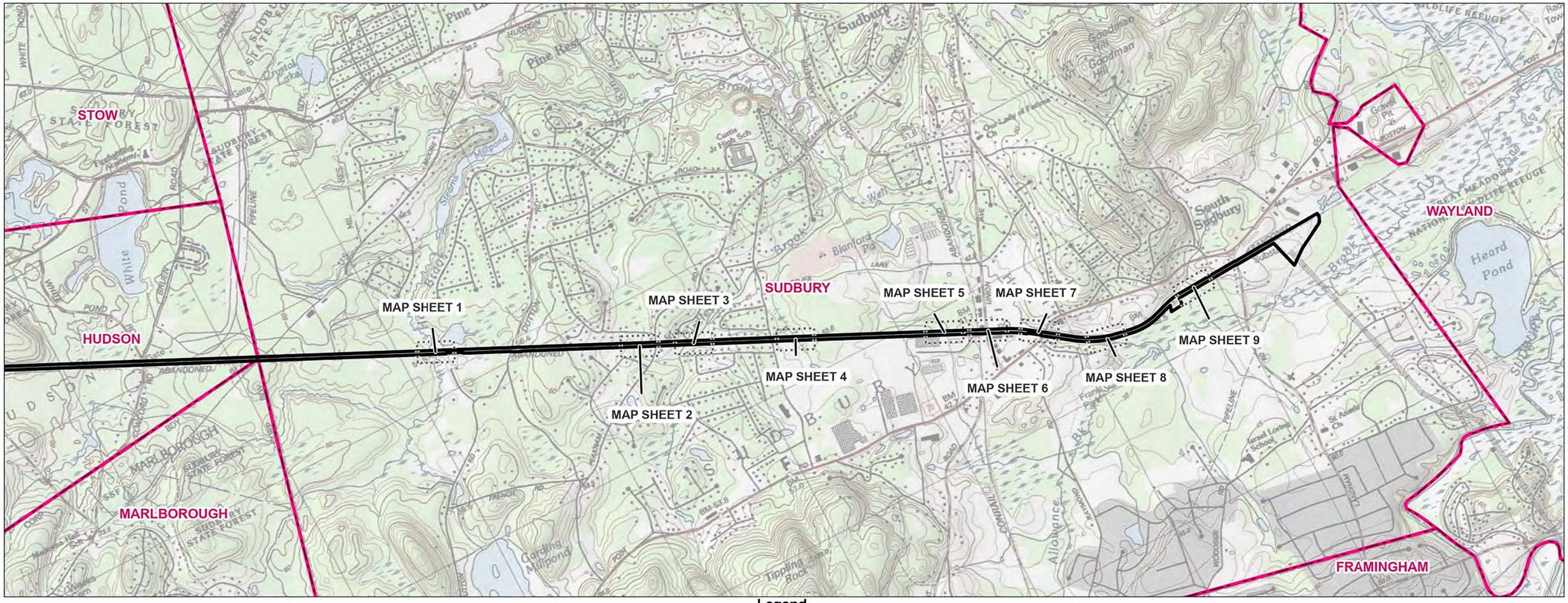
APPENDIX A

Figures Map Book

2021 - Sudbury Hudson Reliability Project

HUDSON, STOW, & SUDBURY, MA
Water Sampling Map

Date: August 11, 2021



Legend

Map Sheet Matchline

PREPARED FOR:

EVERSOURCE ENERGY
107 Selden Street
Berlin, CT 06037

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0 0.25 0.5 Miles

INDEX OF FIGURES

Title Sheet / Index Map
Map Sheets 1-9

NO.	DATE	REVISIONS

PREPARED BY:

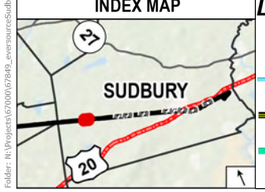
SWCA ENVIRONMENTAL CONSULTANTS
15 Research Drive
Amherst, MA 01002

SUDBURY

ST-400-D

ST-400-U

INDEX MAP



Legend

- Water Sampling Point
- Watercourse
- Limit Of Work (LOW)
- Coldwater Fisheries Line
- Open Water
- Approximate Wetland (Not Delineated)
- Existing Right-of-Way (ROW)
- Municipal Boundary

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Base Map: MassGIS Ortho 2019, accessed August 2021

NO.	DATE	REVISIONS

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Sudbury Hudson Reliability Project
Water Sampling Map

SUDBURY, MA

MAP SHEET 1 OF 9

Date: August, 2021

SWCA ENVIRONMENTAL CONSULTANTS

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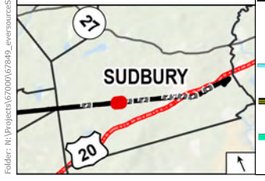
ST-527-U

ST-527-D

SUDBURY

INDEX MAP



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Sudbury Hudson Reliability Project
Water Sampling Map

SUDBURY, MA | MAP SHEET 2 OF 9

Date: August, 2021

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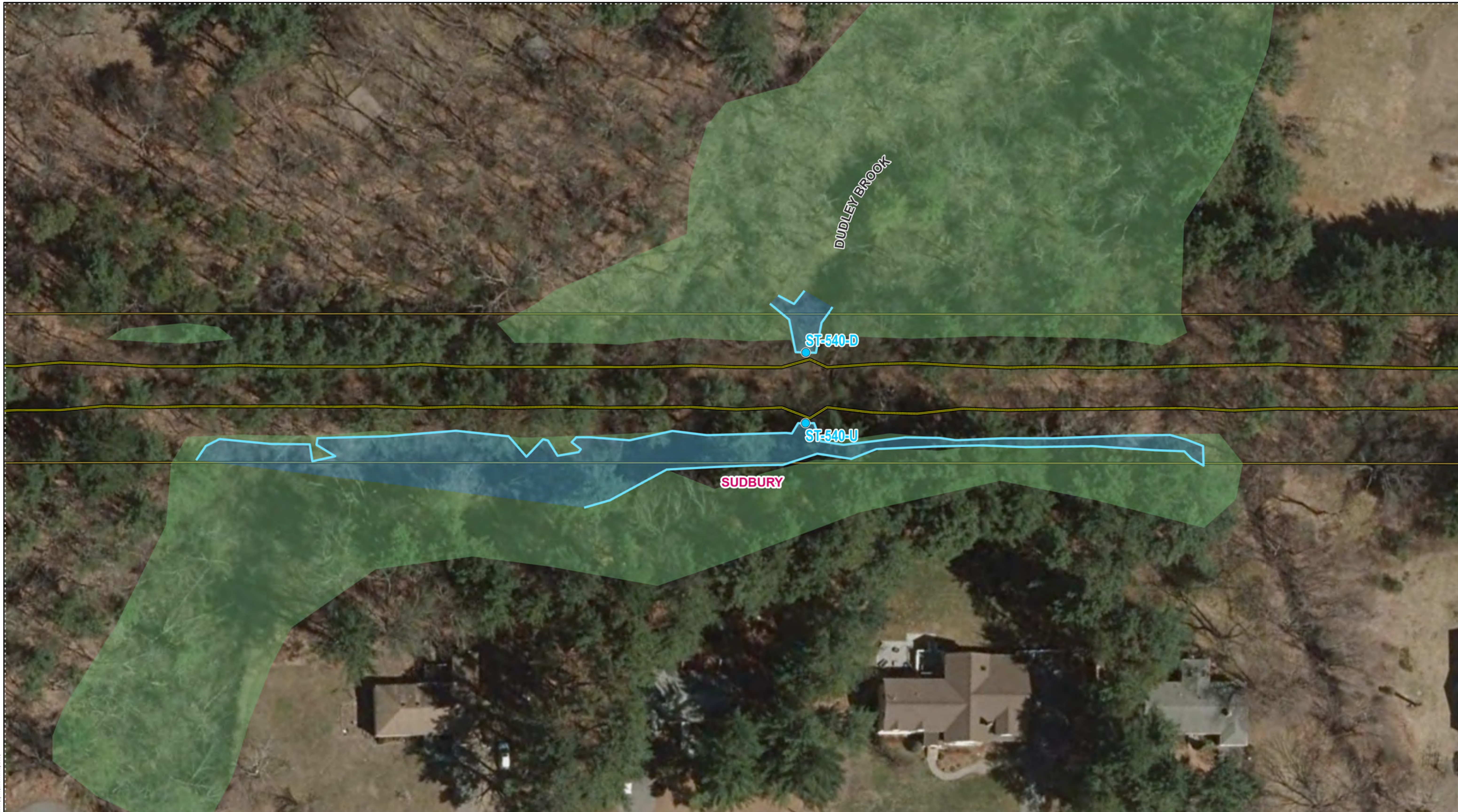

