

Town and Village of Manchester

Stormwater Infrastructure Mapping Project

November 2018



***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). 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-excel spread sheet template 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:

1. Using the provided maps and/or data as a guide confirm that the road draining to this outfall is paved, has at least two catch basins or drop inlets, and the discharge pipe from those catchbasins is directly discharging to waters of the state. Include any outfall from these road segments that discharges within 500 linear feet of surface waters.
2. 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.
3. 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

Field Sheet (use form C only):

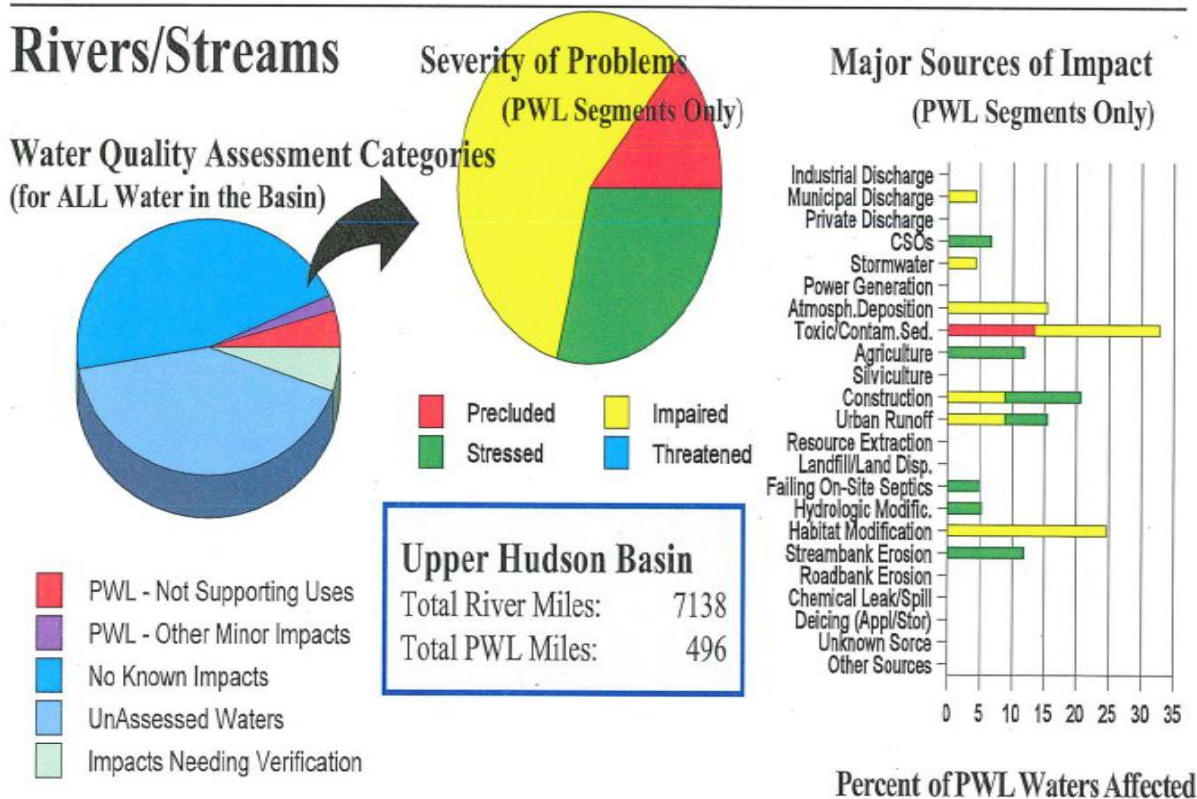
http://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/Permitinformation/MunicipalRoads/sw_MRGP_RoadErosionInventory.pdf

i-phone application: Please contact Ryan Knox at Ryan.Knox@vermont.gov

Hudson River Watershed Overview

Stormwater runoff management is a major priority within the Hudson River Basin because of the chronic nutrient enrichment condition in the Hudson River, which is a high priority for restoration and water quality attainment by the State of New York. While a majority of the urbanized areas in the Basin exist in New York (including the communities of Glens Falls and Queensbury), there are urban areas and rural road networks within the Vermont portion of the basin that contribute stormwater runoff. Unmitigated runoff results in channel erosion, land erosion, nutrient loading, and even thermal stress.

Given the history of stormwater issues in other Vermont watersheds (Winooski and Otter Creek); it is prudent that the issue be addressed pro-actively. Many of the stormwater issues associated with developed lands can be mitigated and prevented using Low Impact Development (LID) and Green Infrastructure (GI) systems and practices. These emerging concepts strive to manage stormwater and pollutants by restoring and maintaining the natural hydrology of a watershed. Rather than funneling stormwater off site through pipes and infrastructure, these systems focus on infiltration, evapotranspiration, and storage as close to the source as possible. Typical practices include green roofs, rain gardens, cisterns, porous pavements, infiltration planters, buffer zones, and sustainable site design.



Priority Waters List (PWL) Information Source: http://www.dec.ny.gov/docs/water_pdf/pwluhdasmt.pdf

Subwatershed Data

*Tables showing calculations and
Priority drainage area retrofit possibilities*

This is a key showing the abbreviations of the different funding programs listed in the calculation sheets.

Abbreviation Key	
Code	Funding Program
BR	Better Roads-VTrans
ERP/CWIP	VTDEC Clean Water Initiative Program
LCBP	Lake Champlain Basin Program
LISF	Long Island Sound Futures Fund
SRF	Clean Water State Revolving Loan Fund
VTrans	Vermont Agency of Transportation Alternatives or Municipal Highway and Stormwater Mitigation Programs

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
BRA	Bioretention Area or Raingarden
BS	Buffer Strip (25' Min.)
CB	Catch Basin
CBI	Catch Basin Insert
CD	Check Dam
CR or ESRD	Impervious Disconnection Credits
DP/DS	Dry Pond or Dry Swale
DW	Drywell
EDP (EDPMP)	Extended Detention Pond (with Micropool)
GS	Grass Swale
IB/IG	Infiltration Basin or Infiltration Gallery
MOD	Modifications/upgrade to 2017 SW Standards
OF	Overland Flow
OGF	Organic Filter
PA/PC/PV	Pervious Asphalt or Pervious Concrete or Pervious Pavers
POP	Pocket Pond
PP	Perforated Pipe or Underdrain
PS	Pump Station
RDD	Roof Drain Disconnect
RR/RS	Rock Riprap or Rock Swale
SB	Sedimentation Basin
SF	Sand Filter (aka Surface Sand Filter)
SS or VS	Swirl Separator
SWPPP	Stormwater Pollution Prevention Plan
TT	Treatment Tank
WL/WP/WS	Wetland (Constructed) or Wet Pond or Wet Swale (aka Bioswale)

Manchester - 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.)
1 Manchester			CB/GS		18.7	11.9	2155	2155	17.96	17.96
2 Manchester			CB/GS		20.7	22.1	5416	5416	45.13	45.13
3 Manchester			CB/GS		25.0	7.0	2213	2213	18.44	18.44
4 Manchester			GS/OF		66.1	9.2	6582	6582	54.85	54.85
5 Manchester			GS/OF		37.2	8.0	3468	3468	28.90	28.90
6 Manchester			CB/GS/OF		61.8	13.2	7636	7636	63.63	63.63
7 Manchester			CB/OF		20.7	15.0	3906	3906	32.55	32.55
8 Manchester			CB		3.9	21.3	1001	1001	8.34	8.34
9 Manchester			OF/GS		73.1	18.1	11544	11544	96.20	96.20
10 Manchester			OF/GS		192.4	4.5	14953	14953	124.61	124.61
11 Manchester			OF/GS		32.6	2.6	2318	2318	19.32	19.32
12 Manchester			OF/GS		31.9	11.6	3617	3617	30.14	30.14
13 Manchester			OF		20.1	12.2	2354	2354	19.62	19.62
14 Manchester			OF/GS/WP/CB	3787-9010	11.7	23.5	984	984	12.29	12.29
15 Manchester			CB/OF/GS		15.0	12.1	1749	1749	14.58	14.58
16 Manchester	1	Infiltration basin near Old Peru Rd intersection	IB/GS/OF/WP		187.7	1.1	12714	5086	105.95	52.97
17 Manchester			OF/GS		15.4	4.9	1223	1223	10.20	10.20
18 Manchester			OF/GS		32.6	4.0	2472	2472	20.60	20.60
19 Manchester			OF/GS		47.4	2.8	3404	3404	28.37	28.37
20 Manchester			OF/GS		3.6	6.9	316	316	2.63	2.63
21 Manchester			CB/GS		3.2	18.6	725	725	6.04	6.04
22 Manchester			GS/OF		7.0	7.2	626	626	5.22	5.22
23 Manchester			OF		26.5	3.1	1929	1929	16.08	16.08
24 Manchester			OF/GS		12.7	14.2	1647	1647	13.72	13.72
25 Manchester			OF		18.3	8.4	1742	1742	14.51	14.51
26 Manchester			OF/GS/CB		164.2	9.8	16877	16877	140.64	140.64
27 Manchester	1	Infiltration basin in Rte 7 exit ramp	IB/CB/GS		96.8	20.6	23890	2389	199.09	19.91
28 Manchester			CB/GS/WP		9.5	16.9	237	237	5.94	5.94
29 Manchester			CB/GS		9.7	25.9	2935	2935	24.46	24.46
30 Manchester			OF		4.6	27.3	1098	1098	9.15	9.15
31 Manchester			OF		30.5	18.6	4947	4947	41.23	41.23
32 Manchester			CB/GS/OF		36.0	16.6	5300	5300	44.16	44.16
33 Manchester			DW/GS/OF/IB	5343-9010	32.0	22.1	4253	4253	35.44	35.44
34 Manchester			CB/GS	5343-9010	45.9	11.8	3691	3691	30.76	30.76

Manchester - Subwatershed Prioritization and Recommendations									
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 Nitrogen or Phosphorus Removal Per Pound (based on annual nutrient load)	Assistance Program	# LID-Roof Raingardens to Treat Water Quality Volume	Raingarden Cost
1 Manchester	0.12	FALSE					CWIP,SRF	61	\$28,042
2 Manchester	0.31	FALSE					CWIP,SRF	153	\$70,476
3 Manchester	0.13	FALSE					CWIP,SRF	63	\$28,800
4 Manchester	0.37	0.67					CWIP,SRF	186	\$85,657
5 Manchester	0.20	0.33					CWIP,SRF	98	\$45,127
6 Manchester	0.43	FALSE					CWIP,SRF	216	\$99,361
7 Manchester	0.22	FALSE					CWIP,SRF	110	\$50,827
8 Manchester	0.06	FALSE					CWIP,SRF	28	\$13,027
9 Manchester	0.65	1.45					CWIP,SRF	327	\$150,218
10 Manchester	0.85	0.96					CWIP,SRF	423	\$194,587
11 Manchester	0.13	0.09					CWIP,SRF	66	\$30,162
12 Manchester	0.20	FALSE					CWIP,SRF	102	\$47,067
13 Manchester	0.13	0.27					CWIP,SRF	67	\$30,634
14 Manchester	0.11	0.30					CWIP,SRF	56	\$25,599
15 Manchester	0.10	0.20					CWIP,SRF	49	\$22,761
16 Manchester	0.72	0.24		\$40,000	\$5	\$755	CWIP,SRF	360	\$165,443
17 Manchester	0.07	0.08					CWIP,SRF	35	\$15,920
18 Manchester	0.14	0.14					CWIP,SRF	70	\$32,171
19 Manchester	0.19	0.15					CWIP,SRF	96	\$44,294
20 Manchester	0.02	0.03					CWIP,SRF	9	\$4,109
21 Manchester	0.04	0.07					CWIP,SRF	21	\$9,436
22 Manchester	0.04	0.06					CWIP,SRF	18	\$8,145
23 Manchester	0.11	0.09					CWIP,SRF	55	\$25,103
24 Manchester	0.09	0.20					CWIP,SRF	47	\$21,430
25 Manchester	0.10	0.17					CWIP,SRF	49	\$22,666
26 Manchester	0.95	FALSE					CWIP,SRF	477	\$219,616
27 Manchester	1.35	FALSE	\$1,236,464		\$58	\$6,901	CWIP,SRF	676	\$310,882
28 Manchester	0.07	FALSE					CWIP,SRF	34	\$15,448
29 Manchester	0.17	FALSE					CWIP,SRF	83	\$38,191
30 Manchester	0.06	FALSE					CWIP,SRF	31	\$14,283
31 Manchester	0.28	FALSE					CWIP,SRF	140	\$64,376
32 Manchester	0.30	FALSE					CWIP,SRF	150	\$68,963
33 Manchester	0.34	FALSE					CWIP,SRF	172	\$79,068
34 Manchester	0.30	FALSE					CWIP,SRF	149	\$68,621

