

Town of Brattleboro

Stormwater Infrastructure Mapping Project

August 2022



***VTDEC – CLEAN WATER INITIATIVE PROGRAM,
WATERSHED MANAGEMENT DIVISION***

<https://dec.vermont.gov/water-investment/cwi/solutions/developed-lands/idde>

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Overview

This stormwater infrastructure mapping project was completed for the municipality by the Agency of Natural Resources Clean Water Initiative Program to supplement the existing drainage data collected by the town and with the intention of providing a tool for planning, maintenance, and inspection of the stormwater infrastructure.

The GIS maps and geodatabase are meant to provide an overall picture and understanding of the connectivity or connectedness of the storm system on both public and private properties. They can be used to: (1) raise the awareness of the need for regular maintenance, the generation and transport of nonpoint source pollution increases with increasing connectivity of a drainage system, (2) as a valuable tool for hazardous material spill planning and prevention, (3) for the detection and elimination of illicit discharges; outfall locations and system connectedness data are used as a base for locating illicit or illegal discharges of non-stormwater to the municipal storm system and tracing them up to the source, (4) better assist the municipality in planning and implementing combined stormwater-sewer separation projects, (5) inform options for cleaning up existing polluted stormwater discharges; this report provides information and guidance for potential retrofit treatment locations and opportunities, (6) assist municipalities and residents with emergency preparedness for large rainfall events (i.e. Tropical Storm or Hurricanes) or spring snowmelt runoff events, by keeping storm drains clean, clear and open a good deal of localized flooding could be prevented, and (7) the basis for a local stormwater ordinance or be used to help enhance an existing stormwater management program.

Project Summary

The principal goal of this project was to develop up to date municipal drainage maps. These drainage maps were created showing the paths that stormwater runoff travels from where it falls on impervious surfaces such as parking lots, roads, and rooftops, to the outfall points in various receiving waters. These maps show the stormwater infrastructure including features like pipes, manholes, catchbasins, and swales within a municipality. Data sources included data collected from field work, a mapping grade Trimble GPS unit, available state permit plans, record drawings, town plans, WWMD plans, existing GIS data from contractors, and the input and guidance of knowledgeable members from the municipalities.

A second goal of this project was to establish potential locations for Best Management Practice (BMP) stormwater retrofit sites. These are sites where stormwater treatment structures could be added and where they would be most cost effective and efficient for sediment and phosphorus or nitrogen removal. In order to develop a retrofit site list, drainage area subwatersheds were delineated around the drainage networks. Determining how the stormwater infrastructure was connected was necessary in determining the subwatershed drainage areas within the town.

Delineating the drainage areas was done using the stormwater infrastructure maps, along with satellite imagery, a Digital Elevation Model (DEM), and USGS topographic maps. These data sources were used to approximate where the land area within each municipality was draining to; as well as where the high points were that divided the sub-drainage areas. The completed maps show the drainage coverage for essentially the entire municipality, but with a focus on areas with greater concentrations of impervious cover.

Impervious cover layers were created by either hand digitization or by using a method of raster pixel calculation (with ArcGIS spatial analyst extension) to create a vegetation index using the best available 4 band imagery (2016 NAIP). The area which contrasted with the vegetation represents impervious surfaces and was then modified with buffered water and roads layers to make it more accurate. A more detailed explanation of this process is available in a separate document. The impervious layer was used to calculate the

percent of each delineated drainage area that would generate stormwater runoff. The percentage of impervious surface number for each subwatershed was then adjusted with a connectivity rating. A rating was assigned to each drainage area polygon describing how directly connected the impervious surfaces within that subwatershed are to the receiving water. By adjusting the percent impervious area numbers with this connectivity rating the effective impervious area (EIA) was established for each subwatershed (*Sutherland, 1995*). This effective impervious number is a more accurate description of the amount of runoff produced by each of the subwatersheds because it helps to take factors such as infiltration into account.

After the effective impervious numbers were calculated for the subwatersheds the Simple Method was used to estimate the annual sediment (TSS) and phosphorus (TP) or Nitrogen (TN) loads generated by each subwatershed. The Simple method uses information which includes the adjusted impervious value, average annual rainfall for the location, total subwatershed area, and a given pollutant concentration value to calculate an annual load for various pollutants (*Schueler, 1987*). Pollutant loads estimated by the Simple Method in this project are planning level estimates and are meant to give a general idea of the amounts of sediment or nutrient wash-off produced by each subwatershed for prioritization purposes. Subwatersheds were then prioritized, using the loading calculations as well as other criteria, and given Action List numbers ranging from 1 to 3 (one being the highest priority). Action List Priority 4 is reserved for properties with more than 3 acres of impervious cover and impacted by VTDEC General Permit 3-9050 and its requirement to retrofit the impervious cover on the parcel to new water quality design standards. The Action List number depends both upon loading values and feasibility of potential retrofit treatment options. Potential retrofit options listed in the TARGET maps are based on field observations and not on actual availability of land or willingness of landowner.

Water Quality Volume (WQv – the amount of storage needed to treat stormwater from a 0.9-1.0-inch storm) and Channel Protection Volume (CPv – the volume of storage that is needed to hold and slowly release stormwater for a 2.1 inch rain event) were also calculated for delineated subwatershed areas. CPv calculations are only applicable if the receiving water is not a large body of water and is therefore susceptible to channel erosion. These numbers were used in the retrofit recommendation process because the volume of water to be treated was a key factor in determining the type of retrofit.

Project References

Schueler, T. 1987. Technical Documentation of a Simple Method for Estimating Urban Storm Pollutant Export. Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs. Appendix A.

Schueler, T. et.al., 2007. Urban Stormwater Retrofit Practices, Version 1.0. Manual 3, Center for Watershed Protection, August 2007.

Sutherland, R. 1995. Methodology for Estimating the Effective Impervious Area of Urban Watersheds. Technical Note 58 – Pervious Area Management. Watershed Protection Techniques. Vol. 2, No. 1

***All data was created in an ArcGIS 10 Geodatabase format and is available from VTDEC.**

Act 64 Municipal Roads General Permit (MRGP)

The 2015 Vermont Legislature adopted Act 64 which will require all municipalities to address stormwater runoff from all hydrologically connected existing municipal roads. In January 2018 the final general permit was issued; municipalities must file a notice of intent to comply with the permit by July 31, 2018. As part of this permit all municipalities will be required, as explained below, to evaluate connected road segments with catch basin served infrastructure to determine compliance with MRGP Standards by December 31, 2020 as part of their road erosion inventory. The permit will require:

- Municipalities to develop road stormwater management plans. These plans will include a comprehensive (1) Road Erosion Inventory (REI) of hydrologically-connected road segments and (2) an Implementation Table.
- The inventory will include an evaluation of municipal hydrologically-connected road segments to determine if they meet the MRGP standards.
- Those road segments that do not currently meet MRGP standards and that can impact waterways will be prioritized for remediation within the Implementation Table. DEC has developed an Implementation Table-Portal for this purpose.

Municipalities will submit annual reports to DEC due on April 1st starting in 2019. The Annual Reports will document progress in upgrading roads to meet MRGP standards. Municipalities will be able to use the spread sheet, mentioned above, for annual compliance reporting requirements. This report and the mapping information contained in it can be used by municipalities to develop the plan for the paved road segments with catchbasins that are hydrologically directly connected. The map(s) and data provided with this report indicate where these road segments outfalls are located using the best available mapping information DEC has to date. The MRGP standard for paved roads with catch basins is that any outfalls that are eroded will have to be stabilized with practices such as stone aprons, culvert headwalls, and stone-lined ditches. As with other classes of roads covered by this permit the municipality should first check the maps provided. DEC suggests municipalities take the following steps to check the maps and/or data provided to determine what outfalls will require municipal attention for erosion repair:

- 30 Using the provided maps and/or data as a guide confirm that the road draining to this outfall is paved," and the discharge pipe from the catchbasin*^s+is directly discharging to waters of the state. Include" any outfall from these road segments that discharges within 500 linear feet of surface waters.
- 40 Using the maps locate the outfall and note any level of erosion present in the outfall and/or in the 500" foot or less long swale between the pipe outlet and waters of the state.
- 50 Prepare a list of all outfalls with notes pertaining to the erosion using the Guidance and Field Sheet or" the i-phone application.

Inventory Guidance:

[http://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/Permitinformation/MunicipalRoads/sw_ "MRGP_PavedRoadsWithCathBasins_REI-Supplement.pdf](http://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/Permitinformation/MunicipalRoads/sw_)

Field Sheet (use form C only):

[http://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/Permitinformation/MunicipalRoads/sw_ "MRGP_RoadErosionInventory.pdf](http://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/Permitinformation/MunicipalRoads/sw_)

I-phone Application:

<http://vtanr.maps.arcgis.com/home/item.html?id=fe11c5ffd0d04eeca968115d84dacf90>

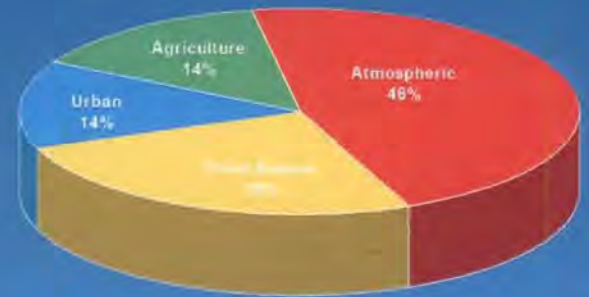
Please contact Jim Ryan at Jim.Ryan@vermont.gov for user ID and password

Long Island Sound – Connecticut River Watershed Nitrogen Overview

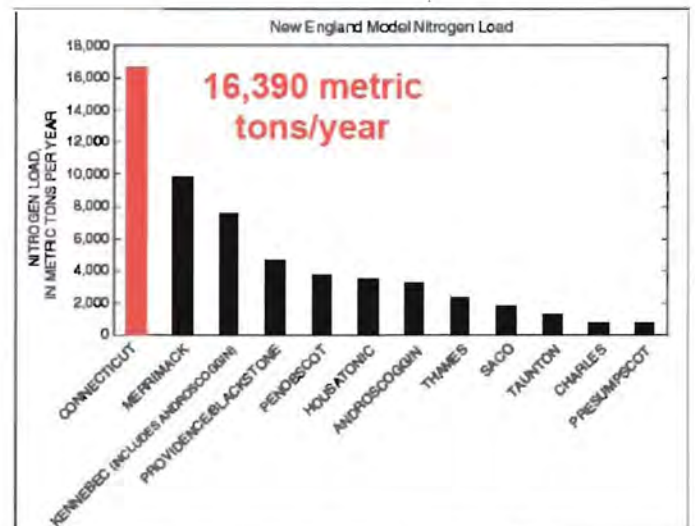


- This map shows an overview of the extent of the Connecticut River watershed including areas of Vermont, New Hampshire, Massachusetts, and Connecticut.

New England SPARROW model -- Predicted Sources of Nitrogen Loading in Connecticut River Watershed to LIS



- This figure shows the modeled nitrogen loading contribution per year from the Connecticut River basin to the Long Island Sound.



- This graph shows the breakdown of the modeled nitrogen load from the Connecticut River watershed to the Long Island Sound from various sources.

Subwatershed Data

***Tables showing calculations and
Priority drainage area retrofit possibilities***

This is a key showing the abbreviations of the different stormwater treatment structures or practices listed in the calculation sheets.

Abbreviation Key	
Code	Structure Type
BB	Baffle Box
BFCB	Baffled Catchbasin
BR	Bioretention Area (aka Bioretention Filter)
BS	Buffer Strip (25' Min.)
CB	Catch Basin
CBI	Catch Basin Insert
CD	Check Dam
DG	Detention Gallery
DI	Drop Inlet
DP	Dry Pond
DS	Dry Swale
DW	Drywell
EDPMP	Ext.Det.Pond with Micropool (aka Micropool ED Pond)
GS	Grass Swale (aka Open Channel)
IB	Infiltration Basin
IG	Infiltration Gallery
IP	Infiltration Pipe
OF	Overland Flow
OGF	Organic Filter
POP	Pocket Pond
PP	Perforated Pipe Attenuator
RDD	Roof Drain Disconnect
RR	Rock RipRap
RS	RipRap Swale
SB	Sediment Basin (10 YR OR >)
SF	Sand Filter (aka Surface Sand Filter)
SS-SF	Swirl Separator – Sand Filter
ST	Septic Tank
TT	Treatment Tank
WL	Wetland (Constructed)
WP	Wet Pond (Retention)
WS	Wet Swale

Brattleboro - Subwatershed Prioritization and Recommendations										
Watershed Number	Action List #	Proposed Action	Proposed or Existing Stormwater Treatment Practice	Permit Number	Watershed Area (Acres)	Percent Mapped Impervious Area (MIA)	Sediment Load with Current Reductions (lbs.)	Sediment Load with Priority Action (lbs.)	Nitrogen Load with Current Reductions (lbs.)	Nitrogen Load with Priority Action (lbs.)
2 Brattleboro			CB/GS/OF/IB	5954-9010	10.30	57.9	2777	2777	34.7	34.7
3 Brattleboro			CB/GS/OF/IB	5954-9010	1.29	29.5	110	110	1.4	1.4
4 Brattleboro	1	Infiltration basin on Town Land on Old Guilford Rd	IB/CB		40.55	37.1	17494	1749	145.8	14.6
5 Brattleboro	3	Swirl Separator/Sand Filter	SS-SF/CB		41.68	43.2	24267	4853	202.2	80.9
6 Brattleboro	1	Maintenance of Kettle Pond for stormwater management	CB/GS/OF/Kettle Pond	5954-9010	135.53	35.2	26143	5229	217.9	119.8
7 Brattleboro			CB		3.39	66.1	2698	2698	22.5	22.5
8 Brattleboro			OF/GS		1.58	80.2	1456	1456	12.1	12.1
9 Brattleboro	3	Swirl Separator/Sand Filter	SS-SF/CB/DS/IP	3423-9010.A	104.14	40.4	24497	17148	387.9	349.1
10 Brattleboro			CB/DW		0.49	60.3	123	123	1.5	1.5
11 Brattleboro			CB/DW/IB		1.86	48.7	325	325	4.1	4.1
12 Brattleboro			RD/DW/IP		2.46	95.5	1421	1421	17.8	17.8
13 Brattleboro			CB/DS/IG	3423-9010.A	3.71	83.5	1664	1664	20.8	20.8
14 Brattleboro	2	Swirl Separator/Sand Filter	SS-SF/CB/SB	3423-9010.A	59.52	25.9	9036	6325	90.4	72.3
15 Brattleboro			CB/SB	3423-9010.A	6.29	56.8	1421	1421	17.8	17.8
16 Brattleboro			CB		11.79	27.6	2827	2827	23.6	23.6
17 Brattleboro			CB/WL(natural)		8.16	39.3	2543	2543	21.2	21.2
18 Brattleboro			CB/WS/OF	6182-9010	9.05	35.7	2238	2238	18.6	18.6
19 Brattleboro			OF/WP/WL(natural)	4387-9003	15.11	78.2	6464	6464	97.0	97.0
20 Brattleboro			OF/GS/WL(natural)		3.07	70.3	2226	2226	18.6	18.6
21 Brattleboro			DI/OF		10.09	88.1	11276	11276	94.0	94.0
22 Brattleboro			CB/OF/WL (natural)		22.27	52.0	10272	10272	85.6	85.6
23 Brattleboro			CB/OF/WL(natural)		5.02	80.0	4454	4454	37.1	37.1
24 Brattleboro			CB/WP		3.45	87.4	674	674	16.8	16.8
25 Brattleboro			OF/GS/CB		34.88	18.7	5673	5673	47.3	47.3
26 Brattleboro			OF/CB		2.99	33.1	879	879	7.3	7.3
27 Brattleboro			OF		8.33	47.3	3786	3786	31.5	31.5
28 Brattleboro			CB		4.91	45.8	2634	2634	22.0	22.0

Watershed Number	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)	Estimated Basin Construction Cost	Estimated Other BMP Construction Cost	Cost of Sediment Removal Per Pound (based on annual sediment load)	Cost of Phosphorus or Nitrogen Removal Per Pound (based on annual nutrient load)	Assistance Program	# LID-Roof Raingardens to Treat Water Quality Volume	Raingarden Cost
2 Brattleboro	0.31	FALSE					CWIP, SRF, LISFF, OTHER	157	
3 Brattleboro	0.01	FALSE					CWIP, SRF, LISFF, OTHER	6	
4 Brattleboro	0.99	FALSE	\$301,814		\$19	\$2,300	CWIP, SRF, LISFF, OTHER	495	
5 Brattleboro	1.37	FALSE	\$5,442,510		\$280	\$44,855	CWIP, SRF, LISFF, OTHER	686	
6 Brattleboro	1.64	FALSE		\$20,000	\$1	\$204	CWIP, SRF, LISFF, OTHER	822	
7 Brattleboro	0.15	FALSE					CWIP, SRF, LISFF, OTHER	76	
8 Brattleboro	0.08	FALSE					CWIP, SRF, LISFF, OTHER	41	
9 Brattleboro	2.77	FALSE	\$10,988,056		\$1,495	\$283,295	CWIP, SRF, LISFF, OTHER	1386	
10 Brattleboro	0.01	FALSE					CWIP, SRF, LISFF, OTHER	7	
11 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	18	
12 Brattleboro	0.16	FALSE					CWIP, SRF, LISFF, OTHER	80	
13 Brattleboro	0.19	FALSE					CWIP, SRF, LISFF, OTHER	94	
14 Brattleboro	1.02	FALSE	\$4,052,986		\$1,495	\$224,275	CWIP, SRF, LISFF, OTHER	511	
15 Brattleboro	0.16	FALSE					CWIP, SRF, LISFF, OTHER	80	
16 Brattleboro	0.16	FALSE					CWIP, SRF, LISFF, OTHER	80	
17 Brattleboro	0.14	FALSE					CWIP, SRF, LISFF, OTHER	72	
18 Brattleboro	0.14	FALSE					CWIP, SRF, LISFF, OTHER	70	
19 Brattleboro	0.73	FALSE					CWIP, SRF, LISFF, OTHER	366	
20 Brattleboro	0.13	FALSE					CWIP, SRF, LISFF, OTHER	63	
21 Brattleboro	0.64	FALSE					CWIP, SRF, LISFF, OTHER	319	
22 Brattleboro	0.58	FALSE					CWIP, SRF, LISFF, OTHER	291	
23 Brattleboro	0.25	FALSE					CWIP, SRF, LISFF, OTHER	126	
24 Brattleboro	0.19	FALSE					CWIP, SRF, LISFF, OTHER	95	
25 Brattleboro	0.32	FALSE					CWIP, SRF, LISFF, OTHER	160	
26 Brattleboro	0.05	FALSE					CWIP, SRF, LISFF, OTHER	25	
27 Brattleboro	0.21	FALSE					CWIP, SRF, LISFF, OTHER	107	
28 Brattleboro	0.15	FALSE					CWIP, SRF, LISFF, OTHER	75	