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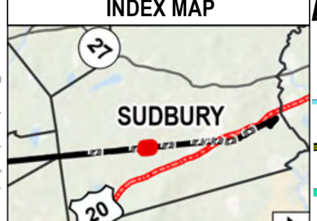

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Sudbury Hudson Reliability Project
Water Sampling Map

SUDBURY, MA

MAP SHEET 3 OF 9

Date: August, 2021

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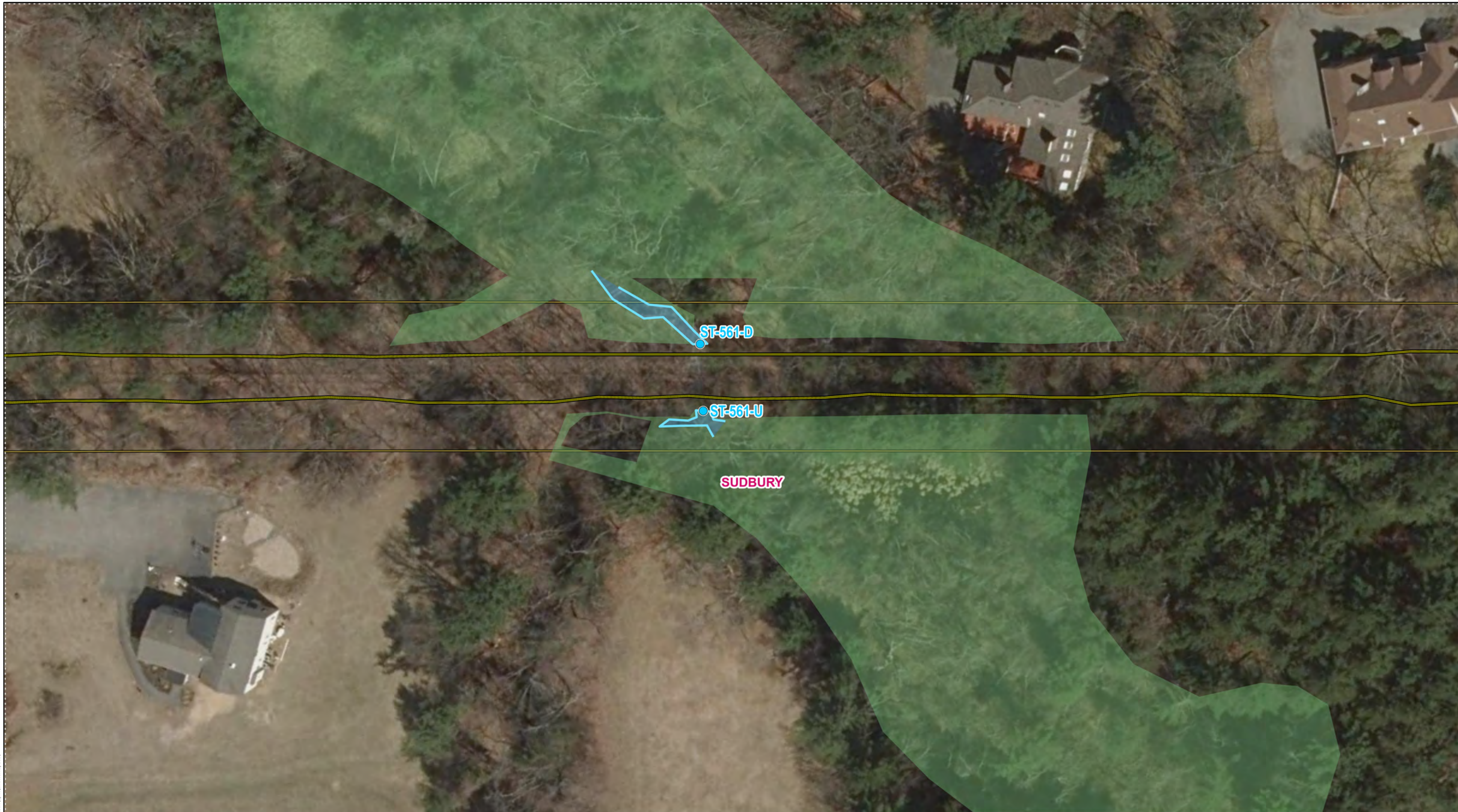

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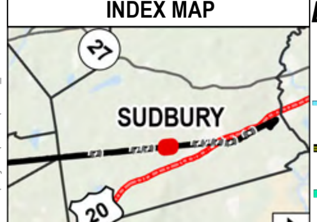

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Sudbury Hudson Reliability Project
Water Sampling Map

SUDBURY, MA

MAP SHEET 4 OF 9

Date: August, 2021

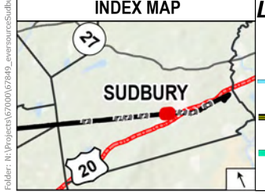
SWCA ENVIRONMENTAL CONSULTANTS

SUDBURY

ST-593-U

ST-593-D

INDEX MAP



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Base Map: MassGIS Ortho 2019, accessed August 2021

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Sudbury Hudson Reliability Project
Water Sampling Map

SUDBURY, MA | MAP SHEET 5 OF 9

Date: August, 2021

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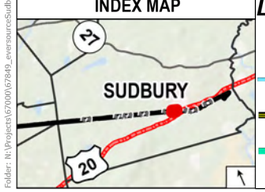
INDEX MAP



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Base Map: MassGIS Ortho 2019, accessed August 2021

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Sudbury Hudson Reliability Project
Water Sampling Map

SUDBURY, MA | MAP SHEET 6 OF 9

Date: August, 2021

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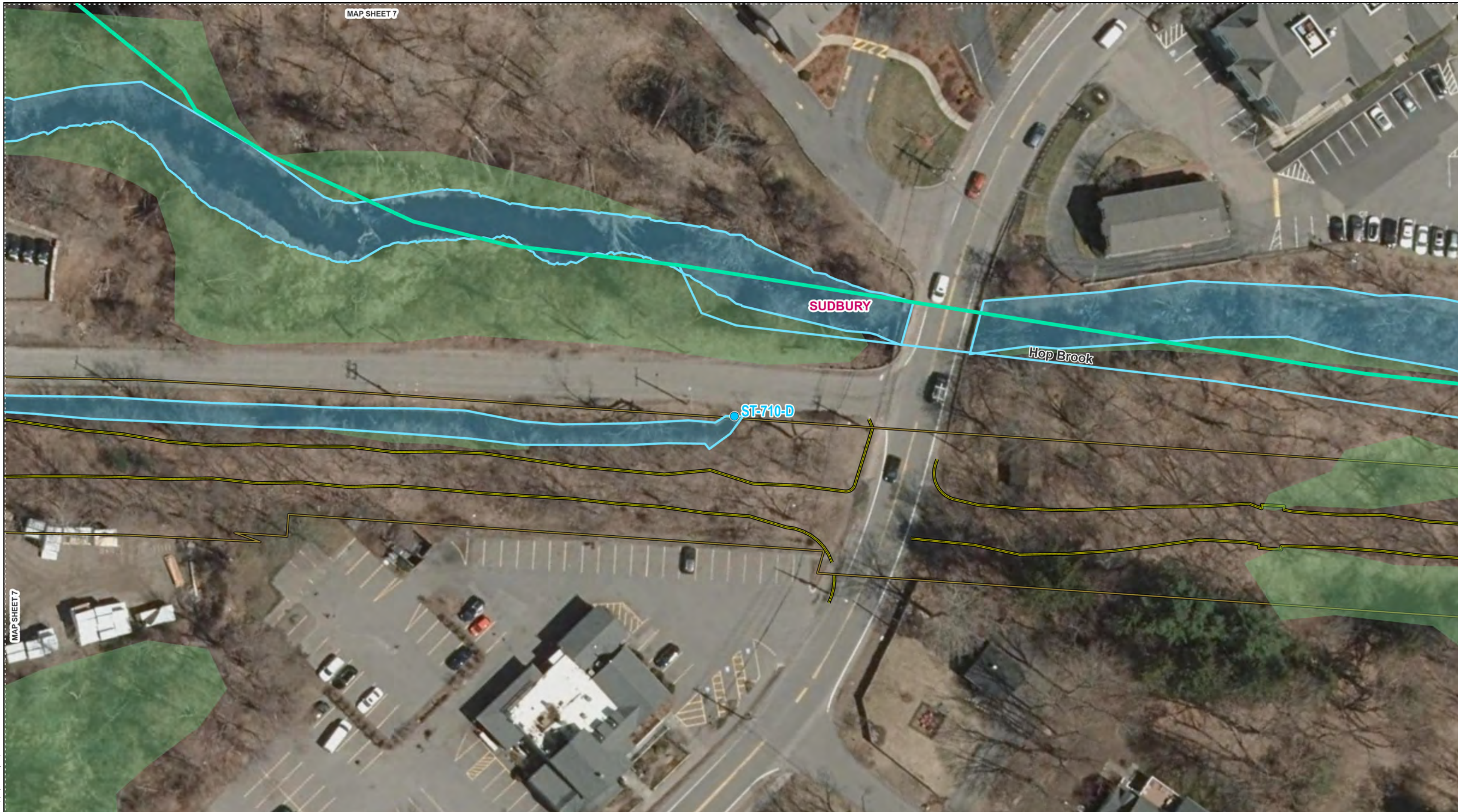

