

Town of Rutland

Stormwater Infrastructure Mapping Project

August 2012



***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 Ecosystems Restoration 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 in order to 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. Having an understanding of the connectedness of the system is also a valuable tool for hazardous material spill planning and prevention. Knowledge of the extent of the system is also essential 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. Knowledge of which areas of the sewer service area have combined stormwater and sewer systems can better assist the municipality in planning and implementing combined sewer separation projects. Knowledge of the layout and extent of the stormwater system can inform options for cleaning up existing polluted stormwater discharges. This project provides information and guidance for potential retrofit treatment locations and opportunities. Finally, by providing a more thorough understanding of the system it is the hope that this project could be 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 from the National Agricultural Imagery Program (NAIP) 08 orthophotos. 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 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.**

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	Extended Detention Pond with Micropool (aka Micropool Extended Detention Basin)
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
RDD	Roof Drain Disconnect
RR	Rock Riprap
RS	Riprap Swale
SB	Sediment Basin
SF	Sand Filter (aka Surface Sand Filter)
SS-SF	Swirl Separator – Sand Filter
ST	Septic Tank
SWPPP	Stormwater Pollution Prevention Plan
TT	Treatment Tank
WL	Wetland (Constructed)
WP	Wet Pond (Retention)
WS	Wet Swale

Rutland Town - Subwatershed Prioritization and Recommendations (p1)

*Subwatershed includes area in Rutland Town and Rutland City

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)	Phosphorus Load with Current Reductions (lbs)	Phosphorus Load with Priority Action (lbs)	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)
167	1	Bioretention/raingarden	BR/CB/GS		3.6	63	2,943	589	8.2	3.3	0.17	0.25
3000	1		disconnect from sanitary sewer		1.8	69	122	122	0.3	0.3	0.01	
81	2	Modify pond outlet	GS/EDP		59.2	18	4,588	2,753	15.9	11.9	0.43	1.15
90	2	EDP	EDP/GS		48.7	17	7,295	1,459	20.3	10.1	0.41	0.91
20	2	Bioretention	BR/CB/GS		13.2	43	6,707	1,341	18.6	7.5	0.38	
158	2	Infiltration basin at Birch Knoll & Post Rd Intersection	IB/GS/OF		44.3	9	4,367	218	12.1	2.4	0.25	0.44
139	2	Modify existing pond	WP/CB/GS		6.0	33	1,387	832	4.8	3.6	0.13	0.22
31	3	Modify pond outlet	CB/EDP	3360-9010	16.8	89	10,106	6,064	35.1	26.3	0.95	1.64
29	3	Modify pond outlet	CB/EDP	3360-9010	6.0	83	3,205	1,923	11.1	8.3	0.30	
32	3	Modify pond outlet	CB/EDP	3360-9010	2.8	78	1,303	782	4.5	3.4	0.12	0.24
14			GS/WP/OF		446.9	3	30,225	30,225	84.0	84.0	1.71	
271			CB/OF	2-0731	84.4	23	23,209	23,209	64.5	64.5	1.31	2.16
9			OF/CB		55.3	28	18,257	18,257	50.7	50.7	1.03	
159			GS/DW/OF		199.5	7	17,910	17,910	49.8	49.8	1.01	1.60
13			OF/SWPPP	4804-9003 5324-9003	27.3	63	16,652	16,652	46.3	46.3	0.94	
128			GS/OF		42.5	40	15,530	15,530	43.1	43.1	0.88	1.86
41			WP/CB/GS	3948-9015	22.3	70	14,620	14,620	40.6	40.6	0.83	1.73
459			OF		183.6	4	14,169	14,169	39.4	39.4	0.80	
1			GS/OF/SWPPP	5303-9003	91.8	21	13,760	13,760	38.2	38.2	0.78	
119			CB/WP	3902-9010	14.8	84	13,419	13,419	37.3	37.3	0.76	1.37
87			CB		42.1	25	12,540	12,540	34.8	34.8	0.71	1.18
54			CB/GS		19.2	55	12,487	12,487	34.7	34.7	0.71	1.16
72			CB/EDP/SWPPP	4382-9003	18.9	69	11,881	11,881	33.0	33.0	0.67	
253			OF		116.3	9	11,490	11,490	31.9	31.9	0.65	1.16
51			OF/GS		46.2	28	11,418	11,418	31.7	31.7	0.65	1.44
210			CB		18.6	51	11,264	11,264	31.3	31.3	0.64	1.05
171			OF		156.5	0	10,389	10,389	28.9	28.9	0.59	0.04
91			OF/GS		78.3	14	10,280	10,280	28.6	28.6	0.58	1.24
120			GS/OF		66.3	18	10,202	10,202	28.3	28.3	0.58	1.28
408			CB/OF		117.0	7	10,094	10,094	28.0	28.0	0.57	
67			GS	5087-9003	71.8	15	9,577	9,577	26.6	26.6	0.54	1.16
188			CB/GS/OF		98.2	9	9,451	9,451	26.3	26.3	0.53	0.93
28			CB/EDP	3360-9010	8.0	90	8,253	8,253	22.9	22.9	0.47	
49			GS/SWPPP	4678-9003	8.5	75	7,766	7,766	21.6	21.6	0.44	0.70
75			OF		71.2	10	7,504	7,504	20.8	20.8	0.42	
125			GS/OF		59.5	14	7,502	7,502	20.8	20.8	0.42	0.89
92			OF/GS		76.3	8	7,246	7,246	20.1	20.1	0.41	0.70
30			CB/GS	3360-9010	6.8	90	7,081	7,081	19.7	19.7	0.40	0.68
178			OF		47.2	17	6,997	6,997	19.4	19.4	0.40	0.87
71			OF/GS/CB		34.9	23	6,949	6,949	19.3	19.3	0.39	0.89
33			CB/EDP/GS	6011-9010	22.4	39	6,799	6,799	18.9	18.9	0.38	0.95
6			OF/CB		18.4	31	6,553	6,553	18.2	18.2	0.37	