Brattleboro - Subwatershed Prioritization and Recommendations										
Watershed Number	Action List #	Proposed Action	Proposed or Existing Stormwater Treatment Practice	Permit Number	Watershed Area (Acres)	Percent Mapped Impervious Area (MIA)	Sediment Load with Current Reductions (lbs.)	Sediment Load with Priority Action (lbs.)	Nitrogen Load with Current Reductions (lbs.)	Nitrogen Load with Priority Action (lbs.)
29 Brattleboro			CB		0.99	62.6	743	743	6.2	6.2
30 Brattleboro			CB		7.32	64.6	5680	5680	47.3	47.3
31 Brattleboro			CB		16.24	55.6	11851	11851	98.8	98.8
32 Brattleboro			CB		5.75	34.0	2270	2270	18.9	18.9
33 Brattleboro			CB		1.11	49.7	650	650	5.4	5.4
34 Brattleboro			OF/GS		3.02	8.2	286	286	2.4	2.4
35 Brattleboro			OF/GS/CB		7.43	23.7	2072	2072	17.3	17.3
36 Brattleboro			CB/GS		4.37	42.9	2187	2187	18.2	18.2
37 Brattleboro			CB/GS		26.07	43.4	10614	10614	88.4	88.4
38 Brattleboro			CB/OF	4560-9003	4.83	65.4	3423	3423	28.5	28.5
39 Brattleboro			CB		6.98	37.9	3072	3072	25.6	25.6
40 Brattleboro			CB		7.98	52.1	5488	5488	27.4	27.4
41 Brattleboro			OF/CB/WP		3.13	15.4	181	181	1.8	1.8
42 Brattleboro			CB		2.43	66.2	1933	1933	16.1	16.1
43 Brattleboro			OF		3.52	22.9	693	693	5.8	5.8
44 Brattleboro			CB		3.15	84.7	3388	3388	28.2	28.2
45 Brattleboro			CB		2.48	58.0	1878	1878	15.6	15.6
46 Brattleboro			CB		0.43	92.9	502	502	4.2	4.2
47 Brattleboro			OF	4384-9003	2.39	96.4	2622	2622	21.9	21.9
48 Brattleboro			OF	4384-9003	2.49	96.9	2743	2743	22.9	22.9
49 Brattleboro			OF	4384-9003	0.64	79.6	559	559	4.7	4.7
50 Brattleboro			OF	4384-9003	1.56	90.4	1588	1588	13.2	13.2
51 Brattleboro			CB		1.70	86.5	1868	1868	15.6	15.6
52 Brattleboro			CB		1.50	98.3	1853	1853	15.4	15.4
53 Brattleboro			OF		2.59	64.8	1783	1783	14.9	14.9
54 Brattleboro			OF		0.87	41.7	336	336	2.8	2.8
55 Brattleboro			CB/BR	6233-9015 NOT BUILT	1.08	93.4	254	254	5.8	5.8
56 Brattleboro			OF/BR	6233-9015 NOT BUILT	0.45	54.2	64	64	1.5	1.5
57 Brattleboro			CB/BR	6233-9015 NOT BUILT	0.73	98.8	181	181	4.1	4.1
58 Brattleboro			CB		15.18	58.5	10574	10574	88.1	88.1

Watershed Number	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)	Estimated Basin Construction Cost	Estimated Other BMP Construction Cost	Cost of Sediment Removal Per Pound (based on annual sediment load)	Cost of Phosphorus or Nitrogen Removal Per Pound (based on annual nutrient load)	Assistance Program	# LID-Roof Raingardens to Treat Water Quality Volume	Raingarden Cost
29 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	21	
30 Brattleboro	0.32	FALSE					CWIP, SRF, LISFF, OTHER	161	
31 Brattleboro	0.67	FALSE					CWIP, SRF, LISFF, OTHER	335	
32 Brattleboro	0.13	FALSE					CWIP, SRF, LISFF, OTHER	64	
33 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	18	
34 Brattleboro	0.02	FALSE					CWIP, SRF, LISFF, OTHER	8	
35 Brattleboro	0.12	FALSE					CWIP, SRF, LISFF, OTHER	59	
36 Brattleboro	0.12	FALSE					CWIP, SRF, LISFF, OTHER	62	
37 Brattleboro	0.60	FALSE					CWIP, SRF, LISFF, OTHER	300	
38 Brattleboro	0.22	FALSE					CWIP, SRF, LISFF, OTHER	108	
39 Brattleboro	0.17	FALSE					CWIP, SRF, LISFF, OTHER	87	
40 Brattleboro	0.31	FALSE					CWIP, SRF, LISFF, OTHER	155	
41 Brattleboro	0.02	FALSE					CWIP, SRF, LISFF, OTHER	10	
42 Brattleboro	0.11	FALSE					CWIP, SRF, LISFF, OTHER	55	
43 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	20	
44 Brattleboro	0.19	FALSE					CWIP, SRF, LISFF, OTHER	96	
45 Brattleboro	0.11	FALSE					CWIP, SRF, LISFF, OTHER	53	
46 Brattleboro	0.03	FALSE					CWIP, SRF, LISFF, OTHER	14	
47 Brattleboro	0.16	FALSE					CWIP, SRF, LISFF, OTHER	82	
48 Brattleboro	0.17	FALSE					CWIP, SRF, LISFF, OTHER	86	
49 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	18	
50 Brattleboro	0.10	FALSE					CWIP, SRF, LISFF, OTHER	50	
51 Brattleboro	0.11	FALSE					CWIP, SRF, LISFF, OTHER	53	
52 Brattleboro	0.10	FALSE					CWIP, SRF, LISFF, OTHER	52	
53 Brattleboro	0.10	FALSE					CWIP, SRF, LISFF, OTHER	50	
54 Brattleboro	0.02	FALSE					CWIP, SRF, LISFF, OTHER	10	
55 Brattleboro	0.07	FALSE					CWIP, SRF, LISFF, OTHER	36	
56 Brattleboro	0.02	FALSE					CWIP, SRF, LISFF, OTHER	9	
57 Brattleboro	0.05	FALSE					CWIP, SRF, LISFF, OTHER	26	
58 Brattleboro	0.60	FALSE					CWIP, SRF, LISFF, OTHER	299	

Brattleboro - Subwatershed Prioritization and Recommendations										
Watershed Number	Action List #	Proposed Action	Proposed or Existing Stormwater Treatment Practice	Permit Number	Watershed Area (Acres)	Percent Mapped Impervious Area (MIA)	Sediment Load with Current Reductions (lbs.)	Sediment Load with Priority Action (lbs.)	Nitrogen Load with Current Reductions (lbs.)	Nitrogen Load with Priority Action (lbs.)
59 Brattleboro			OF		0.52	69.4	394	394	3.3	3.3
60 Brattleboro			CB		4.38	40.8	2083	2083	17.4	17.4
61 Brattleboro			OF		1.71	37.9	588	588	4.9	4.9
62 Brattleboro			CB/OF		16.42	31.0	5913	5913	49.3	49.3
63 Brattleboro			CB		0.46	72.0	427	427	3.6	3.6
64 Brattleboro			CB/DW		0.87	42.9	124	124	1.6	1.6
65 Brattleboro			CB		0.84	57.5	575	575	4.8	4.8
66 Brattleboro			CB		1.49	43.2	752	752	6.3	6.3
67 Brattleboro			OF		5.06	22.2	968	968	8.1	8.1
68 Brattleboro	1	Catchbasin Cleaning	CB		61.87	63.1	46766	42090	389.7	370.2
69 Brattleboro	1	Infiltration basin on Cedar St near Tennis Courts	EDPMP/CB/OF		57.46	21.2	14492	1449	120.8	12.1
70 Brattleboro			CB		36.56	17.9	7976	7976	66.5	66.5
71 Brattleboro			CB/GS/OF/RS	4040-9010	1.68	55.4	551	551	6.9	6.9
72 Brattleboro			CB		0.78	51.0	468	468	3.9	3.9
73 Brattleboro			OF		23.19	8.3	2193	2193	18.3	18.3
74 Brattleboro			CB		5.58	26.2	1710	1710	14.2	14.2
75 Brattleboro			CB		0.71	21.4	181	181	1.5	1.5
76 Brattleboro			OF		15.87	14.6	2114	2114	17.6	17.6
77 Brattleboro			OF		1.58	14.6	210	210	1.8	1.8
78 Brattleboro			GS		5.22	2.7	374	374	3.1	3.1
79 Brattleboro			CB/GS		11.28	21.3	2074	2074	17.3	17.3
80 Brattleboro			OF		3.85	25.8	857	857	7.1	7.1
81 Brattleboro	1	Rock Swale for erosion	RS/CB		4.74	35.8	1972	1183	13.1	9.2
82 Brattleboro			OF		22.73	23.8	4649	4649	38.7	38.7
83 Brattleboro	2	Infiltration basins in median of I-91	EDPMP/CB/GS		110.38	18.1	17429	1743	145.2	14.5
84 Brattleboro			OF		42.92	5.9	23168	23168	193.1	193.1
85 Brattleboro	3	Swirl Separator/Sand Filter	SS-SF/CB		57.48	26.6	17878	7151	149.0	134.1
86 Brattleboro			DW		0.26	88.0	253	253	1.6	1.6
87 Brattleboro			OF/WP		1.75	57.7	406	406	5.1	5.1
88 Brattleboro			DW		1.44	41.4	195	195	2.4	2.4
89 Brattleboro			CB		14.53	39.6	3917	3917	65.3	65.3

Watershed Number	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)	Estimated Basin Construction Cost	Estimated Other BMP Construction Cost	Cost of Sediment Removal Per Pound (based on annual sediment load)	Cost of Phosphorus or Nitrogen Removal Per Pound (based on annual nutrient load)	Assistance Program	# LID-Roof Raingardens to Treat Water Quality Volume	Raingarden Cost
59 Brattleboro	0.02	FALSE					CWIP, SRF, LISFF, OTHER	11	
60 Brattleboro	0.12	FALSE					CWIP, SRF, LISFF, OTHER	59	
61 Brattleboro	0.03	FALSE					CWIP, SRF, LISFF, OTHER	17	
62 Brattleboro	0.33	FALSE					CWIP, SRF, LISFF, OTHER	167	
63 Brattleboro	0.02	FALSE					CWIP, SRF, LISFF, OTHER	12	
64 Brattleboro	0.01	FALSE					CWIP, SRF, LISFF, OTHER	7	
65 Brattleboro	0.03	FALSE					CWIP, SRF, LISFF, OTHER	16	
66 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	21	
67 Brattleboro	0.05	FALSE					CWIP, SRF, LISFF, OTHER	27	
68 Brattleboro	2.65	FALSE					CWIP, SRF, LISFF, OTHER	1323	
69 Brattleboro	0.82	FALSE					CWIP, SRF, LISFF, OTHER	410	
70 Brattleboro	0.45	FALSE					CWIP, SRF, LISFF, OTHER	226	
71 Brattleboro	0.06	FALSE					CWIP, SRF, LISFF, OTHER	31	
72 Brattleboro	0.03	FALSE					CWIP, SRF, LISFF, OTHER	13	
73 Brattleboro	0.12	FALSE					CWIP, SRF, LISFF, OTHER	62	
74 Brattleboro	0.10	FALSE					CWIP, SRF, LISFF, OTHER	48	
75 Brattleboro	0.01	FALSE					CWIP, SRF, LISFF, OTHER	5	
76 Brattleboro	0.12	FALSE					CWIP, SRF, LISFF, OTHER	60	
77 Brattleboro	0.01	FALSE					CWIP, SRF, LISFF, OTHER	6	
78 Brattleboro	0.02	FALSE					CWIP, SRF, LISFF, OTHER	11	
79 Brattleboro	0.12	FALSE					CWIP, SRF, LISFF, OTHER	59	
80 Brattleboro	0.05	FALSE					CWIP, SRF, LISFF, OTHER	24	
81 Brattleboro	0.11	FALSE		\$75,000	\$95	\$19,012	CWIP, SRF, LISFF, OTHER	56	
82 Brattleboro	0.26	FALSE					CWIP, SRF, LISFF, OTHER	132	
83 Brattleboro	0.99	FALSE	\$300,689		\$19	\$2,300	CWIP, SRF, LISFF, OTHER	493	
84 Brattleboro	0.20	FALSE					CWIP, SRF, LISFF, OTHER	506	
85 Brattleboro	1.01	FALSE	\$4,009,611		\$374	\$269,130	CWIP, SRF, LISFF, OTHER	7	
86 Brattleboro	0.01	FALSE					CWIP, SRF, LISFF, OTHER	23	
87 Brattleboro	0.05	FALSE					CWIP, SRF, LISFF, OTHER	11	
88 Brattleboro	0.02	FALSE					CWIP, SRF, LISFF, OTHER	222	
89 Brattleboro	0.44	FALSE					CWIP, SRF, LISFF, OTHER	12	

Brattleboro - Subwatershed Prioritization and Recommendations										
Watershed Number	Action List #	Proposed Action	Proposed or Existing Stormwater Treatment Practice	Permit Number	Watershed Area (Acres)	Percent Mapped Impervious Area (MIA)	Sediment Load with Current Reductions (lbs.)	Sediment Load with Priority Action (lbs.)	Nitrogen Load with Current Reductions (lbs.)	Nitrogen Load with Priority Action (lbs.)
90 Brattleboro			OF		2.65	18.3	423	423	3.5	3.5
91 Brattleboro			CB		1.67	70.3	1422	1422	11.8	11.8
92 Brattleboro			CB		5.00	64.1	4152	4152	34.6	34.6
93 Brattleboro			CB/GS		6.67	23.6	1352	1352	11.3	11.3
94 Brattleboro			CB/GS/DP/IB	5108-9015	9.64	21.8	1185	1185	5.4	5.4
95 Brattleboro			CB/GS		4.82	53.8	518	518	11.9	11.9
96 Brattleboro			OF		2.19	38.8	156	156	6.5	6.5
97 Brattleboro			CB		6.32	73.9	5998	5998	50.0	50.0
98 Brattleboro			CB		4.40	89.3	4978	4978	41.5	41.5
99 Brattleboro			OF		0.59	92.3	688	688	5.7	5.7
100 Brattleboro			CB/OF		5.62	64.1	3814	3814	31.8	31.8
101 Brattleboro			DW		0.14	86.5	133	133	0.8	0.8
102 Brattleboro			CB		5.95	68.0	2443	2443	40.7	40.7
103 Brattleboro			DW		1.51	90.6	1577	1577	9.9	9.9
104 Brattleboro			DW		1.12	90.7	588	588	7.3	7.3
105 Brattleboro			CB		7.02	70.6	3004	3004	50.1	50.1
106 Brattleboro			OF		3.16	23.6	640	640	5.3	5.3
107 Brattleboro			CB/GS		13.12	42.5	5215	5215	43.5	43.5
108 Brattleboro			CB/OF		7.68	18.3	1224	1224	10.2	10.2
109 Brattleboro			DW		2.27	41.8	624	624	3.9	3.9
110 Brattleboro			OF		4.98	26.6	572	572	9.5	9.5
111 Brattleboro			CB/OF		13.73	22.5	3650	3650	30.4	30.4
112 Brattleboro			CB/OF		15.34	23.3	4223	4223	35.2	35.2
113 Brattleboro			CB		0.71	68.2	625	625	5.2	5.2
114 Brattleboro			CB		0.60	78.5	606	606	5.0	5.0
115 Brattleboro			OF		3.70	19.7	630	630	5.3	5.3
116 Brattleboro			OF		11.37	14.6	1513	1513	12.6	12.6
117 Brattleboro			OF		9.92	10.4	1056	1056	8.8	8.8
118 Brattleboro	3	Modify existing permitted basin to extended detention	MOD/CB/GS/OF/RS/DP	3375-9010	8.60	21.6	1051	525	5.3	2.6
119 Brattleboro			CB		0.65	73.4	292	292	4.9	4.9

Watershed Number	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)	Estimated Basin Construction Cost	Estimated Other BMP Construction Cost	Cost of Sediment Removal Per Pound (based on annual sediment load)	Cost of Phosphorus or Nitrogen Removal Per Pound (based on annual nutrient load)	Assistance Program	# LID-Roof Raingardens to Treat Water Quality Volume	Raingarden Cost
90 Brattleboro	0.02	FALSE					CWIP, SRF, LISFF, OTHER	40	
91 Brattleboro	0.08	FALSE					CWIP, SRF, LISFF, OTHER	117	
92 Brattleboro	0.23	FALSE					CWIP, SRF, LISFF, OTHER	38	
93 Brattleboro	0.08	FALSE					CWIP, SRF, LISFF, OTHER	34	
94 Brattleboro	0.07	FALSE					CWIP, SRF, LISFF, OTHER	73	
95 Brattleboro	0.15	FALSE					CWIP, SRF, LISFF, OTHER	22	
96 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	170	
97 Brattleboro	0.34	FALSE					CWIP, SRF, LISFF, OTHER	141	
98 Brattleboro	0.28	FALSE					CWIP, SRF, LISFF, OTHER	19	
99 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	108	
100 Brattleboro	0.22	FALSE					CWIP, SRF, LISFF, OTHER	4	
101 Brattleboro	0.01	FALSE					CWIP, SRF, LISFF, OTHER	138	
102 Brattleboro	0.28	FALSE					CWIP, SRF, LISFF, OTHER	45	
103 Brattleboro	0.09	FALSE					CWIP, SRF, LISFF, OTHER	33	
104 Brattleboro	0.07	FALSE					CWIP, SRF, LISFF, OTHER	170	
105 Brattleboro	0.34	FALSE					CWIP, SRF, LISFF, OTHER	18	
106 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	148	
107 Brattleboro	0.30	FALSE					CWIP, SRF, LISFF, OTHER	35	
108 Brattleboro	0.07	FALSE					CWIP, SRF, LISFF, OTHER	18	
109 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	32	
110 Brattleboro	0.06	FALSE					CWIP, SRF, LISFF, OTHER	103	
111 Brattleboro	0.21	FALSE					CWIP, SRF, LISFF, OTHER	119	
112 Brattleboro	0.24	FALSE					CWIP, SRF, LISFF, OTHER	18	
113 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	17	
114 Brattleboro	0.03	FALSE					CWIP, SRF, LISFF, OTHER	18	
115 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	43	
116 Brattleboro	0.09	FALSE					CWIP, SRF, LISFF, OTHER	30	
117 Brattleboro	0.06	FALSE					CWIP, SRF, LISFF, OTHER	30	
118 Brattleboro	0.06	FALSE	\$10,254		\$20	\$3,904	CWIP, SRF, LISFF, OTHER	17	
119 Brattleboro	0.03	FALSE					CWIP, SRF, LISFF, OTHER	92	

Brattleboro - Subwatershed Prioritization and Recommendations										
Watershed Number	Action List #	Proposed Action	Proposed or Existing Stormwater Treatment Practice	Permit Number	Watershed Area (Acres)	Percent Mapped Impervious Area (MIA)	Sediment Load with Current Reductions (lbs.)	Sediment Load with Priority Action (lbs.)	Nitrogen Load with Current Reductions (lbs.)	Nitrogen Load with Priority Action (lbs.)
120 Brattleboro			CB/GS/OF		14.36	18.6	3242	3242	27.0	27.0
121 Brattleboro			CB/GS/IP/SB/DP		42.62	11.2	3458	3458	21.6	21.6
122 Brattleboro			CB/OF		39.36	6.9	1730	1730	28.8	28.8
123 Brattleboro			DW		1.78	57.5	822	822	5.1	5.1
124 Brattleboro			DW		0.47	99.5	290	290	3.6	3.6
125 Brattleboro			DW		0.09	29.1	7	7	0.1	0.1
126 Brattleboro			CB/OF		24.14	13.7	1533	1533	25.5	25.5
127 Brattleboro			OF		2.16	51.4	1463	1463	12.2	12.2
128 Brattleboro			CB/OF		1.09	74.1	1035	1035	8.6	8.6
129 Brattleboro			CB/OF		6.23	59.4	4417	4417	36.8	36.8
130 Brattleboro			OF		5.11	32.3	1458	1458	12.2	12.2
131 Brattleboro			DW		1.79	67.8	1098	1098	6.9	6.9
132 Brattleboro			OF		8.38	11.9	484	484	8.1	8.1
133 Brattleboro			OF		2.02	49.5	973	973	8.1	8.1
134 Brattleboro			CB/OF		3.89	51.4	1179	1179	19.7	19.7
135 Brattleboro	2	Infiltration Basin in gully	IB/EDP/CB/SB		4.06	34.0	828	83	6.2	0.6
136 Brattleboro			DW		2.42	83.3	1083	1083	13.5	13.5
137 Brattleboro			OF		13.30	8.3	629	629	10.5	10.5
138 Brattleboro			OF		4.59	19.5	777	777	6.5	6.5
139 Brattleboro			CB/SB		1.59	54.8	675	675	4.2	4.2
140 Brattleboro			CB/OF		9.53	74.0	3934	3934	65.6	65.6
141 Brattleboro			CB	3293-9010	12.69	7.6	1533	1533	12.8	12.8
142 Brattleboro			DW		1.87	67.0	561	561	7.0	7.0
143 Brattleboro			DW/IG/CB	3027-9010	16.63	8.2	617	617	7.7	7.7
144 Brattleboro			EDP/DW/CB	3946-9010 3946-9015	2.24	24.3	153	153	1.4	1.4
145 Brattleboro			DW/CB		0.59	84.2	108	108	3.4	3.4
146 Brattleboro			DW/OF		2.86	19.7	162	162	2.0	2.0
147 Brattleboro			DW		0.61	82.4	266	266	3.3	3.3
148 Brattleboro			DW/CB/SB	3257-9010	1.69	72.9	594	594	7.4	7.4
149 Brattleboro			OF/SB	3816-9010	4.26	54.8	904	904	11.3	11.3
150 Brattleboro			OF/SB	3816-9010	4.42	49.8	800	800	10.0	10.0
151 Brattleboro			DW/SB/OF	3957-9010.1	26.22	81.9	11355	11355	141.9	141.9

Watershed Number	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)	Estimated Basin Construction Cost	Estimated Other BMP Construction Cost	Cost of Sediment Removal Per Pound (based on annual sediment load)	Cost of Phosphorus or Nitrogen Removal Per Pound (based on annual nutrient load)	Assistance Program	# LID-Roof Raingardens to Treat Water Quality Volume	Raingarden Cost
120 Brattleboro	0.18	FALSE					CWIP, SRF, LISFF, OTHER	98	
121 Brattleboro	0.20	FALSE					CWIP, SRF, LISFF, OTHER	98	
122 Brattleboro	0.20	FALSE					CWIP, SRF, LISFF, OTHER	23	
123 Brattleboro	0.05	FALSE					CWIP, SRF, LISFF, OTHER	16	
124 Brattleboro	0.03	FALSE					CWIP, SRF, LISFF, OTHER	0	
125 Brattleboro	0.00	FALSE					CWIP, SRF, LISFF, OTHER	87	
126 Brattleboro	0.17	FALSE					CWIP, SRF, LISFF, OTHER	41	
127 Brattleboro	0.08	FALSE					CWIP, SRF, LISFF, OTHER	29	
128 Brattleboro	0.06	FALSE					CWIP, SRF, LISFF, OTHER	125	
129 Brattleboro	0.25	FALSE					CWIP, SRF, LISFF, OTHER	41	
130 Brattleboro	0.08	FALSE					CWIP, SRF, LISFF, OTHER	31	
131 Brattleboro	0.06	FALSE					CWIP, SRF, LISFF, OTHER	27	
132 Brattleboro	0.05	FALSE					CWIP, SRF, LISFF, OTHER	28	
133 Brattleboro	0.06	FALSE					CWIP, SRF, LISFF, OTHER	#REF!	
134 Brattleboro	0.13	FALSE					CWIP, SRF, LISFF, OTHER	67	
135 Brattleboro	0.05	FALSE	\$14,277		\$19	\$2,556	CWIP, SRF, LISFF, OTHER	23	
136 Brattleboro	0.12	FALSE					CWIP, SRF, LISFF, OTHER	61	
137 Brattleboro	0.07	FALSE					CWIP, SRF, LISFF, OTHER	36	
138 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	22	
139 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	19	
140 Brattleboro	0.45	FALSE					CWIP, SRF, LISFF, OTHER	223	
141 Brattleboro	0.09	FALSE					CWIP, SRF, LISFF, OTHER	43	
142 Brattleboro	0.06	FALSE					CWIP, SRF, LISFF, OTHER	32	
143 Brattleboro	0.07	FALSE					CWIP, SRF, LISFF, OTHER	35	
144 Brattleboro	0.02	FALSE					CWIP, SRF, LISFF, OTHER	9	
145 Brattleboro	0.03	FALSE					CWIP, SRF, LISFF, OTHER	15	
146 Brattleboro	0.02	FALSE					CWIP, SRF, LISFF, OTHER	9	
147 Brattleboro	0.03	FALSE					CWIP, SRF, LISFF, OTHER	15	
148 Brattleboro	0.07	FALSE					CWIP, SRF, LISFF, OTHER	34	
149 Brattleboro	0.10	FALSE					CWIP, SRF, LISFF, OTHER	51	
150 Brattleboro	0.09	FALSE					CWIP, SRF, LISFF, OTHER	45	
151 Brattleboro	1.28	FALSE					CWIP, SRF, LISFF, OTHER	642	

Brattleboro - Subwatershed Prioritization and Recommendations										
Watershed Number	Action List #	Proposed Action	Proposed or Existing Stormwater Treatment Practice	Permit Number	Watershed Area (Acres)	Percent Mapped Impervious Area (MIA)	Sediment Load with Current Reductions (lbs.)	Sediment Load with Priority Action (lbs.)	Nitrogen Load with Current Reductions (lbs.)	Nitrogen Load with Priority Action (lbs.)
152 Brattleboro	1	Infiltration basin at outfall on Royal Square Plaza parcel.	IB/CB/DW	3255-9010 3022-9010 3022-9003 3291-9010	29.03	22.6	4882	488	73.2	14.6
153 Brattleboro			CB		8.04	38.6	3252	3252	30.1	30.1
154 Brattleboro			OF		11.58	74.1	9580	9580	79.8	79.8
155 Brattleboro	2	Retrofit infiltration system at time of redevelopment	IB/CB		11.38	26.7	3556	356	29.6	3.0
156 Brattleboro			CB		5.83	56.0	3869	3869	32.2	32.2
157 Brattleboro			DW/SB/OF		4.92	17.5	505	505	3.2	3.2
158 Brattleboro			DW		1.76	33.8	178	178	2.2	2.2
159 Brattleboro			DW		0.67	86.7	323	323	4.0	4.0
160 Brattleboro			DW/SB/OF		1.88	47.5	315	315	3.9	3.9
161 Brattleboro			CB/IG		1.02	90.7	536	536	6.7	6.7
162 Brattleboro			SB/DW		1.27	97.3	761	761	9.5	9.5
163 Brattleboro			CB		2.08	48.0	587	587	9.8	9.8
164 Brattleboro			OF		7.04	26.7	1623	1623	13.5	13.5
165 Brattleboro			CB/IG	4021-9015	2.66	94.1	2984	2984	13.7	13.7
166 Brattleboro			CB		9.17	5.2	185	185	7.7	7.7
167 Brattleboro			OF/SD		0.66	76.1	611	611	5.1	5.1
168 Brattleboro			OF		1.16	85.3	1171	1171	9.8	9.8
169 Brattleboro			OF		4.61	2.6	328	328	2.7	2.7
170 Brattleboro			OF		0.88	11.4	99	99	0.8	0.8
171 Brattleboro			OF/CB		12.84	5.3	1301	1301	10.8	10.8
172 Brattleboro			OF		8.90	10.7	960	960	8.0	8.0
173 Brattleboro			SS-SF/CB	5130-9003	18.09	17.2	3822	3822	28.7	28.7
174 Brattleboro			DW/IB		3.96	63.1	1930	1930	9.8	9.8
175 Brattleboro			SS-SF/CB	5604-9003	16.56	54.2	2362	2362	88.6	88.6
176 Brattleboro			SWPPP/CB	4432-9003	10.02	74.9	8651	8651	72.1	72.1
177 Brattleboro	1	Infiltration basin on Fibermark Wellington Rd property	IB/CB/SW/GS/SB		119.62	12.2	12603	2521	105.0	21.0
178 Brattleboro			CB/SB	3987-9010 4845-9003	20.42	6.3	871	871	9.7	9.7

Watershed Number	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)	Estimated Basin Construction Cost	Estimated Other BMP Construction Cost	Cost of Sediment Removal Per Pound (based on annual sediment load)	Cost of Phosphorus or Nitrogen Removal Per Pound (based on annual nutrient load)	Assistance Program	# LID-Roof Raingardens to Treat Water Quality Volume	Raingarden Cost
152 Brattleboro	0.55	FALSE	\$168,465		\$38	\$2,875	CWIP, SRF, LISFF, OTHER	276	
153 Brattleboro	0.20	FALSE					CWIP, SRF, LISFF, OTHER	102	
154 Brattleboro	0.54	FALSE					CWIP, SRF, LISFF, OTHER	271	
155 Brattleboro	0.20	FALSE	\$61,355		\$19	\$2,300	CWIP, SRF, LISFF, OTHER	101	
156 Brattleboro	0.22	FALSE					CWIP, SRF, LISFF, OTHER	109	
157 Brattleboro	0.03	FALSE					CWIP, SRF, LISFF, OTHER	14	
158 Brattleboro	0.02	FALSE					CWIP, SRF, LISFF, OTHER	10	
159 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	18	
160 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	18	
161 Brattleboro	0.06	FALSE					CWIP, SRF, LISFF, OTHER	30	
162 Brattleboro	0.09	FALSE					CWIP, SRF, LISFF, OTHER	43	
163 Brattleboro	0.07	FALSE					CWIP, SRF, LISFF, OTHER	33	
164 Brattleboro	0.09	FALSE					CWIP, SRF, LISFF, OTHER	46	
165 Brattleboro	0.17	FALSE					CWIP, SRF, LISFF, OTHER	84	
166 Brattleboro	0.05	FALSE					CWIP, SRF, LISFF, OTHER	26	
167 Brattleboro	0.03	FALSE					CWIP, SRF, LISFF, OTHER	17	
168 Brattleboro	0.07	FALSE					CWIP, SRF, LISFF, OTHER	33	
169 Brattleboro	0.02	FALSE					CWIP, SRF, LISFF, OTHER	9	
170 Brattleboro	0.01	FALSE					CWIP, SRF, LISFF, OTHER	3	
171 Brattleboro	0.07	FALSE					CWIP, SRF, LISFF, OTHER	37	
172 Brattleboro	0.05	FALSE					CWIP, SRF, LISFF, OTHER	27	
173 Brattleboro	0.22	FALSE					CWIP, SRF, LISFF, OTHER	108	
174 Brattleboro	0.12	FALSE					CWIP, SRF, LISFF, OTHER	61	
175 Brattleboro	0.67	FALSE					CWIP, SRF, LISFF, OTHER	334	
176 Brattleboro	0.54	FALSE					CWIP, SRF, LISFF, OTHER	272	
177 Brattleboro	0.79	FALSE	\$241,586		\$24	\$2,875	CWIP, SRF, LISFF, OTHER	396	
178 Brattleboro	0.08	FALSE					CWIP, SRF, LISFF, OTHER	41	

Brattleboro - Subwatershed Prioritization and Recommendations										
Watershed Number	Action List #	Proposed Action	Proposed or Existing Stormwater Treatment Practice	Permit Number	Watershed Area (Acres)	Percent Mapped Impervious Area (MIA)	Sediment Load with Current Reductions (lbs.)	Sediment Load with Priority Action (lbs.)	Nitrogen Load with Current Reductions (lbs.)	Nitrogen Load with Priority Action (lbs.)
179 Brattleboro			DW		1.69	71.1	678	678	7.1	7.1
180 Brattleboro			CB/WP	4299-9010	8.25	21.2	494	494	6.2	6.2
181 Brattleboro			CB/IG		2.11	46.3	340	340	3.1	3.1
182 Brattleboro			CB		1.11	89.9	253	253	10.6	10.6
183 Brattleboro			OF		2.63	76.1	2256	2256	18.8	18.8
184 Brattleboro			GS/OF		12.88	38.5	4529	4529	37.7	37.7
185 Brattleboro			CB/SB		35.72	56.3	20388	20388	127.4	127.4
186 Brattleboro			SB/CB/OF	4859-9003	76.32	1.5	3137	3137	39.2	39.2
187 Brattleboro			OF		2.93	86.2	1195	1195	24.9	24.9
188 Brattleboro			OF/GS		8.84	53.4	4700	4700	39.2	39.2
189 Brattleboro			OF		13.35	28.5	3301	3301	27.5	27.5
190 Brattleboro			CB/OF		21.14	12.2	4468	4468	37.2	37.2
191 Brattleboro			IG/CB		3.12	96.2	3775	3775	23.6	23.6
192 Brattleboro			CB/SS		7.17	4.9	315	315	3.9	3.9
193 Brattleboro			OF/SD		0.80	62.2	314	314	4.4	4.4
194 Brattleboro			CB		29.46	1.6	2194	2194	18.3	18.3
195 Brattleboro			CB		4.81	66.3	3846	3846	32.0	32.0
196 Brattleboro			CB		67.49	0.5	4603	4603	38.4	38.4
197 Brattleboro			CB		6.42	49.7	3108	3108	25.9	25.9
198 Brattleboro			CB		22.90	5.4	2336	2336	19.5	19.5
199 Brattleboro			IG/PP/GS	3596-9015	41.85	2.9	2815	2815	12.9	12.9
200 Brattleboro			IG/PP/GS	3596-9015	13.65	24.0	369	369	8.5	8.5
201 Brattleboro			IG/PP/GS	3596-9015 5768-9015	30.01	8.4	449	449	10.3	10.3
202 Brattleboro			CB/GS		14.55	10.2	306	306	12.8	12.8
203 Brattleboro			CB		7.55	39.7	2757	2757	23.0	23.0
204 Brattleboro			OF/GS/WP	3304-9010	114.75	3.4	7761	7761	48.5	48.5
205 Brattleboro			GS/OF	3244-9010	8.31	36.1	1105	1105	15.4	15.4
206 Brattleboro			GS/WP	3244-9010 6044-9003 3742-9010 3303-9003 3303-9010 3801-9010	58.79	5.1	2449	2449	18.7	18.7
207 Brattleboro			CB/GS		22.35	2.7	320	320	13.3	13.3
208 Brattleboro			OF/GS		31.43	25.1	6808	6808	56.7	56.7
209 Brattleboro			CB/GS		34.48	15.7	4846	4846	40.4	40.4
210 Brattleboro			CB/GS		12.66	39.5	6804	6804	56.7	56.7

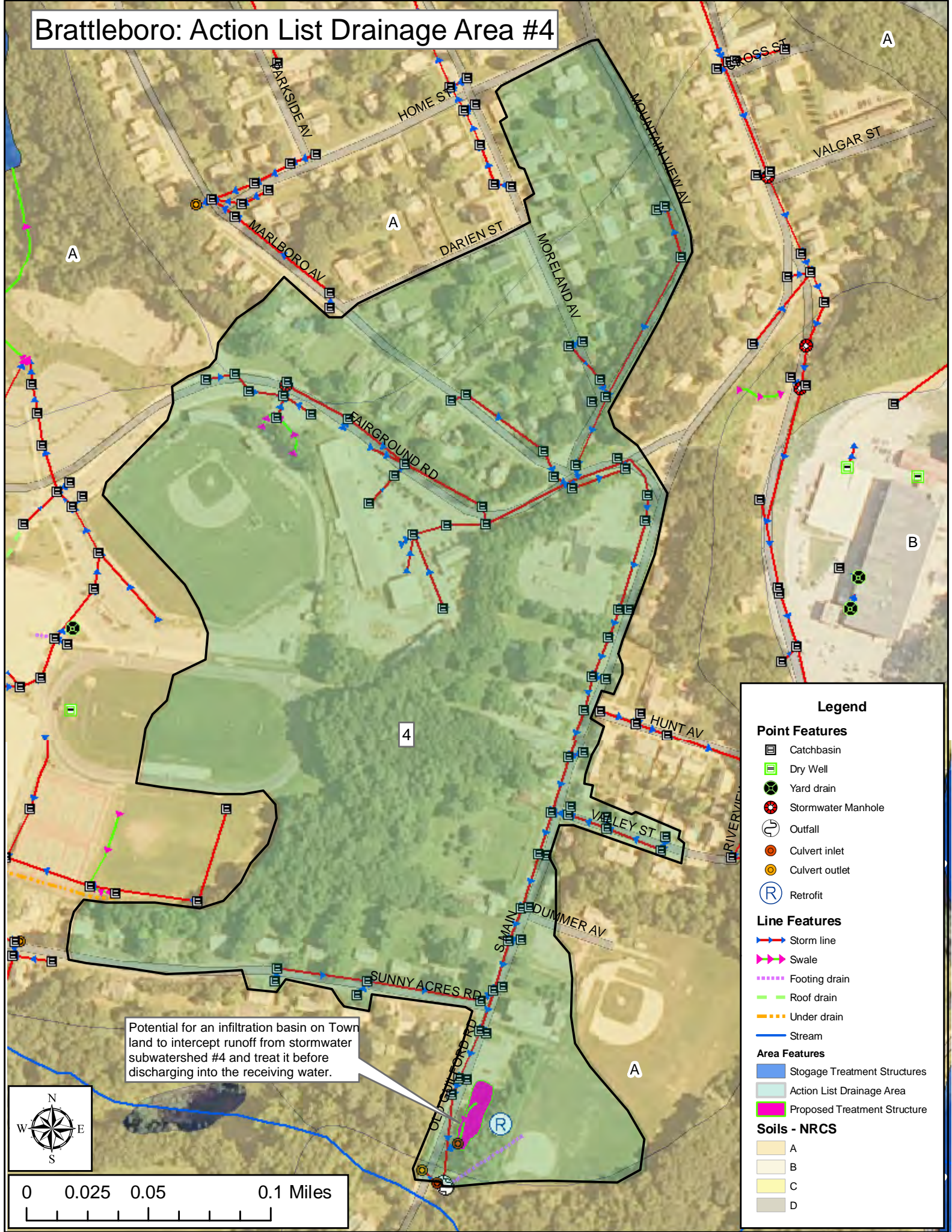
Watershed Number	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)	Estimated Basin Construction Cost	Estimated Other BMP Construction Cost	Cost of Sediment Removal Per Pound (based on annual sediment load)	Cost of Phosphorus or Nitrogen Removal Per Pound (based on annual nutrient load)	Assistance Program	# LID-Roof Raingardens to Treat Water Quality Volume	Raingarden Cost
179 Brattleboro	0.06	FALSE					CWIP, SRF, LISFF, OTHER	32	
180 Brattleboro	0.06	FALSE					CWIP, SRF, LISFF, OTHER	28	
181 Brattleboro	0.04	FALSE					CWIP, SRF, LISFF, OTHER	19	
182 Brattleboro	0.07	FALSE					CWIP, SRF, LISFF, OTHER	36	
183 Brattleboro	0.13	FALSE					CWIP, SRF, LISFF, OTHER	64	
184 Brattleboro	0.26	FALSE					CWIP, SRF, LISFF, OTHER	128	
185 Brattleboro	1.15	FALSE					CWIP, SRF, LISFF, OTHER	577	
186 Brattleboro	0.30	FALSE					CWIP, SRF, LISFF, OTHER	148	
187 Brattleboro	0.17	FALSE					CWIP, SRF, LISFF, OTHER	85	
188 Brattleboro	0.27	FALSE					CWIP, SRF, LISFF, OTHER	133	
189 Brattleboro	0.19	FALSE					CWIP, SRF, LISFF, OTHER	93	
190 Brattleboro	0.25	FALSE					CWIP, SRF, LISFF, OTHER	126	
191 Brattleboro	0.21	FALSE					CWIP, SRF, LISFF, OTHER	107	
192 Brattleboro	0.03	FALSE					CWIP, SRF, LISFF, OTHER	15	
193 Brattleboro	0.03	FALSE					CWIP, SRF, LISFF, OTHER	15	
194 Brattleboro	0.12	FALSE					CWIP, SRF, LISFF, OTHER	62	
195 Brattleboro	0.22	FALSE					CWIP, SRF, LISFF, OTHER	109	
196 Brattleboro	0.26	FALSE					CWIP, SRF, LISFF, OTHER	130	
197 Brattleboro	0.18	FALSE					CWIP, SRF, LISFF, OTHER	88	
198 Brattleboro	0.13	FALSE					CWIP, SRF, LISFF, OTHER	66	
199 Brattleboro	0.16	FALSE					CWIP, SRF, LISFF, OTHER	80	
200 Brattleboro	0.10	FALSE					CWIP, SRF, LISFF, OTHER	52	
201 Brattleboro	0.13	FALSE					CWIP, SRF, LISFF, OTHER	63	
202 Brattleboro	0.09	FALSE					CWIP, SRF, LISFF, OTHER	43	
203 Brattleboro	0.16	FALSE					CWIP, SRF, LISFF, OTHER	78	
204 Brattleboro	0.44	FALSE					CWIP, SRF, LISFF, OTHER	220	
205 Brattleboro	0.10	FALSE					CWIP, SRF, LISFF, OTHER	52	
206 Brattleboro	0.23	FALSE					CWIP, SRF, LISFF, OTHER	115	
207 Brattleboro	0.09	FALSE					CWIP, SRF, LISFF, OTHER	45	
208 Brattleboro	0.39	FALSE					CWIP, SRF, LISFF, OTHER	193	
209 Brattleboro	0.27	FALSE					CWIP, SRF, LISFF, OTHER	137	
210 Brattleboro	0.38	FALSE					CWIP, SRF, LISFF, OTHER	192	

Target Maps

***Showing Priority Action List
Drainage Areas***

And Potential Retrofit Locations

Brattleboro: Action List Drainage Area #4



Legend

Point Features

- Catchbasin
- Dry Well
- Yard drain
- Stormwater Manhole
- Outfall
- Culvert inlet
- Culvert outlet
- Retrofit

Line Features

- Storm line
- Swale
- Footing drain
- Roof drain
- Under drain
- Stream

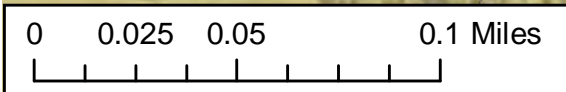
Area Features

- Storage Treatment Structures
- Action List Drainage Area
- Proposed Treatment Structure

Soils - NRCS

- A
- B
- C
- D

Potential for an infiltration basin on Town land to intercept runoff from stormwater subwatershed #4 and treat it before discharging into the receiving water.



Subwatershed: 5
Action List: 3



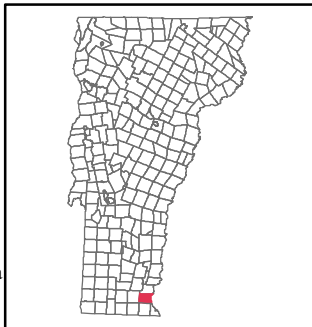
Potential for a swirl separator/ sand filter at the outfall of subwatershed 54 to treat runoff before it enters the receiving water.

Brattleboro, VT

DEC Stormwater Infrastructure Mapping Project

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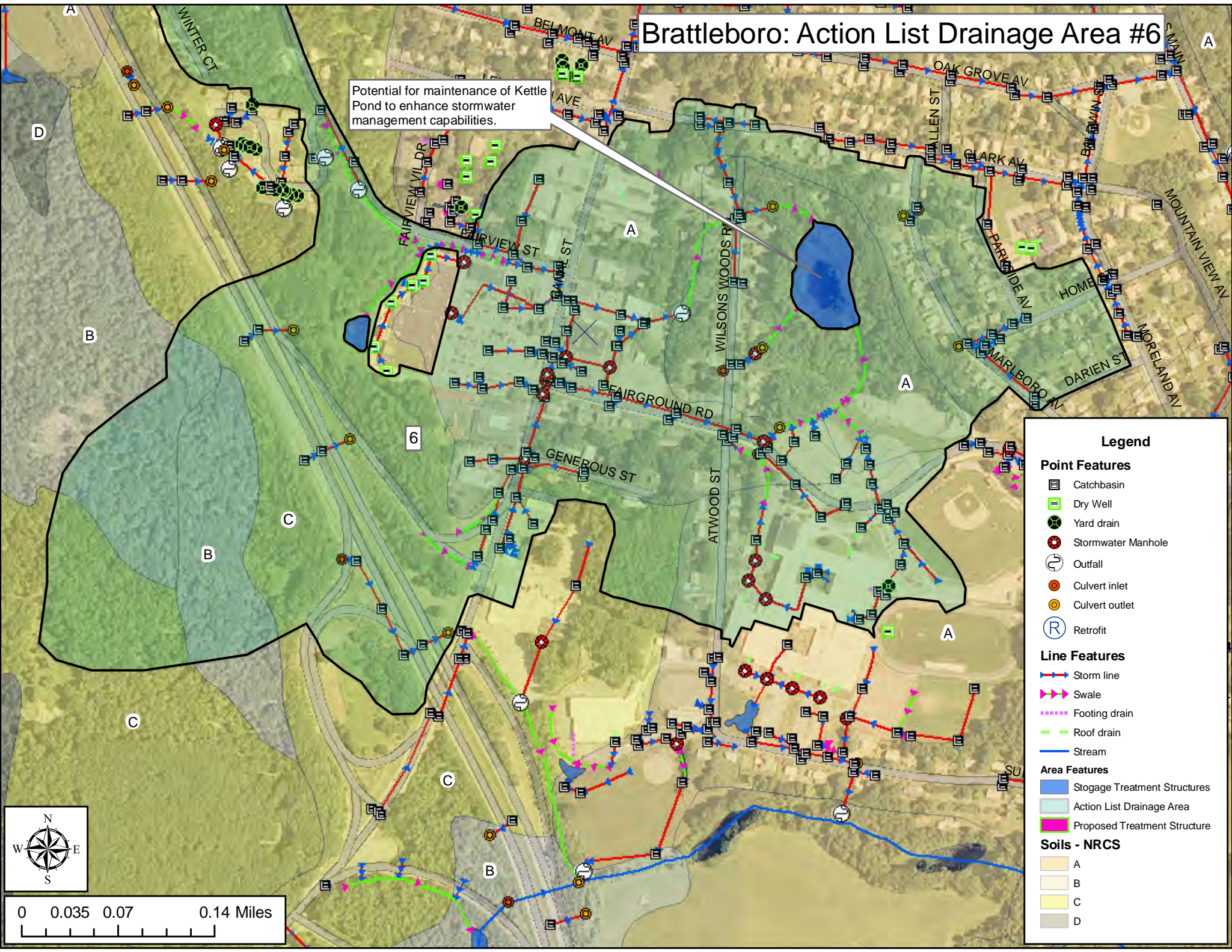


<p>Stormwater points</p> <ul style="list-style-type: none"> Pipe Cross (not connected) Catchbasin Dry Well Drop Inlet Grate/Curb Inlet Yard drain CB tied to sanitary sewer Junction Box Stormwater Manhole Outfall Culvert inlet Culvert outlet Control Structure Treatment feature (see notes) Retrofit Unknown Point Information Point 	<p>Stormwater line</p> <ul style="list-style-type: none"> Storm line Storm line (old Sanitary line) Tunnel (storm) Combined sewer Sanitary line Swale Footing drain Under drain Roof drain Infiltration pipe French drain Trench drain Emergency spillway Stream Overland flow 	<p>NRCS - Soils</p> <ul style="list-style-type: none"> A B C D 	<p>Subwatershed ID</p> <ul style="list-style-type: none"> Priority Subwatershed Stormwater Treatment Area Potential Stormwater Treatment Area
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Creator: Jim Pease, David Ainley
DEC - WID - Clean Water Initiative Program
Plotted Date: 7/22/2022
Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
Imagery Source: VCGI Best Available Imagery

Brattleboro: Action List Drainage Area #6

Potential for maintenance of Kettle Pond to enhance stormwater management capabilities.



Legend

Point Features

- Catchbasin
- Dry Well
- Yard drain
- Stormwater Manhole
- Outfall
- Culvert inlet
- Culvert outlet
- Retrofit

Line Features

- Storm line
- Swale
- Footing drain
- Roof drain
- Stream

Area Features

- Stogage Treatment Structures
- Action List Drainage Area
- Proposed Treatment Structure

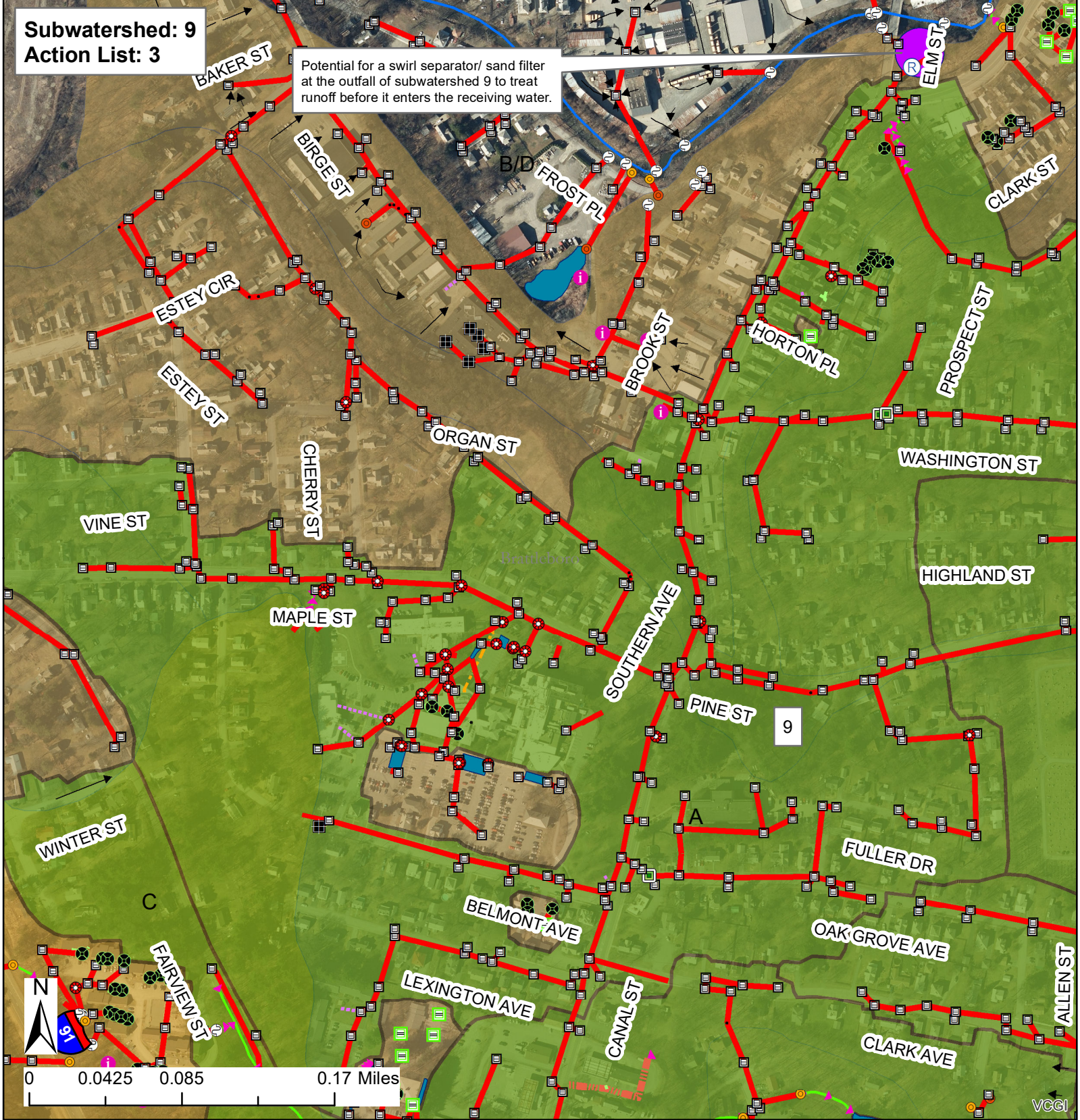
Soils - NRCS

- A
- B
- C
- D

0 0.035 0.07 0.14 Miles

Subwatershed: 9
Action List: 3

Potential for a swirl separator/ sand filter at the outfall of subwatershed 9 to treat runoff before it enters the receiving water.

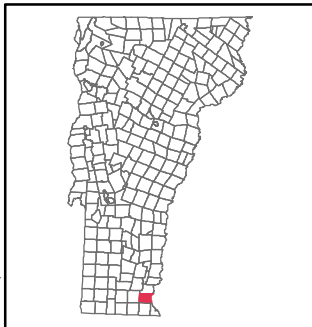


Brattleboro, VT

DEC Stormwater Infrastructure Mapping Project

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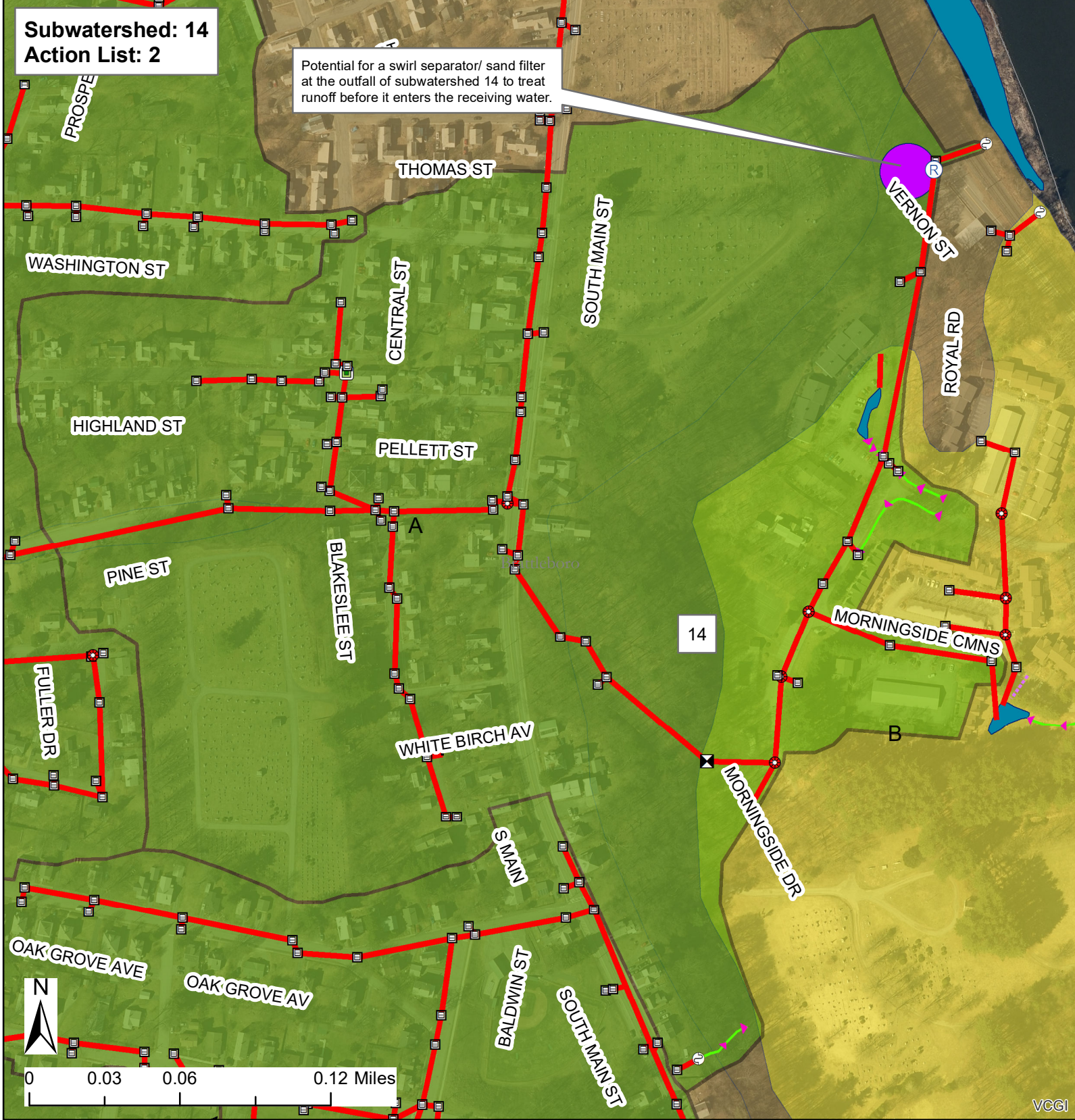
- | | |
|--|---|
| <p>Stormwater points</p> <ul style="list-style-type: none"> Pipe Cross (not connected) Catchbasin Dry Well Drop Inlet Grate/Curb Inlet Yard drain CB tied to sanitary sewer Junction Box Stormwater Manhole Outfall Culvert inlet Culvert outlet Control Structure Treatment feature (see notes) Retrofit Unknown Point Information Point | <p>Stormwater line</p> <ul style="list-style-type: none"> Storm line Storm line (old Sanitary line) Tunnel (storm) Combined sewer Sanitary line Swale Footing drain Under drain Roof drain Infiltration pipe French drain Trench drain Emergency spillway Stream Overland flow |
|--|---|

- | | |
|---|---|
| <p>NRCS - Soils</p> <ul style="list-style-type: none"> A B C D | <p>SubwatershedID</p> <ul style="list-style-type: none"> Priority Subwatershed Stormwater Treatment Area Potential Stormwater Treatment Area |
|---|---|

Creator: Jim Pease, David Ainley
 DEC - WID - Clean Water Initiative Program
 Plotted Date: 7/22/2022
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available Imagery

Subwatershed: 14
Action List: 2

Potential for a swirl separator/ sand filter at the outfall of subwatershed 14 to treat runoff before it enters the receiving water.

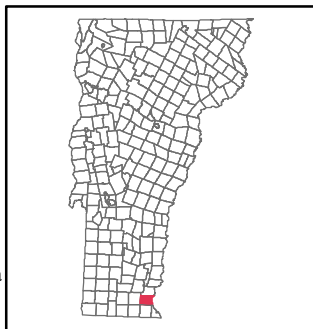


Brattleboro, VT

DEC Stormwater Infrastructure Mapping Project

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Stormwater points

- Pipe Cross (not connected)
- Catchbasin
- Dry Well
- Drop Inlet
- Grate/Curb Inlet
- Yard drain
- CB tied to sanitary sewer
- Junction Box
- Stormwater Manhole
- Outfall
- Culvert inlet
- Culvert outlet
- Control Structure
- Treatment feature (see notes)
- Retrofit
- Unknown Point
- Information Point

Stormwater line

- Storm line
- Storm line (old Sanitary line)
- Tunnel (storm)
- Combined sewer
- Sanitary line
- Swale
- Footing drain
- Under drain
- Roof drain
- Infiltration pipe
- French drain
- Trench drain
- Emergency spillway
- Stream
- Overland flow

NRCS - Soils

- A
- B
- C
- D

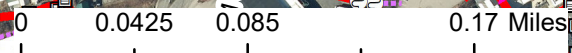
SubwatershedID

- Priority Subwatershed
- Stormwater Treatment Area
- Potential Stormwater Treatment Area

Creator: Jim Pease, David Ainley
DEC - WID - Clean Water Initiative Program
Plotted Date: 7/22/2022
Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
Imagery Source: VCGI Best Available Imagery



Potential for enhanced catchbasin cleaning and street sweeping.

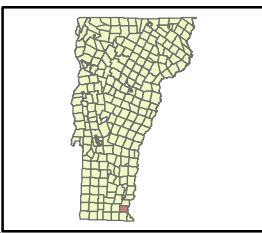


Brattleboro, VT

DEC Stormwater Infrastructure Mapping Project

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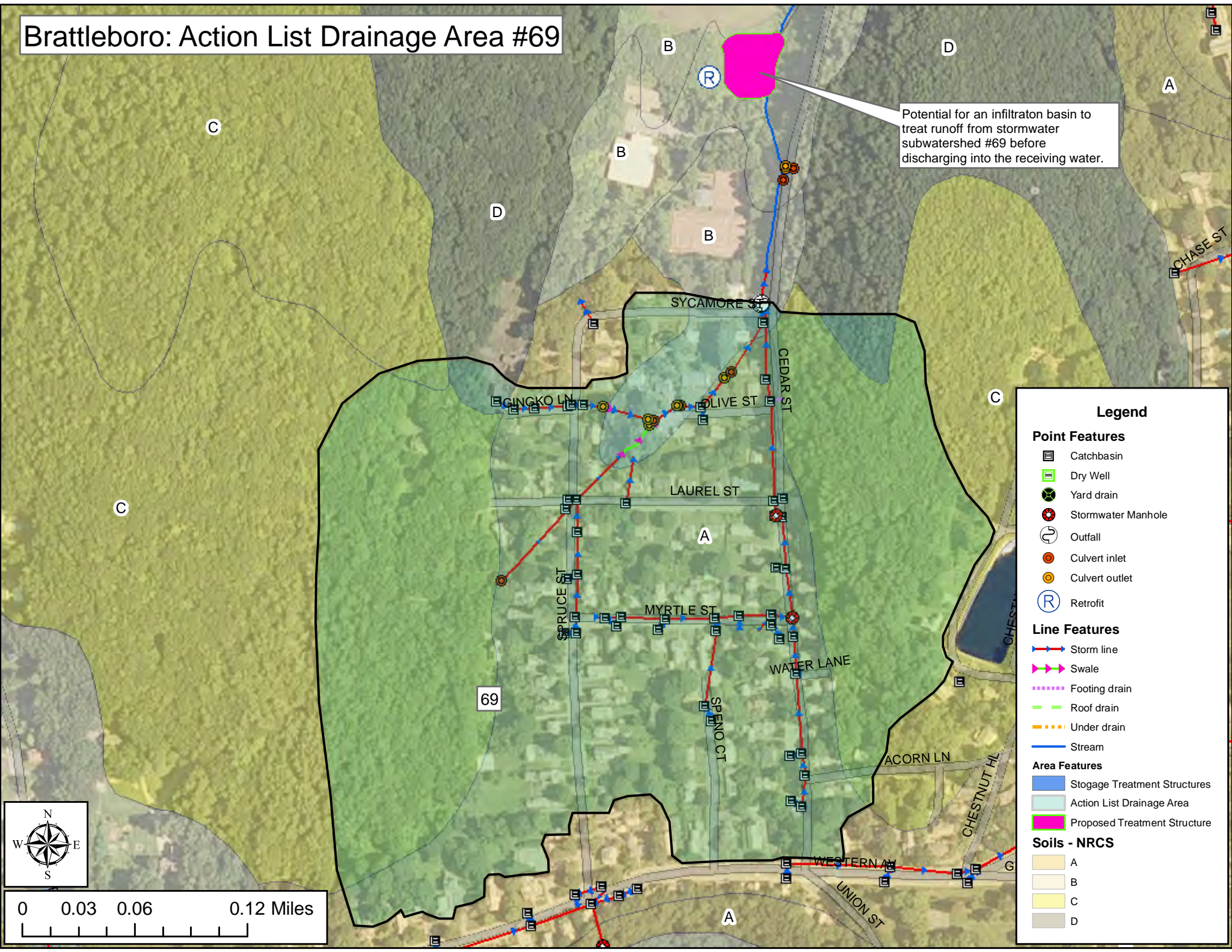


<p>Stormwater points</p> <ul style="list-style-type: none"> Pipe Cross (not connected) Catchbasin Dry Well Drop Inlet Grate/Curb Inlet Yard drain CB tied to sanitary sewer Junction Box Stormwater Manhole Outfall Culvert inlet Culvert outlet Control Structure Treatment feature (see notes) Retrofit Unknown Point Information Point 	<p>Stormwater line</p> <ul style="list-style-type: none"> Storm line Storm line (old Sanitary line) Tunnel (storm) Combined sewer Sanitary line Swale Footing drain Under drain Roof drain Infiltration pipe French drain Trench drain Emergency spillway Stream Overland flow 	<p>SubwatershedID</p> <ul style="list-style-type: none"> Priority Subwatershed Stormwater Treatment Area Potential Stormwater Treatment Area <p>NRCS Soils</p>
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Creator: Jim Pease, David Ainley
 DEC - WID - Clean Water Initiative Program
 Plotted Date: 7/7/2022
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available Imagery

Brattleboro: Action List Drainage Area #69

Potential for an infiltration basin to treat runoff from stormwater subwatershed #69 before discharging into the receiving water.



Legend

Point Features

- Catchbasin
- Dry Well
- Yard drain
- Stormwater Manhole
- Outfall
- Culvert inlet
- Culvert outlet
- Retrofit

Line Features

- Storm line
- Swale
- Footing drain
- Roof drain
- Under drain
- Stream

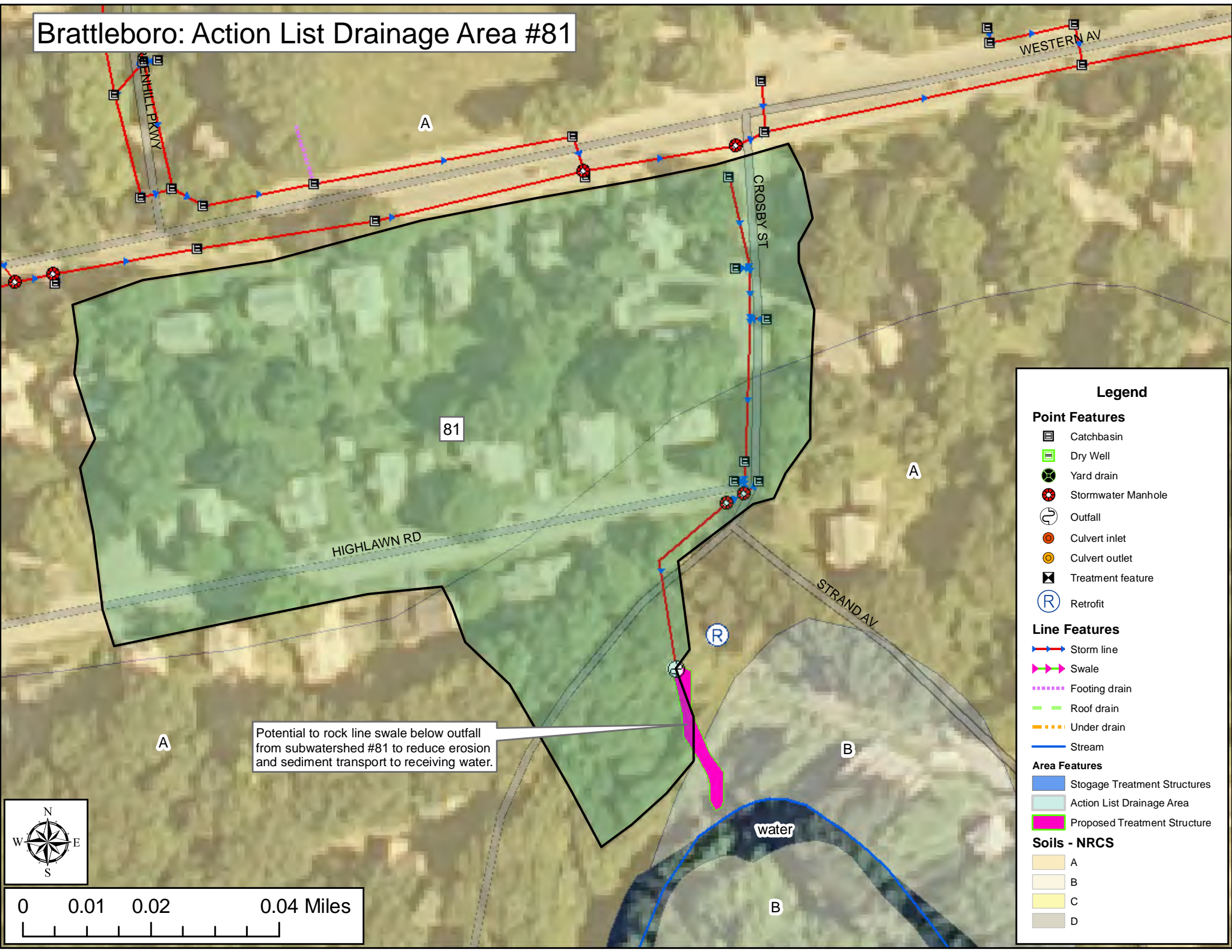
Area Features

- Storage Treatment Structures
- Action List Drainage Area
- Proposed Treatment Structure

Soils - NRCS

- A
- B
- C
- D

Brattleboro: Action List Drainage Area #81



Potential to rock line swale below outfall from subwatershed #81 to reduce erosion and sediment transport to receiving water.

Legend

Point Features

- Catchbasin
- Dry Well
- Yard drain
- Stormwater Manhole
- Outfall
- Culvert inlet
- Culvert outlet
- Treatment feature
- Retrofit

Line Features

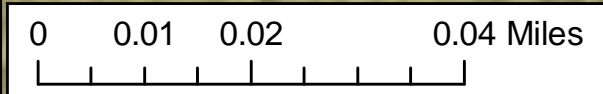
- Storm line
- Swale
- Footing drain
- Roof drain
- Under drain
- Stream

Area Features

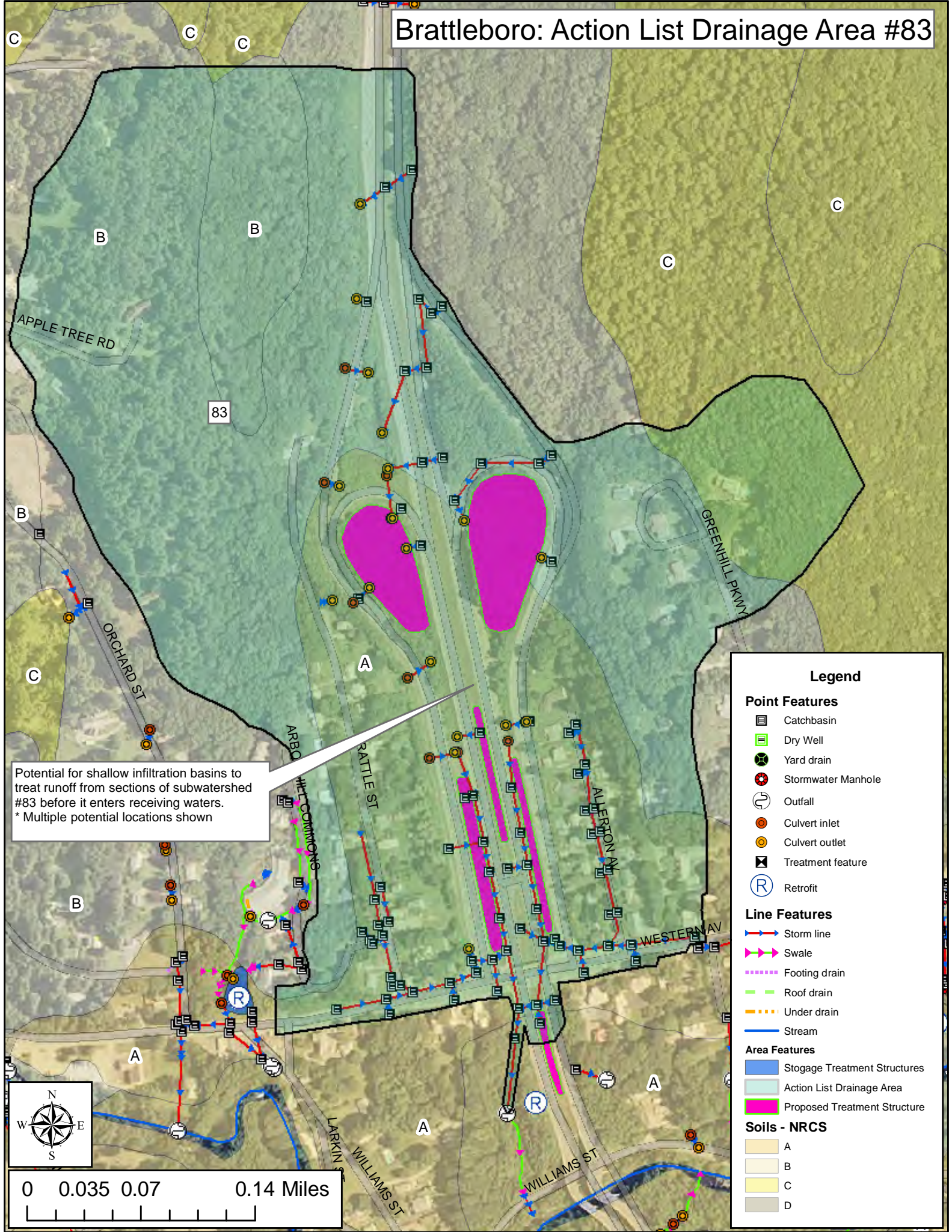
- Storage Treatment Structures
- Action List Drainage Area
- Proposed Treatment Structure

Soils - NRCS

- A
- B
- C
- D



Brattleboro: Action List Drainage Area #83



Potential for shallow infiltration basins to treat runoff from sections of subwatershed #83 before it enters receiving waters.
 * Multiple potential locations shown

Legend

Point Features

- Catchbasin
- Dry Well
- Yard drain
- Stormwater Manhole
- Outfall
- Culvert inlet
- Culvert outlet
- Treatment feature
- Retrofit

Line Features

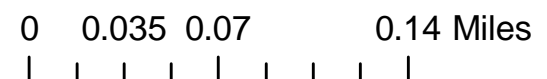
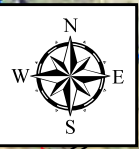
- Storm line
- Swale
- Footing drain
- Roof drain
- Under drain
- Stream

Area Features

- Storage Treatment Structures
- Action List Drainage Area
- Proposed Treatment Structure

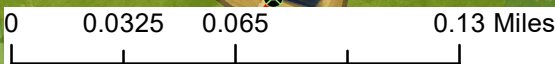
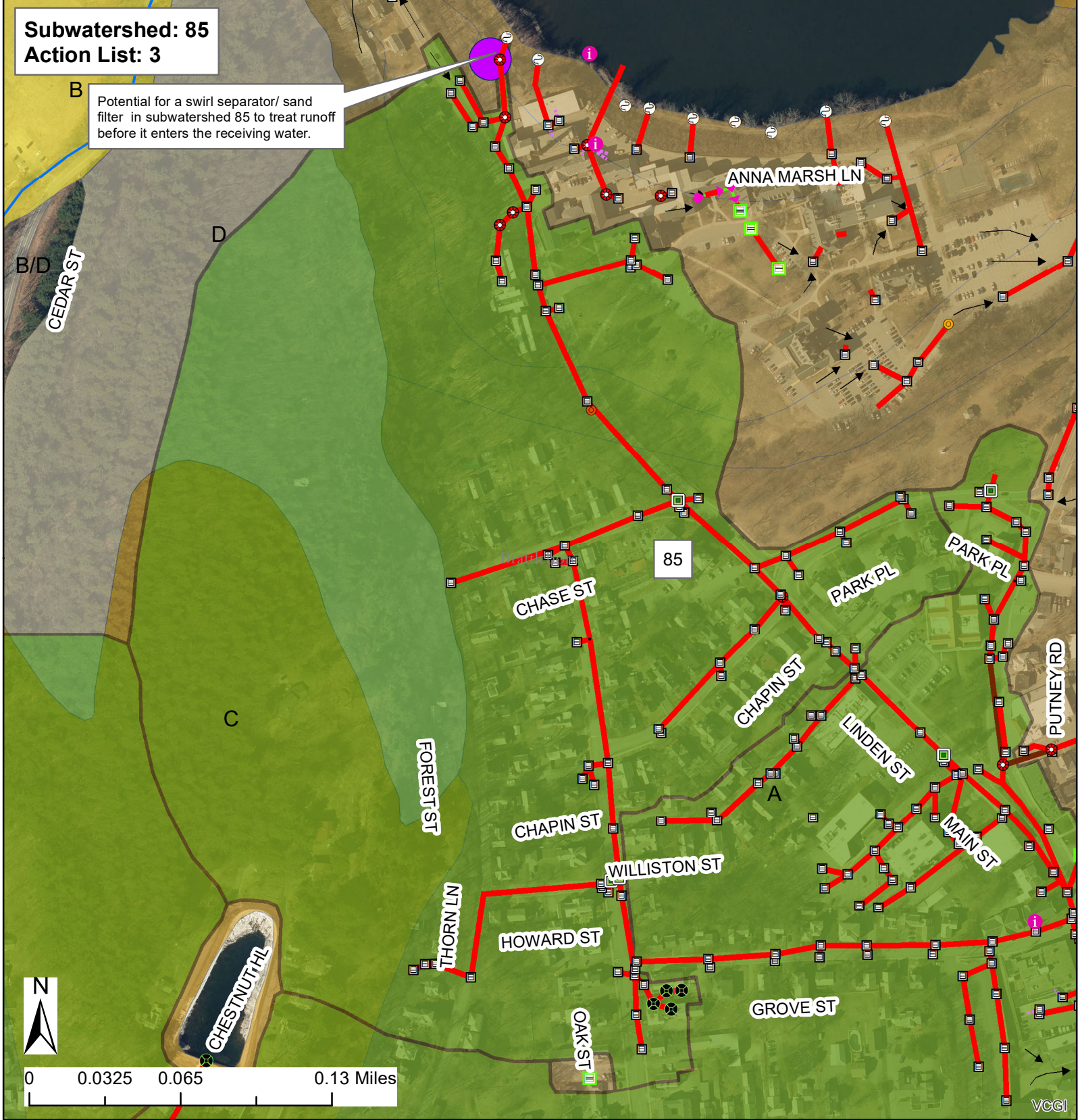
Soils - NRCS

- A
- B
- C
- D



Subwatershed: 85
Action List: 3

Potential for a swirl separator/ sand filter in subwatershed 85 to treat runoff before it enters the receiving water.

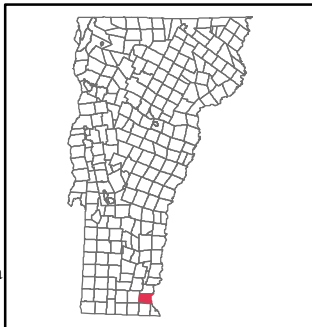


Brattleboro, VT

DEC Stormwater Infrastructure Mapping Project

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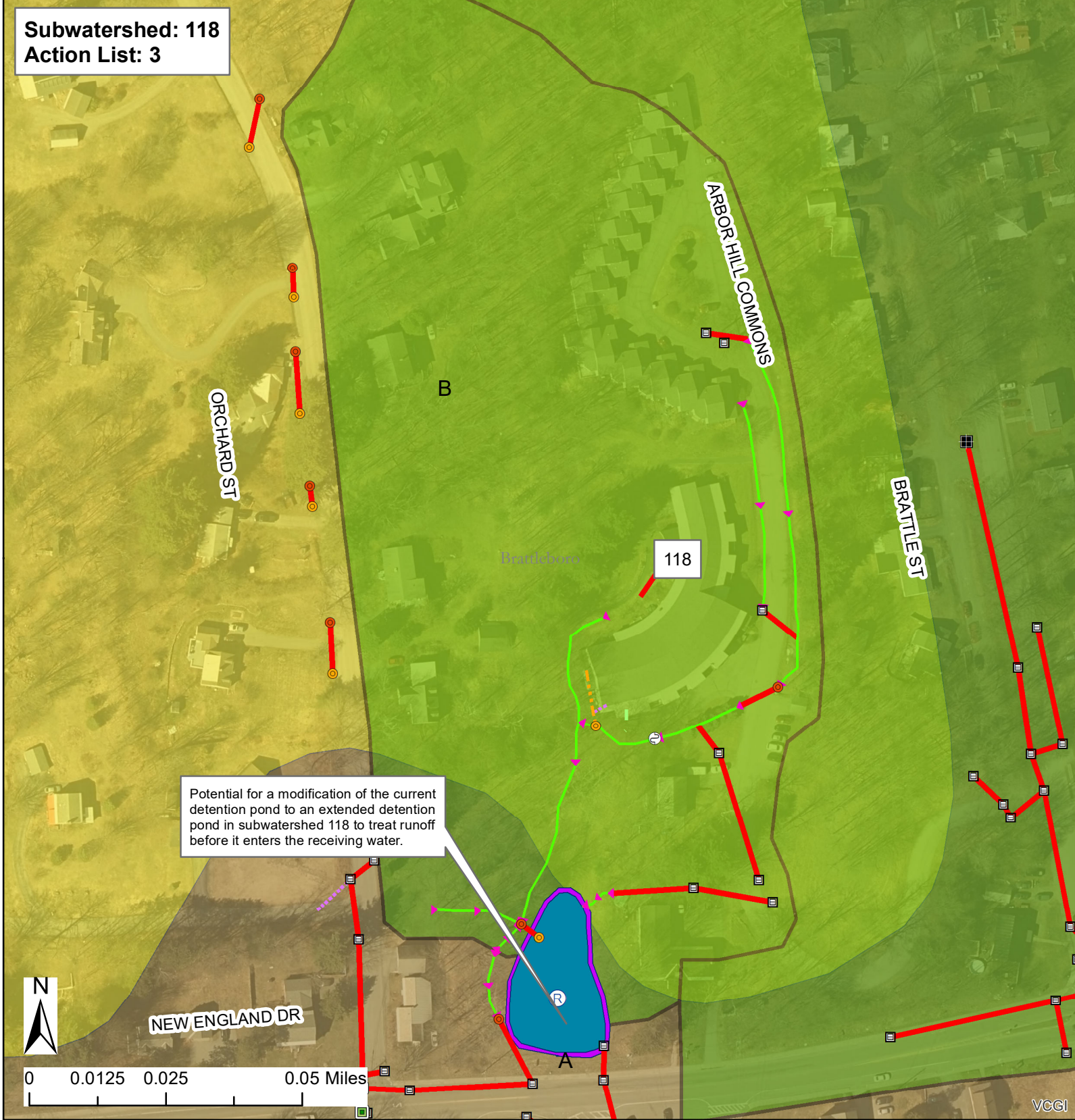


<p>Stormwater points</p> <ul style="list-style-type: none"> Pipe Cross (not connected) Catchbasin Dry Well Drop Inlet Grate/Curb Inlet Yard drain CB tied to sanitary sewer Junction Box Stormwater Manhole Outfall Culvert inlet Culvert outlet Control Structure Treatment feature (see notes) Retrofit Unknown Point Information Point 	<p>Stormwater line</p> <ul style="list-style-type: none"> Storm line Storm line (old Sanitary line) Tunnel (storm) Combined sewer Sanitary line Swale Footing drain Under drain Roof drain Infiltration pipe French drain Trench drain Emergency spillway Stream Overland flow 	<p>NRCS - Soils</p> <ul style="list-style-type: none"> A B C D 	<p>SubwatershedID</p> <ul style="list-style-type: none"> Priority Subwatershed Stormwater Treatment Area Potential Stormwater Treatment Area
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Creator: Jim Pease, David Ainley
 DEC - WID - Clean Water Initiative Program
 Plotted Date: 7/22/2022
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available Imagery



Subwatershed: 118
Action List: 3

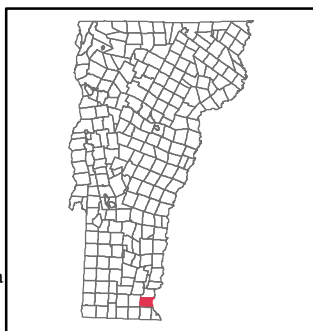


Brattleboro, VT

DEC Stormwater Infrastructure Mapping Project

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Stormwater points

- Pipe Cross (not connected)
- Catchbasin
- Dry Well
- Drop Inlet
- Grate/Curb Inlet
- Yard drain
- CB tied to sanitary sewer
- Junction Box
- Stormwater Manhole
- Outfall
- Culvert inlet
- Culvert outlet
- Control Structure
- Treatment feature (see notes)
- Retrofit
- Unknown Point
- Information Point

Stormwater line

- Storm line
- Storm line (old Sanitary line)
- Tunnel (storm)
- Combined sewer
- Sanitary line
- Swale
- Footing drain
- Under drain
- Roof drain
- Infiltration pipe
- French drain
- Trench drain
- Emergency spillway
- Stream
- Overland flow

NRCS - Soils

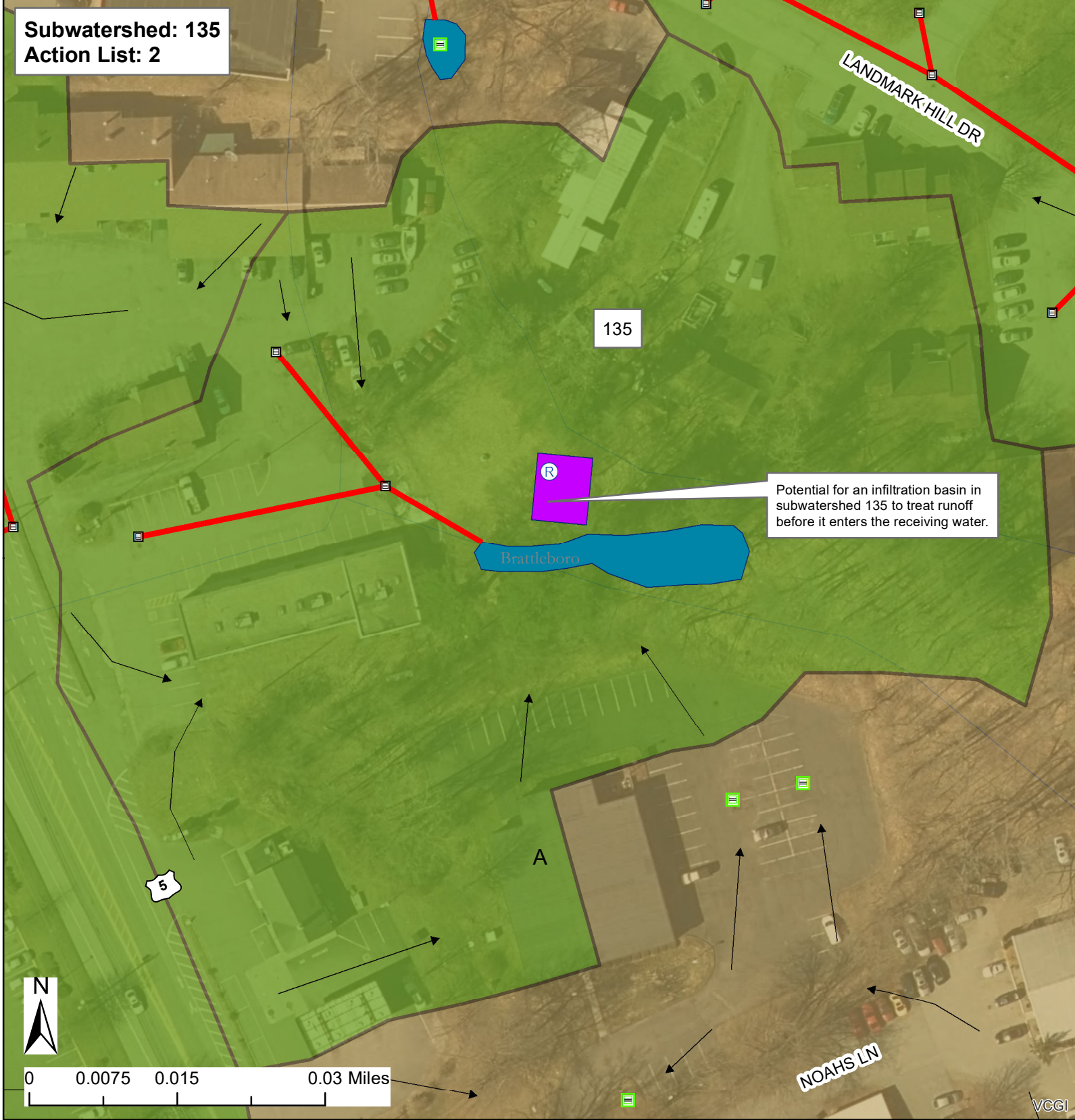
- A
- B
- C
- D

SubwatershedID

- Priority Subwatershed
- Stormwater Treatment Area
- Potential Stormwater Treatment Area

Creator: Jim Pease, David Ainley
 DEC - WID - Clean Water Initiative Program
 Plotted Date: 7/22/2022
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available Imagery

Subwatershed: 135
Action List: 2

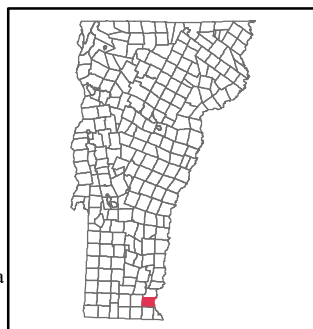


Brattleboro, VT

DEC Stormwater Infrastructure Mapping Project

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Stormwater points

- Pipe Cross (not connected)
- Catchbasin
- Dry Well
- Drop Inlet
- Grate/Curb Inlet
- Yard drain
- CB tied to sanitary sewer
- Junction Box
- Stormwater Manhole
- Outfall
- Culvert inlet
- Culvert outlet
- Control Structure
- Treatment feature (see notes)
- Retrofit
- Unknown Point
- Information Point

Stormwater line

- Storm line
- Storm line (old Sanitary line)
- Tunnel (storm)
- Combined sewer
- Sanitary line
- Swale
- Footing drain
- Under drain
- Roof drain
- Infiltration pipe
- French drain
- Trench drain
- Emergency spillway
- Stream
- Overland flow

NRCS - Soils

- A
- B
- C
- D

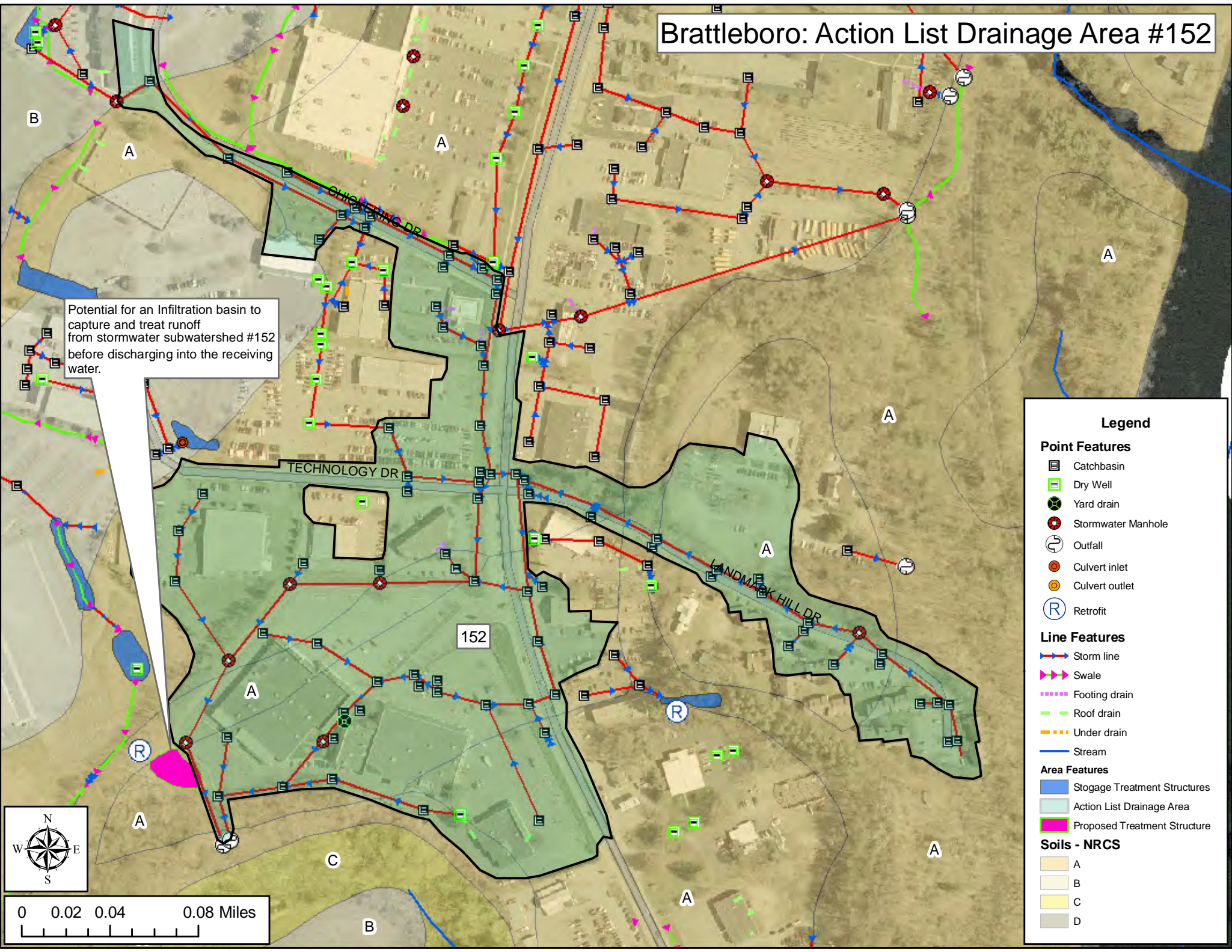
SubwatershedID

- Priority Subwatershed
- Stormwater Treatment Area
- Potential Stormwater Treatment Area

Creator: Jim Pease, David Ainley
DEC - WID - Clean Water Initiative Program
Plotted Date: 7/22/2022

Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
Imagery Source: VCGI Best Available Imagery

Brattleboro: Action List Drainage Area #152



Potential for an Infiltration basin to capture and treat runoff from stormwater subwatershed #152 before discharging into the receiving water.

Legend

Point Features

- Catchbasin
- Dry Well
- Yard drain
- Stormwater Manhole
- Outfall
- Culvert inlet
- Culvert outlet
- Retrofit

Line Features

- Storm line
- Swale
- Footing drain
- Roof drain
- Under drain
- Stream

Area Features

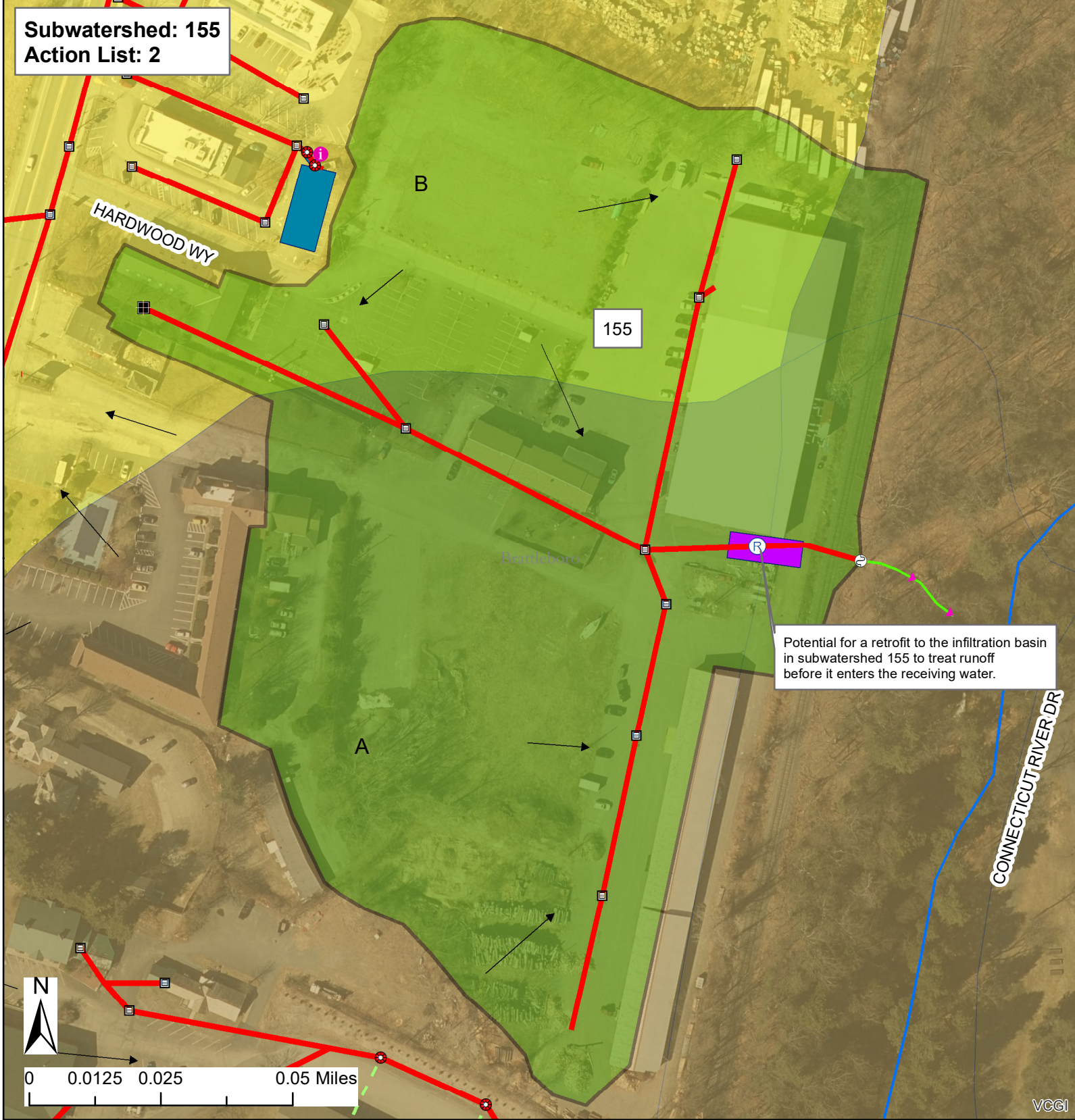
- Stogage Treatment Structures
- Action List Drainage Area
- Proposed Treatment Structure

Soils - NRCS

- A
- B
- C
- D

0 0.02 0.04 0.08 Miles

Subwatershed: 155
Action List: 2

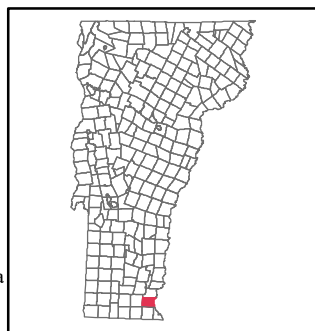


Brattleboro, VT

DEC Stormwater Infrastructure Mapping Project

This map shows high priority subwatersheds which are ranked by connectedness, percent of impervious cover, field observations, and potential retrofit measures and locations.

The data shown on this map is only as accurate as the available sources and field observations allowed and should be used as a basic planning level tool only.



Stormwater points

- Pipe Cross (not connected)
- Catchbasin
- Dry Well
- Drop Inlet
- Grate/Curb Inlet
- Yard drain
- CB tied to sanitary sewer
- Junction Box
- Stormwater Manhole
- Outfall
- Culvert inlet
- Culvert outlet
- Control Structure
- Treatment feature (see notes)
- Retrofit
- Unknown Point
- Information Point

Stormwater line

- Storm line
- Storm line (old Sanitary line)
- Tunnel (storm)
- Combined sewer
- Sanitary line
- Swale
- Footing drain
- Under drain
- Roof drain
- Infiltration pipe
- French drain
- Trench drain
- Emergency spillway
- Stream
- Overland flow

NRCS - Soils

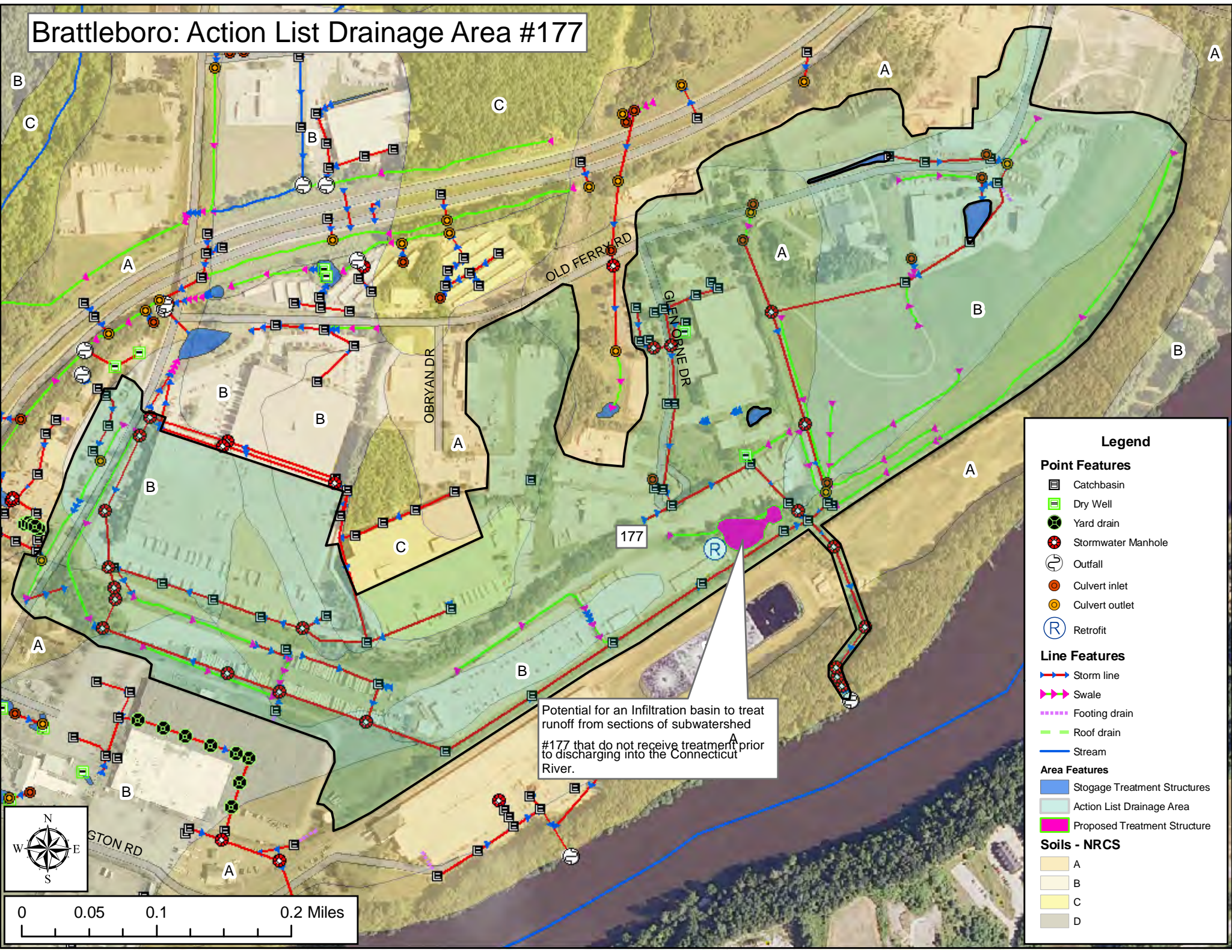
- A
- B
- C
- D

SubwatershedID

- Priority Subwatershed
- Stormwater Treatment Area
- Potential Stormwater Treatment Area

Creator: Jim Pease, David Ainley
 DEC - WID - Clean Water Initiative Program
 Plotted Date: 7/22/2022
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available Imagery

Brattleboro: Action List Drainage Area #177



Potential for an Infiltration basin to treat runoff from sections of subwatershed #177 that do not receive treatment prior to discharging into the Connecticut River.

Legend

Point Features

- Catchbasin
- Dry Well
- Yard drain
- Stormwater Manhole
- Outfall
- Culvert inlet
- Culvert outlet
- Retrofit

Line Features

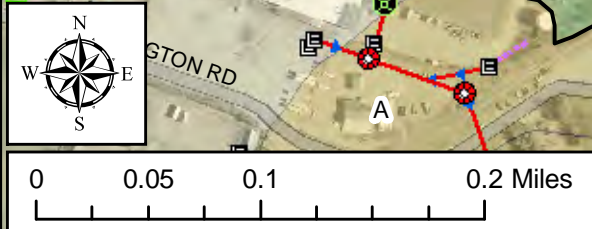
- Storm line
- Swale
- Footing drain
- Roof drain
- Stream

Area Features

- Stogage Treatment Structures
- Action List Drainage Area
- Proposed Treatment Structure

Soils - NRCS

- A
- B
- C
- D



Spill Control

and

***Vermont Hazardous Waste Management
Regulations***

Have a spill control plan for accidental spills at municipal facilities and on municipal streets

These stormwater infrastructure maps show the connectivity of the stormwater system for the municipality as accurately as it could be determined with the collected and existing data. In the event of a spill this can be a valuable tool for controlling spills and in spill response.

Towns should be equipped with suitable equipment to contain and clean up spills of hazardous materials. Accidental spills of materials can be sources of runoff pollution if not addressed appropriately. If possible Towns should be prepared to address spills on municipal streets while at the same time contacting the state Waste Management Division. DPW managers should be aware of all applicable requirements and should contact regulatory authorities if requirements are not known.

All spills should be cleaned up immediately after they occur. For municipal facilities the creation of a site specific spill control and response plan in combination with spill response training for designated on-site personnel can be effective in dealing with accidental spills and preventing the contamination of soil, water, and runoff. Preparation of a spill containment, control, and countermeasures (SPCC) plan might be required to meet regulatory requirements (e.g., requirements regarding storage of specified chemicals above certain volume thresholds).

Even if a formal plan is not required, preparing one is a good idea. In general, an SPCC plan should include guidance to site personnel on the following:

- Proper notification when a spill occurs;
- Site responsibility with respect to addressing the cleanup of a spill;
- Stopping the source of a spill;
- Cleaning up a spill;
- Proper disposal of materials contaminated by the spill;
- Location of spill response equipment programs; and
- Training for designated on-site personnel.

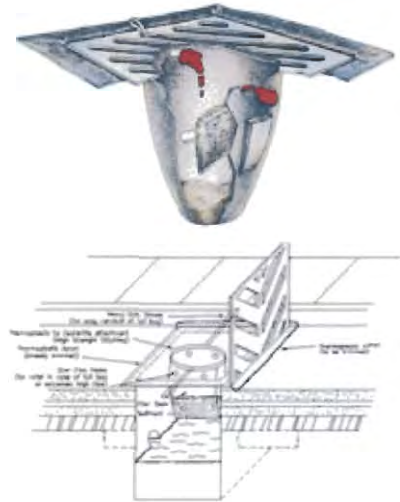
A periodic spill “fire drill” should be conducted to help prepare Town personnel in the event of a spill.

Spill Prevention and Response Measures

Catch Basin Inserts

Catch Basin Inserts (Drain Guards / Sediment Traps) protect our rivers and streams by capturing sediment, debris, oil and grease at storm water catch basins. Catch Basin Inserts are an economical and effective method to protect you from costly clean-up work.

The standard filter material is a non-woven geotextile with built-in overflow ports for cases of abnormally high water flow or over-filled filter bags. Catch Basin Inserts are available with a replaceable 5" x 15" oil absorbent boom that floats to absorb any oil, gas or diesel entering a storm water catch basin.



Urethane Drain Protector

Urethane Drain Protectors are positive sealing drain covers that ensure spills do not enter drains. Drain Protectors are environmentally safe and resistant to chemicals, solvents and hydrocarbons. After use, the Drain Protector can be washed and stored in its tube storage container.



Absorbent Socks

Absorbent socks are flexible tubes used to contain and clean-up spilled fluids. Socks are widely used in industrial applications and are ideal for Spill Kits. Fast spreading spills are quickly stopped with a sock.



Drums & Intermediate Bulk Containers (IBC's)

New and reconditioned steel drums are ideal for storing solid and liquid waste. Poly drums available for durable outdoor storage or for building your own spill kits. Steel and poly drums are available in both tight-head (TH) and full open-head styles (FOH).



Pads & Rolls

Absorbent pads and rolls made from polypropylene fibers are the most popular form of absorbents on the market. Various types of absorbent pads and rolls can be used for different liquids and site applications.

The most widely used absorbent pads and rolls are oil-only (white) and universal (grey). Pads and rolls are great for spills on water or land, easily absorbing 20 to 25 times their own weight in recovered liquid. Rolls can easily be cut to the exact size required.



Booms

Linkable Absorbent Booms

Absorbent booms are ideal for containing and cleaning up spills on water. Booms repel water and float even when completely saturated.

Absorbent booms are constructed with a strong mesh outer skin encasing non-linting and highly absorbent polypropylene filler. Linkable booms come complete with end rings and clips attached to nylon rope running the length of the boom.



Collection basins

Collection basins are permanent structures in which large spills or contaminated storm water is contained and stored before cleanup or treatment. Collection basins are designed to receive spills, leaks, etc., and to prevent pollutants from being released into the environment. Unlike containment dikes, collection basins can receive and contain materials from many locations across a facility.

Containment diking

Containment dikes are temporary or permanent earth or concrete berms or retaining walls that are designed to hold spills. Diking can be used at any industrial facility, but is most common for controlling large spills or releases from liquid storage and transfer areas. Diking can provide one of the best protective measures against the contamination of storm water because it surrounds the area of concern and keeps spilled materials separated from the storm water outside of the diked area.

Curbing

Similar to containment diking, a curb is a barrier that surrounds an area of concern. Unlike diking, curbing is unable to contain large spills and is usually implemented on a small-scale basis. However, curbing is common at many facilities and in small areas where liquids are handled and transferred.

Granular Absorbents

A variety of granular and powdered absorbents are available for the effective clean-up of spills on streets, construction sites and in repair shops. These products absorb spilled liquids of various kinds to greatly lower the viscosity, aiding in the clean-up of the spill.

Sorbents, Gels, and Foams

Sorbents are compounds that immobilize materials by surface absorption or adsorption in the sorbent bulk. Gelling agents interact with the spilled chemical(s) by concentrating and congealing to form a rigid or viscous material more conducive to a mechanical cleanup. Foams are mixtures of air and aqueous solutions of proteins and surfactant-based foaming agents. The primary purpose of foams is to reduce the vapor concentration above the spill surface, thereby controlling the rate of evaporation.

VERMONT HAZARDOUS WASTE MANAGEMENT REGULATIONS

§ 7-105 EMERGENCY AND CORRECTIVE ACTIONS

(a) Emergency actions

(1) In the event of a discharge of hazardous waste or a release of a hazardous material, the person in control of such waste or material shall:

(A) Take all appropriate immediate actions to protect human health and the environment including, but not limited to, emergency containment measures and notification as described below; and

(B) Take any further clean up actions as may be required and approved by federal, state, or local officials, or corrective actions as specified under **subsection (b)** of this section so that the discharged waste or released material and related contaminated materials no longer present a hazard to human health or the environment.

(2) Reporting

(A) All discharges and/or releases that meet any of the following criteria shall be immediately reported to the Secretary by the person or persons exercising control over such waste by calling the Waste Management Division at **(802) 241-3888**, Monday through Friday, 7:45 a.m. to 4:30 p.m. or the Department of Public Safety, Emergency Management Division at **(800) 641-5005**, 24 hours/day:

(i) A discharge of hazardous waste, or release of hazardous material that exceeds 2 gallons;

(ii) A discharge of hazardous waste, or release of hazardous material that is less than or equal to 2 gallons and poses a potential or actual threat to human health or the environment; or

(iii) A discharge of hazardous waste, or release of hazardous material that equals or exceeds its corresponding reportable quantity under CERCLA as specified under **40 CFR § 302.4**.

Note: Under the Federal Water Pollution Control Act, certain spills of “oil” and/or “hazardous substances” are prohibited and must be reported pursuant to the requirements of **40 CFR Part 110 / Discharge of Oil**. Certain spills of hazardous substances must also be reported pursuant to CERCLA. In both

VERMONT HAZARDOUS WASTE MANAGEMENT REGULATIONS

(B) A written report shall be submitted to the Secretary within ten (10) days following any discharge or release subject to **subsection (a)(1)** of this section. The report should be sent to: The Vermont Department of Environmental Conservation, Waste Management Division, 103 South Main Street, Waterbury, VT 05671-0404. The person responsible for submitting the written report may request that it not be submitted for small discharges and/or releases that were reported pursuant to subsection (a)(2)(A) of this section, and that have been entirely remediated within the ten (10) day period immediately following the discharge and/or release

(3) If the discharge or release occurred during transportation, the transporter shall, in addition to notifying the Secretary:

(A) Notify the National Response Center at (800) 424-8802 or (202) 426-2675, if required by **49 CFR § 171.15**; and

(B) Report in writing to the Director, Office of Hazardous Materials Regulations, Materials Transportation Bureau, Department of Transportation, Washington, D.C. 20590, if required by **49 CFR § 171.16**; and

(C) A water (bulk shipment) transporter who has discharged hazardous wastes must give the same notice as required by **33 CFR § 153.203** for oil and hazardous substances.

(4) If a discharge or release occurs and the Secretary determines that immediate removal of the waste is necessary to protect human health or the environment, the Secretary may authorize its removal by unpermitted transporters without the preparation of a manifest. Such hazardous waste may be transported to a site authorized by the Secretary under the provisions of **§ 7-503** to temporarily accept hazardous waste generated during an emergency cleanup of a discharge or release.

(5) In the case of an explosives or munitions emergency response, if a Federal, State, Tribal or local official acting within the scope of his or her official responsibilities, or an explosives or munitions emergency response specialist, determines that immediate removal of the material or waste is necessary to protect human health or the environment, that official or specialist may authorize the removal of the material or waste by transporters who do not have EPA identification numbers or hold Vermont hazardous waste transportation permits and without the preparation of a manifest. In the case of emergencies involving military munitions, the responding military emergency response specialist's organizational unit must retain records for three years identifying the dates of the response, the responsible persons responding, the type and description of material addressed, and its disposition.

VERMONT HAZARDOUS WASTE MANAGEMENT REGULATIONS

(6) All clean up debris and residues that are hazardous waste must be transported ultimately to either:

(A) A designated facility;

(B) A person authorized by the Secretary to use such waste if the waste has been delisted pursuant to § 7-218;

(C) Some other location specified and authorized by the Secretary to receive clean up debris and residues if the waste has been delisted pursuant to § 7-218; or

(D) For hazardous waste not defined as hazardous in 40 CFR Part 261 (i.e., waste regulated as hazardous by Vermont), to a facility, that is not a designated facility, located in a state other than Vermont provided the facility can receive such waste under applicable state and local laws, regulations and ordinances.

(b) Corrective actions

(1) If a discharge of hazardous waste, or a release of hazardous material has not been adequately addressed under **subsection (a)(1)(A)** of this section the Secretary may require that the person or persons responsible pursuant to **10 V.S.A. § 6615** complete the following:

(A) Engage the services of an environmental consultant experienced in the investigation and remediation of hazardous waste-contaminated sites; and

(B) Within thirty (30) days from either the date of the discharge/release or the date that the release was discovered if the date of discharge/release is not known, or within a period of time established by an alternative schedule approved by the Secretary, submit for approval by the Secretary a work plan for an investigation of the contaminated site (i.e., site investigation) prepared by the environmental consultant. The site investigation shall define the nature, degree and extent of the contamination; and shall assess potential impacts to human health and the environment (refer to the document titled: "Site Investigation Procedure" which is available from the Secretary upon request); and

(C) Perform the site investigation within either ninety (90) days of receiving written approval of the work plan by the Secretary, or a period of time established by an alternative schedule approved by the Secretary. A report detailing the findings of the site investigation shall be sent to the Secretary for review; and

(D) Within either thirty (30) days from the date of final acceptance of the site investigation report by the Secretary, or a period of time established by an alternative schedule approved by the Secretary, submit a corrective action plan prepared by the environmental consultant (refer to the document titled: "Corrective Action Guidance" which is available from the Secretary upon request); and

(E) Implement the corrective action plan within either ninety (90) days of receiving written approval of the plan by the Secretary, or a period of time established by an alternative schedule approved by the Secretary. The corrective action activity shall continue until the contamination is remediated to levels approved by the Secretary; and

(F) Submit to the Secretary all investigative, corrective action and monitoring reports, and all analytical results related to **subsections (b)(1)(C) through (E) of this section**, as they become available.

(2) A used or fired military munition is a waste and is potentially subject to corrective action authorities pursuant to **10 V.S.A. § 6615**, and the process described by **subsection (b)(1) of this section** if the munition lands off-range and is not promptly rendered safe or retrieved. Any imminent and substantial threats associated with any remaining material must be addressed. If remedial action is infeasible, the operator of the range must maintain a record of the event for as long as any threat remains. The record must include the type of munition and its location (to the extent the location is known).

§ 7-106 LAND DISPOSAL RESTRICTIONS

(a) Certain hazardous wastes shall not be disposed of in or on the land. **40 CFR Part 268**, which is hereby incorporated by reference, except for **40 CFR §§ 268.5, 268.6, and 268.42(b)**, identifies those wastes which shall not be land disposed and describes the limited circumstances under which an otherwise prohibited waste may continue to be land disposed. The authority for implementing the CFR sections not incorporated by reference remains with the EPA.

Note: A copy of 40 CFR Part 268 (the Land Disposal Restrictions rule), as incorporated by these regulations, is available from the Secretary upon request.

VERMONT HAZARDOUS WASTE MANAGEMENT REGULATIONS

(b) In addition to the prohibitions of **40 CFR Part 268**, the Secretary may restrict the land disposal of any hazardous waste in the State of Vermont:

- (1) Which may present an undue risk to human health or the environment, immediately or over a period of time; or
- (2) Which would be incompatible with the **groundwater protection rule and strategy** of chapter 12 of the environmental protection rules.

(c) Dilution of hazardous waste subject to the land disposal restrictions of **40 CFR Part 268** is prohibited pursuant to **40 CFR § 268.3**.

§ 7-107 ENFORCEMENT

(a) Information that the generation, transportation, treatment, storage or disposal of hazardous waste may present an actual or potential threat to human health or the environment, or is a violation of the 10 V.S.A. chapter 159, or these regulations, or any term or condition of certification, order, or assurance, may serve as grounds for an enforcement action by the Secretary, including, but not limited to:

(1) After notice and opportunity for hearing, issuing an order directing any person to take such steps as are necessary to:

- (A) Immediately cease and desist any operation or practice;
- (B) Correct or prevent environmental damage likely to result from any deficiency in operation or practice;
- (C) Suspend or revoke any certification and require temporary or permanent cessation of the operation of such facility;

(2) A request that the Attorney General or appropriate State's Attorney commence an action for injunctive relief, the imposition of penalties and fines provided in **10 V.S.A. § 6612** and other relief as may be appropriate.

(3) An order for reimbursement to any agency of federal, state, or local government from any person whose act caused governmental expenditures under **10 V.S.A § 1283**.

(4) All other powers of enforcement available to the Secretary through **10 V.S.A., chapter 201**.

VERMONT HAZARDOUS WASTE MANAGEMENT REGULATIONS

(b) The hearing by the Secretary identified under **subsection (a)(1)** of this section shall be conducted as a contested case. Pursuant to **10 V.S.A. § 6610(b)**, the Secretary may issue an emergency order without a prior hearing when an ongoing violation presents an immediate threat of substantial harm to the environment or an immediate threat to public health. An emergency order shall be effective upon actual notice to the person against whom the order is issued. Any person to whom an emergency order is issued shall be given the opportunity for a hearing within five (5) business days of the date the order is issued.

(c) Inspections, investigations, and property access (**10 V.S.A. § 8005**)

(1) Inspections and investigations

(A) An investigator may perform routine inspections to determine compliance.

(B) An investigator may investigate upon receipt or discovery of information that an activity is being or has been conducted that may constitute or cause a violation.

(C) An investigator, upon presentation of credentials, may seek permission to inspect or investigate any portion of the property, fixtures, or other appurtenances belonging to or used by a person whose activity is required to be in compliance. The investigator shall state the purpose of the inspection or investigation. An inspection or investigation may include monitoring, sampling, testing, and copying of any records, reports, or other documents relating to the purposes to be served by compliance.

(D) If permission for an inspection or investigation is refused, the investigator may seek an access order from the district or superior court in whose jurisdiction the property is located enabling the investigator to perform the inspection or investigation.

(2) Access orders

(A) If access has been refused, an access order may be sought pursuant to either **10 V.S.A. § 8005** or **10 V.S.A. § 6609**.

(B) Issuance of an access order shall not negate the Secretary's authority to initiate criminal proceedings in the same matter by referring the matter to the office of the attorney general or a state's attorney.

VERMONT HAZARDOUS WASTE MANAGEMENT REGULATIONS

(d) In an action to enforce these regulations, anyone raising a claim that a certain material is not a hazardous waste, or is exempt from regulation as hazardous waste, must demonstrate that there is a known market or disposition for the material, and that they meet the terms of the exclusion or exemption. Appropriate documentation (such as contracts showing that a second person uses the material as an ingredient in a production process) to demonstrate that the material is not a waste, or is exempt from regulation, must be provided. Owners and operators of facilities claiming that they are actually recycling materials must show that they have the necessary equipment to do so.