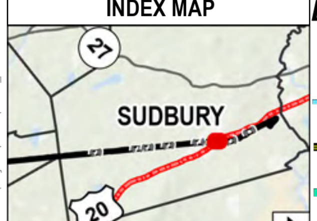

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Sudbury Hudson Reliability Project
Water Sampling Map

SUDBURY, MA

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Date: August, 2021

SWCA ENVIRONMENTAL CONSULTANTS

Hop Brook

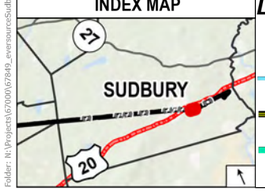
ST-725-U

ST-725-D

SUDBURY

MAP SHEET 8

INDEX MAP



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Sudbury Hudson Reliability Project
Water Sampling Map

SUDBURY, MA

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SUDBURY

ST-747-U

ST-747-D

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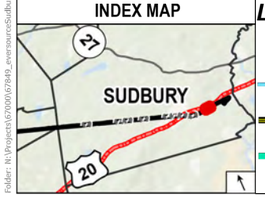

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- Municipal Boundary

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NO.	DATE	REVISIONS

EVERSOURCE ENERGY

Sudbury Hudson Reliability Project
Water Sampling Map

SUDBURY, MA | MAP SHEET 9 OF 9

Date: August, 2021

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APPENDIX B

Tables

Table 3: Cold Water Fisheries Monitoring Results (August - October 2021)
Sudbury to Hudson Reliability Project

Station #	Favorable	ST 400 UP			ST 400 DOWN			ST 527 UP			ST 527 DOWN		
Brook/Stream/Tributary	Conditions	Hop Brook			Hop Brook			Unnamed Stream			Unnamed Stream		
Plan #	for	PLAN 47			PLAN 47			PLAN 52			PLAN 52		
Direction of Flow	Cold	south			south			south			south		
Type	Water	perennial			perennial			intermittent			intermittent		
Sampling Event Date	Fisheries	30-Aug	30-Sep	29-Oct	30-Aug	30-Sep	29-Oct	30-Aug	30-Sep	29-Oct	30-Aug	30-Sep	29-Oct
Temperature (^{o}C)	**< 20**	22.25	16.2	9.23	22.25	16.17	9.22	17.19	12.17	7.42	17.07	12.13	7.36
Specific Conductance (µS/cm @ 25^{o}C)	150-500	414	422	421	415	422	420	305	290	201	301	287	204
Specific Conductance (µS/cm)	150-500	393	351	294	394	351	293	259	219	148	255	217	154
Dissolved Oxygen (%)	no standard listed	61.5	80	87	59.8	77.8	86.4	51.4	61.2	54.3	51.8	64	55.6
Dissolved Oxygen (mg/L)	**> 6**	5.34	7.85	9.99	5.2	7.64	9.02	4.94	6.56	6.02	4.98	6.87	6.16
pH	6.5-8.3	6.61	6.79	6.68	6.59	6.74	6.68	5.43	6.13	6.3	5.75	6.46	6.38
Oxygen Reduction Potential	no standard listed	91	94	93	91	94	93	130	117	105	127	106	105
Turbidity (NTU)	free from turbidity that would impair fish habitat	2.86	1.73	2.39	2.86	1.73	2.3	2.3	0.63	1.52	1.18	0.84	1.56
Alkalinity (ppm)	< 300	40	40	0	40	40	0	0	0	0	0	0	0
Chlorine, Free (ppm)	< 4	0	0	0	0	0	0	0	0	0	0	0	0
Chlorine, Total (ppm)	< 4	0	0	0	0	0	0	0	0	0	0	0	0
Hardness (ppm)	no standard listed	100	0	0	100	0	0	100	0	0	100	100	0
Velocity (ft/s)	no standard listed	0.35	0.38	0.4	0.34	0.31	0.39	0.2	0.18	0.1	0.21	0.06	0.13

Notes: nm = Not measured
ppm = parts per million

Table 3: Cold Water Fisheries Monitoring Results (August - October 2021)
Sudbury to Hudson Reliability Project

Station #	Favorable	ST 540 UP			ST 540 DOWN			ST 561 UP			ST 561 DOWN		
Brook/Stream/Tributary	Conditions	Dudley Brook			Dudley Brook			Unnamed Stream			Unnamed Stream		
Plan #	for	PLAN 54			PLAN 54			PLAN 57			PLAN 57		
Direction of Flow	Cold	south			south			north			north		
Type	Water	perennial			perennial			intermittent			intermittent		
Sampling Event Date	Fisheries	30-Aug	30-Sep	29-Oct	30-Aug	30-Sep	29-Oct	30-Aug	30-Sep	29-Oct	30-Aug	30-Sep	29-Oct
Temperature (^{o}C)	**< 20**	18.84	13.17	7.78	18.83	13.18	7.89	20.59	14.12	7.57	20.14	14.1	7.61
Specific Conductance (µS/cm @ 25^{o}C)	150-500	340	305	271	344	311	274	361	344	243	350	338	252
Specific Conductance (µS/cm)	150-500	300	236	182	303	241	184	331	272	162	318	268	168
Dissolved Oxygen (%)	no standard listed	15.5	56.4	51.6	41.6	66.7	59.3	22.3	42	38	37.2	61.5	62
Dissolved Oxygen (mg/L)	**> 6**	1.41	5.91	6.11	3.86	6.98	7	2	4.32	4.53	3.36	5.34	7.28
pH	6.5-8.3	6.1	6.72	6.49	6.27	6.73	6.93	6.06	6.66	6.44	6.68	6.97	7.25
Oxygen Reduction Potential	no standard listed	123	101	101	115	97	101	47	78	73.4	53	70	52
Turbidity (NTU)	free from turbidity that would impair fish habitat	3.14	1.37	1.9	2.09	1.34	1.84	5.74	1.4	2.16	1.87	1.9	3.27
Alkalinity (ppm)	< 300	40	20	0	40	40	0	40	40	40	40	40	40
Chlorine, Free (ppm)	< 4	0	0	0	0	0	0	0	0	0	0	0	0
Chlorine, Total (ppm)	< 4	0	0	0	0	0	0	0	0	0	0	0	0
Hardness (ppm)	no standard listed	100	0	0	100	0	0	100	100	0	100	100	0
Velocity (ft/s)	no standard listed	0.55	0.44	0.66	0.4	0.34	0.8	0.08	0.06	0.19	0.1	0.13	0.45

Notes: nm = Not measured
ppm = parts per million

Table 3: Cold Water Fisheries Monitoring Results (August - October 2021)
Sudbury to Hudson Reliability Project