Manchester - 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.)
35 Manchester			CB		4.9	29.4	1262	1262	10.52	10.52
36 Manchester			DW/CB		6.2	43.7	2851	2851	23.76	23.76
37 Manchester	2	Infiltration basin on lower Lincoln Ave	IB/IB/CB/GS		20.6	27.4	2253	1239	18.78	10.33
38 Manchester			IB/CB/GS	5558-9010	4.5	59.9	221	221	1.84	1.84
39 Manchester			CB/GS		3.6	19.4	609	609	5.07	5.07
40 Manchester			CB/GS/IB	3459-9010	150.1	12.9	7740	7740	64.50	64.50
41 Manchester			CB/GS/OF		132.6	9.8	13652	13652	113.76	113.76
42 Manchester			CB/GS/OF	3193-9010	85.1	13.8	6518	6518	72.42	72.42
43 Manchester			CB/OF		130.4	3.3	9592	9592	79.94	79.94
44 Manchester			DW/GS		14.2	21.8	2131	2131	17.76	17.76
45 Manchester			CB/SB/GS		16.6	19.1	2212	2212	18.44	18.44
46 Manchester			CB/GS/DW		25.9	8.3	1970	1970	16.42	16.42
47 Manchester			GS/OF		12.5	9.3	1248	1248	10.40	10.40
48 Manchester			CB/GS		9.5	10.9	1036	1036	8.64	8.64
49 Manchester			CB/GS/WP		120.1	8.2	11332	11332	94.43	94.43
50 Manchester			CB/GS		9.6	7.1	847	847	7.06	7.06
51 Manchester			GS/CB		18.4	8.8	1800	1800	15.00	15.00
52 Manchester			CB/WP		12.2	9.6	645	645	7.17	7.17
53 Manchester	2	Gravel Wetland at corner of Taconic Rd and Rte 7	GW/CB		86.4	11.3	13331	2666	111.09	44.44
54 Manchester	3	Extended Detention Pond for school parking lot on W Union St	EDP/CB/GS		11.8	19.8	2017	403	16.81	10.09
55 Manchester			EDP(2)/CB/GS	5995-9010	27.6	30.4	975	975	24.37	24.37
56 Manchester	1	Gravel Wetland or Bioretention for 143 Seminary Rd parking lot	GW/CB/GS/WP		125.2	11.9	26053	20843	217.11	195.40
57 Manchester			BRA/GS/WP	3559-9010	33.0	9.0	1004	1004	14.65	14.65
58 Manchester			GS/OF		8.2	5.8	683	683	5.69	5.69
59 Manchester			GS/CB/OF		8.4	15.5	1164	1164	9.70	9.70
60 Manchester			GS/WP		43.1	2.2	1174	1174	17.12	17.12
61 Manchester			GS/WP	3559-9010	463.7	0.4	12312	12312	179.54	179.54
62 Manchester			CB/OF/GS		122.5	2.0	8522	8522	71.02	71.02
63 Manchester			CB/GS/WP		411.4	3.0	11425	11425	166.61	166.61

Manchester - Subwatershed Prioritization and Recommendations									
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 Nitrogen or Phosphorus Removal Per Pound (based on annual nutrient load)	Assistance Program	# LID-Roof Raingardens to Treat Water Quality Volume	Raingarden Cost
35 Manchester	0.07	FALSE					CWIP,SRF	36	\$16,424
36 Manchester	0.18	FALSE					CWIP,SRF	90	\$41,222
37 Manchester	0.23	FALSE		\$50,000	\$49	\$5,918	CWIP,SRF	116	\$53,306
38 Manchester	0.12	FALSE					CWIP,SRF	62	\$28,722
39 Manchester	0.03	FALSE					CWIP,SRF	17	\$7,924
40 Manchester	0.88	FALSE					CWIP,SRF	438	\$201,450
41 Manchester	0.77	FALSE					CWIP,SRF	386	\$177,646
42 Manchester	0.61	FALSE					CWIP,SRF	307	\$141,367
43 Manchester	0.54	FALSE					CWIP,SRF	271	\$124,822
44 Manchester	0.15	FALSE					CWIP,SRF	75	\$34,667
45 Manchester	0.16	FALSE					CWIP,SRF	78	\$35,986
46 Manchester	0.14	FALSE					CWIP,SRF	70	\$32,049
47 Manchester	0.07	FALSE					CWIP,SRF	35	\$16,242
48 Manchester	0.06	FALSE					CWIP,SRF	29	\$13,484
49 Manchester	0.64	FALSE					CWIP,SRF	321	\$147,460
50 Manchester	0.05	FALSE					CWIP,SRF	24	\$11,025
51 Manchester	0.10	0.18					CWIP,SRF	51	\$23,422
52 Manchester	0.06	0.13					CWIP,SRF	30	\$13,989
53 Manchester	0.75	1.08	\$496,094				CWIP,SRF	377	\$173,472
54 Manchester	0.11	0.26	\$34,798		\$22	\$5,176	CWIP,SRF	57	\$26,248
55 Manchester	0.28	0.92					CWIP,SRF	138	\$63,433
56 Manchester	1.47	1.64		\$30,000	\$6	\$1,382	CWIP,SRF	737	\$339,027
57 Manchester	0.14	0.33					CWIP,SRF	71	\$32,674
58 Manchester	0.04	0.05					CWIP,SRF	19	\$8,882
59 Manchester	0.07	0.14					CWIP,SRF	33	\$15,142
60 Manchester	0.17	0.10					CWIP,SRF	83	\$38,192
61 Manchester	1.74	0.21					CWIP,SRF	871	\$400,521
62 Manchester	0.48	0.27					CWIP,SRF	241	\$110,899
63 Manchester	1.62	1.37					CWIP,SRF	808	\$371,680

Manchester - 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.)
64 Manchester	3	Extended Detention pond behind 3962 Main	EDP/PP		5.9	71.0	3251	1463	27.09	23.03
65 Manchester			CB		0.4	66.7	361	361	3.01	3.01
66 Manchester			OF/GS/CB		21.3	16.4	3100	3100	25.83	25.83
67 Manchester			OF		114.9	8.4	10964	10964	91.36	91.36
68 Manchester			CB/GS		2.3	31.9	634	634	5.28	5.28
69 Manchester			GS/CB/WP/SWPPP	3040-9010, 3040-9003	2.3	41.0	123	123	3.07	3.07
70 Manchester			CB/WP/GS/SWPPP	3040-9010, 3040-9003	6.5	46.5	422	422	10.55	10.55
71 Manchester			CB/IB		18.9	9.7	587	587	4.89	4.89
72 Manchester			GS/WP	3273-9010	278.6	1.9	11324	11324	125.82	125.82
73 Manchester			GS/OF/WP		153.4	9.3	9234	9234	102.60	102.60
74 Manchester			GS/CB		16.9	10.5	1800	1800	15.00	15.00
75 Manchester			GS/WP/OF/CB/CF	5703-9015, 3278-INDS	66.1	10.0	1033	1033	25.83	25.83
76 Manchester	3	Raingarden in Main St-Ways Ln traffic island	BRA/CB/GS		6.7	33.1	1970	1576	16.42	13.14
77 Manchester			GS/DW		14.6	10.8	952	952	7.93	7.93
78 Manchester			DW	3278-INDS	2.4	68.5	746	746	6.22	6.22
79 Manchester	3	Infiltration basin on backside of shopping plaza or in front of 65 The Fields Rd	IB/CB/DW/GS		3.2	73.3	2474	247	20.62	2.06
80 Manchester			CB		1.0	55.7	649	649	5.41	5.41
81 Manchester			CB/IB/GS	7219-9015	25.6	22.1	320	320	2.67	2.67
82 Manchester			CB/OF		62.3	9.5	6300	6300	52.50	52.50
83 Manchester			CB/GS/OF/WP		24.2	14.2	3152	3152	26.27	26.27
84 Manchester			OF/GS/DW		17.7	38.8	4393	4393	36.61	36.61
85 Manchester			CB/GS		19.4	11.2	2160	2160	18.00	18.00
86 Manchester			CB/GS		2.0	52.2	1036	1036	8.63	8.63
87 Manchester			CB/GS		1.3	37.3	426	426	3.55	3.55
88 Manchester			EDP/CB/GS		10.5	26.9	823	823	12.01	12.01
89 Manchester			CB		9.1	8.8	884	884	7.37	7.37
90 Manchester			CB/GS		17.4	22.9	2409	2409	24.38	24.38
91 Manchester			CB/GS	3674-9010	4.0	22.8	650	650	5.41	5.41
92 Manchester			CB		4.0	59.4	2847	2847	23.73	23.73

Manchester - Subwatershed Prioritization and Recommendations									
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 Nitrogen or Phosphorus Removal Per Pound (based on annual nutrient load)	Assistance Program	# LID-Roof Raingardens to Treat Water Quality Volume	Raingarden Cost
64 Manchester	0.25	0.46	\$74,774		\$42	\$18,402	CWIP,SRF	123	\$56,401
65 Manchester	0.02	0.03					CWIP,SRF	10	\$4,700
66 Manchester	0.18	0.38					CWIP,SRF	88	\$40,339
67 Manchester	0.62	1.06					CWIP,SRF	310	\$142,667
68 Manchester	0.04	0.08					CWIP,SRF	18	\$8,253
69 Manchester	0.03	0.10					CWIP,SRF	17	\$7,998
70 Manchester	0.12	0.33					CWIP,SRF	60	\$27,463
71 Manchester	0.08	0.20					CWIP,SRF	42	\$19,093
72 Manchester	1.07	0.59					CWIP,SRF	534	\$245,598
73 Manchester	0.87	1.58					CWIP,SRF	435	\$200,266
74 Manchester	0.10	0.19					CWIP,SRF	51	\$23,422
75 Manchester	0.29	0.73					CWIP,SRF	146	\$67,237
76 Manchester	0.11	0.24		\$10,000	\$25	\$3,045	CWIP,SRF	56	\$25,639
77 Manchester	0.09	0.17					CWIP,SRF	45	\$20,645
78 Manchester	0.08	0.18					CWIP,SRF	42	\$19,423
79 Manchester	0.14	0.26	\$128,060		\$58	\$6,901	CWIP,SRF	70	\$32,198
80 Manchester	0.04	0.06					CWIP,SRF	18	\$8,450
81 Manchester	0.18	0.62					CWIP,SRF	90	\$41,618
82 Manchester	0.36	0.65					CWIP,SRF	178	\$81,977
83 Manchester	0.18	FALSE					CWIP,SRF	89	\$41,017
84 Manchester	0.36	FALSE					CWIP,SRF	178	\$81,664
85 Manchester	0.12	FALSE					CWIP,SRF	61	\$28,103
86 Manchester	0.06	FALSE					CWIP,SRF	29	\$13,477
87 Manchester	0.02	FALSE					CWIP,SRF	12	\$5,542
88 Manchester	0.12	FALSE					CWIP,SRF	58	\$26,789
89 Manchester	0.05	FALSE					CWIP,SRF	25	\$11,505
90 Manchester	0.19	0.44					CWIP,SRF	97	\$44,781
91 Manchester	0.04	FALSE					CWIP,SRF	18	\$8,452
92 Manchester	0.16	0.26					CWIP,SRF	81	\$37,053

Manchester - 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.)
93 Manchester			CB/GS/VF/SF	4911-9010.1	3.0	33.7	419	419	3.49	3.49
94 Manchester	2	Infiltration basin on east side of property	IB/OF	4911-9010.1	3.2	52.4	1635	163	13.62	1.36
95 Manchester			OF	4911-9010.1	1.4	81.2	1299	1299	10.83	10.83
96 Manchester			CB/GS	3674-9010	3.3	54.2	2112	2112	17.60	17.60
97 Manchester			CB/OF		8.9	15.7	1252	1252	10.43	10.43
98 Manchester	1	Infiltration basin on northeast side of 4674 Main St	IB/DW	3275-9010, 4911-9010.1	6.6	75.6	6099	4880	50.83	40.66
99 Manchester			CB/URB/GS	4911-9010.2	1.8	47.9	119	119	2.98	2.98
100 Manchester			EDMP/CB/GS	7329-INDS	4.5	33.2	1751	1751	14.59	14.59
101 Manchester			CB		2.9	81.4	2933	2933	24.44	24.44
102 Manchester			CB/GS	7329-INDS	3.8	32.7	1457	1457	12.14	12.14
103 Manchester			CB	4288-9010	1.2	76.4	1149	1149	9.57	9.57
104 Manchester			CB	7329_INDS	1.6	87.4	1775	1775	14.79	14.79
105 Manchester			OF		3.5	47.6	1963	1963	16.36	16.36
106 Manchester			CB/DW		3.8	66.0	1518	1518	12.65	12.65
107 Manchester			DW		0.5	76.4	242	242	2.01	2.01
108 Manchester			CB		3.2	68.7	2684	2684	22.36	22.36
109 Manchester			CB		0.6	61.9	413	413	3.44	3.44
110 Manchester	2	Swirl separator or sand filter in island in front of 590 Depot St	VS-SF/DW/CB/GS/SWPPP	5025-9003	71.6	29.0	12676	5070	105.63	42.25
111 Manchester			OF			8.1	43.1	4079	4079	33.99
112 Manchester			OF/GS	3058-9010	10.3	29.3	3159	3159	27.79	27.79
113 Manchester			CB/GS		20.6	28.1	6760	6760	56.33	56.33
114 Manchester			SB/GS	3058-9010	2.7	31.2	146	146	2.63	2.63
115 Manchester			IB/GS/OF		28.6	10.6	683	683	5.69	5.69
116 Manchester			IB/OF/GS		20.2	21.3	974	974	8.11	8.11
117 Manchester			GS/CB		6.3	44.0	2590	2590	21.58	21.58
118 Manchester			OF/GS/CB		27.4	24.7	5829	5829	48.57	48.57
119 Manchester			CB/OF		204.5	19.0	33797	33797	281.64	281.64
120 Manchester			CB/GS		40.6	10.9	4426	4426	36.89	36.89

Manchester - Subwatershed Prioritization and Recommendations									
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 Nitrogen or Phosphorus Removal Per Pound (based on annual nutrient load)	Assistance Program	# LID-Roof Raingardens to Treat Water Quality Volume	Raingarden Cost
93 Manchester	0.03	FALSE					CWIP,SRF	17	\$7,782
94 Manchester	0.09	FALSE	\$67,246		\$46	\$5,485	CWIP,SRF	46	\$21,272
95 Manchester	0.07	FALSE					CWIP,SRF	37	\$16,908
96 Manchester	0.12	FALSE					CWIP,SRF	60	\$27,483
97 Manchester	0.07	0.15					CWIP,SRF	35	\$16,286
98 Manchester	0.35	FALSE		\$25,000			CWIP,SRF, BR	173	\$79,372
99 Manchester	0.03	0.09					CWIP,SRF	17	\$7,756
100 Manchester	0.10	FALSE					CWIP,SRF	50	\$22,784
101 Manchester	0.17	FALSE					CWIP,SRF	83	\$38,166
102 Manchester	0.08	FALSE					CWIP,SRF	41	\$18,960
103 Manchester	0.06	FALSE					CWIP,SRF	32	\$14,949
104 Manchester	0.10	FALSE					CWIP,SRF	50	\$23,094
105 Manchester	0.11	FALSE					CWIP,SRF	56	\$25,544
106 Manchester	0.14	FALSE					CWIP,SRF	72	\$32,913
107 Manchester	0.02	FALSE					CWIP,SRF	11	\$5,239
108 Manchester	0.15	FALSE					CWIP,SRF	76	\$34,922
109 Manchester	0.02	FALSE					CWIP,SRF	12	\$5,374
110 Manchester	1.02	FALSE	\$4,061,188		\$534	\$64,079	CWIP,SRF	512	\$235,638
111 Manchester	0.23	FALSE					CWIP,SRF	115	\$53,081
112 Manchester	0.20	FALSE					CWIP,SRF	99	\$45,673
113 Manchester	0.38	FALSE					CWIP,SRF	191	\$87,969
114 Manchester	0.03	FALSE					CWIP,SRF	14	\$6,314
115 Manchester	0.13	FALSE					CWIP,SRF	64	\$29,634
116 Manchester	0.14	FALSE					CWIP,SRF	69	\$31,671
117 Manchester	0.15	FALSE					CWIP,SRF	73	\$33,703
118 Manchester	0.33	FALSE					CWIP,SRF	165	\$75,851
119 Manchester	1.91	FALSE					CWIP,SRF	956	\$439,794
120 Manchester	0.25	FALSE					CWIP,SRF	125	\$57,600

