CITY AND TOWN OF

ST. ALBANS

STORMWATER MAPPING PROJECT

MARCH 2009

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 ANR Clean and Clear 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. Another benefit of knowing the layout and extent of the stormwater system is the possibility to address existing untreated 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 main 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 things such as 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, existing GIS data from contractors, and the input and guidance of knowledgeable members from 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, Digital Elevation Models (DEMs), and 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 more impervious cover. Combining the drainage polygons with an effective impervious connectivity rating (Sutherland, 1995) of the stormwater subwatersheds was the first step in determining potential locations for the best cost/benefit stormwater retrofits.

Impervious cover layers were created 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 as accurate as possible. A 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. This percentage of impervious surface area for each subwatershed was then adjusted with the connectivity rating. This rating depended upon existing stormwater treatment practices for the area and how directly connected the area was to the outfall (Sutherland, 1995), for example whether it went directly into a pipe versus flowing over a grassy area where it would infiltrate.

The drainage areas were selected generally by size and percentage of impervious of the subwatershed, which correlates with the sediment, phosphorus, or nitrogen loads produced. Larger areas that have a greater percentage of their areas as impervious cover were the focus. These subwatershed selections were then modified depending on knowledge gained through field visits, or other available information. After the drainage areas were chosen they were prioritized based on the relative amounts of sediment and phosphorus they could potentially produce. These subwatersheds were given an Action List number ranging from 1 (highest priority) to 3 (lower priority)/ A potential retrofit treatment structure/practice was suggested for each Action List subwatershed, the type of treatment varied depending on availability of potentially "open" land where a treatment structure could be put in place. Availability of "open" land was based solely upon ortho photos and does not indicate land ownership or actual availability.

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 2.1inch 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

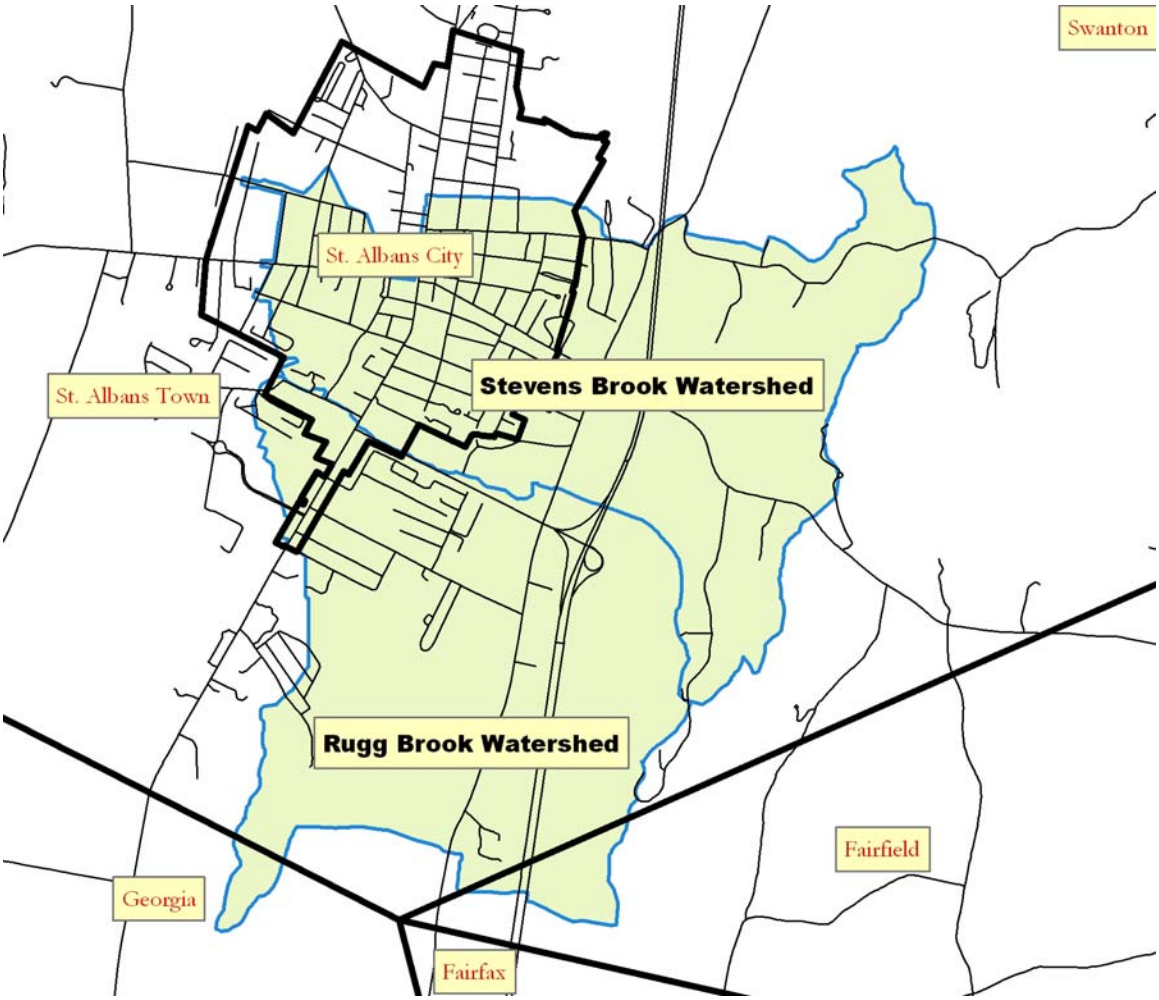
Schueler, T. 1987. Technical Documentation of a Simple Method for Estimating Urban Storm Pollutant Export. Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs. Appendix A.

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

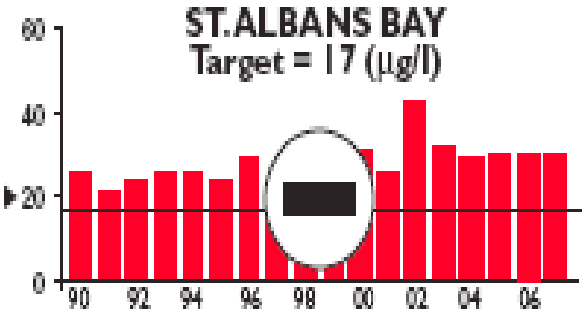
Sutherland, R. 1995. Methodology for Estimating the Effective Impervious Area of Urban Watersheds. Technical Note 58 – Pervious Area Management. Watershed Protection Techniques. Vol. 2, No. 1

***All data was created in a ArcGIS 9.3.1 Geodatabase format and is available from VTDEC.**

Note: This report does not include stormwater discharges to the Rugg Brook watershed in St Albans Town and City or the section of Stevens Brook which is impaired for stormwater and located upstream of Pearl Street in St Albans City. See map below. Stormwater discharges in these subwatersheds will be assessed thru a separate plan developed by the VTDEC Stormwater Section and the respective municipality.

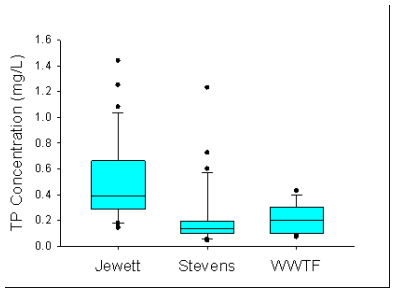


St Albans Bay Phosphorus Overview



-Graph shows the target line for phosphorus concentration in St Albans Bay as well as the actual monitored concentrations from 1990 thru 2006. The central symbol shows that there has been a negative trend of increasing concentration over the time span.

-Bay Tributary monitoring data from 2009-2010. Total phosphorus loading from each land use and each bay watershed has not yet been calculated.



DEVELOPED
All roads, cities, suburbs, lawns and large-lot buildings.

AGRICULTURE
Crop and livestock production.

-Figure shows the breakdown of contributions from nonpoint sources in the St Albans Bay Watershed to total Phosphorus loading of the Bay.

Figures taken from the Lake Champlain Basin Program - *State of the Lake and Ecosystem Indicators Report* (2008).