Station #	Favorable	ST 593 UP			ST 593 DOWN			ST 700 UP			ST 710 DOWN		
Brook/Stream/Tributary	Conditions	Unnamed Stream			Unnamed Stream			Hop Brook Tributary			Hop Brook Tributary		
Plan #	for	PLAN 60			PLAN 60			PLAN 61			PLAN 63		
Direction of Flow	Cold	north			north			East			East		
Type	Water	intermittent			intermittent			intermittent			intermittent		
Sampling Event Date	Fisheries	30-Aug	30-Sep	29-Oct	30-Aug	30-Sep	29-Oct	30-Aug	30-Sep	29-Oct	30-Aug	30-Sep	29-Oct
Temperature (^{o}C)	**< 20**	nm	nm	nm	nm	nm	nm	21.13	16.14	9.67	21.08	14.28	9.55
Specific Conductance (µS/cm @ 25^{o}C)	150-500	nm	nm	nm	nm	nm	nm	1362	1129	1104	1122	755	927
Specific Conductance (µS/cm)	150-500	nm	nm	nm	nm	nm	nm	1263	938	702	1039	600	653
Dissolved Oxygen (%)	no standard listed	nm	nm	nm	nm	nm	nm	42.5	41	52	37.3	48.6	60.7
Dissolved Oxygen (mg/L)	**> 6**	nm	nm	nm	nm	nm	nm	3.96	4.13	5.87	3.3	4.97	6.87
pH	6.5-8.3	nm	nm	nm	nm	nm	nm	6.49	6.85	6.8	6.82	6.91	6.83
Oxygen Reduction Potential	no standard listed	nm	nm	nm	nm	nm	nm	62	10	20	66	51	25
Turbidity (NTU)	free from turbidity that would impair fish habitat	nm	nm	nm	nm	nm	nm	20.9	12.09	8.17	11.5	9.48	6.62
Alkalinity (ppm)	< 300	nm	nm	nm	nm	nm	nm	40	80	40	100	120	40
Chlorine, Free (ppm)	< 4	nm	nm	nm	nm	nm	nm	0	0	0	0	0	0
Chlorine, Total (ppm)	< 4	nm	nm	nm	nm	nm	nm	0	0	0	0	0	0
Hardness (ppm)	no standard listed	nm	nm	nm	nm	nm	nm	100	100	100	100	100	100
Velocity (ft/s)	no standard listed	nm	nm	nm	nm	nm	nm	0.23	0.02	0.05	0.08	0.02	0.07

Notes: nm = Not measured
ppm = parts per million

Table 3: Cold Water Fisheries Monitoring Results (August - October 2021)
Sudbury to Hudson Reliability Project

Station #	Favorable	ST 725 UP			ST 725 DOWN			ST 747 UP			ST 747 DOWN		
Brook/Stream/Tributary	Conditions	Hop Brook			Hop Brook			Wash Brook Tributary			Wash Brook Tributary		
Plan #	for	PLAN 65			PLAN 65			PLAN 67			PLAN 67		
Direction of Flow	Cold	south			south			south			south		
Type	Water	perennial			perennial			intermittent			intermittent		
Sampling Event Date	Fisheries	30-Aug	30-Sep	29-Oct	30-Aug	30-Sep	29-Oct	30-Aug	30-Sep	29-Oct	30-Aug	30-Sep	29-Oct
Temperature (^{o}C)	**< 20**	20.55	14.52	7.67	20.49	14.45	7.63	19.39	13.34	7.72	19.45	13.26	7.76
Specific Conductance (µS/cm @ 25^{o}C)	150-500	393	355	380	399	360	378	524	418	379	495	451	382
Specific Conductance (µS/cm)	150-500	360	284	254	365	287	253	468	325	254	443	350	256
Dissolved Oxygen (%)	no standard listed	75	87.2	94.2	80.2	78.6	99.6	90.7	86.4	88.9	80.2	84.7	82.3
Dissolved Oxygen (mg/L)	**> 6**	6.74	8.87	11.23	7.2	8	11.88	8.32	9.02	10.57	7.36	8.85	9.79
pH	6.5-8.3	6.83	6.95	6.91	7.18	7.03	7.14	7.15	6.95	6.57	7	6.82	6.48
Oxygen Reduction Potential	no standard listed	97	96	88	98	98	80	58	60	80	73	75	84
Turbidity (NTU)	free from turbidity that would impair fish habitat	2.62	2.15	2.62	2.63	2.19	3.05	0.72	1.15	1.88	0.79	1.87	1.81
Alkalinity (ppm)	< 300	40	0	0	40	0	0	80	40	40	80	40	40
Chlorine, Free (ppm)	< 4	0	0	0	0	0	0	0	0	0	0	0	0
Chlorine, Total (ppm)	< 4	0	0	0	0	0	0	0	0	0	0	0	0
Hardness (ppm)	no standard listed	100	0	0	100	0	0	100	100	100	100	100	100
Velocity (ft/s)	no standard listed	0.23	0.15	0.51	0.08	0.13	0.17	0.24	0.23	0.35	0.07	0.1	0.2

Notes: nm = Not measured
ppm = parts per million

Table 4: Surface Water Sampling Results

Con-Test, a Pace Analytical Laboratory | Client | SWCA Environmental Consultants
Analytical Testing Report | Attention | Alison Holmes
Work Order: 21H1559 | Project Name | Sudbury, MA

Analyte	Units	21H1559-02	21H1559-01	21H1559-03	21H1559-04	LAB ID
		ST 725 UP	ST 725 DOWN	ST 400 UP	ST 400 DOWN	CLIENT ID
		30-Aug-21	30-Aug-21	30-Aug-21	30-Aug-21	DATE SAMPLED
Nitrate/Nitrite as N	mg/L	0.87	0.8	0.55	0.56	
Phosphorus, Total	mg/L	0.11	0.11	0.15	0.15	
Total Kjeldahl Nitrogen	mg/L	1.1	1.1	1.1	1.1	
Total Nitrogen	mg/L	2	1.9	1.6	1.7	

APPENDIX C

Field Logs

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 747 Wash Brook Tributary
Weather and Temp	70-80 degrees, overcast, humid	Date	Monday August 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	gravel and sand		
Comments	collected from eastern bank of the stream		

Field Measurements	
Temperature °C	19.39
Specific Conductance µS/cm @ 25°C	524
Specific Conductance µS/cm	468
Dissolved Oxygen %	90.7
Dissolved Oxygen mg/L	8.32
pH	7.15
ORP	58
Turbidity (NTU)	0.72
Alkalinity	80
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.24

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	sand and mud		
Comments	collected from eastern bank of the stream		

Field Measurements	
Temperature °C	19.45
Specific Conductance µS/cm @ 25°C	495
Specific Conductance µS/cm	443
Dissolved Oxygen %	80.2
Dissolved Oxygen mg/L	7.36
pH	7
ORP	73
Turbidity (NTU)	0.79
Alkalinity	80
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.07

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 725 Hop Brook
Weather and Temp	70-80 degrees, overcast, humid	Date	Monday August 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments	collected from railroad bridge		
	circular pattern to water in front of wall		
	lots of trash accumulated next to wall		

Field Measurements	
Temperature °C	20.55
Specific Conductance µS/cm @ 25°C	393
Specific Conductance µS/cm	360
Dissolved Oxygen %	75
Dissolved Oxygen mg/L	6.74
pH	6.83
ORP	97
Turbidity (NTU)	2.62
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.23

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments	support wall preventing steady flow from bridge		

Field Measurements	
Temperature °C	20.49
Specific Conductance µS/cm @ 25°C	399
Specific Conductance µS/cm	365
Dissolved Oxygen %	80.2
Dissolved Oxygen mg/L	7.2
pH	7.18
ORP	98
Turbidity (NTU)	2.63
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.08

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 700 and 710 Hop Brook Tributary
Weather and Temp	70-80 degrees, overcast, humid	Date	Monday August 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
cloudy, milky	slight odor organics

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool	Riffle	Open Channel	Braided	Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	muds and fines		
Comments	Water has a lot of scum and floating debris and roadside trash, iron bacteria, small trickle from culvert		

Field Measurements	
Temperature °C	21.13
Specific Conductance µS/cm @ 25°C	1362
Specific Conductance µS/cm	1263
Dissolved Oxygen %	42.5
Dissolved Oxygen mg/L	3.96
pH	6.49
ORP	62
Turbidity (NTU)	20.9
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.23

Downgradient Station

Flow Appearance	Flow Odor
cloudy, milky	slight odor organics

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool	Riffle	Open Channel	Braided	Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	muds/fines		
Comments	Water very gray and scum on the surface. Not much visible flow		

Field Measurements	
Temperature °C	21.08
Specific Conductance µS/cm @ 25°C	1122
Specific Conductance µS/cm	1039
Dissolved Oxygen %	37.3
Dissolved Oxygen mg/L	3.3
pH	6.82
ORP	66
Turbidity (NTU)	11.5
Alkalinity	100
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.08

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 593
Weather and Temp	70-80 degrees, overcast, humid	Date	Monday August 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor

Location	From Headwall	From Bank	From Bridge	
Sampling site	Pool	Riffle	Open Channel	Braided	Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen	
Floatables	Foam	Oil Sheen	Iron Bacteria	
	Floating Solids	Trash	Debris buildup	
Condition of bottom				
Comments				