Manchester - 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.)
121 Manchester			IB/GS	5084-9010, 5423-9010	160.3	7.0	7644	7644	63.70	63.70
122 Manchester			CB		4.4	23.6	1213	1213	10.11	10.11
123 Manchester			CB/GS/OF		171.9	4.1	13066	13066	108.89	108.89
124 Manchester			GS/OF		107.5	6.8	9393	9393	78.28	78.28
125 Manchester			GS/OF		113.4	6.0	9525	9525	79.38	79.38
126 Manchester			GS/OF		38.4	8.8	3746	3746	31.22	31.22
127 Manchester			OF/GS/CB	4366-9015	248.3	4.7	19464	19464	162.20	162.20
128 Manchester			CB		0.8	87.5	838	838	6.98	6.98
129 Manchester			CB/OF	3616-9010	6.5	39.3	2971	2971	24.76	24.76
130 Manchester			BRA/CB		0.5	57.0	222	222	1.85	1.85
131 Manchester	1	Infiltration basin behind 49 Center Hill Rd	IB/CB		9.2	46.6	4085	408	34.04	3.40
132 Manchester			DW/CB		6.7	19.6	1021	1021	8.51	8.51
133 Manchester			OF		10.7	11.7	1221	1221	10.18	10.18
134 Manchester			CB/GS		18.0	17.0	2708	2708	22.57	22.57
135 Manchester			CB		5.5	16.5	805	805	6.71	6.71
136 Manchester			CB/GS		5.4	41.9	2117	2117	17.64	17.64
137 Manchester			CB/IB		1.6	60.9	84	84	0.70	0.70
138 Manchester			CB		5.0	59.0	3483	3483	29.02	29.02
139 Manchester			CB/DW		6.2	66.6	4699	4699	39.16	39.16
140 Manchester			CB		0.8	25.7	244	244	2.03	2.03
141 Manchester			OF/CB/DW		15.9	48.7	9780	9780	81.50	81.50
142 Manchester			CB		0.4	82.4	376	376	3.13	3.13
143 Manchester			2VS/CB	3335-9010	4.5	69.3	1495	1495	28.02	28.02
144 Manchester	2	Upgrade existing stormwater detention area at north end of parking lot	EDMP/OF/SB	3335-9010	5.5	31.9	1236	494	11.59	8.11
145 Manchester	1	Add underground infiltration system in playground	IG/CB/DW		4.6	62.2	2712	1627	22.60	13.56
146 Manchester	1	Add surface infiltration at north end of parking lot	(B/CB/GS		10.1	25.2	2196	220	18.30	1.83

Manchester - Subwatershed Prioritization and Recommendations									
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 Nitrogen or Phosphorus Removal Per Pound (based on annual nutrient load)	Assistance Program	# LID-Roof Raingardens to Treat Water Quality Volume	Raingarden Cost
121 Manchester	0.72	FALSE					CWIP,SRF	360	\$165,788
122 Manchester	0.07	FALSE					CWIP,SRF	34	\$15,782
123 Manchester	0.74	FALSE					CWIP,SRF	370	\$170,031
124 Manchester	0.53	FALSE					CWIP,SRF	266	\$122,231
125 Manchester	0.54	FALSE					CWIP,SRF	269	\$123,953
126 Manchester	0.21	FALSE					CWIP,SRF	106	\$48,751
127 Manchester	1.10	1.28					CWIP,SRF	551	\$253,277
128 Manchester	0.05	FALSE					CWIP,SRF	24	\$10,907
129 Manchester	0.17	0.28					CWIP,SRF	84	\$38,659
130 Manchester	0.02	0.03					CWIP,SRF	9	\$4,130
131 Manchester	0.23	FALSE	\$211,420		\$58	\$6,901	CWIP,SRF	116	\$53,157
132 Manchester	0.06	0.14					CWIP,SRF	32	\$14,758
133 Manchester	0.07	0.14					CWIP,SRF	35	\$15,890
134 Manchester	0.15	0.34					CWIP,SRF	77	\$35,240
135 Manchester	0.05	0.10					CWIP,SRF	23	\$10,477
136 Manchester	0.12	0.25					CWIP,SRF	60	\$27,545
137 Manchester	0.05	FALSE					CWIP,SRF	24	\$10,887
138 Manchester	0.20	0.32					CWIP,SRF	99	\$45,323
139 Manchester	0.28	FALSE					CWIP,SRF	140	\$64,364
140 Manchester	0.01	FALSE					CWIP,SRF	7	\$3,170
141 Manchester	0.58	FALSE					CWIP,SRF	291	\$133,958
142 Manchester	0.02	FALSE					CWIP,SRF	11	\$4,895
143 Manchester	0.21	FALSE					CWIP,SRF	106	\$48,623
144 Manchester	0.09	FALSE					CWIP,SRF	44	\$20,107
145 Manchester	0.17	0.32	\$155,935		\$144	\$17,252	CWIP,SRF	85	\$39,206
146 Manchester	0.12	0.28	\$113,660		\$58	\$6,901	CWIP,SRF	62	\$28,577

Manchester - 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.)
147 Manchester			DW		6.0	31.0	1299	1299	10.83	10.83
148 Manchester			OF		1.4	18.3	227	227	1.89	1.89
149 Manchester			OF/GS/WP		45.8	7.4	2490	2490	27.67	27.67
150 Manchester			CB/GS		7.4	33.4	490	490	4.09	4.09
151 Manchester			CB/GS		3.8	28.3	251	251	2.09	2.09
152 Manchester			CB/GS	3373-9010	38.0	17.5	3889	3889	36.46	36.46
153 Manchester			CB/GS		17.5	25.1	3777	3777	31.48	31.48
154 Manchester	3	Bioretention on lower Stoney Fields Rd	BRA/GS		86.3	4.1	6575	3945	54.79	43.83
155 Manchester			GS/OF		38.0	5.2	3059	3059	25.49	25.49
156 Manchester			CB/GS/WP		157.4	10.5	16775	16775	139.80	139.80
157 Manchester			IB/GS/CB	7060-9015	78.2	11.5	8806	8806	73.38	73.38
158 Manchester			GS/WP		85.7	6.3	1219	1219	30.46	30.46
159 Manchester			EDMP/OF/GS/CB	7060-9015	82.0	5.1	6545	6545	54.54	54.54
160 Manchester			GS/SB	2-1185	12.1	15.8	575	575	8.39	8.39
161 Manchester			DW/CB/IB		30.5	19.1	335	335	2.79	2.79
162 Manchester			CB/GS/SWPPP/CR	6698-9015, 5141-9003	138.4	19.2	9587	9587	79.89	79.89
163 Manchester			GS/CB		310.2	8.6	29886	29886	249.05	249.05
164 Manchester			GS/CB/WP		217.7	6.2	-652315	-652315	111.51	111.51
165 Manchester			CB/GS		267.5	2.1	18721	18721	156.01	156.01
166 Manchester			OF/GS/WP		647.7	1.2	43974	43974	366.45	366.45
167 Manchester			OF/GS		158.2	4.2	12102	12102	100.85	100.85
168 Manchester			OF/GS/CB		69.7	8.7	6735	6735	56.13	56.13
169 Manchester			CB/GS		28.4	7.9	2627	2627	21.89	21.89
170 Manchester			CB/GS/WP	4294-9010	133.9	2.8	3601	3601	52.51	52.51
171 Manchester			(3)EDMP/CB/GS	4403-9010	33.0	12.2	555	555	13.88	13.88
172 Manchester			GS/OF/WP		14.7	17.2	2227	2227	18.56	18.56
173 Manchester			GS/OF		35.8	5.8	2978	2978	24.82	24.82
174 Manchester			GS/WP/CR/SB	3831-9010	117.8	4.9	1627	1627	40.68	40.68
175 Manchester			GS/WP/CR/SB	3831-9010	76.1	2.3	1019	1019	25.47	25.47
176 Manchester			CB/GS	4294-9010	24.8	8.9	1279	1279	14.21	14.21
177 Manchester			GS/WP/SB	4294-9010	14.4	11.4	236	236	5.90	5.90
178 Manchester			GS/(3)WP	6286-9015	30.1	1.4	401	401	10.02	10.02
179 Manchester			GS/GS/SB/CR	5641-9010	38.1	0.0	505	505	12.62	12.62
180 Manchester			GS/WP/CR	5849-9010	9.0	19.6	202	202	5.04	5.04
181 Manchester			OF/GS	5463-9010	62.4	9.8	3351	3351	37.23	37.23

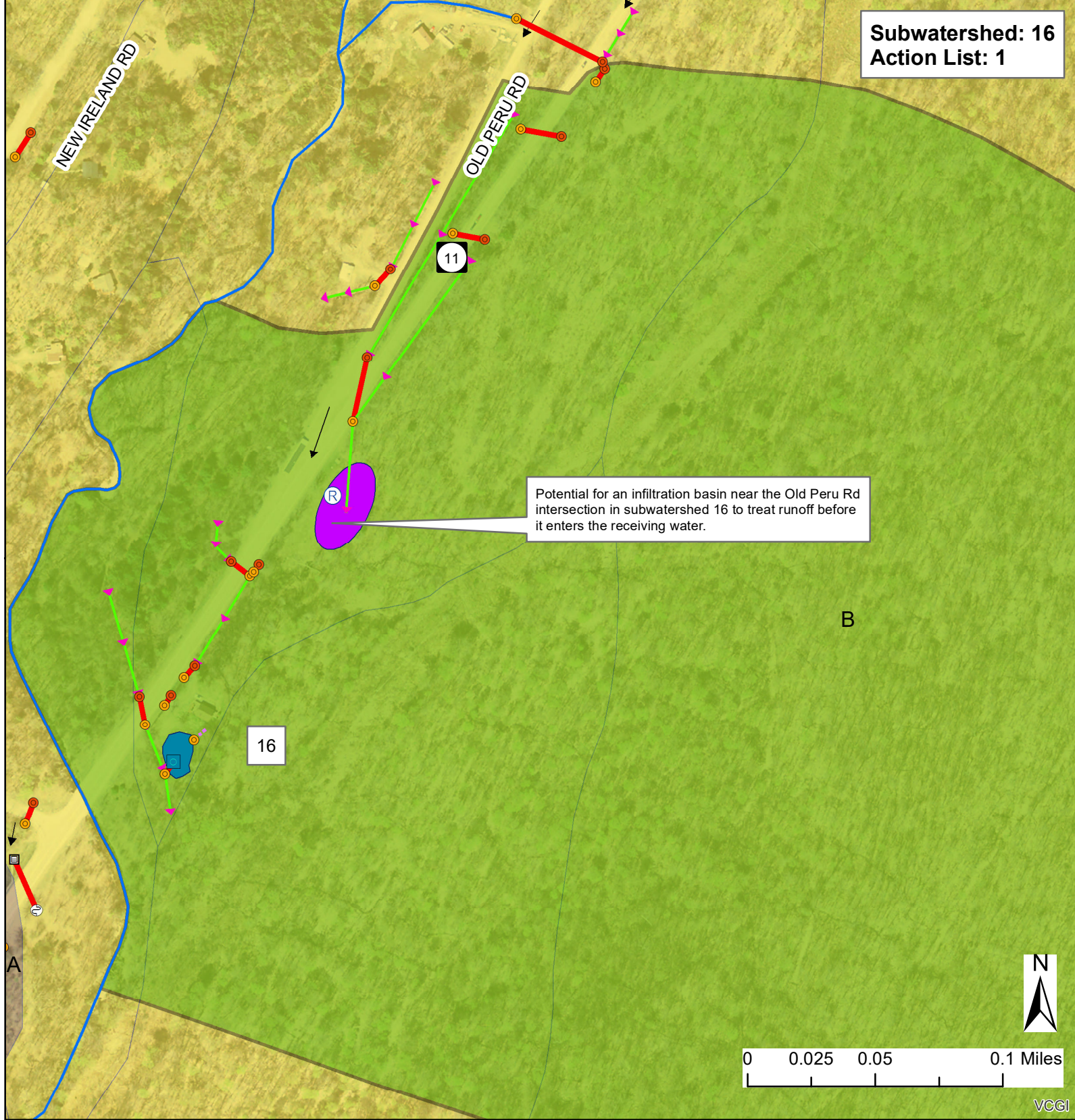
Manchester - Subwatershed Prioritization and Recommendations									
Watershed Number	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)	Estimated Basin Construction Cost	Estimated Other BMP Construction Cost	Cost of Sediment Removal Per Pound (based on annual sediment load)	Cost of Nitrogen or Phosphorus Removal Per Pound (based on annual nutrient load)	Assistance Program	# LID-Roof Raingardens to Treat Water Quality Volume	Raingarden Cost
147 Manchester	0.09	0.20					CWIP,SRF	46	\$21,130
148 Manchester	0.01	0.03					CWIP,SRF	6	\$2,948
149 Manchester	0.23	0.38					CWIP,SRF	117	\$54,007
150 Manchester	0.03	0.27					CWIP,SRF	14	\$6,381
151 Manchester	0.01	0.12					CWIP,SRF	7	\$3,267
152 Manchester	0.28	0.73					CWIP,SRF	138	\$63,252
153 Manchester	0.21	FALSE					CWIP,SRF	107	\$49,150
154 Manchester	0.37	FALSE		\$10,000	\$4	\$913	CWIP,SRF,BR	186	\$85,557
155 Manchester	0.17	FALSE					CWIP,SRF	87	\$39,804
156 Manchester	0.95	FALSE					CWIP,SRF	475	\$218,297
157 Manchester	0.50	0.99					CWIP,SRF	249	\$114,591
158 Manchester	0.34	FALSE					CWIP,SRF	172	\$79,287
159 Manchester	0.37	0.46					CWIP,SRF	185	\$85,170
160 Manchester	0.08	FALSE					CWIP,SRF	41	\$18,716
161 Manchester	0.19	FALSE					CWIP,SRF	95	\$43,548
162 Manchester	1.08	FALSE					CWIP,SRF	542	\$249,506
163 Manchester	1.69	FALSE					CWIP,SRF	845	\$388,901
164 Manchester	0.95	FALSE					CWIP,SRF	473	\$217,654
165 Manchester	1.06	0.63					CWIP,SRF	530	\$243,616
166 Manchester	2.49	0.87					CWIP,SRF	1244	\$572,222
167 Manchester	0.68	0.73					CWIP,SRF	342	\$157,488
168 Manchester	0.38	0.66					CWIP,SRF	191	\$87,644
169 Manchester	0.15	0.25					CWIP,SRF	74	\$34,179
170 Manchester	0.51	FALSE					CWIP,SRF	255	\$117,138
171 Manchester	0.16	0.44					CWIP,SRF	79	\$36,118
172 Manchester	0.13	0.28					CWIP,SRF	63	\$28,983
173 Manchester	0.17	0.23					CWIP,SRF	84	\$38,757
174 Manchester	0.46	0.63					CWIP,SRF	230	\$105,882
175 Manchester	0.29	0.19					CWIP,SRF	144	\$66,277
176 Manchester	0.12	0.24					CWIP,SRF	60	\$27,737
177 Manchester	0.07	0.18					CWIP,SRF	33	\$15,360
178 Manchester	0.11	0.05					CWIP,SRF	57	\$26,067
179 Manchester	0.14	0.00					CWIP,SRF	71	\$32,849
180 Manchester	0.06	FALSE					CWIP,SRF	29	\$13,111
181 Manchester	0.32	0.67					CWIP,SRF	158	\$72,668