Rutland Town - Subwatershed Prioritization and Recommendations (p1 cont.)

Watershed Number	Action List #	Proposed or Existing Stormwater Treatment Practice	Estimated Basin Construction Cost	Estimated Other BMP Construction Cost	Cost of Sediment Removal Per Pound (based on annual sediment load)	Cost of Phosphorus Removal Per Pound (based on annual phosphorus load)	Assistance Program	Number of LID - Roof raingardens to treat WQv (Residential)	Raingarden Cost	Number of LID - Roof Raingardens to treat CPv (Residential)	Raingarden Cost
167	1	BR/CB/GS	\$57,333		\$24	\$11,690	ERP, Section 319, LCBP				
3000	1	disconnect from sanitary sewer					ERP, Section 319, LCBP				
81	2	GS/EDP					ERP, Section 319, LCBP	216	\$99,511	575	\$264,497
90	2	EDP/GS	\$277,409		\$48	\$27,380	ERP, Section 319, LCBP	206	\$94,928	455	\$209,246
20	2	BR/CB/GS	\$87,274		\$16	\$7,808	ERP, Section 319, LCBP				
158	2	IB/GS/OF	\$402,127		\$97	\$41,436	ERP, Section 319, LCBP	124	\$56,829	220	\$101,106
139	2	WP/CB/GS	\$37,767		\$68	\$31,375	ERP, Section 319, LCBP				
31	3	CB/EDP					ERP, Section 319, LCBP				
29	3	CB/EDP					ERP, Section 319, LCBP				
32	3	CB/EDP					ERP, Section 319, LCBP				
14								855	\$393,314		
271								657	\$302,021	1,082	\$497,542
9											
159								507	\$233,063	800	\$368,135
13											
128											
41											
459								401	\$184,384		
1											
119											
87								355	\$163,176	588	\$270,630
54											
72											
253								325	\$149,522	580	\$266,579
51											
210											
171								294	\$135,186	19	\$8,608
91								291	\$133,772	619	\$284,696
120								289	\$132,757	639	\$294,148
408											
67											
188								267	\$122,988	463	\$212,959
28											
49											
75								212	\$97,651		
125								212	\$97,628	445	\$204,688
92								205	\$94,289	350	\$160,915
30											
178								198	\$91,054	436	\$200,356
71								197	\$90,427	444	\$204,351
33											
6								185	\$85,279		

Rutland Town - Subwatershed Prioritization and Recommendations (p2)