Field Measurements	
Temperature °C	
Specific Conductance µS/cm @ 25°C	
Specific Conductance µS/cm	
Dissolved Oxygen %	
Dissolved Oxygen mg/L	
pH	
ORP	
Turbidity (NTU)	
Alkalinity	
Chlorine Free	
Chlorine Total	
Hardness	
Velocity (ft/s)	

Downgradient Station

Flow Appearance	Flow Odor

Location	From Headwall	From Bank	From Bridge	
Sampling site	Pool	Riffle	Open Channel	Braided	Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen	
Floatables	Foam	Oil Sheen	Iron Bacteria	
	Floating Solids	Trash	Debris buildup	
Condition of bottom				
Comments				

Field Measurements	
Temperature °C	
Specific Conductance µS/cm @ 25°C	
Specific Conductance µS/cm	
Dissolved Oxygen %	
Dissolved Oxygen mg/L	
pH	
ORP	
Turbidity (NTU)	
Alkalinity	
Chlorine Free	
Chlorine Total	
Hardness	
Velocity (ft/s)	

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 561 Unnamed Stream
Weather and Temp	70-80 degrees, overcast, humid	Date	Monday August 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	gravel and mud fines		
Comments			

Field Measurements	
Temperature °C	20.59
Specific Conductance µS/cm @ 25°C	361
Specific Conductance µS/cm	331
Dissolved Oxygen %	22.3
Dissolved Oxygen mg/L	2
pH	6.06
ORP	47
Turbidity (NTU)	5.74
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.08

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	gravel and mud fines		
Comments			

Field Measurements	
Temperature °C	20.14
Specific Conductance µS/cm @ 25°C	350
Specific Conductance µS/cm	318
Dissolved Oxygen %	37.2
Dissolved Oxygen mg/L	3.36
pH	6.68
ORP	53
Turbidity (NTU)	1.87
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.1

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 540 Dudley Brook
Weather and Temp	70-80 degrees, overcast, humid	Date	Monday August 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	18.84
Specific Conductance µS/cm @ 25°C	340
Specific Conductance µS/cm	300
Dissolved Oxygen %	15.5
Dissolved Oxygen mg/L	1.41
pH	6.1
ORP	123
Turbidity (NTU)	3.14
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.55

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	18.83
Specific Conductance µS/cm @ 25°C	344
Specific Conductance µS/cm	303
Dissolved Oxygen %	41.6
Dissolved Oxygen mg/L	3.86
pH	6.27
ORP	115
Turbidity (NTU)	2.09
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.4

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 527 Unnamed Stream
Weather and Temp	70-80 degrees, overcast, humid	Date	Monday August 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	17.19
Specific Conductance µS/cm @ 25°C	305
Specific Conductance µS/cm	259
Dissolved Oxygen %	51.4
Dissolved Oxygen mg/L	4.94
pH	5.43
ORP	130
Turbidity (NTU)	2.3
Alkalinity	0
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.2

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	17.07
Specific Conductance µS/cm @ 25°C	301
Specific Conductance µS/cm	255
Dissolved Oxygen %	51.8
Dissolved Oxygen mg/L	4.98
pH	5.75
ORP	127
Turbidity (NTU)	1.18
Alkalinity	0
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.21

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 400 Hop Brook
Weather and Temp	70-80 degrees, overcast, humid	Date	Monday August 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	22.25
Specific Conductance µS/cm @ 25°C	414
Specific Conductance µS/cm	393
Dissolved Oxygen %	61.5
Dissolved Oxygen mg/L	5.34
pH	6.61
ORP	91
Turbidity (NTU)	2.86
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.35

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	22.25
Specific Conductance µS/cm @ 25°C	415
Specific Conductance µS/cm	394
Dissolved Oxygen %	59.8
Dissolved Oxygen mg/L	5.2
pH	6.59
ORP	91
Turbidity (NTU)	2.86
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.34

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 747 Wash Brook Tributary
Weather and Temp	Sunny Clear and 50-60°	Date	Thursday September 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge	
Sampling site	Pool	Riffle	Open Channel	Braided	Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen	
Floatables	Foam	Oil Sheen	Iron Bacteria	
	Floating Solids	Trash	Debris buildup	
Condition of bottom	gravel and sand			
Comments	collected from eastern bank of the stream			

Field Measurements	
Temperature °C	13.34
Specific Conductance µS/cm @ 25°C	418
Specific Conductance µS/cm	325
Dissolved Oxygen %	86.4
Dissolved Oxygen mg/L	9.02
pH	6.95
ORP	60
Turbidity (NTU)	1.15
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.23

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge	
Sampling site	Pool	Riffle	Open Channel	Braided	Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen	
Floatables	Foam	Oil Sheen	Iron Bacteria	
	Floating Solids	Trash	Debris buildup	
Condition of bottom	sand and mud			
Comments	collected from eastern bank of the stream			

Field Measurements	
Temperature °C	13.26
Specific Conductance µS/cm @ 25°C	451
Specific Conductance µS/cm	350
Dissolved Oxygen %	84.7
Dissolved Oxygen mg/L	8.85
pH	6.82
ORP	75
Turbidity (NTU)	1.87
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.1

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 725 Hop Brook
Weather and Temp	Sunny Clear and 50-60°	Date	Thursday September 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color, slightly milky	None

Location	From Headwall	From Bank	**From Bridge**	
Sampling site	Pool	Riffle	**Open Channel**	Braided	Backwater
Signs of Flow	Present- Fast	**Present- Slow**	Not Seen	
Floatables	Foam	Oil Sheen	**Iron Bacteria**	
	Floating Solids	**Trash**	**Debris buildup**	

Condition of bottom	not visible
Comments	collected from railroad bridge
	circular pattern to water in front of wall
	lots of trash accumulated next to wall

Field Measurements	
Temperature °C	14.52
Specific Conductance µS/cm @ 25°C	355
Specific Conductance µS/cm	284
Dissolved Oxygen %	87.2
Dissolved Oxygen mg/L	8.87
pH	6.95
ORP	96
Turbidity (NTU)	2.15
Alkalinity	0
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.15

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color, slightly milky	None

Location	From Headwall	From Bank	**From Bridge**	
Sampling site	Pool	Riffle	**Open Channel**	Braided	Backwater
Signs of Flow	Present- Fast	**Present- Slow**	Not Seen	
Floatables	Foam	Oil Sheen	Iron Bacteria	
	Floating Solids	Trash	Debris buildup	

Condition of bottom	not visible
Comments	support wall preventing flow from bridge

Field Measurements	
Temperature °C	14.45
Specific Conductance µS/cm @ 25°C	360
Specific Conductance µS/cm	287
Dissolved Oxygen %	78.6
Dissolved Oxygen mg/L	8
pH	7.03
ORP	98
Turbidity (NTU)	2.19
Alkalinity	0
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.13

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 700 and 710 Hop Brook Tributary
Weather and Temp	Sunny Clear and 50-60°	Date	Thursday September 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
cloudy, milky	slight odor organics

Location	**From Headwall**	From Bank	From Bridge
Sampling site	Pool Riffle Open Channel Braided	**Backwater**	
Signs of Flow	Present- Fast Present- Slow	**Not Seen**	
Floatables	Foam Oil Sheen	**Iron Bacteria**	
	Floating Solids	**Trash**	**Debris buildup**
Condition of bottom	muds and fines		
Comments	only a slight flow from the culvert		

Field Measurements	
Temperature °C	16.14
Specific Conductance µS/cm @ 25°C	1129
Specific Conductance µS/cm	938
Dissolved Oxygen %	41
Dissolved Oxygen mg/L	4.13
pH	6.85
ORP	10
Turbidity (NTU)	12.09
Alkalinity	80
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.02

Downgradient Station

Flow Appearance	Flow Odor
cloudy, milky	slight odor organics

Location	**From Headwall**	From Bank	From Bridge
Sampling site	Pool Riffle Open Channel Braided	**Backwater**	
Signs of Flow	Present- Fast Present- Slow	**Not Seen**	
Floatables	Foam Oil Sheen	**Iron Bacteria**	
	Floating Solids	**Trash**	Debris buildup
Condition of bottom	muds/fines		
Comments	Water very gray and scum on the surface.		
	Not much visible flow		

Field Measurements	
Temperature °C	14.28
Specific Conductance µS/cm @ 25°C	755
Specific Conductance µS/cm	600
Dissolved Oxygen %	48.6
Dissolved Oxygen mg/L	4.97
pH	6.91
ORP	51
Turbidity (NTU)	9.48
Alkalinity	120
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.02