Target Maps

*Showing Priority Action List
Drainage Areas*

And Potential Retrofit Locations

Subwatershed: 16
Action List: 1

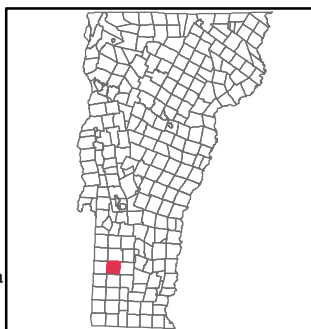


Manchester, VT

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
- Pond outlet 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

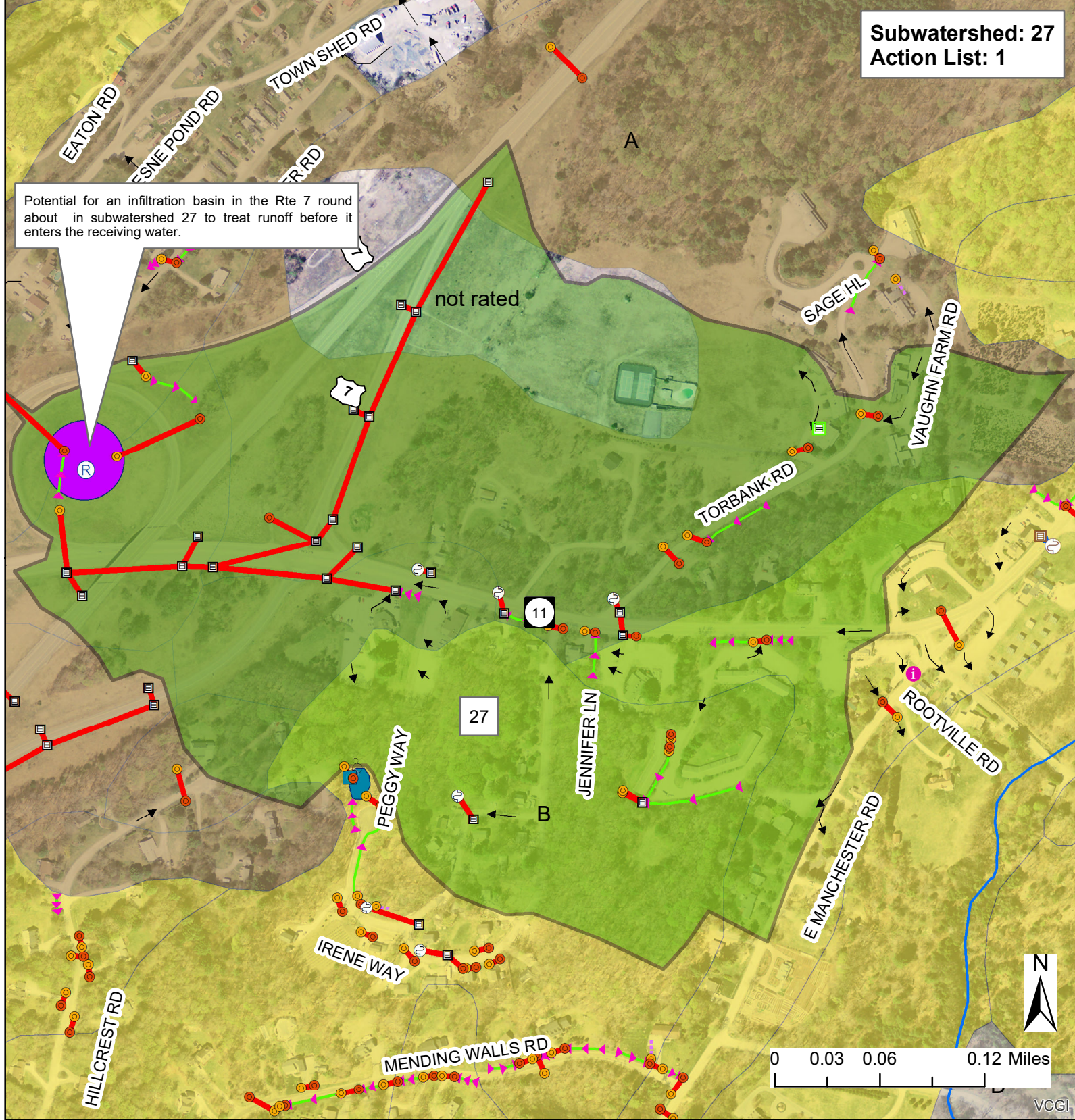
- A
- B
- C
- D

SubwatershedID

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

Creator: Jim Pease, David Ainley
DEC - WSMD - Clean Water Initiative Program
Plotted Date: 10/30/2018
Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
Imagery Source: VCGI Best Available

Potential for an infiltration basin in the Rte 7 round about in subwatershed 27 to treat runoff before it enters the receiving water.

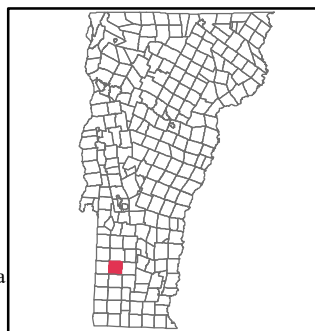


Manchester, VT

DEC Stormwater Infrastructure Mapping Project

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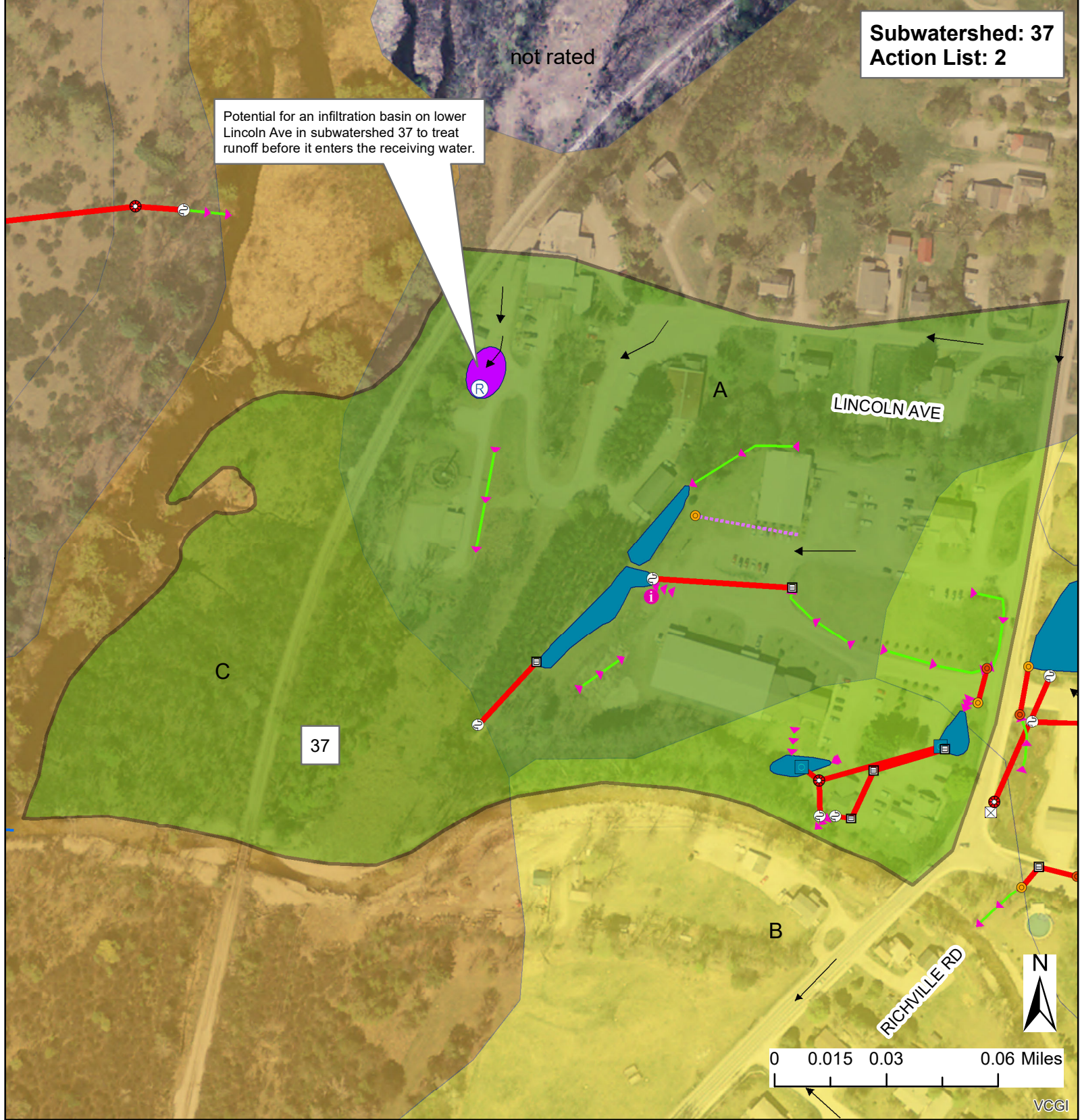


<p>Stormwater points</p> <ul style="list-style-type: none"> Pipe Cross (not connected) Catchbasin Dry Well Drop Inlet Grate/Curb Inlet Yard drain CB tied to sanitary sewer Junction Box Stormwater Manhole Outfall Culvert inlet Culvert outlet Pond outlet structure Treatment feature (see notes) Retrofit 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 - WSMD - Clean Water Initiative Program
 Plotted Date: 10/30/2018
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available

Subwatershed: 37
Action List: 2

Potential for an infiltration basin on lower Lincoln Ave in subwatershed 37 to treat runoff before it enters the receiving water.

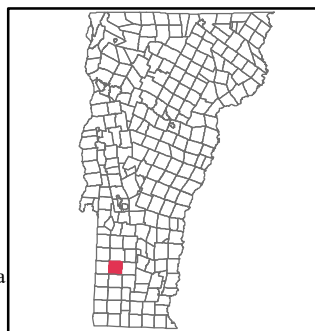


Manchester, VT

DEC Stormwater Infrastructure Mapping Project

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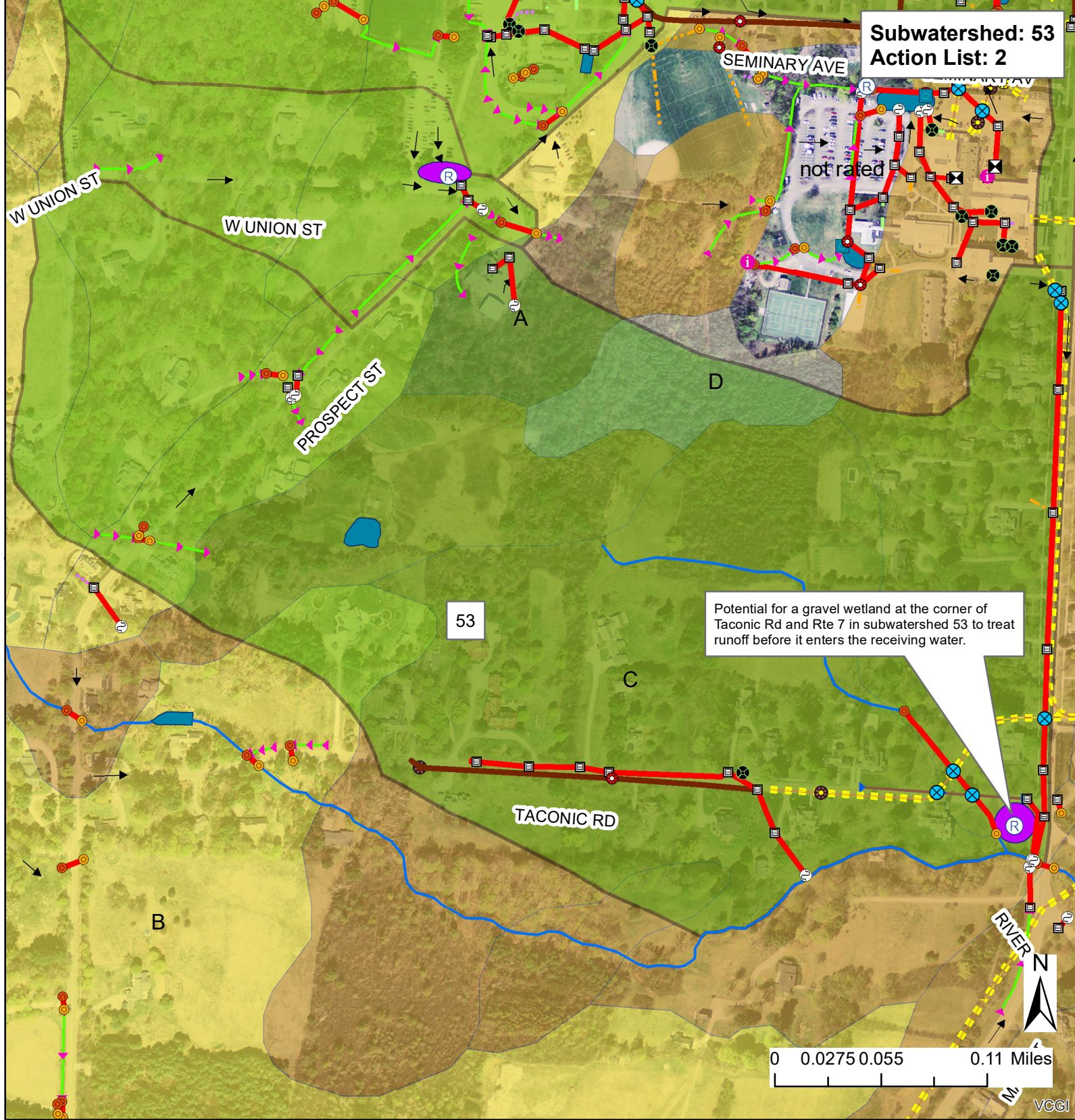
- Stormwater points**
- Pipe Cross (not connected)
 - Catchbasin
 - Dry Well
 - Drop Inlet
 - Grate/Curb Inlet
 - Yard drain
 - CB tied to sanitary sewer
 - Junction Box
 - Stormwater Manhole
 - Outfall
 - Culvert inlet
 - Culvert outlet
 - Pond outlet structure
 - Treatment feature (see notes)
 - Retrofit
 - 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 - WSMD - Clean Water Initiative Program
 Plotted Date: 10/30/2018
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available



Subwatershed: 53
Action List: 2

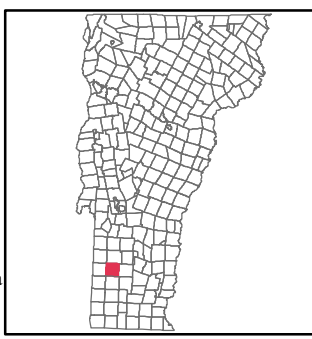
Potential for a gravel wetland at the corner of Taconic Rd and Rte 7 in subwatershed 53 to treat runoff before it enters the receiving water.

Manchester, VT

DEC Stormwater Infrastructure Mapping Project

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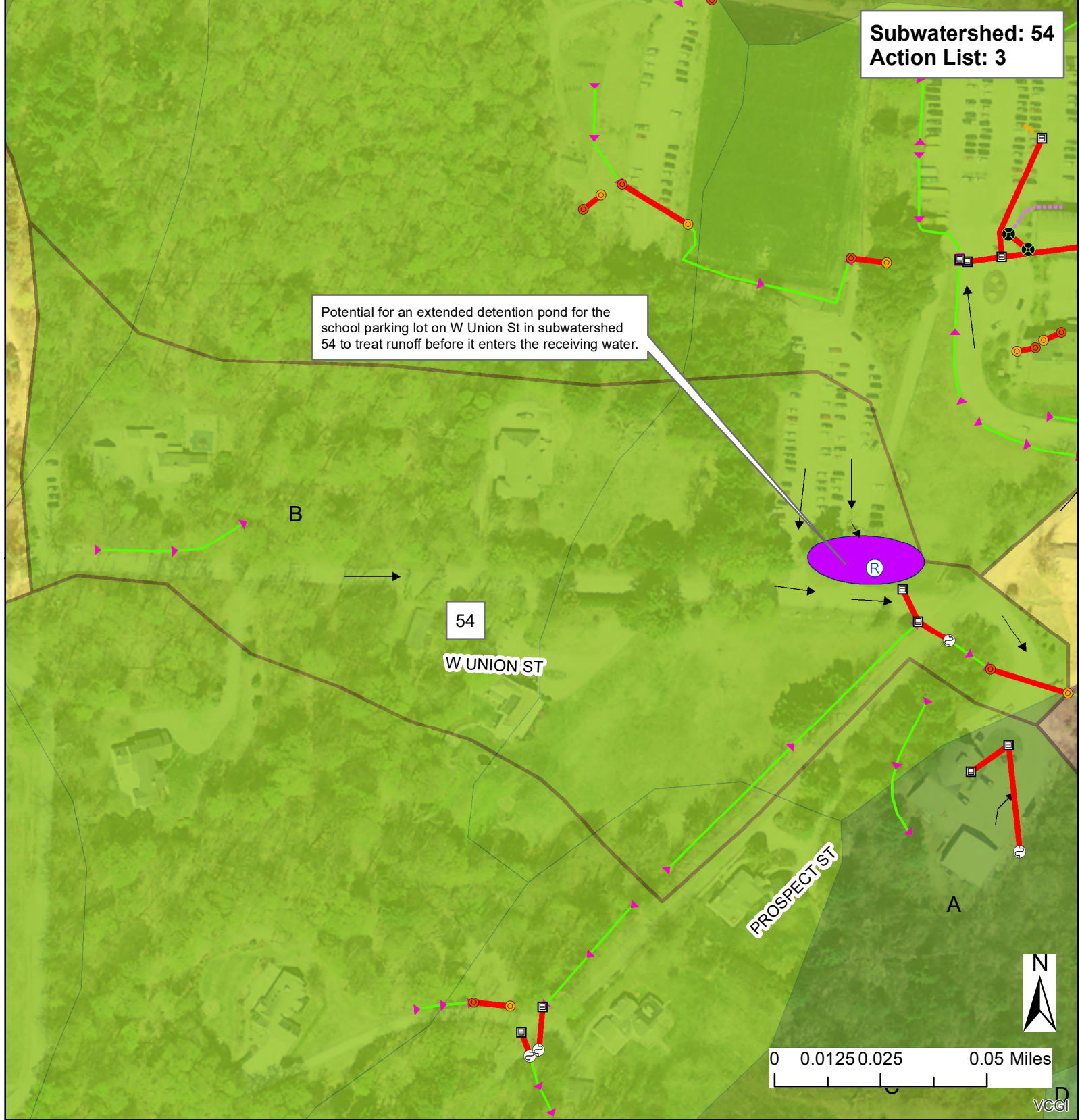


<p>Stormwater points</p> <ul style="list-style-type: none"> Pipe Cross (not connected) Catchbasin Dry Well Drop Inlet Grate/Curb Inlet Yard drain CB tied to sanitary sewer Junction Box Stormwater Manhole Outfall Culvert inlet Culvert outlet Pond outlet structure Treatment feature (see notes) Retrofit 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 - WSMD - Clean Water Initiative Program
 Plotted Date: 10/30/2018
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available

Subwatershed: 54
Action List: 3

Potential for an extended detention pond for the school parking lot on W Union St in subwatershed 54 to treat runoff before it enters the receiving water.

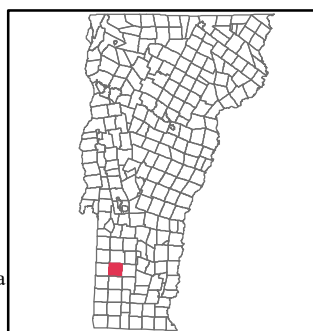


Manchester, VT

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
- Pond outlet 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

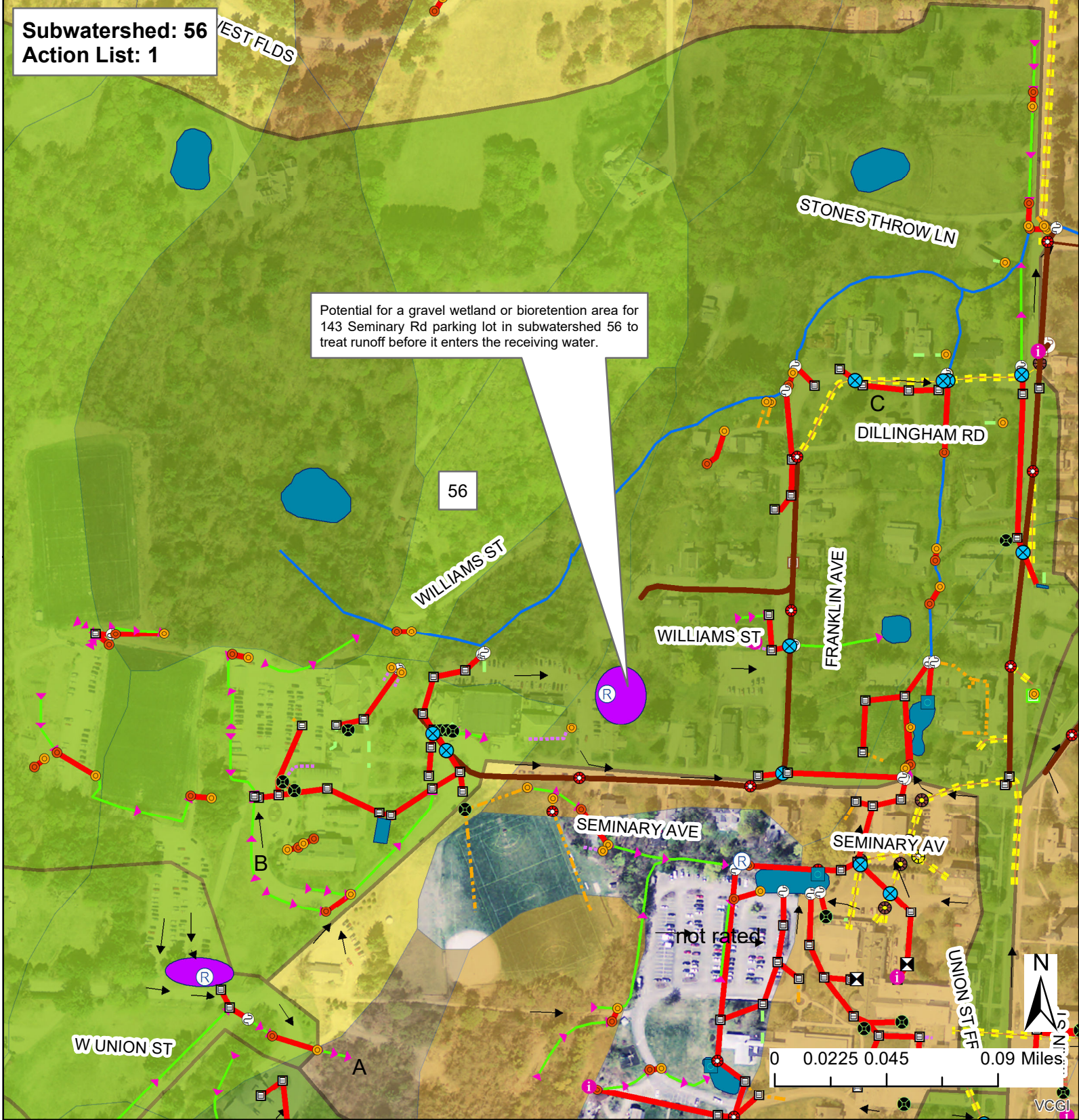
- A
- B
- C
- D

SubwatershedID

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

Creator: Jim Pease, David Ainley
DEC - WSMD - Clean Water Initiative Program
Plotted Date: 10/30/2018
Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
Imagery Source: VCGI Best Available

Subwatershed: 56
Action List: 1

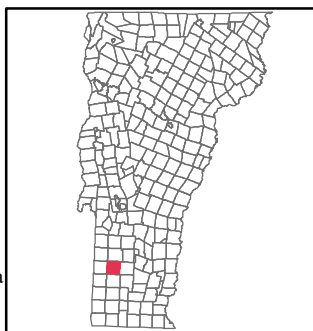


Manchester, VT

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
- Pond outlet 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