*Subwatershed includes area in Rutland Town and Rutland City

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)	Phosphorus Load with Current Reductions (lbs)	Phosphorus Load with Priority Action (lbs)	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)
84			GS		67.5	9	6,507	6,507	18.1	18.1	0.37	0.64
170			OF		91.2	3	6,488	6,488	18.0	18.0	0.37	0.26
95			OF/GS		78.3	6	6,456	6,456	17.9	17.9	0.37	0.49
331			OF		82.9	4	6,414	6,414	17.8	17.8	0.36	0.40
200			OF/GS		53.8	12	6,374	6,374	17.7	17.7	0.36	
357			OF		76.7	5	6,253	6,253	17.4	17.4	0.35	0.46
55			CB/GS		15.0	36	6,211	6,211	17.3	17.3	0.35	0.59
257			CB/OF		63.6	9	6,209	6,209	17.2	17.2	0.35	0.62
353			OF		64.6	7	5,774	5,774	16.0	16.0	0.33	0.51
325			CB/TT	1-0823	6.3	70	5,695	5,695	15.8	15.8	0.32	0.49
8			OF/CB		19.2	25	5,644	5,644	15.7	15.7	0.32	
131			GS/OF		39.2	16	5,615	5,615	15.6	15.6	0.32	0.69
145			OF/GS		63.6	7	5,558	5,558	15.4	15.4	0.31	0.48
360			OF		63.4	6	5,389	5,389	15.0	15.0	0.30	0.44
162			GS/CB		40.3	15	5,335	5,335	14.8	14.8	0.30	0.64
379			OF/GS/SWPPP	5190-9003 5115-9003	35.2	21	5,201	5,201	14.4	14.4	0.29	
203			OF		34.8	11	5,171	5,171	14.4	14.4	0.29	
68			OF/GS		23.0	26	5,168	5,168	14.4	14.4	0.29	0.66
136			GS		30.1	19	5,036	5,036	14.0	14.0	0.28	0.64
204			OF		61.0	6	5,016	5,016	13.9	13.9	0.28	
80			GS/M/P	4375-INDS	15.4	46	4,840	4,840	13.4	13.4	0.27	0.77
208			GS/OF		26.9	21	4,838	4,838	13.4	13.4	0.27	
112			GS/OF		28.9	19	4,705	4,705	13.1	13.1	0.27	0.59
169			OF		63.9	3	4,603	4,603	12.8	12.8	0.26	0.20
18			CB/GS		6.1	61	4,455	4,455	12.4	12.4	0.25	
197			OF/GS	5497-9015	30.9	20	4,352	4,352	12.1	12.1	0.25	0.66
37			OF/GS		4.6	82	4,334	4,334	12.0	12.0	0.25	0.41
110			GS/OF		33.1	14	4,291	4,291	11.9	11.9	0.24	0.51
83			GS	1-1031	29.1	11	4,288	4,288	11.9	11.9	0.24	0.34
82			GS	1-1031	19.5	18	4,275	4,275	11.9	11.9	0.24	0.39
85			OF		37.9	11	4,268	4,268	11.9	11.9	0.24	0.48
150			OF		42.6	9	4,265	4,265	11.8	11.8	0.24	0.44
5			OF/SWPPP	5323-9003	19.4	30	4,225	4,225	11.7	11.7	0.24	
66			GS		7.6	46	4,104	4,104	11.4	11.4	0.23	0.39
206			GS		7.6	46	4,074	4,074	11.3	11.3	0.23	
15			OF		12.1	36	3,961	3,961	11.0	11.0	0.22	
176			CB/OF		32.9	7	3,933	3,933	10.9	10.9	0.22	0.27
356			CB/OF		16.6	27	3,901	3,901	10.8	10.8	0.22	0.50
194			OF/GS		50.1	4	3,892	3,892	10.8	10.8	0.22	0.25
349			OF		41.8	7	3,790	3,790	10.5	10.5	0.21	0.34
102			OF/GS/CB		24.4	18	3,764	3,764	10.5	10.5	0.21	0.47
117			CB	3902-9010	3.2	93	3,760	3,760	10.4	10.4	0.21	0.33
73			OF/CB/SWPPP	4382-9003	5.0	62	3,756	3,756	10.4	10.4	0.21	0.35
454			OF/GS		35.2	10	3,718	3,718	10.3	10.3	0.21	
36			WP/CB/GS	5607-9015	9.9	51	3,679	3,679	10.2	10.2	0.21	0.55
161			GS/OF		30.0	13	3,643	3,643	10.1	10.1	0.21	0.42
182			GS/OF	3288-9010	10.1	44	3,624	3,624	10.1	10.1	0.21	0.48

Rutland Town - Subwatershed Prioritization and Recommendations (p3)

*Subwatershed includes area in Rutland Town and Rutland City

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)	Phosphorus Load with Current Reductions (lbs)	Phosphorus Load with Priority Action (lbs)	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)
115			OF		21.9	19	3,556	3,556	9.9	9.9	0.20	0.45
12			OF		34.2	17	3,509	3,509	9.7	9.7	0.20	
453			OF/GS/CB		32.3	11	3,493	3,493	9.7	9.7	0.20	
213			CB/OF		22.5	17	3,421	3,421	9.5	9.5	0.19	0.43
38			OF/GS		5.6	58	3,329	3,329	9.2	9.2	0.19	0.36
160			OF		31.9	10	3,243	3,243	9.0	9.0	0.18	0.34
248			GS		22.7	16	3,240	3,240	9.0	9.0	0.18	
47			CB/GS	3093-9010	4.6	68	3,119	3,119	8.7	8.7	0.18	0.34
355			CB/OF		20.8	16	3,031	3,031	8.4	8.4	0.17	0.38
101			OF/GS		35.8	6	2,932	2,932	8.1	8.1	0.17	0.22
180			OF		33.1	7	2,859	2,859	7.9	7.9	0.16	0.24
4			GS		14.7	22	2,829	2,829	7.9	7.9	0.16	
76			CB/GS		19.3	16	2,788	2,788	7.7	7.7	0.16	
140			GS/CB		9.3	24	2,653	2,653	7.4	7.4	0.15	0.25
179			OF		33.9	5	2,651	2,651	7.4	7.4	0.15	0.17
202			CB/GS		17.0	18	2,649	2,649	7.4	7.4	0.15	
116			CB		2.3	91	2,630	2,630	7.3	7.3	0.15	0.23
157			OF		30.9	6	2,626	2,626	7.3	7.3	0.15	0.21
187			GS/OF		25.6	9	2,475	2,475	6.9	6.9	0.14	0.24
96			OF/GS		26.4	8	2,463	2,463	6.8	6.8	0.14	0.23
214			OF		32.3	4	2,456	2,456	6.8	6.8	0.14	0.14
109			GS/OF	3168-9010	9.9	20	2,392	2,392	6.6	6.6	0.14	0.22
163			GS/CB		18.2	14	2,390	2,390	6.6	6.6	0.14	0.29
181			CB/GS/OF	3288-9010	2.1	93	2,390	2,390	6.6	6.6	0.14	0.22
129			GS		13.6	20	2,324	2,324	6.5	6.5	0.13	0.30
172			WP/CB/GS	6430-9015	3.8	68	2,321	2,321	6.4	6.4	0.13	0.28
130			GS		5.2	46	2,294	2,294	6.4	6.4	0.13	0.26
89			GS		12.3	21	2,250	2,250	6.3	6.3	0.13	0.29
185			OF	3288-9010	30.9	7	2,248	2,248	6.2	6.2	0.13	0.25
3			GS		17.2	14	2,230	2,230	6.2	6.2	0.13	
105			OF/GS	3168-9010	10.0	30	2,224	2,224	6.2	6.2	0.13	0.33
193			OF/GS		2.9	62	2,173	2,173	6.0	6.0	0.12	0.20
121			CB/GS		17.6	8	2,149	2,149	6.0	6.0	0.12	0.15
127			CB/GS		20.8	10	2,147	2,147	6.0	6.0	0.12	0.23
23			GS/CB		5.3	34	2,115	2,115	5.9	5.9	0.12	
79			GS		5.8	31	2,106	2,106	5.9	5.9	0.12	0.20
196			CB/OF/GS		8.6	20	2,085	2,085	5.8	5.8	0.12	0.19
132			OF/WP	3404-9010	18.9	19	2,084	2,084	5.8	5.8	0.12	0.40
45			WP/CB	3687-9015	3.5	65	2,032	2,032	5.6	5.6	0.11	0.25
195			OF/GS		7.3	22	1,935	1,935	5.4	5.4	0.11	0.18
137			GS		14.4	15	1,912	1,912	5.3	5.3	0.11	0.23
190			CB/GS		7.2	22	1,909	1,909	5.3	5.3	0.11	
17			OF		23.4	11	1,906	1,906	5.3	5.3	0.11	
106			CB	3168-9010	3.0	52	1,865	1,865	5.2	5.2	0.11	0.17
118			CB	3902-9010	1.5	94	1,843	1,843	5.1	5.1	0.10	0.16
207			CB		2.0	76	1,809	1,809	5.0	5.0	0.10	
24			GS/CB/OF		2.7	56	1,790	1,790	5.0	5.0	0.10	
103			OF/GS/CB		12.3	16	1,777	1,777	4.9	4.9	0.10	0.22

Rutland Town - Subwatershed Prioritization and Recommendations (p3 cont.)

Watershed Number	Action List #	Proposed or Existing Stormwater Treatment Practice	Estimated Basin Construction Cost	Estimated Other BMP Construction Cost	Cost of Sediment Removal Per Pound (based on annual sediment load)	Cost of Phosphorus Removal Per Pound (based on annual phosphorus load)	Assistance Program	Number of LID - Roof raingardens to treat WQv (Residential)	Raingarden Cost	Number of LID - Roof Raingardens to treat CPv (Residential)	Raingarden Cost
115								101	\$46,277	225	\$103,357
12								99	\$45,666		
453								99	\$45,449		
213								97	\$44,511	214	\$98,406
38											
160								92	\$42,206	168	\$77,363
248								92	\$42,166		
47											
355								86	\$39,448	188	\$86,478
101								83	\$38,154	109	\$50,300
180								81	\$37,209	120	\$55,026
4								80	\$36,808		
76											
140											
179								75	\$34,494	87	\$39,891
202											
116											
157								74	\$34,167	106	\$48,893
187								70	\$32,206	122	\$56,095
96								70	\$32,053	116	\$53,507
214								69	\$31,958	72	\$32,971
109								68	\$31,125	110	\$50,469
163								68	\$31,104	144	\$66,223
181											
129								66	\$30,244	148	\$67,911
172											
130											
89								64	\$29,285	144	\$66,054
185								64	\$29,255	125	\$57,558
3											
105								63	\$28,947	166	\$76,238
193											
121											
127								61	\$27,945	113	\$51,875
23											
79											
196											
132											
45											
195											
137								54	\$24,882	115	\$53,113
190											
17								54	\$24,796		
106								53	\$24,267	87	\$40,004
118											
207											
24								51	\$23,293		
103								50	\$23,118	110	\$50,581

Rutland Town - Subwatershed Prioritization and Recommendations (p4)

*Subwatershed includes area in Rutland Town and Rutland City

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)	Phosphorus Load with Current Reductions (lbs)	Phosphorus Load with Priority Action (lbs)	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)
135			GS		21.2	6	1,773	1,773	4.9	4.9	0.10	0.14
215			OF		16.7	10	1,710	1,710	4.8	4.8	0.10	0.18
62			GS		5.4	35	1,650	1,650	4.6	4.6	0.09	0.20
124			OF		18.5	7	1,645	1,645	4.6	4.6	0.09	0.14
100			OF/GS/CB		10.9	17	1,625	1,625	4.5	4.5	0.09	0.20
40			CB/GS		2.6	52	1,594	1,594	4.4	4.4	0.09	0.15
123			GS	3168-9015	19.4	11	1,548	1,548	4.3	4.3	0.09	0.23
151			GS		15.3	9	1,498	1,498	4.2	4.2	0.08	0.15
94			GS		18.1	6	1,495	1,495	4.2	4.2	0.08	0.11
186			GS/OF		17.8	6	1,463	1,463	4.1	4.1	0.08	0.11
27			GS		15.6	15	1,445	1,445	4.0	4.0	0.08	
177			CB/OF		1.7	69	1,441	1,441	4.0	4.0	0.08	0.13
42			EDP/GS/CB	3536-9015.1	2.0	74	1,427	1,427	4.0	4.0	0.08	0.16
164			GS/CB		4.6	34	1,416	1,416	3.9	3.9	0.08	0.17
165			GS/DW		13.0	11	1,407	1,407	3.9	3.9	0.08	0.15
168			CB		1.6	71	1,396	1,396	3.9	3.9	0.08	0.13
189			GS/UD		7.1	22	1,370	1,370	3.8	3.8	0.08	0.18
264			CB/OF		5.4	29	1,336	1,336	3.7	3.7	0.08	0.17
48			CB		1.1	98	1,309	1,309	3.6	3.6	0.07	0.11
153			GS/OF		13.9	8	1,299	1,299	3.6	3.6	0.07	0.12
97			OF/GS/CB		10.8	12	1,243	1,243	3.5	3.5	0.07	0.14
39			CB/GS		2.8	36	1,198	1,198	3.3	3.3	0.07	0.11
205			CB		1.3	76	1,195	1,195	3.3	3.3	0.07	
59			CB/EDP	4095-9010	2.6	57	1,187	1,187	3.3	3.3	0.07	0.16
155			GS/OF		6.8	20	1,171	1,171	3.3	3.3	0.07	0.15
148			OF/GS		10.1	12	1,153	1,153	3.2	3.2	0.07	0.13
10			OF/CB		2.3	36	1,136	1,136	3.2	3.2	0.06	
46			CB/GS	3687-9015	1.3	78	1,096	1,096	3.0	3.0	0.06	0.11
78			GS/CB		3.4	26	1,049	1,049	2.9	2.9	0.06	
19			CB/WP	3589-9015	1.7	68	1,042	1,042	2.9	2.9	0.06	
152			OF/CB		11.1	8	1,038	1,038	2.9	2.9	0.06	0.10
183			GS/OF	3289-9010	3.5	38	1,033	1,033	2.9	2.9	0.06	0.15
147			OF		10.3	9	1,032	1,032	2.9	2.9	0.06	0.11
114			CB		0.9	92	1,022	1,022	2.8	2.8	0.06	0.09
122			OF		7.9	14	991	991	2.8	2.8	0.06	0.12
60			CB	4095-9010	0.7	103	960	960	2.7	2.7	0.05	0.08
88			GS		3.4	32	950	950	2.6	2.6	0.05	0.12
2			CB		0.9	81	929	929	2.6	2.6	0.05	
86			DW		5.7	23	921	921	2.6	2.6	0.05	0.14
58			OF/SB	4095-9010	3.0	44	912	912	2.5	2.5	0.05	
156			GS/OF/CB		4.2	25	893	893	2.5	2.5	0.05	0.11
93			CB/GS		4.5	16	880	880	2.4	2.4	0.05	0.08
21			CB		0.9	76	877	877	2.4	2.4	0.05	
22			CB		0.7	91	859	859	2.4	2.4	0.05	
44			OF/GS	3687-9015	0.8	87	843	843	2.3	2.3	0.05	0.08
154			GS/OF/CB		5.7	16	831	831	2.3	2.3	0.05	0.10
184			OF/CB	3289-9010	8.6	11	828	828	2.3	2.3	0.05	
358			GS		3.5	19	817	817	2.3	2.3	0.05	0.07

Rutland Town - Subwatershed Prioritization and Recommendations (p5)

*Subwatershed includes area in Rutland Town and Rutland City

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)	Phosphorus Load with Current Reductions (lbs)	Phosphorus Load with Priority Action (lbs)	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)
141			OF/CB		2.1	41	812	812	2.3	2.3	0.05	0.10
98			OF		7.6	10	793	793	2.2	2.2	0.04	0.08
138			CB/OF		1.8	46	793	793	2.2	2.2	0.04	0.09
201			CB/OF		1.0	67	780	780	2.2	2.2	0.04	
192			CB/GS		4.6	12	743	743	2.1	2.1	0.04	
149			OF		7.7	8	737	737	2.0	2.0	0.04	0.07
77			CB		0.6	97	724	724	2.0	2.0	0.04	
126			CB/GS		3.4	23	679	679	1.9	1.9	0.04	0.09
252			GS/CB	5973-9010	3.4	26	645	645	1.8	1.8	0.04	0.10
99			CB/OF		3.2	22	628	628	1.7	1.7	0.04	0.08
174			CB/GS/WP	6430-9015	4.9	23	627	627	1.7	1.7	0.04	0.12
26			GS/WP	6731-9015	7.2	12	612	612	1.7	1.7	0.03	
144			GS		6.3	9	610	610	1.7	1.7	0.03	0.06
43			CB/GS	3687-9015	0.8	69	600	600	1.7	1.7	0.03	0.06
52			CB/TT/URB	6736-INDS	0.5	92	587	587	1.6	1.6	0.03	0.05
53			CB	6736-INDS	0.5	95	581	581	1.6	1.6	0.03	0.05
64			GS/CB		2.2	29	546	546	1.5	1.5	0.03	0.07
104			OF/GS		4.1	13	508	508	1.4	1.4	0.03	0.06
111			GS/OF	3168-9010	1.3	32	504	504	1.4	1.4	0.03	0.05
146			CB		0.4	87	497	497	1.4	1.4	0.03	0.04
354			CB/OF		2.2	26	489	489	1.4	1.4	0.03	0.06
65			GS		2.2	25	469	469	1.3	1.3	0.03	0.06
50			DW		0.6	71	455	455	1.3	1.3	0.03	0.05
133			CB/GS	3404-9010	1.0	50	454	454	1.3	1.3	0.03	0.06
61			CB/IB	4095-9010	0.8	64	424	424	1.2	1.2	0.02	0.05
142			GS		1.5	31	412	412	1.1	1.1	0.02	0.05
191			CB/GS		0.5	67	408	408	1.1	1.1	0.02	
107			CB/EDP	3168-9015	0.7	68	406	406	1.1	1.1	0.02	0.05
143			GS/CB		1.0	35	405	405	1.1	1.1	0.02	0.04
7			OF/CB		1.4	31	387	387	1.1	1.1	0.02	
16			CB		0.4	79	360	360	1.0	1.0	0.02	
198			GS		0.3	89	316	316	0.9	0.9	0.02	
166			CB		0.3	85	314	314	0.9	0.9	0.02	0.03
134			CB/GS	3404-9010	0.7	53	305	305	0.8	0.8	0.02	0.04
11			CB/DW		1.9	22	303	303	0.8	0.8	0.02	
56			CB/OF		1.2	38	287	287	0.8	0.8	0.02	
57			CB/OF		0.6	57	274	274	0.8	0.8	0.02	
199			OF		4.1	0	271	271	0.8	0.8	0.02	
63			GS/OF		1.7	18	270	270	0.8	0.8	0.02	0.03
108			CB/GS	3168-9015	0.5	57	214	214	0.6	0.6	0.01	0.03
74			GS/WP	3589-9015	0.6	45	202	202	0.6	0.6	0.01	
175			CB/GS/VS/WP	6430-9015	3.0	1	201	201	0.6	0.6	0.01	0.00
25			CB		0.2	83	167	167	0.5	0.5	0.01	
173			CB/GS/WP	6430-9015	2.0	11	157	157	0.4	0.4	0.01	0.02
460			CB/EDP		1.3	20	141	141	0.4	0.4	0.01	0.03
35			WP	5511-9015	1.9	2	125	125	0.3	0.3	0.01	0.00

Target Maps

*Showing Priority Action List
Drainage Areas*

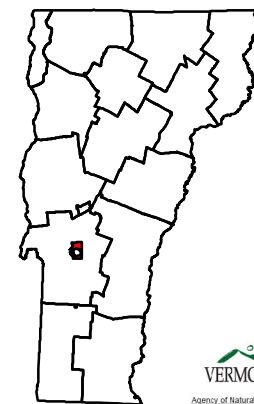
And Potential Retrofit Locations

Rutland Town

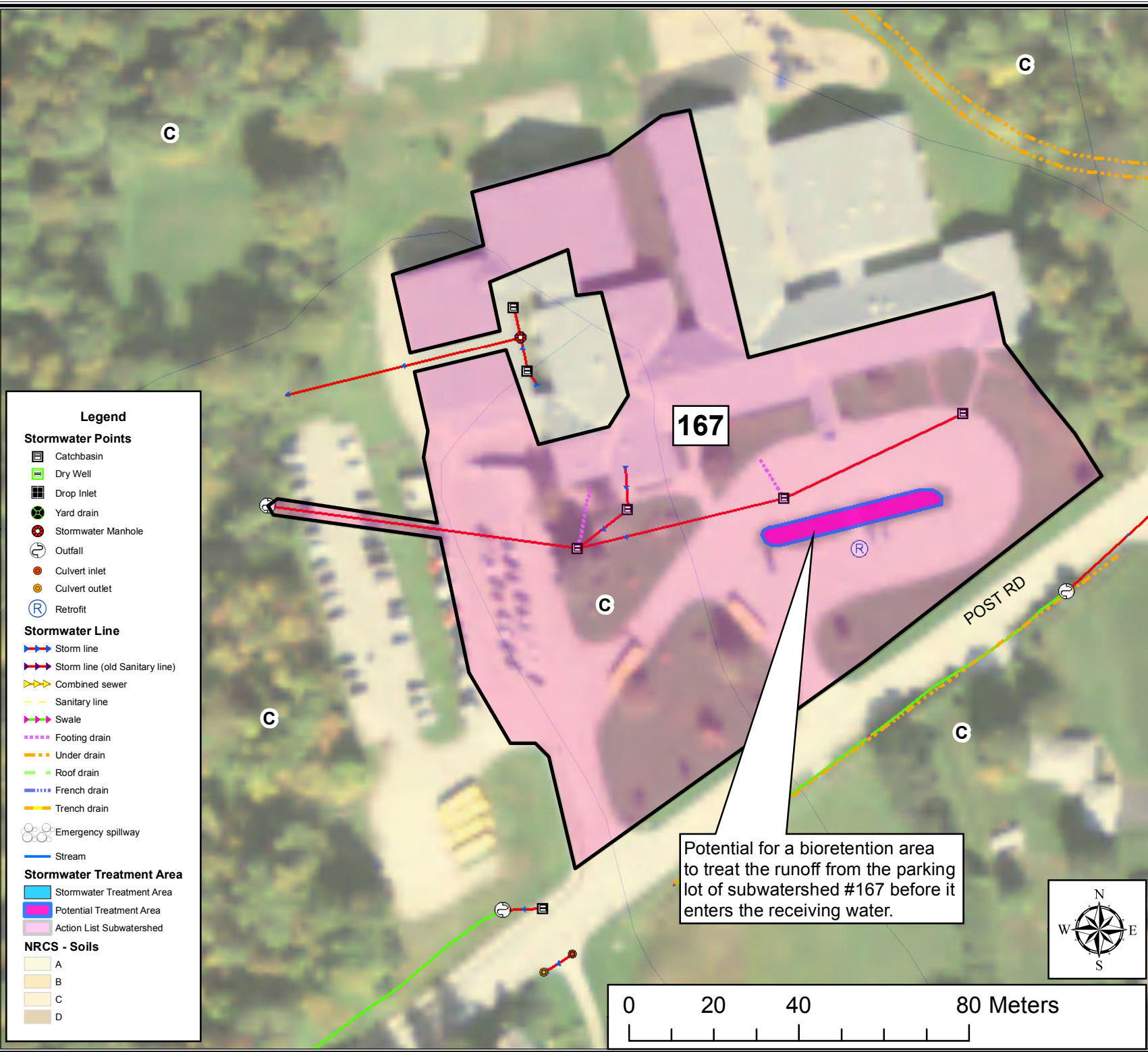
Action List 1 Subwatershed: 167

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.



VTANR - DEC - WSMD
 Creator: Jim Pease, Collin Smythe
 Date: 6/26/2012
 Data Sources: Field data, Town and stormwater permit plans, existing GIS data, GPS data, municipal member knowledge, VTRANS roads data, VT Hydrography dataset, NRCS soils map
 Imagery Source: NAIP 2011



Potential for a bioretention area to treat the runoff from the parking lot of subwatershed #167 before it enters the receiving water.

Legend

Stormwater Points

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

Stormwater Line

- Storm line
- Storm line (old Sanitary line)
- Combined sewer
- Sanitary line
- Swale
- Footing drain
- Under drain
- Roof drain
- French drain
- Trench drain
- Emergency spillway
- Stream

Stormwater Treatment Area

- Stormwater Treatment Area
- Potential Treatment Area
- Action List Subwatershed

NRCS - Soils

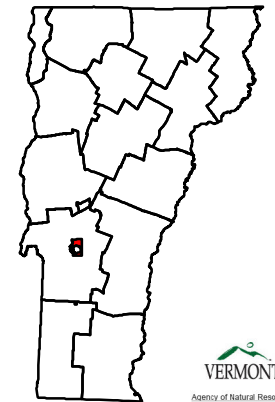
- A
- B
- C
- D

Rutland Town

Action List 1 Subwatershed: 3000

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.



VTANR - DEC - WSMD
 Creator: Jim Pease, Collin Smythe
 Date: 6/26/2012
 Data Sources: Field data, Town and stormwater permit plans, existing GIS data, GPS data, municipal member knowledge, VTRANS roads data, VT Hydrography dataset, NRCS soils map
 Imagery Source: NAIP 2011

C

Potential to disconnect this catchbasin from the sanitary sewer system.

C

3000

D

C

D

SEWARD RD

QUALITY LN

Legend

Stormwater Points

- Catchbasin
- Dry Well
- Drop Inlet
- Yard drain
- Stormwater Manhole
- Outfall
- Culvert inlet
- Culvert outlet
- Retrofit
- Sanitary Manhole
- CB tied to sanitary sewer

Stormwater Line

- Storm line
- Storm line (old Sanitary line)
- Combined sewer
- Sanitary line
- Swale
- Footing drain
- Under drain
- Roof drain
- French drain
- Trench drain
- Emergency spillway

Stream

Stormwater Treatment Area

- Stormwater Treatment Area
- Potential Treatment Area
- Action List Subwatershed

NRCS - Soils

- A
- B
- C
- D



0 20 40 80 Meters

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.

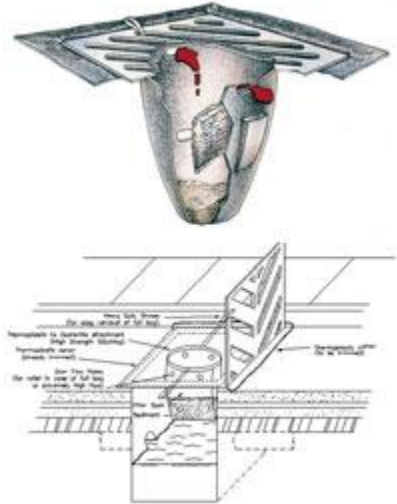
A periodic spill “fire drill” should be conducted to help prepare Town personnel in the event of a spill.

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 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.

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.

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(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

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(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.

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(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**.

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(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.

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(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.