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 593
Weather and Temp	Sunny Clear and 50-60°	Date	Thursday September 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
Dry	

Location	From Headwall	From Bank	From Bridge	
Sampling site	Pool	Riffle	Open Channel	Braided	Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen	
Floatables	Foam	Oil Sheen	Iron Bacteria	
	Floating Solids	Trash	Debris buildup	
Condition of bottom				
Comments				

Field Measurements	
Temperature °C	
Specific Conductance µS/cm @ 25°C	
Specific Conductance µS/cm	
Dissolved Oxygen %	
Dissolved Oxygen mg/L	
pH	
ORP	
Turbidity (NTU)	
Alkalinity	
Chlorine Free	
Chlorine Total	
Hardness	
Velocity (ft/s)	

Downgradient Station

Flow Appearance	Flow Odor
Dry	

Location	From Headwall	From Bank	From Bridge	
Sampling site	Pool	Riffle	Open Channel	Braided	Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen	
Floatables	Foam	Oil Sheen	Iron Bacteria	
	Floating Solids	Trash	Debris buildup	
Condition of bottom				
Comments				

Field Measurements	
Temperature °C	
Specific Conductance µS/cm @ 25°C	
Specific Conductance µS/cm	
Dissolved Oxygen %	
Dissolved Oxygen mg/L	
pH	
ORP	
Turbidity (NTU)	
Alkalinity	
Chlorine Free	
Chlorine Total	
Hardness	
Velocity (ft/s)	

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 561 Unnamed Stream
Weather and Temp	Sunny Clear and 50-60°	Date	Thursday September 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	gravel and mud fines		
Comments			

Field Measurements	
Temperature °C	14.12
Specific Conductance µS/cm @ 25°C	344
Specific Conductance µS/cm	272
Dissolved Oxygen %	42
Dissolved Oxygen mg/L	4.32
pH	6.66
ORP	78
Turbidity (NTU)	1.4
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.06

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	gravel and mud fines		
Comments			

Field Measurements	
Temperature °C	14.1
Specific Conductance µS/cm @ 25°C	338
Specific Conductance µS/cm	268
Dissolved Oxygen %	61.5
Dissolved Oxygen mg/L	5.34
pH	6.97
ORP	70
Turbidity (NTU)	1.9
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.13

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 540 Dudley Brook
Weather and Temp	Sunny Clear and 50-60°	Date	Thursday September 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	13.17
Specific Conductance µS/cm @ 25°C	305
Specific Conductance µS/cm	236
Dissolved Oxygen %	56.4
Dissolved Oxygen mg/L	5.91
pH	6.72
ORP	101
Turbidity (NTU)	1.37
Alkalinity	20
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.44

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	13.18
Specific Conductance µS/cm @ 25°C	311
Specific Conductance µS/cm	241
Dissolved Oxygen %	66.7
Dissolved Oxygen mg/L	6.98
pH	6.73
ORP	97
Turbidity (NTU)	1.34
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.34

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 527 Unnamed Stream
Weather and Temp	Sunny Clear and 50-60°	Date	Thursday September 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	12.17
Specific Conductance µS/cm @ 25°C	290
Specific Conductance µS/cm	219
Dissolved Oxygen %	61.2
Dissolved Oxygen mg/L	6.56
pH	6.13
ORP	117
Turbidity (NTU)	0.63
Alkalinity	0
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.18

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	12.13
Specific Conductance µS/cm @ 25°C	287
Specific Conductance µS/cm	217
Dissolved Oxygen %	64
Dissolved Oxygen mg/L	6.87
pH	6.46
ORP	106
Turbidity (NTU)	0.84
Alkalinity	0
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.06

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 400 Hop Brook
Weather and Temp	Sunny Clear and 50-60°	Date	Thursday September 30, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	**From Bridge**
Sampling site	Pool Riffle	**Open Channel**	Braided Backwater
Signs of Flow	**Present- Fast**	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	16.2
Specific Conductance µS/cm @ 25°C	422
Specific Conductance µS/cm	351
Dissolved Oxygen %	80
Dissolved Oxygen mg/L	7.85
pH	6.79
ORP	94
Turbidity (NTU)	1.73
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.38

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	**From Bridge**
Sampling site	Pool Riffle	**Open Channel**	Braided Backwater
Signs of Flow	**Present- Fast**	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	16.17
Specific Conductance µS/cm @ 25°C	422
Specific Conductance µS/cm	351
Dissolved Oxygen %	77.8
Dissolved Oxygen mg/L	7.64
pH	6.74
ORP	94
Turbidity (NTU)	1.73
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.31

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 747 Wash Brook Tributary
Weather and Temp	Overcast and 40°	Date	Friday October 29, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	**From Bank**	From Bridge
Sampling site	Pool Riffle	**Open Channel**	Braided Backwater
Signs of Flow	**Present- Fast**	Present- Slow	Not Seen
Floatables	**Foam**	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	gravel and sand		
Comments	collected from western bank of the stream		

Field Measurements	
Temperature °C	7.72
Specific Conductance µS/cm @ 25°C	379
Specific Conductance µS/cm	254
Dissolved Oxygen %	88.9
Dissolved Oxygen mg/L	10.57
pH	6.57
ORP	80
Turbidity (NTU)	1.88
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.35

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	**From Bank**	From Bridge
Sampling site	Pool Riffle	**Open Channel**	Braided Backwater
Signs of Flow	**Present- Fast**	Present- Slow	Not Seen
Floatables	**Foam**	Oil Sheen	**Iron Bacteria**
	Floating Solids	Trash	Debris buildup
Condition of bottom	sand and mud		
Comments	collected from eastern bank of the stream		

Field Measurements	
Temperature °C	7.76
Specific Conductance µS/cm @ 25°C	382
Specific Conductance µS/cm	256
Dissolved Oxygen %	82.3
Dissolved Oxygen mg/L	9.79
pH	6.48
ORP	84
Turbidity (NTU)	1.81
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.2

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 725 Hop Brook
Weather and Temp	Overcast and 40°	Date	Friday October 29, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color, water level high	None

Location	From Headwall	From Bank	**From Bridge**
Sampling site	Pool Riffle	**Open Channel**	Braided Backwater
Signs of Flow	Present- Fast	**Present- Slow**	Not Seen
Floatables	Foam	Oil Sheen	**Iron Bacteria**
	Floating Solids	**Trash**	**Debris buildup**
Condition of bottom	not visible		
Comments	collected from railroad bridge		
	circular pattern to water in front of wall		
	lots of trash accumulated next to wall		

Field Measurements	
Temperature °C	7.67
Specific Conductance µS/cm @ 25°C	380
Specific Conductance µS/cm	254
Dissolved Oxygen %	94.2
Dissolved Oxygen mg/L	11.23
pH	6.91
ORP	88
Turbidity (NTU)	2.62
Alkalinity	0
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.51

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color, water level high	None

Location	From Headwall	From Bank	**From Bridge**
Sampling site	Pool Riffle	**Open Channel**	Braided Backwater
Signs of Flow	Present- Fast	**Present- Slow**	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments	support wall preventing flow from bridge		
	large rain event 3 days before		

Field Measurements	
Temperature °C	7.63
Specific Conductance µS/cm @ 25°C	378
Specific Conductance µS/cm	253
Dissolved Oxygen %	99.6
Dissolved Oxygen mg/L	11.88
pH	7.14
ORP	80
Turbidity (NTU)	3.05
Alkalinity	0
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.17

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 700 and 710 Hop Brook Tributary
Weather and Temp	Overcast and 40°	Date	Friday October 29, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
cloudy, milky, yellow-brown	slight odor organics

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool	Riffle	Open Channel	Braided	Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup

Condition of bottom	muds and fines
Comments	only a slight flow from the culvert

Field Measurements	
Temperature °C	9.67
Specific Conductance µS/cm @ 25°C	1104
Specific Conductance µS/cm	702
Dissolved Oxygen %	52
Dissolved Oxygen mg/L	5.87
pH	6.8
ORP	20
Turbidity (NTU)	8.17
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.05

Downgradient Station

Flow Appearance	Flow Odor
cloudy, milky	slight odor organics

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool	Riffle	Open Channel	Braided	Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup

Condition of bottom	muds/fines
Comments	Water very gray and scum on the surface.
	Not much visible flow, slight oil sheen