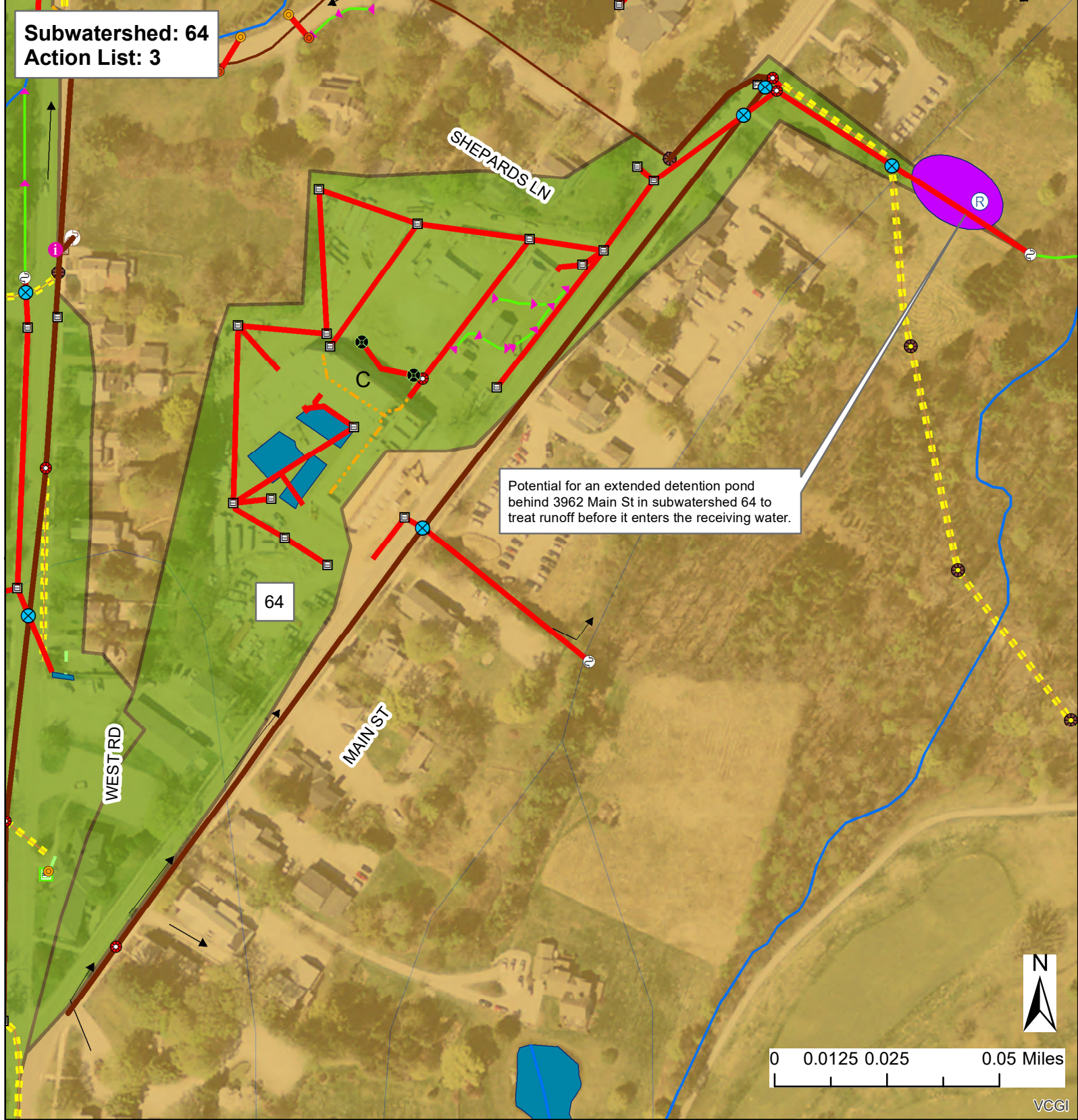
- A
- B
- C
- D

SubwatershedID

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

Creator: Jim Pease, David Ainley
 DEC - WSMD - Clean Water Initiative Program
 Plotted Date: 10/30/2018
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available

Subwatershed: 64
Action List: 3

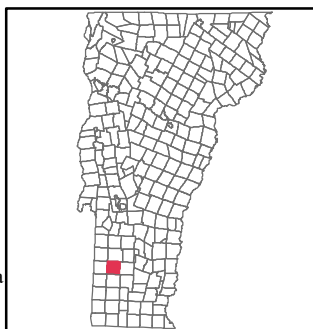


Manchester, VT

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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
- Pond outlet 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 - WSMD - Clean Water Initiative Program
Plotted Date: 10/30/2018
Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
Imagery Source: VCGI Best Available

Subwatershed: 76
Action List: 3

HIGH HILL RD

76

WAYS LN

MAIN ST

Potential for a raingarden in the Main St - Ways Ln traffic island in subwatershed 76 to treat runoff before it enters the receiving water.

0 0.0075 0.015 0.03 Miles

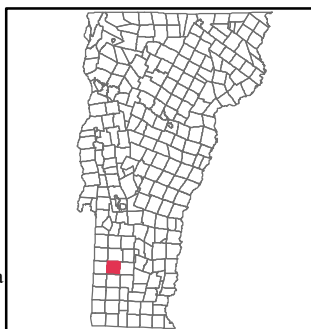
VCGI

Manchester, VT

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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
- Pond outlet 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

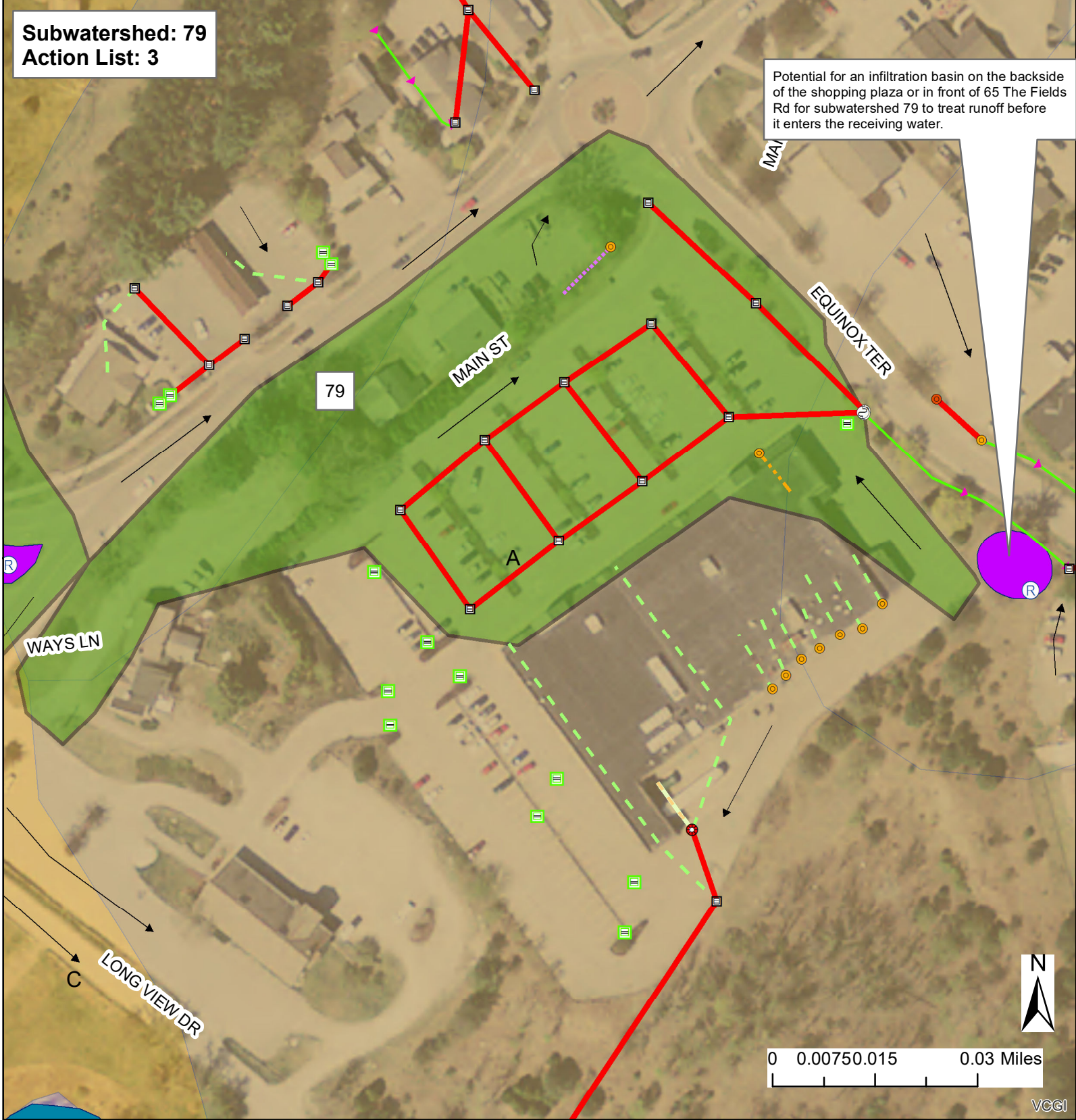
SubwatershedID

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

Creator: Jim Pease, David Ainley
 DEC - WSMD - Clean Water Initiative Program
 Plotted Date: 10/30/2018
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available

Subwatershed: 79
Action List: 3

Potential for an infiltration basin on the backside of the shopping plaza or in front of 65 The Fields Rd for subwatershed 79 to treat runoff before it enters the receiving water.

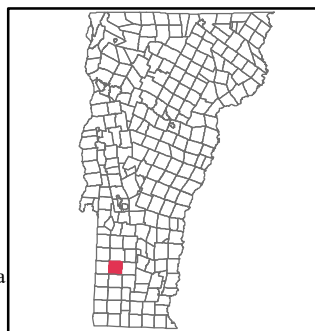


Manchester, VT

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Stormwater points

- Pipe Cross (not connected)
- Catchbasin
- Dry Well
- Drop Inlet
- Grate/Curb Inlet
- Roof drain
- Yard drain
- CB tied to sanitary sewer
- Junction Box
- Stormwater Manhole
- Outfall
- Culvert inlet
- Culvert outlet
- Pond outlet 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 - WSMD - Clean Water Initiative Program
 Plotted Date: 10/30/2018
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available

Subwatershed: 94
Action List: 2

Potential for an infiltration basin on the east side of the parking lot in subwatershed 94 to treat runoff before it enters the receiving water.

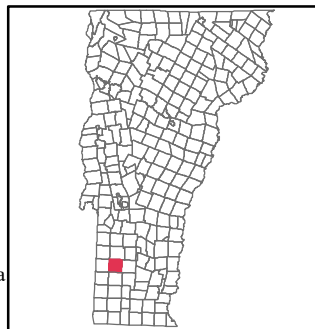


Manchester, VT

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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
- Pond outlet 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

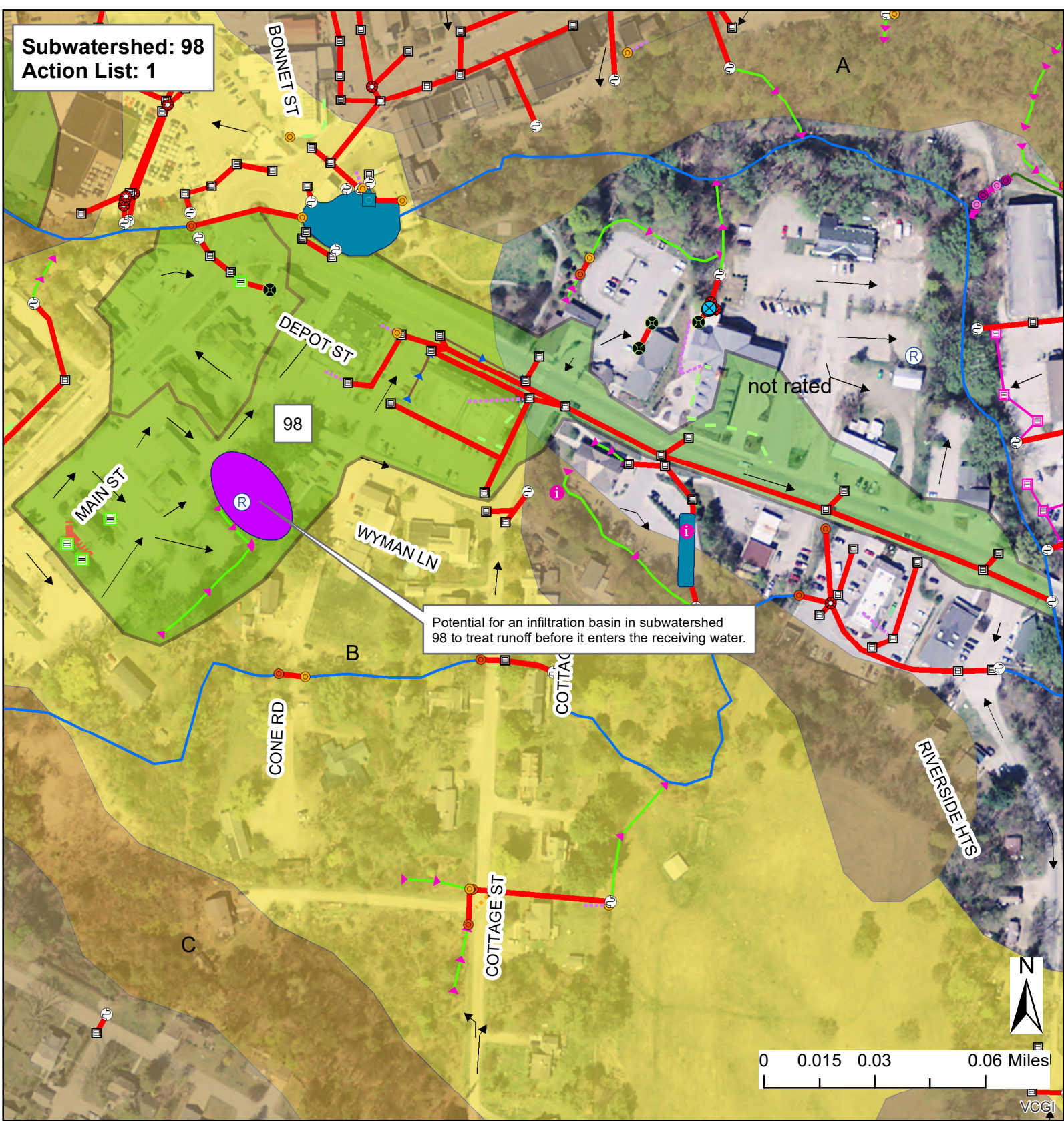
- A
- B
- C
- D

SubwatershedID

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

Creator: Jim Pease, David Ainley
DEC - WSMD - Clean Water Initiative Program
Plotted Date: 10/30/2018
Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
Imagery Source: VCGI Best Available

Subwatershed: 98
Action List: 1

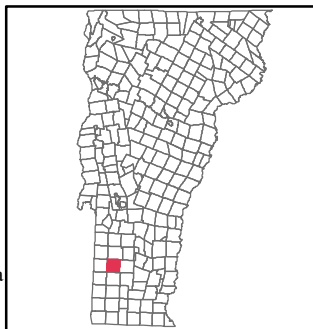


Manchester, VT

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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
- Pond outlet 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

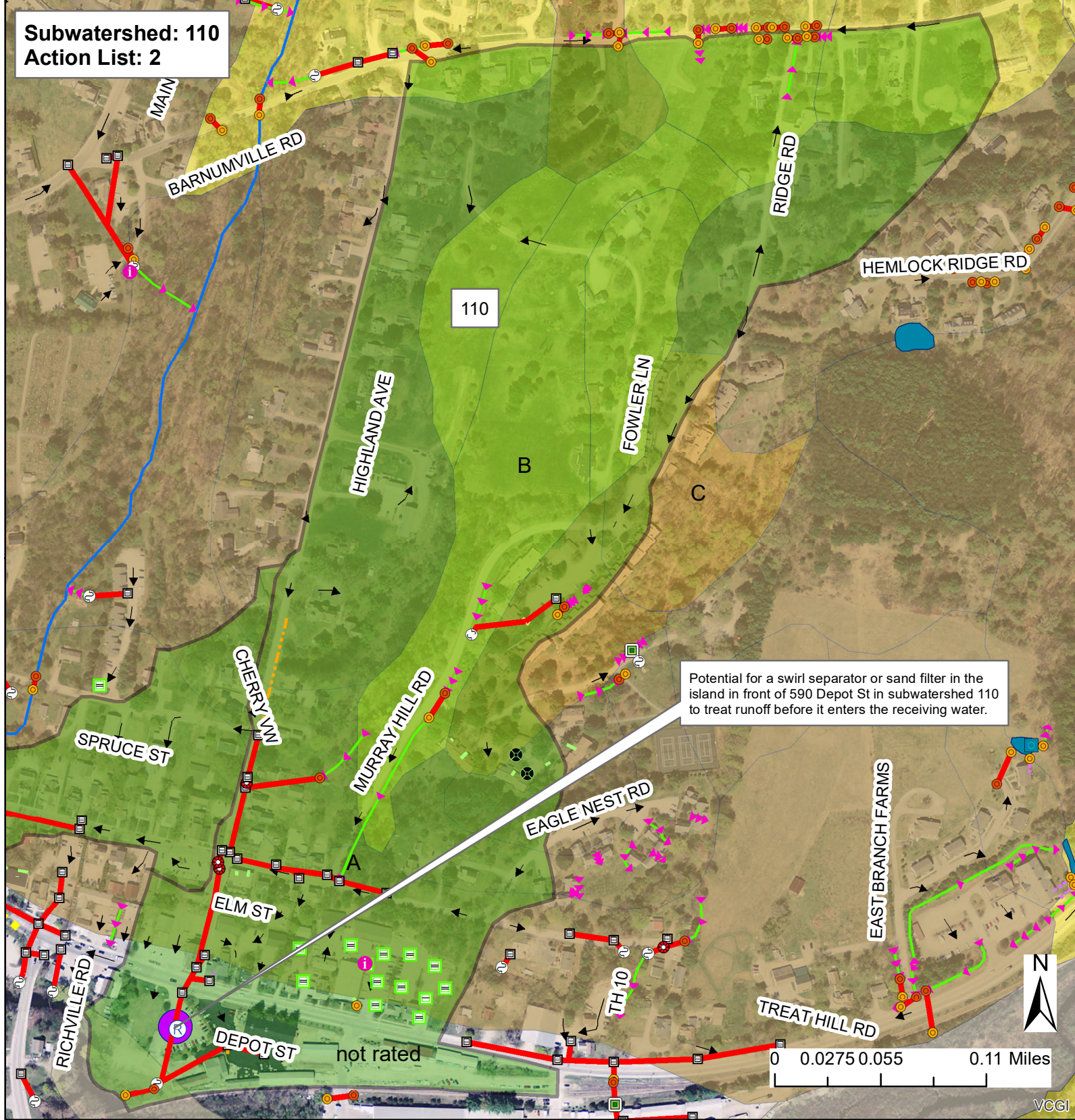
- A
- B
- C
- D

SubwatershedID

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

Creator: Jim Pease, David Ainley
DEC - WSMD - Clean Water Initiative Program
Plotted Date: 10/30/2018
Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
Imagery Source: VCGI Best Available

Subwatershed: 110
Action List: 2

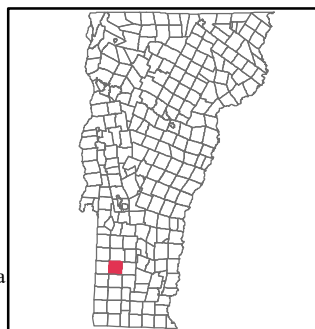


Manchester, VT

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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
- Pond outlet 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

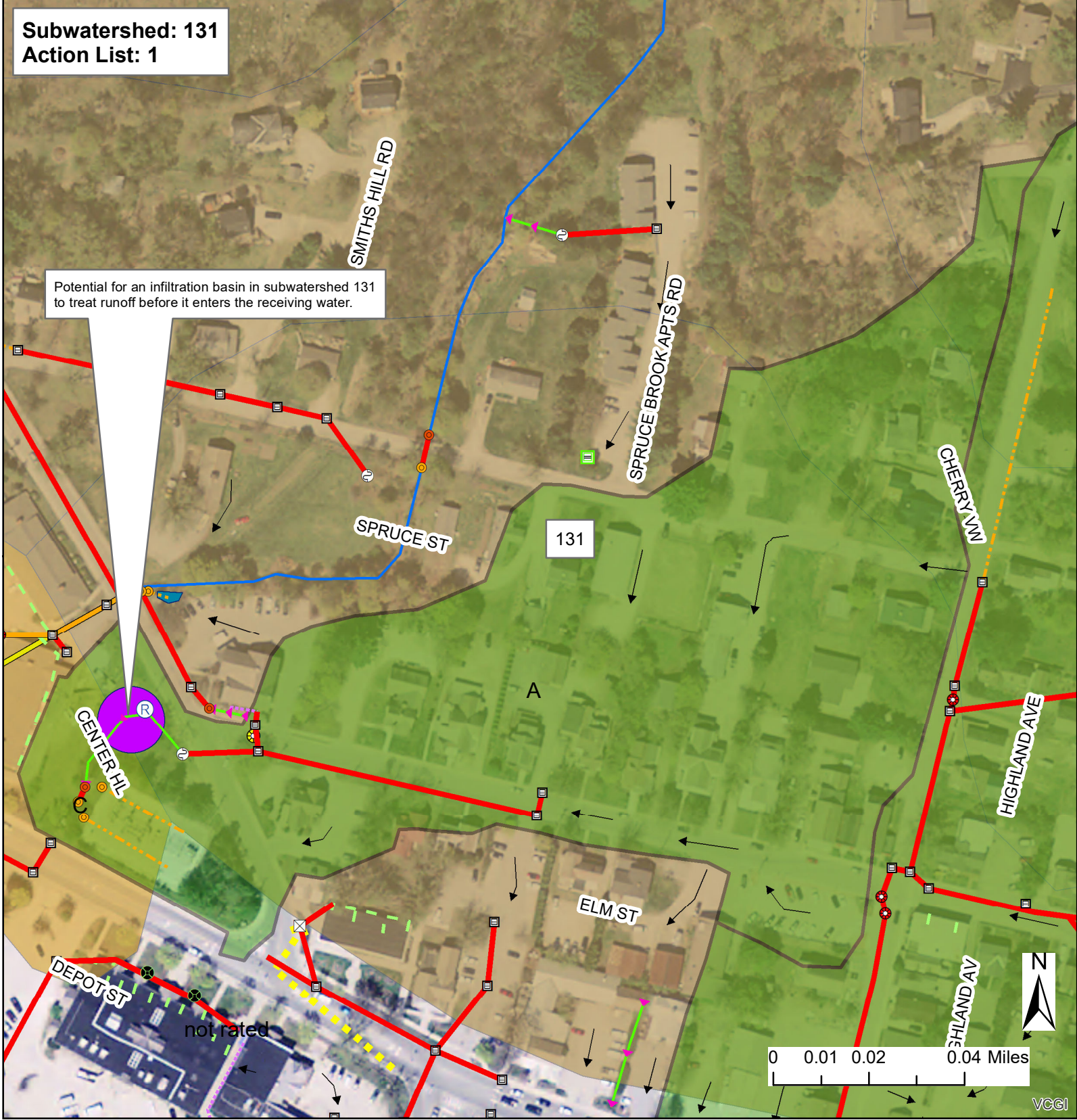
SubwatershedID

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

Creator: Jim Pease, David Ainley
 DEC - WSMD - Clean Water Initiative Program
 Plotted Date: 10/30/2018
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available

Subwatershed: 131
Action List: 1

Potential for an infiltration basin in subwatershed 131 to treat runoff before it enters the receiving water.

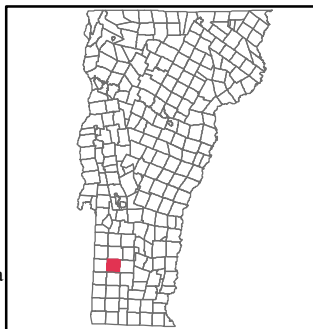


Manchester, VT

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
- Pond outlet 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

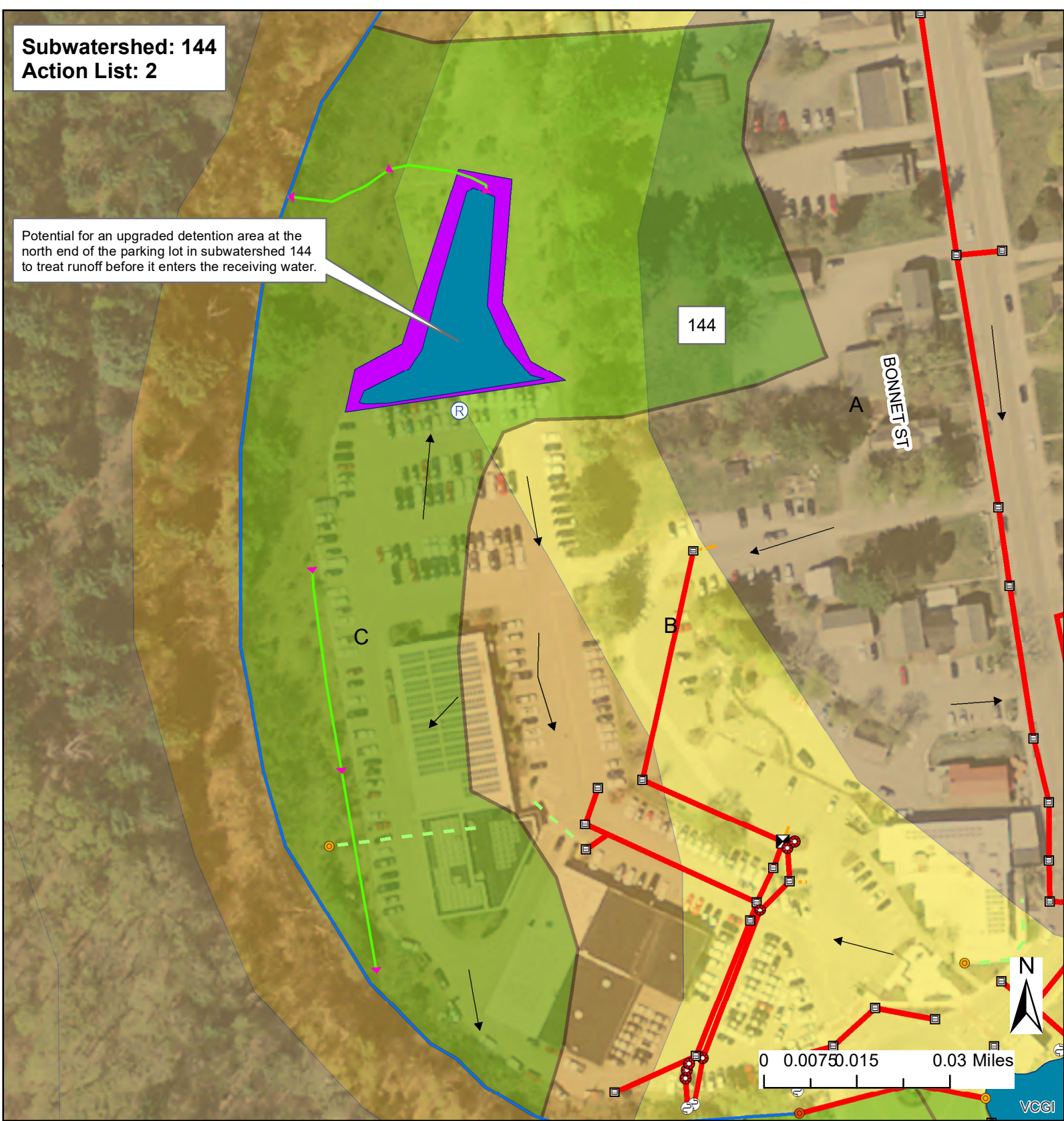
SubwatershedID

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

Creator: Jim Pease, David Ainley
 DEC - WSMD - Clean Water Initiative Program
 Plotted Date: 10/30/2018
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available

Subwatershed: 144
Action List: 2

Potential for an upgraded detention area at the north end of the parking lot in subwatershed 144 to treat runoff before it enters the receiving water.