St. Albans - Subwatershed Prioritization and Recommendations (p1)

Watershed Number	Action List	Proposed or Existing Stormwater Treatment Practice	Permit Number	Watershed Area (Acres)	Percent Mapped Impervious Area (MIA)	EIA Equation (RANK)	Percent Effective Impervious Area
10	1	Existing Ext Det. Basin, upgrade to 2002	3070-9010	12.37	64.3	5	41
12	1	Convert Asphalt Swale to Grass Swale		3.03	15.0	1	6
13	1	Convert Asphalt Swale to Grass Swale		6.49	23.9	1	12
11	1	Existing Infiltration basin	3207-9010	4.18	96.5	5	93
14	1	Combine with 11		7.63	50.8	1	36
18	1	Wet Pond		5.15	94.2	3	94
3	1/1	Upgrade Permitted Basin to Ext Det. Micro Pool & Combine Outfall with 18*	3419-9010	11.74	66.8	2	62
19	1	Ext Det. Micro Pool		9.70	65.4	2	60
57	1	Filter strip		2.66	53.8	1	39
60	1	Correct Erosion Near 1328 Swanton Rd	Upper drainage covered by 5531-9010	27.76	22.1	1	10
61	1	Stream Buffer in Corn Field		16.11	6.7	1	2
62	1	Stream Buffer in Corn Field		21.76	13.0	1	5
17	1/1	Ext Det. Micro Pool & Correct Erosion Near 34 Sheldon Rd		36.99	30.9	1	17
63	1	Combine with 17		28.64	32.6	2	26
66	1	Wetland or Ext Det. Micro Pool at WWTP site	Coote Field IP covered by 1-0702	12.93	72.5	3	73
23	1	Combine with 66		21.12	80.6	2	78
47	1	Combine with 23		9.45	62.5	1	49
28		Combine with 66 or Ext Det. Micro Pool		99.18	33.3	2	27
50	1	Combine with 28		3.76	89.7	2	88
21	2	Combine With 66 & Clean-up Site		6.85	86.5	2	84
71	1	Permit Has Title 3 for Old 10 yr Design Pond; Motivate to Upgrade, Site Not Yet Built	3154-9010.1	50.53	2.3	5	0
20	1/1	Wet Swale & Remove Old Culvert In Lower Swale		13.73	47.1	1	32
65	1/1	Filter Strip/No Dumping		3.96	55.6	1	41
24	2/1	Ext Det. Micro Pool in RR Cloverleaf & Stabilize Eroded Outfall Into Stream		9.53	60.6	2	55
67	2/1	Permit Has Title 3 for Old 2 yr Design; Motivate to Upgrade & Break Old Ag Tile Drains In Field/Remove Old Ag Road Culvert/Plant Stream Buffer-No Mow Zone	3178-9010	51.52	28.3	4	12

St. Albans - Subwatershed Prioritization and Recommendations (p1 cont.)

Watershed Number	Action List	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)	Water Quality Volume (ft^3)	Channel Protection Volume (ft^3)	WQv (m^3)	CPv (m^3)	Estimated Basin Construction Cost	Estimated Other BMP Construction Cost	Assistance Program
10	1	0.39	0.84	17,081	36,412	484	1,031		$25,000	ANR-CWSRF, C&C, 319
12	1	0.02	0.05	1,012	2,076	29	59		$500	VYCC
13	1	0.08	0.16	3,295	7,105	93	201		$500	VYCC
11	1	0.28	0.42	12,138	18,461	344	523		$15,000	ANR-CWSRF, C&C, 319
14	1	0.22	0.41	9,369	17,729	265	502	included in above		
18	1	0.35	0.51	15,092	22,170	427	628	$186,311		ANR-CWSRF, C&C, 319
3	1/1	0.53	0.82	23,273	35,844	659	1,015		$15,000	ANR-CWSRF, C&C, 319
19	1	0.43	0.67	18,797	29,012	532	822	$239,044		ANR-CWSRF, C&C, 319
57	1	0.08	0.15	3,523	6,549	100	185		$500	Partnerships in Wildlife/VYCC
60	1	0.30	0.65	13,032	28,098	369	796		$250	Better Backroads/VYCC
61	1	0.08	0.11	3,447	4,915	98	139		$500	CREP-DAFM/Partnerships in Wildlife/VYCC
62	1	0.15	0.30	6,562	12,964	186	367		$500	CREP-DAFM/Partnerships in Wildlife/VYCC
17	1/1	0.57	1.20	24,713	52,257	700	1,480	$731,666	$500	ANR-CWSRF, C&C, 319 / VTrans-Enhancement
63	1	0.61	0.98	26,698	42,666	756	1,208	included in above		
66	1	0.68	0.98	29,687	42,894	841	1,215	$2,806,016		ANR-CWSRF, C&C, 319 / VTrans-Enhancement, Insufficient room for 33% of basin
23	1	1.18	1.79	51,576	77,802	1,461	2,203	included in above		
47	1	0.35	0.62	15,279	27,023	433	765	included in above		
28		2.17	3.47	94,616	151,229	2,680	4,283	included in above		
50	1	0.24	0.35	10,377	15,446	294	437	included in above		
21	2	0.42	0.62	18,144	27,130	514	768	included in above		Anti-litter Ordinance
71	1	0.19	0.12	8,333	5,317	236	151			
20	1/1	0.35	0.68	15,274	29,550	433	837		$1,000	C&C, 319
65	1/1	0.13	0.23	5,472	10,065	155	285		$500	Partnerships in Wildlife/Anti-litter Ordinance
24	2/1	0.39	0.61	16,989	26,410	481	748		$500	VYCC
67	2/1	0.60	1.53	26,192	66,631	742	1,887		$1,000	Partnerships in Wildlife/VYCC

St. Albans - Subwatershed Prioritization and Recommendations (p2)

Watershed Number	Action List	Proposed or Existing Stormwater Treatment Practice	Permit Number	Watershed Area (Acres)	Percent Mapped Impervious Area (MIA)	EIA Equation (RANK)	Percent Effective Impervious Area
15	2	Existing Ext Det. Basin, Upgrade to 2002	4219-9010	7.48	46.1	5	21
31	2	Wetland or wet swale		12.11	33.3	1	19
32	2	Ext Det. Micro Pool		6.09	70.0	1	59
37	2	Ext Det. Micro Pool		16.59	40.3	1	26
58	2	Check Dams In Long Western Swale		3.65	34.1	1	20
30	3/1	Roof Cisterns, Remove Culvert In Stream on N-side		2.69	86.4	2	84
25	3/1	Ext Det. Micro Pool & Stream Buffer		3.48	27.9	2	22
59	3/1	Small Ext Det Micro Pool & Stream Buffer In Corn Field		6.81	51.1	1	37
26	3	Ext Det. Micro Pool Along East Side of Baseball Field		24.84	29.6	2	23
29	3	Roof Cisterns		1.71	94.2	3	94
39	3	Clean RR Swales and Install Check Dams	4521-9003	11.15	26.5	1	14
40	3	Bioretention		3.93	81.6	1	74
22	4/1	Break Pipe and Install Ext Det. Micro Pool for Future Use & Stream Buffer		10.84	61.2	1	48
27	4	Ext Det. Micro Pool		8.71	38.1	2	32
5	4	Ext Det. Micro Pool		3.14	12.0	4	3
6	4	Bioretention		0.62	75.4	1	65
8	4	Enhance Natural Detention Area		1.22	86.1	1	80
48	4	Small Ext Det Micro Pool		9.27	31.7	1	18
1		Existing Wet Pond	3106-9010	4.08	83.3	5	69
2		NA		1.98	19.3	1	8
4		Existing Wet Pond	3178-9010	2.47	64.4	5	42
7		NA		1.35	87.0	2	85
9		Existing Wet Pond	3006-9015	3.79	68.4	5	47
16		NA		6.04	26.9	1	14
33		Existing Natural Detention area		0.75	77.2	1	68

St. Albans - Subwatershed Prioritization and Recommendations (p2 cont.)

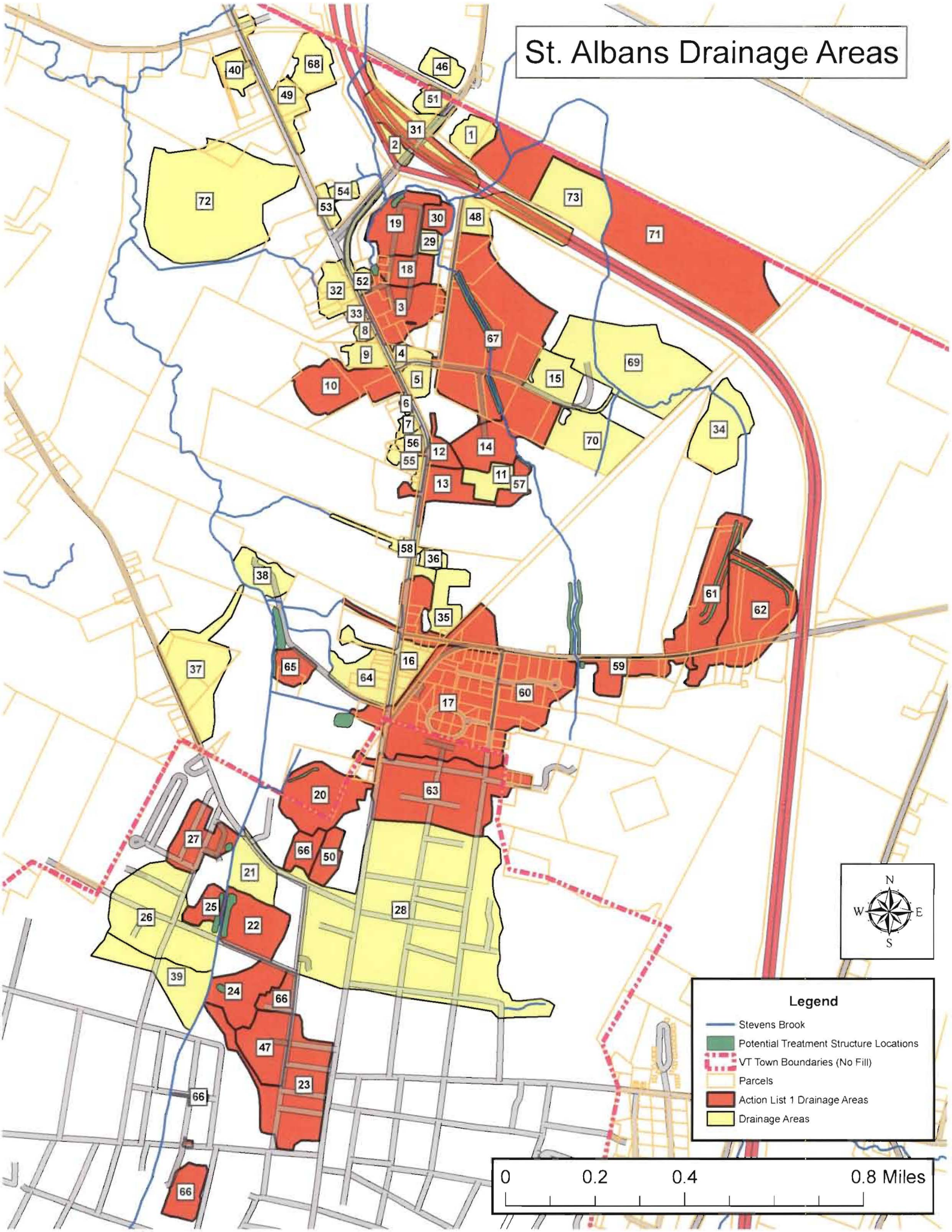
Watershed Number	Action List	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)	Water Quality Volume (ft^3)	Channel Protection Volume (ft^3)	WQv (m^3)	CPv (m^3)	Estimated Basin Construction Cost	Estimated Other BMP Construction Cost	Assistance Program
15	2	0.14	0.36	5,893	15,765	167	446			
31	2	0.20	0.42	8,821	18,445	250	522			
32	2	0.26	0.45	11,469	19,478	325	552			
37	2	0.35	0.70	15,208	30,611	431	867			
58	2	0.06	0.13	2,732	5,690	77	161			
30	3/1	0.16	0.24	7,097	10,614	201	301		$1,000	C&C, 319
25	3/1	0.06	0.10	2,787	4,435	79	126		$500	Partnerships in Wildlife/VYCC
59	3/1	0.19	0.37	8,442	15,941	239	451		$1,000	CREP-DAFM/Partnerships in Wildlife/VYCC
26	3	0.48	0.77	21,097	33,648	597	953			
29	3	0.12	0.17	5,021	7,375	142	209			
39	3	0.14	0.31	6,297	13,521	178	383			
40	3	0.21	0.34	9,162	14,675	259	416			
22	4/1	0.39	0.70	17,041	30,356	483	860		$1,000	Partnerships in Wildlife/VYCC
27	4	0.22	0.35	9,506	15,179	269	430			
5	4	0.02	0.04	764	1,720	22	49			
6	4	0.03	0.05	1,303	2,152	37	61			
8	4	0.07	0.11	3,068	4,810	87	136			
48	4	0.15	0.31	6,390	13,461	181	381			
1		0.21	0.36	8,993	15,550	255	440			
2		0.02	0.04	820	1,754	23	50			
4		0.08	0.17	3,423	7,290	97	206			
7		0.08	0.12	3,589	5,364	102	152			
9		0.13	0.27	5,824	11,843	165	335			
16		0.08	0.17	3,465	7,433	98	211			
33		0.04	0.06	1,614	2,642	46	75			

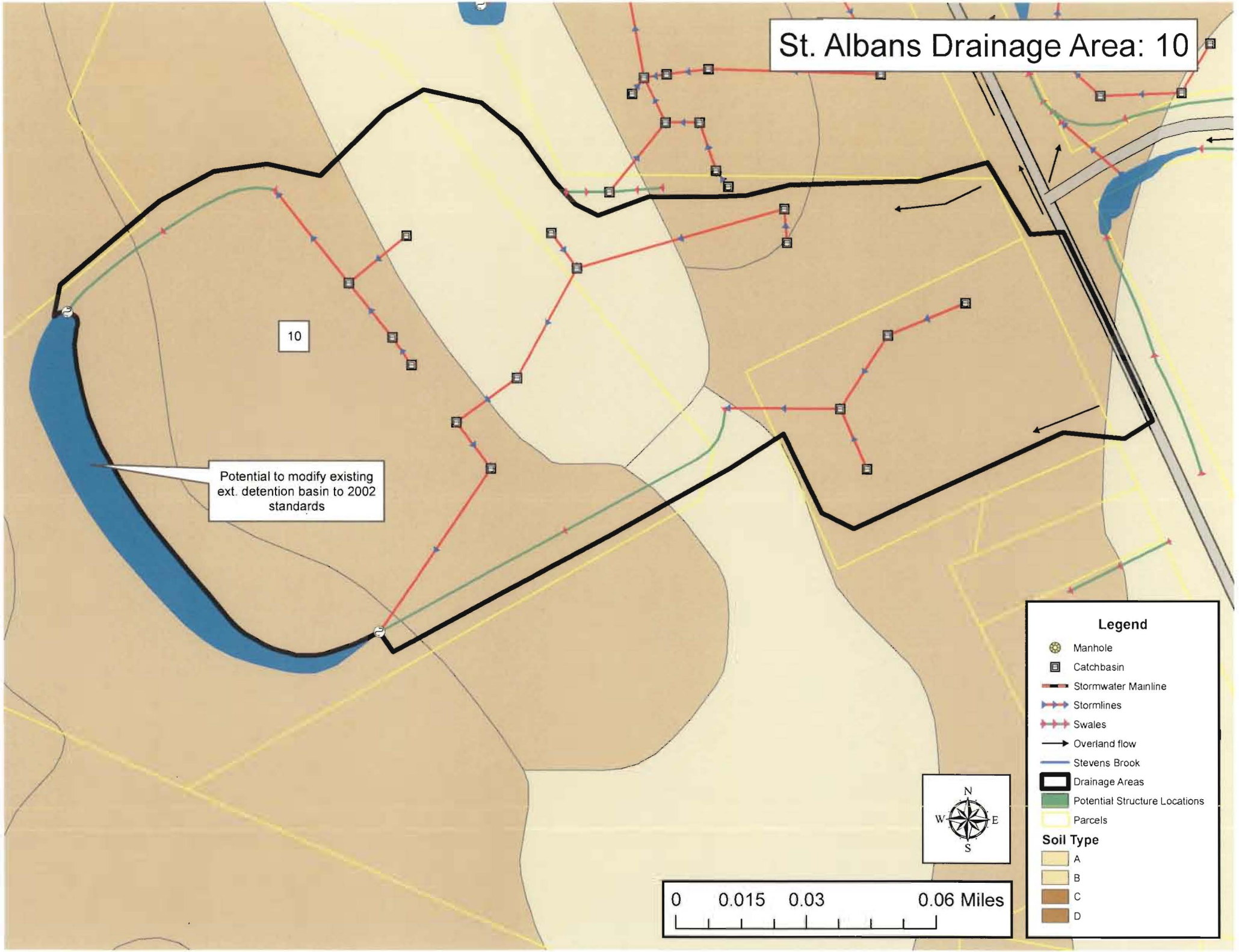
St. Albans - Subwatershed Prioritization and Recommendations (p3)

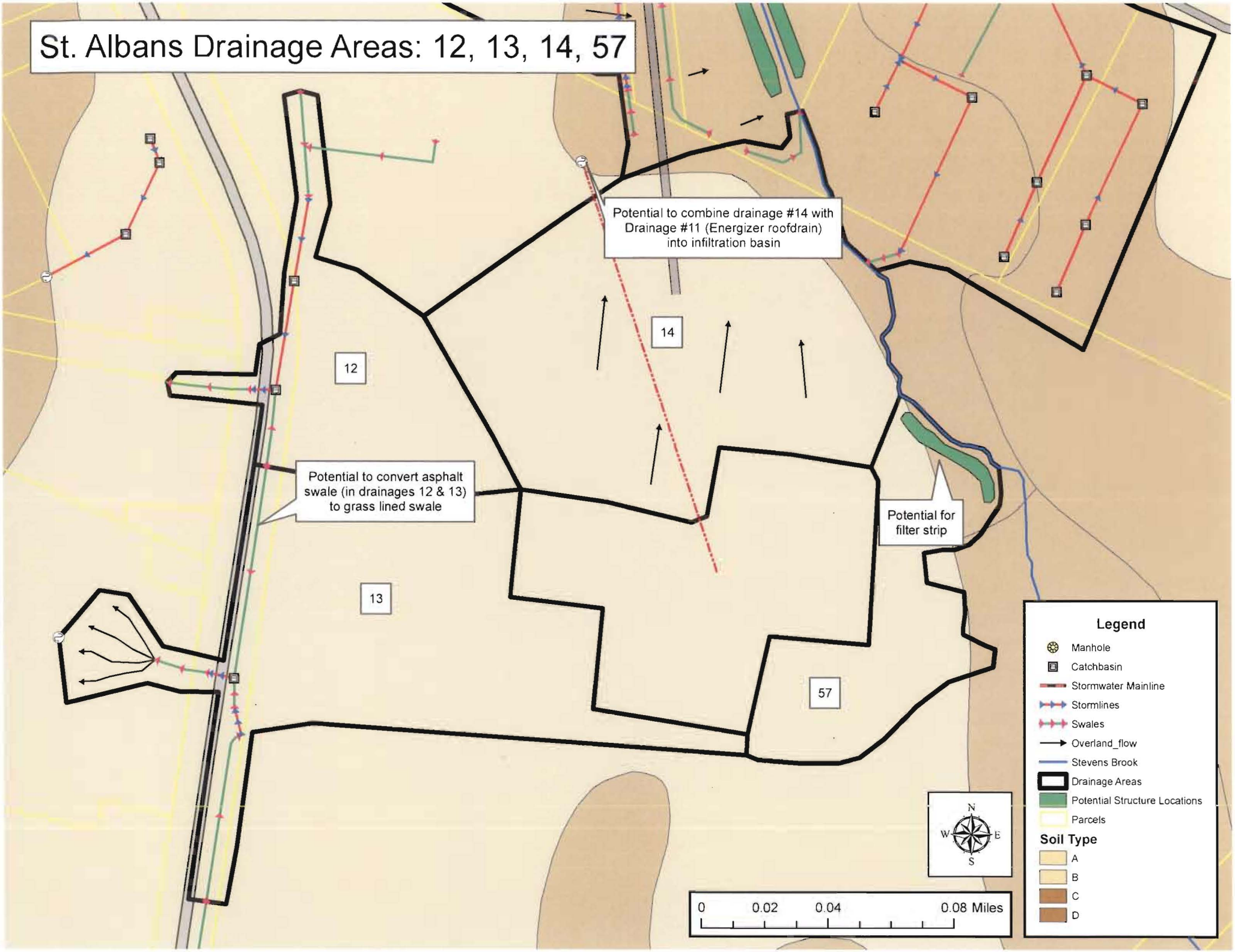
Watershed Number	Action List	Proposed or Existing Stormwater Treatment Practice	Permit Number	Watershed Area (Acres)	Percent Mapped Impervious Area (MIA)	EIA Equation (RANK)	Percent Effective Impervious Area
34		Existing Ext Det. Micro Pool	3604-9015	12.06	32.8	5	11
35		Existing Ext Det. Micro Pool	3727-9015	5.57	38.6	5	15
36		Existing Ext Det. Micro Pool	3875-9015	1.55	53.4	5	29
38		SWPPP	4947-9003	5.57	35.2	1	21
41		Existing Grass Swales	5950-9010	11.27	15.6	4	4
42		Existing Grass Swales	5950-9010	2.69	11.5	4	3
43		Existing Grass Swales	5950-9010	6.46	17.0	4	5
44		Existing Grass Swales	5950-9010	12.43	16.1	4	4
45		Existing Grass Swales	5950-9010	3.18	66.4	4	50
46		Existing Wet Pond & Infiltration Basin	4145-9015	3.45	96.1	5	92
49		NA		6.63	29.8	1	16
51		Existing Ext Det. Micro Pool	Rear lot covered by	2.56	80.6	4	70
52		Existing Grass Swales	3474-9010	3.11	57.4	1	44
53		NA		1.96	81.8	1	74
54		NA		1.34	76.2	1	67
55		NA		2.47	52.4	1	38
56		NA		1.85	37.6	1	23
64		NA		8.32	35.5	1	21
68		Existing Ext Det. Micro Pool	3830-9015	6.23	41.4	5	17
69		Existing Ext Det. Micro Pool	3599-9015	29.09	5.6	5	0
70		Existing Ext Det. Micro Pool	3759-9015	12.46	1.9	5	0
72		Existing Ext Det. Micro Pool	3655-9015	43.14	0.7	5	0
73		Existing Wet Pond	3154-9015	12.48	0.0	5	0
TOTALS				**827.44**			

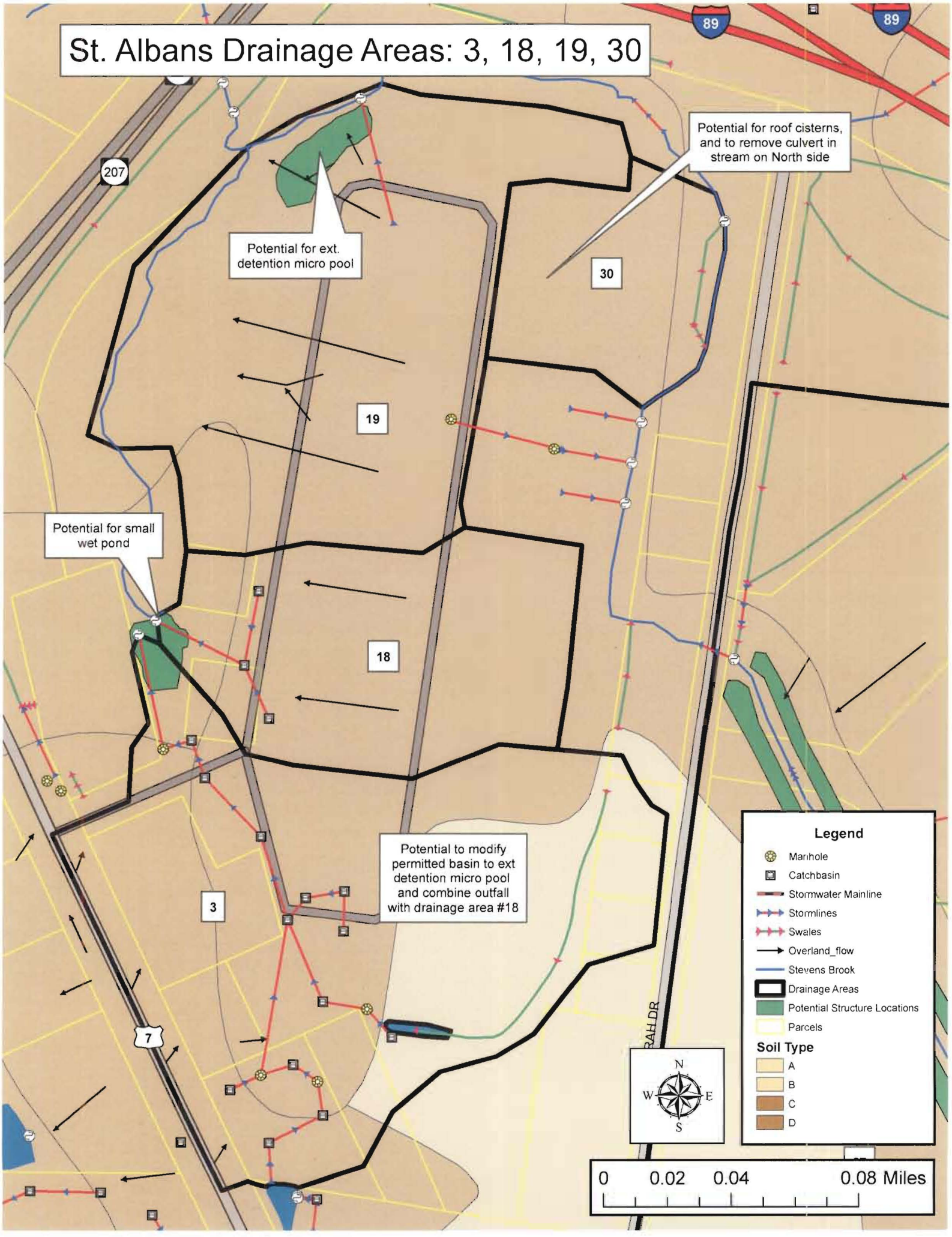
St. Albans - Subwatershed Prioritization and Recommendations (p3 cont.)

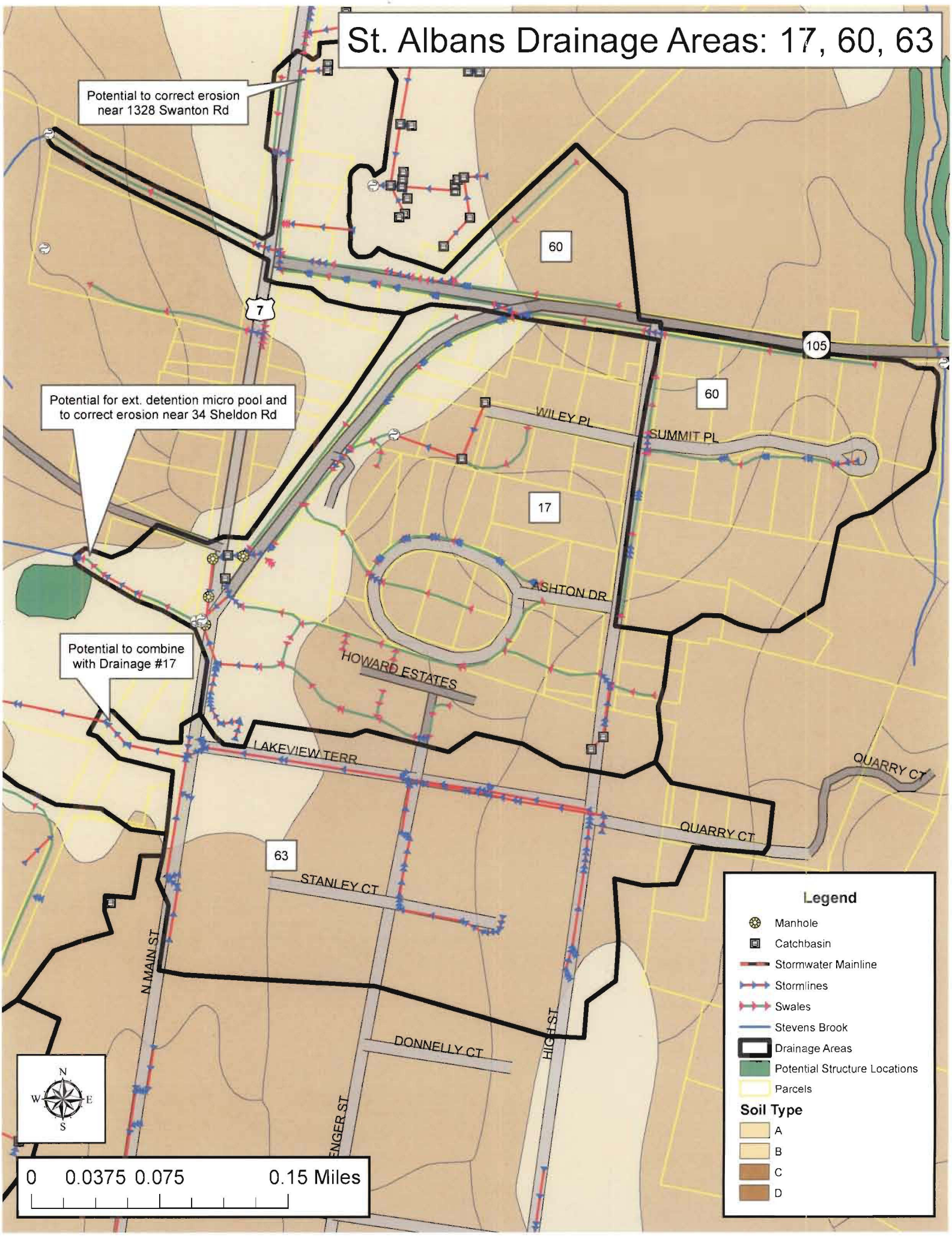
Watershed Number	Action List	Water Quality Volume (Acre-Feet)	Channel Protection (Acre-Feet)	Water Quality Volume (ft^3)	Channel Protection Volume (ft^3)	WQv (m^3)	CPv (m^3)	Estimated Basin Construction Cost	Estimated Other BMP Construction Cost	Assistance Program
34		0.13	0.42	5,784	18,090	164	512			
35		0.08	0.23	3,352	9,838	95	279			
36		0.04	0.09	1,553	3,787	44	107			
38		0.10	0.21	4,331	8,969	123	254			
41		0.07	0.18	3,252	8,028	92	227			
42		0.01	0.03	642	1,419	18	40			
43		0.05	0.12	1,998	5,035	57	143			
44		0.08	0.21	3,673	9,141	104	259			
45		0.12	0.22	5,200	9,653	147	273			
46		0.23	0.35	9,923	15,148	281	429			
49		0.10	0.21	4,250	9,029	120	256			
51		0.13	0.22	5,664	9,444	160	267			
52		0.10	0.19	4,482	8,158	127	231			
53		0.11	0.17	4,592	7,347	130	208			
54		0.07	0.11	2,838	4,668	80	132			
55		0.07	0.14	3,154	5,912	89	167			
56		0.04	0.07	1,558	3,186	44	90			
64		0.15	0.31	6,536	13,514	185	383			
68		0.10	0.27	4,154	11,789	118	334			
69		0.12	0.17	5,023	7,488	142	212			
70		0.05	0.02	2,048	1,057	58	30			
72		0.16	0.03	7,052	1,307	200	37			
73		0.05	0.00	2,038	0	58	0			
TOTALS		**16.82**	**29.33**							

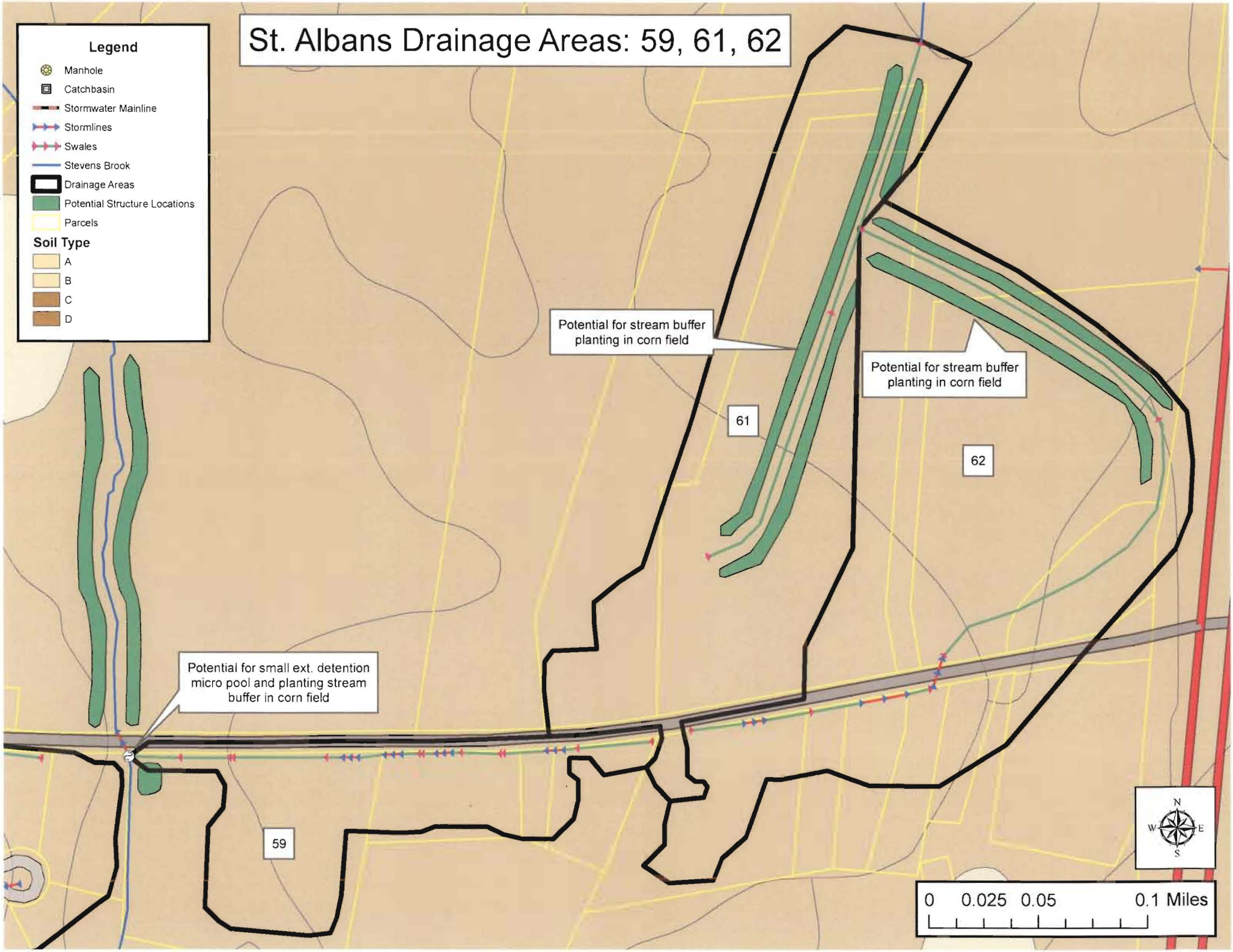

St. Albans Drainage Areas
N
W
E
S
Legend
Stevens Brook
Potential Treatment Structure Locations
VT Town Boundaries (No Fill)
Parcels
Action List 1 Drainage Areas
Drainage Areas
0
0.2
0.4
0.8 Miles

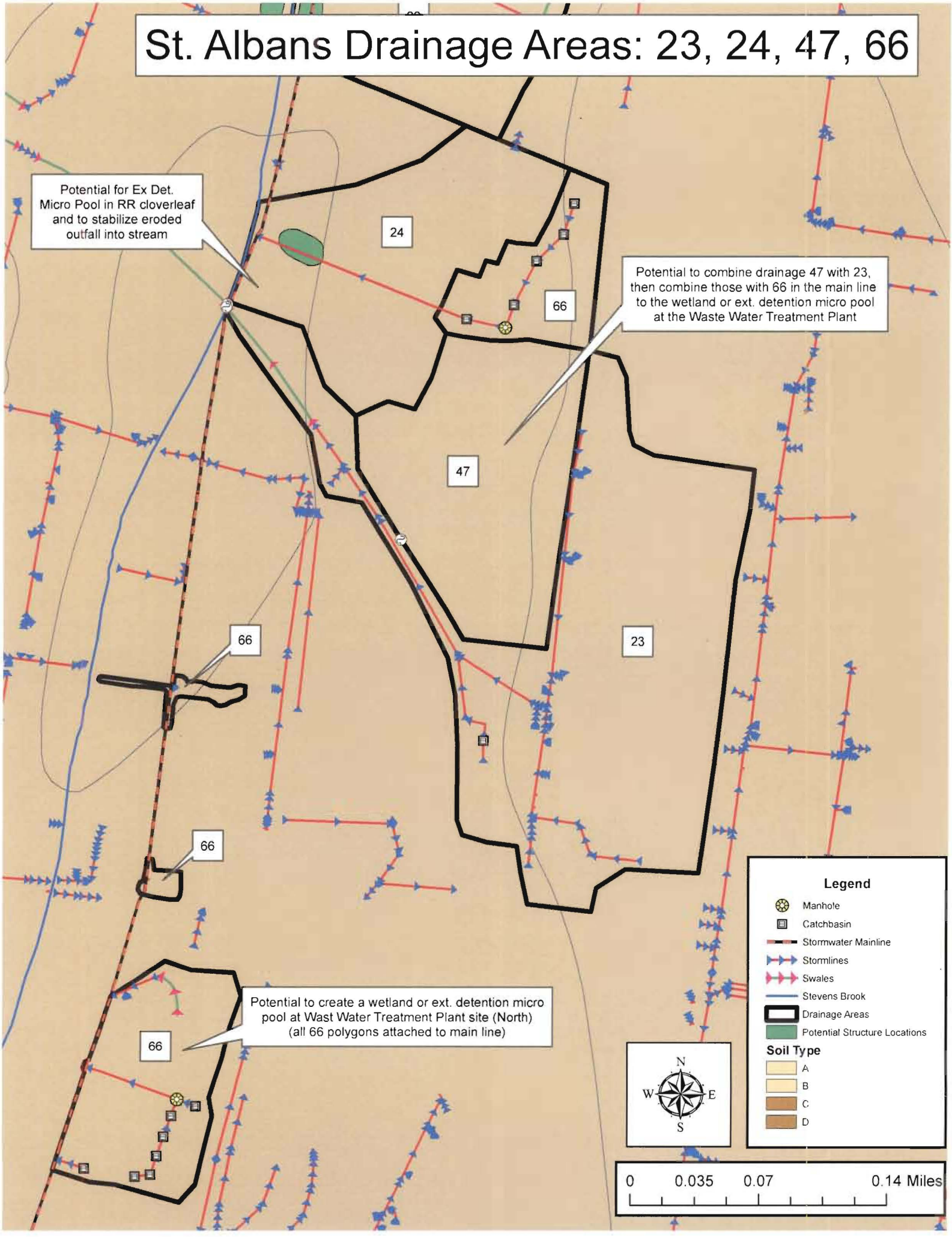

St. Albans Drainage Area: 10
10
Potential to modify existing ext. detention basin to 2002 standards
Legend
Manhole
Catchbasin
Stormwater Mainline
Stormlines
Swales
Overland flow
Stevens Brook
Drainage Areas
Potential Structure Locations
Parcels
Soil Type
A
B
C
D
N
W
E
S
0
0.015
0.03
0.06 Miles

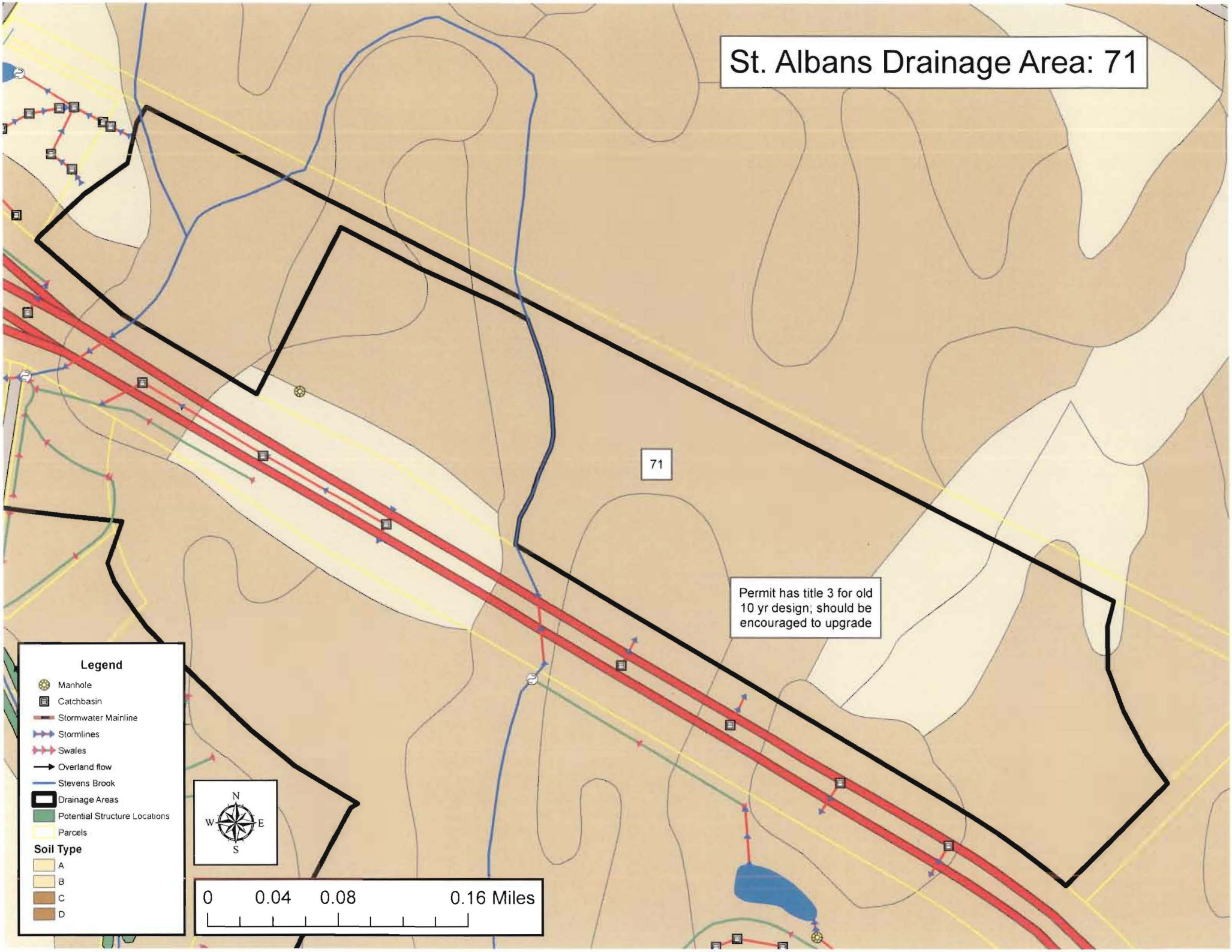

St. Albans Drainage Areas: 12, 13, 14, 57
Potential to combine drainage #14 with Drainage #11 (Energizer roofdrain) into infiltration basin
Potential to convert asphalt swale (in drainages 12 & 13) to grass lined swale
Potential for filter strip
12
13
14
57
Legend
Manhole
Catchbasin
Stormwater Mainline
Stormlines
Swales
Overland_flow
Stevens Brook
Drainage Areas
Potential Structure Locations
Parcels
Soil Type
A
B
C
D
N
W
E
S
0
0.02
0.04
0.08 Miles

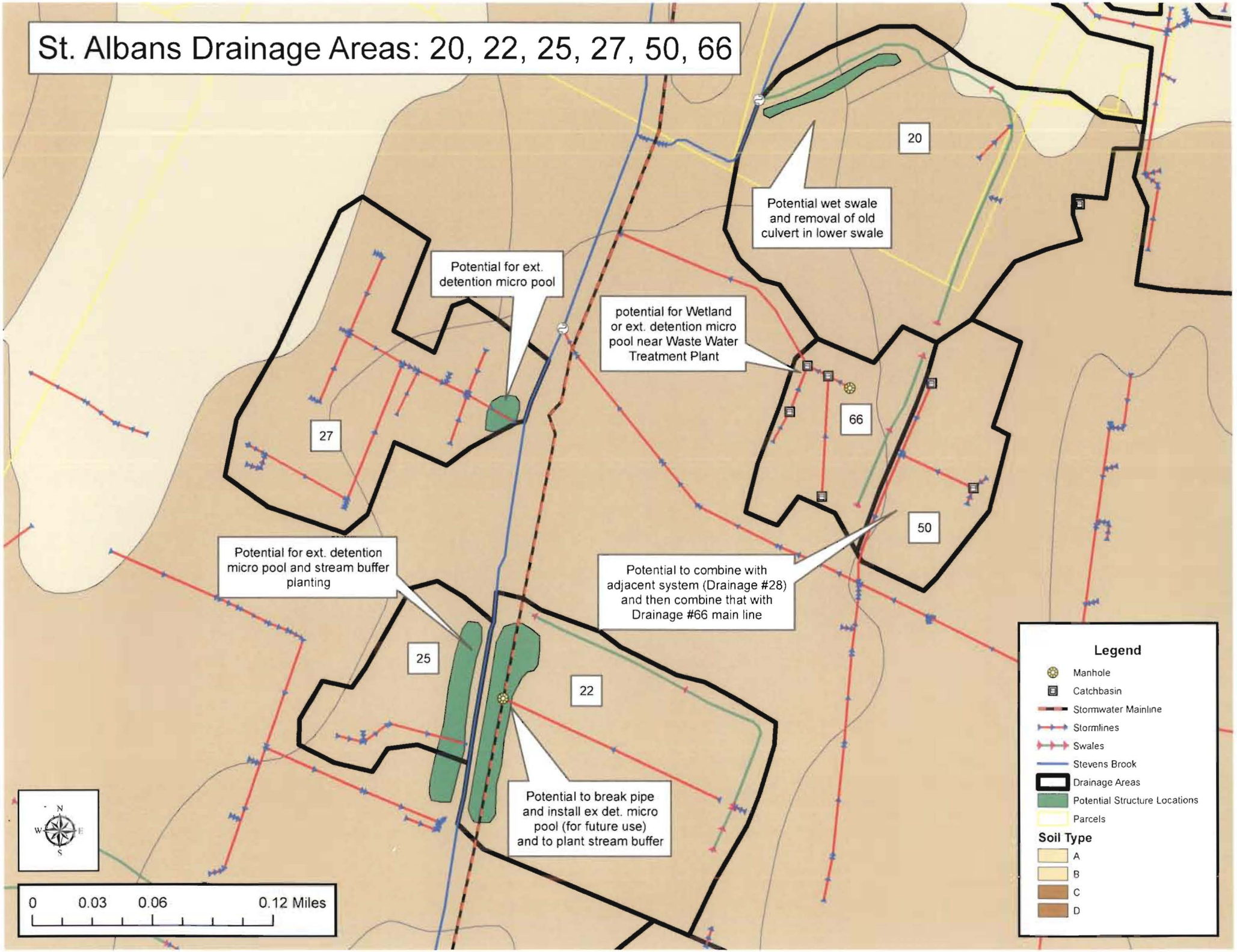

St. Albans Drainage Areas: 3, 18, 19, 30
89
89
207
Potential for roof cisterns, and to remove culvert in stream on North side
Potential for ext. detention micro pool
30
19
Potential for small wet pond
18
Potential to modify permitted basin to ext detention micro pool and combine outfall with drainage area #18
3
7
RAH DR
Legend
Manhole
Catchbasin
Stormwater Mainline
Stormlines
Swales
Overland_flow
Stevens Brook
Drainage Areas
Potential Structure Locations
Parcels
Soil Type
A
B
C
D
N
W
E
S
0
0.02
0.04
0.08 Miles

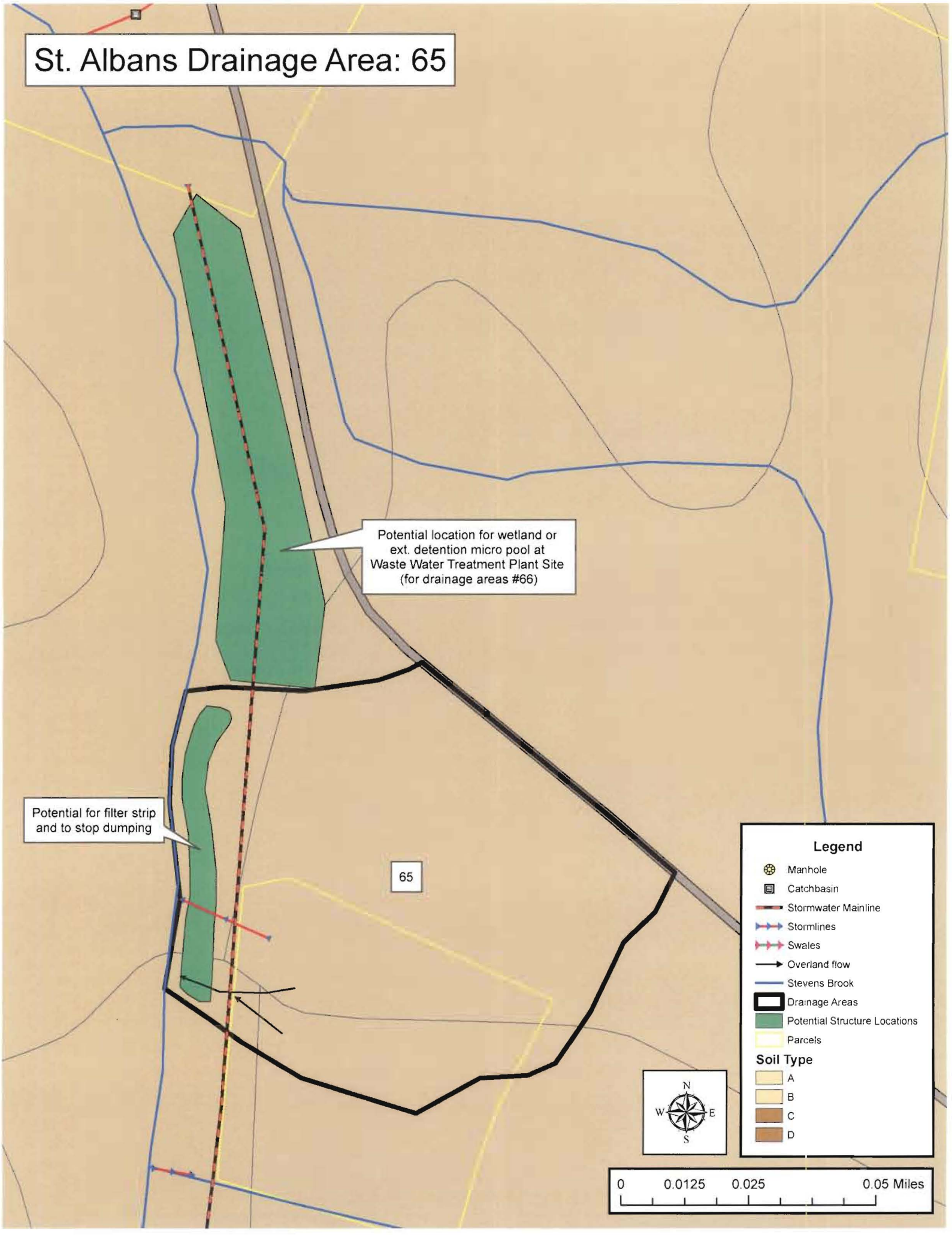

St. Albans Drainage Areas: 17, 60, 63
Potential to correct erosion near 1328 Swanton Rd
Potential for ext. detention micro pool and to correct erosion near 34 Sheldon Rd
Potential to combine with Drainage #17
60
17
63
7
105
WILEY PL
SUMMIT PL
ASHTON DR
HOWARD ESTATES
LAKEVIEW TERR
QUARRY CT
STANLEY CT
N MAIN ST
DONNELLY CT
HIGH ST
Legend
Manhole
Catchbasin
Stormwater Mainline
Stormlines
Swales
Stevens Brook
Drainage Areas
Potential Structure Locations
Parcels
Soil Type
A
B
C
D
N
W
E
S
0 0.0375 0.075 0.15 Miles

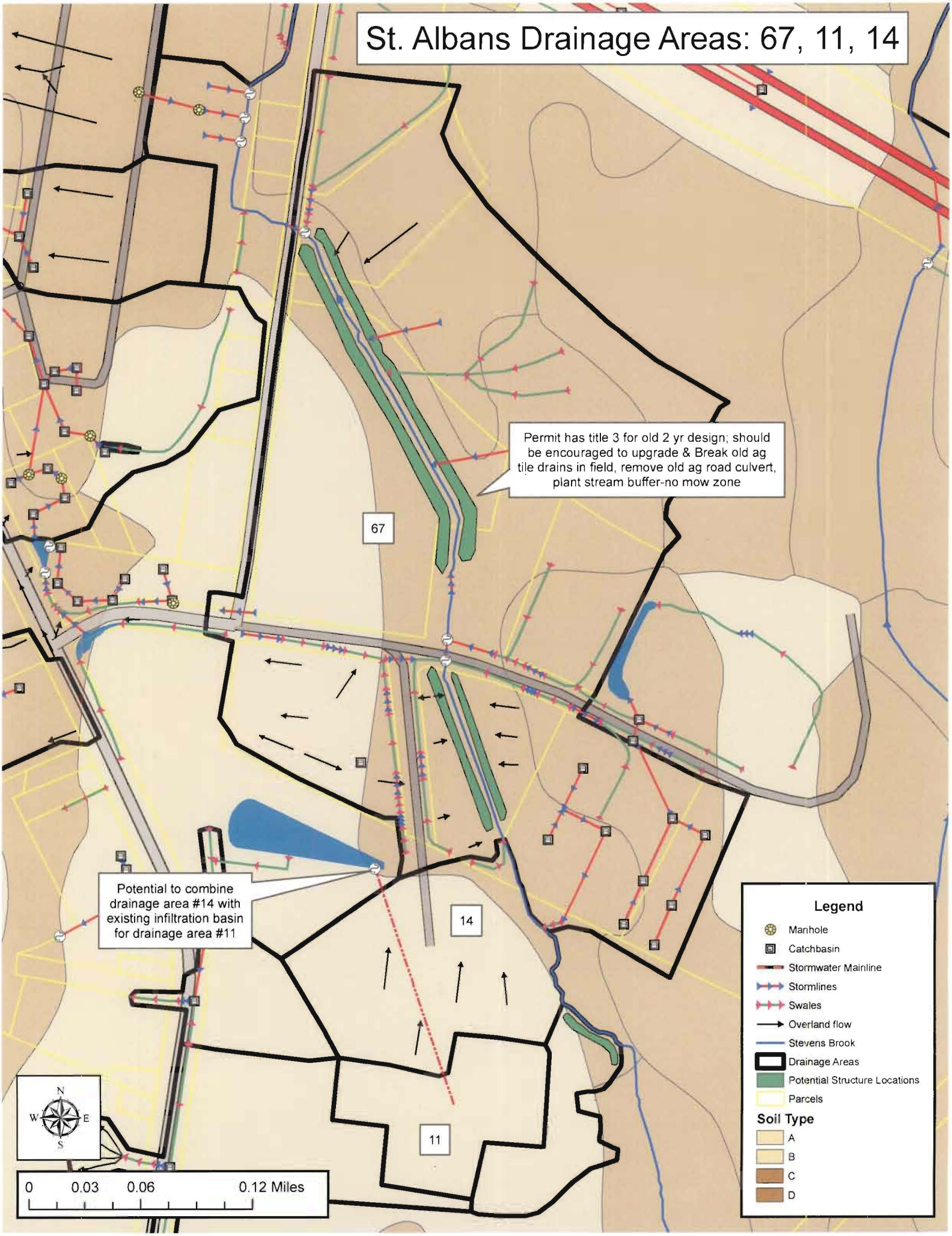

St. Albans Drainage Areas: 59, 61, 62
Legend
Manhole
Catchbasin
Stormwater Mainline
Stormlines
Swales
Stevens Brook
Drainage Areas
Potential Structure Locations
Parcels
Soil Type
A
B
C
D
Potential for stream buffer planting in corn field
Potential for stream buffer planting in corn field
61
62
Potential for small ext. detention micro pool and planting stream buffer in corn field
59
N
W
E
S
0 0.025 0.05 0.1 Miles


St. Albans Drainage Areas: 23, 24, 47, 66
Potential for Ex Det. Micro Pool in RR cloverleaf and to stabilize eroded outfall into stream
Potential to combine drainage 47 with 23, then combine those with 66 in the main line to the wetland or ext. detention micro pool at the Waste Water Treatment Plant
Potential to create a wetland or ext. detention micro pool at Wast Water Treatment Plant site (North) (all 66 polygons attached to main line)
24
66
47
23
66
66
66
Legend
Manhole
Catchbasin
Stormwater Mainline
Stormlines
Swales
Stevens Brook
Drainage Areas
Potential Structure Locations
Soil Type
A
B
C
D
N
W
E
S
0
0.035
0.07
0.14 Miles


St. Albans Drainage Area: 71
71
Permit has title 3 for old 10 yr design; should be encouraged to upgrade
Legend
Manhole
Catchbasin
Stormwater Mainline
Stormlines
Swales
Overland flow
Stevens Brook
Drainage Areas
Potential Structure Locations
Parcels
Soil Type
A
B
C
D
N
W
E
S
0
0.04
0.08
0.16 Miles


St. Albans Drainage Areas: 20, 22, 25, 27, 50, 66
20
Potential wet swale and removal of old culvert in lower swale
Potential for ext. detention micro pool
27
potential for Wetland or ext. detention micro pool near Waste Water Treatment Plant
66
50
Potential for ext. detention micro pool and stream buffer planting
Potential to combine with adjacent system (Drainage #28) and then combine that with Drainage #66 main line
25
22
Potential to break pipe and install ex det. micro pool (for future use) and to plant stream buffer
N
W
E
S
0
0.03
0.06
0.12 Miles
Legend
Manhole
Catchbasin
Stormwater Mainline
Stormlines
Swales
Stevens Brook
Drainage Areas
Potential Structure Locations
Parcels
Soil Type
A
B
C
D


St. Albans Drainage Area: 65
Potential location for wetland or ext. detention micro pool at Waste Water Treatment Plant Site (for drainage areas #66)
Potential for filter strip and to stop dumping
65
Legend
Manhole
Catchbasin
Stormwater Mainline
Stormlines
Swales
Overland flow
Stevens Brook
Drainage Areas
Potential Structure Locations
Parcels
Soil Type
A
B
C
D
N
W
E
S
0
0.0125
0.025
0.05 Miles


St. Albans Drainage Areas: 67, 11, 14
Permit has title 3 for old 2 yr design; should be encouraged to upgrade & Break old ag tile drains in field, remove old ag road culvert, plant stream buffer-no mow zone
67
Potential to combine drainage area #14 with existing infiltration basin for drainage area #11
14
11
N
W
E
S
0
0.03
0.06
0.12 Miles
Legend
Manhole
Catchbasin
Stormwater Mainline
Stormlines
Swales
Overland flow
Stevens Brook
Drainage Areas
Potential Structure Locations
Parcels
Soil Type
A
B
C
D