Field Measurements	
Temperature °C	9.55
Specific Conductance µS/cm @ 25°C	927
Specific Conductance µS/cm	653
Dissolved Oxygen %	60.7
Dissolved Oxygen mg/L	6.87
pH	6.83
ORP	25
Turbidity (NTU)	6.62
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	100
Velocity (ft/s)	0.07

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 593
Weather and Temp	Overcast and 40°	Date	Friday October 29, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
Dry	

Location	From Headwall	From Bank	From Bridge	
Sampling site	Pool	Riffle	Open Channel	Braided	Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen	
Floatables	Foam	Oil Sheen	Iron Bacteria	
	Floating Solids	Trash	Debris buildup	
Condition of bottom				
Comments				

Field Measurements	
Temperature °C	
Specific Conductance µS/cm @ 25°C	
Specific Conductance µS/cm	
Dissolved Oxygen %	
Dissolved Oxygen mg/L	
pH	
ORP	
Turbidity (NTU)	
Alkalinity	
Chlorine Free	
Chlorine Total	
Hardness	
Velocity (ft/s)	

Downgradient Station

Flow Appearance	Flow Odor
Dry	

Location	From Headwall	From Bank	From Bridge	
Sampling site	Pool	Riffle	Open Channel	Braided	Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen	
Floatables	Foam	Oil Sheen	Iron Bacteria	
	Floating Solids	Trash	Debris buildup	
Condition of bottom				
Comments				

Field Measurements	
Temperature °C	
Specific Conductance µS/cm @ 25°C	
Specific Conductance µS/cm	
Dissolved Oxygen %	
Dissolved Oxygen mg/L	
pH	
ORP	
Turbidity (NTU)	
Alkalinity	
Chlorine Free	
Chlorine Total	
Hardness	
Velocity (ft/s)	

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 561 Unnamed Stream
Weather and Temp	Overcast and 40°	Date	Friday October 29, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	gravel and mud fines		
Comments			

Field Measurements	
Temperature °C	7.57
Specific Conductance µS/cm @ 25°C	243
Specific Conductance µS/cm	162
Dissolved Oxygen %	38
Dissolved Oxygen mg/L	4.53
pH	6.44
ORP	73.4
Turbidity (NTU)	2.16
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.19

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	gravel and mud fines		
Comments			

Field Measurements	
Temperature °C	7.61
Specific Conductance µS/cm @ 25°C	252
Specific Conductance µS/cm	168
Dissolved Oxygen %	62
Dissolved Oxygen mg/L	7.28
pH	7.25
ORP	52
Turbidity (NTU)	3.27
Alkalinity	40
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.45

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 540 Dudley Brook
Weather and Temp	Overcast and 40°	Date	Friday October 29, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	7.78
Specific Conductance µS/cm @ 25°C	271
Specific Conductance µS/cm	182
Dissolved Oxygen %	51.6
Dissolved Oxygen mg/L	6.11
pH	6.49
ORP	101
Turbidity (NTU)	1.9
Alkalinity	0
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.66

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	7.89
Specific Conductance µS/cm @ 25°C	274
Specific Conductance µS/cm	184
Dissolved Oxygen %	59.3
Dissolved Oxygen mg/L	7
pH	6.93
ORP	101
Turbidity (NTU)	1.84
Alkalinity	0
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.8

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 527 Unnamed Stream
Weather and Temp	Overcast and 40°	Date	Friday October 29, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	7.42
Specific Conductance µS/cm @ 25°C	201
Specific Conductance µS/cm	148
Dissolved Oxygen %	54.3
Dissolved Oxygen mg/L	6.02
pH	6.3
ORP	105
Turbidity (NTU)	1.52
Alkalinity	0
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.1

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	7.36
Specific Conductance µS/cm @ 25°C	204
Specific Conductance µS/cm	154
Dissolved Oxygen %	55.6
Dissolved Oxygen mg/L	6.16
pH	6.38
ORP	105
Turbidity (NTU)	1.56
Alkalinity	0
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.13

SWCA ENVIRONMENTAL CONSULTANTS

CWF Monitoring Field Log

Project Name / #	Sudbury to Hudson Reliability Project	Stream ID and Station #	ST 400 Hop Brook
Weather and Temp	Overcast and 40°	Date	Friday October 29, 2021
Technician	Alison Holmes		

Upgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	9.23
Specific Conductance µS/cm @ 25°C	421
Specific Conductance µS/cm	294
Dissolved Oxygen %	87
Dissolved Oxygen mg/L	9.99
pH	6.68
ORP	93
Turbidity (NTU)	2.39
Alkalinity	0
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.4

Downgradient Station

Flow Appearance	Flow Odor
clear, brown color	None

Location	From Headwall	From Bank	From Bridge
Sampling site	Pool Riffle	Open Channel	Braided Backwater
Signs of Flow	Present- Fast	Present- Slow	Not Seen
Floatables	Foam	Oil Sheen	Iron Bacteria
	Floating Solids	Trash	Debris buildup
Condition of bottom	not visible		
Comments			

Field Measurements	
Temperature °C	9.22
Specific Conductance µS/cm @ 25°C	420
Specific Conductance µS/cm	293
Dissolved Oxygen %	86.4
Dissolved Oxygen mg/L	9.02
pH	6.68
ORP	93
Turbidity (NTU)	2.3
Alkalinity	0
Chlorine Free	0
Chlorine Total	0
Hardness	0
Velocity (ft/s)	0.39

APPENDIX D

Laboratory Report

con-test®
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

September 8, 2021

Alison Holmes
SWCA Environmental Consultants
15 Research Drive
Amherst, MA 01002

Project Location: Sudbury
Client Job Number:
Project Number: [none]
Laboratory Work Order Number: 21H1559

Enclosed are results of analyses for samples received by the laboratory on August 30, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Matthew J Beaupre
Project Manager

Table of Contents

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

SWCA Environmental Consultants
15 Research Drive
Amherst, MA 01002
ATTN: Alison Holmes

REPORT DATE: 9/8/2021

PURCHASE ORDER NUMBER:

PROJECT NUMBER: [none]

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21H1559

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Sudbury

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
ST 725 DOWN	21H1559-01	Surface Water		NECi N07-0003	
				SM 21-23 4500 P E	
				SM19-23 4500-N Org B,C-NH3 C	
ST 725 UP	21H1559-02	Surface Water		NECi N07-0003	
				SM 21-23 4500 P E	
				SM19-23 4500-N Org B,C-NH3 C	
ST 400 UP	21H1559-03	Surface Water		NECi N07-0003	
				SM 21-23 4500 P E	
				SM19-23 4500-N Org B,C-NH3 C	
ST 400 DOWN	21H1559-04	Surface Water		NECi N07-0003	
				SM 21-23 4500 P E	
				SM19-23 4500-N Org B,C-NH3 C	

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CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

NECi N07-0003

Qualifications:

Z-01

NECI test had calibration points outside acceptable back calculated recoveries. Reanalysis yielded similar nonconformances.

Analyte & Samples(s) Qualified:

Nitrate/Nitrite as N

21H1559-01[ST 725 DOWN], 21H1559-02[ST 725 UP], 21H1559-03[ST 400 UP], 21H1559-04[ST 400 DOWN]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa A. Worthington
Technical Representative

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Project Location: Sudbury | Sample Description: | Work Order: 21H1559

Date Received: 8/30/2021

Field Sample #: ST 725 DOWN | Sampled: 8/30/2021 08:30

Sample ID: 21H1559-01

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Nitrate/Nitrite as N	0.80	0.050	mg/L	1	Z-01	NECi N07-0003	8/31/21	8/31/21 14:07	IS
Phosphorus, Total	0.11	0.050	mg/L	1		SM 21-23 4500 P E	9/2/21	9/3/21 11:05	MMH
Total Kjeldahl Nitrogen	1.1	1.0	mg/L	1		SM19-23 4500-N Org B,C-NH3 C	8/31/21	9/1/21 7:56	YR
Total Nitrogen	1.9	0.050	mg/L	1		SM19-23 4500-N Org B,C-NH3 C	9/8/21	9/8/21 7:29	LL

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Project Location: Sudbury | Sample Description: | Work Order: 21H1559

Date Received: 8/30/2021

Field Sample #: ST 725 UP | Sampled: 8/30/2021 08:45

Sample ID: 21H1559-02

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Nitrate/Nitrite as N	0.87	0.050	mg/L	1	Z-01	NECi N07-0003	8/31/21	8/31/21 14:10	IS
Phosphorus, Total	0.11	0.050	mg/L	1		SM 21-23 4500 P E	9/2/21	9/3/21 11:05	MMH
Total Kjeldahl Nitrogen	1.1	1.0	mg/L	1		SM19-23 4500-N Org B,C-NH3 C	8/31/21	9/1/21 7:56	YR
Total Nitrogen	2.0	0.050	mg/L	1		SM19-23 4500-N Org B,C-NH3 C	9/8/21	9/8/21 7:29	LL