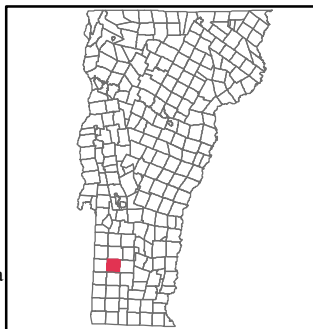


Manchester, VT

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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
- Pond outlet 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

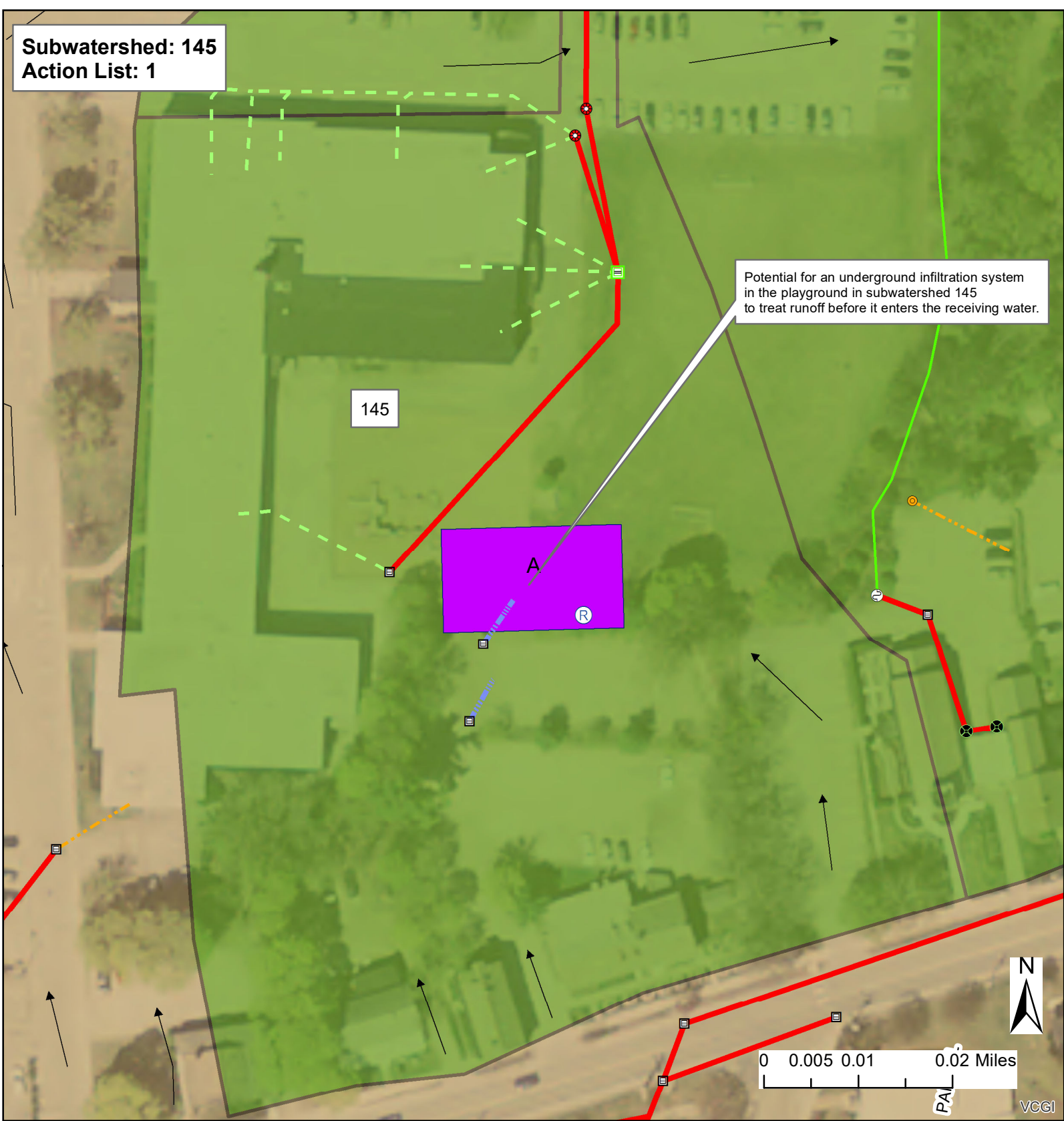
- A
- B
- C
- D

SubwatershedID

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

Creator: Jim Pease, David Ainley
DEC - WSMD - Clean Water Initiative Program
Plotted Date: 10/30/2018
Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
Imagery Source: VCGI Best Available

Subwatershed: 145
Action List: 1

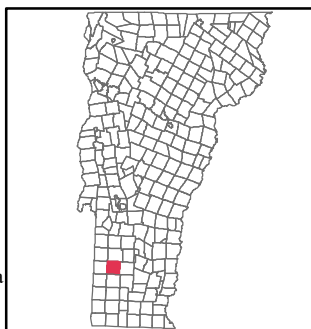


Manchester, VT

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
- Pond outlet 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

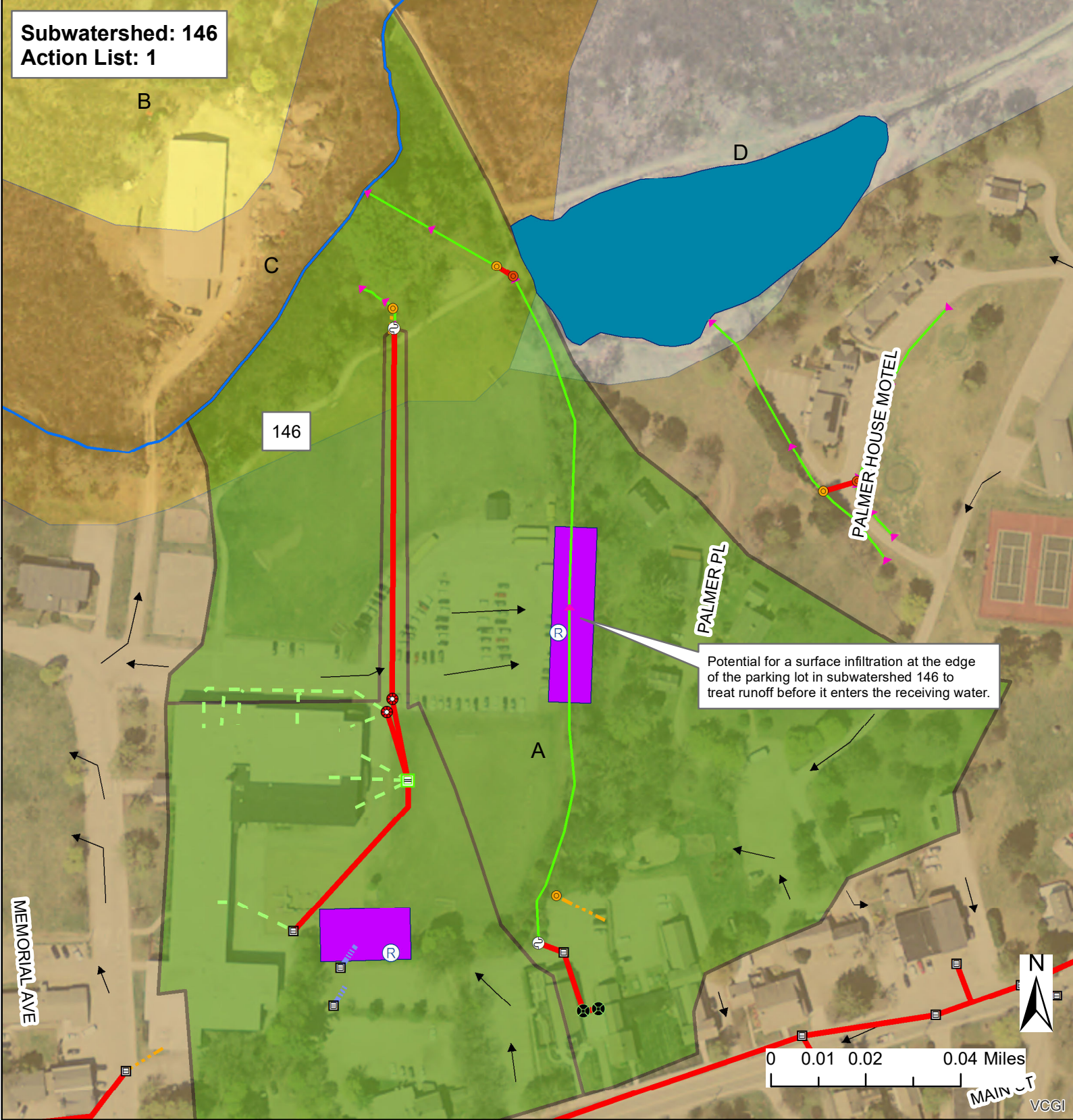
- A
- B
- C
- D

SubwatershedID

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

Creator: Jim Pease, David Ainley
 DEC - WSMD - Clean Water Initiative Program
 Plotted Date: 10/30/2018
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
 Imagery Source: VCGI Best Available

Subwatershed: 146
Action List: 1

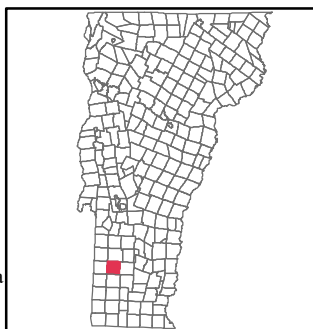


Manchester, VT

DEC Stormwater Infrastructure Mapping Project

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NRCS - Soils

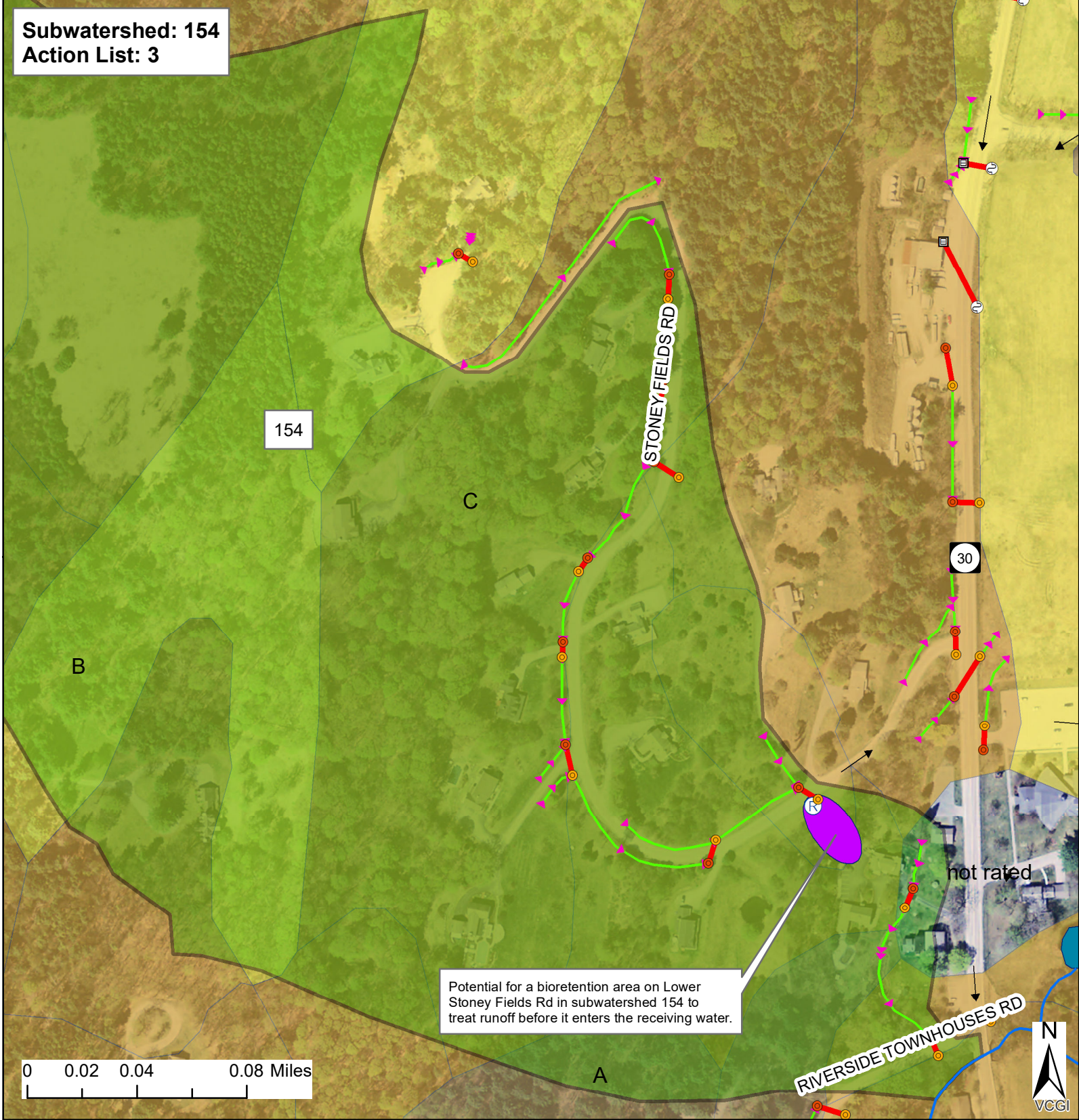
- A
- B
- C
- D

SubwatershedID

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

Creator: Jim Pease, David Ainley
DEC - WSMD - Clean Water Initiative Program
Plotted Date: 10/30/2018
Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
Imagery Source: VCGI Best Available

Subwatershed: 154
Action List: 3

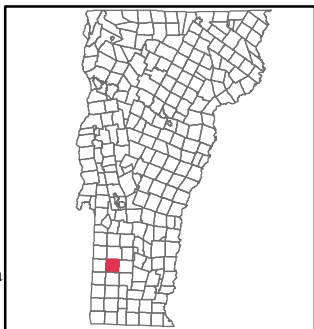


Potential for a bioretention area on Lower Stoney Fields Rd in subwatershed 154 to treat runoff before it enters the receiving water.

not rated

Manchester, VT

DEC Stormwater Infrastructure Mapping Project



- | | |
|--|---|
| <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 Pond outlet 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 - WSMD - Clean Water Initiative Program
 Plotted Date: 10/30/2018
 Data Sources: VTRANS Roads data, VT Hydrography data set, DEC Stormwater database, NRCS soils survey
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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.

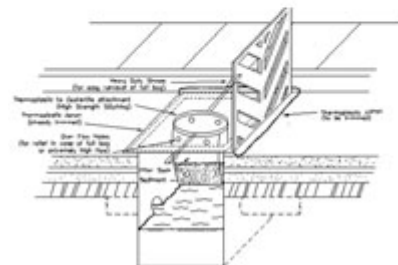
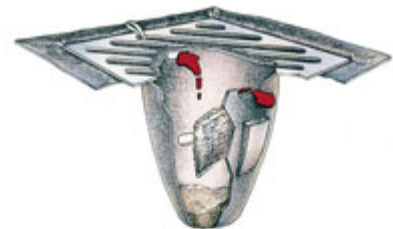
A periodic spill “fire drill” should be conducted to help prepare Town personnel in the event of a spill.

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)

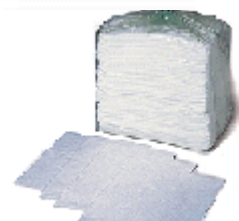
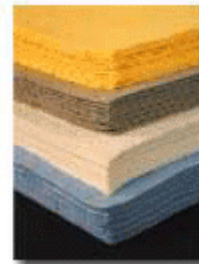
New and reconditioned steel drums are ideal for storing solid and liquid waste. Poly drums available for durable outdoor storage or for building your own spill kits. Steel and poly drums are available in both tight-head (TH) and full open-head styles (FOH).



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 land, easily absorbing 20 to 25 times their own weight in recovered liquid. Rolls can easily be cut to the exact size required.



water or

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.

§ 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 cases, the National Response Center must be notified at **(800) 424-8802**. Finally, in addition to federal and state spill reporting, EPCRA requires that spills are also reported to local authorities.

(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.

(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.

(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**.

(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.

(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.