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Project Location: Sudbury | Sample Description: | Work Order: 21H1559

Date Received: 8/30/2021

Field Sample #: ST 400 UP | Sampled: 8/30/2021 15:00

Sample ID: 21H1559-03

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Nitrate/Nitrite as N	0.55	0.050	mg/L	1	Z-01	NECi N07-0003	8/31/21	8/31/21 14:15	IS
Phosphorus, Total	0.15	0.050	mg/L	1		SM 21-23 4500 P E	9/2/21	9/3/21 11:05	MMH
Total Kjeldahl Nitrogen	1.1	1.0	mg/L	1		SM19-23 4500-N Org B,C-NH3 C	8/31/21	9/1/21 7:56	YR
Total Nitrogen	1.6	0.050	mg/L	1		SM19-23 4500-N Org B,C-NH3 C	9/8/21	9/8/21 7:29	LL

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Project Location: Sudbury | Sample Description: | Work Order: 21H1559

Date Received: 8/30/2021

Field Sample #: ST 400 DOWN | Sampled: 8/30/2021 15:10

Sample ID: 21H1559-04

Sample Matrix: Surface Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Nitrate/Nitrite as N	0.56	0.050	mg/L	1	Z-01	NECi N07-0003	8/31/21	8/31/21 14:16	IS
Phosphorus, Total	0.15	0.050	mg/L	1		SM 21-23 4500 P E	9/2/21	9/3/21 11:05	MMH
Total Kjeldahl Nitrogen	1.1	1.0	mg/L	1		SM19-23 4500-N Org B,C-NH3 C	8/31/21	9/1/21 7:56	YR
Total Nitrogen	1.7	0.050	mg/L	1		SM19-23 4500-N Org B,C-NH3 C	9/8/21	9/8/21 7:29	LL

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Sample Extraction Data

NECi N07-0003

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21H1559-01 [ST 725 DOWN]	B289332	10.0	10.0	08/31/21
21H1559-02 [ST 725 UP]	B289332	10.0	10.0	08/31/21
21H1559-03 [ST 400 UP]	B289332	10.0	10.0	08/31/21
21H1559-04 [ST 400 DOWN]	B289332	10.0	10.0	08/31/21

SM 21-23 4500 P E

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21H1559-01 [ST 725 DOWN]	B289498	50.0	50.0	09/02/21
21H1559-02 [ST 725 UP]	B289498	50.0	50.0	09/02/21
21H1559-03 [ST 400 UP]	B289498	50.0	50.0	09/02/21
21H1559-04 [ST 400 DOWN]	B289498	50.0	50.0	09/02/21

SM19-23 4500-N Org B,C-NH3 C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21H1559-01 [ST 725 DOWN]	B289305	25.0	25.0	08/31/21
21H1559-02 [ST 725 UP]	B289305	25.0	25.0	08/31/21
21H1559-03 [ST 400 UP]	B289305	25.0	25.0	08/31/21
21H1559-04 [ST 400 DOWN]	B289305	25.0	25.0	08/31/21

SM19-23 4500-N Org B,C-NH3 C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21H1559-01 [ST 725 DOWN]	B289790	50.0	50.0	09/08/21
21H1559-02 [ST 725 UP]	B289790	50.0	50.0	09/08/21
21H1559-03 [ST 400 UP]	B289790	50.0	50.0	09/08/21
21H1559-04 [ST 400 DOWN]	B289790	50.0	50.0	09/08/21

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B289305 - SM19-23 4500-N Org B,C-NH3 C										
Blank (B289305-BLK1)				Prepared: 08/31/21 Analyzed: 09/01/21						
Total Kjeldahl Nitrogen	ND	1.0	mg/L							
LCS (B289305-BS1)				Prepared: 08/31/21 Analyzed: 09/01/21						
Total Kjeldahl Nitrogen	20	1.0	mg/L	20.0		101	86.9-114			
Batch B289332 - NECi N07-0003										
Blank (B289332-BLK1)				Prepared & Analyzed: 08/31/21						
Nitrate/Nitrite as N	ND	0.050	mg/L							
LCS (B289332-BS1)				Prepared & Analyzed: 08/31/21						
Nitrate/Nitrite as N	2.7	0.050	mg/L	2.50		106	90-110			
LCS Dup (B289332-BSD1)				Prepared & Analyzed: 08/31/21						
Nitrate/Nitrite as N	2.7	0.050	mg/L	2.50		107	90-110	0.975	20	
Batch B289498 - SM 21-23 4500 P E										
Blank (B289498-BLK1)				Prepared: 09/02/21 Analyzed: 09/03/21						
Phosphorus, Total	ND	0.050	mg/L							
LCS (B289498-BS1)				Prepared: 09/02/21 Analyzed: 09/03/21						
Phosphorus, Total	0.17	0.050	mg/L	0.167		104	76.5-122			
LCS Dup (B289498-BSD1)				Prepared: 09/02/21 Analyzed: 09/03/21						
Phosphorus, Total	0.17	0.050	mg/L	0.167		103	76.5-122	1.37	12.6	

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
Z-01	NECI test had calibration points outside acceptable back calculated recoveries. Reanalysis yielded similar nonconformances.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
NECi N07-0003 in Water	
Nitrate/Nitrite as N	NC,NY,RI,NH,VA
SM 21-23 4500 P E in Water	
Phosphorus, Total	CT,MA,NH,NY,RI,NC,ME,VA
SM19-23 4500-N Org B,C-NH3 C in Water	
Total Kjeldahl Nitrogen	CT,MA,NH,NY,RI,NC,ME,VA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2022
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2022
RI	Rhode Island Department of Health	LAO00112	12/30/2021
NC	North Carolina Div. of Water Quality	652	12/31/2021
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2021
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2021

2141559

con-test ANALYTICAL LABORATORY

Phone: 413-525-2332
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http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 2_06262019

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Company Name:	SWCA ENV. CONS.
Address:	15 Research Drive Amh.
Phone:	413 262 4010
Project Name:	Sud Hud
Project Location:	Sudbury
Project Number:	
Project Manager:	
Con-Test Quote Name/Number:	
Invoice Recipient:	
Sampled By:	

Requested Turnaround Time
7-Day ☑ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date:

Rush Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: aholmes@swca.com
Fax To #:

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1]Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	total nitrogen	total phosphorous										
01	ST 725 DOWN	8/30/21	8:30	G	O	U		1	3			X	X										
02	ST 725 UP		8:45	G	O	U		1				X	X										
03	ST 400 UP		3:00	G	O	U		1				X	X										
04	ST 400 DOWN	↓	3:10	G	O	U		1				X	X										

[2] Preservation Code

Container Use Only
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Contest is not responsible for missing samples from prepacked coolers

[1] Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define) Surface water

[2] Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time: 8/30/21 4pm	Client Comments:
Received by: (signature)	Date/Time: 8/30/21 4pm	
Relinquished by: (signature)	Date/Time: 8/30 5:55 pm	
Received by: (signature) 4.1C	Date/Time: 8/31/21 1755	
Relinquished by: (signature)	Date/Time:	
Received by: (signature)	Date/Time:	
Relinquished by: (signature)	Date/Time:	
Received by: (signature)	Date/Time:	

Detection Limit Requirements
MA
CT
Other:

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

HELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

PCB ONLY
☐ Soxhlet
☐ Non Soxhlet

Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. Th Chain of Custody is a legal document that must be complete and accurate and is used to determine wh analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Co Test values your partnership on each project and will try to assist with missing information, but will not held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client SWCA

Received By RLF Date 8/30/21 Time 1755

How were the samples received? In Cooler T No Cooler _____ On Ice T No Ice _____
Direct from Sampling _____ Ambient _____ Melted Ice _____

Were samples within Temperature? 2-6°C T By Gun # 3 Actual Temp - 4.1°C
By Blank # _____ Actual Temp - _____

Was Custody Seal Intact? NA Were Samples Tampered with? NA
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Project T Analysis T ID's T Sampler Name T Collection Dates/Times T
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? _____
Are there Rushes? F Who was notified? _____
Are there Short Holds? RT Who was notified? David
Is there enough Volume? T
Is there Headspace where applicable? NA MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? Acid T Base NA

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.	4	500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments: