

MID-SPENCER/GREENSVILLE RURAL SETTLEMENT AREA SUBWATERSHED STUDY

APPENDIX

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The City of Hamilton



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Hydrologic Model Parameters

1) Hydrologic Model Parameters

**TABLE A.1:
SUMMARY OF SOILS AND "CN" PARAMETERS**

Catchment	Area (ha)	Soils*	Coverage (ha)	% Coverage	Soil Group**	CN***	Composite CN					
							AMC II	S II				
316	598.0	Guelph loam	39.9	7%	BC	72	61	164				
		Burford loam	128.3	21%	AB	56						
		London loam	30.3	5%	BC	72						
		Vineyard sandy loam	211.0	35%	AB	56						
		Parkhill loam	34.4	6%	BC	72						
		Grimsby sandy loam	25.7	4%	A	46						
		Flamboro sandy loam	10.2	2%	B	66						
		Muck	100.7	17%	B	66						
		Bedrock	15.9	3%	D	82						
		317	404.6	Vineyard Sandy loam	23.2	6%			AB	56	65	135
Grimsby Sandy loam	44.0			11%	A	46						
Flamboro Sandy loam	7.2			2%	B	66						
Guelph loam	119.8			30%	BC	72						
London loam	11.1			3%	BC	72						
Parkhill loam	13.8			3%	BC	72						
Burford loam	5.6			1%	AB	56						
Tuscola silt loam	4.0			1%	AB	56						
Muck	172.4			43%	B	66						
Bedrock	3.5			1%	D	82						
318	305.0			Tuscola silt loam	49.1	16%	AB	56	63	147		
				Guelph loam	34.3	11%	BC	72				
		Brant silt loam	21.5	7%	B	66						
		Grimsby sandy loam	25.8	8%	A	46						
		Dorseybrook gravelly loam	25.7	8%	B	66						
		Flamboro sandy loam	76.7	25%	B	66						
		Vineyard Sandy loam	31.2	10%	AB	56						
		Farmington loam	45.5	15%	B	66						
		319	1237.5	Grimsby sandy loam	90.8	7%	A	56			60	171
				Grimsby sandy loam - Brant silt loam	14.3	1%	B	66				
Farmington loam	510.7			41%	B	66						
Flamboro sandy loam	178.9			14%	B	66						
Toledo silt loam	42.8			3%	BC	72						
Tuscola silt loam	75.6			6%	AB	56						
Oneida loam	50.0			4%	BC	72						
Binbrook silt loam	38.3			3%	C	77						
Colwood silt loam	78.6			6%	B	66						
Muck	31.0			3%	B	66						
Vineyard sandy loam	79.5			6%	AB	56						
320	650.1			Parkhill loam	26.3	4%	BC	72	52	231		
				Burford loam	22.8	4%	AB	56				
				Granby sandy loam	97.2	15%	B	66				
		London loam	93.9	14%	BC	72						
		Farmington loam	25.6	4%	B	66						
		Toledo silt loam	80.7	12%	BC	72						
		Muck	34.7	5%	B	66						
		Brant silt loam	81.9	13%	B	66						
		Colwood silt loam	36.3	6%	B	66						
		Bedrock	21.8	3%	D	82						
		321	443.2	Granby sandy loam	5.6	1%	B	66			51	247
				London loam	5.0	1%	BC	72				
				Farmington loam	25.6	6%	B	66				
Colwood silt loam	55.6			13%	B	66						
Muck	51.2			12%	B	66						
Grimsby sandy loam	147.7			33%	A	46						
Tuscola silt loam	28.6			6%	AB	56						
Burford loam	2.4			1%	AB	56						
Vineyard sandy loam	75.3			17%	AB	56						
Bedrock	44.6			10%	D	82						
322	989.4			Flamboro sandy loam	261.8	26%	B	66	62	158		
				Grimsby sandy loam	198.3	20%	A	46				
				Toledo silt loam	24.3	2%	BC	72				
		Oneida loam	36.9	4%	BC	72						
		Colwood silt loam	25.8	3%	B	66						
		Beverly silty clay loam	145.9	15%	C	77						
		Brant silt loam	10.0	1%	B	66						
		Grimsby sandy loam - Brant silt loam	77.1	8%	B	66						
		Brantford silt loam	92.5	9%	BC	72						
		Tuscola silt loam	117.3	12%	AB	56						
		323	68.4	Grimsby sandy loam	33.3	49%	A	46			56	197
				Vineyard sandy loam	9.5	14%	AB	56				
				Flamboro sandy loam	10.3	15%	B	66				
Beverly silty clay loam	1.4			2%	C	77						
Bedrock	12.2			18%	D	82						
324	602.4			Toledo silt loam	1.2	0%	BC	72	52	232		
		Guelph loam	22.7	4%	BC	72						
		Parkhill loam	10.4	2%	BC	72						
		Farmington loam	133.9	22%	B	66						
		Colwood silt loam	106.2	18%	B	66						
		Grimsby sandy loam	64.3	11%	A	46						
		Tuscola silt loam	33.1	5%	AB	56						
		London loam	4.0	1%	BC	72						
		Beverly silty clay loam	2.4	0%	C	77						
		Grimsby sandy loam - Brant silt loam	149.0	25%	B	66						
		Flamboro sandy loam	25.6	4%	B	66						
		Vineyard sandy loam	10.0	2%	AB	56						
		Bedrock	34.5	6%	D	82						

**TABLE A.1:
SUMMARY OF SOILS AND "CN" PARAMETERS**

Catchment	Area (ha)	Soils*	Coverage (ha)	% Coverage	Soil Group**	CN***	Composite CN	
							AMC II	S II
325	213.7	Grimsby sandy loam	54.2	25%	A	46	61	160
		Colwood silt loam	3.5	2%	B	56		
		Farmington loam	29.2	14%	B	56		
		London loam	26.6	12%	BC	72		
		Grimsby sandy loam - Brant silt loam	40.5	19%	B	66		
		Beverly silty clay loam	13.2	6%	C	77		
		Muck	6.9	3%	B	66		
		Tuscola silt loam	20.0	9%	AB	56		
		Bedrock	19.6	9%	D	82		
		Grimsby sandy loam	212.6	53%	A	46		
326	404.3	Tuscola silt loam	21.8	5%	AB	56	55	205
		Colwood silt loam	99.8	25%	B	66		
		Farmington loam	13.1	3%	B	66		
		Tuscola silt loam	9.2	2%	AB	56		
		Flamoro sandy loam	0.6	0%	B	66		
		Bedrock	47.4	12%	D	82		
		Flamoro sandy loam	7.7	5%	B	66		
		Grimsby sandy loam - Brant silt loam	9.2	5%	B	66		
		Vineyard sandy loam	3.8	2%	AB	56		
		Grimsby sandy loam	32.6	19%	A	46		
327	171.5	Beverly silty clay loam	51.2	30%	C	77	45	311
		Toledo silt loam	50.1	29%	BC	72		
		Brantford silt loam - Grimsby sandy loam	6.7	4%	B	66		
		Bedrock	10.1	6%	D	82		
		Tuscola silt loam	12.3	3%	AB	56		
		Flamoro Sandy loam	25.8	6%	B	66		
		Grimsby sandy loam	129.6	29%	A	46		
		Grimsby sandy loam - Brant silt loam	6.6	1%	B	66		
		Vineyard Sandy loam	104.3	24%	AB	56		
		Toledo silt loam	104.5	24%	BC	72		
328	443.6	Beverly silty clay loam	32.2	7%	C	77	47	288
		Bedrock	24.5	6%	D	82		
		Toledo silt loam	12.7	5%	BC	72		
		Grimsby sandy loam	99.8	40%	A	46		
		Beverly silty clay loam	52.5	21%	C	77		
		Vineyard Sandy loam	0.7	0%	AB	56		
		Farmington loam	15.5	6%	B	66		
		Muck	11.5	5%	B	66		
		Springuale sandy loam	24.6	10%	A	46		
		Bedrock	30.5	12%	D	82		
329	247.8	Springuale sandy loam	26.2	3%	A	46	56	196
		Beverly silty clay loam	74.0	9%	C	77		
		Grimsby sandy loam	70.8	9%	A	46		
		Farmington loam	1.5	0%	B	66		
		Tuscola silt loam	94.3	12%	AB	56		
		Grimsby sandy loam - Brant silt loam	263.5	32%	B	66		
		Colwood silt loam	5.1	1%	B	66		
		Vineyard sandy loam	26.4	3%	AB	46		
		Flamoro sandy loam	15.5	2%	B	66		
		Toledo silt loam	61.2	8%	BC	72		
330	812.5	Brant silt loam	66.9	8%	B	66	58	182
		Ancaster silt loam	25.9	3%	BC	72		
		Muck	16.1	2%	B	66		
		Bedrock	64.9	8%	D	82		
		Grimsby sandy loam	208.9	26%	A	46		
		Flamoro sandy loam	16.5	2%	B	66		
		Vineyard sandy loam	19.3	2%	AB	56		
		Springuale sandy loam	224.0	28%	A	46		
		Beverly silty clay loam	10.6	1%	C	77		
		Ancaster silt loam	52.4	7%	BC	72		
331, 332	795.2	Grimsby sandy loam - Brant silt loam	116.0	15%	B	66	57	189
		Bedrock	147.4	19%	D	82		
		Grimsby sandy loam - Brant silt loam	15.3	7%	B	66		
		Ancaster silt loam	155.6	76%	BC	72		
		Springuale sandy loam	9.6	5%	A	46		
		Bedrock	25.1	12%	D	82		
		Oneida loam	66.0	22%	BC	72		
		Flamoro sandy loam	65.1	22%	B	66		
		Vineyard sandy loam	9.8	3%	AB	56		
		Muck	31.7	11%	B	66		
333, 334	205.7	Grimsby sandy loam	236.5	79%	A	46	72	101
		Oneida loam	132.7	13%	BC	72		
		Vineyard sandy loam	162.6	16%	AB	56		
		Jeddo loam	55.7	5%	BC	72		
		Grimsby sandy loam	314.0	31%	A	46		
		Chinguacousy loam	27.7	3%	BC	72		
		Grimsby sandy loam - Brant silt loam	123.0	12%	B	66		
		Ancaster silt loam	6.3	1%	BC	72		
		Escarpment	9.5	1%				
		Quarries	88.9	9%				
335	298.5	Bedrock	22.0	2%	D	82	76	82
		Grimsby sandy loam - Brant silt loam	2.3	1%	B	66		
		Ancaster silt loam	89.6	42%	BC	72		
		Springuale sandy loam	46.4	22%	A	46		
		Escarpment	53.7	25%				
		Bedrock	15.6	7%	D	82		
		Ancaster silt loam	291.3	73%	BC	72		
		Escarpment	29.2	7%				
		Bedrock	79.1	20%	D	82		
		336	1026.7	Grimsby sandy loam	291.3	73%		
Escarpment	29.2			7%				
Bedrock	79.1			20%	D	82		
Oneida loam	132.7			13%	BC	72		
Vineyard sandy loam	162.6			16%	AB	56		
Jeddo loam	55.7			5%	BC	72		
Grimsby sandy loam	314.0			31%	A	46		
Chinguacousy loam	27.7			3%	BC	72		
Grimsby sandy loam - Brant silt loam	123.0			12%	B	66		
Ancaster silt loam	6.3			1%	BC	72		
338	213.3	Escarpment	9.5	1%			47	287
		Quarries	88.9	9%				
		Bedrock	22.0	2%	D	82		
		Grimsby sandy loam - Brant silt loam	2.3	1%	B	66		
		Ancaster silt loam	89.6	42%	BC	72		
		Springuale sandy loam	46.4	22%	A	46		
		Escarpment	53.7	25%				
		Bedrock	15.6	7%	D	82		
		Ancaster silt loam	291.3	73%	BC	72		
		Escarpment	29.2	7%				
340,341,342	401.2	Bedrock	79.1	20%	D	82	68	117
		Escarpment	29.2	7%				
		Ancaster silt loam	291.3	73%	BC	72		

*Soil Survey Mapping for Hamilton (Westworth County) Regional Municipality of Niagara

** MTO Drainage Manual, Chart H2-6A

***Assuming rural cover (meadows), AMCII

Table A.2
SUMMARY OF SUBCATCHMENT PHYSICAL PARAMETERS

Catchment	Landuse	Area (ha)	Length (m)	Slope (%)
315.0	Rural	705	7204.0	0.43
316.0	Rural	597.90	3476.4	0.14
317.0	Rural	404.60	3968.0	0.12
318.0	Rural	305.5	4054.0	0.28
319.0	Rural	1185.1	7330.7	0.08
320.0	Rural	650.1	7121.2	0.34
321.0	Rural	443.2	8558.4	0.17
322.0	Rural	989.4	17787.3	0.11
323.0	Rural	68.4	1356.8	0.32
324.0	Rural	602.4	7379.3	0.14
325.0	Rural	213.7	4044.6	0.19
326.0	Rural	404.3	4578.3	0.36
327.0	Rural	171.6	2800.4	0.03
328.0	Rural	443.7	2144.3	0.13
329.0	Rural	247.8	2818.5	0.03
330.0	Rural	812.5	5307.8	0.27
331-332	Rural	795.2	3641.4	0.27
335	Rural	298.5	3710.4	0.21
333-334	Rural	205.7	3891.8	1.24
336	Rural	1026.8	7227.1	0.35
338	Rural	213.3	3839.5	3.18
340-342	Rural	401.2	4930.2	55.00

Table A.3:
MIKE-11 Model Subcatchment Parameters - Nam approach

Name	Surface-Rootzone							Ground Water							Snow Melt				
	Umax	Lmax	CQOF	CKIF	CK1,2	TOF	TIF	TG	CKBF	Carea	Sy	GWLBF0	GWLBF1	Cqlow	Cklow	Csnow	T0	Cradiation	Crain
315	15.0	120	0.6	500	20	0.418	0.2	0.8	9000	1	0.1	10	0	0	5926.94	4	1	0	0
316	10.2	187	0.6	500	20	0.597	0.2	0.8	9000	1	0.1	10	0	3.22	2032.27	4	1	0	0
317	10.9	161	0.6	500	20	0.681	0.2	0.8	9000	1	0.1	10	0	0.409	4757.85	4	1	0	0
318	10.5	183	0.6	500	20	0.606	0.2	0.8	9000	1	0.1	10	0	0	13550.2	4	1	0	0
319	9.7	201	0.6	500	20	0.562	0.2	0.8	9000	1	0.1	10	0	10.7	9916.11	4	1	0	0
320	10.3	244	0.6	500	20	0.452	0.2	0.8	9000	1	0.1	10	0	0.915	20110.9	4	1	0	0
321	11.3	255	0.6	500	20	0.453	0.2	0.8	9000	1	0.1	10	0	0	2010.11	4	1	0	0
322	10.3	190	0.6	500	20	0.528	0.2	0.8	9000	1	0.1	10	0	0	12273.3	4	1	0	0
323	10.0	242	0.6	500	20	0.473	0.2	0.8	9000	1	0.1	10	0	2.51	8089.29	4	1	0	0
324	10.0	266	0.6	500	20	0.513	0.2	0.8	9000	1	0.1	10	0	1.85	6811.8	4	1	0	0
325	10.9	182	0.6	500	20	0.507	0.2	0.8	9000	1	0.1	10	0	6.49	3023.5	4	1	0	0
326	10.3	252	0.6	500	20	0.471	0.2	0.8	9000	1	0.1	10	0	13.2	3693.68	4	1	0	0
327	9.7	306	0.6	500	20	0.430	0.2	0.8	9000	1	0.1	10	0	3.29	9876.29	4	1	0	0
328	10.9	263	0.6	500	20	0.487	0.2	0.8	9000	1	0.1	10	0	0.0522	20325.5	4	1	0	0
329	11.5	218	0.6	500	20	0.523	0.2	0.8	9000	1	0.1	10	0	2.5	3932.56	4	1	0	0
330	9.7	155	0.6	500	20	0.027	0.2	0.8	9000	1	0.1	10	0	46.9	1529.1	4	1	0	0
331	10.1	158	0.8	500	3	0.087	0.2	0.8	9000	1	0.1	10	0	54.7	14917.2	4	1	0	0
332	10.4	158	0.8	500	3	0.054	0.2	0.8	9000	1	0.1	10	0	39.2	19800.5	4	1	0	0
335	11.4	93	0.6	500	20	0.112	0.2	0.8	9000	1	0.1	10	0	20.5	12579.6	4	1	0	0
333-334	10.1	249	0.8	500	3	0.274	0.2	0.8	9000	1	0.1	10	0	11.3	19362.6	4	1	0	0
336	10.4	196	0.6	500	20	0.118	0.2	0.8	9000	1	0.1	10	0	23.4	19406.7	4	1	0	0
338	9.7	240	0.8	500	3	0.097	0.2	0.8	9000	1	0.1	10	0	3.3	28840.3	4	1	0	0
340-342	11.2	120	0.6	500	20	0.169	0.2	0.8	9000	1	0.1	10	0	6.39	3836.05	4	1	0	0

**Mid-Spencer Creek /
Greenville Rural
Settlement Area
Subwatershed Study**

Legend

- Roads
- Watercourses
- Mid-Spencer Creek Watershed
- Rural Settlement

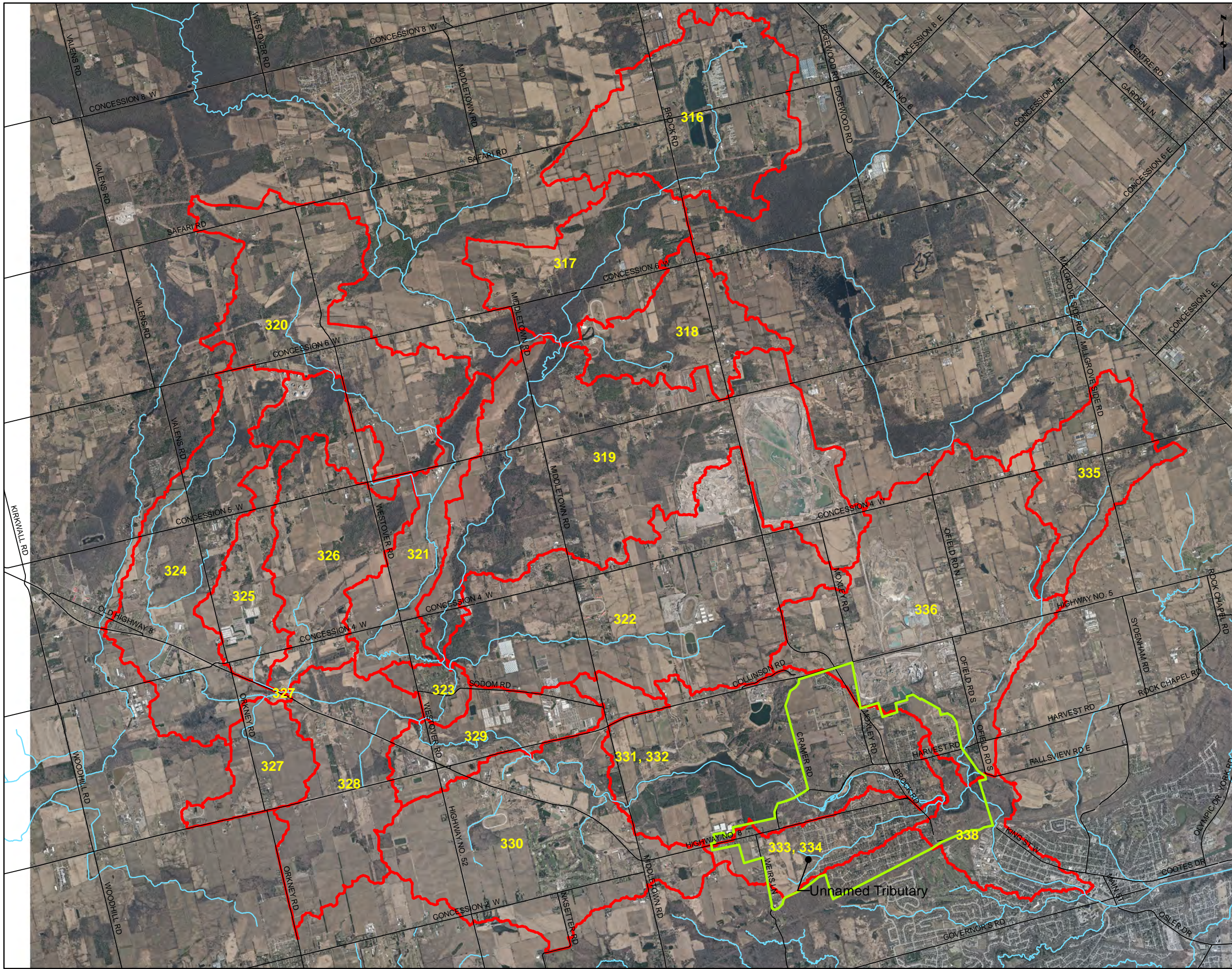


FIGURE 4.3.2

**Hydrologic Model
Subcatchments**



Table A.4 SWMHYMO Mode Setup

Subcatchment	SWM Pond #	Total Area	Rural Area	Rural Parameters				Urban Parameters									
				Rural CN AMC II	IA Rural	Nashyd "n"	Time to Peak hrs	Urban Area	Urban CN AMC II	IA pervious	DPI (IA imp)	% imp	% Direct Connected	Length		Manning's "n"	
														Impervious	Pervious	Impervious	Pervious
Existing																	
1		101.1	92.7	60	8.0	3	0.889	8.40	60	8	2	40%	25%	236	40	0.013	0.25
2		81.2	56.7	58	8.0	3	1.065	24.50	58	8	2	40%	25%	404	40	0.013	0.25
3		46.9	16.3	68	8	3	0.694	30.6	68	8	2	40%	25%	236	40	0.013	0.25
4		38	29.2	66	8	3	0.799	8.8	66	8	2	40%	25%	242	40	0.013	0.25
5		29.6	21.2	77	8	3	0.913	8.4	77	8	2	40%	25%	237	40	0.013	0.25
6		44.2	20.1	77	8	3	0.506	24.1	77	8	2	40%	25%	401	40	0.013	0.25
7		45.6	32	80	8	3	0.33	13.6	80	8	2	40%	25%	301	40	0.013	0.25
8a		102	74.3	75	8	3	0.963	27.7	75	8	2	40%	25%	430	40	0.013	0.25
8b		95.6	17.3	70	8	3	1.325	78.3	70	8	2	40%	25%	722	40	0.013	0.25
9a		28.8						28.8	78	8	2	40%	25%	438	40	0.013	0.25
9b		32.2						32.2	79	8	2	40%	25%	463	40	0.013	0.25
10		31.8	29.7	80	8	3	0.417	2.1	80	8	2	40%	25%	118	40	0.013	0.25
11		10.4	10.4	82	8	3	0.054										
12		9.7	9.7	84	8	3	0.054										
Future																	
1-1 (new development)	1-1	10.9						10.90	60	4	2	50%	35%	269	40	0.015	0.2
1-2 (new development)	1-2	6.4						6.40	60	4	2	50%	35%	206	40	0.015	0.2
2-2 (new development)	2-2	12.0						12	58	4	2	50%	35%	283	40	0.015	0.2
2-3 (new development)	2-3	8.3						8.3	58	4	2	85%	78%	235	40	0.015	0.2
2-4 (new development)	2-4	4.6						4.6	58	4	2	50%	35%	175	40	0.015	0.2
6-1 (new development)	6-1	5.7						5.7	77	4	2	50%	35%	195	40	0.015	0.2
7-1 (new development)	7-1	6.1						6.1	80	4	2	50%	35%	202	40	0.015	0.2

Mid-Spencer Creek /
Greenville Rural
Settlement Area
Subwatershed Study

Legend

- Watercourses
- Catchment

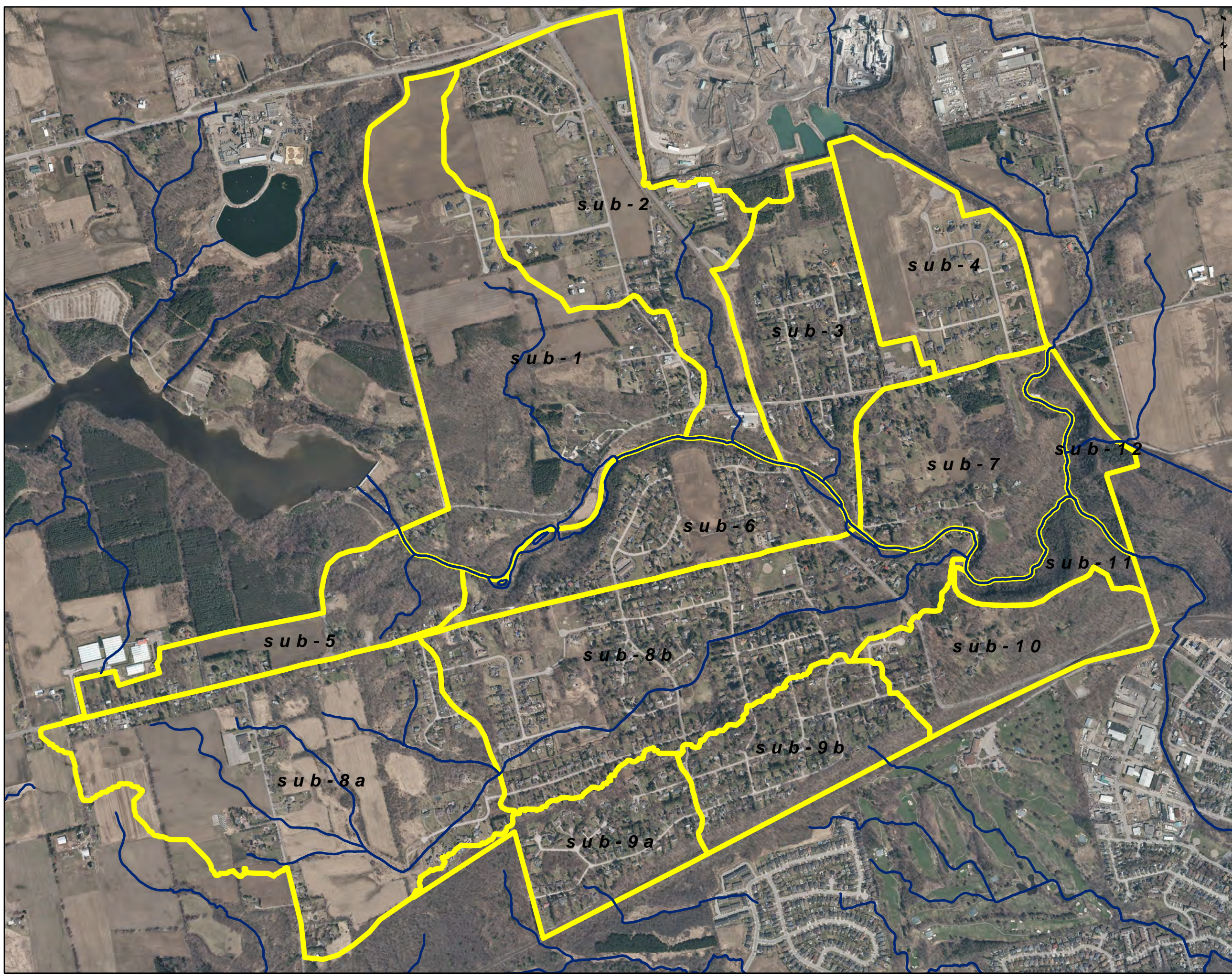
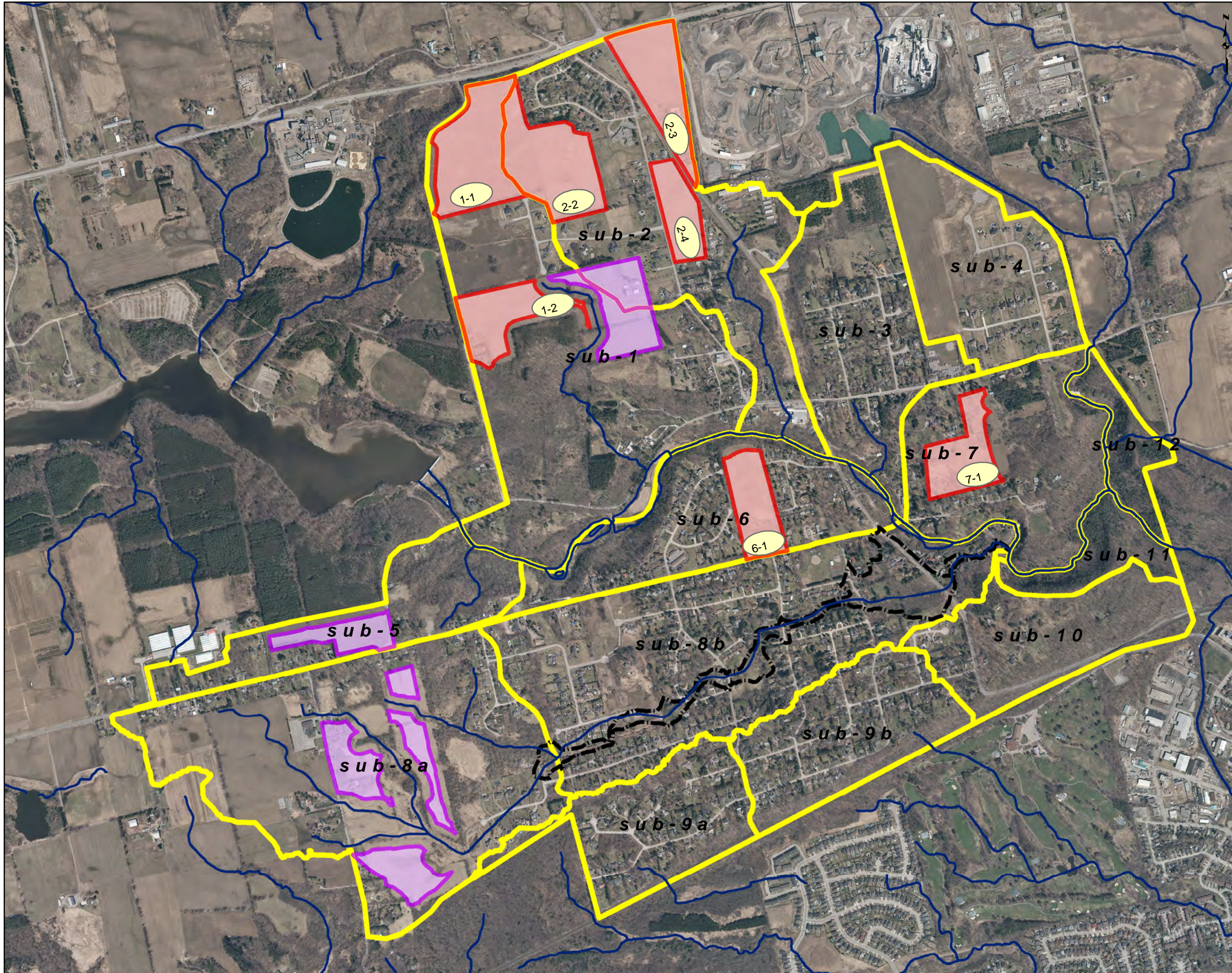


FIGURE 4.3.10
Rural Settlement Area
Subcatchments
(Existing Conditions)

**Mid-Spencer Creek /
Greenville Rural
Settlement Area
Subwatershed Study**



Legend

- Watercourses
- Floodline
- Catchment
- Catchment Area for Development**
- Catchment Area >5ha (Wet Pond)
- Catchment Area <5ha (Traditional Source Controls)
- 1-1 Stormwater management Pond (quality and quantity control)

Note: Final location of SWM facilities to be defined upon completion of Functional Servicing Study. Facilities must be located outside of any environmentally significant areas as defined by City, HCA, MNRF or other policy.

FIGURE 9.2.1

**Stormwater Management
Facilities for Water Quality
/Erosion and Flood Control**

2) Culvert Inventory

**GREENVILLES SUBWATERSHED STUDY
MID-SPENCER CREEK**

CULVERT INVENTORY FORM

Structure ID: C01

Crossing Name: Safari Road

Aquafor Survey Date: July 10, 2007

Structure Type: Concrete Box Culvert

Structure Dimensions: Height: 1.50m
Width: 5.40m

Invert Elevation: U/S: 265.54
D/S: 265.45

Obvert Elevation: U/S: 266.98
D/S: 266.98

Overflow / Weir Elevation: 267.5

Crossing Length: 11.2m

Slope: 0.8 %

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C01



Safari Road - Upstream side



Safari Road - Downstream side

**GREENVILLES SUBWATERSHED STUDY
MID-SPENCER CREEK**

CULVERT INVENTORY FORM

Structure ID: C02

Crossing Name: Concession 6

Aquafor Survey Date: July 10, 2007

Structure Type: Concrete Box Culvert

Structure Dimensions: Height: 1.50m
Width: 5.55m

Invert Elevation: U/S: 251.58
D/S: 251.51

Obvert Elevation: U/S: 253.07
D/S: 253.09

Overflow / Weir Elevation: 253.43

Crossing Length: 7.4m

Slope: 0.9 %

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C02



Concession 6 - Upstream side



Concession 6 - Downstream side

**GREENVILLES SUBWATERSHED STUDY
MID-SPENCER CREEK**

CULVERT INVENTORY FORM

Structure ID: C03

Crossing Name: Middletown Road

Aquafor Survey Date: July 20, 2007

Structure Type: Concrete Box Culvert

Structure Dimensions: Height: 1.55m
Width: 5.30m

Invert Elevation: U/S: 247.47
D/S: 247.62

Obvert Elevation: U/S: 249.08
D/S: 249.12

Overflow / Weir Elevation: 249.17

Crossing Length: 12m

Slope: -1.30 %

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C03



Middletown Road - Upstream side



Middletown Road - Downstream side

**GREENVILLES SUBWATERSHED STUDY
MID-SPENCER CREEK**

CULVERT INVENTORY FORM

Structure ID: C04

Crossing Name: Middletown Road

Aquafor Survey Date: July 20, 2007

Structure Type: Triple Corrugated Steel Pipe (ellipsoidal)

Structure Dimensions: Height: 1.55m (North) 1.40m (Centre) 1.60m (South)
Width: 1.75m (North) 1.75m (Centre) 1.75m (Centre)

Invert Elevation: U/S: 246.51 (North) 246.62 (Centre) 246.28 (South)
D/S: 246.83 (North) 246.76 (Centre) 246.63 (Centre)

Obvert Elevation: U/S: 248.19 (North) 248.07 (Centre) 247.98 (South)
D/S: 248.26 (North) 248.14 (Centre) 247.12 (South)

Overflow / Weir Elevation: 248.35

Crossing Length: 10.8m (North) 11m (Centre) 10.7m (South)

Slope: -3.0% (North) -1.3% (Centre) -3.3% (South)

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C04



Middletown Road - Upstream side



Middletown Road - Downstream side

**GREENVILLES SUBWATERSHED STUDY
MID-SPENCER CREEK**

CULVERT INVENTORY FORM

Structure ID: C05

Crossing Name: Concession 5

Aquafor Survey Date: July 10, 2007

Structure Type: Concrete Box Culvert

Structure Dimensions: Height: 1.75m
Width: 7.30m

Invert Elevation: U/S: 245.73
D/S: 246.63

Obvert Elevation: U/S: 247.46
D/S: 247.41

Overflow / Weir Elevation: 247.64

Crossing Length: 15.5m

Slope: 0.6 %

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C05



Concession 5 - Upstream side



Concession 5 - Downstream side

**GREENVILLES SUBWATERSHED STUDY
MID-SPENCER CREEK**

CULVERT INVENTORY FORM

Structure ID: C06

Crossing Name: Concession 4

Aquafor Survey Date: July 10, 2007

Structure Type: Concrete Box Culvert

Structure Dimensions: Height: 0.90m
Width: 9.50m

Invert Elevation: U/S: 242.47
D/S: 242.74

Obvert Elevation: U/S: 243.52
D/S: 243.53

Overflow / Weir Elevation: 243.55

Crossing Length: 11.10m

Slope: -2.4 %

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C06



Concession 4 - Upstream side



Concession 4 - Downstream side

**GREENVILLES SUBWATERSHED STUDY
MID-SPENCER CREEK**

CULVERT INVENTORY FORM

Structure ID: C07

Crossing Name: Westover Road

Aquafor Survey Date: July 11, 2007

Structure Type: Concrete Box Culvert

Structure Dimensions: Height: 2.45m
Width: 7.30m

Invert Elevation: U/S: 235.54
D/S: 235.5

Obvert Elevation: U/S: 238.01
D/S: 237.94

Overflow / Weir Elevation: 237.62

Crossing Length: 9.2m

Slope: 0.4%

Notes:

GREENVILLES SUBWATERSHED STUDY

STRUCTURE ID: C07



Westover Road - Upstream side



Westover Road - Downstream side

**GREENVILLES SUBWATERSHED STUDY
MID-SPENCER CREEK**

CULVERT INVENTORY FORM

Structure ID: C08

Crossing Name: Westover Road

Aquafor Survey Date: July 11, 2007

Structure Type: Concrete Box Culvert

Structure Dimensions: Height: 2.10m
Width: 9.10m

Invert Elevation: U/S: 235.59
D/S: 235.59

Obvert Elevation: U/S: 237.71
D/S: 237.73

Overflow / Weir Elevation: 237.59

Crossing Length: 10.1m

Slope: 0.00%

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C08



Westover Road - Upstream side



Westover Road - Downstream side

**GREENVILLES SUBWATERSHED STUDY
MID-SPENCER CREEK**

CULVERT INVENTORY FORM

Structure ID: C09

Crossing Name: Highway 5

Aquafor Survey Date: July 11, 2007

Structure Type: Bridge

Structure Dimensions: Height: 2.85m
Width: 16.1m

Invert Elevation: U/S: 235.14
D/S: 235.07

Obvert Elevation: U/S: 237.95
D/S: 237.94

Overflow / Weir Elevation: 238.01

Crossing Length: 18.0m

Slope: 0.40 %

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C09



Highway 5 - Upstream side



Highway 5 - Downstream side

**GREENVILLES SUBWATERSHED STUDY
MID-SPENCER CREEK**

CULVERT INVENTORY FORM

Structure ID: C11

Crossing Name: Crooks Hollow

Aquafor Survey Date: July 11, 2007

Structure Type: Bridge

Structure Dimensions: Height: 3.60m
Width: 13.8m

Invert Elevation: U/S: 221.14
D/S: 221.39

Obvert Elevation: U/S: 224.86
D/S: 224.90

Overflow / Weir Elevation: 226.33

Crossing Length: 9.50m

Slope: -2.60%

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C11



Crooks Hollow - Upstream side



Crooks Hollow - Downstream side

**GREENVILLES SUBWATERSHED STUDY
MID-SPENCER CREEK**

CULVERT INVENTORY FORM

Structure ID: C12

Crossing Name: Brock Road

Aquafor Survey Date: July 20, 2007

Structure Type: Bridge

Structure Dimensions: Height: 8.50m
Width: 41.3m

Invert Elevation: U/S: 207.12
D/S: 207.00

Obvert Elevation: U/S: 215.40
D/S: 215.71

Overflow / Weir Elevation: 212.96

Crossing Length: 15.1m

Slope: 0.8 %

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C12



Brock Road - Upstream side



Brock Road - Downstream side

**GREENVILLES SUBWATERSHED STUDY
MID-SPENCER CREEK**

CULVERT INVENTORY FORM

Structure ID: C13

Crossing Name: Pedestrian Bridge

Aquafor Survey Date: July 12, 2007

Structure Type: Bridge

Structure Dimensions: Height: 4.0m
Width:

Invert Elevation: U/S: 202.78
D/S: 202.62

Obvert Elevation: U/S: 206.72
D/S: 206.72

Overflow / Weir Elevation: 207.20

Crossing Length:

Slope: 7.0 %

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C13



Pedestrian Bridge - Upstream side



Pedestrian Bridge - Downstream side

**GREENVILLES SUBWATERSHED STUDY
MID-SPENCER CREEK**

CULVERT INVENTORY FORM

Structure ID: C14

Crossing Name: Market Street

Aquafor Survey Date: July 12, 2007

Structure Type: Bridge

Structure Dimensions: Height: 3.1m
Width:

Invert Elevation: U/S: 97.69
D/S:

Obvert Elevation: U/S 100.78
D/S:

Overflow / Weir Elevation: 101.17

Crossing Length: 21.7m

Slope:

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C14



Market Street - Upstream side



Market Street - Downstream side

**GREENVILLES SUBWATERSHED STUDY
ANN STREET CREEK**

CULVERT INVENTORY FORM

Structure ID: C15

Crossing Name: Highway 8

Aquafor Survey Date: July 12, 2007

Structure Type: Concrete Box Culvert

Structure Dimensions: Height: 1.7m
Width: 0.9m

Invert Elevation: U/S: 208.14
D/S: 208.28

Obvert Elevation: U/S: 209.34
D/S: 209.09

Overflow / Weir Elevation: 210.57

Crossing Length: 18.2m

Slope: -0.8%

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C15



Highway 8 - Upstream side



Highway 8 - Downstream side

**GREENVILLES SUBWATERSHED STUDY
ANN STREET CREEK**

CULVERT INVENTORY FORM

Structure ID: C16

Crossing Name: Park Avenue

Aquafor Survey Date: July 12, 2007

Structure Type: Corrugated Steel Pipe (ellipsoidal)

Structure Dimensions: Height: 1.29m
Width: 2.10m

Invert Elevation: U/S: 210.74
D/S: 210.67

Obvert Elevation: U/S: 212.72
D/S: 212.45

Overflow / Weir Elevation: 212.58

Crossing Length: 17.2m

Slope: 0.4%

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C16



Park Avenue - Upstream side



Park Avenue - Downstream side

**GREENVILLES SUBWATERSHED STUDY
ANN STREET CREEK**

CULVERT INVENTORY FORM

Structure ID: C17

Crossing Name: Mountain View Road

Aquafor Survey Date: July 12, 2007

Structure Type: Corrugated Steel Pipe (Arch)

Structure Dimensions: Height: 1.29m
Width: 1.85m

Invert Elevation: U/S: 215.62
D/S: 215.39

Obvert Elevation: U/S: 216.88
D/S: 216.70

Overflow / Weir Elevation: 216.89

Crossing Length: 12.4m

Slope: 1.9%

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C17



Mountain View Road - Upstream side



Mountain View Road - Downstream side

**GREENVILLES SUBWATERSHED STUDY
ANN STREET CREEK**

CULVERT INVENTORY FORM

Structure ID: C18

Crossing Name: Rosebough Street

Aquafor Survey Date: July 12, 2007

Structure Type: Corrugated Steel Pipe (Arch)

Structure Dimensions: Height: 1.17m
Width: 1.80m

Invert Elevation: U/S: 218.15
D/S: 218.01

Obvert Elevation: U/S: 219.32
D/S: 219.18

Overflow / Weir Elevation: 219.46

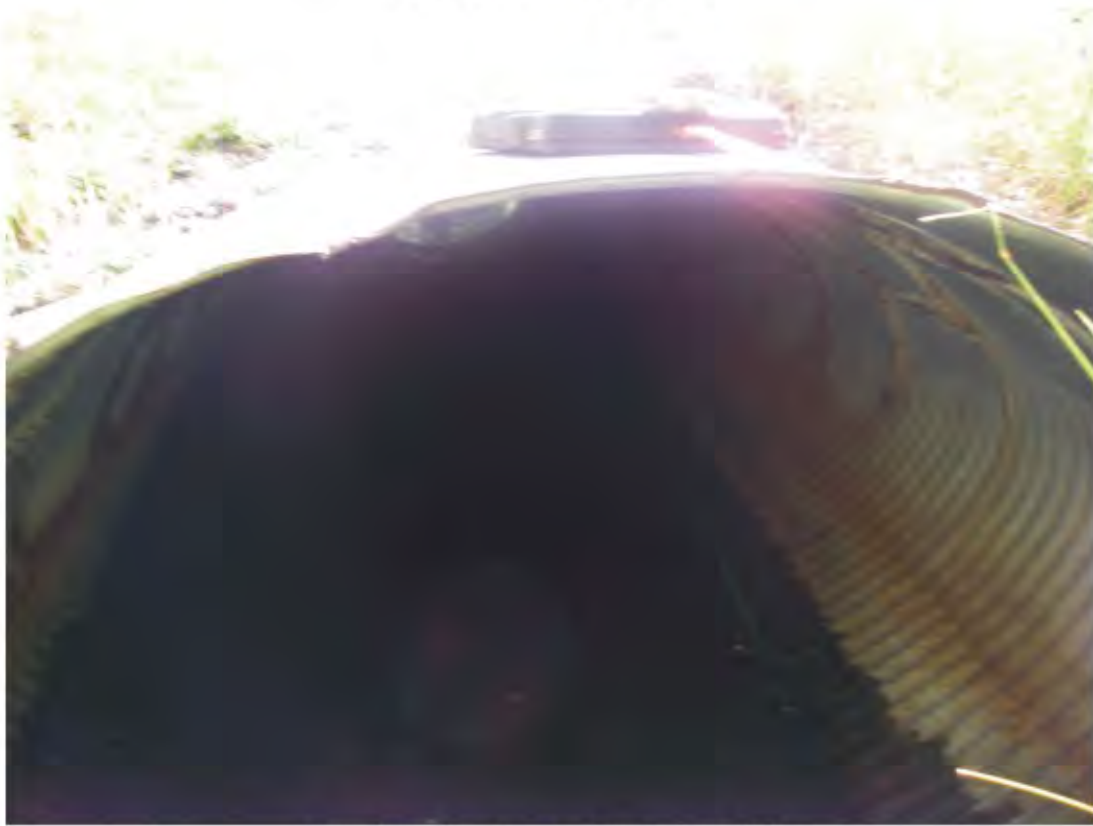
Crossing Length: 12.2

Slope: 1.1%

Notes:

GREENVILLE SUBWATERSHED STUDY

STRUCTURE ID: C18



Rosebough Street - Upstream side



Rosebough Street - Downstream side

**GREENVILLES SUBWATERSHED STUDY
ANN STREET CREEK**

CULVERT INVENTORY FORM

Structure ID: C19

Crossing Name: Pathway off Oak Avenue

Aquafor Survey Date: July 12, 2007

Structure Type: Corrugated Steel Pipe (Arch)

Structure Dimensions: Height: 1.10m
Width: 1.85m

Invert Elevation: U/S: 223.60
D/S: 223.45

Obvert Elevation: U/S: 224.66
D/S: 224.56

Overflow / Weir Elevation: 224.92

Crossing Length: 14.2m

Slope: 1.1%

Notes:

GREENVILLES SUBWATERSHED STUDY

STRUCTURE ID: C19



Parkway off Oak Avenue - Upstream side

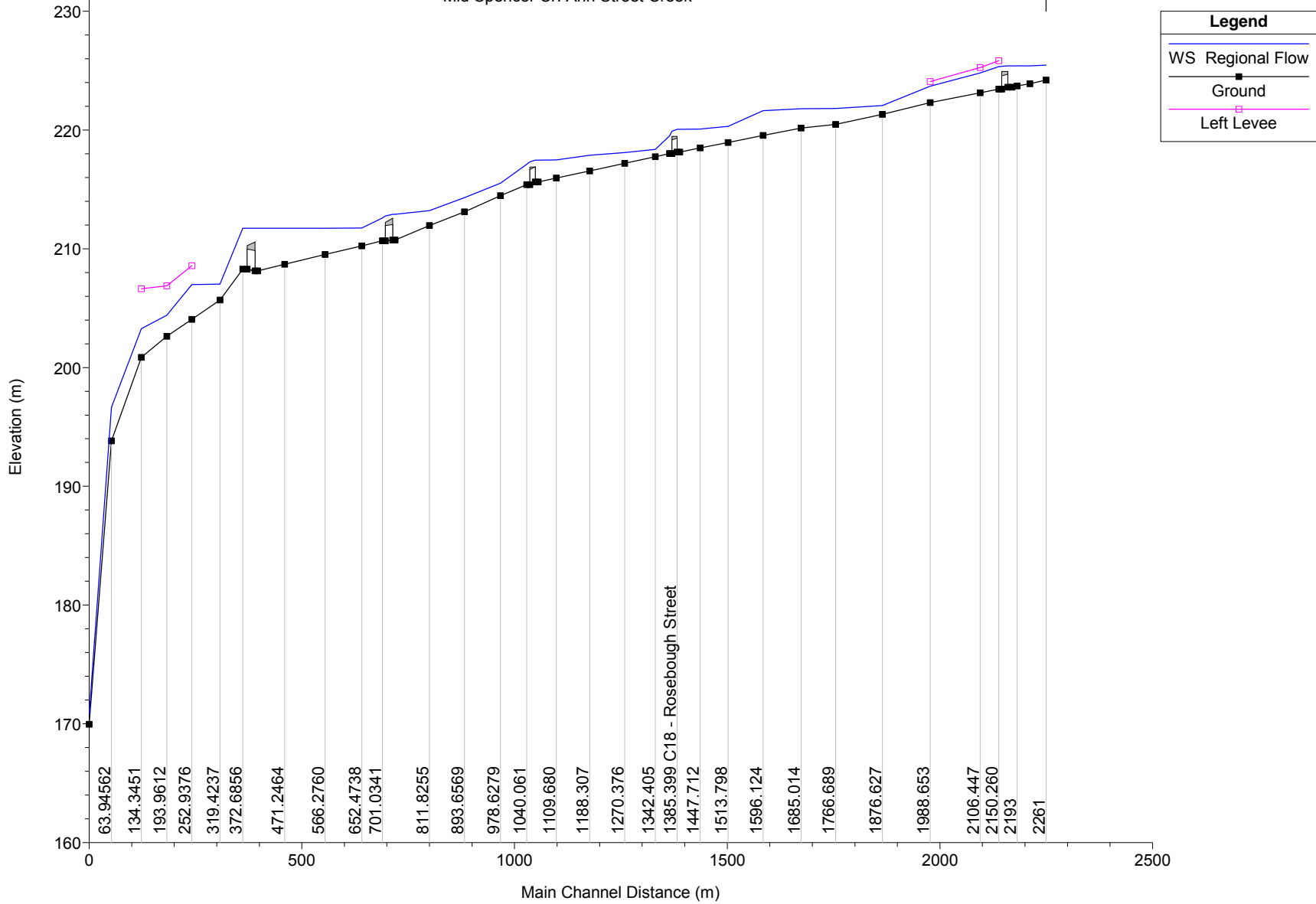


Parkway off Oak Avenue - Downstream side

Appendix B
Hydraulic Model

Greenville Creek Tributary Plan: Greenville Creek Tributary

Mid Spencer Cr. Ann Street Creek



HEC-RAS Plan: Green River: Mid Spencer Cr. Reach: Ann Street Creek Profile: Regional Flow

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Ann Street Creek	2261	Regional Flow	16.60	224.20	225.46	225.32	225.52	0.008072	1.62	17.61	48.89	0.49
Ann Street Creek	2223	Regional Flow	16.60	223.90	225.40		225.41	0.001076	0.68	35.38	58.91	0.19
Ann Street Creek	2193	Regional Flow	16.60	223.70	225.40		225.41	0.000081	0.23	92.31	93.96	0.06
Ann Street Creek	2181.077	Regional Flow	16.60	223.60	225.40	224.97	225.40	0.000070	0.25	98.62	104.91	0.06
Ann Street Creek	2163.308		Culvert									
Ann Street Creek	2150.260	Regional Flow	16.60	223.45	225.35	225.35	225.37	0.000575	1.05	34.76	60.68	0.24
Ann Street Creek	2106.447	Regional Flow	16.60	223.14	224.79	224.40	224.87	0.003556	2.19	18.76	35.67	0.55
Ann Street Creek	1988.653	Regional Flow	16.60	222.31	223.69	223.69	223.98	0.019905	3.43	7.94	25.79	0.98
Ann Street Creek	1876.627	Regional Flow	16.60	221.31	222.07	221.87	222.12	0.007392	2.04	17.60	44.50	0.75
Ann Street Creek	1766.689	Regional Flow	16.60	220.47	221.81		221.83	0.001302	1.23	29.52	45.78	0.34
Ann Street Creek	1685.014	Regional Flow	16.60	220.16	221.80		221.80	0.000119	0.34	90.92	120.91	0.09
Ann Street Creek	1596.124	Regional Flow	21.50	219.54	221.63	221.48	221.74	0.011704	1.95	15.01	27.45	0.49
Ann Street Creek	1513.798	Regional Flow	21.50	218.95	220.32	220.32	220.52	0.018948	3.16	12.20	26.85	0.92
Ann Street Creek	1447.712	Regional Flow	21.50	218.49	220.07	219.66	220.10	0.002344	1.29	30.31	50.01	0.34
Ann Street Creek	1399.952	Regional Flow	21.50	218.15	220.06	219.60	220.07	0.000269	0.72	66.78	75.41	0.17
Ann Street Creek	1385.399		Culvert									
Ann Street Creek	1375.812	Regional Flow	21.50	218.01	219.49	219.49	219.55	0.002667	1.92	28.17	55.29	0.50
Ann Street Creek	1342.405	Regional Flow	21.50	217.75	218.36	218.36	218.45	0.024688	2.58	18.45	85.43	1.14
Ann Street Creek	1270.376	Regional Flow	21.50	217.19	218.10		218.11	0.001635	0.89	45.31	102.79	0.32
Ann Street Creek	1188.307	Regional Flow	21.50	216.56	217.88		217.92	0.003456	1.53	24.88	40.92	0.45
Ann Street Creek	1109.680	Regional Flow	21.50	215.95	217.49		217.58	0.005547	2.21	18.27	27.80	0.59
Ann Street Creek	1067.101	Regional Flow	21.50	215.62	217.46	216.99	217.48	0.000852	1.25	40.90	55.19	0.29
Ann Street Creek	1048.814		Culvert									
Ann Street Creek	1040.061	Regional Flow	21.50	215.39	217.11	217.11	217.12	0.000242	0.64	65.06	77.12	0.16
Ann Street Creek	978.6279	Regional Flow	21.50	214.47	215.51	215.82	216.71	0.128540	7.19	5.57	16.74	2.43
Ann Street Creek	893.6569	Regional Flow	21.50	213.11	214.31	214.22	214.42	0.008156	2.85	18.86	42.38	0.84
Ann Street Creek	811.8255	Regional Flow	21.50	211.96	213.22	213.22	213.47	0.017422	3.67	11.64	22.25	1.08
Ann Street Creek	731.0230	Regional Flow	21.50	210.74	212.90	212.65	212.90	0.000185	0.61	90.39	130.52	0.14
Ann Street Creek	714.3663		Culvert									
Ann Street Creek	701.0341	Regional Flow	21.50	210.67	212.59	212.59	212.63	0.002017	1.29	26.63	182.75	0.31
Ann Street Creek	652.4738	Regional Flow	21.50	210.25	211.74	211.21	211.75	0.000436	0.67	77.86	165.30	0.19
Ann Street Creek	566.2760	Regional Flow	21.50	209.51	211.73		211.73	0.000082	0.38	147.49	213.93	0.08
Ann Street Creek	471.2464	Regional Flow	21.50	208.69	211.73		211.73	0.000003	0.10	512.30	377.29	0.02
Ann Street Creek	407.5992	Regional Flow	21.50	208.14	211.73	211.58	211.73	0.000002	0.08	545.41	354.97	0.02
Ann Street Creek	388.8397		Culvert									
Ann Street Creek	372.6856	Regional Flow	21.50	208.28	211.72	211.72	211.72	0.000001	0.07	644.38	352.34	0.01
Ann Street Creek	319.4237	Regional Flow	21.50	205.68	207.03	207.52	210.64	0.213843	10.13	3.64	13.60	3.01
Ann Street Creek	252.9376	Regional Flow	21.50	204.06	206.97	206.97	207.14	0.013932	2.24	14.32	33.46	0.52
Ann Street Creek	193.9612	Regional Flow	21.50	202.64	204.41	204.83	205.61	0.051943	6.09	5.35	7.75	1.56
Ann Street Creek	134.3451	Regional Flow	21.50	200.85	203.27	203.34	203.83	0.016174	4.13	8.03	8.84	0.90
Ann Street Creek	63.94562	Regional Flow	21.50	193.83	196.64	196.64	197.33	0.016046	4.02	6.74	5.42	0.86
Ann Street Creek	11.67039	Regional Flow	21.50	169.97	170.80	171.58	192.27	4.375694	22.72	1.20	4.87	8.88

Appendix C

Well Logs

Borehole Log Report

Install Date: 12/11/2006

Project Name: Mid-Spencer Creek / Greensville RSA Subwatershed Study

 Borehole: **MW1_Bedrock**

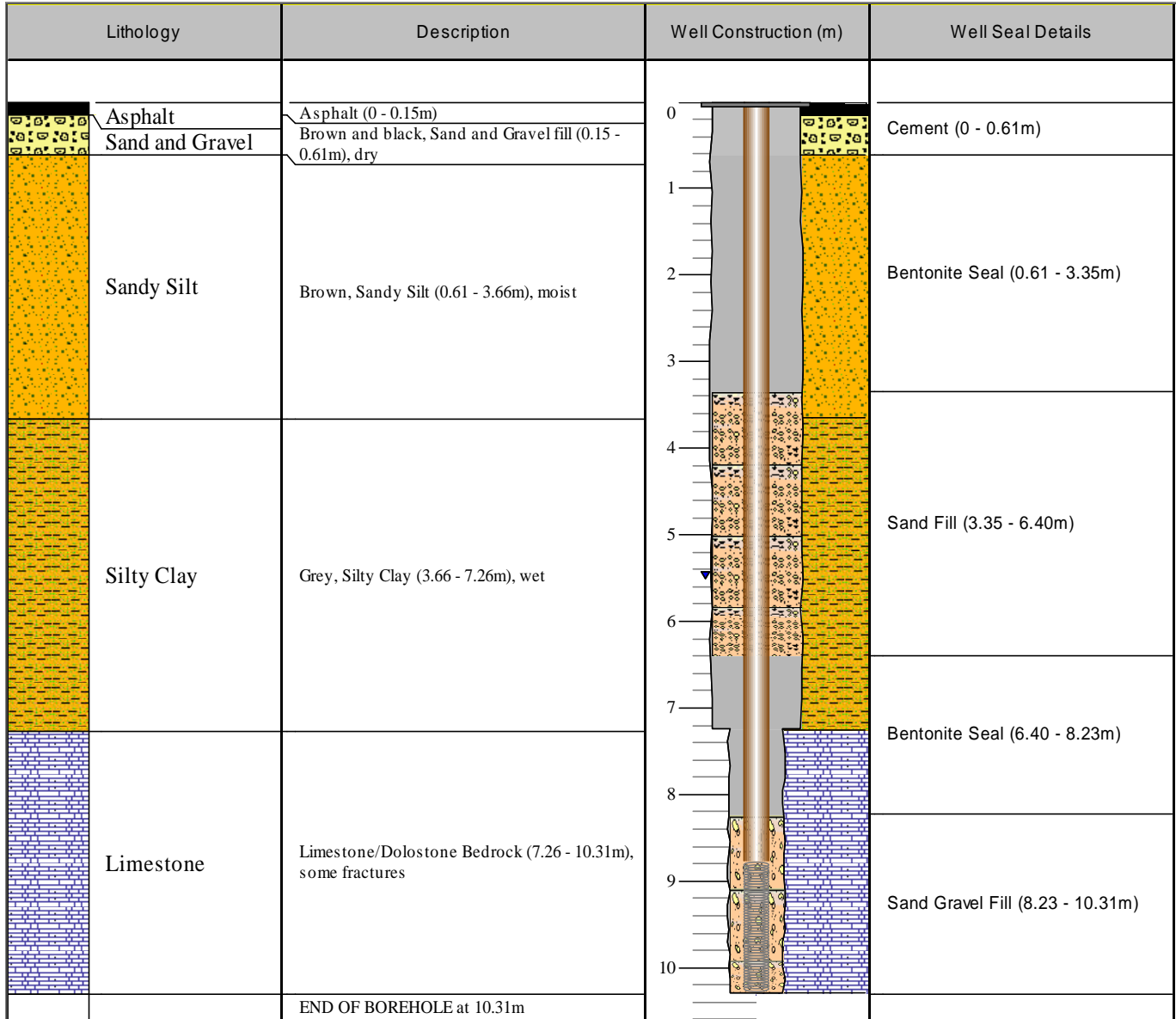
Client Name: City of Hamilton

Well Tag: A052567

Location: Greensville, End of Old Brock Road

Project #: 3060377

Well Type: Monitoring



Casing Details	Well Details	Drilling Details
2 Inch PVC Casing 2 Inch PVC Screen with 0.25mm slots TOC Height(m): -0.114	Easting: 581072.00 Northing: 4793773.00 Elevation (masl): 255.832 Water Depth(m): 5.43 Meas Date: 12/12/2006	Rig Type: 6.5 inch Auger, switched to 4 inch hollow core Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Bedrock Layer Rock Core Diameter(in): 4 Auger Diameter (in): 6.5



Borehole Log Report

Install Date: 12/11/2006

Project Name: Mid-Spencer Creek / Greensville RSA Subwatershed Study

Borehole: MW1_Overburden

Client Name: City of Hamilton

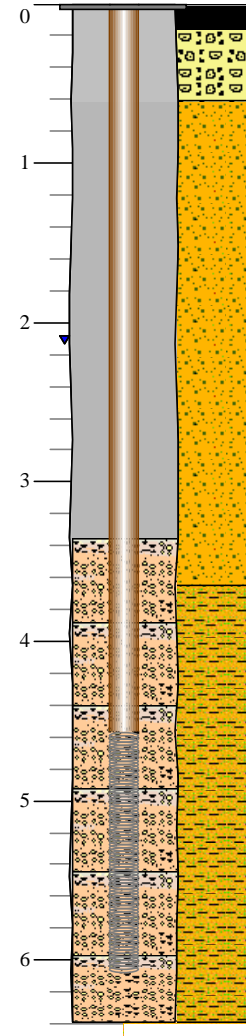
Well Tag: A052567

Location: Greensville, End of Old Brock Road

Project #: 3060377

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
Asphalt	Asphalt (0 - 0.15m)	0	
Sand and Gravel	Brown and black, Sand and Gravel fill (0.15 - 0.61m), dry	0.15 - 0.61	Cement (0 - 0.61m)
Sandy Silt	Brown, Sandy Silt (0.61 - 3.66m), moist	0.61 - 3.66	Bentonite Seal (0.61 - 3.35m)
Silty Clay	Grey, Silty Clay (3.66 - 6.40m), wet	3.66 - 6.40	Sand Fill (3.35 - 6.40m)
	END OF BOREHOLE at 6.40m		



Casing Details	Well Details	Drilling Details
2 Inch PVC Casing 2 Inch PVC Screen with 0.25mm slots TOC Height(m): -0.12	Easting: 581072.00 Northing: 4793773.00 Elevation (masl): 255.832 Water Depth(m): 2.09 Meas Date: 12/12/2006	Rig Type: 6.5 inch Auger Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Continuous (auger) Rock Core Diameter(in): Auger Diameter (in): 6.5



Borehole Log Report

Install Date: 12/12/2006

Project Name: Mid-Spencer Creek / Greenville RSA Subwatershed Study

Borehole: **MW4_Bedrock**

Client Name: City of Hamilton



Well Tag: A052569

Location: Greenville, Harvest Rd at Spencer Gorge

Project #: 3060377

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
		0	Cement (0 - 0.61m)
Silt	Brown, Silt (0 - 3.05m), moist	1	Bentonite Seal (0.61 - 5.49m)
Sand	Brown, Sand (3.05 - 4.57m), wet	2	
Silt	Grey, Silt (4.57 - 6.10m), wet	3	
Silt	Grey, Silt (6.10 - 7.47m), with weathered Bedrock cobbles	4	Sand Fill (5.49 - 7.47m)
Limestone	Limestone/Dolostone Bedrock (7.47 - 10.36m)	5	
		6	Bentonite Seal (7.47 - 8.53m)
		7	Sand Gravel Fill (8.53 - 10.36m)
		8	
		9	
	END OF BOREHOLE at 10.36m	10	

Casing Details	Well Details	Drilling Details
 2 Inch PVC Casing  2 Inch PVC Screen with 0.25mm slots TOC Height(m): -0.06	Easting: 582831.00 Northing: 4792620.00 Elevation (masl): 231.146 Water Depth(m): 2.955 Meas Date: 12/18/2006	Rig Type: 6.5 inch Auger, switched to 4 inch hollow core Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Bedrock Layer Rock Core Diameter(in): 4 Auger Diameter (in): 6.5

Borehole Log Report

Install Date: 12/12/2006

 Borehole: **MW4_Overburden**

Project Name: Mid-Spencer Creek / Greenville RSA Subwatershed Study

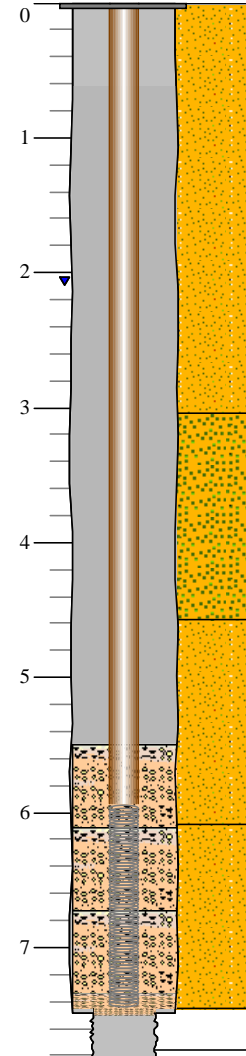
Well Tag: A052569



Client Name: City of Hamilton

Project #: 3060377

Location: Greenville, Harvest Rd at Spencer Gorge

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
Silt	Brown, Silt (0 - 3.05m), moist		Cement (0 - 0.61m)
Sand	Brown, Sand (3.05 - 4.57m), wet		Bentonite Seal (0.61 - 5.49m)
Silt	Grey, Silt (4.57 - 6.10m), wet		Sand Fill (5.49 - 7.47m)
Silt	Grey, Silt (6.10 - 7.47m), with weathered_Bedrock cobbles		
	END OF BOREHOLE at 7.47m		

Casing Details	Well Details	Drilling Details
 2 Inch PVC Casing  2 Inch PVC Screen with 0.25mm slots TOC Height(m): -0.06	Easting: 582831.00 Northing: 4792620.00 Elevation (masl): 231.146 Water Depth(m): 2.035 Meas Date: 12/18/2006	Rig Type: 6.5 inch Auger Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Continuous (auger) Rock Core Diameter(in): Auger Diameter (in): 6.5

Borehole Log Report

Install Date: 11/17/2006

 Borehole: **MW2_Bedrock**

Project Name: Mid-Spencer Creek / Greenville RSA Subwatershed Study

Well Tag: A052560



Client Name: City of Hamilton

Project #: 3060377

Location: Greenville, End of Cramer Road

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
		0	Cement (0 - 0.61m)
Silty Sand	Brown Silty Sand (0 - 10.67m), trace gravel, dry and compact	5	Grout (0.61 - 26.21m)
Sand	Brown Sand (10.67 - 21.34m), some gravel, dry, loose	10	
Sand and Gravel	Brown Sand and Gravel (21.43 - 24.38m), dry, loose	15	Sand Fill (26.21 - 28.65m)
Gravel	Brown Gravel (24.38 - 27.43m), some sand, dry, very loose	20	
Clay	Grey Clay (27.43 - 31.55m), some silt, moist, compact	25	Cave-In (28.65 - 31.09m)
Limestone	Limestone/Dolostone Bedrock (31.55 - 36.45m), First core (10ft) solid rock, little fracturing, second core showed some fractures and gravel inclusions	30	Bentonite Seal (31.09 - 33.83m)
	END OF BOREHOLE at 36.45m	35	Sand Gravel Fill (33.83 - 36.45m)

Casing Details	Well Details	Drilling Details
 2 Inch PVC Casing  2 Inch PVC Screen with 0.25mm slots TOC Height(m): 1.21	Easting: 580655.00 Northing: 4792670.00 Elevation (masl): 268.659 Water Depth(m): 26.8 Meas Date: 11/21/2006	Rig Type: 6.5 inch Auger, switched to 4 inch hollow core Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Bedrock Layer Rock Core Diameter(in): 4 Auger Diameter (in): 6.5



Borehole Log Report

Install Date: 11/17/2006

Project Name: Mid-Spencer Creek / Greenville RSA Subwatershed Study

Borehole: **MW2_Overburden**

Client Name: City of Hamilton

Well Tag: A052560

Location: Greenville, End of Cramer Road

Project #: 3060377

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
		0	Cement (0 - 0.61m)
Silty Sand	Brown Silty Sand (0 - 10.67m), trace gravel, dry and compact	0 - 10.67	
Sand	Brown Sand (10.67 - 21.34m), some gravel, dry, loose	10.67 - 21.34	Grout (0.61 - 26.21m)
Sand and Gravel	Brown Sand and Gravel (21.43 - 24.38m), dry, loose	21.43 - 24.38	
Gravel	Brown Gravel (24.38 - 27.43m), some sand, dry, very loose	24.38 - 27.43	
Clay	Grey Clay (27.43 - 28.65m), some silt, moist, compact	27.43 - 28.65	Sand Fill (26.21 - 28.65m)
	END OF BOREHOLE at 28.65m		

Casing Details	Well Details	Drilling Details
2 Inch PVC Casing 2 Inch PVC Screen with 0.25mm slots TOC Height(m): 1.22	Easting: 580655.00 Northing: 4792670.00 Elevation (masl): 268.659 Water Depth(m): 23.8 Meas Date: 11/21/2006	Rig Type: 6.5 inch Auger Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Continuous (auger) Rock Core Diameter(in): 4 Auger Diameter (in): 6.5



Borehole Log Report

Install Date: 12/06/2006

Borehole: **MW3_Bedrock**

Well Tag: A052565

Project #: 3060377

Project Name: Mid-Spencer Creek / Greensville RSA Subwatershed Study

Client Name: City of Hamilton

Location: Greensville, Brock Rd and Harvest Rd

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
Sand and Silt	Brown, Sand and Silt (0 - 2.29m), some cobbles, trace gravel, dry		Cement (0 - 0.61m)
			Bentonite Seal (0.61 - 1.22m)
Limestone	Limestone/Dolostone Bedrock (2.44 - 6.40m), heavily fractured		Sand Fill (1.22 - 2.29m)
			Bentonite Seal (2.29 - 4.27m)
			Sand Gravel Fill (4.27 - 6.40m)
	END OF BOREHOLE at 6.40m		

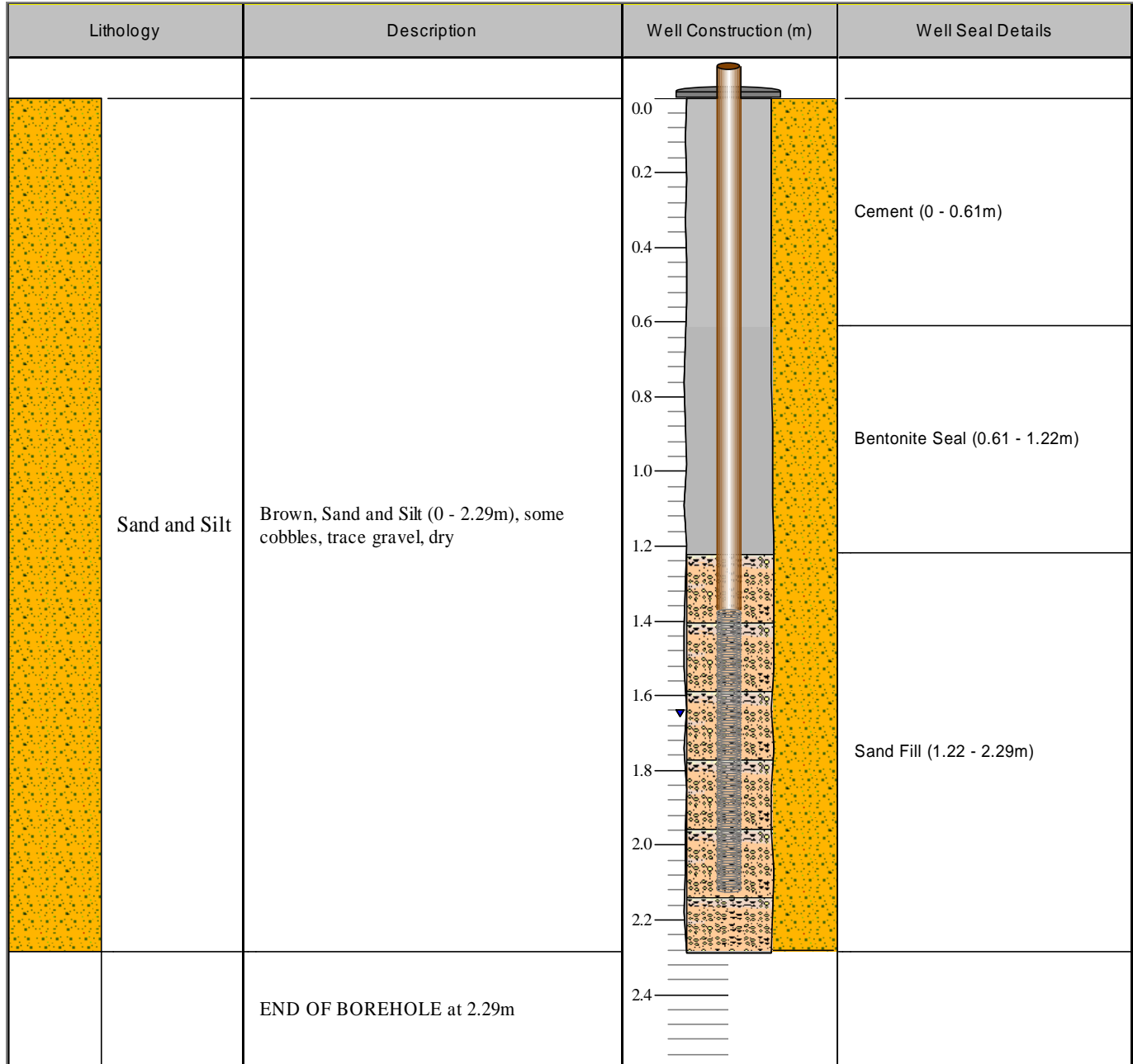
Casing Details	Well Details	Drilling Details
2 Inch PVC Casing 2 Inch PVC Screen with 0.25mm slots TOC Height(m): 1.28	Easting: 581871.00 Northing: 4792650.00 Elevation (masl): 234.808 Water Depth(m): 1.64 Meas Date: 12/08/2006	Rig Type: 6.5 inch Auger, switched to 4 inch hollow core Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Bedrock Layer Rock Core Diameter(in): 4 Auger Diameter (in): 6.5



Borehole Log Report

Project Name: Mid-Spencer Creek / Greenville RSA Subwatershed Study
 Client Name: City of Hamilton
 Location: Greenville, Brock Rd and Harvest Rd

Install Date: 12/06/2006
 Borehole: MW3_Overburden
 Well Tag: A052565
 Project #: 3060377
 Well Type: Monitoring



Casing Details	Well Details	Drilling Details
2 Inch PVC Casing 2 Inch PVC Screen with 0.25mm slots TOC Height(m): 1.25	Easting: 581871.00 Northing: 4792650.00 Elevation (masl): 234.808 Water Depth(m): 1.64 Meas Date: 12/08/2006 Later monitoring showed no water level	Rig Type: 6.5 inch Auger Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Continuous (auger) Rock Core Diameter(in): 4 Auger Diameter (in): 6.5

Borehole Log Report

Install Date: 12/05/2006

 Borehole: **MW5_Bedrock**

Project Name: Mid-Spencer Creek / Greenville RSA Subwatershed Study

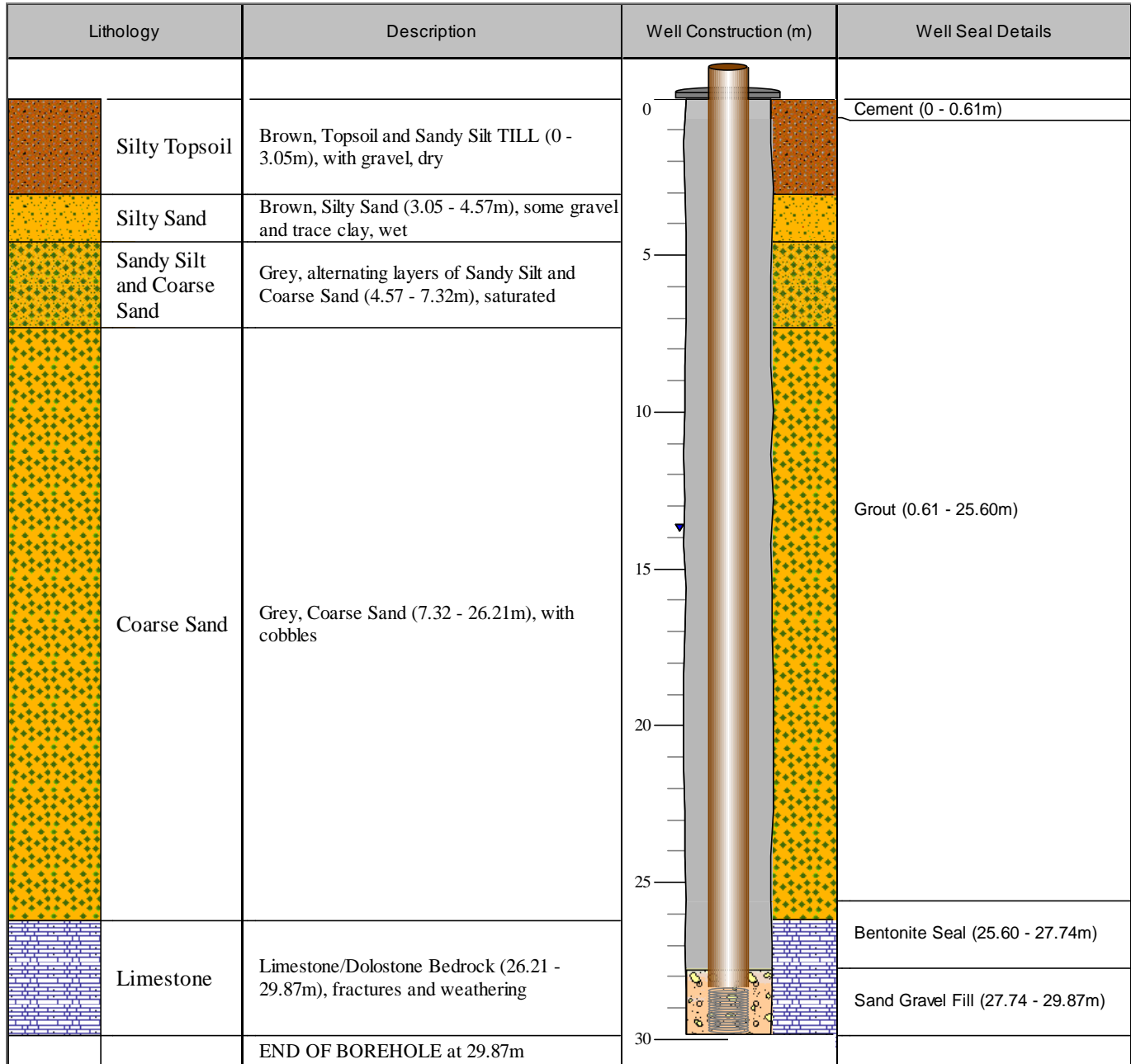
Well Tag: A052564



Client Name: City of Hamilton

Project #: 3060377

Location: Greenville, In the cul-de-sac at the end of Hunts Dr

Well Type: Monitoring



<u>Casing Details</u>	<u>Well Details</u>	<u>Drilling Details</u>
 2 Inch PVC Casing  2 Inch PVC Screen with 0.25mm slots TOC Height(m): 1.24	Easting: 581636.00 Northing: 4792060.00 Elevation (masl): 229.475 Water Depth(m): 13.6 Meas Date: 12/05/2006	Rig Type: 6.5 inch Auger, switched to 4 inch hollow core Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Bedrock Layer Rock Core Diameter(in): 4 Auger Diameter (in): 6.5



Borehole Log Report

Install Date: 12/05/2006

Borehole: **MW5_Overburden**

Project Name: Mid-Spencer Creek / Greenville RSA Subwatershed Study

Well Tag: A052564



Client Name: City of Hamilton

Project #: 3060377

Location: Greenville, In the cul-de-sac at the end of Hunts Dr

Well Type: Monitoring

Lithology		Description	Well Construction (m)	Well Seal Details
			0	Cement (0 - 0.61m)
Topsoil and Sandy Silt TILL	Brown, Topsoil and Sandy Silt TILL (0 - 3.05m), with gravel, dry		1	Bentonite Seal (0.61 - 4.88m)
			2	
Silty Sand	Brown, Silty Sand (3.05 - 4.57m), some gravel and trace clay, wet		3	
			4	
Sandy Silt and Coarse Sand	Grey, alternating layers of Sandy Silt and Coarse Sand (4.57 - 7.32m), saturated		5	Sand Fill (4.88 - 7.32m)
			6	
			7	
END OF BOREHOLE at 7.32m				

Casing Details	Well Details	Drilling Details
 2 Inch PVC Casing  2 Inch PVC Screen with 0.25mm slots TOC Height(m): 1.41	Easting: 581636.00 Northing: 4792060.00 Elevation (masl): 229.475 Water Depth(m): 4.155 Meas Date: 12/05/2006	Rig Type: 6.5 inch Auger Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Continuous (auger) Rock Core Diameter(in): 4 Auger Diameter (in): 6.5

Borehole Log Report

Install Date: 11/24/2006

 Borehole: **MW6_Bedrock**

Project Name: Mid-Spencer Creek / Greenville RSA Subwatershed Study

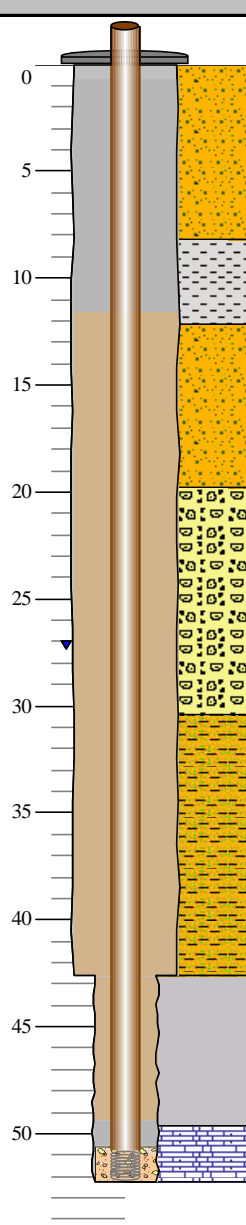
Well Tag: A052581



Client Name: City of Hamilton

Project #: 3060377

Location: Greenville, Crooks Hollow Rd, across from #838

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
			
Silty Sand	Brown Silty Sand (0 - 8.23m), trace gravel, dry and compact	0 - 8.23	Cement (0 - 0.61m) Grout (0.61 - 11.58m)
Clay	Grey, Clay (8.23 - 12.19m), some silt, wet	8.23 - 12.19	
Silty Sand	Grey, Silty Sand (12.19 - 19.81m), wet	12.19 - 19.81	
Sand and Gravel	Brown, Sand and Gravel (19.81 - 30.48m), wet	19.81 - 30.48	
Silty Clay	Grey, Silty Clay (30.48 - 42.67m), wet	30.48 - 42.67	Cave-In (11.58 - 49.38m)
unknown	**Augers switched to temporary casing and no cuttings available to sample (42.67 - 49.68m)**	42.67 - 49.68	
Limestone	Limestone/Dolostone Bedrock (49.68 - 52.33m), first 5ft solid rock, some fractures in deeper core	49.68 - 52.33	Bentonite Seal (49.38 - 50.60m) Sand Gravel Fill (50.60 - 52.33m)
	END OF BOREHOLE at 52.33m		

Casing Details	Well Details	Drilling Details
 2 Inch PVC Casing  2 Inch PVC Screen with 0.25mm slots TOC Height(m): 1.13	Easting: 580369.00 Northing: 4791720.00 Elevation (masl): 256.187 Water Depth(m): 27 Meas Date: 11/27/2006	Rig Type: 6.5 inch Auger, switched to 4 inch hollow core Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Bedrock Layer Rock Core Diameter(in): 4 Auger Diameter (in): 6.5



Borehole Log Report

Install Date: 11/24/2006

Borehole: **MW6_Overburden**

Project Name: Mid-Spencer Creek / Greenville RSA Subwatershed Study

Well Tag: A052581

Client Name: City of Hamilton

Project #: 3060377

Location: Greenville, Crooks Hollow Rd, across from #838

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
Clayey Silt	Brown, Clayey Silt (0 - 1.52m), dry		Cement (0 - 0.61m)
Silty Clay	Red to brown, Silty Clay (1.52 - 3.66m), dry		Grout (0.61 - 13.11m)
Clay	Brown turned to grey, Clay (3.66 - 13.11m), some silt, moist 1ft Seam of fine Sand at 25-26ft Clay material was very moist and malleable at 27-40ft		Bentonite Seal (13.11 - 13.72m)
Sand	Grey to black, Sand (13.11 - 16.76m), with silt, dry turning to wet at 50-55ft		Sand Fill (13.72 - 16.76m)
END OF BOREHOLE at 16.76m			

Casing Details	Well Details	Drilling Details
2 Inch PVC Casing 2 Inch PVC Screen with 0.25mm slots TOC Height(m): 1.39	Easting: 580369.00 Northing: 4791723.00 Elevation (masl): 256.459 Water Depth(m): 14.35 Meas Date: 12/18/2006	Rig Type: 6.5 inch Auger Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Continuous (auger) Rock Core Diameter(in): 4 Auger Diameter (in): 6.5



Borehole Log Report

Install Date:

Borehole: **MW6_Decommissioned**

Project Name: Mid-Spencer Creek / Greensville RSA Subwatershed Study

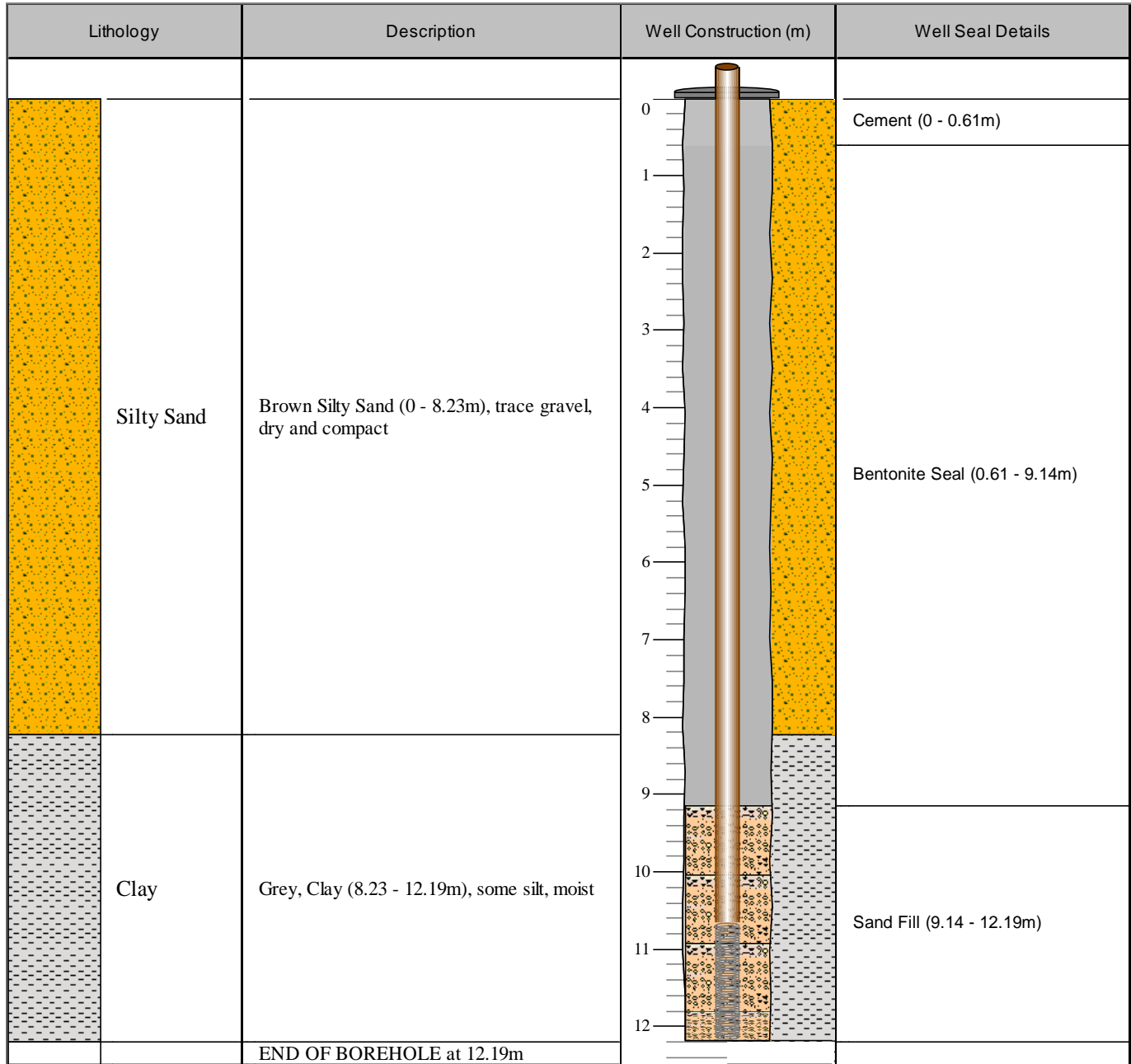
Well Tag:

Client Name: City of Hamilton

Project #: 3060377

Location: Greensville, Crooks Hollow Rd, across from #838

Well Type: Monitoring



Casing Details	Well Details	Drilling Details
2 Inch PVC Casing 2 Inch PVC Screen with 0.25mm slots TOC Height(m):	Easting: 580371.00 Northing: 4791721.00 Elevation (masl): 256.554 Water Depth(m): Meas Date:	Rig Type: Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Rock Core Diameter(in): 4 Auger Diameter (in): 6.5

Borehole Log Report

Install Date: 11/28/2006

 Borehole: **MW7_Bedrock**

Project Name: Mid-Spencer Creek / Greensville RSA Subwatershed Study

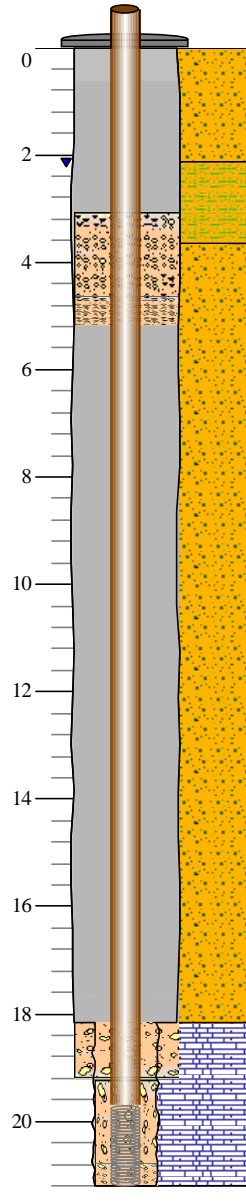
Well Tag: A052563



Client Name: City of Hamilton

Project #: 3060377

Location: Greensville, End of Oak Avenue

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
			
Sandy Silt	Brown, Sandy Silt (0 -2.13m), trace gravel, dry	0 - 2.13	Cement (0 - 0.61m)
Clayey Silt	Dark grey, Clayey Silt (2.13 - 3.66m), moist	2.13 - 3.66	Bentonite Seal (0.61 - 3.05m)
Sandy Silt	Grey, Sandy Silt (3.66 - 18.19m), some clay, saturated	3.66 - 18.19	Sand Fill (3.05 - 5.18m)
			Grout (5.18 - 17.68m)
Limestone	Limestone/Dolostone Bedrock (18.19 - 21.24m)	18.19 - 21.24	Bentonite Seal (17.68 - 19.20m)
			Sand Gravel Fill (19.20 - 21.24m)
	END OF BOREHOLE at 21.24m		

Casing Details	Well Details	Drilling Details
 2 Inch PVC Casing  2 Inch PVC Screen with 0.25mm slots TOC Height(m): 1.1	Easting: 580712.00 Northing: 4790899.00 Elevation (masl): 228.34 Water Depth(m): 2.07 Meas Date: 11/28/2006	Rig Type: 6.5 inch Auger, switched to 4 inch hollow core Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Bedrock Layer Rock Core Diameter(in): 4 Auger Diameter (in): 6.5

Borehole Log Report

Install Date: 11/28/2006

 Borehole: **MW7_Overburden**

Project Name: Mid-Spencer Creek / Greenville RSA Subwatershed Study

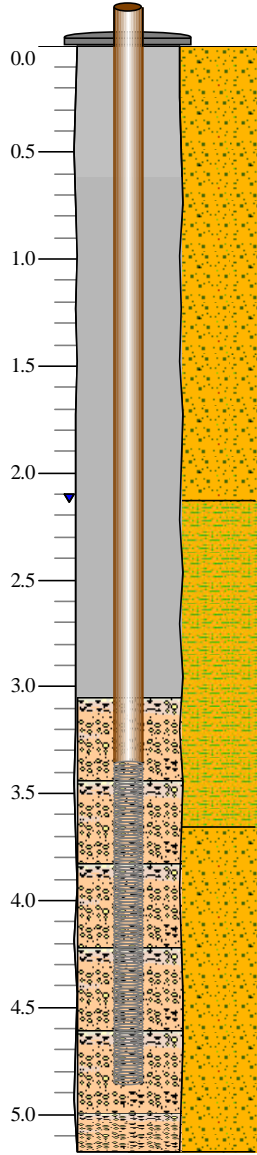
Well Tag: A052563



Client Name: City of Hamilton

Project #: 3060377

Location: Greenville, End of Oak Avenue

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
Sandy Silt	Brown, Sandy Silt (0 -2.13m), trace gravel, dry		Cement (0 - 0.61m)
Clayey Silt	Dark grey, Clayey Silt (2.13 - 3.66m), moist		Bentonite Seal (0.61 - 3.05m)
Sandy Silt	Grey, Sandy Silt (3.66 - 5.18m), some clay, saturated		Sand Fill (3.05 - 5.18m)
	END OF BOREHOLE at 5.18m		

Casing Details	Well Details	Drilling Details
 2 Inch PVC Casing  2 Inch PVC Screen with 0.25mm slots TOC Height(m): 1.1	Easting: 580712.00 Northing: 4790899.00 Elevation (masl): 228.34 Water Depth(m): 2.1 Meas Date: 11/28/2006	Rig Type: 6.5 inch Auger Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Continuous (auger) Rock Core Diameter(in): 4 Auger Diameter (in): 6.5

Borehole Log Report

Install Date: 11/27/2006

 Borehole: **MW8_Bedrock**

Project Name: Mid-Spencer Creek / Greenville RSA Subwatershed Study

Well Tag: A052562



Client Name: City of Hamilton

Project #: 3060377

Location: Greenville, Corner of Rosebough Park

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
Silty Topsoil	Brown Silty Topsoil (0 - 1.52m), dry and compact	0 - 1.52	Cement (0 - 0.61m)
Sandy Silt	Brown to grey, Sandy Silt (1.52 - 3.05m), wet	1.52 - 3.05	Bentonite Seal (0.61 - 5.49m)
Silty Clay	Grey, Silty Clay (3.05 - 6.10m), saturated	3.05 - 6.10	
Silty Sand	Grey, Silty Sand (6.10 - 10.74m), saturated	6.10 - 10.74	Sand Fill (5.49 - 7.92m)
Limestone	Limestone/Dolostone Bedrock (10.74 - 13.79m), significantly fractured, soil seams in rock	10.74 - 13.79	Bentonite Seal (7.92 - 11.58m)
	END OF BOREHOLE at 13.79m	13.79	Sand Gravel Fill (11.58 - 13.79m)

Casing Details	Well Details	Drilling Details
 2 Inch PVC Casing  2 Inch PVC Screen with 0.25mm slots TOC Height(m): 0.68	Easting: 581644.00 Northing: 4791438.00 Elevation (masl): 218.7 Water Depth(m): 5.81 Meas Date: 11/27/2006	Rig Type: 6.5 inch Auger, switched to 4 inch hollow core Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Bedrock Layer Rock Core Diameter(in): 4 Auger Diameter (in): 6.5



Borehole Log Report

Install Date: 11/27/2006

Borehole: **MW8_Overburden**

Project Name: Mid-Spencer Creek / Greenville RSA Subwatershed Study

Well Tag: A052562

Client Name: City of Hamilton

Project #: 3060377

Location: Greenville, Corner of Rosebough Park

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
Silty Topsoil	Brown Silty Topsoil (0 - 1.52m), dry and compact		Cement (0 - 0.61m)
Sandy Silt	Brown to grey, Sandy Silt (1.52 - 3.05m), wet		Bentonite Seal (0.61 - 5.49m)
Silty Clay	Grey, Silty Clay (3.05 - 6.10m), saturated		
Silty Sand	Grey, Silty Sand (6.10 - 7.92m), saturated		Sand Fill (5.49 - 7.92m)
	END OF BOREHOLE at 7.92m		

Casing Details	Well Details	Drilling Details
2 Inch PVC Casing 2 Inch PVC Screen with 0.25mm slots TOC Height(m): 0.72	Easting: 581644.00 Northing: 4791438.00 Elevation (masl): 218.7 Water Depth(m): 0.18 Meas Date: 11/27/2006	Rig Type: 6.5 inch Auger Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Continuous (auger) Rock Core Diameter(in): 4 Auger Diameter (in): 6.5

Borehole Log Report

Install Date: 12/08/2006

 Borehole: **MW10_Bedrock**

Project Name: Mid-Spencer Creek / Greensville RSA Subwatershed Study

Well Tag: A052566



Client Name: City of Hamilton

Project #: 3060377

Location: Greensville, NorthEastern corner of the Bullock Park

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
		0	
	Clayey Silt	1	Cement (0 - 0.61m)
	Brown to red, Clayey Silt (0 - 3.05m), dry	2	
		3	
	Silty Sand	4	Bentonite Seal (0.61 - 7.62m)
	Red and Brown, Silty Sand (3.05 - 4.57m), with gravel, dry	5	
		6	
	Sandy Silt	7	
	Brown, Sandy Silt (4.57 - 6.10m), trace clay, moist	8	
		9	
	Silty Clay	10	Sand Fill (7.62 - 9.91m)
	Brown to grey, Silty Clay (6.10 - 10.06m), wet	11	
		12	
	Limestone	13	Bentonite Seal (9.91 - 10.97m)
	Limestone/Dolostone Bedrock (10.06 - 13.11m), some fractures, non-porous		
			Sand Gravel Fill (10.97 - 13.11m)
	END OF BOREHOLE at 13.11m		

Casing Details	Well Details	Drilling Details
 2 Inch PVC Casing  2 Inch PVC Screen with 0.25mm slots TOC Height(m): 0.83	Easting: 582026.00 Northing: 4791931.00 Elevation (masl): 214.333 Water Depth(m): 4.27 Meas Date: 12/08/2006	Rig Type: 6.5 inch Auger, switched to 4 inch hollow core Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Bedrock Layer Rock Core Diameter(in): 4 Auger Diameter (in): 6.5



Borehole Log Report

Install Date: 12/08/2006

Project Name: Mid-Spencer Creek / Greenville RSA Subwatershed Study

Borehole: **MW10_Overburden**

Client Name: City of Hamilton

Well Tag: A052566

Location: Greenville, NorthEastern corner of the Bullock Park

Project #: 3060377

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
		0	Cement (0 - 0.61m)
Clayey Silt	Brown to red, Clayey Silt (0 - 3.05m), dry	1	Bentonite Seal (0.61 - 7.62m)
		2	
		3	
Silty Sand	Red and Brown, Silty Sand (3.05 - 4.57m), with gravel, dry	4	
		5	
Sandy Silt	Brown, Sandy Silt (4.57 - 6.10m), trace clay, moist	6	
		7	
Silty Clay	Brown to grey, Silty Clay (6.10 - 10.06m), wet	8	Sand Fill (7.62 - 9.91m)
		9	
	END OF BOREHOLE at 10.06m	10	

Casing Details	Well Details	Drilling Details
2 Inch PVC Casing 2 Inch PVC Screen with 0.25mm slots TOC Height(m): 0.83	Easting: 582026.00 Northing: 4791931.00 Elevation (masl): 214.333 Water Depth(m): 2.75 Meas Date: 12/08/2006	Rig Type: 6.5 inch Auger Drilling Contractor: Lantech Drilling Supervisor: K.Belan Sampling Interval: Continuous (auger) Rock Core Diameter(in): 4 Auger Diameter (in): 6.5

Borehole Log Report

Install Date: 12/12/2006

 Borehole: **MW11_Bedrock**

Project Name: Mid-Spencer Creek / Greensville RSA Subwatershed Study

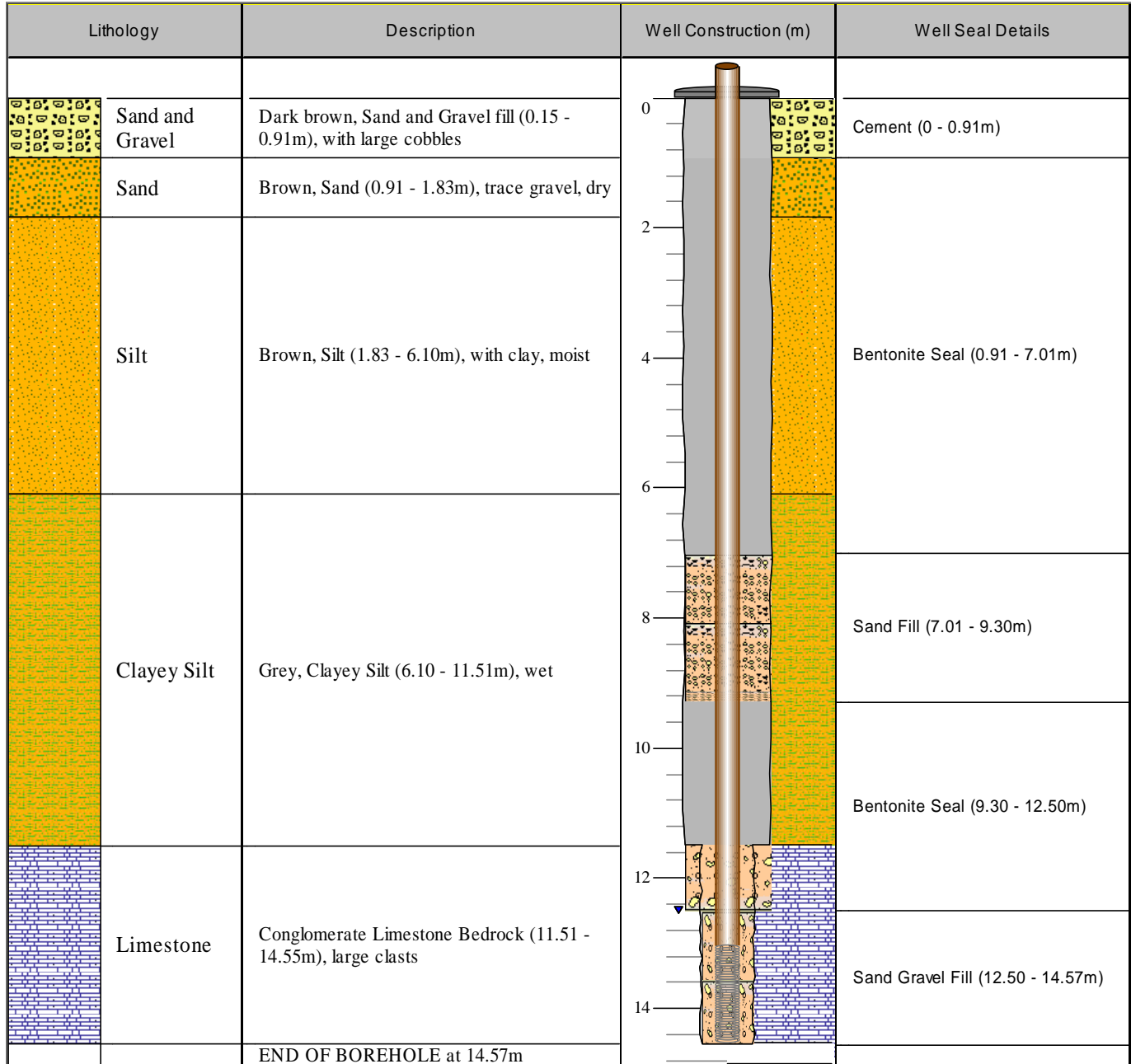
Well Tag: A052568



Client Name: City of Hamilton

Project #: 3060377

Location: Greensville, Side of HWY 8 near the escarpment

Well Type: Monitoring



Casing Details	Well Details	Drilling Details
 2 Inch PVC Casing	Easting: 582427.00	Rig Type: 6.5 inch Auger, switched to 4 inch hollow core
 2 Inch PVC Screen with 0.25mm slots	Northing: 4791743.00	Drilling Contractor: Lantech
TOC Height(m): 1.4	Elevation (masl): 209.825	Drilling Supervisor: K.Belan
	Water Depth(m): 12.45	Sampling Interval: Bedrock Layer
	Meas Date: 12/18/2006	Rock Core Diameter(in): 4 Auger Diameter (in): 6.5



Borehole Log Report

Install Date: 12/12/2006

Project Name: Mid-Spencer Creek / Greenville RSA Subwatershed Study

Borehole: MW11_Overburden


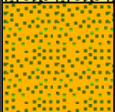
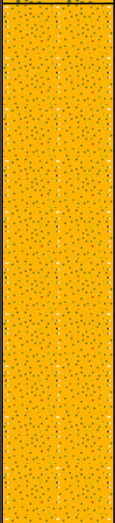

Client Name: City of Hamilton



Well Tag: A052568

Location: Greenville, Side of HWY 8 near the escarpment

Project #: 3060377

Well Type: Monitoring

Lithology	Description	Well Construction (m)	Well Seal Details
	Sand and Gravel Dark brown, Sand and Gravel fill (0 - 0.91m), with large cobbles	0	Cement (0 - 0.91m)
	Sand Brown, Sand (0.91 - 1.83m), trace gravel, dry	1	Bentonite Seal (0.91 - 7.01m)
	Silt Brown, Silt (1.83 - 6.10m), with clay, moist	2	
	Clayey Silt Grey, Clayey Silt (6.10 - 9.30m), wet	3	
	END OF BOREHOLE at 9.30m	4	Sand Fill (7.01 - 9.30m)

Casing Details	Well Details	Drilling Details
 2 Inch PVC Casing	Easting: 582427.00	Rig Type: 6.5 inch Auger
 2 Inch PVC Screen with 0.25mm slots	Northing: 4791743.00	Drilling Contractor: Lantech
TOC Height(m): 1.41	Elevation (masl): 209.825	Drilling Supervisor: K.Belan
	Water Depth(m): 4.43	Sampling Interval: Continuous (auger)
	Meas Date: 12/18/2006	Rock Core Diameter(in): 4 Auger Diameter (in): 6.5

Appendix D

RGAs Form



Date _____

Reach _____

RAPID GEOMORPHIC ASSESSMENT

Watercourse:

Reach Boundaries:

Form/ Process	Geomorphic Indicator		Present		Factor/Value
	no.	Description	No	Yes	
Evidence of Aggradation (AI)	1	Lobate bar			
	2	Coarse material in riffle embedded			
	3	Siltation in pools			
	4	Medial bars			
	5	Accretion on point bars			
	6	Poor longitudinal sorting of bed materials			
	7	Deposition in overbank zone			
Evidence of Degradation (DI)	1	Exposed bridge footings			
	2	Exposed sanitary/storm sewer/pipeline etc			
	3	Elevated stormsewer outfall			
	4	undermined gabion basket/concrete apron/etc			
	5	Scour pools d/s of culverts/stormsewers			
	6	Cut face on bar forms			
	7	Head cutting due to knick point migration			
	8	Terrace cut through older bar material			
	9	Suspended armor layer visible in bank			
	10	Channel worn into undisturbed overburden/bedrock			
Evidence of Widening (WI)	1	Fallen/leaning trees/fence posts/etc			
	2	Occurrence of large organic debris			
	3	Exposed tree roots			
	4	Basal scour on inside meander bends			
	5	Basal scour on both sides of channel through riffle			
	6	Gabion baskets/concrete walls/armour stone etc. out flanked			
	7	Length of basal scour > 50% through subject reach			
	8	Exposed length of previously buried pipe/cable etc.			
	9	Fracture lines along top of bank			
	10	Exposed building foundation			
Evidence of Planimetric Form Adjustment (PI)	1	Formation of chute(s)			
	2	Evolution of single thread channel to multiple channel			
	3	Evolution of pool-riffle form to low bed relief form			
	4	Cutoff channel(s)			
	5	Formation of island(s)			
	6	Thalweg alignment out of phase with meander geometry			
	7	Bar forms poorly formed/reworked/removed			
Stability Index (SI) = (AI+DI+WI+PI)/m				SI =	

(MOE, 1999)

Reach Description:

Appendix E

Site Summaries

- 1) Logies Creek
- 2) Greensville Tributary
- 3) Middle Spencer Creek

1) Logies Creek

Fluvial Geomorphology Summary

Watercourse:	Logies Creek	Length Surveyed:	74.79 m
Site Location:	Upstream of Harvest Road	Number of Cross Sections:	7
Date of Survey:	2007		

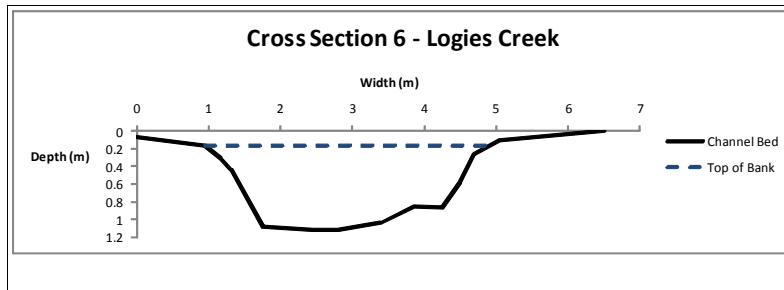
Cross Section Characteristics

Bankfull Width Average (m):	4.01	Width:Depth Ratio Average (m/m)	5.65
Bankfull Width Range (m):	2.89 - 4.72	Width:Depth Ratio Range (m/m):	4.31 - 6.56
Bankfull Depth Average (m):	0.74	Wetted Width Average (m):	3.15
Bankfull Depth Range (m):	0.61 - 0.95	Wetted Width Range (m):	2.24 - 4.25

Planform:



Cross Section:



Bank Characteristics

Bank Height Range (m):	0.44 to 0.87	Root Depth (cm):	~ 0.60
Bank Height Average (m):	0.67		

Bank Material (Right Bank):	Sandy Loam, Loam	Bank Material (Left Bank):	Sandy Loam
(RB) Layer 1 - Stickiness:	Slightly Sticky	(LB) Layer 1 - Stickiness:	Slightly Sticky
(RB) Layer 1 - Plasticity:	Plastic	(LB) Layer 1 - Plasticity:	Non-plastic to Slightly Plasti
(RB) Layer 1 - Firmness:	Very Soft	(LB) Layer 1 - Firmness:	Loose to Very Soft
(RB) Layer 2 - Stickiness:	Slightly Sticky	(LB) Layer 2 - Stickiness:	Slightly Sticky
(RB) Layer 2 - Plasticity:	Plastic	(LB) Layer 2 - Plasticity:	Non-plastic to Slightly Plasti
(RB) Layer 2 - Firmness:	Very Soft	(LB) Layer 2 - Firmness:	Loose to Very Soft
(RB) Layer 3 - Stickiness:	Sticky	(LB) Layer 3 - Stickiness:	N/A
(RB) Layer 3 - Plasticity:	Very Plastic	(LB) Layer 3 - Plasticity:	N/A
(RB) Layer 3 - Firmness:	Soft	(LB) Layer 3 - Firmness:	N/A

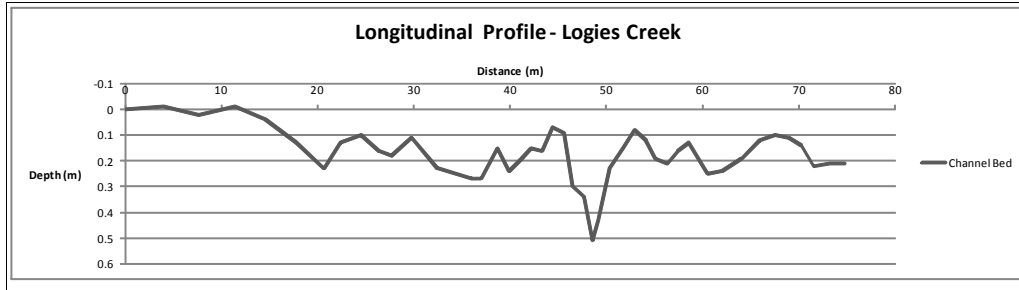
Fluvial Geomorphology Summary

Longitudinal Characteristics

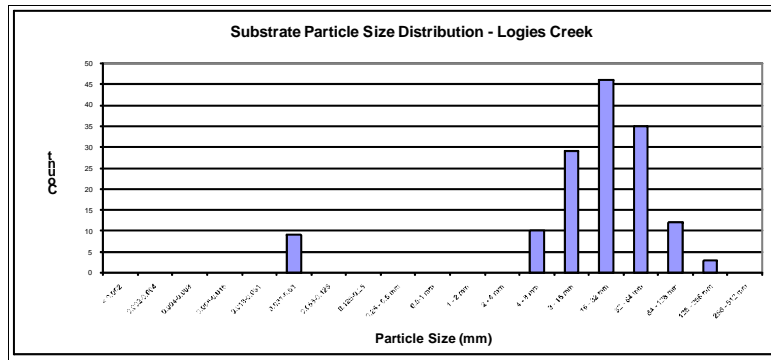
Channel Gradient (%): 0.28
Riffle Gradient Average (%): 2.69

Riffle Pool Spacing Average (m): 8.0

Longitudinal Profile:



Particle Size Distribution:



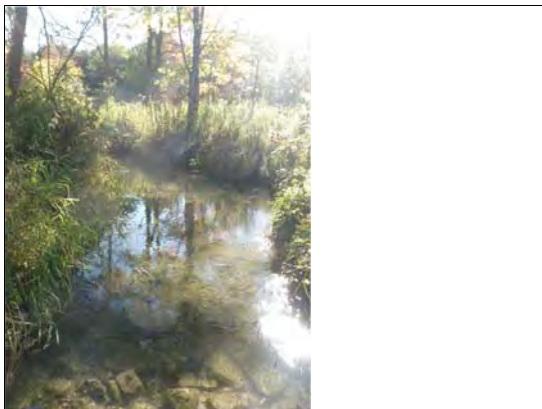
Substrate Characteristics

D10: 6 mm
D50: 25 mm
D84: 55 mm

Site Observations:

Notes: Channel substrate consists of cobbles and small boulders with unconsolidated fines. Well defined low to moderate sinuous meandering channel with pools and riffles. Deciduous trees and herbaceous vegetation along bank.

Upstream:



Downstream:



2) Greenville Tributary

Fluvial Geomorphology Summary

Watercourse:	Greenville Tributary	Length Surveyed:	138.17 m
Site Location:	Upstream and Downstream of Brock Road	Number of Cross Sections:	6
Date of Survey:	2009		

Cross Section Characteristics

Bankfull Width Average (m):	7.0	Width:Depth Ratio Average (m/m)	12.34
Bankfull Width Range (m):	4.20 to 10.66	Width:Depth Ratio Range (m/m):	4.46 to 38.35
Bankfull Depth Average (m):	1.01	Wetted Width Average (m):	6.67
Bankfull Depth Range (m):	0.18 to 2.04	Wetted Width Range (m):	1.45 to 26.63

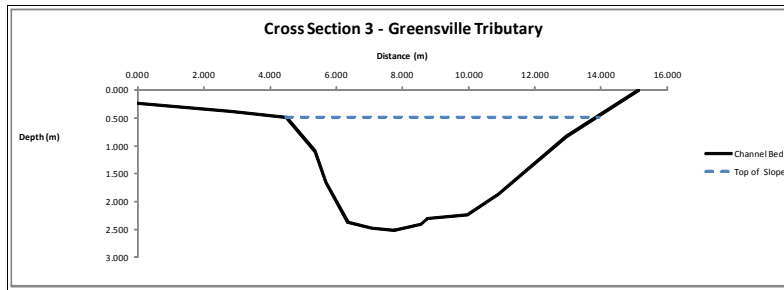
Planform:



Approximate locations of cross sections.

Google Earth (2012)

Cross Section:



Bank Characteristics

Bank Height Range (m): 0.09 to 1.88

Root Depth (cm):

Bank Height Average (m): 0.94

Bank Material (Right Bank): Gravel, Loam

(RB) Layer 1 - Stickiness: Slightly Sticky to Sticky

(RB) Layer 1 - Plasticity: Plastic

(RB) Layer 1 - Firmness: Soft to Firm

(RB) Layer 2 - Stickiness:

(RB) Layer 2 - Plasticity:

(RB) Layer 2 - Firmness:

(RB) Layer 3 - Stickiness:

(RB) Layer 3 - Plasticity:

(RB) Layer 3 - Firmness:

Bank Material (Left Bank): Clay Loam, Clay

(LB) Layer 1 - Stickiness: Slightly Sticky to Sticky

(LB) Layer 1 - Plasticity: Plastic

(LB) Layer 1 - Firmness: Soft

(LB) Layer 2 - Stickiness: Sticky

(LB) Layer 2 - Plasticity: Very Plastic

(LB) Layer 2 - Firmness: Soft

(LB) Layer 3 - Stickiness: Extremely Sticky

(LB) Layer 3 - Plasticity: Very Plastic

(LB) Layer 3 - Firmness: Firm to Stiff

Fluvial Geomorphology Summary

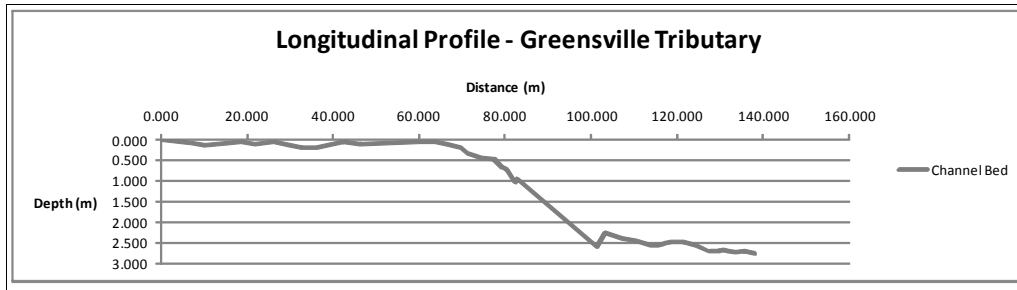
Longitudinal Characteristics

Channel Gradient (%): 2.0

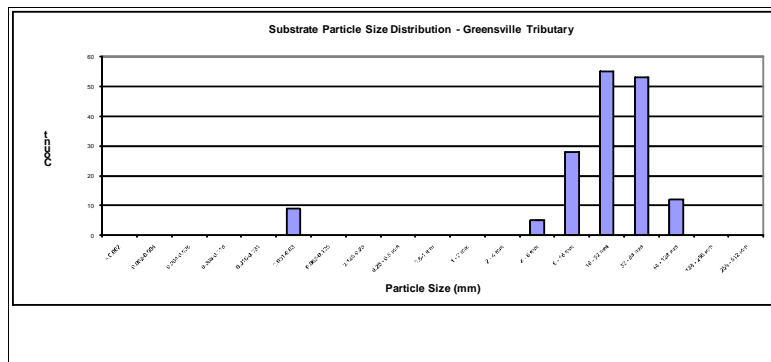
Riffle Pool Spacing Average (m): Approximately 14 m

Riffle Gradient Average (%): Poorly Defined

Longitudinal Profile:



Particle Size Distribution:



Substrate Characteristics

D10: 9 mm

D50: 26 mm

D84: 49 mm

Site Observations:

Notes: D/S section is entrenched with various sizes of poorly sorted bed material exist along the bed, bank erosion present. U/S section has unconsolidated sediment along the bed and access to floodplain. Culvert at Brock Road crossing is undersized.

Upstream:



Downstream:



3) Middle Spencer Creek

Fluvial Geomorphology Summary

Watercourse:	Middle Spencer Creek	Length Surveyed:	100.65 m
Site Location:	Downstream of Brock Road	Number of Cross Sections:	6
Date of Survey:	2011		

Cross Section Characteristics

Bankfull Width Average (m):	11.97	Width:Depth Ratio Average (m/m)	25.99
Bankfull Width Range (m):	9.59 to 16.31	Width:Depth Ratio Range (m/m):	15.94 to 37.47
Bankfull Depth Average (m):	0.50	Wetted Width Average (m):	9.64
Bankfull Depth Range (m):	0.26 to 0.73	Wetted Width Range (m):	8.16 to 10.47

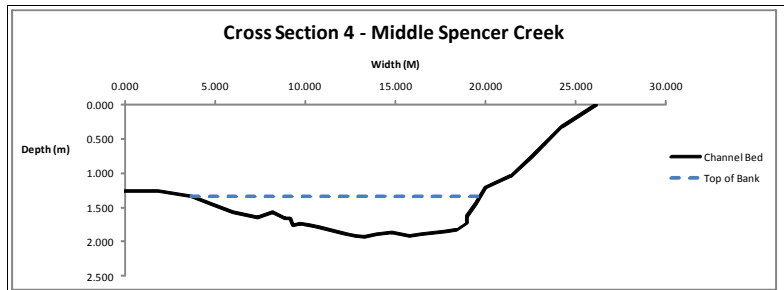
Planform:



Approximate locations of cross sections.

Google Earth (2012)

Cross Section:



Bank Characteristics

Bank Height Range (m):	0.11 to 0.43	Root Depth (cm):	
Bank Height Average (m):	0.31		
Bank Material (Right Bank):	Gravel, Loam	Bank Material (Left Bank):	Gravel, Loam
(RB) Layer 1 - Stickiness:		(LB) Layer 1 - Stickiness:	
(RB) Layer 1 - Plasticity:		(LB) Layer 1 - Plasticity:	
(RB) Layer 1 - Firmness:		(LB) Layer 1 - Firmness:	
(RB) Layer 2 - Stickiness:		(LB) Layer 2 - Stickiness:	
(RB) Layer 2 - Plasticity:		(LB) Layer 2 - Plasticity:	
(RB) Layer 2 - Firmness:		(LB) Layer 2 - Firmness:	
(RB) Layer 3 - Stickiness:		(LB) Layer 3 - Stickiness:	
(RB) Layer 3 - Plasticity:		(LB) Layer 3 - Plasticity:	
(RB) Layer 3 - Firmness:		(LB) Layer 3 - Firmness:	

Fluvial Geomorphology Summary

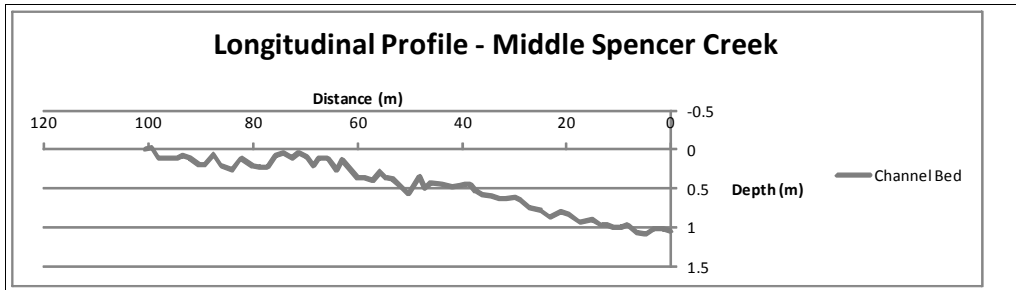
Longitudinal Characteristics

Channel Gradient (%): 1.04

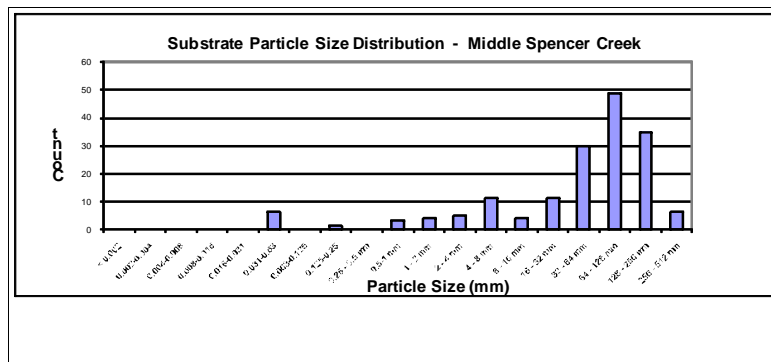
Riffle Pool Spacing Average (m): Approximately 7m

Riffle Gradient Average (%): 4.37

Longitudinal Profile:



Particle Size Distribution:



Substrate Characteristics

D10: 3 mm

D50: 70 mm

D84: 155 mm

Site Observations:

Notes: Poorly sorted bed substrate, composed of cobbles and small boulders, with gravel and fine sediment. Poorly formed riffle-pool formation. High width to depth ratio. Deciduous trees, shrubs, and herbaceous vegetation within the buffer zone.

Upstream:



Downstream:



Appendix F

Species Lists

- 1) Floral
- 2) Faunal

1) Floral

Wiers Road Plant List

Family	Scientific Name	Common Name	CC	CW	Ranking					Introduced in Ontario (0=n 1=y)	MAM2-2 (1)	CUW1 (2)	MAS2-1 (3)	CUW1 (4)	MAM2-2 (5)	CUW1 (6)	FOD7 (7)	CUT1 (8)	CUMI-1 (9)	FOD7 (10)
					COSEWIC	COSSARO	G-Rank	S-Rank	Hamilton Rare											
ACERACEAE	<i>Acer negundo</i>	Manitoba Maple	0	-2			G5	S5		0		*		*						
ASTERACEAE	<i>Achillea millefolium</i> ssp. <i>millefolium</i>	Common Yarrow	0	3			G5	SE		1					*					
LAMIACEAE	<i>Ajuga reptans</i>	Common Bugle	0	5			G?	SE2		1						*				
BRASSICACEAE	<i>Alliaria petiolata</i>	Garlic Mustard	0	0			G?	SE5		1		*		*	*	*	*			*
ASTERACEAE	<i>Ambrosia artemisiifolia</i>	Common Ragweed	0	3			G5	S5		0	*									
ASTERACEAE	<i>Arctium minus</i> ssp. <i>minus</i>	Common Burdock	0	5			G?	SE5		1			*		*				*	*
ASCLEPIADACEAE	<i>Asclepias syriaca</i>	Common Milkweed	0	5			G5	S5		0	*			*	*				*	
ASTERACEAE	<i>Aster cordifolius</i>	Heart-leaved Aster	5	5			G5	S5		0						*				
ASTERACEAE	<i>Aster lanceolatus</i> ssp. <i>lanceolatus</i>	Panicled Aster	3	-3			G5	S5		0					*					
ASTERACEAE	<i>Aster lateriflorus</i> var. <i>lateriflorus</i>	One-sided Aster	3	-2			G5	S5		0			*	*	*	*				
ASTERACEAE	<i>Aster novae-angliae</i>	New England Aster	2	-3			G5	S5		0			*	*	*	*				
ASTERACEAE	<i>Aster pilosus</i> var. <i>pilosus</i>	Hairy Aster	4	2			G5	S5		0									*	
ASTERACEAE	<i>Aster puniceus</i> var. <i>puniceus</i>	Purple-stem Aster	6	-5			G5	S5		0			*							
BETULACEAE	<i>Betula papyrifera</i>	White Birch	2	2			G5	S5		0							*			
ASTERACEAE	<i>Bidens cernua</i>	Nodding Beggar-ticks	2	-5			G5	S5		0			*							
POACEAE	<i>Bromus inermis</i> ssp. <i>inermis</i>	Smooth Brome	0	5			G4G5	SE5		1			*		*				*	
CYPERACEAE	<i>Carex lacustris</i>	Lakebank Sedge	5	-5			G5	S5		0					*					
CYPERACEAE	<i>Carex</i> spp.	Sedge Species													*			*		
JUGLANDACEAE	<i>Carya cordiformis</i>	Bitternut Hickory	6	0			G5	S5		0						*		*		*
ONAGRACEAE	<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	Canada Enchanter's Nightshade	3	3			G5	S5		0						*			*	
ASTERACEAE	<i>Cirsium arvense</i>	Canada Thistle	0	3			G?	SE5		1	*		*	*						*
ASTERACEAE	<i>Cirsium vulgare</i>	Bull Thistle	0	4			G5	SE5		1								*		
ASTERACEAE	<i>Conyza canadensis</i>	Horseweed	0	1			G5	S5		0	*									
CORNACEAE	<i>Cornus foemina</i> ssp. <i>racemosa</i>	Grey Dogwood	2	-2			G5	S5		0	*	*			*	*	*	*		
CORNACEAE	<i>Cornus stolonifera</i>	Red-osier Dogwood	2	-3			G5	S5		0	*	*		*	*	*	*	*		
ROSACEAE	<i>Crataegus</i>	Hawthorn species										*	*	*	*	*	*	*		*
CONVOLVULACEAE	<i>Cuscuta gronovii</i>	Common Dodder	4	-3			G5	S5		0			*							
POACEAE	<i>Dactylis glomerata</i>	Orchard Grass	0	3			G?	SE5		1					*	*			*	
APIACEAE	<i>Daucus carota</i>	Wild Carrot	0	5			G?	SE5		1					*					
CUCURBITACEAE	<i>Echinocystis lobata</i>	Wild Cucumber	3	-2			G5	S5		0						*				*
ONAGRACEAE	<i>Epilobium hirsutum</i>	Hairy Willow-herb	0	-4			G?	SE5		1		*								
EQUISETACEAE	<i>Equisetum arvense</i>	Field Horsetail	0	0			G5	S5		0	*		*		*					
ASTERACEAE	<i>Erigeron annuus</i>	Daisy Fleabane	0	1			G5	S5		0							*			*
ASTERACEAE	<i>Eupatorium maculatum</i> ssp. <i>maculatum</i>	Spotted Joe-pye-weed	3	-5			G5	S5		0			*							
ASTERACEAE	<i>Eupatorium perfoliatum</i>	Common Boneset	2	-4			G5	S5		0			*							
ASTERACEAE	<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	2	-2			G5	S5		0		*		*	*				*	
ROSACEAE	<i>Fragaria virginiana</i> ssp. <i>virginiana</i>	Common Strawberry	2	1			G5	S5		0						*				
OLEACEAE	<i>Fraxinus pennsylvanica</i>	Red Ash	3	-3			G5	S5		0					*					*
ROSACEAE	<i>Geum</i> sp.	Avens Species																*		*
BORAGINACEAE	<i>Hackelia virginiana</i>	Virginia Stickseed	5	1			G5	S5		0					*		*			
BRASSICACEAE/CRUCIFERAE	<i>Hesperis matronalis</i>	Dame's Rocket	0	5			G4G5	SE5		1										*
BALSAMINACEAE	<i>Impatiens capensis</i>	Spotted Touch-me-not	4	-3			G5	S5		0		*	*	*	*					
JUGLANDACEAE	<i>Juglans nigra</i>	Black Walnut	5	3			G5	S4		0					*			*		*
POACEAE	<i>Leersia oryzoides</i>	Rice Cut Grass	3	-5			G5	S5		0			*							
LAMIACEAE	<i>Leonurus cardiaca</i> ssp. <i>cardiaca</i>	Motherwort	0	5			G?	SE5		1									*	*
SCROPHULARIACEAE	<i>Linaria vulgaris</i>	Butter-and-eggs	0	5			G?	SE5		1	*									
LYTHRACEAE	<i>Lythrum salicaria</i>	Purple Loosestrife	0	-5			G5	SE5		1			*		*					
MENISPERMACEAE	<i>Menispermum canadense</i>	Moonseed	7	0			G5	S4		0							*			
DRYOPTERIDACEAE	<i>Onoclea sensibilis</i>	Sensitive Fern	4	-3			G5	S5		0	*									
VITACEAE	<i>Parthenocissus quinquefolia</i>	Virginia Creeper	6	1			G5	S4?		0				*	*			*		
VITACEAE	<i>Parthenocissus vitaceae</i>	Thicket Creeper	3	3			G5	S5		0		*	*							
POACEAE	<i>Phalaris arundinacea</i>	Reed Canary Grass	0	-4			G5	S5		0	*		*		*					
POACEAE	<i>Phragmites australis</i>	Common Reed	0	-4			G5	S5		0	*									
POACEAE	<i>Poa compressa</i>	Canada Blue Grass	0	2			G?	S5		1									*	
POACEAE	<i>Poa palustris</i>	Fowl Blue Grass	5	-4			G5	S5		0			*	*						
POACEAE	<i>Poa pratensis</i> ssp. <i>pratensis</i>	Kentucky Blue Grass	0	1			G?	S5		0									*	*
POLYGONACEAE	<i>Polygonum hydropiper</i>	Common Smartweed	0	-5			G5	SE5		1				*						
ROSACEAE	<i>Potentilla simplex</i>	Common Cinquefoil	3	4			G5	S5		0					*	*	*			
ROSACEAE	<i>Prunus serotina</i>	Black Cherry	3	3			G5	S5		0						*				*

Wiers Road Plant List

Family	Scientific Name	Common Name	CC	CW	Ranking					Introduced in Ontario (0=n 1=y)	MAM2-2 (1)	CUW1 (2)	MAS2-1 (3)	CUW1 (4)	MAM2-2 (5)	CUW1 (6)	FOD7 (7)	CUT1 (8)	CUM1-1 (9)	FOD7 (10)
					COSEWIC	COSSARO	G-Rank	S-Rank	Hamilton Rare											
RANUNCULACEAE	Ranunculus ficaria	Lesser Celandine	0	-2			G?	SE1		I										*
RHAMNACEAE	Rhamnus cathartica	Common Buckthorn	0	3			G?	SE5		I	*		*		*	*		*		
ANACARDIACEAE	Rhus typhina	Staghorn Sumac	1	5			G5	S5		0					*					
ROSACEAE	Rosa multiflora	Multiflora Rose	0	3			G?	SE4		I				*	*	*				
ROSACEAE	Rubus idaeus ssp. melanolasius	Wild Red Raspberry	0	-2			G5	S5		0			*		*			*		*
ROSACEAE	Rubus occidentalis	Black Raspberry	2	5			G5	S5		0										*
ROSACEAE	Rubus odoratus	Purple Flowering Raspberry	3	5			G5	S5		0					*					
SALICACEAE	Salix fragilis	Crack Willow	0	-1			G?	SE5		I				*						
CAPRIFOLIACEAE	Sambucus canadensis	Common Elderberry	5	-2			G5	S5		0					*					
CYPERACEAE	Scirpus atrovirens	Black Bulrush	3	-5			G5?	S5	H	0			*	*						
SOLANACEAE	Solanum dulcamara	Bittersweet Nightshade	0	0			G?	SE5		I	*	*		*		*				*
ASTERACEAE	Solidago canadensis var. canadensis	Canada Goldenrod	1	3			G5	S5		0	*	*	*	*	*	*		*		*
ASTERACEAE	Taraxacum officinale	Common Dandelion	0	3			G5	SE5		I	*									
ASTERACEAE	Tussilago farfara	Coltsfoot	0	3			G?	SE5		I			*		*					
TYPHACEAE	Typha angustifolia	Narrow-leaved Cattail	3	-5			G5	S5		0			*							
TYPHACEAE	Typha latifolia	Broad-leaved Cattail	3	-5			G5	S5		0				*						
URTICACEAE	Urtica dioica ssp. gracilis	Slender Stinging Nettle	2	-1			G5?	S5		0	*	*	*							
VERBENACEAE	Verbena urticifolia	White Vervain	4	-1			G5	S5		0			*	*	*					
SCROPHULARIACEAE	Veronica officinalis	Common Speedwell	0	5			G5	SE5		I						*				
CAPRIFOLIACEAE	Viburnum opulus	European Highbush Cranberry	0	0			G5	SE4		I							*			
VITACEAE	Vitis riparia	Riverbank Grape	0	-2			G5	S5		0	*	*		*		*				*

Marshboro Road Plant List

Family	Scientific Name	Common Name	CC	CW	Ranking					Introduced in Ontario 0=n 1=y	FOD (1)	FOD3-1 (2)	CUM1-1 (3)	CUM1-1 (4)	CUW1 (5)	FOD (6)	FOD6 (7)	CUT 1-4 (8)	FOD7-2 (9)	FOD7 (10)
					COSEWIC	COSSARO	G-Rank	S-Rank	Hamilton Rare											
ACERACEAE	<i>Acer negundo</i>	Manitoba Maple	0	-2			G5	S5		0	*	*	*		*			*	*	
ACERACEAE	<i>Acer platanoides</i>	Norway Maple	0	5			G?	SE5		1	*									
ACERACEAE	<i>Acer rubrum</i>	Red Maple	4	0			G5	S5		0		*								
ACERACEAE	<i>Acer saccharinum</i>	Silver Maple	5	-3			G5	S5		0			*							*
ACERACEAE	<i>Acer saccharum ssp. saccharum</i>	Sugar Maple	4	3			G5	S5		0	*	*					*			
ROSACEAE	<i>Agrimonia (species?)</i>	*Agrimony (species?)										*			*		*			
LAMIACEAE	<i>Ajuga reptans</i>	Common Bugle	0	5			G?	SE2		1					*					
BRASSICACEAE	<i>Alliaria petiolata</i>	Garlic Mustard	0	0			G?	SE5		1	*	*				*			*	
ASTERACEAE	<i>Ambrosia artemisiifolia</i>	Common Ragweed	0	3			G5	S5		0					*	*				
ASTERACEAE	<i>Arctium minus ssp. minus</i>	Common Burdock	0	5			G?	SE5		1					*					
ASCLEPIADACEAE	<i>Asclepias syriaca</i>	Common Milkweed	0	5			G5	S5		0		*	*		*					*
ASTERACEAE	<i>Aster lanceolatus ssp. lanceolatus</i>	Panicled Aster	3	-3			G5	S5		0				*	*	*	*			
ASTERACEAE	<i>Aster lateriflorus var. lateriflorus</i>	One-sided Aster - Calico	3	-2			G5	S5		0		*	*				*			
ASTERACEAE	<i>Aster macrophyllus</i>	Large-leaved Aster	5	5			G5	S5		0							*			
ASTERACEAE	<i>Aster novae-angliae</i>	New England Aster	2	-3			G5	S5		0		*	*		*			*		
ASTERACEAE	<i>Aster urophyllum</i>	Arrow-leaved Aster	6	5			G4	S4		0	*	*	*		*					*
BETULACEAE	<i>Betula papyrifera</i>	White Birch	2	2			G5	S5		0	*	*	*				*			
ASTERACEAE	<i>Bidens vulgata</i>	Tall Beggar-ticks	5	-3			G5	S5		0					*					
POACEAE	<i>Bromus inermis ssp. inermis</i>	Smooth Brome	0	5			G4G5	SE5		1		*			*		*		*	
CYPERACEAE	<i>Carex pensylvanica</i>	Pennsylvania Sedge	5	5			G5	S5		0							*			
CYPERACEAE	<i>Carex sp</i>	Sedge Species																	*	
JUGLANDACEAE	<i>Carya cordiformis</i>	Bitternut Hickory	6	0			G5	S5		0	*		*				*			
BIGNONIACEAE	<i>Catalpa speciosa</i>	Northern Catalpa	0	3			G2G4	SE1		1	*									
ASTERACEAE	<i>Chrysanthemum leucanthemum</i>	Ox-eye Daisy	0	5			G?	SE5		1					*					
ASTERACEAE	<i>Cichorium intybus</i>	Chicory	0	5			G?	SE5		1				*	*		*			
ONAGRACEAE	<i>Circaea lutetiana ssp. canadensis</i>	Canada Enchanter's Nightshade	3	3			G5	S5		0	*	*			*	*				
ASTERACEAE	<i>Cirsium arvense</i>	Canada Thistle	0	3			G?	SE5		1				*	*					
ASTERACEAE	<i>Cirsium vulgare</i>	Bull Thistle	0	4			G5	SE5		1				*	*					
CORNACEAE	<i>Cornus alternifolia</i>	Alternate-leaved Dogwood	6	5			G5	S5		0							*			
CORNACEAE	<i>Cornus amomum ssp. obliqua</i>	Silky Dogwood	5	-4			G5	S5		0					*					
CORNACEAE	<i>Cornus foemina ssp. racemosa</i>	Grey Dogwood	2	-2			G5	S5		0		*	*	*	*	*	*	*	*	*
CORNACEAE	<i>Cornus stolonifera</i>	Red-osier Dogwood	2	-3			G5	S5		0		*	*		*				*	*
ROSACEAE	<i>Crataegus</i>	Hawthorn species																	*	
POACEAE	<i>Dactylis glomerata</i>	Orchard Grass	0	3			G?	SE5		1		*		*	*					*
APIACEAE	<i>Daucus carota</i>	Wild Carrot	0	5			G?	SE5		1		*	*	*				*		*
ELAEAGNACEAE	<i>Elaeagnus umbellata</i>	Autumn Olive	0	3			G?	SE3		1				*						*
ONAGRACEAE	<i>Epilobium hirsutum</i>	Hairy Willow-herb	0	-4			G?	SE5		1			*		*				*	
EQUISETACEAE	<i>Equisetum arvense</i>	Field Horsetail	0	0			G5	S5		0										*
ASTERACEAE	<i>Erigeron annuus</i>	Daisy Fleabane	0	1			G5	S5		0		*			*				*	*
ASTERACEAE	<i>Eupatorium maculatum ssp. maculatum</i>	Spotted Joe-pye-weed	3	-5			G5	S5		0			*		*					
ASTERACEAE	<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	2	-2			G5	S5		0		*	*	*	*	*				*
POACEAE	<i>Festuca rubra</i>	Red Fescue	0	1			G5	S5		0										*
ROSACEAE	<i>Fragaria vesca ssp. americana</i>	Woodland Strawberry	4	4			G5	S5		0							*			
ROSACEAE	<i>Fragaria virginiana ssp. virginiana</i>	Common Strawberry	2	1			G5	S5		0		*			*		*			
OLEACEAE	<i>Fraxinus americana</i>	White Ash	4	3			G5	S5		0								*		
OLEACEAE	<i>Fraxinus pennsylvanica</i>	Red Ash	3	-3			G5	S5		0		*	*					*	*	
GERANIACEAE	<i>Geranium maculatum</i>	Spotted Crane's-bill	6	3			G5	S5		0							*			
ROSACEAE	<i>Geum spp.</i>	Avens species									*	*			*	*		*		
BRASSICACEAE/CRUCIFERAE	<i>Hesperis matronalis</i>	Dame's Rocket	0	5			G4G5	SE5		1	*	*					*			
CLUSIACEAE	<i>Hypericum perforatum</i>	Common St. John's-wort	0	5			G?	SE5		1				*						
BALSAMINACEAE	<i>Impatiens capensis</i>	Spotted Touch-me-not	4	-3			G5	S5		0			*		*			*		
JUGLANDACEAE	<i>Juglans cinerea</i>	Butternut	6	2			G4	S4		0					*				*	
JUGLANDACEAE	<i>Juglans nigra</i>	Black Walnut	5	3			G5	S4		0	*	*	*		*			*	*	*
JUNCACEAE	<i>Juncus spp.</i>	Rush species										*					*			
JUNCACEAE	<i>Juncus tenuis</i>	Path Rush	0	0			G5	S5		0				*						
OLEACEAE	<i>Ligustrum vulgare</i>	European Privet	0	1			GNR	SNA		1							*			
LAMIACEAE	<i>Leonurus cardiaca ssp. cardiaca</i>	Motherwort	0	5			G?	SE5		1					*					
SCROPHULARIACEAE	<i>Linaria vulgaris</i>	Butter-and-eggs	0	5			G?	SE5		1			*							*

Brock Road and Concession 4 West Plant List

Family	Scientific Name	Common Name	CC	CW	Ranking					Introduced in Ontario 0=n 1=y	RBTB2 (A)	RBSB2 (B)	MEMF1 (C)	WOMM3 (D)	FODM4-2 (E)	MAMMI-3 (F)
					COSEWIC	COSSARO	G-Rank	S-Rank	Hamilton Rare							
ASTERACEAE	<i>Achillea millefolium ssp. millefolium</i>	Common Yarrow	0	3			G5	SE		I	*			*		
BRASSICACEAE	<i>Alliaria petiolata</i>	Garlic Mustard	0	0			G?	SE5		I					*	
ASTERACEAE	<i>Ambrosia artemisiifolia</i>	Common Ragweed	0	3			G5	S5		0	*	*				
ASTERACEAE	<i>Arctium minus ssp. minus</i>	Common Burdock	0	5			G?	SE5		I						*
ASCLEPIADACEAE	<i>Asclepias syriaca</i>	Common Milkweed	0	5			G5	S5		0		*	*	*		*
LILIACEAE	<i>Asparagus officinalis</i>	Asparagus	0	3			G5?	SE5		I		*		*		
ASTERACEAE	<i>Aster lanceolatus ssp. lanceolatus</i>	Panicled Aster	3	-3			G5	S5		0	*	*	*			*
ASTERACEAE	<i>Aster lateriflorus var. lateriflorus</i>	One-sided Aster	3	-2			G5	S5		0					*	
ASTERACEAE	<i>Aster macrophyllus</i>	Large-leaved Aster	5	5			G5	S5		0					*	
ASTERACEAE	<i>Aster novae-angliae</i>	New England Aster	2	-3			G5	S5		0	*		*	*	*	*
BERBERIDACEAE	<i>Berberis spp.</i>	Barberry species													*	
POACEAE	<i>Bromus inermis ssp. inermis</i>	Smooth Brome	0	5			G4G5	SE5		I	*					
CANNABACEAE	<i>Cannabis sativa</i>	Marijuana	0	0			G5	SE1		I			*			
CYPERACEAE	<i>Carex bebbii</i>	Bebb's Sedge	3	-5			G5	S5		0			*	*		*
CYPERACEAE	<i>Carex lacustris</i>	Lakebank Sedge	5	-5			G5	S5		0				*		
ASTERACEAE	<i>Cichorium intybus</i>	Chicory	0	5			G?	SE5		I	*		*			
ONAGRACEAE	<i>Circaea lutetiana ssp. canadensis</i>	Canada Enchanter's Nightshade	3	3			G5	S5		0					*	
ASTERACEAE	<i>Cirsium arvense</i>	Canada Thistle	0	3			G?	SE5		I	*		*			
CORNACEAE	<i>Cornus amomum ssp. obliqua</i>	Silky Dogwood	5	-4			G5	S5		0	*					
CORNACEAE	<i>Cornus foemina ssp. racemosa</i>	Grey Dogwood	2	-2			G5	S5		0		*	*	*	*	*
CORNACEAE	<i>Cornus stolonifera</i>	Red-osier Dogwood	2	-3			G5	S5		0	*	*	*		*	*
ROSACEAE	<i>Crataegus spp.</i>	Hawthorn species		0			H	S5		0	*			*	*	
POACEAE	<i>Dactylis glomerata</i>	Orchard Grass	0	3			G?	SE5		I	*		*			
APIACEAE	<i>Daucus carota</i>	Wild Carrot	0	5			G?	SE5		I	*	*	*	*		*
CARYOPHYLLACEAE	<i>Dianthus armeria</i>	Deptford Pink	0	5			G?	SE5		I		*				
DIPSACACEAE	<i>Dipsacus fullonum ssp. sylvestris</i>	Common Teasel	0	5			G?	SE5		I	*		*	*		
POACEAE	<i>Echinochloa crusgalli</i>	Barnyard Grass	0	-3			G?	SE5		I	*	*	*	*		
POACEAE	<i>Elymus repens</i>	Quack Grass	0	3			G5	SE5		I			*			
ONAGRACEAE	<i>Epilobium ciliatum ssp. ciliatum</i>	American Willow-herb	3	3			G5	S5		0			*		*	
ONAGRACEAE	<i>Epilobium hirsutum</i>	Hairy Willow-herb	0	-4			G?	SE5		I						*
ONAGRACEAE	<i>Epilobium leptophyllum</i>	Narrow-leaved Willow-herb	7	-5			G5	S5		0		*				
ASTERACEAE	<i>Erigeron annuus</i>	Daisy Fleabane	0	1			G5	S5		0				*		
ASTERACEAE	<i>Erigeron philadelphicus ssp. philadelphicus</i>	Philadelphia Fleabane	1	-3			G5	S5		0	*					
ASTERACEAE	<i>Eupatorium maculatum ssp. maculatum</i>	Spotted Joe-pye-weed	3	-5			G5	S5		0				*		
EUPHORBIACEAE	<i>Euphorbia esula</i>	Hungarian Spurge	0	5			G5	SE5		I		*				
ASTERACEAE	<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	2	-2			G5	S5		0	*	*	*	*		*
POACEAE	<i>Festuca sp</i>	Fescue Species										*				
ROSACEAE	<i>Fragaria vesca ssp. americana</i>	Woodland Strawberry	4	4			G5	S5		0					*	
ROSACEAE	<i>Fragaria virginiana ssp. virginiana</i>	Common Strawberry	2	1			G5	S5		0	*	*		*	*	*
OLEACEAE	<i>Fraxinus americana</i>	White Ash	4	3			G5	S5		0	*		*	*	*	*
OLEACEAE	<i>Fraxinus pennsylvanica</i>	Red Ash	3	-3			G5	S5		0	*					
RUBIACEAE	<i>Galium mollugo</i>	Smooth Bedstraw	0	5			G?	SE5		I		*			*	
ROSACEAE	<i>Geum laciniatum</i>	Rough Avens	4	-3			G5	S4		0		*	*	*	*	*
CLUSIACEAE	<i>Hypericum perforatum</i>	Common St. John's-wort	0	5			G?	SE5		I	*	*	*	*	*	*
ASTERACEAE	<i>Inula helenium</i>	Elecampane	0	5			G?	SE5		I						*
JUGLANDACEAE	<i>Juglans nigra</i>	Black Walnut	5	3			G5	S4		0	*			*		
JUNCACEAE	<i>Juncus tenuis</i>	Path Rush	0	0			G5	S5		0				*		
CUPRESSACEAE	<i>Juniperus virginiana</i>	Eastern Red Cedar	4	3			G5	S5		0				*		
SCROPHULARIACEAE	<i>Linaria vulgaris</i>	Butter-and-eggs	0	5			G?	SE5		I	*					
CAMPANULACEAE	<i>Lobelia inflata</i>	Indian Tobacco	3	4			G5	S5		0					*	
CAPRIFOLIACEAE	<i>Lonicera spp.</i>	Honeysuckle species									*					
CAPRIFOLIACEAE	<i>Lonicera tatarica</i>	Tartarian Honeysuckle	0	3			G?	SE5		I	*		*	*	*	*
FABACEAE	<i>Lotus corniculatus</i>	Bird's-foot Trefoil	0	1			G?			I	*	*	*			
LAMIACEAE	<i>Lycopus uniflorus</i>	Northern Water-horehound	5	-5			G5	S5		0				*		
LYTHRACEAE	<i>Lythrum salicaria</i>	Purple Loosestrife	0	-5			G5	SE5		I				*		
ROSACEAE	<i>Malus pumila</i>	Common Apple	0	5			G5	SE5		I	*	*	*	*		
ONAGRACEAE	<i>Oenothera biennis</i>	Common Evening-primrose	0	3			G5	S5		0		*				
ONAGRACEAE	<i>Oenothera fruticosa ssp. glauca</i>	Sundrops	-	-			G5T5	SX		0	*			*		

Brock Road and Concession 4 West Plant List

Family	Scientific Name	Common Name	CC	CW	Ranking					Introduced in Ontario 0=n 1=y	RBTB2 (A)	RBSB2 (B)	MEMF1 (C)	WOMM3 (D)	FODM4-2 (E)	MAMMI-3 (F)
					COSEWIC	COSSARO	G-Rank	S-Rank	Hamilton Rare							
DRYOPTERIDACEAE	<i>Onoclea sensibilis</i>	Sensitive Fern	4	-3			G5	S5		0					*	
OXALIDACEAE	<i>Oxalis stricta</i>	Upright Yellow Wood-sorrel	0	3			G5	S5		0					*	
VITACEAE	<i>Parthenocissus quinquefolia</i>	Virginia Creeper	6	1			G5	S4?		0		*			*	
SCROPHULARIACEAE	<i>Penstemon digitalis</i>	Foxglove Beard-tongue	6	1			G5	S4S5		0	*	*		*		
POACEAE	<i>Phalaris arundinacea</i>	Reed Canary Grass	0	-4			G5	S5		0			*			*
POACEAE	<i>Phleum pratense</i>	Timothy	0	3			G?	SE5		1	*		*	*		*
SOLANACEAE	<i>Physalis heterophylla</i>	Clammy Ground-cherry	3	5			G5	S4		0		*				
PINACEAE	<i>Picea glauca</i>	White Spruce	6	3			G5	S5	I/N	0				*		
PINACEAE	<i>Pinus strobus</i>	Eastern White Pine	4	3			G5	S5		0				*		
PINACEAE	<i>Pinus sylvestris</i>	Scots Pine	0	5			G?	SE5		1	*	*		*		
PLANTAGINACEAE	<i>Plantago lanceolata</i>	Ribgrass	0	0			G5	SE5		1		*		*		
SALICACEAE	<i>Populus balsamifera ssp. balsamifera</i>	Balsam Poplar	4	-3			G5	S5		0	*			*		
SALICACEAE	<i>Populus tremuloides</i>	Trembling Aspen	2	0			G5	S5		0	*				*	
ROSACEAE	<i>Potentilla norvegica ssp. monspeliensis</i>	Rough Cinquefoil	0	0			G5	S5		0	*		*	*		
LAMIACEAE	<i>Prunella vulgaris ssp. lanceolata</i>	Heal-all	5	5			G5	S5		1	*	*		*	*	
ROSACEAE	<i>Prunus pensylvanica</i>	Pin Cherry	3	4			G5	S5		0		*	*	*		
ROSACEAE	<i>Prunus spp.</i>	Cherry Species									*			*		
ROSACEAE	<i>Prunus virginiana ssp. virginiana</i>	Choke Cherry	2	1			G5	S5		0	*				*	
ROSACEAE	<i>Pyrus communis</i>	Common Pear	0	5			G5	SE4		1				*	*	
FAGACEAE	<i>Quercus macrocarpa</i>	Bur Oak	5	1			G5	S5		0	*	*				
RANUNCULACEAE	<i>Ranunculus recurvatus</i>	Hooked Buttercup	4	-3			G5	S5		0					*	
RHAMNACEAE	<i>Rhamnus cathartica</i>	Common Buckthorn	0	3			G?	SE5		1	*		*	*	*	
ANACARDIACEAE	<i>Rhus radicans ssp. negundo</i>	Climbing Poison-ivy	5	-1			G5	S5		0	*			*		
ANACARDIACEAE	<i>Rhus typhina</i>	Staghorn Sumac	1	5			G5	S5		0	*			*		
ROSACEAE	<i>Rubus idaeus ssp. melanolasius</i>	Wild Red Raspberry	0	-2			G5	S5		0		*			*	
POLYGONACEAE	<i>Rumex crispus</i>	Curly Dock	0	-1			G?	SE5		1	*					*
POLYGONACEAE	<i>Rumex obtusifolius ssp. obtusifolius</i>	Bitter Dock	0	-3			G?	SE5		1		*	*	*		
SALICACEAE	<i>Salix eriocephala</i>	Woolly-headed Willow	4	-3			G5	S5		0	*	*		*	*	
SALICACEAE	<i>Salix fragilis</i>	Crack Willow	0	-1			G?	SE5		1	*					
SALICACEAE	<i>Salix petiolaris</i>	Slender Willow	3	-4			G5	S5		0				*		
CYPERACEAE	<i>Scirpus atrovirens</i>	Black Bulrush	3	-5			G5?	S5	H	0				*		*
SOLANACEAE	<i>Solanum dulcamara</i>	Bittersweet Nightshade	0	0			G?	SE5		1			*	*	*	*
ASTERACEAE	<i>Solidago canadensis var. canadensis</i>	Canada Goldenrod	1	3			G5	S5		0	*	*	*	*	*	*
ASTERACEAE	<i>Solidago gigantea</i>	Giant Goldenrod	4	-3			G5	S5		0		*				
ASTERACEAE	<i>Solidago juncea</i>	Early Goldenrod	3	5			G5	S5		0						*
ASTERACEAE	<i>Solidago nemoralis ssp. nemoralis</i>	Gray Goldenrod	2	5			G5	S5		0				*		
ASTERACEAE	<i>Solidago rugosa ssp. rugosa</i>	Rough Goldenrod	4	-1			G5	S5		0	*				*	
ASTERACEAE	<i>Sonchus arvensis ssp. arvensis</i>	Field Sow-thistle	0	1			G?	SE5		1	*		*			*
OLEACEAE	<i>Syringa vulgaris</i>	Common Lilac	0	5			G?	SE5		1	*					
CUPRESSACEAE	<i>Thuja occidentalis</i>	Eastern White Cedar	4	-3			G5	S5		0	*					
SAXIFRAGACEAE	<i>Tiarella cordifolia</i>	Foamflower	6	1			G5	S5		0					*	
TILIACEAE	<i>Tilia americana</i>	Basswood	4	3			G5	S5		0					*	
FABACEAE	<i>Trifolium repens</i>	White Clover	0	2			G?	SE5		1	*		*			
ASTERACEAE	<i>Tussilago farfara</i>	Coltsfoot	0	3			G?	SE5		1					*	
TYPHACEAE	<i>Typha latifolia</i>	Broad-leaved Cattail	3	-5			G5	S5		0			*	*		
ULMACEAE	<i>Ulmus americana</i>	White Elm	3	-2			G5?	S5		0	*	*		*	*	
SCROPHULARIACEAE	<i>Verbascum thapsus</i>	Common Mullein	0	5			G?	SE5		1	*					
VERBENACEAE	<i>Verbena hastata</i>	Blue Vervain	4	-4			G5	S5		0				*		
CAPRIFOLIACEAE	<i>Viburnum lentago</i>	Nannyberry	4	-1			G5	S5		0				*		
FABACEAE	<i>Vicia cracca</i>	Cow Vetch - tufted	0	5			G?	SE5		1			*			
VIOLACEAE	<i>Viola spp.</i>	Violet species													*	
VITACEAE	<i>Vitis riparia</i>	Riverbank Grape	0	-2			G5	S5		0	*	*		*	*	*
RUTACEAE	<i>Zanthoxylum americanum</i>	Prickly-ash	3	5			G5	S5		0		*		*	*	

Brock Road and Concession 5 Plant List

Family	Scientific Name	Common Name	CC	CW	Ranking					Introduced in Ontario 0=n 1=y	SWDR1 (A)	FODR1-1 (B)	SWDR1-1 (B)Incl.	FODM6-5 (C)	SWDM2-2 (D)	FOCS3-1 (E)
					COSEWIC	COSSARO	G-Rank	S-Rank	Hamilton Rare							
ACERACEAE	<i>Acer rubrum</i>	Red Maple	4	0			G5	S5		0		*				
ACERACEAE	<i>Acer saccharinum</i>	Silver Maple	5	-3			G5	S5		0				*		
ACERACEAE	<i>Acer saccharum ssp. saccharum</i>	Sugar Maple	4	3			G5	S5		0	*					
ACERACEAE	<i>Acer X freemanii</i>	Freeman's Maple					G?	S5		0			*			
ASTERACEAE	<i>Achillea millefolium ssp. millefolium</i>	Common Yarrow	0	3			G5	SE		1	*					
RANUNCULACEAE	<i>Actaea pachypoda</i>	White Baneberry	6	5			G5	S5		0					*	
ROSACEAE	<i>Agrimonia sp.</i>	Agrimony species											*			
ALISMATACEAE	<i>Alisma sp.</i>	Water Plantain species										*				
BRASSICACEAE	<i>Alliaria petiolata</i>	Garlic Mustard	0	0			G?	SE5		1	*			*	*	
RANUNCULACEAE	<i>Anemone quinquefolia</i>	Wood Anemone	7	0			G5	S5		0	*					
RANUNCULACEAE	<i>Anemone virginiana var. virginiana</i>	Thimbleweed	4	5			G5	S5		0	*		*			
ASTERACEAE	<i>Antennaria parlinii ssp. parlinii</i>	Smooth Pussytoes	2	5			G4	SU		0	*					
ARALIACEAE	<i>Aralia nudicaulis</i>	Wild Sarsaparilla	4	3			G5	S5		0				*	*	
ASTERACEAE	<i>Arctium minus ssp. minus</i>	Common Burdock	0	5			G?	SE5		1					*	
ARACEAE	<i>Arisaema triphyllum ssp. triphyllum</i>	Jack-in-the-pulpit	5	-2			G5	S5		0		*				
ASCLEPIADACEAE	<i>Asclepias incarnata ssp. incarnata</i>	Swamp Milkweed	6	-5			G5	S5		0		*				
LILIACEAE	<i>Asparagus officinalis</i>	Asparagus	0	3			G5?	SE5		1	*					
ASTERACEAE	<i>Aster cordifolius</i>	Heart-leaved Aster	5	5			G5	S5		0				*		
ASTERACEAE	<i>Aster lateriflorus var. lateriflorus</i>	One-sided Aster - Calico	3	-2			G5	S5		0	*	*		*	*	
ASTERACEAE	<i>Aster novae-angliae</i>	New England Aster	2	-3			G5	S5		0	*					
ASTERACEAE	<i>Aster oolentangiensis</i>	Azure Aster	9	5			G5	S4		0	*					
ASTERACEAE	<i>Aster puniceus var. puniceus</i>	Purple-stem Aster	6	-5			G5	S5		0	*	*	*			
ASTERACEAE	<i>Aster pilosum var. pilosum</i>	White Heath Aster	4	2			G5T5	S5		0				*		
ASTERACEAE	<i>Aster urophyllum</i>	Arrow-leaved Aster	6	5			G4	S4		0	*					
BETULACEAE	<i>Betula pendula</i>	European White Birch	0	-4			G?	SE4		1			*			
ASTERACEAE	<i>Bidens spp.</i>	Beggar-ticks species													*	
CYPERACEAE	<i>Carex bebbii</i>	Bebb's Sedge	3	-5			G5	S5		0		*				
CYPERACEAE	<i>Carex intumescens</i>	Bladder Sedge	6	-4			G5	S5		0			*			
CYPERACEAE	<i>Carex lupulina</i>	Common Hop Sedge	6	-5			G5	S5		0		*				
CYPERACEAE	<i>Carex retrorsa</i>	Retorse Sedge	5	-5			G5	S5		0		*				
CYPERACEAE	<i>Carex sp.</i>	Sedge Species								0				*		
BETULACEAE	<i>Carpinus caroliniana</i>	Blue Beech	6	0			G5	S5	H	0		*				
MOSS	<i>Ceratodon purpureus var. purpureus</i>	Moss	0	0			G5	S5		0				*	*	
ASTERACEAE	<i>Cichorium intybus</i>	Chicory	0	5			G?	SE5		1					*	
ONAGRACEAE	<i>Circaea lutetiana ssp. canadensis</i>	Canada Enchanter's Nightshade	3	3			G5	S5		0		*	*	*	*	
ASTERACEAE	<i>Cirsium arvense</i>	Canada Thistle	0	3			G?	SE5		1		*				
LAMIACEAE	<i>Clinopodium vulgare</i>	Wild Basil	4	5			G?	S5		0	*		*			
RANUNCULACEAE	<i>Coptis trifolia ssp. groenlandica</i>	Goldthread	7	-3			G5	S5		0			*			
CORNACEAE	<i>Cornus alternifolia</i>	Alternate-leaved Dogwood	6	5			G5	S5		0	*		*			
CORNACEAE	<i>Cornus amomum ssp. obliqua</i>	Silky Dogwood	5	-4			G5	S5		0		*	*			
CORNACEAE	<i>Cornus foemina ssp. racemosa</i>	Grey Dogwood	2	-2			G5	S5		0			*			
CORNACEAE	<i>Cornus stolonifera</i>	Red-osier Dogwood	2	-3			G5	S5		0	*	*				
ROSACEAE	<i>Crataegus mollis</i>	Downy Hawthorn	4	-2			G5	S5		0			*			
ROSACEAE	<i>Crataegus sp.</i>	Hawthorn species												*		
APIACEAE	<i>Daucus carota</i>	Wild Carrot	0	5			G?	SE5		1	*				*	
DIPSACACEAE	<i>Dipsacus fullonum ssp. sylvestris</i>	Common Teasel	0	5			G?	SE5		1		*	*			
CUCURBITACEAE	<i>Echinocystis lobata</i>	Wild Cucumber	3	-2			G5	S5		0					*	
BORAGINACEAE	<i>Echium vulgare</i>	Viper's Bugloss	0	5			G?	SE5		1	*					
POACEAE	<i>Elymus repens</i>	Quack Grass	0	3			G5	SE5		1		*				
ONAGRACEAE	<i>Epilobium strictum</i>	Downy Willow-herb	9	-5			G5?	S5	H	0		*				
ORCHIDACEAE	<i>Epipactis helleborine</i>	Helleborine	0	5			G?	SE5		1		*				
ASTERACEAE	<i>Erigeron annuus</i>	Daisy Fleabane	0	1			G5	S5		0	*					
CELASTRACEAE	<i>Euonymus obovata</i>	Running Strawberry-bush	6	5			G5	S5		0		*		*		
ASTERACEAE	<i>Eupatorium perfoliatum</i>	Common Boneset	2	-4			G5	S5		0		*				
EUPHORBIACEAE	<i>Euphorbia esula</i>	Hungarian Spurge	0	5			G5	SE5		1			*			
ASTERACEAE	<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	2	-2			G5	S5		0	*	*	*	*		
ROSACEAE	<i>Fragaria vesca ssp. americana</i>	Woodland Strawberry	4	4			G5	S5		0		*	*			
ROSACEAE	<i>Fragaria virginiana ssp. virginiana</i>	Common Strawberry	2	1			G5	S5		0	*		*	*		
OLEACEAE	<i>Fraxinus americana</i>	White Ash	4	3			G5	S5		0	*	*	*	*		
OLEACEAE	<i>Fraxinus pennsylvanica</i>	Red Ash	3	-3			G5	S5		0		*	*	*		
RUBIACEAE	<i>Galium palustre</i>	Marsh Bedstraw	5	-5			G5	S5		0		*				
GERANIACEAE	<i>Geranium robertianum</i>	Herb Robert	0	5			G5	SE5		1				*	*	
ROSACEAE	<i>Geum aleppicum</i>	Yellow Avens	2	-1			G5	S5		0		*	*	*	*	
ROSACEAE	<i>Geum laciniatum</i>	Rough Avens	4	-3			G5	S4		0	*	*	*	*		
ROSACEAE	<i>Geum macrophyllum</i>	Large-leaved Avens	9	-4			G5	S5		0		*	*	*		
POACEAE	<i>Glyceria striata</i>	Fowl Manna Grass	3	-5			G5	S5		0		*				
BRASSICACEAE/CRUCIFERAE	<i>Hesperis matronalis</i>	Dame's Rocket	0	5			G4G5	SE5		1					*	

Brock Road and Concession 5 Plant List

Family	Scientific Name	Common Name	CC	CW	Ranking					Introduced in Ontario 0=n 1=y	SWDR1 (A)	FODR1-1 (B)	SWDR1-1 (B)Incl.	FODM6-5 (C)	SWDM2-2 (D)	FOCS3-1 (E)
					COSEWIC	COSSARO	G-Rank	S-Rank	Hamilton Rare							
ASTERACEAE	<i>Hieracium aurantiacum</i>	Orange Hawkweed	0	5			G?	SE5						*		
CLUSIACEAE	<i>Hypericum perforatum</i>	Common St. John's-wort	0	5			G?	SE5					*		*	
BALSAMINACEAE	<i>Impatiens capensis</i>	Spotted Touch-me-not	4	-3			G5	S5								
JUGLANDACEAE	<i>Juglans nigra</i>	Black Walnut	5	3			G5	S4			*					
BORAGINACEAE	<i>Lithospermum officinale</i>	Common Gromwell	0	5			G?	SE5							*	
CAPRIFOLIACEAE	<i>Lonicera tatarica</i>	Tartarian Honeysuckle	0	3			G?	SE5		*						
FABACEAE	<i>Lotus corniculatus</i>	Bird's-foot Trefoil	0	1			G?	SE5		*						
LAMIACEAE	<i>Lycopus uniflorus</i>	Northern Water-horehound	5	-5			G5	S5				*				
LILIACEAE	<i>Maianthemum racemosum ssp. racemosum</i>	False Solomon's Seal	4	3			G5	S5						*	*	
ROSACEAE	<i>Malus pumila</i>	Common Apple	0	5			G5	SE5					*			
LAMIACEAE	<i>Mentha arvensis ssp. borealis</i>	Wild Mint	3	-3			G5	S5				*		*	*	
ONAGRACEAE	<i>Oenothera biennis</i>	Common Evening-primrose	0	3			G5	S5		*						
DRYOPTERIDACEAE	<i>Onoclea sensibilis</i>	Sensitive Fern	4	-3			G5	S5				*				
OXALIDACEAE	<i>Oxalis stricta</i>	Upright Yellow Wood-sorrel	0	3			G5	S5							*	
VITACEAE	<i>Parthenocissus quinquefolia</i>	Virginia Creeper	6	1			G5	S4?		*	*	*	*	*		
POACEAE	<i>Phalaris arundinacea</i>	Reed Canary Grass	0	-4			G5	S5				*				
POACEAE	<i>Phleum pratense</i>	Timothy	0	3			G?	SE5		*			*			
PINACEAE	<i>Pinus resinosa</i>	Red Pine	8	3			G5	S5	I/N	I/N	*					
PINACEAE	<i>Pinus strobus</i>	Eastern White Pine	4	3			G5	S5			*		*		*	
POACEAE	<i>Poa pratensis ssp. pratensis</i>	Kentucky Blue Grass	0	1			G?	S5		*						
SALICACEAE	<i>Populus tremuloides</i>	Trembling Aspen	2	0			G5	S5		*	*		*			
ROSACEAE	<i>Potentilla norvegica ssp. monspeliensis</i>	Rough Cinquefoil	0	0			G5	S5		*						
LAMIACEAE	<i>Prunella vulgaris ssp. lanceolata</i>	Heal-all	5	5			G5	S5					*			
LAMIACEAE	<i>Prunella vulgaris ssp. vulgaris</i>	Selfheal	0	0			G5	SE3						*		
ROSACEAE	<i>Prunus pensylvanica</i>	Pin Cherry	3	4			G5	S5		*						
ROSACEAE	<i>Prunus serotina</i>	Black Cherry	3	3			G5	S5			*		*	*	*	
ROSACEAE	<i>Prunus virginiana ssp. virginiana</i>	Choke Cherry	2	1			G5	S5						*	*	
FAGACEAE	<i>Quercus macrocarpa</i>	Bur Oak	5	1			G5	S5			*		*	*		
RANUNCULACEAE	<i>Ranunculus acris</i>	Tall Buttercup	0	-2			G5	SE5			*	*				
RANUNCULACEAE	<i>Ranunculus ficaria</i>	Lesser Celandine	0	-2			G?	SE1							*	
RHAMNACEAE	<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn	7	-5			G5	S5		*						
RHAMNACEAE	<i>Rhamnus cathartica</i>	Common Buckthorn	0	3			G?	SE5		*	*		*	*	*	
ANACARDIACEAE	<i>Rhus radicans ssp. negundo</i>	Climbing Poison-ivy	5	-1			G5	S5		*	*		*		*	
ANACARDIACEAE	<i>Rhus typhina</i>	Staghorn Sumac	1	5			G5	S5					*			
ROSACEAE	<i>Rubus allegheniensis</i>	Common Blackberry	2	2			G5	S5		*						
ROSACEAE	<i>Rubus idaeus ssp. melanolasius</i>	Wild Red Raspberry	0	-2			G5	S5		*			*	*	*	
ROSACEAE	<i>Rubus occidentalis</i>	Black Raspberry	2	5			G5	S5			*		*			
POLYGONACEAE	<i>Rumex verticillatus</i>	Swamp Dock	7	-5			G5	S4				*				
SALICACEAE	<i>Salix alba</i>	White Willow	0	-3			G5	SE4				*				
PAPAVERACEAE	<i>Sanguinaria canadensis</i>	Bloodroot	5	4			G5	S5						*		
ASTERACEAE	<i>Solidago altissima var. altissima</i>	Tall Goldenrod	1	3			G?	S5		*			*			
ASTERACEAE	<i>Solidago canadensis var. canadensis</i>	Canada Goldenrod	1	3			G5	S5							*	
ASTERACEAE	<i>Solidago flexicaulis</i>	Zig-zag Goldenrod	6	3			G5	S5						*	*	
ASTERACEAE	<i>Solidago gigantea</i>	Giant Goldenrod	4	-3			G5	S5			*	*				
ASTERACEAE	<i>Solidago juncea</i>	Early Goldenrod	3	5			G5	S5		*				*		
ASTERACEAE	<i>Solidago nemoralis ssp. nemoralis</i>	Gray Goldenrod	2	5			G5	S5		*						
ASTERACEAE	<i>Solidago rugosa ssp. rugosa</i>	Rough Goldenrod	4	-1			G5	S5						*		
CARYOPHYLLACEAE	<i>Stellaria graminea</i>	Grass-leaved Stitchwort	0	5			G?	SE5				*				
OLEACEAE	<i>Syringa vulgaris</i>	Common Lilac	0	5			G?	SE5					*			
ASTERACEAE	<i>Taraxacum officinale</i>	Common Dandelion	0	3			G5	SE5						*	*	
CUPRESSACEAE	<i>Thuja occidentalis</i>	Eastern White Cedar	4	-3			G5	S5					*	*	*	
TILIACEAE	<i>Tilia americana</i>	Basswood	4	3			G5	S5			*		*			
ASTERACEAE	<i>Tussilago farfara</i>	Coltsfoot	0	3			G?	SE5							*	
TYPHACEAE	<i>Typha angustifolia</i>	Narrow-leaved Cattail	3	-5			G5	S5				*				
ULMACEAE	<i>Ulmus americana</i>	White Elm	3	-2			G5?	S5			*	*	*	*		
SCROPHULARIACEAE	<i>Verbascum thapsus</i>	Common Mullein	0	5			G?	SE5		*						
VERBENACEAE	<i>Verbena hastata</i>	Blue Vervain	4	-4			G5	S5				*				
FABACEAE	<i>Vicia cracca</i>	Cow Vetch	0	5			G?	SE5					*			
VIOLACEAE	<i>Viola pubescens</i>	Yellow Violet	5	4			G5	S5							*	
VITACEAE	<i>Vitis riparia</i>	Riverbank Grape	0	-2			G5	S5		*	*	*	*	*	*	
RUTACEAE	<i>Zanthoxylum americanum</i>	Prickly-ash	3	5			G5	S5		*					*	

Brock Road and Harvest Road Plant List

Family	Scientific Name	Common Name	CC	CW	Ranking					Introduced in Ontario 0=n 1=y	FODM7-4 (A)	MAMM1-2 (A)Incl.	MAMM2-6 (A)Incl.	MEFM1 (B)	TAGM1 (C)	MEMM3 (D)	TAGM1 (D)Incl.	TAGM1 (E)	MEMM3* (E)Incl.	FOD (F)	FODM4-11 (G)	MEMM3 (H)	FOCM6-3 (I)	THOM2-1 (J)
					COSEWIC	COSSARO	G-Rank	S-Rank	Hamilton Rare															
PINACEAE	<i>Abies balsamea</i>	Balsam Fir	5	-3			G5	S5		0	*													
ACERACEAE	<i>Acer negundo</i>	Manitoba Maple	0	-2			G5	S5		0	*		*				*		*	*				*
ACERACEAE	<i>Acer platanoides</i>	Norway Maple	0	5			G?	SE5		1	*		*							*				
ACERACEAE	<i>Acer saccharinum</i>	Silver Maple	5	-3			G5	S5		0	*								*					
ACERACEAE	<i>Acer saccharum ssp. saccharum</i>	Sugar Maple	4	3			G5	S5		0	*									*	*			
ASTERACEAE	<i>Achillea millefolium ssp. millefolium</i>	Common Yarrow	0	3			G5	SE		1			*				*				*	*		
ALISMATACEAE	<i>Alisma plantago-aquatica</i>	Common Water-plantain	3	-5			G5	S5		0		*												
BRASSICACEAE	<i>Alliaria petiolata</i>	Garlic Mustard	0	0			G?	SE5		1	*						*			*				
ASTERACEAE	<i>Ambrosia artemisiifolia</i>	Common Ragweed	0	3			G5	S5		0							*							
APIACEAE/UMBELLIFERAE	<i>Angelica atropurpurea</i>	Purple-stem Angelica	6	-5			G5	S5	h	0		*												
ASTERACEAE	<i>Antennaria neglecta</i>	Field Pussytoes	3	5			G5	S5		0							*							
ASTERACEAE	<i>Arctium minus ssp. minus</i>	Common Burdock	0	5			G?	SE5		1			*	*	*		*		*	*				*
ERICACEAE	<i>Arctostaphylos uva-ursi</i>	Bear-berry (ornamental escape)	8	5			G5	S5		0											*			
ASCLEPIADACEAE	<i>Asclepias syriaca</i>	Common Milkweed	0	5			G5	S5		0			*								*			
LILIACEAE	<i>Asparagus officinalis</i>	Asparagus	0	3			G?	SE5		1	*						*	*			*	*		*
ASTERACEAE	<i>Aster lanceolatus ssp. lanceolatus</i>	Panicled Aster	3	-3			G5	S5		0						*								
ASTERACEAE	<i>Aster lateriflorus var. lateriflorus</i>	One-sided Aster - Calico	3	-2			G5	S5		0	*		*				*							*
ASTERACEAE	<i>Aster novae-angliae</i>	New England Aster	2	-3			G5	S5		0			*				*							
ASTERACEAE	<i>Aster spp.</i>	Aster species												*								*		
BERBERIDACEAE	<i>Berberis thunbergii</i>	Japanese Barberry	0	4			G?	SE5		1	*									*	*			*
BETULACEAE	<i>Betula alleghaniensis</i>	Yellow Birch	6	0			G5	S5		0	*													
BETULACEAE	<i>Betula papyrifera</i>	White Birch	2	2			G5	S5		0						*						*		
POACEAE	<i>Bromus inermis ssp. inermis</i>	Smooth Brome	0	5			G4G5	SE5		1	*		*		*				*	*		*		*
CAMPANULACEAE	<i>Campanula rapunculoides</i>	European Bellflower	0	5			G?	SE5		1				*										
CAMPANULACEAE	<i>Campanula rotundifolia</i>	Harebell	7	1			G5	S5													*			
CYPERACEAE	<i>Carex sp</i>	Sedge Species								0							*							
JUGLANDACEAE	<i>Carya ovata</i>	Shagbark Hickory	6	3			G5	S5		0	*								*	*				*
ASTERACEAE	<i>Cichorium intybus</i>	Chicory	0	5			G?	SE5		1											*			
ONAGRACEAE	<i>Circaea lutetiana ssp. canadensis</i>	Canada Enchanter's Nightshade	3	3			G5	S5		0	*		*				*		*	*				
ASTERACEAE	<i>Cirsium arvense</i>	Canada Thistle	0	3			G?	SE5		1			*		*				*	*				
ASTERACEAE	<i>Cirsium vulgare</i>	Bull Thistle	0	4			G5	SE5		1	*										*			*
CORNACEAE	<i>Cornus foemina ssp. racemosa</i>	Grey Dogwood	2	-2			G5	S5		0	*										*			*
CORNACEAE	<i>Cornus stolonifera</i>	Red-osier Dogwood	2	-3			G5	S5		0		*		*		*	*				*	*		*
ROSACEAE	<i>Crataegus spp.</i>	Hawthorn species																			*			*
POACEAE	<i>Dactylis glomerata</i>	Orchard Grass	0	3			G?	SE5		1	*		*	*					*	*	*			*
APIACEAE	<i>Daucus carota</i>	Wild Carrot	0	5			G?	SE5		1	*		*	*	*		*		*	*	*	*		*
CARYOPHYLLACEAE	<i>Dianthus armeria</i>	Deptford Pink	0	5			G?	SE5		1			*								*			
POACEAE	<i>Echinochloa crusgalli</i>	Barnyard Grass	0	-3			G?	SE5		1			*											
CUCURBITACEAE	<i>Echinocystis lobata</i>	Wild Cucumber	3	-2			G5	S5		0	*						*			*				
BORAGINACEAE	<i>Echium vulgare</i>	Viper's Bugloss	0	5			G?	SE5		1											*			*
ELAAGNACEAE	<i>Elaeagnus angustifolia</i>	Russian Olive	0	4			G?	SE3		1											*			*
EQUISETACEAE	<i>Equisetum arvense</i>	Field Horsetail	0	0			G5	S5		0			*	*		*				*	*	*		*
ASTERACEAE	<i>Erigeron annuus</i>	Daisy Fleabane	0	1			G5	S5		0	*		*	*					*	*		*		*
ASTERACEAE	<i>Erigeron philadelphicus ssp. philadelphicus</i>	Philadelphia Fleabane	1	-3			G5	S5		0	*													
ASTERACEAE	<i>Eupatorium maculatum ssp. maculatum</i>	Spotted Joe-pye-weed	3	-5			G5	S5		0		*	*											
ASTERACEAE	<i>Eupatorium perfoliatum</i>	Common Boneset	2	-4			G5	S5		0		*	*											
ASTERACEAE	<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	2	-2			G5	S5		0							*					*		
ROSACEAE	<i>Fragaria vesca ssp. americana</i>	Woodland Strawberry	4	4			G5	S5		0												*		*
OLEACEAE	<i>Fraxinus americana</i>	White Ash	4	3			G5	S5		0	*			*			*		*	*	*	*		*
OLEACEAE	<i>Fraxinus pennsylvanica</i>	Red Ash	3	-3			G5	S5		0	*										*	*		*
ROSACEAE	<i>Geum aleppicum</i>	Yellow Avens	2	-1			G5	S5		0									*	*				*
ROSACEAE	<i>Geum canadense</i>	White Avens	3	0			G5	S5		0	*													
ROSACEAE	<i>Geum laciniatum</i>	Rough Avens	4	-3			G5	S4		0	*			*			*		*	*	*			*
BRASSICACEAE/CRUCIFERAE	<i>Hesperis matronalis</i>	Dame's Rocket	0	5			G4G5	SE5		1	*								*	*				*
ASTERACEAE	<i>Hieracium aurantiacum</i>	Orange Hawkweed	0	5			G?	SE5		1				*			*				*	*		*
ASTERACEAE	<i>Hieracium scabrum</i>	Rough Hawkweed	7	5			G5	S4		0							*							
CLUSIACEAE	<i>Hypericum perforatum</i>	Common St. John's-wort	0	5			G?	SE5		1						*						*		*
BALSAMINACEAE	<i>Impatiens capensis</i>	Spotted Touch-me-not	4	-3			G5	S5		0		*												
JUGLANDACEAE	<i>Juglans nigra</i>	Black Walnut	5	3			G5	S4		0	*		*							*	*			*
CUPRESSACEAE	<i>Juniperus communis</i>	Common Juniper	4	3			G5	S5		0						*								
CUPRESSACEAE	<i>Juniperus virginiana</i>	Eastern Red Cedar	4	3			G5	S5		0	*													
OLEACEAE	<i>Ligustrum vulgare</i>	European Privet	0	1			GNR	SNA		1	*													
LEMNACEAE	<i>Lemna minor</i>	Lesser Duckweed	2	-5			G5	S5		0		*												
LAMIACEAE	<i>Leonurus cardiaca ssp. cardiaca</i>	Motherwort	0	5			G?	SE5		1										*	*			
LILIACEAE	<i>Lilium lancifolium</i>	Tiger Lily	0	5			G?	SE1		1	*													
SCROPHULARIACEAE	<i>Linaria vulgaris</i>	Butter-and-eggs	0	5			G?	SE5		1							*							
MAGNOLIACEAE	<i>Liriodendron tulipifera</i>	Tulip Tree (planted)	8	2			G5	S4	H	0	*													
CAPRIFOLIACEAE	<i>Lonicera tatarica</i>	Tartarian Honeysuckle	0	3			G?	SE5		1	*			*					*	*	*			*
FABACEAE	<i>Lotus corniculatus</i>	Bird's-foot Trefoil	0	1			G?			1							*							
LILIACEAE	<i>Maianthemum racemosum ssp. racemosum</i>	False Solomon's Seal	4	3			G5	S5		0	*													*
ROSACEAE	<i>Malus pumila</i>	Common Apple	0	5			G5	SE5		1											*	*		*
FABACEAE	<i>Medicago lupulina</i>	Black Medick	0	1			G?	SE5		1			*		*		*							*
FABACEAE	<i>Medicago sativa ssp. sativa</i>	Alfalfa	0	5			G?	SE5		1			*		*		*					*	*	*
FABACEAE	<i>Melilotus alba</i>	White Sweet-clover	0	3			G5	SE5		1			*		*		*			*	*	*		*
LAMIACEAE	<i>Monarda fistulosa</i>	Wild Bergamot	6	3			G5	S5		0											*	*		*

Brock Road and Harvest Road Plant List

Family	Scientific Name	Common Name	CC	CW	Ranking					Introduced in Ontario 0=n 1=y	FODM7-4 (A)	MAMM1-2 (A)Incl.	MAMM2-6 (A)Incl.	MEFM1 (B)	TAGM1 (C)	MEMM3 (D)	TAGM1 (D)Incl.	TAGM1 (E)	MEMM3* (E)Incl.	FOD (F)	FODM4-11 (G)	MEMM3 (H)	FOCM6-3 (I)	THOM2-1 (J)
					COSEWIC	COSSARO	G-Rank	S-Rank	Hamilton Rare															
MORACEAE	<i>Morus alba</i>	White Mulberry	0	0			G?	SE5		1									*					
MOSS	<i>Moss sp.</i>	Moss Species																*						
ONAGRACEAE	<i>Oenothera biennis</i>	Common Evening-primrose	0	3			G5	S5		0			*								*			
ONAGRACEAE	<i>Oenothera fruticosa ssp. glauca</i>	Sundrops	-	-			G5T5	SX														*		
OxALIDACEAE	<i>Oxalis stricta</i>	Upright Yellow Wood-sorrel	0	3			G5	S5		0	*						*			*				
VITACEAE	<i>Parthenocissus quinquefolia</i>	Virginia Creeper	6	1			G5	S4?		0	*			*	*		*		*	*	*			
POACEAE	<i>Phalaris arundinacea</i>	Reed Canary Grass	0	-4			G5	S5		0		*			*				*	*	*			
POACEAE	<i>Phleum pratense</i>	Timothy	0	3			G?	SE5		1	*		*								*			
ROSACEAE	<i>Physocarpus opulifolius</i>	Ninebark	5	-2			G5	S5		0											*			
PINACEAE	<i>Picea abies</i>	Norway Spruce	0	5			G?	SE3		1							*			*				
PINACEAE	<i>Picea glauca</i>	White Spruce	6	3			G5	S5	I/N	0				*		*				*		*		
PINACEAE	<i>Picea pungens</i>	Blue Spruce	0	0			G5	SNA		1							*							
URTICACEAE	<i>Pilea sp.</i>	Clearweed Species								0		*												
PINACEAE	<i>Pinus resinosa</i>	Red Pine	8	3			G5	S5	I/N	I/N							*			*		*		
PINACEAE	<i>Pinus strobus</i>	Eastern White Pine	4	3			G5	S5		0				*						*		*		
PINACEAE	<i>Pinus sylvestris</i>	Scots Pine	0	5			G?	SE5		1						*	*		*	*	*	*		
PLANTAGINACEAE	<i>Plantago major</i>	Common Plantain	0	-1			G5	SE5		1				*	*		*						*	
POLYGONACEAE	<i>Polygonum cuspidatum</i>	Japanese Knotweed	0	3			G?	SE4		1	*													
SALICACEAE	<i>Populus balsamifera ssp. balsamifera</i>	Balsam Poplar	4	-3			G5	S5		0	*			*					*	*	*	*	*	
SALICACEAE	<i>Populus grandidentata</i>	Large-tooth Aspen	5	3			G5	S5		0	*													
SALICACEAE	<i>Populus tremuloides</i>	Trembling Aspen	2	0			G5	S5		0						*						*		
LAMIACEAE	<i>Prunella vulgaris ssp. lanceolata</i>	Heal-all	5	5			G5	S5		1				*								*	*	
ROSACEAE	<i>Prunus pensylvanica</i>	Pin Cherry	3	4			G5	S5		0	*		*							*	*	*	*	
ROSACEAE	<i>Prunus serotina</i>	Black Cherry	3	3			G5	S5		0	*								*	*	*	*	*	
ROSACEAE	<i>Prunus virginiana ssp. virginiana</i>	Choke Cherry	2	1			G5	S5		0	*								*	*	*	*	*	
FAGACEAE	<i>Quercus macrocarpa</i>	Bur Oak	5	1			G5	S5		0	*													
RANUNCULACEAE	<i>Ranunculus ficaria</i>	Lesser Celandine	0	-2			G?	SE1		1	*													
RHAMNACEAE	<i>Rhamnus cathartica</i>	Common Buckthorn	0	3			G?	SE5		1	*			*					*	*	*	*	*	
ANACARDIACEAE	<i>Rhus radicans ssp. negundo</i>	Climbing Poison-ivy	5	-1			G5	S5		0				*							*	*	*	
ANACARDIACEAE	<i>Rhus typhina</i>	Staghorn Sumac	1	5			G5	S5		0	*		*		*				*	*	*	*	*	
GROSSULARIACEAE	<i>Ribes americanum</i>	Wild Black Currant	4	-3			G5	S5		0														
FABICEAE/LEGUMINOSAE	<i>Robinia pseudo-acacia</i>	Black Locust	0	4			G5	SE5		1									*	*	*	*	*	
ROSACEAE	<i>Rosa multiflora</i>	Multiflora Rose	0	3			G?	SE4		1	*								*	*	*	*	*	
ROSACEAE	<i>Rubus allegheniensis</i>	Common Blackberry	2	2			G5	S5		0	*			*					*	*	*	*	*	
ROSACEAE	<i>Rubus idaeus ssp. melanolasius</i>	Wild Red Raspberry	0	-2			G5	S5		0	*			*					*	*	*	*	*	
POLYGONACEAE	<i>Rumex crispus</i>	Curly Dock	0	-1			G?	SE5		1	*		*		*				*	*	*	*	*	
SALICACEAE	<i>Salix fragilis</i>	Crack Willow	0	-1			G?	SE5		1	*		*							*	*	*	*	
SALICACEAE	<i>Salix purpurea</i>	Purple Osier Willow	0	-3			G5	SE4		1			*								*	*	*	
CAPRIFOLIACEAE	<i>Sambucus canadensis</i>	Common Elderberry	5	-2			G5	S5		0									*	*	*	*	*	
SMILACACEAE	<i>Smilax herbacea</i>	Herbaceous Carrion Flower	5	0			G5	S4		0									*	*	*	*	*	
SOLANACEAE	<i>Solanum dulcamara</i>	Bittersweet Nightshade	0	0			G?	SE5		1										*	*	*	*	
ASTERACEAE	<i>Solidago canadensis var. canadensis</i>	Canada Goldenrod	1	3			G5	S5		0	*		*	*	*		*		*	*	*	*	*	
ASTERACEAE	<i>Solidago juncea</i>	Early Goldenrod	3	5			G5	S5		0			*								*	*	*	
ASTERACEAE	<i>Solidago nemoralis ssp. nemoralis</i>	Gray Goldenrod	2	5			G5	S5		0			*								*	*	*	
ASTERACEAE	<i>Solidago rugosa ssp. rugosa</i>	Rough Goldenrod	4	-1			G5	S5		0			*	*	*		*				*	*	*	
ASTERACEAE	<i>Sonchus arvensis ssp. arvensis</i>	Field Sow-thistle	0	1			G?	SE5		1			*											
ROSACEAE	<i>Sorbus aucuparia</i>	European Mountain-ash	0	5			G5	SE4		1			*				*				*	*	*	
ASTERACEAE	<i>Symphotrichum pilosum var. pilosum</i>	White Heath Aster	4	2			G5T5	S5		0						*								
ARACEAE	<i>Symplocarpus foetidus</i>	Skunk Cabbage	7	-5			G5	S5		0	*													
OLEACEAE	<i>Syringa vulgaris</i>	Common Lilac	0	5			G?	SE5		1											*	*	*	
ASTERACEAE	<i>Taraxacum officinale</i>	Common Dandelion	0	3			G5	SE5		1	*		*	*			*		*	*	*	*	*	
CUPRESSACEAE	<i>Thuja occidentalis</i>	Eastern White Cedar	4	-3			G5	S5		0											*	*	*	
ASTERACEAE	<i>Tragopogon dubius</i>	Doubtful Goat's-beard	0	5			G?	SE5		1			*									*	*	
FABACEAE	<i>Trifolium pratense</i>	Red Clover	0	2			G?	SE5		1											*	*	*	
FABACEAE	<i>Trifolium repens</i>	White Clover	0	2			G?	SE5		1			*								*	*	*	
ASTERACEAE	<i>Tussilago farfara</i>	Coltsfoot	0	3			G?	SE5		1				*										
TYPHACEAE	<i>Typha latifolia</i>	Broad-leaved Cattail	3	-5			G5	S5		0		*	*											
ULMACEAE	<i>Ulmus pumila</i>	Siberian Elm	0	5			G?	SE3		1									*	*	*	*	*	
ULMACEAE	<i>Ulmus spp.</i>	* Elm sp. - ornamental										*												
URTICACEAE	<i>Urtica dioica ssp. gracilis</i>	Slender Stinging Nettle	2	-1			G5?	S5		0							*							
SCROPHULARIACEAE	<i>Verbascum thapsus</i>	Common Mullein	0	5			G?	SE5		1			*				*				*	*	*	
VERBENACEAE	<i>Verbena hastata</i>	Blue Vervain	4	-4			G5	S5		0			*										*	
VERBENACEAE	<i>Verbena urticifolia</i>	White Vervain	4	-1			G5	S5		0			*										*	
SCROPHULARIACEAE	<i>Veronica officinalis</i>	Common Speedwell	0	5			G5	SE5		1							*						*	
CAPRIFOLIACEAE	<i>Viburnum opulus</i>	European Highbush Cranberry	0	0			G5	SE4		1							*						*	
CAPRIFOLIACEAE	<i>Viburnum trilobum</i>	Highbush Cranberry	5	-3			G5T5	S5		0	*		*								*	*	*	
FABACEAE	<i>Vicia cracca</i>	Cow Vetch - tufted	0	5			G?	SE5		1			*	*	*		*		*	*	*	*	*	
VITACEAE	<i>Vitis riparia</i>	Riverbank Grape	0	-2			G5	S5		0	*		*	*	*		*	*	*	*	*	*	*	

Brock Road and Concession 4 West Plant List

Family	Scientific Name	Common Name	CC	CW	Ranking					Introduced in Ontario 0=n 1=y	RRSA1 (A)	WOCM1 (B)	FOCM6-1 (C)	THDM2 (D)
					COSEWIC	COSSARO	G-Rank	S-Rank	Hamilton Rare					
ACERACEAE	<i>Acer negundo</i>	Manitoba Maple	0	-2			G5	S5		0			*	
ACERACEAE	<i>Acer platanoides</i>	Norway Maple	0	5			G?	SE5		1	*		*	
ASTERACEAE	<i>Achillea millefolium ssp. millefolium</i>	Common Yarrow	0	3			G5	SE		1	*	*		
BRASSICACEAE	<i>Alliaria petiolata</i>	Garlic Mustard	0	0			G?	SE5		1		*	*	
ASTERACEAE	<i>Ambrosia artemisiifolia</i>	Common Ragweed	0	3			G5	S5		0	*			
APOCYNACEAE	<i>Apocynum androsaemifolium ssp. androsaemifolium</i>	Spreading Dogbane	3	5			G5	S5		0			*	
ASTERACEAE	<i>Arctium minus ssp. minus</i>	Common Burdock	0	5			G?	SE5		1		*		
ASCLEPIADACEAE	<i>Asclepias syriaca</i>	Common Milkweed	0	5			G5	S5		0	*	*		
LILIACEAE	<i>Asparagus officinalis</i>	Asparagus	0	3			G5?	SE5		1	*			
ASTERACEAE	<i>Aster lateriflorus var. lateriflorus</i>	One-sided Aster - Calico	3	-2			G5	S5		0		*		
ASTERACEAE	<i>Aster novae-angliae</i>	New England Aster	2	-3			G5	S5		0	*	*		
ASTERACEAE	<i>Aster oolentangiensis</i>	Azure Aster	9	5			G5	S4		0	*	*	*	
ASTERACEAE	<i>Aster puniceus var. puniceus</i>	Purple-stem Aster	6	-5			G5	S5		0	*			
POACEAE	<i>Bromus inermis ssp. inermis</i>	Smooth Brome	0	5			G4G5	SE5		1	*	*	*	
JUGLANDACEAE	<i>Carya ovata</i>	Shagbark Hickory	6	3			G5	S5		0	*			
ASTERACEAE	<i>Chrysanthemum leucanthemum</i>	Ox-eye Daisy	0	5			G?	SE5		1	*			
ONAGRACEAE	<i>Circaea lutetiana ssp. canadensis</i>	Canada Enchanter's Nightshade	3	3			G5	S5		0			*	
ASTERACEAE	<i>Cirsium arvense</i>	Canada Thistle	0	3			G?	SE5		1	*	*		
ASTERACEAE	<i>Cirsium vulgare</i>	Bull Thistle	0	4			G5	SE5		1	*	*		
CORNACEAE	<i>Cornus foemina ssp. racemosa</i>	Grey Dogwood	2	-2			G5	S5		0	*	*	*	
ROSACEAE	<i>Crataegus spp.</i>	Hawthorn species									*			
POACEAE	<i>Dactylis glomerata</i>	Orchard Grass	0	3			G?	SE5		1	*			
APIACEAE	<i>Daucus carota</i>	Wild Carrot	0	5			G?	SE5		1	*	*		
CARYOPHYLLACEAE	<i>Dianthus armeria</i>	Deptford Pink	0	5			G?	SE5		1	*			
DIPSACACEAE	<i>Dipsacus fullonum ssp. sylvestris</i>	Common Teasel	0	5			G?	SE5		1	*			
CUCURBITACEAE	<i>Echinocystis lobata</i>	Wild Cucumber	3	-2			G5	S5		0		*	*	
ASTERACEAE	<i>Erigeron annuus</i>	Daisy Fleabane	0	1			G5	S5		0	*	*	*	
ASTERACEAE	<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	2	-2			G5	S5		0	*	*	*	
ROSACEAE	<i>Fragaria virginiana ssp. virginiana</i>	Common Strawberry	2	1			G5	S5		0	*	*	*	
OLEACEAE	<i>Fraxinus pennsylvanica</i>	Red Ash	3	-3			G5	S5		0	*	*	*	
ROSACEAE	<i>Geum aleppicum</i>	Yellow Avens	2	-1			G5	S5		0	*	*	*	
ASTERACEAE	<i>Hieracium aurantiacum</i>	Orange Hawkweed	0	5			G?	SE5		1	*			
CLUSIACEAE	<i>Hypericum perforatum</i>	Common St. John's-wort	0	5			G?	SE5		1	*	*	*	
JUGLANDACEAE	<i>Juglans nigra</i>	Black Walnut	5	3			G5	S4		0	*	*	*	
JUNCACEAE	<i>Juncus tenuis</i>	Path Rush	0	0			G5	S5		0	*	*		
CUPRESSACEAE	<i>Juniperus virginiana</i>	Eastern Red Cedar	4	3			G5	S5		0	*			
CAPRIFOLIACEAE	<i>Lonicera tatarica</i>	Tartarian Honeysuckle	0	3			G?	SE5		1	*	*	*	
FABACEAE	<i>Lotus corniculatus</i>	Bird's-foot Trefoil	0	1			G?			1	*	*		
ROSACEAE	<i>Malus pumila</i>	Common Apple	0	5			G5	SE5		1	*			
MOSS	<i>Moss sp</i>	Moss Species									*	*	*	
ONAGRACEAE	<i>Oenothera biennis</i>	Common Evening-primrose	0	3			G5	S5		0	*			
ONAGRACEAE	<i>Oenothera parviflora</i>	Small-flowered Evening-primrose	1	3			G4?	S5?		0	*			
LAMIACEAE	<i>Origanum vulgare</i>	Wild Marjaram	0	5			G?	SE5		1		*		
VITACEAE	<i>Parthenocissus quinquefolia</i>	Virginia Creeper	6	1			G5	S4?		0			*	
SCROPHULARIACEAE	<i>Penstemon digitalis</i>	Foxglove Beard-tongue	6	1			G5	S4S5		0	*	*		
POACEAE	<i>Phleum pratense</i>	Timothy	0	3			G?	SE5		1	*	*		
PINACEAE	<i>Picea abies</i>	Norway Spruce	0	5			G?	SE3		1		*		

2) Faunal

Concession 4 West and Middletown Road: Incidental Wildlife Observations

Species		Status					ELC Polygon			
Scientific Name	Common Name	COSEWIC	COSSARO	G-Rank	S-Rank	Local	A	B	C	D
Birds										
<i>Corvus brachyrhynchos</i>	American Crow				S5B, SZN		*		*	
<i>Carduelis tristis</i>	American Goldfinch				S5B, SZN		*	*	*	
<i>Hirundo rustica</i>	Barn Swallow				S5B, SZN		*			
<i>Poecile atricapillus</i>	Black-capped Chickadee				S5			*	*	
<i>Bombycilla cedrorum</i>	Cedar Waxwing				S5B, SZN			*	*	
<i>Quiscalus quiscula</i>	Common Grackle				S5B, SZN				*	
<i>Tyrannus tyrannus</i>	Eastern Kingbird				S5B, SZN		*			
<i>Sturnella magna</i>	Eastern Meadowlark	THR			S5B, SZN		*			
<i>Contopus virens</i>	Eastern Wood-Pewee				S5B, SZN			*		
<i>Sturnus vulgaris</i>	European Starling				SE		*			
<i>Spizella pusilla</i>	Field Sparrow				S5B, SZN		*			
<i>Zenaida macroura</i>	Mourning Dove				S5B, SZN		*			
<i>Cardinalis cardinalis</i>	Northern Cardinal				S5			*		
<i>Melospiza melodia</i>	Song Sparrow				S5B, SZN		*			
	Wren sp.						*	*		
Mammals										
<i>Vulpes vulpes</i>	Red Fox				S5					*
Herps										
<i>Rana pipiens</i>	Northern Leopard Frog	NAR			S5			*		
Odonates and Lepidoptera										
<i>Pieris rapae</i>	Cabbage White				SE		*	*		
<i>Coenonympha tullia</i>	Common Ringlet				S5			*		
<i>Colias philodice</i>	Clouded Sulphur				S5		*			
<i>Papilio cresphontes</i>	Giant Swallowtail				S4S5	h		*	*	
<i>Phyciodes pascoensis</i>	Northern Pearl Crescentspot				S5		*			
<i>Limenitis arthemis astyanax</i>	Red-spotted Purple				S5				*	

Brock Road and Concession 4 West: Incidental Wildlife Observations

Species		Status					ELC Polygon					
Scientific Name	Common Name	COSEWIC	COSSARO	G-Rank	S-Rank	Local	A	B	C	D	E	F
Birds												
<i>Corvus brachyrhynchos</i>	American Crow				S5B, SZN			*	*		*	
<i>Carduelis tristis</i>	American Goldfinch				S5B, SZN		*	*	*	*	*	*
<i>Turdus migratorius</i>	American Robin				S5B, SZN		*				*	
<i>Hirundo rustica</i>	Barn Swallow	THR	THR		S5B, SZN		*	*				*
<i>Poecile atricapillus</i>	Black-capped Chickadee				S5		*	*		*	*	
<i>Cyanocitta cristata</i>	Blue Jay				S5			*	*	*		
<i>Dolichonyx oryzivorus</i>	Bobolink	THR	THR		S4B, SZN				*			*
<i>Branta canadensis</i>	Canada Goose				S5B, SZN		*					
<i>Bombycilla cedrorum</i>	Cedar Waxwing				S5B, SZN		*				*	
<i>Spizella passerina</i>	Chipping Sparrow				S5B, SZN		*					
<i>Quiscalus quiscula</i>	Common Grackle				S5B, SZN		*	*		*	*	
<i>Corvus corax</i>	Common Raven				S5		*					
<i>Geothlypis trichas</i>	Common Yellowthroat				S5B, SZN				*			
<i>Picoides pubescens</i>	Downy Woodpecker				S5		*	*				
<i>Pipilo erythrophthalmus</i>	Eastern Towhee				S4B, SZN	h		*		*		
<i>Sturnella magna</i>	Eastern Meadowlark	THR	THR		S5B, SZN					*		
<i>Sturnus vulgaris</i>	European Starling				SE			*	*			
<i>Spizella pusilla</i>	Field Sparrow				S5B, SZN			*				
<i>Dumetella carolinensis</i>	Gray Catbird				S5B, SZN		*	*				
<i>Eremophila alpestris</i>	Horned Lark				S5B, SZN			*				
<i>Carpodacus mexicanus</i>	House Finch				SE		*					
<i>Passer domesticus</i>	House Sparrow				SE		*					
<i>Troglodytes aedon</i>	House Wren				S5B, SZN		*					
<i>Passerina cyanea</i>	Indigo Bunting				S5B, SZN		*					
<i>Zenaidura macroura</i>	Mourning Dove				S5B, SZN		*	*		*		
<i>Cardinalis cardinalis</i>	Northern Cardinal				S5		*	*				
<i>Buteo jamaicensis</i>	Red-tailed Hawk				S5B, SZN							*
<i>Agelaius phoeniceus</i>	Red-winged Blackbird				S5B, SZN			*				
<i>Melospiza melodia</i>	Song Sparrow				S5B, SZN			*	*	*		
<i>Cathartes aura</i>	Turkey Vulture				S4B, SZN	h			*	*		*
<i>Dendroica petechia</i>	Yellow Warbler				S5B, SZN			*				
<i>Empidonax traillii</i>	Willow Flycatcher				S5B, SZN			*	*			
Mammals												
<i>Tamias striatus</i>	Eastern Chipmunk				S5					*		
<i>Sylvilagus floridanus</i>	Eastern Cottontail				S5					*		
<i>Vulpes vulpes</i>	Red Fox				S5		*					
<i>Odocoileus virginianus</i>	White-tailed Deer				S5					*		*
Odonates and Lepidoptera												
<i>Papilio polyxenes</i>	Black Swallowtail				S5					*		
<i>Pieris rapae</i>	Cabbage White				SE		*	*	*	*	*	*
<i>Coenonympha tullia</i>	Common Ringlet				S5						*	
<i>Colias philodice</i>	Clouded Sulphur				S5				*	*	*	
<i>Cercyonis pegala</i>	Common Wood Nymph				S5		*			*		
<i>Everes comyntas</i>	Eastern Tailed Blue				S5					*		
<i>Papilio glaucus</i>	Eastern Tiger Swallowtail				S5						*	
<i>Papilio cressphontes</i>	Giant Swallowtail				S4S5	h			*	*	*	
<i>Danaus plexippus</i>	Monarch				S5				*		*	
<i>Phyciodes pascoensis</i>	Northern Pearl Crescentspot				S5					*		
<i>Limenitis arthemis astyanax</i>	Red-spotted Purple				S5					*	*	
<i>Limenitis archippus</i>	Viceroy				S5					*		

Brock Road and Concession 5: Incidental Wildlife Observations

Species		Status					ELC Polygon				
Scientific Name	Common Name	COSEWIC	COSSARO	G-Rank	S-Rank	Local	A	B	C	D	E
Birds											
<i>Corvus brachyrhynchos</i>	American Crow				S5B, SZN						*
<i>Carduelis tristis</i>	American Goldfinch				S5B, SZN			*		*	*
<i>Turdus migratorius</i>	American Robin				S5B, SZN		*	*			*
<i>Hirundo rustica</i>	Barn Swallow				S5B, SZN		*		*		
<i>Poecile atricapillus</i>	Black-capped Chickadee				S5					*	
<i>Cyanocitta cristata</i>	Blue Jay				S5		*			*	
<i>Bombycilla cedrorum</i>	Cedar Waxwing				S5B, SZN		*				
<i>Quiscalus quiscula</i>	Common Grackle				S5B, SZN		*				
<i>Picoides pubescens</i>	Downy Woodpecker				S5						*
<i>Pipilo erythrophthalmus</i>	Eastern Towhee				S4B, SZN	h	*				
<i>Dumetella carolinensis</i>	Gray Catbird				S5B, SZN					*	
<i>Passerina cyanea</i>	Indigo Bunting				S5B, SZN		*				
<i>Charadrius vociferus</i>	Killdeer				S5B, SZN						*
<i>Zenaida macroura</i>	Mourning Dove				S5B, SZN		*	*		*	
<i>Cardinalis cardinalis</i>	Northern Cardinal				S5		*		*		
<i>Colaptes auratus</i>	Northern Flicker				S5B, SZN		*				
<i>Buteo jamaicensis</i>	Red-tailed Hawk	NAR			S5B, SZN					*	*
<i>Vireo gilvus</i>	Warbling Vireo				S5B, SZN		*				
Mammals											
<i>Tamias striatus</i>	Eastern Chipmunk				S5			*			
<i>Sciurus carolinensis</i>	Gray Squirrel				S5		*				
<i>Odocoileus virginianus</i>	White-tailed Deer				S5			*			
Odonates and Lepidopterans											
<i>Pieris rapae</i>	Cabbage White				SE		*			*	
<i>Cercyonis pegala</i>	Common Wood Nymph				S5					*	
<i>Papilio cresphontes</i>	Giant Swallowtail				S4S5	h		*	*	*	
<i>Speyeria cybele</i>	Great Spangled Fritillary				S5						*
<i>Danaus plexippus</i>	Monarch				S5				*	*	
<i>Nymphalis antiopa</i>	Mourning Cloak				S5		*				
<i>Limenitis arthemis astyanax</i>	Red-spotted Purple				S5		*				

Marshborough Road: Incidental Wildlife Observations

Species		Status					ELC Polygon									
Scientific Name	Common Name	COSEWIC	COSSARO	G-Rank	S-Rank	Local	1	2	3	4	5	6	7	8	9	10
Birds																
<i>Turdus migratorius</i>	American Robin				S5B, SZN						*					
<i>Dumetella carolinensis</i>	Gray Catbird				S5B, SZN						*					
<i>Buteo jamaicensis</i>	Red-tailed Hawk	NAR			S5B, SZN						*					

Appendix G

Ecoplans Limited

Mid-Spencer Creek / Greensville Subwatershed Study

Faunal Inventories Report 2006

**Mid-Spencer Creek / Greensville
Subwatershed Study**

**Faunal Inventories Report
2006**

Prepared for:
City of Hamilton

February 2007

Prepared by:



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1.0 Introduction

Ecoplans Limited (Ecoplans) was retained to conduct in-season faunal inventories for the Mid-Spencer Creek watershed, including the Greensville Rural Settlement Area (RSA), as a component of the sub-watershed study being carried out for the area. The primary components of the faunal study are a spring migrant bird survey, a breeding bird inventory and a breeding amphibian survey, with supplemental observations.

The preliminary review of background information indicated that the study area includes several Environmentally Sensitive Areas (ESA), locally / provincially significant wetlands and records of significant bird species. In recognition of the ecological significance of the study area, a comprehensive field survey program was undertaken to provide an appropriate level of information for integration into the sub-watershed study.

This report provides the faunal inventory results in several tables, summarizes the findings, provides an evaluation of wildlife use and makes conclusions on wildlife habitat significance / quality in the Mid-Spencer Creek / Greensville RSA study area.

2.0 Study Approach

The approach involved an initial review of background information available for the study area. This review provided an overview of the existing natural environment in the study area, and helped to focus and prioritize the faunal field surveys. Field visits and surveys of the study area were conducted between April 13 and July 31, 2006. Specific dates are listed in Sections 2.2.1, 2.2.2 and 2.2.3.

2.1 Background Information

Background information sources reviewed prior to the initiation of field investigations included:

- ≠ Aerial photography and mapping provided by City of Hamilton. Maps were plotted and used to identify field survey stations and Wildlife Survey Units.
- ≠ *Nature Counts Project Hamilton Natural Areas Inventory* (Dwyer et. al. 2003) documents for ESAs within the study area.
- ≠ Natural Heritage Information Centre (NHIC) on-line database for sensitive / rare amphibian and bird species that overlap or were in the vicinity of the study area.
- ≠ Ontario Breeding Bird Atlas (2001-2005) data including Point Count data.
- ≠ Rare species information provided by City of Hamilton.
- ≠ Consultation with staff from the City of Hamilton, Ontario Breeding Bird Atlas and Ministry of Natural Resources for available information.

A summary of the results of the background information review can be found in Section 3.0.

2.2 Field Surveys

Wildlife survey units and Amphibian Call Stations were identified based on secondary source information and a reconnaissance field visit.

The faunal inventory program was intended to provide thorough coverage of the study area, with preliminary survey units, identified on aerial photographs, prioritized using the following criteria:

- ≠ Priority was given to those areas either not already covered by the *Nature Counts Project Hamilton Natural Areas Inventory* (Dyer, et. al. 2003) or identified with 'inadequate coverage' in the *Nature Counts Project*.
- ≠ Wildlife survey units and stations within the Greensville RSA were assigned a higher priority.
- ≠ Natural areas already protected (i.e. those owned by the Conservation Authority), were assigned a lower priority.
- ≠ Areas where access was denied were not included in any of the Ecoplans field surveys (with the exception of roadside observations or observations recorded while on adjacent lands).

With this approach, nearly all natural or semi-natural areas (and all larger habitat blocks) were inventoried during the 2006 field program, most sites with 2 or 3 visits.

2.2.1 Amphibian

Amphibian breeding activity in the study area was assessed primarily through amphibian call surveys, supplemented by some vernal pool checks.

Amphibian Call Surveys

Three rounds of amphibian calling surveys for breeding amphibians were conducted in 2006; the first round on April 13 and April 20; the second round on May 24 and May 25; and the final round on June 21 and June 22. Date selection and survey methodology followed the process outlined in the Marsh Monitoring Program (MMP) protocol (e.g. night-time air temperature exceeding 5 degrees C for first round of surveying, survey dates at least 15 days apart, 3 minute survey time, no heavy rain or wind) (Bird Studies Canada 2003).

At each call survey location the intensity and number of calling amphibians were measured and recorded using call level code and abundance count, as outlined in the MMP. Call Level 1 indicates a lower abundance of a species, as individual calls can be counted and calls are not simultaneous (i.e. there is no overlap of calls). At Call Level 2 amphibian calls are distinguishable, but there is some simultaneous calling (i.e. some overlap of calls). A full chorus is noted as a Call Level 3, where there are so many amphibians that calls are continuous and overlapping. For Call Levels 1 and 2, an Abundance Count was recorded, which is a count or estimate of the number of calling amphibians heard. An Abundance Count is not possible for Call Level 3 because individual calling amphibians can not be distinguished (Bird Studies Canada 2003).

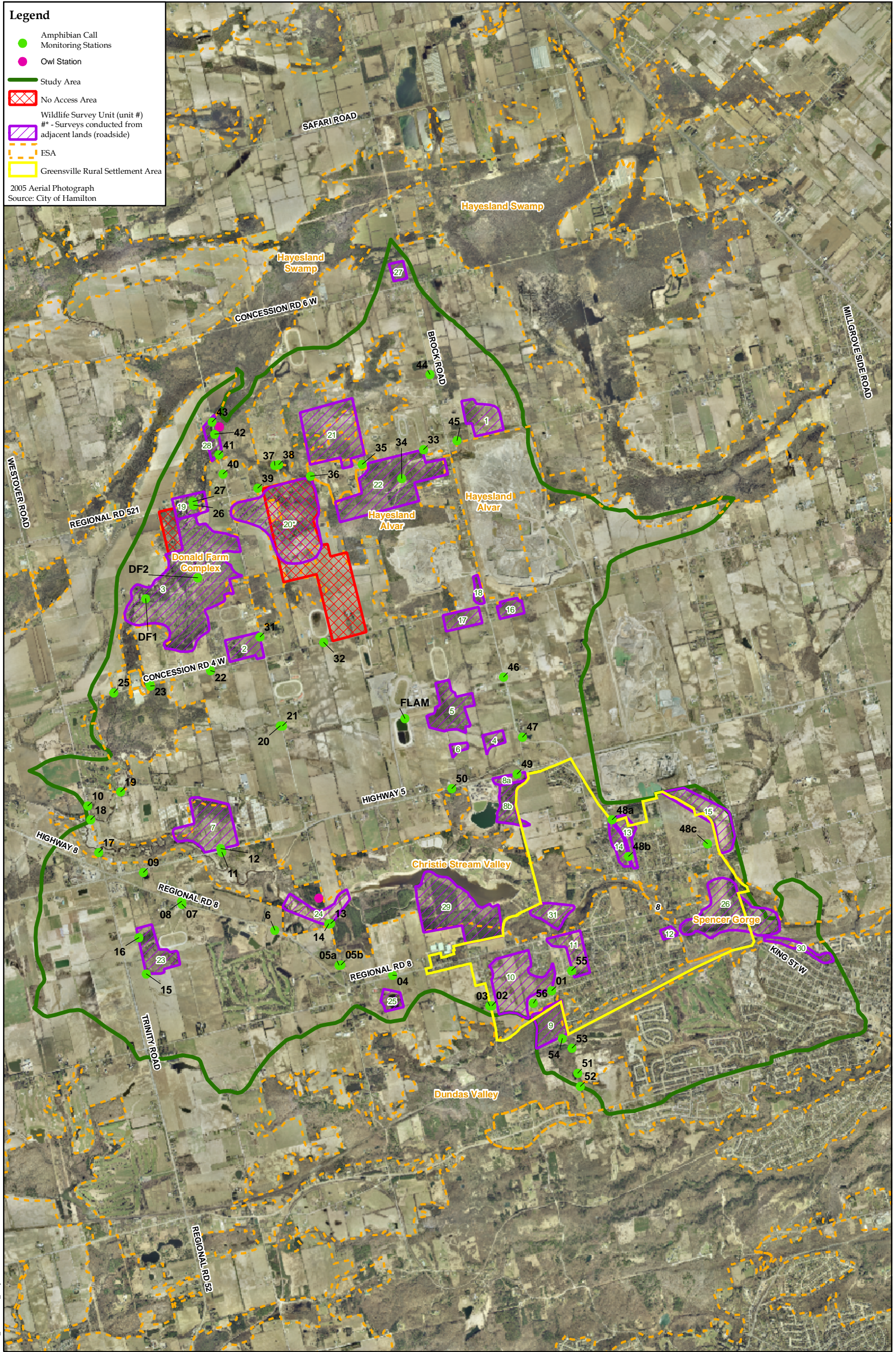
A total of sixty (60) Amphibian Call Station survey locations was identified using air photo interpretation and a reconnaissance field visit conducted on April 13 prior to the first field survey. Locations were chosen across the study area, based on anticipated appropriate / optimal habitat for breeding amphibians, as well as site access. Amphibian Call Station locations are shown on Figure 1. A large number of stations were identified to provide thorough coverage across the study area. Due to timing restrictions based on the protocol (surveys to begin half hour after sunset and end at midnight), most of the stations were roadside. Two evenings per round were required to cover all 60 call survey stations. General habitat types (e.g. thicket, marsh, floodplain swamp etc.) for each survey location are listed in Table 1. Amphibian survey results for the study area are presented in Table 1 and summarized in Section 4.1 below.

Breeding amphibian egg mass surveys. Vernal pools with potential for amphibian breeding were identified during the initial (reconnaissance) visit and characteristics / condition were generally noted. However, no targeted searches for amphibian breeding pools were completed.

Legend

- Amphibian Call Monitoring Stations
- Owl Station
- Study Area
- No Access Area
- Wildlife Survey Unit (unit #)
- #* - Surveys conducted from adjacent lands (roadside)
- ESA
- Greenville Rural Settlement Area

2005 Aerial Photograph
Source: City of Hamilton



3095 Greenville_Amphibians&Owl.mxd



Mid-Spencer Creek/Greenville Subwatershed Study
AMPHIBIAN CALL STATIONS

Date:
Oct 2006

Project No:
06 - 3095

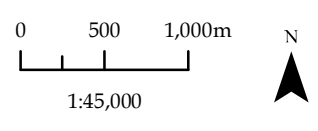


Table 1 - Amphibian Call Survey Results 2006
Mid-Spencer Creek / Greenville

		Common Name	American Toad	Grey Treefrog	Spring Peeper	Chorus Frog	Bullfrog	Green Frog	Northern Leopard Frog	Wood Frog	
	Habitat	Scientific Name	<i>Bufo americanus</i>	<i>Hyla versicolor</i>	<i>Pseudacris crucifer</i>	<i>Pseudacris maculata</i>	<i>Rana catesbeiana</i>	<i>Rana clamitans</i>	<i>Rana pipiens</i>	<i>Rana sylvatica</i>	
Station No.		Date (2006)	Calling Level¹								Comments
1 (GV)	thicket/marsh	April 13			2(10+)						
		May 24			1(1)						
		June 21	No calls heard								
2 (GV)	meadow marsh	April 13	No calls heard								
		May 24	No calls heard								
		June 21	No calls heard								
3	meadow marsh/pond	April 13			3						
		May 24		1(2)	3						
		June 21	No calls heard								
4	large pond/marsh/thicket	April 13	1(3)		3					1(2)	
		May 24		3	3						Grey Treefrogs very loud
		June 22		1(6+)							traffic noise loud/frequent
5a	riparian meadow	April 13	No calls heard								
		May 24	No calls heard								
		June 21		1(2)							
5b	riparian meadow	April 13	No calls heard								
		May 24	No calls heard								
		June 21	No calls heard								
6	open water pond	April 13			3						
		May 24	2(2)		1(1)						traffic noise loud/frequent
		June 22	1(4)				1(2)	1(2)			
7	riparian marsh	April 13	2(3)		3				1(1)		
		May 24	1(1)	2(6)	1(1)						traffic noise loud/frequent
8	riparian marsh	April 13	No calls heard								
		May 24	2(2)								traffic noise loud/frequent
9	open water pond	April 13			2(5)						
		May 24	No calls heard								traffic noise loud/frequent
		June 22					1(1)	1(6)			
10	open water pond	April 13	2(6)		2(7)				2(8)		
		May 24	1(1)					1(2)			
		June 22					1(1)	2(8+)			
11	floodplain marsh/thicket/swamp	April 13			3				1(3)		
		May 24	1(2)	2							traffic noise loud/frequent
		June 22	No calls heard								
12	floodplain marsh/thicket/swamp	April 13			3						
		May 24			1(1)						
		June 22	No calls heard								
13	riparian marsh/mudflats	April 13	1(2)		3				1(1)	3	
		May 24	2(3)		2(6+)						
		June 22		1(2)				2(10)			
14	riparian marsh/mudflats	April 13	No calls heard								
		May 24	1(1)		3						
		June 22		1(2)				2(5)			
15	meadow marsh	April 13			1(3)						
		May 24	No calls heard								
16	marsh/thicket	April 13			1(2)						
		May 24	No calls heard								
		June 22	No calls heard								

Table 1 - Amphibian Call Survey Results 2006
Mid-Spencer Creek / Greenville

		Common Name	American Toad	Grey Treefrog	Spring Peeper	Chorus Frog	Bullfrog	Green Frog	Northern Leopard Frog	Wood Frog	
17	riparian meadow	April 13	1(2)		1(3)						
		May 24	No calls heard								
18	riparian meadow/thicket	April 13			1(4)						
		May 24	2(2)								
19	riparian meadow/marsh/thicket	April 13	1(2)		2(5)						
		May 24	No calls heard								
20	riparian meadow/thicket	April 20	2(8)		1(1)/2(5+)						
		May 24	No calls heard								
21	riparian meadow/thicket	April 20			1(3-4)						
		May 24	2(2)								
22	wet meadow	April 20	3		3						
		May 24	1(2)	1(2)	1(1)						
23	swamp/thicket	April 20	No calls heard								
		May 24	2(2)	1(1)	2(5+)						
		June 22	No calls heard								
24	wet meadow	April 20	1(1)						1(2)		
		May 24	1(1)		2(6+)						
		June 22		1(1)				1(1)			
25	riparian swamp/thicket	April 20	No calls heard								
		May 24						1(1)			
26	swamp/thicket	April 20	2(8)		2(10+)						
		May 25	2(2)	1(2-3)	2(4-5)						
		June 22					1(2)	2(10)			
27	swamp/thicket	April 20	2(8)		2(6+)				1(2)		
		May 25	1(1)	1(2-3)	1(1)						
		June 22						2(3)			
28		n.a.	Station unsuitable - removed								
29		n.a.	Station unsuitable - removed								
30		n.a.	Station unsuitable - removed								
31	wet meadow/thicket	April 20	3		3				1(1)		
		May 25	1(1)	3							
		June 22						1(1)			
32	open water pond	April 20	2(4)		3				1(1)		
		May 25	No calls heard								
		June 22	No calls heard								
33	open water pond	April 20	2(3)		3				1(1)		
		May 25		2(6)							
34	cattail marsh/thicket	May 25		3						Spring Peeper & Wood Frog heard April 13 reconnaissance visit	
		June 22	No calls heard								
35	swamp/thicket	April 20	2(3+)		3						
		May 25	1(2)	2(6+)	1(1)						
36	swamp/thicket	April 20	1(2)								
		May 25	2(3)	3	1(1)			1(1)			
37	open water pond	April 20	1(1)		3					American Toad observed	
		May 25		3	2(2)			1(2)			
		June 22						2(7)			
38	open water pond	April 20	3		2(2)				2(3)		
		May 25	2(2+)	3							
		June 22						1(3)			

Table 1 - Amphibian Call Survey Results 2006
Mid-Spencer Creek / Greenville

		Common Name	American Toad	Grey Treefrog	Spring Peeper	Chorus Frog	Bullfrog	Green Frog	Northern Leopard Frog	Wood Frog	
39	thicket/marsh/pond	April 20			2(10+)						
		May 25	1(1)	3				1(1)			
40	floodplain swamp	April 20	2(5+)		1(3)						
		May 25	2(4)								
41	floodplain swamp	April 20	2(5+)		1(3)				1(2-3)		
		May 25	3	1(1)	1(1)				1(1)		
42	floodplain swamp	April 20	2(5+)						2(3)		
		May 25	2(2)								
		June 22	No calls heard								
43	floodplain swamp	April 20	2(5+)						2(4)		
		May 25	2(4-5)								
		June 22	No calls heard								
44	swamp/thicket	April 20	2(2)						1(2)		
		May 25			1(1)						Numerous Grey Treefrogs heard between 44 & 45
		June 22	No calls heard								
45	swamp/thicket	April 20	2(4)		2(5)						
		May 25		3	1(1)						
46	thicket/marsh/pond	April 20	2(3-4)		2(3)						
		May 25	1(1)	2(5)							
		June 22	No calls heard								
47	manicured pond	April 20	2(5+)								
		May 25	1(2)								
		June 22						2(15)			
48a (GV)	thicket/wet meadow	April 20	2(3)								
		May 25	1(2)								
		June 22	No calls heard								
48b (GV)	thicket/marsh/pond	April 20			3						
		May 25			1(2)						
		June 22						1(3)			
48c (GV)	wet meadow	April 20	3								
		May 25						1(1)			
		June 22						1(5)			
49	cattail marsh/thicket	April 20	No calls heard							Background noise too loud / difficult to hear over	
50	thicket	April 20	No calls heard							Background noise too loud / difficult to hear over	
51	open water pond	April 13			3	1(2)					
		May 24		1(4)	3						
		June 21		1(2)				1(4)	1(1)		
52	swamp/thicket	April 13	1(2)		1(4)						
		May 24	No calls heard								
		June 21	No calls heard								
53	swamp/thicket	April 13	No calls heard								
		May 24	No calls heard								
		June 21	No calls heard								
54	swamp/thicket	April 13	No calls heard								
		May 24	No calls heard								
		June 21	No calls heard								
55 (GV)	thicket/marsh/pond	April 13	2(4)		2(10+)						
		May 24	1(1)		1(1)						
		June 21	No calls heard								

**Table 1 - Amphibian Call Survey Results 2006
Mid-Spencer Creek / Greenville**

		Common Name	American Toad	Grey Treefrog	Spring Peeper	Chorus Frog	Bullfrog	Green Frog	Northern Leopard Frog	Wood Frog	
56 (GV)	thicket/marsh/pond	April 13			2(6)						
		May 24		1(3)							
		June 21	No calls heard								
Flamborough Downs	manicured pond	April 20	1		1						
		May 25	2(3)								
		June 22	No calls heard								
DF1	thicket/marsh/swamp	April 20	No calls heard								Northern Leopard Frogs & Green Frog observed; American Toad & Spring Peeper loud to south
		May 25		2(6+)							numerous Northern Leopard Frogs observed; Green Frog heard & observed prior to count
DF2	thicket/marsh/swamp	April 20			2(6)						Northern Leopard Frog observed

GV=Greenville Rural Settlement Area

¹ **Calling Level** (Bird Studies Canada 2003)

Level 1 - Individuals can be counted; calls not simultaneous

Level 2 - Calls distinguishable; some simultaneous calling

Level 3 - Full chorus; calls continuous and overlapping

e.g.. 2(3) corresponds to Calling Level 2 with 3 individuals heard calling and overlapping

Weather Conditions

Wind strength measure based on Beaufort Scale. Survey should only be conducted with wind strength of 3 or less.

0 = 0-2 km/hr (calm); 1 = 3-5 km/hr (light); 2 = 6-11 km/h (slight breeze); 3 = 12-19 km/hr (gentle breeze)

April 13: Partly cloudy, wind 0-1, 12°C

April 20: High overcast, wind 0, 15°C

May 24: High overcast, wind 0, 18°C

May 25: Clear to slightly overcast, wind 0, 19°C

June 21: Stopped survey early due to wind strength intensifying as evening progressed

June 22: Overcast, wind 0, 18°C

2.2.2 Birds

Twenty-five Wildlife Survey Units were identified based on air photo interpretation and a reconnaissance field visit conducted on April 17, 2006. The identified units (Units 1-25) were used for both for both the migrant and breeding bird surveys. Based on the migrant bird survey results, seven additional units (Units 8b, 26-31) were added to the breeding bird inventory. These Wildlife Survey Units are shown on Figure 2.

Migrants

The migrant bird inventory was conducted in 2006 on April 27 and May 10, to inventory migrant birds utilizing the site. Twenty-five units were surveyed using the same protocols for timing and conditions as the breeding bird survey outlined below. Migrant survey results for the study area are presented in Table 2a and summarized in Section 4.2.1 below.

Breeding Birds






A breeding bird inventory of the study area was conducted in 2006 over a total of 9 days (May 17, May 19, May 24, June 1, June 6, June 20, June 22, July 13 and July 31) using the Ontario Breeding Bird Atlas (OBBA) protocols (Bird Studies Canada 2001). Thirty-two Wildlife Survey Units were identified based on air photo interpretation, the reconnaissance field visit and further habitat observations during the migrant bird survey. Each survey unit was visited at least once within the peak breeding bird season, with an effort made for a second visit to as many survey units as possible (separated by at least 10 days as per OBBA protocol). Priority for second visits was given to units in areas not covered by previous studies (see Section 3.0) or currently protected (i.e. Conservation Authority lands). Breeding evidence and abundance was recorded for each species noted in a Wildlife Survey Unit. Breeding bird survey results for the study area are presented in Table 3a.

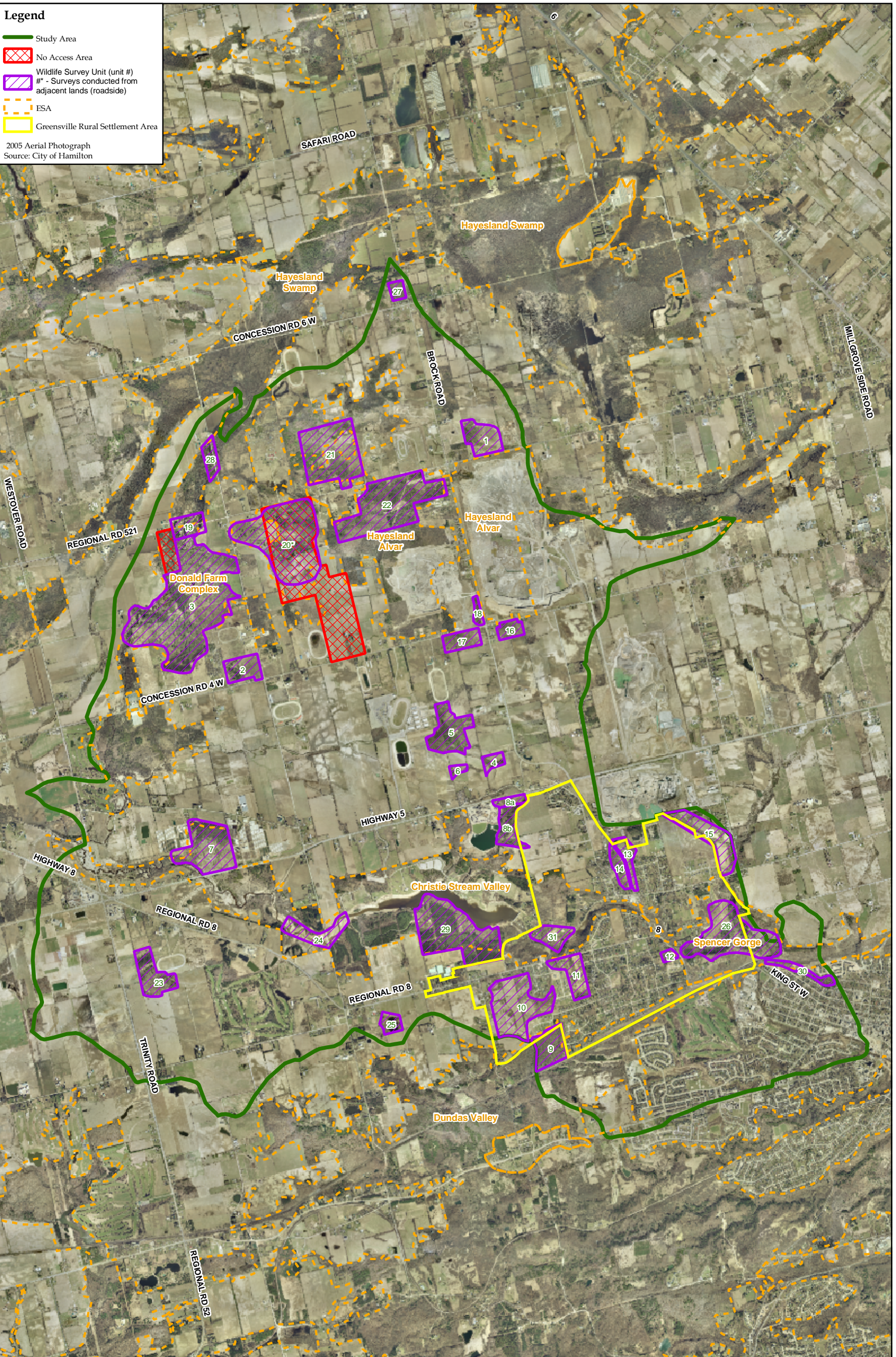
Hawks and Owls

Although specific raptor species searches were not undertaken, potential habitat for Red-shouldered Hawk (e.g. large contiguous woodlands) and Barn Owl (e.g. old barns and buildings, large natural cavities) was surveyed during breeding bird / migrant bird field surveys.

Additional Owl surveys were conducted during amphibian surveys following a modified version of the OBBA owl survey protocol (Bird Studies Canada 2002). The 'silent listening' method was employed co-incident with the amphibian surveys. Locations for conducting taped playback methods that were readily accessible and had appropriate habitat were limited. As such, this method was used only in a few select locations; Unit 28 (Call Station 42 / 43), and north of Unit 24 in Christie Lake Conservation Area. Species used in the taped playback were Eastern Screech Owl (*Otus asio*) and Great Horned Owl (*Bubo virginianus*), recognizing that Great Horned Owl response to playback is poor (Bird Studies Canada 2002).

Legend

-  Study Area
 -  No Access Area
 -  Wildlife Survey Unit (unit #)
#* - Surveys conducted from adjacent lands (roadside)
 -  ESA
 -  Greenville Rural Settlement Area
- 2005 Aerial Photograph
Source: City of Hamilton

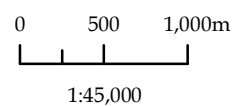


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Mid-Spencer Creek/Greenville Subwatershed Study
FAUNAL INVENTORIES
WILDLIFE SURVEY UNITS

Date:
Oct 2006
 Project No:
06 - 3095



**Table 2a - Migrant Bird Survey 2006
Mid-Spencer Creek/Greenville**

Common Name	Scientific Name	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8a	Unit 9	Unit 10	Unit 11	Unit 12	Unit 13	Unit 14
Common Loon	<i>Gavia immer</i>	G5	S4B,SZN																
Red-throated Loon	<i>Gavia stellata</i>	G5	S1S2B,SZN																
Herring Gull	<i>Larus argentatus</i>	G5	S5B,SZN																
Ring-billed Gull	<i>Larus delawarensis</i>	G5	S5B,SZN																
Caspian Tern	<i>Sterna caspia</i>	G5	S3B,SZN																
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	G5	S4B,SZN												18				
Mallard	<i>Anas platyrhynchos</i>	G5	S5B,SZN							2									2
Wood Duck	<i>Aix sponsa</i>	G5	S5B,SZN							1									2
Canada Goose	<i>Branta canadensis</i>	G5	S5B,SZN									1							
Great Blue Heron	<i>Ardea herodias</i>	G5	S5B,SZN									1							
American Woodcock	<i>Scolopax minor</i>	G5	S5B,SZN				1												
Solitary Sandpiper	<i>Tringa solitaria</i>	G5	S4B,SZN																1
Killdeer	<i>Charadrius vociferus</i>	G5	S5B,SZN					1							1				
Wild Turkey	<i>Meleagris gallopavo</i>	G5	S4					2				1							
Rock Dove	<i>Columba livia</i>	G5	SE																
Mourning Dove	<i>Zenaida macroura</i>	G5	S5B,SZN							2	1			1	2				
Turkey Vulture	<i>Cathartes aura</i>	G5	S4B,SZN													1		1	
Sharp-shinned Hawk	<i>Accipiter striatus</i>	G5	S5B,SZN							1									
Cooper's Hawk	<i>Accipiter cooperii</i>	G5	S4B,SZN																
Red-tailed Hawk	<i>Buteo jamaicensis</i>	G5	S5B,SZN			1					1	2		1					
American Kestrel	<i>Falco sparverius</i>	G5	S5B,SZN										1						
Great Horned Owl	<i>Bubo virginianus</i>	G5	S5							1									
Belted Kingfisher	<i>Ceryle alcyon</i>	G5	S5B,SZN																
Hairy Woodpecker	<i>Picoides villosus</i>	G5	S5													1			
Downy Woodpecker	<i>Picoides pubescens</i>	G5	S5					3		1				2					
Pileated Woodpecker	<i>Dryocopus pileatus</i>	G5	S4S5					1											
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	G5	S4											2	1				
Northern Flicker	<i>Colaptes auratus</i>	G5	S5B,SZN				1	3				2			4			1	
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	G5	S5B,SZN																
Eastern Kingbird	<i>Tyrannus tyrannus</i>	G5	S5B,SZN																
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	G5	S5B,SZN											2			1		
Eastern Phoebe	<i>Sayornis phoebe</i>	G5	S5B,SZN									1							1
Willow Flycatcher	<i>Empidonax traillii</i>	G5	S5B,SZN																
Least Flycatcher	<i>Empidonax minimus</i>	G5	S5B,SZN												2				
Homed Lark	<i>Eremophila alpestris</i>	G5	S5B,SZN			3									2				
Blue Jay	<i>Cyanocitta cristata</i>	G5	S5				1	3				3		5	5				2
American Crow	<i>Corvus brachyrhynchos</i>	G5	S5B,SZN			2		4				4	2	1		2		1	

Table 2a - Migrant Bird Survey 2006
Mid-Spencer Creek/Greenville

Common Name	Scientific Name	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8a	Unit 9	Unit 10	Unit 11	Unit 12	Unit 13	Unit 14
European Starling	<i>Sturnus vulgaris</i>	G5	SE				5								5		2		
Bobolink	<i>Dolichonyx oryzivorus</i>	G5	S4B,SZN																
Brown-headed Cowbird	<i>Molothrus ater</i>	G5	S5B,SZN				1		3					3	2	2	2		
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	G5	S5B,SZN			5	3	4		6	5	5			2	7		5	8
Eastern Meadowlark	<i>Sturnella magna</i>	G5	S5B,SZN				2			1					1				
Orchard Oriole	<i>Icterus spurius</i>	G5	SZB,SZN																
Baltimore Oriole	<i>Icterus galbula</i>	G5	S5B,SZN											1	14	3	1	2	6
Common Grackle	<i>Quiscalus quiscula</i>	G5	S5B,SZN			2		2		4		2		2	7	4		3	5
Purple Finch	<i>Carpodacus purpureus</i>	G5	S5B,SZN					1											
House Finch	<i>Carpodacus mexicanus</i>	G5	SE				1								1	1			
American Goldfinch	<i>Carduelis tristis</i>	G5	S5B,SZN				2	1			2	3		10	16	7	3	4	
Savannah Sparrow	<i>Passerculus sandwichensis</i>	G5	S5B,SZN			3	2	1			1								
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	G5	S4B,SZN																
White-throated Sparrow	<i>Zonotrichia albicollis</i>	G5	S5B,SZN										4		2				
Chipping Sparrow	<i>Spizella passerina</i>	G5	S5B,SZN				1	2	1	3					1	1	1		1
Field Sparrow	<i>Spizella pusilla</i>	G5	S5B,SZN			2	4	4		1		2				1			
Dark-eyed Junco	<i>Junco hyemalis</i>	G5	S5B,SZN					1											
Song Sparrow	<i>Melospiza melodia</i>	G5	S5B,SZN			4	2		3		2	4		1	7	5	1	2	
Swamp Sparrow	<i>Melospiza georgiana</i>	G5	S5B,SZN									3							
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	G5	S4B,SZN				2	2											
Northern Cardinal	<i>Cardinalis cardinalis</i>	G5	S5				1		1			1	2	6	6	3	1	2	2
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	G5	S5B,SZN											2	1				
Indigo Bunting	<i>Passerina cyanea</i>	G5	S5B,SZN											2	1				1
Scarlet Tanager	<i>Piranga olivacea</i>	G5	S5B,SZN											4		2			
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	G5	S5B,SZN																
Barn Swallow	<i>Hirundo rustica</i>	G5	S5B,SZN												2			1	3
Tree Swallow	<i>Tachycineta bicolor</i>	G5	S5B,SZN								2								
Bank Swallow	<i>Riparia riparia</i>	G5	S5B,SZN												2				
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	G5	S5B,SZN					1				2							2
Cedar Waxwing	<i>Bombycilla cedrorum</i>	G5	S5B,SZN											7	6				
Red-eyed Vireo	<i>Vireo olivaceus</i>	G5	S5B,SZN											3		1		1	
Warbling Vireo	<i>Vireo gilvus</i>	G5	S5B,SZN																1
Black-and-white Warbler	<i>Mniotilta varia</i>	G5	S5B,SZN											2					
Blue-winged Warbler	<i>Vermivora pinus</i>	G5	S4B,SZN											1					
Nashville Warbler	<i>Vermivora ruficapilla</i>	G5	S5B,SZN											2		1			
Cape May Warbler	<i>Dendroica tigrina</i>	G5	S5B,SZN											1					
Yellow Warbler	<i>Dendroica petechia</i>	G5	S5B,SZN											3	15	2		4	3

**Table 2a - Migrant Bird Survey 2006
Mid-Spencer Creek/Greenville**

Common Name	Scientific Name	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8a	Unit 9	Unit 10	Unit 11	Unit 12	Unit 13	Unit 14
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	G5	S5B,SZN											1					
Yellow-rumped Warbler	<i>Dendroica coronata</i>	G5	S5B,SZN					1		2				8	8	3		1	13
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	G5	S5B,SZN											1	2				
Blackpoll Warbler	<i>Dendroica striata</i>	G5	S4B,SZN																
Blackburnian Warbler	<i>Dendroica fusca</i>	G5	S5B,SZN																
Pine Warbler	<i>Dendroica pinus</i>	G5	S5B,SZN					1						3			1		
Common Yellowthroat	<i>Geothlypis trichas</i>	G5	S5B,SZN											2	4			1	
American Redstart	<i>Setophaga ruticilla</i>	G5	S5B,SZN											2					
House Sparrow	<i>Passer domesticus</i>	G5	SE													2			
Northern Mockingbird	<i>Mimus polyglottos</i>	G5	S4B,SZN												1				
Gray Catbird	<i>Dumetella carolinensis</i>	G5	S5B,SZN											2	5	3			2
Brown Thrasher	<i>Toxostoma rufum</i>	G5	S5B,SZN			1	3	3										1	
Carolina Wren	<i>Thryothorus ludovicianus</i>	G5	S3S4													1			
House Wren	<i>Troglodytes aedon</i>	G5	S5B,SZN											3	4	2	1	2	
Brown Creeper	<i>Certhia americana</i>	G5	S5B,SZN											1					
White-breasted Nuthatch	<i>Sitta carolinensis</i>	G5	S5					2		1		1		1		1			1
Black-capped Chickadee	<i>Poecile atricapillus</i>	G5	S5				2	4	1				3	4	2	5		2	
Ruby-crowned Kinglet	<i>Regulus calendula</i>	G5	S5B,SZN					3		2									
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	G5	S4B,SZN					1											
Wood Thrush	<i>Hylocichla mustelina</i>	G5	S5B,SZN											4					
American Robin	<i>Turdus migratorius</i>	G5	S5B,SZN			1	1	5	2	3	2	3	4	5	4	2	2	2	2
Eastern Bluebird	<i>Sialia sialis</i>	G5	S4S5B,SZN			1													
Totals		96		0	0	11	18	25	6	15	8	18	6	36	34	25	11	18	19

**Table 2a - Migrant Bird Survey 2006
Mid-Spencer Creek/Greenville**

Common Name	Scientific Name	Unit 15	Unit 16	Unit 17	Unit 18	Unit 19	Unit 20	Unit 21	Unit 22	Unit 23	Unit 24	Unit 25	Unit 26 (Spencer Gorge)*	Unit 29 (Christie Lake)*
Common Loon	<i>Gavia immer</i>													1*
Red-throated Loon	<i>Gavia stellata</i>													1*
Herring Gull	<i>Larus argentatus</i>	2			1									
Ring-billed Gull	<i>Larus delawarensis</i>	4									2			
Caspian Tern	<i>Sterna caspia</i>										1			
Double-crested Cormorant	<i>Phalacrocorax auritus</i>													
Mallard	<i>Anas platyrhynchos</i>											2		
Wood Duck	<i>Aix sponsa</i>											2		
Canada Goose	<i>Branta canadensis</i>					15					4	2		
Great Blue Heron	<i>Ardea herodias</i>									1		1		
American Woodcock	<i>Scolopax minor</i>	3												
Solitary Sandpiper	<i>Tringa solitaria</i>													
Killdeer	<i>Charadrius vociferus</i>											1		
Wild Turkey	<i>Meleagris gallopavo</i>													
Rock Dove	<i>Columba livia</i>	1												
Mourning Dove	<i>Zenaida macroura</i>	4												
Turkey Vulture	<i>Cathartes aura</i>	1		1										
Sharp-shinned Hawk	<i>Accipiter striatus</i>													
Cooper's Hawk	<i>Accipiter cooperii</i>													
Red-tailed Hawk	<i>Buteo jamaicensis</i>													
American Kestrel	<i>Falco sparverius</i>													
Great Horned Owl	<i>Bubo virginianus</i>													
Belted Kingfisher	<i>Ceryle alcyon</i>					1								
Hairy Woodpecker	<i>Picoides villosus</i>													
Downy Woodpecker	<i>Picoides pubescens</i>													
Pileated Woodpecker	<i>Dryocopus pileatus</i>													
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>									1				
Northern Flicker	<i>Colaptes auratus</i>	1				1				1				
Ruby-throated Hummingbird	<i>Archilochus colubris</i>		1											
Eastern Kingbird	<i>Tyrannus tyrannus</i>		1											
Great Crested Flycatcher	<i>Myiarchus crinitus</i>								1	1				
Eastern Phoebe	<i>Sayornis phoebe</i>					1								
Willow Flycatcher	<i>Empidonax traillii</i>		1											
Least Flycatcher	<i>Empidonax minimus</i>		1											
Homed Lark	<i>Eremophila alpestris</i>											1		
Blue Jay	<i>Cyanocitta cristata</i>										1			
American Crow	<i>Corvus brachyrhynchos</i>				1				2	2	2			

**Table 2a - Migrant Bird Survey 2006
Mid-Spencer Creek/Greenville**

Common Name	Scientific Name	Unit 15	Unit 16	Unit 17	Unit 18	Unit 19	Unit 20	Unit 21	Unit 22	Unit 23	Unit 24	Unit 25	Unit 26 (Spencer Gorge)*	Unit 29 (Christie Lake)*
European Starling	<i>Sturnus vulgaris</i>		2	3	2									
Bobolink	<i>Dolichonyx oryzivorus</i>									1		1		
Brown-headed Cowbird	<i>Molothrus ater</i>	16	4							2				
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	15				8				4	2	9		
Eastern Meadowlark	<i>Sturnella magna</i>			2										
Orchard Oriole	<i>Icterus spurius</i>	1												
Baltimore Oriole	<i>Icterus galbula</i>	11	3		1	2	1		1	2	1	1		
Common Grackle	<i>Quiscalus quiscula</i>	10		2		4	5					10		
Purple Finch	<i>Carpodacus purpureus</i>													
House Finch	<i>Carpodacus mexicanus</i>											1		
American Goldfinch	<i>Carduelis tristis</i>	8	5	4			1	4	3	5	4			
Savannah Sparrow	<i>Passerculus sandwichensis</i>									2		1		
Grasshopper Sparrow	<i>Ammodramus savannarum</i>			1										
White-throated Sparrow	<i>Zonotrichia albicollis</i>													
Chipping Sparrow	<i>Spizella passerina</i>		1											
Field Sparrow	<i>Spizella pusilla</i>		2	1	1									
Dark-eyed Junco	<i>Junco hyemalis</i>													
Song Sparrow	<i>Melospiza melodia</i>	7	1	3	2	3	2	2	2	3	3	2		
Swamp Sparrow	<i>Melospiza georgiana</i>	1				2					2			
Eastern Towhee	<i>Pipilo erythrophthalmus</i>													
Northern Cardinal	<i>Cardinalis cardinalis</i>	4		1	1						2			
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>		1			2				1				
Indigo Bunting	<i>Passerina cyanea</i>	1												
Scarlet Tanager	<i>Piranga olivacea</i>	1												
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	2									10			
Barn Swallow	<i>Hirundo rustica</i>	4								2		3		
Tree Swallow	<i>Tachycineta bicolor</i>	6				2					6	4		
Bank Swallow	<i>Riparia riparia</i>		2											
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>					3					1			
Cedar Waxwing	<i>Bombycilla cedrorum</i>										2			
Red-eyed Vireo	<i>Vireo olivaceus</i>													
Warbling Vireo	<i>Vireo gilvus</i>					2								
Black-and-white Warbler	<i>Mniotilta varia</i>													
Blue-winged Warbler	<i>Vermivora pinus</i>				1									
Nashville Warbler	<i>Vermivora ruficapilla</i>	1								1				
Cape May Warbler	<i>Dendroica tigrina</i>													
Yellow Warbler	<i>Dendroica petechia</i>	11	5			3				1	3	2		

**Table 2a - Migrant Bird Survey 2006
Mid-Spencer Creek/Greenville**

Common Name	Scientific Name	Unit 15	Unit 16	Unit 17	Unit 18	Unit 19	Unit 20	Unit 21	Unit 22	Unit 23	Unit 24	Unit 25	Unit 26 (Spencer Gorge)*	Unit 29 (Christie Lake)*
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>												2*	
Yellow-rumped Warbler	<i>Dendroica coronata</i>	5								3	3		5*	
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>													
Blackpoll Warbler	<i>Dendroica striata</i>												1*	
Blackburnian Warbler	<i>Dendroica fusca</i>												2*	
Pine Warbler	<i>Dendroica pinus</i>													
Common Yellowthroat	<i>Geothlypis trichas</i>	2				1						1		
American Redstart	<i>Setophaga ruticilla</i>													
House Sparrow	<i>Passer domesticus</i>											2		
Northern Mockingbird	<i>Mimus polyglottos</i>													
Gray Catbird	<i>Dumetella carolinensis</i>	3	1	1										
Brown Thrasher	<i>Toxostoma rufum</i>		4		1									
Carolina Wren	<i>Thryothorus ludovicianus</i>													
House Wren	<i>Troglodytes aedon</i>	2				1				2				
Brown Creeper	<i>Certhia americana</i>													
White-breasted Nuthatch	<i>Sitta carolinensis</i>									1				
Black-capped Chickadee	<i>Poecile atricapillus</i>		2											
Ruby-crowned Kinglet	<i>Regulus calendula</i>													
Blue-gray Gnatcatcher	<i>Poliptila caerulea</i>					1								
Wood Thrush	<i>Hylocichla mustelina</i>													
American Robin	<i>Turdus migratorius</i>	14	2		2			1	1	2	1	3		
Eastern Bluebird	<i>Sialia sialis</i>													
Totals		96	28	18	10	10	17	4	3	6	20	19	19	4

LEGEND

Migrant bird field survey dates: April 27 and May 10, 2006. See Figure 2 for location of survey units.

****Note: Spencer Gorge and Christie Lake Conservation Area were not included in the migrant bird survey, but the annotated species were noted as late migrants (not breeding birds) during the breeding bird survey on May 24 (Spencer Gorge) or June 1 (Christie Lake) 2006.**

¹G-rank

Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.

- G1 Extremely rare - usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
- G2 Very rare - usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.
- G3 Rare to uncommon - usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
- G4 Common - usually more than 100 occurrences; usually not susceptible to immediate threats.
- G5 Very common - demonstrably secure under present conditions.

²S-Rank

(from NHIC, January 2006)

Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

- S1 Critically Imperiled - Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
- S2 Imperiled - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
- S3 Vulnerable - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
- S4 Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
- S5 Secure - Common, widespread, and abundant in the nation or state/province.
- S#S# Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
- SAN Non-breeding accidental.
- SE Exotic - not believed to be a native component of Ontario's fauna.
- SZN Non-breeding migrants/vagrants.
- SZB Breeding migrants/vagrants.

³COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

(federal status from COSEWIC November 2006)

- EXT Extinct - A species that no longer exists.
- EXP Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.
- END Endangered - A species facing imminent extirpation or extinction.
- THR Threatened - A species likely to become endangered if limiting factors are not reversed.
- SC Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
- NAR Not At Risk - A species that has been evaluated and found to be not at risk of extinction given the current circumstances.
- DD Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.
- * - Species on Schedule 1 of Species At Risk Act (SARA)

⁴MNR (Ministry of Natural Resources)

(provincial status from MNR June 2006)

The provincial review process is implemented by the MNR's Committee on the Status of Species at Risk in Ontario (COSSARO).

- EXT Extinct - A species that no longer exists anywhere.
- EXP Extirpated - A species that no longer exists in the wild in Ontario but still occurs elsewhere.
- END-R Endangered (Regulated) - A species facing imminent extinction or extirpation in Ontario which has been regulated under Ontario's Endangered Species Act (ESA).
- END Endangered (Not Regulated) - A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA.
- THR Threatened - A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.
- SC Special Concern (formerly Vulnerable) - A species with characteristics that make it sensitive to human activities or natural events.
- NAR Not at Risk - A species that has been evaluated and found to be not at risk.
- DD Data Deficient (formerly Indeterminate) - A species for which there is insufficient information for a provincial status recommendation.

**Table 3a Breeding Bird Survey 2006
Mid-Spencer Creek/Greenville**

Common Name	Scientific Name	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	Hamilton Region Significance ⁵	MNR Area Sensitive ⁶	Highest Breeding Evidence ⁷	Unit 1		Unit 2		Unit 3		Unit 4	Unit 5	Unit 6
									May 17	June 6	May 19	June 6	May 19	June 20	July 31	July 31	July 31
Mallard	<i>Anas platyrhynchos</i>	G5	S5B,SZN					P		1							
Wood Duck	<i>Aix sponsa</i>	G5	S5B,SZN			h		FY								1	
Canada Goose	<i>Branta canadensis</i>	G5	S5B,SZN					FY									
Ruffed Grouse	<i>Bonasa umbellus</i>	G5	S5			h		H				2	2				
Wild Turkey	<i>Meleagris gallopavo</i>	G5	S4					FY				2				1	
Green Heron	<i>Butorides virescens</i>	G5	S4B,SZN			h		H									
Great Blue Heron	<i>Ardea herodias</i>	G5	S5B,SZN			h		H	1			2	2			2	
Black-crowned Night-heron	<i>Nycticorax nycticorax</i>	G5	S3B,SZN			H		H									
Turkey Vulture	<i>Cathartes aura</i>	G5	S4B,SZN			h		X									
Cooper's Hawk	<i>Accipiter cooperii</i>	G5	S4B,SZN			H	X	A									
Red-tailed Hawk	<i>Buteo jamaicensis</i>	G5	S5B,SZN			H		FY				1				1	
Killdeer	<i>Charadrius vociferus</i>	G5	S5B,SZN					A			1						
American Woodcock	<i>Scolopax minor</i>	G5	S5B,SZN					H									
Spotted Sandpiper	<i>Actitis macularia</i>	G5	S5B,SZN					A									
Ring-billed Gull	<i>Larus delawarensis</i>	G5	S5B,SZN					X									
Rock Dove	<i>Columba livia</i>	G5	SE					P									
Mourning Dove	<i>Zenaida macroura</i>	G5	S5B,SZN					FY	3		4	1	2	2		1	
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	G5	S4B,SZN			H		P			1	1	2				
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	G5	S4B,SZN			h		S			1	1					
Great Horned Owl	<i>Bubo virginianus</i>	G5	S5			h		FY				2				1	
Chimney Swift	<i>Chaetura pelagica</i>	G5	S5B,SZN			h		X									
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	G5	S5B,SZN			h		T					2				
Belted Kingfisher	<i>Ceryle alcyon</i>	G5	S5B,SZN			h		H									
Hairy Woodpecker	<i>Picoides villosus</i>	G5	S5			h	X	P				1				1	
Downy Woodpecker	<i>Picoides pubescens</i>	G5	S5					FY	1			4	2			2	
Pileated Woodpecker	<i>Dryocopus pileatus</i>	G5	S4S5			h	X	T				1					
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	G5	S3B,SZN	SC	SC	H		H				1					
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	G5	S4			h		P		1							
Northern Flicker	<i>Colaptes auratus</i>	G5	S5B,SZN					FY	2	2	1		2	2	2	2	
Eastern Kingbird	<i>Tyrannus tyrannus</i>	G5	S5B,SZN					A			2	2		2		2	
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	G5	S5B,SZN					FY				2	3				
Eastern Phoebe	<i>Sayornis phoebe</i>	G5	S5B,SZN			h		FY									
Eastern Wood-pewee	<i>Contopus virens</i>	G5	S5B,SZN					FY				3	2	1	2		
Willow Flycatcher	<i>Empidonax traillii</i>	G5	S5B,SZN					T	5	7	1	2					7
Alder Flycatcher	<i>Empidonax alnorum</i>	G5	S5B,SZN			h		T									3
Least Flycatcher	<i>Empidonax minimus</i>	G5	S5B,SZN			h	X	H									
Red-eyed Vireo	<i>Vireo olivaceus</i>	G5	S5B,SZN					FY			2	5	8		3		
Warbling Vireo	<i>Vireo gilvus</i>	G5	S5B,SZN					FY				1		1		4	2
Blue Jay	<i>Cyanocitta cristata</i>	G5	S5					FY		3	2		2	4	1	4	
American Crow	<i>Corvus brachyrhynchos</i>	G5	S5B,SZN					FY	4	6	4		6	8	2		
Homed Lark	<i>Eremophila alpestris</i>	G5	S5B,SZN					D			1						
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	G5	S5B,SZN			h		T									
Barn Swallow	<i>Hirundo rustica</i>	G5	S5B,SZN					FY	4	8	6	5	4	4			10
Tree Swallow	<i>Tachycineta bicolor</i>	G5	S5B,SZN					FY		4			4				
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	G5	S5B,SZN					AE		4							
Tufted Titmouse	<i>Baeolophus bicolor</i>	G5	S2S3			H	X	S									
Black-capped Chickadee	<i>Poecile atricapillus</i>	G5	S5					FY			4	2	10	16	4	6	1

**Table 3a Breeding Bird Survey 2006
Mid-Spencer Creek/Greenville**

Common Name	Scientific Name	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	Hamilton Region Significance ⁵	MNR Area Sensitive ⁶	Highest Breeding Evidence ⁷	Unit 1		Unit 2		Unit 3		Unit 4	Unit 5	Unit 6
									May 17	June 6	May 19	June 6	May 19	June 20	July 31	July 31	July 31
White-breasted Nuthatch	<i>Sitta carolinensis</i>	G5	S5				X	FY					2	1	1	1	
Red-breasted Nuthatch	<i>Sitta canadensis</i>	G5	S5B,SZN			h	X	P									
Carolina Wren	<i>Thryothorus ludovicianus</i>	G5	S3S4			H		A									1
House Wren	<i>Troglodytes aedon</i>	G5	S5B,SZN					FY	2	2	2	3	4	7	3	3	
Winter Wren	<i>Troglodytes troglodytes</i>	G5	S5B,SZN			h	X	S								1	
Golden-crowned Kinglet	<i>Regulus satrapa</i>	G5	S5B,SZN			H		P									
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	G5	S4B,SZN			h	X	FY			1		2	6			
Wood Thrush	<i>Hylocichla mustelina</i>	G5	S5B,SZN					T					3	4	1		
Veery	<i>Catharus fuscescens</i>	G5	S4B,SZN				X	S						3			
American Robin	<i>Turdus migratorius</i>	G5	S5B,SZN					FY	4	5	6	4	9	9	5	9	4
Eastern Bluebird	<i>Sialia sialis</i>	G5	S4S5B,SZN			h		S						1			
Northern Mockingbird	<i>Mimus polyglottos</i>	G5	S4B,SZN			h		S		1							
Gray Catbird	<i>Dumetella carolinensis</i>	G5	S5B,SZN					FY	6	7	2	3	5	14	2		5
Brown Thrasher	<i>Toxostoma rufum</i>	G5	S5B,SZN			h		FY	3	6	3	2	2	4			
European Starling	<i>Sturnus vulgaris</i>	G5	SE					FY		12	6	8	8	10	6		
Cedar Waxwing	<i>Bombycilla cedrorum</i>	G5	S5B,SZN					FY	2	6	2	2	2	15	4	2	4
Black-and-white Warbler	<i>Mniotilta varia</i>	G5	S5B,SZN			h	X	S									
Blue-winged Warbler	<i>Vermivora pinus</i>	G5	S4B,SZN			h		T		1	1	1	2	8			
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	G4	S4B,SZN	THR		H		T									
Nashville Warbler	<i>Vermivora ruficapilla</i>	G5	S5B,SZN			h		S									
Yellow Warbler	<i>Dendroica petechia</i>	G5	S5B,SZN					FY	4	9	2	3	4		2	2	4
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	G5	S5B,SZN			h		T									
Pine Warbler	<i>Dendroica pinus</i>	G5	S5B,SZN			h	X	P					1				
Ovenbird	<i>Seiurus aurocapillus</i>	G5	S5B,SZN				X	A						7			
Northern Waterthrush	<i>Seiurus noveboracensis</i>	G5	S5B,SZN					T					2	1			
Louisiana Waterthrush	<i>Seiurus motacilla</i>	G5	S3B,SZN	SC	SC	H		A								1	
Mourning Warbler	<i>Oporornis philadelphia</i>	G5	S5B,SZN			h		T							1		
Common Yellowthroat	<i>Geothlypis trichas</i>	G5	S5B,SZN					FY	2	4	1		6	4	2	2	1
American Redstart	<i>Setophaga ruticilla</i>	G5	S5B,SZN			h	X	T						4			
Scarlet Tanager	<i>Piranga olivacea</i>	G5	S5B,SZN			h	X	T					1	2			
Vesper Sparrow	<i>Poocetes gramineus</i>	G5	S4B,SZN			h		T	1	1							
Savannah Sparrow	<i>Passerculus sandwichensis</i>	G5	S5B,SZN				X	FY	7	9	6	6	2	2			
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	G5	S4B,SZN			h	X	T			2	2					
White-throated Sparrow	<i>Zonotrichia albicollis</i>	G5	S5B,SZN			h		S						2			
Chipping Sparrow	<i>Spizella passerina</i>	G5	S5B,SZN					FY			1	2	2	6			1
Clay-colored Sparrow	<i>Spizella pallida</i>	G5	S4B,SZN			H		T									
Field Sparrow	<i>Spizella pusilla</i>	G5	S5B,SZN					FY	5	5	4		3	17		2	
Song Sparrow	<i>Melospiza melodia</i>	G5	S5B,SZN					FY	4	6	7	9	11	11	6	4	10
Swamp Sparrow	<i>Melospiza georgiana</i>	G5	S5B,SZN					T					3	5			
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	G5	S4B,SZN			h		T			1	2	3	5			
Northern Cardinal	<i>Cardinalis cardinalis</i>	G5	S5					FY			2	1	7	6	1	5	
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	G5	S5B,SZN					FY					8	4			
Indigo Bunting	<i>Passerina cyanea</i>	G5	S5B,SZN					FY			2		3	5	3	2	2
Bobolink	<i>Dolichonyx oryzivorus</i>	G5	S4B,SZN					T			6	2	4				
Brown-headed Cowbird	<i>Molothrus ater</i>	G5	S5B,SZN					FY	3	4	3	1		5	2		
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	G5	S5B,SZN					FY	8	12	4	8	8	21	2		16
Eastern Meadowlark	<i>Sturnella magna</i>	G5	S5B,SZN					T	1	1	1	1	1				

**Table 3a Breeding Bird Survey 2006
Mid-Spencer Creek/Greenville**

										Unit 1		Unit 2		Unit 3		Unit 4	Unit 5	Unit 6
Common Name	Scientific Name	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	Hamilton Region Significance ⁵	MNR Area Sensitive ⁶	Highest Breeding Evidence ⁷	May 17	June 6	May 19	June 6	May 19	June 20	July 31	July 31	July 31	
Orchard Oriole	<i>Icterus spurius</i>	G5	SZB,SZN			h		S										
Baltimore Oriole	<i>Icterus galbula</i>	G5	S5B,SZN					FY		2	1	1	5	4	1	1	2	
Common Grackle	<i>Quiscalus quiscula</i>	G5	S5B,SZN					FY	10	15		10	12	18	4	6		
House Finch	<i>Carpodacus mexicanus</i>	G5	SE					T			2		2				2	
American Goldfinch	<i>Carduelis tristis</i>	G5	S5B,SZN					FY	6	10	8	6	7	10	4	3		
House Sparrow	<i>Passer domesticus</i>	G5	SE					FY			2	4					2	
Totals:	100		5 (>S4)	3	2	47	17		22	30	37	28	54	47	24	29	18	

**Table 3a Breeding Bird Survey 2006
Mid-Spencer Creek/Greenville**

Common Name	Unit 7	Unit 7	Unit 8a	Unit 8b	Unit 9		Unit 10		Unit 11	Unit 12	Unit 13	Unit 14	Unit 15		Unit 16		Unit 17	
	May 19	July 13	July 13	July 13	May 17	June 22	May 17	June 22	June 22	June 22	June 22	June 22	May 17	July 31	May 17	June 6	May 17	July 13
Mallard																		
Wood Duck																		
Canada Goose																		
Ruffed Grouse																		
Wild Turkey		12																
Green Heron																		
Great Blue Heron	1	1						1										
Black-crowned Night-heron																		
Turkey Vulture			1			3			1				2					1
Cooper's Hawk												1	1					
Red-tailed Hawk	1	1																
Killdeer														1				
American Woodcock	1												1					
Spotted Sandpiper																		
Ring-billed Gull																		
Rock Dove																		
Mourning Dove	2	2						2	2		1	2	2	4	3			
Yellow-billed Cuckoo						1					1							
Black-billed Cuckoo										1								
Great Horned Owl																		
Chimney Swift								6										
Ruby-throated Hummingbird									1									
Belted Kingfisher														1				
Hairy Woodpecker		1							1									
Downy Woodpecker	2		1		1	1			1					2				
Pileated Woodpecker					1	2												
Red-headed Woodpecker																		
Red-bellied Woodpecker						2												
Northern Flicker	2	4						1	1			2	1	3	1	2		
Eastern Kingbird	1	2												2	2	2	1	1
Great Crested Flycatcher	1				2	2				1	1	1						
Eastern Phoebe																		
Eastern Wood-pewee		1			2	2				1								
Willow Flycatcher	4	2	2				1	2						2	5	4		
Alder Flycatcher																		
Least Flycatcher																		
Red-eyed Vireo	1	2		5	4	5	2	2	2		1	1				2		
Warbling Vireo	1							1			1	2		1				
Blue Jay	2	4	2	4	4	4			1	1	4	2		3				
American Crow	2	2				6	1	4	5			1		5				
Homed Lark														1				
Cliff Swallow																	2	6
Barn Swallow	4					12		10					8	10		12		
Tree Swallow						10		16					4					
Northern Rough-winged Swallow																6		
Tufted Titmouse									1									
Black-capped Chickadee	5	1	2	4	4	8	2	6	3	1	2			6				

**Table 3a Breeding Bird Survey 2006
Mid-Spencer Creek/Greenville**

Common Name	Unit 7	Unit 7	Unit 8a	Unit 8b	Unit 9		Unit 10		Unit 11	Unit 12	Unit 13	Unit 14	Unit 15		Unit 16		Unit 17	
	May 19	July 13	July 13	July 13	May 17	June 22	May 17	June 22	June 22	June 22	June 22	June 22	May 17	July 31	May 17	June 6	May 17	July 13
White-breasted Nuthatch	1				1	1			1									
Red-breasted Nuthatch																		
Carolina Wren									1									
House Wren	3	2	2	2	2	3	2	3	2	1		2	1	5			2	1
Winter Wren																		
Golden-crowned Kinglet																		
Blue-gray Gnatcatcher	1				1	1												
Wood Thrush				2	2	4			1									
Veery																		
American Robin	6	10	4	6	4	6	3	6	4	2	2	4	10	11	6	7		
Eastern Bluebird																		
Northern Mockingbird																		
Gray Catbird	4	5	2	3	2	4	4	5	4		4	3	2	4	3	3	2	2
Brown Thrasher	1						1	1							2	3		
European Starling	2	11	9					4	4		10	5			4	4		
Cedar Waxwing	5	3	4	4		3	2	4	5		2	1		6				
Black-and-white Warbler																		
Blue-winged Warbler	1					2	1	1										
Golden-winged Warbler																		
Nashville Warbler																		
Yellow Warbler	7	5	2		2	3	2	5			1	4	5	5	3	5	2	2
Chestnut-sided Warbler					2	5												
Pine Warbler						1			1									
Ovenbird																		
Northern Waterthrush																		
Louisiana Waterthrush																		
Mourning Warbler				1		1												
Common Yellowthroat	3	4	2				1	2	2				2	1				
American Redstart					1	3												
Scarlet Tanager					1	1			1									
Vesper Sparrow																		
Savannah Sparrow	2													4			2	1
Grasshopper Sparrow																	1	1
White-throated Sparrow																		
Chipping Sparrow						2		2	2	1				2	4	2		
Clay-colored Sparrow															6	7		1
Field Sparrow	3	9							2					2	6	6	4	5
Song Sparrow	7	5	5		2	2	4	8	4	2	3	7	5	13	5	4		
Swamp Sparrow	3	5											1	1				
Eastern Towhee	1	1			1	1									2	1		
Northern Cardinal	2	4		2	2	3	2	2	2	2	2	4	1	4	2	2		
Rose-breasted Grosbeak	2			2	2	4	1	2			1	1		2				
Indigo Bunting	1		1	2	2	4	2	2	3	1			1	3				
Bobolink															4			
Brown-headed Cowbird		3				4			1		2		4	3	2	3		
Red-winged Blackbird	14	16	10		2	6	9	18	4			10	8	14	6	12		
Eastern Meadowlark														2			1	1

**Table 3a Breeding Bird Survey 2006
Mid-Spencer Creek/Greenville**

	Unit 7		Unit 8a	Unit 8b	Unit 9		Unit 10		Unit 11	Unit 12	Unit 13	Unit 14	Unit 15		Unit 16		Unit 17	
	May 19	July 13	July 13	July 13	May 17	June 22	May 17	June 22	June 22	June 22	June 22	June 22	May 17	July 31	May 17	June 6	May 17	July 13
Common Name																		
Orchard Oriole	1											1						
Baltimore Oriole	2		1		2	3	2	2	2	1	2	3	5	2				
Common Grackle					5	2	14	22	2	2	2	15	6	15			4	4
House Finch							1	2	2					2				
American Goldfinch	4	5	6		4	10	2	4	6	3	6	5	4	10	1	4		
House Sparrow		2							2	2	2							2
Totals:	38	29	17	12	26	38	21	31	34	15	20	22	21	34	19	20	10	13

**Table 3a Breeding Bird Survey 2006
Mid-Spencer Creek/Greenville**

Common Name	Unit 18		Unit 19	Unit 20		Unit 21	Unit 22	Unit 23	Unit 24	Unit 25	Unit 26 (Spencer Gorge)	Unit 27	Unit 28 Hayesland Swamp		Unit 29 (Christie CA)	Unit 30 (Escarpment East)	Unit 31 Crooks Hollow
	May 17	July 13	June 20	May 19	June 6	June 6	June 6	July 13	June 20	July 13	May 24	July 31	May 17	June 1	June 1	July 31	July 31
Mallard									2					2			
Wood Duck									2	18			3				
Canada Goose														2	9		
Ruffed Grouse																	
Wild Turkey				1	1							1					
Green Heron									1	2							1
Great Blue Heron									2	4			1				2
Black-crowned Night-heron										1							
Turkey Vulture	1	1		4					3		16						
Cooper's Hawk															1		
Red-tailed Hawk				2				1		1	2		1				2
Killdeer					1												
American Woodcock						3											
Spotted Sandpiper															2		1
Ring-billed Gull									15								
Rock Dove										2							
Mourning Dove	2	2	2	4	4		1			5			2	1			
Yellow-billed Cuckoo					3		2		1				1	1	1		
Black-billed Cuckoo				1											1		
Great Horned Owl								1									
Chimney Swift															4		1
Ruby-throated Hummingbird				1										3	1		
Belted Kingfisher										1			1				1
Hairy Woodpecker				1				2			1						
Downy Woodpecker		1		3					1	1		1	1				2
Pileated Woodpecker																	
Red-headed Woodpecker																	
Red-bellied Woodpecker								1			1		1		1		1
Northern Flicker		1		2	2			1	1	2			2				1
Eastern Kingbird	1	1		2	1					1				1	2		1
Great Crested Flycatcher		1		1	2						5		1		2		
Eastern Phoebe			1						1		3						
Eastern Wood-pewee							1	3	1		4		2	2	3		1
Willow Flycatcher			2	6	2			1					1		2		
Alder Flycatcher				1	1												
Least Flycatcher			1														
Red-eyed Vireo		1		3	3	3	5	8	4		19	2	3	3	9	1	1
Warbling Vireo			2	2						2			1				1
Blue Jay		1		4		2	2	3	5		15					1	
American Crow				4		4	6		10	3	4	5			6		
Homed Lark	2	2		1						1							
Cliff Swallow		6		6					8								
Barn Swallow				2	6				16	10	8						
Tree Swallow			4						4	4			6				
Northern Rough-winged Swallow			4	3					4		26			4	8	1	
Tufted Titmouse																	
Black-capped Chickadee				11	4	2	4	4	15	4	24	4	3		6	2	6

**Table 3a Breeding Bird Survey 2006
Mid-Spencer Creek/Greenville**

Common Name	Unit 18		Unit 19	Unit 20		Unit 21	Unit 22	Unit 23	Unit 24	Unit 25	Unit 26 (Spencer Gorge)	Unit 27	Unit 28 Hayesland Swamp		Unit 29 (Christie CA)	Unit 30 (Escarpment East)	Unit 31 Crooks Hollow
	May 17	July 13	June 20	May 19	June 6	June 6	June 6	July 13	June 20	July 13	May 24	July 31	May 17	June 1	June 1	July 31	July 31
White-breasted Nuthatch				2				1			2		1		2		3
Red-breasted Nuthatch															2		
Carolina Wren											1						2
House Wren	1	2	4	5		2	2	8	3			1	1	2	2		
Winter Wren																	
Golden-crowned Kinglet																	2
Blue-gray Gnatcatcher			1										2	1			1
Wood Thrush				2		2		3			3		1	2	3		
Veery											1						
American Robin	3	3	5	13	6	6	4	5	8	1	18		4	3	7	5	8
Eastern Bluebird											1						
Northern Mockingbird																	
Gray Catbird	1	3	2	7	9	7	3	3	11	4	7				5		5
Brown Thrasher				3	7	4	3										
European Starling		4	6	8		10		15		18							
Cedar Waxwing		2		12	10	18	4		10	4	7		2		10		7
Black-and-white Warbler					1	1											
Blue-winged Warbler				6	7	3	2										
Golden-winged Warbler				1	1												
Nashville Warbler				1													
Yellow Warbler			3	15	9	2			4	2		1	4	2	5		2
Chestnut-sided Warbler					1				1		6				4		
Pine Warbler				2			1								3		
Ovenbird						1					2						
Northern Waterthrush													1	1			
Louisiana Waterthrush											3						
Mourning Warbler											2		1	1	1		
Common Yellowthroat			3	3	1			5	3	3	4		3	3	7		2
American Redstart						4					13			2			
Scarlet Tanager											9				1		
Vesper Sparrow																	
Savannah Sparrow				6	4	2				3							
Grasshopper Sparrow		1		2	3												
White-throated Sparrow																	
Chipping Sparrow	2	2		4				2	2		2	5		1			
Clay-colored Sparrow				1	2												
Field Sparrow	3	5		8	5	4	2										
Song Sparrow			5	12	11	6		7		10	4		3	2			5
Swamp Sparrow			2	2					3	3			1	2			3
Eastern Towhee				2	6	3	1										
Northern Cardinal	2	2		4	4	3	2	3	4	1	15	3	2		5	2	
Rose-breasted Grosbeak			1	3	2	4		4	4		23		2	1	7		
Indigo Bunting				5	2	1		3	3	2	11	1	1		5	1	
Bobolink				10					2								
Brown-headed Cowbird		1		7	5		2				4	1	3	1			
Red-winged Blackbird			15	23	21	14	18		36	25	9		11	6			
Eastern Meadowlark				2													

**Table 3a Breeding Bird Survey 2006
Mid-Spencer Creek/Greenville**

	Unit 18		Unit 19	Unit 20		Unit 21	Unit 22	Unit 23	Unit 24	Unit 25	Unit 26 (Spencer Gorge)	Unit 27	Unit 28 Hayesland Swamp		Unit 29 (Christie CA)	Unit 30 (Escarpment East)	Unit 31 Crooks Hollow
	May 17	July 13	June 20	May 19	June 6	June 6	June 6	July 13	June 20	July 13	May 24	July 31	May 17	June 1	June 1	July 31	July 31
Common Name																	
Orchard Oriole																	
Baltimore Oriole			1	4			2		3		32		1	1	9		1
Common Grackle	4	6	10	9		4	5	10			10	2	14				7
House Finch								2									
American Goldfinch	2	4		14	6	8	4		6	4	21	2	3		15	2	
House Sparrow																	
Totals:	12	22	20	54	34	27	22	24	35	30	38	13	36	25	34	8	27

Legend

See Figure 2 for location of survey units.

Breeding bird surveys were conducted for the study area in 2006 on May 17, May 19, May 24, June 1, June 6, June 20, June 22, July 13 and July 31.

¹G-rank

Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.

G1 Extremely rare - usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

G2 Very rare - usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.

G3 Rare to uncommon - usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.

G4 Common - usually more than 100 occurrences; usually not susceptible to immediate threats.

G5 Very common - demonstrably secure under present conditions.

²S-Rank

(ranks from NHIC, January 2006)

Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

S1 Critically Imperiled - Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure - Common, widespread, and abundant in the nation or state/province.

S#S# Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

SAN Non-breeding accidental; SE Exotic - not believed to be a native component of Ontario's fauna; SZN Non-breeding migrants/vagrants; SZB Breeding migrants/vagrants.

³COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

(federal status from COSEWIC November 2006)

EXT Extinct - A species that no longer exists.

EXP Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.

END Endangered - A species facing imminent extirpation or extinction.

THR Threatened - A species likely to become endangered if limiting factors are not reversed.

SC Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

NAR Not At Risk - A species that has been evaluated and found to be not at risk of extinction given the current circumstances.

DD Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

* - Species on Schedule 1 of Species At Risk Act (SARA)

⁴MNR (Ministry of Natural Resources)

(provincial status from MNR June 2006)

The provincial review process is implemented by the MNR's Committee on the Status of Species at Risk in Ontario (COSSARO).

EXT Extinct - A species that no longer exists anywhere.

EXP Extirpated - A species that no longer exists in the wild in Ontario but still occurs elsewhere.

END-R Endangered (Regulated) - A species facing imminent extinction or extirpation in Ontario which has been regulated under Ontario's Endangered Species Act (ESA).

END Endangered (Not Regulated) - A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA.

THR Threatened - A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.

SC Special Concern (formerly Vulnerable) - A species with characteristics that make it sensitive to human activities or natural events.

NAR Not at Risk - A species that has been evaluated and found to be not at risk.

DD Data Deficient (formerly Indeterminate) - A species for which there is insufficient information for a provincial status recommendation.

⁵MNR Significant Wildlife Habitat Technical Guide Area Sensitive Species

Area Sensitivity is defined as species requiring large areas of suitable habitat in order to sustain population numbers

From: Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section. Science Development and Transfer Branch, Southcentral Science Section. 151pp. + appendices.

⁶Hamilton Region Nature Counts Significance Rating

Based on a number of local sources (Natural Areas Inventory for Hamilton (2000), Nature Counts (2001-2002), Hamilton Naturalists' Club Records, etc.) NHIC, and OBBA counts.

h = Uncommon (21-200 breeding pairs in the City of Hamilton); H = Rare (1-20 breeding pairs in the City of Hamilton)

⁷Highest Breeding Evidence

Ontario Breeding Bird Atlas - Breeding Evidence Codes

Observed

X Species observed in its breeding season (no breeding evidence).

Possible

H Species observed in its breeding season in suitable nesting habitat; S Singing male(s) present, or breeding calls heard, in suitable nesting habitat in breeding season.

Probable

P Pair observed in suitable nesting habitat in nesting season; T Permanent territory presumed through registration of territorial behaviour (song, etc.) on at least two days, a week or more apart, at the same place; D Courtship or display, including interaction between a male and a female or two males, including courtship feeding or copulation; V Visiting probable nest site; A Agitated behaviour or anxiety calls of an adult; B Brood Patch on adult female or cloacal protuberance on adult male; N Nest-building or excavation of nest hole.

Confirmed

DD Distraction display or injury feigning; NU Used nest or egg shells found (occupied or laid within the period of the survey); FY Recently fledged young (nidicolous species) or downy young (nidifugous species), including incapable of sustained flight; AE Adult leaving or entering nest sites in circumstances indicating occupied nest; FS Adult carrying fecal sac; CF Adult carrying food for young; NE Nest containing eggs; NY Nest with young seen or heard.

Species of Conservation Concern

Existing background information included NHIC records of several bird species at risk within or in the vicinity of the study area including Acadian Flycatcher (*Empidonax virescens*), Cerulean Warbler (*Dendroica cerulea*) and Louisiana Waterthrush (*Seiurus motacilla*). In addition, the reconnaissance site visit revealed potential for additional species at risk and / or other species of conservation concern, including Henslow's Sparrow (*Ammodramus henslowii*), Barn Owl (*Tyto alba*), Northern Bobwhite (*Colinus virginianus*), Golden-winged Warbler (*Vermivora chrysoptera*), Yellow-breasted Chat (*Icteria virens*), Loggerhead Shrike (*Lanius ludovicianus*) and Red-headed Woodpecker (*Melanerpes erythrocephalus*).

Most of these species could reasonably be identified during field visits conducted for the breeding bird and migrant bird survey program. However, to more thoroughly assess breeding potential, specific targeted surveys and additional surveys were identified for two species: Louisiana Waterthrush and Barn Owl. For Louisiana Waterthrush, earlier visits were conducted in suitable habitat using taped playback calls to elicit response. As noted above, where potential Barn Owl habitat was noted, a more focused search was conducted.

2.2.3 Other

Specific inventories and surveys were not conducted for other fauna groups (e.g. reptiles, mammals, butterflies, odonata) but any incidental observations and evidence of other wildlife made during all field surveys were recorded (e.g. tracks, scat, browse, nests etc.). In particular, numerous incidental butterfly and odonata observations were made between April 27 and July 31, 2006 during the migrant and breeding bird surveys. These incidental observations are shown in Table 5 and summarized in Section 4.3. Observations are keyed to the same Wildlife Survey Units used for the bird surveys.

3.0 Background Information Summary

As outlined in Section 2.1, several background information sources were reviewed prior to conducting the faunal inventories.

The Nature Counts Project Hamilton Natural Areas Inventory (2003) was used to obtain detailed information on ESAs within the study area: Spencer Gorge (ESA 30), Christie Stream Valley (ESA 31), Donald Farm Complex (ESA 29), Hayesland Alvar, part of Hayesland Swamp (ESA 13), and part of Dundas Valley (ESA 41). The Nature Counts Project incorporates the 1991 *Natural Areas Inventory* (NAI; Heagy 1995) and the *Hamilton Herpetofaunal Atlas* (HHA; 1983-1992). Regional significance for breeding birds, butterflies and herpetofauna was also provided. The table below outlines a summary of the Nature Counts (2003) fauna field results.

Nature Counts (2003) Summary of Fauna Field Results

ESA Name No.	Herpetofauna Significant Species noted (year)	Birds Significant Species noted (most recent year)
Spencer Gorge ESA 30	Adequate coverage during HHA work noted within the 2002 report, but Heagey notes HHA inadequate (1994) Milksnake (1987)	Inadequate coverage (1 visit) Louisiana Waterthrush (1991), Yellow-rumped Warbler (2001)
Hayesland Swamp ESA 13 <i>note: ESA covers much larger area outside the current subwatershed study area</i>	Adequate coverage during HHA (2002)	Adequate coverage where access granted Least Bittern (2002), Acadian Flycatcher (1976) + many more
Christie Stream Valley ESA 31	Adequate coverage during HHA (2002) Milksnake (1989)	Adequate coverage where access was granted. Christie reservoir only occasionally used by migrating waterfowl, but exposed mud used by migrating shorebirds. Common Snipe (2001)
Donald Farm Complex ESA 29	Inadequate coverage	Adequate coverage Blue-winged Teal (2002), Cooper's Hawk (1997-1999), Hooded Merganser (1996), Sharp-shinned Hawk (1991), Upland Sandpiper (1991), Saw-whet Owl (pre-1970s)

ESA Name No.	Herpetofauna Significant Species noted (year)	Birds Significant Species noted (most recent year)
Hayesland Alvar ESA 28	Adequate coverage (Hamilton Herpetofauna Atlas-HHP)	Adequate coverage Sharp-shinned Hawk (1990), Clay-coloured Sparrow (1990, also noted from OBBA 17NH79 #27 2002)
Dundas Valley ESA 41 <i>note: ESA covers larger area south of the current subwatershed study area</i>	Adequate coverage on CA lands, private lands not surveyed	Adequate coverage on CA lands, private lands not surveyed (but portion of ESA in the study area is Conservation Authority land) Acadian Flycatcher (2002), Hooded Warbler (2002), Cerulean Warbler (1990), Louisiana Waterthrush (1993) + many more

The NHIC online mapping tool was used to identify additional designated areas in the study area. Two of the ESAs listed in the table above also have a MNR designation: Hayesland - Christie Wetland Complex (1473 ha Provincially Significant Wetland [PSW]) and Spencer Gorge (147 ha Provincially Significant Life Science Area of Natural and Scientific Interest [ANSI]). Spencer Gorge, Dundas Valley, and a portion of the Christie Stream Valley (Christie Lake reservoir) are also Conservation Areas owned by Hamilton Region Conservation Authority.

The Ontario Breeding Bird Atlas (OBBA) online mapping and database were reviewed for the atlas squares that overlapped with the study area (squares 17NH79 and 17NH89). The OBBA 10 km squares cover additional area beyond the Mid-Spencer Creek / Greensville RSA study area, including Cootes Paradise and Hamilton Harbour areas. Hence, data from the squares does not necessarily indicate occurrence in the study area, but the information does provide a broader context for field surveys, including a sense of what common breeding bird species could be expected in the general area, as well as potential rare species. In addition to OBBA square summaries, detailed information for 15 OBBA point counts found within study area were provided by Bird Studies Canada. Four of these point counts corresponded to wildlife habitat units surveyed by Ecoplans. The OBBA point count information indicated no federally or provincially designated (COSEWIC or MNR) or provincially rare (S-rank) species and 19 regionally rare bird observations (for 11 bird species). This information is discussed further in Section 4.2.2, as it relates to results from the Ecoplans breeding bird survey.

The NHIC online database was used to review the potential for, and approximate locations of, any rare fauna species known for the study area. Several rare species Element Occurrence (EO) 1 km squares appear within the study area and include:

- ≠ Eastern Amberwing (*Perithemis tenera*); provincial rarity rank of S3 (vulnerable, NHIC); date of observation 2002.

- ≠ Louisiana Waterthrush; designated Special Concern (COSEWIC, MNR), provincial rarity rank of S3 (vulnerable, NHIC); date of observation 1991.
- ≠ Sensitive Species; dates of observation 1987 and 1989.

Additional EO squares in the vicinity of the Mid-Spencer Creek watershed include:

- ≠ Cerulean Warbler; designated Special Concern (COSEWIC, MNR); provincial rarity rank of S3 (vulnerable, NHIC); dates of observation 1990 and 1994.
- ≠ Acadian Flycatcher; designated Threatened (COSEWIC, MNR); provincial rarity rank of S2 (imperilled, NHIC); date of observation 1984.

Attempts to obtain rare fauna species information from the City of Hamilton, OBBA, and MNR were made, with the intent to use the data to help focus and prioritize field surveys. Information was provided by the City of Hamilton (*Natural Heritage System Mapping Rare Species Located in Greensville Requested Area 2006*) for regionally significant species (no provincially or nationally rare species records were provided), with approximate locations (no UTM coordinates) provided. 12 regionally uncommon¹ bird species and 7 regionally uncommon² butterfly species were noted. This information is discussed further in Section 4.2.2, as it relates to results from the Ecoplans breeding bird survey.

Additional significant species information from the OBBA and MNR was either not released, not available, too general to be utilized in focusing the faunal surveys, or included species outside the study area. Further attempts to obtain rare species locations in the study area were not made, as information could no longer be obtained in a manner timely to the field surveys. Rare or at-risk species locations are not mapped due to the sensitivity of the information.

¹ Bird Regionally Rare: 1-20 breeding pairs; Bird Regionally Uncommon: 21-200 breeding pairs (*City of Hamilton Nature Counts Project Dwyer et. al. 2003*)

² Butterfly Regionally Rare: known from 10 or less stations; Butterfly Regionally Uncommon: known from 11-30 stations (*City of Hamilton Nature Counts Project Dwyer et. al. 2003*)

4.0 Summary of Field Survey Results

The results of the faunal inventories are presented in Tables 1 to 5 and summarized below.

4.1 Amphibians

Originally, 62 Call Stations were established for surveying amphibians in the Mid-Spencer Creek / Greensville study area (see Figure 1 and Table 1). Five stations were either eliminated or only surveyed during the first round, because suitable amphibian habitat was not present, or background noise was too loud to properly conduct the survey.

In total, eight (8) species of amphibian were heard over the three rounds (April, May, June) of the amphibian call surveys in 2006: American Toad (*Bufo americanus*), Gray Treefrog (*Hyla versicolor*), Spring Peeper (*Pseudacris crucifer*), Chorus Frog (*Pseudacris maculata*), Bullfrog (*Rana catesbeiana*), Green Frog (*Rana clamitans*), Northern Leopard Frog (*Rana pipiens*) and Wood Frog (*Rana sylvatica*). All are common species typical of the various habitats found in the study area. No regionally or provincially rare species or federally or provincially designated species at risk were recorded.

Spring Peeper was the most commonly encountered species (recorded at 43 Call Stations, or 73% of the stations surveyed) and often at Call Level 3, indicating a high abundance. American Toad was also commonly encountered (recorded at 42 Call Stations [71%]) but at a lower abundance, with Call Level 2 being the highest recorded abundance. Grey Treefrog was recorded at 25 Call Stations, Green Frog at 18 stations, and Northern Leopard Frog at 15 stations. Bullfrog, Wood Frog and Chorus Frog were found at very few Call Stations (4, 2 and 1 respectively). Bullfrog and Wood Frog were also recorded at very low abundance levels (Level 1 – a few individuals). This is likely due to timing of surveys (generally later than most Wood Frog calling) and because of limited habitat for Bullfrogs.

Call Station 13 (associated with Wildlife Survey Unit 27), had the greatest species diversity (6 species). Seven Amphibian Call Stations had the next highest species richness, with 5 species being recorded at each of Stations 10, 24, 25, 27, 31, 38 and 51. Four of these stations are also associated with a Wildlife Survey Unit: Call Station 13 (Wildlife Survey Unit 27), Station 13 (Unit 24), Station 27 (Unit 19) and Station 31 (Unit 2). Other Amphibian Call Stations were associated with farm ponds, drainage ditches or small watercourses in the study area.

Noteworthy stations include Station 4 (open water pond with very loud Gray Treefrog chorus) and Stations 13 and 14 (Christie Stream Valley), 34, 37/38, and DFC 1 and DFC 2 – with good diversity and abundance.

Three Call Stations (DF1, DF2 and 34) in the study area were “walk-ins” (i.e. not roadside). Generally few frogs were heard at them during the call surveys, but they provide good amphibian habitat as evidenced by the direct observation of several species at these stations. In particular,

numerous (potentially hundreds) of Northern Leopard Frogs were observed at Call Station 34 (Wildlife Unit 22) on June 22.

Greensville RSA

Seven of the Amphibian Call Stations were located within the Greensville Rural Settlement Area (Stations 1, 2, 48a, 48b, 48c, 55, 56) with a total of 4 amphibian species encountered (American Toad, Gray Treefrog, Spring Peeper, Green Frog). Spring Peeper was the most commonly noted species being found at 4 of the Call Stations in the Greensville RSA, including at a Call Level 3 at Station 48b. American Toad was found at 3 stations, with its highest abundance being recorded at 48c with a Call Level 3. Species richness across the stations in the Greensville RSA, was relatively low when compared with the large study area. Four of the stations had only one species recorded across all the survey dates, and 2 species were observed at the other 3 stations (Stations 48b, 55 and 56).

4.2 Birds

4.2.1 Migratory Birds

In spring 2006, 25 units were surveyed for migrant bird use on April 27 and May 10 (see Figure 2). Although Spencer Gorge (Unit 26) and Christie Lake Conservation Area (Unit 29) were not included in the migrant bird survey, a few additional species observed in these 2 units during the breeding bird surveys (on May 24 and June 1) were identified as late migrants and not breeding birds. They have been included in the migrant bird survey results and analysis.

A total of 94 species was observed during the migrant bird survey. Five units had greater than 20 bird species observed during migration. Unit 9 and 10 had the greatest number, with 36 and 34 species, respectively. Unit 15 had 28 species recorded, and Unit 11 and Unit 3 had 25 species each (see Table 2a).

Greensville RSA

Within the Greensville Rural Settlement Area, 64 species were observed during migrant bird survey (see Table 2b). This is approximately 68% of the species found in the total Mid-Spencer Creek study area during the migrant bird surveys. In total, 6 units were surveyed in the Greensville area (Units 10-15). Three of the units had greater than 20 species observed in them (Unit 10, 28, 11). The total number of species includes 3 species recorded only in Spencer Gorge, as late migrants on May 24; Black-throated Blue Warbler (*Dendroica caerulescens*), Blackpoll Warbler (*Dendroica striata*), and Blackburnian Warbler (*Dendroica fusca*).

4.2.2 Breeding Birds

The breeding bird inventory of the Mid-Spencer Creek / Greensville RSA study area was carried out over 9 days, from May 17 to July 31. Thirty-two units were surveyed at least once for breeding birds, with 12 units receiving a second visit at least 10 days apart from the first (as per

**Table 2b - Migrant Bird Survey 2006
Greenville Rural Settlement Area**

Common Name	Scientific Name	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	Unit 10	Unit 11	Unit 12	Unit 13	Unit 14	Unit 15	Unit 26 (Spencer Gorge)*
Herring Gull	<i>Larus argentatus</i>	G5	S5B,SZN								2	
Ring-billed Gull	<i>Larus delawarensis</i>	G5	S5B,SZN								4	
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	G5	S4B,SZN			18						
Mallard	<i>Anas platyrhynchos</i>	G5	S5B,SZN							2		
Wood Duck	<i>Aix sponsa</i>	G5	S5B,SZN							2		
American Woodcock	<i>Scolopax minor</i>	G5	S5B,SZN								3	
Solitary Sandpiper	<i>Tringa solitaria</i>	G5	S4B,SZN							1		
Killdeer	<i>Charadrius vociferus</i>	G5	S5B,SZN			1						
Rock Dove	<i>Columba livia</i>	G5	SE								1	
Mourning Dove	<i>Zenaida macroura</i>	G5	S5B,SZN			2					4	
Turkey Vulture	<i>Cathartes aura</i>	G5	S4B,SZN				1		1		1	
Hairy Woodpecker	<i>Picoides villosus</i>	G5	S5				1					
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	G5	S4			1						
Northern Flicker	<i>Colaptes auratus</i>	G5	S5B,SZN			4			1		1	
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	G5	S5B,SZN					1				
Eastern Phoebe	<i>Sayornis phoebe</i>	G5	S5B,SZN							1		
Least Flycatcher	<i>Empidonax minimus</i>	G5	S5B,SZN			2						
Horned Lark	<i>Eremophila alpestris</i>	G5	S5B,SZN			2						
Blue Jay	<i>Cyanocitta cristata</i>	G5	S5			5				2		
American Crow	<i>Corvus brachyrhynchos</i>	G5	S5B,SZN				2		1			
European Starling	<i>Sturnus vulgaris</i>	G5	SE			5		2				
Brown-headed Cowbird	<i>Molothrus ater</i>	G5	S5B,SZN			2	2	2			16	
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	G5	S5B,SZN			2	7		5	8	15	
Eastern Meadowlark	<i>Sturnella magna</i>	G5	S5B,SZN			1						
Orchard Oriole	<i>Icterus spurius</i>	G5	SZB,SZN								1	
Baltimore Oriole	<i>Icterus galbula</i>	G5	S5B,SZN			14	3	1	2	6	11	
Common Grackle	<i>Quiscalus quiscula</i>	G5	S5B,SZN			7	4		3	5	10	
House Finch	<i>Carpodacus mexicanus</i>	G5	SE			1	1					
American Goldfinch	<i>Carduelis tristis</i>	G5	S5B,SZN			16	7	3	4		8	
White-throated Sparrow	<i>Zonotrichia albicollis</i>	G5	S5B,SZN			2						
Chipping Sparrow	<i>Spizella passerina</i>	G5	S5B,SZN			1	1	1		1		
Field Sparrow	<i>Spizella pusilla</i>	G5	S5B,SZN				1					
Song Sparrow	<i>Melospiza melodia</i>	G5	S5B,SZN			7	5	1	2		7	
Swamp Sparrow	<i>Melospiza georgiana</i>	G5	S5B,SZN								1	
Northern Cardinal	<i>Cardinalis cardinalis</i>	G5	S5			6	3	1	2	2	4	

**Table 2b - Migrant Bird Survey 2006
Greenville Rural Settlement Area**

Common Name	Scientific Name	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	Unit 10	Unit 11	Unit 12	Unit 13	Unit 14	Unit 15	Unit 26 (Spencer Gorge)*
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	G5	S5B,SZN			1						
Indigo Bunting	<i>Passerina cyanea</i>	G5	S5B,SZN			1				1	1	
Scarlet Tanager	<i>Piranga olivacea</i>	G5	S5B,SZN				2				1	
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	G5	S5B,SZN								2	
Barn Swallow	<i>Hirundo rustica</i>	G5	S5B,SZN			2			1	3	4	
Tree Swallow	<i>Tachycineta bicolor</i>	G5	S5B,SZN								6	
Bank Swallow	<i>Riparia riparia</i>	G5	S5B,SZN			2						
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	G5	S5B,SZN							2		
Cedar Waxwing	<i>Bombycilla cedrorum</i>	G5	S5B,SZN			6						
Red-eyed Vireo	<i>Vireo olivaceus</i>	G5	S5B,SZN				1		1			
Warbling Vireo	<i>Vireo gilvus</i>	G5	S5B,SZN							1		
Nashville Warbler	<i>Vermivora ruficapilla</i>	G5	S5B,SZN				1				1	
Yellow Warbler	<i>Dendroica petechia</i>	G5	S5B,SZN			15	2		4	3	11	
Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	G5	S5B,SZN									2*
Yellow-rumped Warbler	<i>Dendroica coronata</i>	G5	S5B,SZN			8	3		1	13	5	5*
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	G5	S5B,SZN			2						
Blackpoll Warbler	<i>Dendroica striata</i>	G5	S4B,SZN									1*
Blackburnian Warbler	<i>Dendroica fusca</i>	G5	S5B,SZN									2*
Pine Warbler	<i>Dendroica pinus</i>	G5	S5B,SZN					1				
Common Yellowthroat	<i>Geothlypis trichas</i>	G5	S5B,SZN			4			1		2	
House Sparrow	<i>Passer domesticus</i>	G5	SE				2					
Northern Mockingbird	<i>Mimus polyglottos</i>	G5	S4B,SZN			1						
Gray Catbird	<i>Dumetella carolinensis</i>	G5	S5B,SZN			5	3			2	3	
Brown Thrasher	<i>Toxostoma rufum</i>	G5	S5B,SZN						1			
Carolina Wren	<i>Thryothorus ludovicianus</i>	G5	S3S4				1					
House Wren	<i>Troglodytes aedon</i>	G5	S5B,SZN			4	2	1	2		2	
White-breasted Nuthatch	<i>Sitta carolinensis</i>	G5	S5				1			1		
Black-capped Chickadee	<i>Poecile atricapillus</i>	G5	S5			2	5		2			
American Robin	<i>Turdus migratorius</i>	G5	S5B,SZN			4	2	2	2	2	14	
Totals		64		0	0	34	25	11	18	19	28	4

LEGEND

Migrant bird field survey dates: April 27 and May 10, 2006. See Figure 2 for location of survey units.

****Note: Spencer Gorge was not included in the migrant bird survey, but the annotated species were noted as late migrants (not breeding birds) during the breeding bird survey on May 24, 2006.**

¹G-rank

Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.

G1 Extremely rare - usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

G2 Very rare - usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.

G3 Rare to uncommon - usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.

G4 Common - usually more than 100 occurrences; usually not susceptible to immediate threats.

G5 Very common - demonstrably secure under present conditions.

²S-Rank

(ranks from NHIC, January 2006)

Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

S1 Critically Imperiled - Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure - Common, widespread, and abundant in the nation or state/province.

S#S# Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

SAN Non-breeding accidental.

SE Exotic - not believed to be a native component of Ontario's fauna.

SZN Non-breeding migrants/vagrants.

SZB Breeding migrants/vagrants.

³COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

(federal status from COSEWIC November 2006)

EXT Extinct - A species that no longer exists.

EXP Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.

END Endangered - A species facing imminent extirpation or extinction.

THR Threatened - A species likely to become endangered if limiting factors are not reversed.

SC Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

NAR Not At Risk - A species that has been evaluated and found to be not at risk of extinction given the current circumstances.

DD Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

* - Species on Schedule 1 of Species At Risk Act (SARA)

⁴MNR (Ministry of Natural Resources)

(provincial status from MNR June 2006)

The provincial review process is implemented by the MNR's Committee on the Status of Species at Risk in Ontario (COSSARO).

EXT Extinct - A species that no longer exists anywhere.

EXP Extirpated - A species that no longer exists in the wild in Ontario but still occurs elsewhere.

END-R Endangered (Regulated) - A species facing imminent extinction or extirpation in Ontario which has been regulated under Ontario's Endangered Species Act (ESA).

END Endangered (Not Regulated) - A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA.

THR Threatened - A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.

SC Special Concern (formerly Vulnerable) - A species with characteristics that make it sensitive to human activities or natural events.

NAR Not at Risk - A species that has been evaluated and found to be not at risk.

DD Data Deficient (formerly Indeterminate) - A species for which there is insufficient information for a provincial status recommendation.

⁵MNR Significant Wildlife Habitat Technical Guide Area Sensitive Species

Area Sensitivity is defined as species requiring large areas of suitable habitat in order to sustain population numbers

From: Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section. Science Development and Transfer Branch, Southcentral Science Section. 151pp. + appendices.

OBBA protocol). The units included the 25 surveyed during the migrant bird field work, plus 7 additional units. See Figure 2 for unit locations and Table 3a for survey results.

In total, 100 breeding bird species³ were observed during the breeding bird inventories. Unit 3 and Unit 20 had the highest species richness with 62 and 58 species respectively. Unit 7 and Unit 28 had the next highest with 43 species each. Richness in other units ranged from 8 to 40 species, but most had at least 20 species that exhibited some level of breeding evidence. There may be several reasons for the difference in species richness between units, including unit size, the habitat types present, the quality of habitat, and the diversity of habitat found within the unit.

In addition, breeding evidence of American Woodcock (*Scolopax minor*) was also observed during the amphibian call survey at 10 Call Stations (2, 7, 8, 9, 11, 12, 17, 22, 38, and 44) in the form of the male 'advertising flight'. Two of the Call Stations are also associated with Wildlife Survey Units; Call Station 2 (Wildlife Survey Unit 10 in the Greenville RSA); and Call Station 12, associated with Wildlife Survey Unit 7. The distinctive display flights predominantly occur at night (Ehrlich et. al. 1988) and this species breeds earlier than other avian species (as early as the beginning of April). The nest is often built within 90 metres (300 feet) of the display area (Ehrlich et. al. 1988).

Numerous significant species were observed during the breeding bird inventories in the Mid-Spencer Creek study area. Overall, 51 significant or notable breeding avian species were recorded, some with more than one status, and are outlined in Section 4.2.4 below.

Greenville RSA

Within the Greenville Rural Settlement Area, breeding bird inventories were carried out in seven units over five survey dates (see Figure 2 and Table 3b). Results are comparable with the broader study area in terms of diversity, abundance and rare species presence. However, the 'alvar-associated' species recorded in the broader study area were absent and there were relatively fewer forest associated species, and they were generally restricted to Spencer Gorge and the Unit 9 forest.

In total, 73 breeding bird species were observed. Two units (Unit 15 and Unit 26 Spencer Gorge) had the highest species richness in the Greenville area with 38 species each. Richness in other units ranged from 15 to 38 species, but many units had over 30 species that exhibited some level of breeding evidence. Although Unit 15 had a relatively high species richness, this is likely due to the diversity of old field and cultural wetland habitat. Many of the species observed in Unit 15 are common, tolerant species, such as Mourning Dove (*Zenaida macroura*), House Finch (*Carpodacus mexicanus*) and Yellow Warbler (*Dendroica petechia*).

³ 'Breeding Birds' defined as birds that exhibit some level of breeding evidence (from 'possible' to 'confirmed')

**Table 3b - Breeding Bird Survey 2006
Greensville Rural Settlement Area**

Common Name	Scientific Name	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	Hamilton Region Significance ⁵	MNR Area Sensitive ⁶	Unit 10		Unit 11	Unit 12	Unit 13	Unit 14	Unit 15		Unit 26 (Spencer Gorge)	Unit 31 Crooks Hollow
								May 17	June 22	June 22	June 22	June 22	June 22	May 17	July 31	May 24	July 31
Green Heron	<i>Butorides virescens</i>	G5	S4B,SZN			h											1
Great Blue Heron	<i>Ardea herodias</i>	G5	S5B,SZN			h		1									2
Turkey Vulture	<i>Cathartes aura</i>	G5	S4B,SZN			h			1					2		16	
Cooper's Hawk	<i>Accipiter cooperii</i>	G5	S4B,SZN			H	X					1	1				
Red-tailed Hawk	<i>Buteo jamaicensis</i>	G5	S5B,SZN			H										2	2
Killdeer	<i>Charadrius vociferus</i>	G5	S5B,SZN											1			
American Woodcock	<i>Scolopax minor</i>	G5	S5B,SZN										1				
Spotted Sandpiper	<i>Actitis macularia</i>	G5	S5B,SZN														1
Mourning Dove	<i>Zenaida macroura</i>	G5	S5B,SZN					2	2		1	2	2	4			
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	G5	S4B,SZN			H					1						
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	G5	S4B,SZN			h				1							
Chimney Swift	<i>Chaetura pelagica</i>	G5	S5B,SZN			h		6									1
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	G5	S5B,SZN			h			1								
Belted Kingfisher	<i>Ceryle alcyon</i>	G5	S5B,SZN			h								1			1
Hairy Woodpecker	<i>Picoides villosus</i>	G5	S5			h	X			1						1	
Downy Woodpecker	<i>Picoides pubescens</i>	G5	S5							1				2			2
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	G5	S4			h										1	1
Northern Flicker	<i>Colaptes auratus</i>	G5	S5B,SZN					1	1			2	1	3			1
Eastern Kingbird	<i>Tyrannus tyrannus</i>	G5	S5B,SZN											2			1
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	G5	S5B,SZN							1	1	1				5	
Eastern Phoebe	<i>Sayornis phoebe</i>	G5	S5B,SZN			h										3	
Eastern Wood-pewee	<i>Contopus virens</i>	G5	S5B,SZN							1						4	1
Willow Flycatcher	<i>Empidonax traillii</i>	G5	S5B,SZN					1	2					2			
Red-eyed Vireo	<i>Vireo olivaceus</i>	G5	S5B,SZN					2	2	2	1	1				19	1
Warbling Vireo	<i>Vireo gilvus</i>	G5	S5B,SZN						1		1	2		1			1
Blue Jay	<i>Cyanocitta cristata</i>	G5	S5							1	1	4	2	3		15	
American Crow	<i>Corvus brachyrhynchos</i>	G5	S5B,SZN					1	4	5			1	5		4	
Homed Lark	<i>Eremophila alpestris</i>	G5	S5B,SZN											1			
Barn Swallow	<i>Hirundo rustica</i>	G5	S5B,SZN						10					8	10	8	
Tree Swallow	<i>Tachycineta bicolor</i>	G5	S5B,SZN						16					4			
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	G5	S5B,SZN													26	
Tufted Titmouse	<i>Baeolophus bicolor</i>	G5	S2S3			H	X			1							
Black-capped Chickadee	<i>Poecile atricapillus</i>	G5	S5					2	6	3	1	2		6		24	6

**Table 3b - Breeding Bird Survey 2006
Greensville Rural Settlement Area**

Common Name	Scientific Name	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	Hamilton Region Significance ⁵	MNR Area Sensitive ⁶	Unit 10		Unit 11	Unit 12	Unit 13	Unit 14	Unit 15		Unit 26 (Spencer Gorge)	Unit 31 Crooks Hollow
								May 17	June 22	June 22	June 22	June 22	June 22	May 17	July 31	May 24	July 31
White-breasted Nuthatch	<i>Sitta carolinensis</i>	G5	S5				X			1						2	3
Carolina Wren	<i>Thryothorus ludovicianus</i>	G5	S3S4			H				1						1	2
House Wren	<i>Troglodytes aedon</i>	G5	S5B,SZN					2	3	2	1		2	1	5		
Golden-crowned Kinglet	<i>Regulus satrapa</i>	G5	S5B,SZN			H											2
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	G5	S4B,SZN			h	X										1
Wood Thrush	<i>Hylocichla mustelina</i>	G5	S5B,SZN							1						3	
Veery	<i>Catharus fuscescens</i>	G5	S4B,SZN				X									1	
American Robin	<i>Turdus migratorius</i>	G5	S5B,SZN					3	6	4	2	2	4	10	11	18	8
Eastern Bluebird	<i>Sialia sialis</i>	G5	S4S5B,SZN			h										1	
Gray Catbird	<i>Dumetella carolinensis</i>	G5	S5B,SZN					4	5	4		4	3	2	4	7	5
Brown Thrasher	<i>Toxostoma rufum</i>	G5	S5B,SZN			h		1	1								
European Starling	<i>Sturnus vulgaris</i>	G5	SE						4	4		10	5				
Cedar Waxwing	<i>Bombycilla cedrorum</i>	G5	S5B,SZN					2	4	5		2	1		6	7	7
Blue-winged Warbler	<i>Vermivora pinus</i>	G5	S4B,SZN			h		1	1								
Yellow Warbler	<i>Dendroica petechia</i>	G5	S5B,SZN					2	5			1	4	5	5		2
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	G5	S5B,SZN			h										6	
Pine Warbler	<i>Dendroica pinus</i>	G5	S5B,SZN			h	X			1							
Ovenbird	<i>Seiurus aurocapillus</i>	G5	S5B,SZN				X									2	
Louisiana Waterthrush	<i>Seiurus motacilla</i>	G5	S3B,SZN	SC	SC	H										3	
73	Totals:		3 (>S4)	1	1	27	11	21	31	34	15	20	22	21	34	38	27

Legend

See Figure 2 for location of survey units.

Breeding bird surveys were conducted in the Greensville settlement area in 2006 on May 17, May 24, June 22 and July 31.vey units.

¹G-rank

Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.

G1 Extremely rare - usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

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(ranks from NHIC, January 2006)

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S#S# Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

SAN Non-breeding accidental; SE Exotic - not believed to be a native component of Ontario's fauna; SZN Non-breeding migrants/vagrants; SZB Breeding migrants/vagrants.

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(federal status from COSEWIC November 2006)

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Area Sensitivity is defined as species requiring large areas of suitable habitat in order to sustain population numbers

From: Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section. Science Development and Transfer Branch, Southcentral Science Section. 151pp. + appendices.

⁶Hamilton Region Nature Counts Significance Rating

Based on a number of local sources (Natural Areas Inventory for Hamilton (2000), Nature Counts (2001-2002), Hamilton Naturalists' Club Records, etc.) NHIC, and OBBA counts.

h = Uncommon (21-200 breeding pairs in the City of Hamilton); H = Rare (1-20 breeding pairs in the City of Hamilton)

⁷Highest Breeding Evidence

Ontario Breeding Bird Atlas - Breeding Evidence Codes

Observed

X Species observed in its breeding season (no breeding evidence).

Possible

H Species observed in its breeding season in suitable nesting habitat; S Singing male(s) present, or breeding calls heard, in suitable nesting habitat in breeding season.

Probable

P Pair observed in suitable nesting habitat in nesting season; T Permanent territory presumed through registration of territorial behaviour (song, etc.) on at least two days, a week or more apart, at the same place; D Courtship or display, including interaction between a male and a female or two males, including courtship feeding or copulation; V Visiting probable nest site; A Agitated behaviour or anxiety calls of an adult; B Brood Patch on adult female or cloacal protuberance on adult male; N Nest-building or excavation of nest hole.

Confirmed

DD Distraction display or injury feigning; NU Used nest or egg shells found (occupied or laid within the period of the survey); FY Recently fledged young (nidicolous species) or downy young (nidifugous species), including incapable of sustained flight; AE Adult leaving or entering nest sites in circumstances indicating occupied nest; FS Adult carrying fecal sac; CF Adult carrying food for young; NE Nest containing eggs; NY Nest with young seen or heard.

In Unit 11 (cultural mosaic), Unit 26 (Spencer Gorge), and Unit 31 (Crooks Hollow), a number of notable species were observed during the breeding bird inventories. Overall, 30 significant breeding bird species were recorded in the Greensville RSA, some with multiple designations/status. Significant species are discussed in Section 4.2.4 below.

4.2.3 Owl Surveys

No owl species were heard during any amphibian monitoring on any of the April, May or June dates. No responses were elicited from taped playback attempts at two stations. Great-horned Owl was observed in three Wildlife Survey Units during the migrant and breeding bird surveys.

4.2.4 Significant Bird Species

Field Surveys – Study Area

A large number of significant breeding bird species was observed in the Mid-Spencer Creek / Greensville RSA study area. Overall, 51 notable breeding avian species were recorded, several of these with more than one status / designation. See Table 4 for a summary of the significant breeding avian species found in the study area.

Three COSEWIC designated species and 2 MNR designated species were found in the study area. Red-headed Woodpecker is designated *Special Concern* by COSEWIC and MNR. It was observed in Wildlife Survey Unit 3 with a breeding evidence of ‘possible’. The alvar areas, present throughout the study area, provide excellent habitat for this species. Golden-winged Warbler, designated *Threatened* by COSEWIC, was observed in Wildlife Survey Unit 20 on 2 separate dates, indicating a possible territory. The alvar areas provide ideal habitat for this species. Louisiana Waterthrush is designated by COSEWIC and MNR as *Special Concern*. Three birds were observed in Unit 26 (Spencer Gorge) and one bird was recorded in Unit 5. Although the birds present in Spencer Gorge would be expected, the male found in Unit 5 was in an unusual / atypical habitat and in an unexpected location. Records for Louisiana Waterthrush are also noted on the NHIC online mapping, generally associated with Spencer Gorge.

Forty-seven regionally (City of Hamilton) rare or uncommon⁴ breeding bird species were observed in the study area. Five of these species have been assigned a provincial rarity of S2 (imperiled) or S3 (vulnerable) by NHIC, due to a restricted range, relatively few populations, or other factors. Seventeen (17) species identified as “Area Sensitive” in the *Significant Wildlife Habitat Technical Guide* (OMNR 2000) were observed in the study area. These species are recognized as requiring large areas of suitable habitat (not necessarily limited to forest / woodland) in order to sustain a viable population.

⁴ Bird Regionally Rare: 1-20 breeding pairs; Bird Regionally Uncommon: 21-200 breeding pairs (*City of Hamilton Nature Counts Project* Dwyer et. al. 2003)

**Table 4 - Breeding Bird Survey Results 2006 - Significant Species
Mid-Spencer Creek/Greenville**

Common Name	Scientific Name	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	Hamilton Region Significance ⁵	MNR Area Sensitive ⁶	Highest Breeding Evidence ⁷	Total No. of Units Found In	Comments
Wood Duck	<i>Aix sponsa</i>	G5	S5B,SZN			h		FY	4	
Ruffed Grouse	<i>Bonasa umbellus</i>	G5	S5			h		H	1	
Green Heron	<i>Butorides virescens</i>	G5	S4B,SZN			h		H	3	
Great Blue Heron	<i>Ardea herodias</i>	G5	S5B,SZN			h		H	9	
Black-crowned Night-heron	<i>Nycticorax nycticorax</i>	G5	S3B,SZN			H		H	1	Although possibly nesting within the study area, most likely the record refers to a visitant or Hamilton (waterfront) area breeder.
Turkey Vulture	<i>Cathartes aura</i>	G5	S4B,SZN			h		X	9	
Cooper's Hawk	<i>Accipiter cooperii</i>	G5	S4B,SZN			H	X	A	3	
Red-tailed Hawk	<i>Buteo jamaicensis</i>	G5	S5B,SZN			H		FY	9	
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	G5	S4B,SZN			H		P	9	The species has periods of cyclical abundance. 2006 was an 'up' year for YBCU, accounting for the observation in a large number of units.
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	G5	S4B,SZN			h		S	5	
Great Horned Owl	<i>Bubo virginianus</i>	G5	S5			h		FY	3	
Chimney Swift	<i>Chaetura pelagica</i>	G5	S5B,SZN			h		X	3	
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	G5	S5B,SZN			h		T	5	
Belted Kingfisher	<i>Ceryle alcyon</i>	G5	S5B,SZN			h		H	4	
Hairy Woodpecker	<i>Picoides villosus</i>	G5	S5			h	X	P	7	
Pileated Woodpecker	<i>Dryocopus pileatus</i>	G5	S4S5			h	X	T	2	
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	G5	S3B,SZN	SC	SC	H		H	1	The alvar areas provide excellent habitat for this species a type which is uncommon in Ontario.
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	G5	S4			h		P	7	
Eastern Phoebe	<i>Sayornis phoebe</i>	G5	S5B,SZN			h		FY	3	
Alder Flycatcher	<i>Empidonax alnorum</i>	G5	S5B,SZN			h		T	2	
Least Flycatcher	<i>Empidonax minimus</i>	G5	S5B,SZN			h	X	H	1	
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	G5	S5B,SZN			h		T	4	
Tufted Titmouse	<i>Baeolophus bicolor</i>	G5	S2S3			H	X	S	1	Although breeding was not confirmed, the study area is within the species historic range, hence is expected for the area.
White-breasted Nuthatch	<i>Sitta carolinensis</i>	G5	S5				X	FY	12	
Red-breasted Nuthatch	<i>Sitta canadensis</i>	G5	S5B,SZN			h	X	P	1	
Carolina Wren	<i>Thryothorus ludovicianus</i>	G5	S3S4			H		A	4	Expected in the region.
Winter Wren	<i>Troglodytes troglodytes</i>	G5	S5B,SZN			h	X	S	1	
Golden-crowned Kinglet	<i>Regulus satrapa</i>	G5	S5B,SZN			H		P	1	Associated with conifer plantations, this species is expanding throughout SW Ont.
Blue-gray Gnatcatcher	<i>Poliptila caerulea</i>	G5	S4B,SZN			h	X	FY	7	
Veery	<i>Catharus fuscescens</i>	G5	S4B,SZN				X	S	2	
Eastern Bluebird	<i>Sialia sialis</i>	G5	S4S5B,SZN			h		S	2	
Northern Mockingbird	<i>Mimus polyglottos</i>	G5	S4B,SZN			h		S	1	
Brown Thrasher	<i>Toxostoma rufum</i>	G5	S5B,SZN			h		FY	9	
Black-and-white Warbler	<i>Mniotilta varia</i>	G5	S5B,SZN			h	X	S	2	

**Table 4 - Breeding Bird Survey Results 2006 - Significant Species
Mid-Spencer Creek/Greenville**

Common Name	Scientific Name	GRANK ¹	SRANK ²	COSEWIC ³	MNR ⁴	Hamilton Region Significance ⁵	MNR Area Sensitive ⁶	Highest Breeding Evidence ⁷	Total No. of Units Found In	Comments
Blue-winged Warbler	<i>Vermivora pinus</i>	G5	S4B,SZN			h		T	9	
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	G4	S4B,SZN	THR		H		T	1	The alvar areas, present throughout the study area, provides ideal habitat for this species.
Nashville Warbler	<i>Vermivora ruficapilla</i>	G5	S5B,SZN			h		S	1	
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	G5	S5B,SZN			h		T	5	
Pine Warbler	<i>Dendroica pinus</i>	G5	S5B,SZN			h	X	P	6	
Ovenbird	<i>Seiurus aurocapillus</i>	G5	S5B,SZN				X	A	3	
Louisiana Waterthrush	<i>Seiurus motacilla</i>	G5	S3B,SZN	SC	SC	H		A	2	Although the pairs present in Spencer Gorge would be expected, the male found in Unit 5 was in unusual / atypical habitat and in an unexpected location.
Mourning Warbler	<i>Oporornis philadelphia</i>	G5	S5B,SZN			h		T	6	
American Redstart	<i>Setophaga ruticilla</i>	G5	S5B,SZN			h	X	T	5	
Scarlet Tanager	<i>Piranga olivacea</i>	G5	S5B,SZN			h	X	T	5	
Vesper Sparrow	<i>Pooecetes gramineus</i>	G5	S4B,SZN			h		T	1	
Savannah Sparrow	<i>Passerculus sandwichensis</i>	G5	S5B,SZN				X	FY	9	
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	G5	S4B,SZN			h	X	T	4	
White-throated Sparrow	<i>Zonotrichia albicollis</i>	G5	S5B,SZN			h		S	1	
Clay-colored Sparrow	<i>Spizella pallida</i>	G5	S4B,SZN			H		T	3	The alvar areas provide ideal habitat for this species, as evidenced by the concentrations found in some Units. The scarcity of alvar habitat in SW Ont. makes the study area especially important for CCSP.
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	G5	S4B,SZN			h		T	8	
Orchard Oriole	<i>Icterus spurius</i>	G5	SZB,SZN			h		S	2	
51	Totals:		5 (>S4)	3	2	47	17			

Legend

¹G-rank

Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.

G1 Extremely rare - usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

G2 Very rare - usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.

G3 Rare to uncommon - usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.

G4 Common - usually more than 100 occurrences; usually not susceptible to immediate threats.

G5 Very common - demonstrably secure under present conditions.

²S-Rank

(ranks from NHIC, January 2006)

Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

S1 Critically Imperiled - Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure - Common, widespread, and abundant in the nation or state/province.

S#S# Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

SAN Non-breeding accidental ; SE Exotic - not believed to be a native component of Ontario's fauna; SZN Non-breeding migrants/vagrants; SZB Breeding migrants/vagrants.

³COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

(federal status from COSEWIC November 2006)

EXT Extinct - A species that no longer exists.

EXP Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.

END Endangered - A species facing imminent extirpation or extinction.

THR Threatened - A species likely to become endangered if limiting factors are not reversed.

SC Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

NAR Not At Risk - A species that has been evaluated and found to be not at risk of extinction given the current circumstances.

DD Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

* - Species on Schedule 1 of Species At Risk Act (SARA)

⁴MNR (Ministry of Natural Resources)

(provincial status from MNR June 2006)

The provincial review process is implemented by the MNR's Committee on the Status of Species at Risk in Ontario (COSSARO).

EXT Extinct - A species that no longer exists anywhere.

EXP Extirpated - A species that no longer exists in the wild in Ontario but still occurs elsewhere.

END-R Endangered (Regulated) - A species facing imminent extinction or extirpation in Ontario which has been regulated under Ontario's Endangered Species Act (ESA).

END Endangered (Not Regulated) - A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA.

THR Threatened - A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.

SC Special Concern (formerly Vulnerable) - A species with characteristics that make it sensitive to human activities or natural events.

NAR Not at Risk - A species that has been evaluated and found to be not at risk.

DD Data Deficient (formerly Indeterminate) - A species for which there is insufficient information for a provincial status recommendation.

⁵MNR Significant Wildlife Habitat Technical Guide Area Sensitive Species

Area Sensitivity is defined as species requiring large areas of suitable habitat in order to sustain population numbers

From: Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section. Science Development and Transfer Branch, Southcentral Science Section. 151pp. + appendices.

⁶Hamilton Region Nature Counts Significance Rating

Based on a number of local sources (Natural Areas Inventory for Hamilton (2000), Nature Counts (2001-2002), Hamilton Naturalists' Club Records, etc.) NHIC, and OBBA counts.

h = Uncommon (21-200 breeding pairs in the City of Hamilton); H = Rare (1-20 breeding pairs in the City of Hamilton)

⁷Highest Breeding Evidence

Ontario Breeding Bird Atlas - Breeding Evidence Codes

Observed

X Species observed in its breeding season (no breeding evidence).

Possible

H Species observed in its breeding season in suitable nesting habitat; S Singing male(s) present, or breeding calls heard, in suitable nesting habitat in breeding season.

Probable

P Pair observed in suitable nesting habitat in nesting season; T Permanent territory presumed through registration of territorial behaviour (song, etc.) on at least two days, a week or more apart, at the same place; D Courtship or display, including interaction between a male and a female or two males, including courtship feeding or copulation; V Visiting probable nest site; A Agitated behaviour or anxiety calls of an adult; B Brood Patch on adult female or cloacal protuberance on adult male; N Nest-building or excavation of nest hole.

Confirmed

DD Distraction display or injury feigning; NU Used nest or egg shells found (occupied or laid within the period of the survey); FY Recently fledged young (nidicolous species) or downy young (nidifugous species), including incapable of sustained flight; AE Adult leaving or entering nest sites in circumstances indicating occupied nest; FS Adult carrying fecal sac; CF Adult carrying food for young; NE Nest containing eggs; NY Nest with young seen or heard.

Field Surveys – Greensville RSA

A number of significant species were found in the Greensville Rural Settlement Area, including one federally (COSEWIC) and provincially (MNR) designated species of *Special Concern* (Louisiana Waterthrush), 3 provincially rare species (S ranks between S1-S3), and 27 regionally significant bird species.

Unit 11, Unit 26 (Spencer Gorge), and Unit 31 (Crooks Hollow), had the highest number of significant species out of the Greensville area units, with 7 or more regionally significant species found in each. All 3 of the provincially rare (S rank) species found in the Greensville area are also found in these three units, including Louisiana Waterthrush (*Special Concern*; recorded in Spencer Gorge). The other two species are Carolina Wren (*Thryothorus ludovicianus*) found in Unit 11, Unit 26 and Unit 31; and Tufted Titmouse (*Baeolophus bicolor*) recorded in Unit 31.

Background Information – OBBA Point Counts

Additional species of conservation concern were identified during the OBBA point count background review with the following key results as they relate to the Ecoplans surveys:

- ≠ Seven of the 11 regionally rare species recorded in the OBBA point counts were also observed within the study area by Ecoplans during the breeding bird surveys (although not necessarily in the same locations as the point count observations). The following species were recorded in both the OBBA point counts and Ecoplans 2006 field surveys, in the same locations:
 - Unit 17: Grasshopper Sparrow (*Ammodramus savannarum*) and Clay-coloured Sparrow (*Spizella pallida*)
 - Unit 19: Blue-gray Gnatcatcher (*Poliopitila caerulea*).
- ≠ Two regionally significant species were observed during the OBBA point counts but not recorded during Ecoplans breeding bird surveys: Virginia Rail (*Rallus limicola*), a regionally uncommon species recorded near Unit 19; and Bank Swallow (*Riparia riparia*), a regionally uncommon species recorded near Unit 1 and Unit 17.

Background Information – City of Hamilton Natural Heritage System Mapping

Ten of the regionally significant bird species and 6 of the regionally significant butterfly species identified on the Natural Heritage System mapping provided by the City of Hamilton (dated April 27, 2006) and discussed in Section 3.0, were also observed within the study area by Ecoplans. A number of the Ecoplans' observations of these species were in different areas than the approximate locations provided by the City of Hamilton. The table below lists the species provided by City of Hamilton, whether the species was observed during Ecoplans surveys and indicates if it was found in the same approximate location as the City of Hamilton record.

List of City of Hamilton Rare Species Records in the Study Area

Common Name	Scientific Name	Hamilton Status	Observed by Ecoplans
American Redstart	<i>Setophaga ruticilla</i>	Uncommon	Yes. Same approx. location, and 4 additional units.
Brown Thrasher	<i>Toxostoma rufum</i>	Uncommon	Yes. Not in same approx. location, but in 9 additional units.
Blue-winged Warbler	<i>Vermivora pinus</i>	Uncommon	Yes. Same approx. location, and 8 additional units.
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	Uncommon	Yes. Same approx. location, and 4 additional units.
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	Uncommon	Yes. Not in same approx. location, but in 7 additional units.
Pine Warbler	<i>Dendroica pinus</i>	Uncommon	Yes. Same approx. location, and 5 additional units.
Turkey Vulture	<i>Cathartes aura</i>	Uncommon	Yes. Same approx. location, and 8 additional units.
Wood Duck	<i>Aix sponsa</i>	Uncommon	Yes. Same approx. location as 1 of the records, plus 3 additional units.
Belted Kingfisher	<i>Ceryle alcyon</i>	Uncommon	Yes. Not in same approx. location, but in 4 additional units.
Blue-gray Gnatcatcher	<i>Poliptila caerulea</i>	Uncommon	Yes. Same approx. location, and 5 additional units.
Virginia Rail	<i>Rallus limicola</i>	Uncommon	No
Marsh Wren	<i>Cistothorus palustris</i>	Uncommon	No
Silver-spotted Skipper	<i>Epargyreus clarus</i>	Uncommon	Yes. Not in same approx. location, but in many additional units.
Giant Swallowtail	<i>Papilio crephontes</i>	Uncommon	Yes. Same approx. location, and many additional units.
Indian Skipper	<i>Hesperia sassacus</i>	Uncommon	Yes.

Common Name	Scientific Name	Hamilton Status	Observed by Ecoplans
			Not in same approx. location, but found in 1 other unit.
Black Dash	<i>Euphyes conspicuus</i>	Uncommon	Yes. Not in same approx. location, but found in 1 other unit.
Baltimore Checkerspot	<i>Euphydryas phaeton</i>	Uncommon	Yes. Not in same approx. location, but found in 1 other unit.
Bronze Copper	<i>Lycaena hyllus</i>	Uncommon	No.
Silver-bordered Fritillary	<i>Bolotia selene</i>	Uncommon	Yes. Same approx. location.

4.3 Other

Insects

Incidental observations of butterflies and odonata were made between April 27 and July 31, 2006 during the bird surveys. As a result, numerous common species were not noted in many units due to lack of available time and a non-targeted approach. The observation of a species in few (or one) unit does not necessarily imply a level of rarity. The butterfly and odonate species observed are listed in Table 5 by the same Wildlife Survey Unit as the bird surveys. Highlights are as follows:

- ≠ Although small patches of early successional meadow are widespread in the study area, no larger exceptional meadow areas were noted during the 2006 surveys. A small area of sedge meadow, supporting sedge-meadow associated species, is present in Unit 7.
- ≠ One provincially rare (S3 or 'vulnerable' rank) odonate species was observed in the study area; Eastern Amberwing was found in Unit 31 (Crooks Hollow). This species was also noted in the NHIC background information, but from a location northeast of the Ecoplans observation.
- ≠ One federally (COSEWIC) and provincially (MNR) designated species, Monarch (*Danaus plexippus*), was observed throughout the study area. Monarch is designated *Special Concern* primarily because of on-going threats to its wintering areas located outside of Canada. This butterfly species and its larval host plant of Common Milkweed (*Asclepias syriaca*) are actually common in Ontario. No notable stands of Milkweed or exceptional old field habitat were noted in the study area.
- ≠ Incidental observations of four provincially rare (S ranks S2-S3) butterfly species from the study area; Delaware Skipper (*Anatrytone logan*), Black Dash (*Euphyes conspicua*), Mulberry Wing (*Poanes massasoit*), and Giant Swallowtail (*Papilio cresphontes*).
 - Delaware Skipper was recorded in Units 7, 20 and 22.

**Table 5 - Incidental Butterfly and Odonate Observations 2006
Mid-Spencer Creek/Greenville**

Butterflies

Common Name	Scientific Name	S-Rank ¹	COSEWIC ²	MNR ³	Hamilton Region Significance ⁴	Unit No. Observed In	COMMENTS ⁵
Silver-spotted Skipper	<i>Epargyreus clarus</i>	S4			U	Many units	
Juvenal's Duskywing	<i>Erynnis juvenalis</i>	S5				15,18,20	
Delaware Skipper	<i>Anatrytone logan</i>	S3S4				7,20,22	
Least Skipper	<i>Ancyloxypha numitor</i>	S5				Many units	
Black Dash	<i>Euphyes conspicua</i>	S3/S4			U	7	10 observed July 13. Usually rare and very local to sedges.
Dun Skipper	<i>Euphyes vestris</i>	S5				7,20,21,22	
Hobomok Skipper	<i>Poanes hobomok</i>	S5				Most units	
Mulberry Wing	<i>Poanes massasoit</i>	S3			R	7	1 observed July 13. Rare and very local to sedges.
Long Dash Skipper	<i>Polites mystic</i>	S5				Many units	
Indian Skipper	<i>Hesperia sassacus</i>	S4			U	22	1 observed June 6. Scarce in much of S. Ontario.
Peck's Skipper	<i>Polites peckius</i>	S5				20	
Tawny-edged Skipper	<i>Polites themistocles</i>	S5				Many units	
European Skipper	<i>Thymelicus lineola</i>	SE				Most units	
Northern Broken Dash	<i>Wallengrenia egeremet</i>	S5				21	
Giant Swallowtail	<i>Papilio cresphontes</i>	S2			U	Most units	Observed throughout the study period, with peak of 14 June 6
Eastern Tiger Swallowtail	<i>Papilio glaucus</i>	S4S5				Most units	
Black Swallowtail	<i>Papilio polyxenes</i>	S5				Most units	
Spicebush Swallowtail	<i>Papilio troilus</i>	S4			R	9	3 observed June 22. New location for this rare Hamilton area Butterfly
Cabbage White	<i>Pieris rapae</i>	SE				Most units	
Clouded Sulphur	<i>Colias philodice</i>	S5				Most units	
Orange Sulphur	<i>Colias eurytheme</i>	S5				23	
Eastern Pine Elfin	<i>Callophrys niphon</i>	S5			R	20	1 observed June 6
Banded Hairstreak	<i>Satyrium calanus</i>	S4				9	
Acadian Hairstreak	<i>Satyrium acadicum</i>	S4				Many units	
Coral Hairstreak	<i>Harkenclenus titus</i>	S4			U	5	
Spring Azure	<i>Celastrina ladon</i>	S5				Most units	
Summer Azure	<i>Celastrina neglecta</i>	S5				Most units	
Eastern Tailed Blue	<i>Everes comyntas</i>	S5				7	
Meadow Fritillary	<i>Boloria bellona</i>	S5				15	1 observed May 17
Silver-bordered Fritillary	<i>Boloria selene</i>	S5			U	7	5 observed July 22
Great Spangled Fritillary	<i>Speyeria cybele</i>	S5				3,9	
Baltimore Checkerspot	<i>Euphydryas phaeton</i>	S4			U	7	2 observed July 22
Crescent Sp.	<i>Phyciodes sp.</i>					Most units	
Mourning Cloak	<i>Nymphalis antiopa</i>	S5				15	
Milbert's Tortoiseshell	<i>Nymphalis milberti</i>	S5			R	9	2 observed June 22
Compton Tortoiseshell	<i>Nymphalis vaualbum</i>	S5			U	5	1 observed April 27
Eastern Comma	<i>Polygonia comma</i>	S5				Many units	
Question Mark	<i>Polygonia interrogationis</i>	S5				Many units	
Red Admiral	<i>Vanessa atalanta</i>	SZB				15	
Painted Lady	<i>Vanessa cardui</i>	SZB				20	
Viceroy	<i>Limenitis archippus</i>	S5				Most units	
Red-spotted Purple	<i>Limenitis arthemis astyanax</i>	S5				23	
Common Wood Nymph	<i>Cercyonis pegala</i>	S5				Most units	
Common Ringlet	<i>Coenonympha tullia</i>	S5				Many units	

**Table 5 - Incidental Butterfly and Odonate Observations 2006
Mid-Spencer Creek/Greenville**

Common Name	Scientific Name	S-Rank ¹	COSEWIC ²	MNR ³	Hamilton Region Significance ⁴	Unit No. Observed In	COMMENTS ⁵
Northern Pearly-eye	<i>Enodia anthedon</i>	S4				9	
Little Wood Satyr	<i>Megisto cymela</i>	S5				19	
Appalachian Brown	<i>Satyroides appalachia</i>	S4				7	
Eyed Brown	<i>Satyroides eurydice</i>	S5				8a	
Monarch	<i>Danaus plexippus</i>	S4	SC	SC		Most units	
	Totals	4 (S1-S3)			8 U, 4 R		

Table 5 - Incidental Butterfly and Odonate Observations 2006
Mid-Spencer Creek/Greenville

Odonata

Common Name	Scientific Name	S-Rank ¹	COSEWIC ²	MNR ³	Unit No. Observed In	COMMENTS ⁴
Common Green Damer	<i>Anax junius</i>	S5			Most units	
Lance-tipped Damer	<i>Aeshna constricta</i>	S5			5	
Clubtail sp.	<i>Argomphus sp.</i>				Hayesville swamp	
Common Baskettail	<i>Epiptera cynosura</i>	S5			Hayesville swamp	
Calico Pennant	<i>Celithemis elisa</i>	S5			23	6 observed June 6
Eastern Pondhawk	<i>Erythemis simplicicollis</i>	S5			14	
Dot-tailed Whiteface	<i>Leucorrhinia intacta</i>	S5			14	
Widow Skimmer	<i>Libellula luctuosa</i>	S5			Many units	
Twelve-spotted Skimmer	<i>Libellula pulchella</i>	S5			Many units	
Blue Dasher	<i>Pachydiplax longipennis</i>	S5			11	
Wandering Glider	<i>Pantala flavescens</i>	S4			4	
Eastern Amberwing	<i>Perithemis tenera</i>	S3			31	11 males observed July 31
Four-spotted Skimmer	<i>Libellula quadrimaculata</i>	S5			14	
Common Whitetail	<i>Plathemis lydia</i>	S5			Most units	
Meadowhawk Sp.	<i>Sympetrum sp.</i>				Most units	
Black Saddlebags	<i>Tramea lacerata</i>	S5			23	
Ebony Jewelwing	<i>Calopteryx maculata</i>	S5			5,7,9,10	
Emerald Spreadwing	<i>Lestes dryas</i>	S5			Most units	
Eastern Forktail	<i>Ischnura verticalis</i>	S5			Most units	
	Totals	1 (S3)				

LEGEND

See Figure 2 for location of survey units.

⁵The tables summarized observations of all Butterflies and Odonata observed within the study area. The observation period was April 27 – July 31, 2006. It should be noted that these observations were incidental to the bird studies being conducted at the time. As a result, numerous common species were not noted in many units due to lack of available time and a non-targeted approach. The observation of a species in few (or one) unit does not imply rarity. Any species deemed sufficiently rare or noteworthy are mentioned in the 'comments' section, usually with the specific details of the observation.

¹S-Rank

(ranks from NHIC, January 2006)

Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

S1 Critically Imperiled - Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure - Common, widespread, and abundant in the nation or state/province.

S#S# Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

SAN Non-breeding accidental ; SE Exotic - not believed to be a native component of Ontario's fauna; SZN Non-breeding migrants/vagrants; SZB Breeding migrants/vagrants.

²COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

(federal status from COSEWIC November 2006)

EXT Extinct - A species that no longer exists.

EXP Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.

END Endangered - A species facing imminent extirpation or extinction.

THR Threatened - A species likely to become endangered if limiting factors are not reversed.

SC Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

NAR Not At Risk - A species that has been evaluated and found to be not at risk of extinction given the current circumstances.

DD Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

* - Species on Schedule 1 of Species At Risk Act (SARA)

³MNR (Ministry of Natural Resources)

(provincial status from MNR June 2006)

The provincial review process is implemented by the MNR's Committee on the Status of Species at Risk in Ontario (COSSARO).

EXT Extinct - A species that no longer exists anywhere.

EXP Extirpated - A species that no longer exists in the wild in Ontario but still occurs elsewhere.

END-R Endangered (Regulated) - A species facing imminent extinction or extirpation in Ontario which has been regulated under Ontario's Endangered Species Act (ESA).

END Endangered (Not Regulated) - A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA.

THR Threatened - A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.

SC Special Concern (formerly Vulnerable) - A species with characteristics that make it sensitive to human activities or natural events.

NAR Not at Risk - A species that has been evaluated and found to be not at risk.

DD Data Deficient (formerly Indeterminate) - A species for which there is insufficient information for a provincial status recommendation.

⁴ Hamilton Region Nature Counts Significance Rating

Based on the presence of known stations for the years 1981-2002 inclusive (Dwyer et. al. 2003), primarily on surveys conducted for Natural Areas Inventory for Hamilton (2000), Nature Counts project (2001-2002), and the Hamilton Naturalists' Club records

R = Rare (currently known to be present at 1-10 stations in City of Hamilton)

U = Uncommon (currently known to be present at 11-30 stations in City of Hamilton)

- Black Dash and Mulberry Wing, uncommon species associated with sedge meadows, were recorded in Unit 7 (the only notable 'sedge meadow' habitat observed during field surveys).
 - Giant Swallowtail was observed throughout the study area (particularly in 'alvar' habitats), with a peak abundance on June 6, 2006. Prickly Ash (*Zanthoxylum americanum*), one of several host plants for Giant Swallowtail, is widespread and abundant through the central alvar habitats in the study area.
- ≠ Incidental observations of 12 butterfly species considered rare (known to be present at 1-10 stations) or uncommon (known to be present at 11-30 stations) in the City of Hamilton⁵, were made during the bird surveys conducted in 2006. Refer to Table 5 for locations of regionally significant butterfly observations.

Mammals and Reptiles

Incidental observations of mammal sightings and sign were recorded. A number of common mammals were observed in the project study area including Grey Squirrel (*Sciurus carolinensis*), White-tailed Deer (*Odocoileus virginianus*), Eastern Cottontail (*Sylvilagus floridanus*) and Raccoon (*Procyon lotor*). A number of additional small mammals (e.g. mice, voles, shrews and bats) are also likely present in the study area, but went undetected due to their secretive and / or nocturnal natures. Common Gartersnake (*Thamnophis sirtalis*) was also observed. These species are all typical and expected species for the study area.

An incidental observation of a road-killed Milksnake (*Lampropeltis triangulum*) was recorded on Weirs Lane at the southwest limit of the study area. This species is provincially significant (S3) and designated as *Special Concern* by COSEWIC and MNR. No other Milksnake observations were recorded during field surveys, but suitable habitat is present across the study area and targeted searches were not conducted.

⁵ Based on the *Nature Counts Project* (Dwyer et. al. 2003) species checklist with regional butterfly status

5.0 Evaluation of Wildlife Habitat

5.1 Significant Wildlife Habitat

A preliminary assessment of “Significant Wildlife Habitat” was completed using the *Significant Wildlife Habitat Technical Guide* (SWHTG) (OMNR 2000). In the SWHTG, ‘significant wildlife habitat’ is broadly identified under four categories:

- ≠ Seasonal concentrations of animals
- ≠ Rare vegetation communities or specialized habitats for wildlife
- ≠ Habitats of species of conservation concern
- ≠ Wildlife movement corridors

Based on our preliminary assessment of the using the SWHTG, 15 of the Wildlife Survey Units could potentially be considered ‘significant wildlife habitat’ due to the presence of rare habitat types (i.e. alvar)⁶ and / or species of conservation concern (i.e. provincially significant species [‘Srank S1-S3’] or abundant regionally significant species). It should be noted that this is a preliminary assessment attended to provide input to the rating of wildlife habitat quality and has not included assessment of all criteria presented in the SWHTG (OMNR 2000).

5.2 Summary by Wildlife Survey Unit

The findings of the 2006 faunal inventories are summarized on a wildlife unit base in Table 6 with highlights and notable units described in this section.

Each wildlife unit in the Mid-Spencer Creek / Greensville RSA study area was assigned a habitat quality relative to the other units in the study area. The habitat quality rating is a qualitative assessment based on the following criteria:

- ≠ breeding bird species richness / diversity
- ≠ habitat diversity
- ≠ species of conservation concern
- ≠ significant habitat types
- ≠ presence of specialized wildlife habitat (e.g. groundwater seepage, sedge meadows, open water, alvar, etc.)
- ≠ significant wildlife habitat
- ≠ amphibian breeding habitat
- ≠ level of anthropogenic disturbance
- ≠ habitat block size (including potential for forest ‘interior’ species)
- ≠ habitat continuity and/or proximity to other natural areas

⁶ Identification of significant wildlife habitat is pending confirmation of ‘alvar’ habitat types per *Ecological Land Classification for Southern Ontario* (ELC) (Lee et.al. 1998).

Table 6 - Wildlife Survey Unit Overview 2006
Mid-Spencer Creek / Greenville SWS - Faunal Inventories

Unit No.	Habitat	Dates of Field Visits	Spring Migrants	Breeding Birds						Habitat Quality ⁶	Comments
			No. of Species Observed During Migration	No. of Significant Species (breeding)							
				No. of Breeding Bird Species	SRANK ¹	COSEWIC ²	MNR ³	Hamilton Region Significance ⁴	MNR Area Sensitive ⁵		
Unit 1	habitat mosaic, including alvar	April 27, May 17, June 6	11	32	0	0	0	6 h 0 H	1	High	<ul style="list-style-type: none"> ≠ unique mix of wetland, woodland and alvar ≠ moderately high avian species diversity and abundance (including high numbers of Brown Thrasher) ≠ 6 regionally significant avian species: Red-bellied Woodpecker, Great Blue Heron, Vesper Sparrow, Brown Thrasher, Northern Mockingbird, Blue-winged Warbler ≠ good potential for alvar-associated species ≠ amphibian Call Station 45 located on adjacent lands to the west – 3 species recorded (American Toad, Gray Treefrog, Spring Peeper), with moderate to high abundance. Some potential for amphibian breeding / use in localized wetter areas within unit ≠ potentially considered 'significant wildlife habitat' (based on rare habitat type – alvar) **
Unit 2	habitat mosaic, including alvar	April 27, May 19, June 6	18	40	0	0	0	6 h 1 H	3	High	<ul style="list-style-type: none"> ≠ mostly hawthorn scrub and immature woodland, with some alvar characteristics ≠ 7 regionally significant avian species: Yellow-billed Cuckoo, Black-billed Cuckoo, Blue-gray Gnatcatcher, Blue-winged Warbler, Brown Thrasher, Grasshopper Sparrow, Eastern Towhee, ≠ good potential for alvar-associated species ≠ amphibian Call Station 31 associated with this Unit; high relative amphibian species richness (5 species) with high abundance (call level 3) for 3 of the species ≠ potentially considered 'significant wildlife habitat' (based on rare habitat type – alvar) **
Unit 3	diverse habitat mosaic	April 27, May 19, June 20	25	62	1	1 (SC)	1 (SC)	16 h 3 H	10	High	<ul style="list-style-type: none"> ≠ large, diverse habitat grouping (forest, swamp, meadow, marsh, thicket) with many unique wildlife habitat attributes ≠ high avian species diversity and high abundance of common avian species ≠ large number of notable avian species recorded, including: a species S3 ranked by NHIC and Special Concern designated by COSEWIC (Red-headed Woodpecker) ≠ 19 regionally significant species including: Yellow-billed and Black-billed Cuckoos, Blue-gray Gnatcatcher, Blue-winged Warbler, Brown Thrasher, Eastern Towhee); forest 'interior' species (e.g. Scarlet Tanager, Wood Thrush, Veery, Ovenbird); and 'northern' breeders (e.g. White-throated Sparrow) ≠ amphibian Call Stations DF1 and DF2 associated with this Unit; low relative species richness recorded (2 species) with moderate abundance (call level 2), but 2 other species were incidentally observed in good abundance that were not heard during call surveys ≠ located within the Donald Farm Complex ESA ≠ potentially considered 'significant wildlife habitat' (based on rare species and specialized habitats – forest interior)
Unit 4	forest	April 27, July 31	6	24	0	0	0	1 h 0 H	1	Low	<ul style="list-style-type: none"> ≠ small, isolated upland deciduous forest within agricultural field matrix ≠ relatively low avian species diversity ≠ 1 regionally significant avian species recorded: Mourning Warbler ≠ no specialized or uncommon wildlife habitat present

Table 6 - Wildlife Survey Unit Overview 2006
 Mid-Spencer Creek / Greenville SWS - Faunal Inventories

Unit No.	Habitat	Dates of Field Visits	Spring Migrants	Breeding Birds						Habitat Quality ⁶	Comments
			No. of Species Observed During Migration	No. of Significant Species (breeding)							
				No. of Breeding Bird Species	SRANK ¹	COSEWIC ²	MNR ³	Hamilton Region Significance ⁴	MNR Area Sensitive ⁵		
Unit 5	habitat mosaic	April 27, July 31	15	29	1	1 (SC)	1 (SC)	5 h 2 H	3	High	≠ relatively large block of mixed wet woods, swamp, thicket and conifer plantation ≠ moderate avian species diversity ≠ 1 species designated Special Concern by COSEWIC and MNR, and S3 ranked by NHIC: Louisiana Waterthrush; ≠ 7 regionally significant avian species: Louisiana Waterthrush, Wood Duck, Great-blue Heron, Great-horned Owl, Winter Wren, Hairy Woodpecker, Red-tailed Hawk ≠ Suitable habitat for Prothonotary Warbler (Endangered - COSEWIC) is present ≠ 2 regionally significant butterfly species incidentally observed: Compton Tortoiseshell (uncommon) and Coral Hairstreak (uncommon) ≠ woodland amphibian breeding habitat present within extensive vernal pools throughout the swamp and associated marsh areas ≠ potentially considered 'significant wildlife habitat' (based on rare species)
Unit 6	cultural habitat mosaic	April 27, July 31	8	18	1	0	0	1 h 1 H	0	Low	≠ small block of successional meadow / thicket (former agricultural lands), with an old farm pond ≠ low avian species diversity and abundance ≠ 2 regionally significant avian species recorded: Alder Flycatcher, Carolina Wren (also ranked S3S4 by NHIC) – not habitat specific birds ≠ small amount of breeding habitat for amphibians present in the pond – calling not assessed
Unit 7	diverse habitat mosaic	May 19, July 13	18	43	0	0	0	7 h 1 H	4	Very High	≠ large, diverse habitat grouping (forest, slope seepage swamp, floodplain swamp, upland/wetland meadow, marsh, thicket, riparian) with numerous unique wildlife habitat attributes including alvar characteristics ≠ high avian species diversity and high abundance of common avian species ≠ 8 regionally significant avian species recorded, including: Blue-gray Gnatcatcher, Blue-winged Warbler, Brown Thrasher, Eastern Towhee, Orchard Oriole, Great Blue Heron, Red-tailed Hawk, Hairy Woodpecker ≠ provides habitat for a diverse suite of butterflies, including sedge meadow areas, which provide habitat for rare butterfly species as shown by incidental observations of Black Dash, Mulberry Wing, and Delaware Skipper (all S3 ranked by NHIC), and 4 regionally significant species: Black Dash (uncommon), Mulberry Wing (rare), Silver-bordered Fritillary (uncommon), and Baltimore Checkerspot (uncommon). ≠ amphibian Call Station 12 associated with this Unit; low relative species richness (1 species - Spring Peeper), but in high abundance (call code 3). ≠ located within the Christie Stream Valley ESA ≠ potentially considered 'significant wildlife habitat' (based on specialized habitat type – sedge meadow and rare species)

Table 6 - Wildlife Survey Unit Overview 2006
Mid-Spencer Creek / Greenville SWS - Faunal Inventories

Unit No.	Habitat	Dates of Field Visits	Spring Migrants No. of Species Observed During Migration	Breeding Birds						Habitat Quality ⁶	Comments
				No. of Breeding Bird Species	No. of Significant Species (breeding)						
					SRANK ¹	COSEWIC ²	MNR ³	Hamilton Region Significance ⁴	MNR Area Sensitive ⁵		
Unit 8a	wetland	April 27, July 13	6	17	0	0	0	0 h 0 H	0	Moderate	<ul style="list-style-type: none"> ≠ small cattail marsh / meadow marsh, with inclusions of thicket swamp ≠ relatively low avian species diversity and abundance ≠ 1 regionally significant avian species recorded: Turkey Vulture ≠ Cattail marsh provides limited potential habitat for some marsh birds (e.g. Virginia Rail, Sora, American Bittern, Marsh Wren) ≠ low probability for Least Bittern, King Rail ≠ amphibian Call Station 49 associated with this Unit – no calling was recorded, but background noise level was very high
Unit 8b	forest, woodland	July 13	n/a	12	0	0	0	1 h 0 H	0	Low	<ul style="list-style-type: none"> ≠ mixed woodland on slopes / lands adjacent to large industrial plant ≠ strong cultural influence: highly disturbed ≠ low avian species diversity and abundance ≠ 1 regionally significant avian species recorded: Mourning Warbler ≠ no specialized or uncommon wildlife habitat present ≠ some continuity with Christie Valley ESA to the south ≠ no amphibian breeding habitat present
Unit 9	forest	May 10, May 17, June 22	36	38	0	0	0	11 h 1 H	6	High	<ul style="list-style-type: none"> ≠ large block of submature/mature deciduous forest on the escarpment ≠ moderately high avian species diversity and abundance, including a number of forest-associated species ≠ large number of regionally significant avian species recorded: Yellow-billed Cuckoo, Pileated Woodpecker, Red-bellied Woodpecker, Blue-gray Gnatcatcher, Blue-winged Warbler, Chestnut-sided Warbler, Pine Warbler, Mourning Warbler, American Redstart, Scarlet Tanager, Eastern Towhee, Turkey Vulture ≠ located within the Dundas Valley ESA ≠ 2 regionally significant butterfly species incidentally recorded: Milbert's Tortoiseshell (rare) and Spicebush Swallowtail (rare) ≠ Limited amphibian breeding habitat is present along drains and streams ≠ potentially considered 'significant wildlife habitat' (based on rare species and specialized habitat – forest interior)
Unit 10 (Greenville)	cultural habitat mosaic	May 10, May 17, June 22	34	31	0	0	0	4 h 0 H	0	Moderate	<ul style="list-style-type: none"> ≠ mosaic of agricultural fields and culturally influenced habitats including old field meadow, cultural thicket/woodland and riparian meadow marsh ≠ moderately high avian species diversity and abundance ≠ 4 regionally significant avian species recorded: Great-blue Heron, Brown Thrasher, Blue-winged Warbler, Chimney Swift ≠ adjacent lands include rural residential / agricultural and urban residential ≠ amphibian Call Stations 1, 2 and 56 associated with this Unit; low relative species richness (2 species) with low to moderate abundance (call levels 1 and 2) ≠ small wetland area at the southeast end provides breeding habitat for common amphibians (e.g. Spring Peeper, Grey Tree Frog, American Toad) ≠ amphibian calling was not recorded in the riparian marsh areas at the west end of this unit

Table 6 - Wildlife Survey Unit Overview 2006
Mid-Spencer Creek / Greenville SWS - Faunal Inventories

Unit No.	Habitat	Dates of Field Visits	Spring Migrants	Breeding Birds						Habitat Quality ⁶	Comments
			No. of Species Observed During Migration	No. of Significant Species (breeding)							
				No. of Breeding Bird Species	SRANK ¹	COSEWIC ²	MNR ³	Hamilton Region Significance ⁴	MNR Area Sensitive ⁵		
Unit 11 (Greenville)	cultural habitat mosaic	May 10, June 22	25	34	2	0	0	5 h 2 H	5	Moderate	<ul style="list-style-type: none"> ≠ mosaic of culturally influenced habitats (meadow, thicket, woodland, marsh) surrounded by urban residential development ≠ moderately high avian species diversity and abundance ≠ 7 regionally significant avian species recorded: Turkey Vulture, Tufted Titmouse (S2S3), Carolina Wren (S3S4), Pine Warbler, Scarlet Tanager, Ruby-throated Hummingbird, Hairy Woodpecker ≠ small wetland at the south end provides breeding habitat for common amphibians - Call Station 55 associated with this Unit; low relative species richness (Spring Peeper, American Toad) with moderate abundance (call level 2) ≠ potentially considered 'significant wildlife habitat' (based on rare species) - Carolina Wren is possibly breeding in portions of the site, but Tufted Titmouse is like only a visitant
Unit 12 (Greenville)	forest	May 10, June 22	11	15	0	0	0	1 h 0 H	0	Low	<ul style="list-style-type: none"> ≠ small, isolated deciduous forest surrounded by urban residential development, strong cultural influence: highly disturbed ≠ low avian species diversity and abundance ≠ 1 regionally significant avian species recorded: Black-billed Cuckoo ≠ no specialized or uncommon wildlife habitat present ≠ some continuity with Spencer Gorge ESA to the east, but separated by busy Highway 8
Unit 13 (Greenville)	cultural habitat mosaic	May 10, June 22	18	20	0	0	0	0 h 1 H	0	Low	<ul style="list-style-type: none"> ≠ mosaic of early successional meadow and cultural thicket ≠ low avian species diversity and abundance ≠ 1 regionally significant avian species recorded: Yellow-billed Cuckoo ≠ adjacent lands include agricultural and urban residential ≠ amphibian Call Station 48a associated with this Unit; low relative species richness (1 species) ≠ no specialized or uncommon wildlife habitat present
Unit 14 (Greenville)	cultural habitat mosaic	May 10, June 22	19	22	0	0	0	1 h 1 H	2	Low Overall (Moderate for wetland)	<ul style="list-style-type: none"> ≠ mosaic of early successional meadow and cultural thicket, with small high-quality wetland inclusion ≠ low avian species diversity and abundance ≠ 2 regionally significant avian species recorded: Cooper's Hawk, Orchard Oriole ≠ adjacent lands include agricultural and urban residential ≠ amphibian Call Station 48b associated with this Unit; low relative species richness (2 species) with high abundance of Spring Peeper (call level 3) ≠ no specialized or uncommon wildlife habitat present (with the exception of amphibian breeding habitat)
Unit 15 (Greenville)	cultural habitat mosaic	May 10, May 17, July 31	28	38	0	0	0	2 h 1 H	2	Moderate	<ul style="list-style-type: none"> ≠ mosaic of idle farmland, early successional meadow and cultural thicket ≠ moderately high avian species diversity – predominantly common species ≠ 3 regionally significant avian species recorded: Turkey Vulture, Cooper's Hawk, Belted Kingfisher ≠ adjacent lands include agricultural, urban residential and aggregate extraction ≠ amphibian Call Station 48c associated with this Unit; low relative species richness (2 species) with high abundance of American Toad (call level 3) ≠ no specialized or uncommon wildlife habitat present (with the exception of amphibian breeding habitat)

Table 6 - Wildlife Survey Unit Overview 2006
 Mid-Spencer Creek / Greenville SWS - Faunal Inventories

Unit No.	Habitat	Dates of Field Visits	Spring Migrants No. of Species Observed During Migration	Breeding Birds						Habitat Quality ⁶	Comments
				No. of Breeding Bird Species	No. of Significant Species (breeding)						
					SRANK ¹	COSEWIC ²	MNR ³	Hamilton Region Significance ⁴	MNR Area Sensitive ⁵		
Unit 16	Alvar / cultural thicket	May 10, May 17, June 6	18	22	0	0	0	2 h 1 H	0	High	≠ small alvar / cultural thicket – moderately high disturbance level ≠ was likely contiguous with large adjacent Hayesland Alvar ESA blocks prior to aggregate extraction ≠ moderate avian species diversity ≠ 3 regionally significant avian species recorded: Clay-colored Sparrow, Brown Thrasher, Eastern Towhee ≠ no amphibian breeding habitat – no amphibian calling surveys conducted ≠ potentially considered 'significant wildlife habitat' (based on rare habitat type – alvar) **
Unit 17	Alvar / cultural thicket	May 10, May 17, July 13	10	13	0	0	0	3 h 1 H	2	High	≠ small alvar / cultural thicket – moderately high disturbance level ≠ was likely contiguous with large adjacent Hayesland Alvar ESA blocks prior to aggregate extraction ≠ relatively low species diversity, but includes more conservative/ habitat specific birds ≠ 4 regionally significant avian species recorded: Clay-colored Sparrow, Turkey Vulture, Cliff Swallow, Grasshopper Sparrow ≠ no amphibian breeding habitat – no amphibian calling surveys conducted ≠ potentially considered 'significant wildlife habitat' (based on rare habitat type – alvar) **
Unit 18	Plantation / alvar	May 10, May 17, July 13	10	22	0	0	0	3 h 0 H	1	Moderate	≠ very small, mostly planted Pine with some alvar at margins – highly disturbed through aggregate extraction ≠ contiguous with large adjacent Hayesland Alvar ESA block ≠ moderate avian species diversity ≠ 3 regionally significant avian species recorded: Grasshopper Sparrow, Cliff Swallow, Turkey Vulture ≠ no amphibian breeding habitat – no amphibian calling surveys conducted
Unit 19	wetland, forest	May 10, June 20	17	20	0	0	0	3 h 0 H	2	High	≠ diverse habitat mix including marsh, mixed woods and thicket ≠ good potential for some marsh birds (Virginia Rail, Sora, American Bittern, Marsh Wren) ≠ limited potential for Least Bittern or King Rail ≠ moderate avian species diversity ≠ 3 regionally significant avian species recorded: Least Flycatcher, Blue-gray Gnatcatcher, Eastern Phoebe ≠ amphibian Call Stations 26 and 27 associated with this Unit; high relative amphibian species richness (6 species total from the two stations) with moderate abundance (call levels 1 and 2) ≠ located within Hayesland Swamp ESA north of the road and within Donald Farm Complex ESA south of the road

Table 6 - Wildlife Survey Unit Overview 2006
Mid-Spencer Creek / Greenville SWS - Faunal Inventories

Unit No.	Habitat	Dates of Field Visits	Spring Migrants		Breeding Birds						Habitat Quality ⁶	Comments
			No. of Species Observed During Migration	No. of Breeding Bird Species	No. of Significant Species (breeding)							
					SRANK ¹	COSEWIC ²	MNR ³	Hamilton Region Significance ⁴	MNR Area Sensitive ⁵			
Unit 20	alvar	May 10, May 19, June 6	4	58	0	1 (THR)	0	14 h 4 H	6	Very High	<ul style="list-style-type: none"> ≠ exceptional alvar habitat, ≠ very high avian species diversity with many rare species recorded ≠ 1 species designated Threatened by COSEWIC: Golden-winged Warbler ≠ 19 regionally significant avian species recorded, including: Yellow-billed Cuckoo, Clay-colored Sparrow, Grasshopper Sparrow, Alder Flycatcher, Cliff Swallow, Nashville Warbler, Chestnut-sided Warbler, Blue-winged Warbler ≠ 1 regionally significant butterfly species incidentally recorded: Eastern Pine Elfin (rare) ≠ amphibian breeding habitat not confirmed, but likely exists ≠ potentially considered 'significant wildlife habitat' (based on rare habitat type – alvar and rare species) ** 	
Unit 21	Habitat mosaic - Alvar / forest / cultural thicket	May 10, June 6	3	27	0	0	0	5 h 0 H	4	Very High	<ul style="list-style-type: none"> ≠ exceptional alvar habitat with diverse associated mix of habitats ≠ located within Hayesland Alvar ESA ≠ moderately high avian species diversity, including numerous conservative/sensitive species and potential for other rare species ≠ 5 regionally significant avian species recorded: Black-and-white Warbler, Blue-winged Warbler, Eastern Towhee, Brown Thrasher, American Redstart ≠ amphibian Call Station 36 associated with this Unit; moderate amphibian species richness (American Toad, Gray Treefrog and Spring Peeper) with variable abundances (level 1 to 3) ≠ potentially considered 'significant wildlife habitat' (based on rare habitat type – alvar) ** 	
Unit 22	Habitat mosaic - Alvar / forest / cultural thicket	May 10, June 6	6	22	0	0	0	4 h 1 H	1	Very High	<ul style="list-style-type: none"> ≠ exceptional alvar habitat, with diverse associated mix of habitats ≠ located within Hayesland Alvar ESA ≠ very high species diversity ≠ 5 regionally significant avian species recorded: Yellow-billed Cuckoo, Pine Warbler, Eastern Towhee, Blue-winged Warbler, Brown Thrasher ≠ amphibian Call Stations 33, 34 and 35 associated with this Unit; good relative species richness (4 species) with moderate to high abundance (call levels 2 and 3). ≠ 1 regionally significant butterfly species incidentally recorded: Indian Skipper (uncommon) ≠ potentially considered 'significant wildlife habitat' (based on rare habitat type – alvar) ** 	
Unit 23	forest, wetland	May 10, July 13	20	24	0	0	0	3 h 1 H	2	Moderate	<ul style="list-style-type: none"> ≠ diverse woodland (immature to mature) with wetland inclusions, good condition overall ≠ relatively isolated – surrounded by agricultural lands ≠ moderate avian species diversity ≠ 4 regionally significant avian species recorded: Great-horned Owl, Red-bellied Woodpecker, Red-tailed Hawk, Hairy Woodpecker ≠ amphibian Call Stations 15 and 16 associated with this Unit; low relative species richness (1 species - Spring Peeper) at low abundance (call level 1). 	

Table 6 - Wildlife Survey Unit Overview 2006
Mid-Spencer Creek / Greenville SWS - Faunal Inventories

Unit No.	Habitat	Dates of Field Visits	Spring Migrants		Breeding Birds						Habitat Quality ⁶	Comments
			No. of Species Observed During Migration	No. of Breeding Bird Species	No. of Significant Species (breeding)							
					SRANK ¹	COSEWIC ²	MNR ³	Hamilton Region Significance ⁴	MNR Area Sensitive ⁵			
Unit 24	Riparian – wetland, forest	May 10, June 24	18	35	0	0	0	7 h 1 H	0	High	<ul style="list-style-type: none"> ≠ riparian zone along Spencer Creek – large areas of mudflat during drawdown periods (includes a large area of riparian cattail marsh) ≠ good potential for water birds and marsh birds ≠ moderate avian species diversity and numerous significant species recorded ≠ 8 regionally significant avian species recorded: Yellow-billed Cuckoo, Green Heron, Eastern Phoebe, Chestnut-sided Warbler, Wood Duck, Great Blue Heron, Turkey Vulture, Cliff Swallow ≠ excellent amphibian habitat – supports wide diversity and high abundance of species (Call Station 13 - 6 species recorded) ≠ located within Christie Stream Valley ESA ≠ potentially considered 'significant wildlife habitat' (based on seasonal concentration area for water birds) ** 	
Unit 25	Wetland (open water and fringe habitats)	May 10, July 13	19	30	1	0	0	4 h 2 H	1	High	<ul style="list-style-type: none"> ≠ large, relatively undisturbed and diverse open water pond, with associated wetland and woodland habitats ≠ moderate avian species diversity with numerous rare species and/or water birds ≠ 6 regionally significant avian species: Black-crowned Night Heron (S3), Red-tailed Hawk, Belted Kingfisher, Green Heron, Great Blue Heron, Wood Duck ≠ excellent amphibian habitat – supports wide diversity and high abundance of species (Call Station 4 – 4 species recorded; call level 3 for Spring Peeper and Grey Treefrog) ≠ potentially considered 'significant wildlife habitat' (based on rare species and specialized habitat – open water / marsh) 	
Unit 26 (Greenville)	Spencer Gorge (forest)	May 24	n/a	38	2	1 (SC)	1 (SC)	9 h 3 H	6	Very High	<ul style="list-style-type: none"> ≠ unique, relatively undisturbed natural area with many ecological attributes ≠ high avian species diversity, with many rare / conservative species <ul style="list-style-type: none"> ≠ 1 species designated Special Concern by COSEWIC and MNR, and S3 ranked (NHIC): Louisiana Waterthrush ≠ 12 regionally significant avian species recorded including Carolina Wren (S3S4), Red-bellied Woodpecker, Mourning Warbler, Scarlet Tanager, Eastern Bluebird ≠ located within Spencer Gorge ESA and Conservation Area ≠ potentially considered 'significant wildlife habitat' (based on rare species) 	
Unit 27	forest	July 31	n/a	13	0	0	0	0 h 0 H	0	Low	<ul style="list-style-type: none"> ≠ relatively small woodland with no outstanding wildlife habitat attributes ≠ adjacent to Hayesland Swamp ESA ≠ low avian species diversity ≠ no avian species of concern recorded ≠ no amphibian breeding habitat noted (may be present) – no amphibian calling surveys conducted 	

Table 6 - Wildlife Survey Unit Overview 2006
Mid-Spencer Creek / Greenville SWS - Faunal Inventories

Unit No.	Habitat	Dates of Field Visits	Spring Migrants No. of Species Observed During Migration	Breeding Birds						Habitat Quality ⁶	Comments
				No. of Significant Species (breeding)							
				No. of Breeding Bird Species	SRANK ¹	COSEWIC ²	MNR ³	Hamilton Region Significance ⁴	MNR Area Sensitive ⁵		
Unit 28	Swamp / forest	May 17, June 1	n/a	43	0	0	0	8 h 2 H	3	High	<ul style="list-style-type: none"> ≠ large, diverse habitat block with potential SCTE species ≠ located within Hayesland Swamp ESA ≠ high avian species diversity, with many rare / conservative species ≠ 10 regionally significant avian species recorded including Yellow-billed Cuckoo, Red-bellied Woodpecker, Belted Kingfisher, Blue-gray Gnatcatcher, Mourning Warbler ≠ amphibian Call Stations 41, 42, 43 associated with this Unit; moderate relative species diversity (3 species) with moderate to high abundance (call levels 2 and 3)
Unit 29	Plantation / forest, cultural habitats	June 1	n/a	34	0	0	0	9 h 2 H	5	High	<ul style="list-style-type: none"> ≠ located within Christie Stream Valley ESA / Christie Lake Conservation Area ≠ good habitat diversity - mostly planted pines, some mature deciduous components, large open water component (additional habitats present on north side – not assessed) ≠ moderately high avian species diversity, with numerous rare species recorded and specialized habitat for water birds (including migrant stopover function) ≠ 11 regionally significant avian species recorded including Cooper's Hawk, Yellow-billed Cuckoo, Black-billed Cuckoo, Red-bellied Woodpecker, Red-breasted Nuthatch ≠ Excellent amphibian habitat, especially in mudflats at west end
Unit 30	forest	July 31	n/a	8	0	0	0	0 h 0 H	0	Low	<ul style="list-style-type: none"> ≠ mostly scrubby forest ≠ low avian species diversity and no avian species of concern recorded ≠ located partially within Spencer Gorge ESA (area south of rail line)
Unit 31 (Greenville)	forest, wetland	July 31	n/a	27	1	0	0	6 h 3 H	2	High	<ul style="list-style-type: none"> ≠ fairly mature, mixed woodland along with extensive riparian habitat ≠ moderately high avian species diversity, including numerous rare species ≠ 9 regionally significant avian species recorded: Carolina Wren, Golden-crowned Kinglet, Red-tailed Hawk, Great Blue Heron, Green Heron, Chimney Swift, Belted Kingfisher, Red-bellied Woodpecker, Blue-gray Gnatcatcher ≠ located within Christie Stream Valley ESA (area called Crooks Hollow)
Total Site				100	5	3	2	36 h 11 H	17		

** Assessment of 'significant wildlife habitat' is preliminary and pending confirmation of habitat types (i.e. alvar) and seasonal water bird use in Christie Lake.

Legend

See Figure 2 for location of survey units.

¹S-Rank

(from NHIC, January 2006)

Provincial (or Sub national) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

S1 Critically Imperilled—Critically imperilled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperilled—Imperilled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure—Common, widespread, and abundant in the nation or state/province.

S#S# Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

SAN Non-breeding accidental.

SE Exotic; not believed to be a native component of Ontario's fauna.

SZN Non-breeding migrants/vagrants.

SZB Breeding migrants/vagrants.

²COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

(federal status from COSEWIC November 2006)

EXT Extinct - A species that no longer exists.

EXP Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.

END Endangered - A species facing imminent extirpation or extinction.

THR Threatened - A species likely to become endangered if limiting factors are not reversed.

SC Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

NAR Not At Risk - A species that has been evaluated and found to be not at risk of extinction given the current circumstances.

DD Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

* - Species on Schedule 1 of Species At Risk Act (SARA)

³MNR (Ministry of Natural Resources)

(provincial status from MNR June 2006)

The provincial review process is implemented by the MNR's Committee on the Status of Species at Risk in Ontario (COSSARO).

EXT Extinct - A species that no longer exists anywhere.

EXP Extirpated - A species that no longer exists in the wild in Ontario but still occurs elsewhere.

END-R Endangered (Regulated) - A species facing imminent extinction or extirpation in Ontario which has been regulated under Ontario's Endangered Species Act (ESA).

END Endangered (Not Regulated) - A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA.

THR Threatened - A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.

SC Special Concern (formerly Vulnerable) - A species with characteristics that make it sensitive to human activities or natural events.

NAR Not at Risk - A species that has been evaluated and found to be not at risk.

DD Data Deficient (formerly Indeterminate) - A species for which there is insufficient information for a provincial status recommendation.

⁴Hamilton Region Nature Counts Significance Rating

Based on a number of local sources (Natural Areas Inventory for Hamilton (2000), Nature Counts (2001-2002), Hamilton Naturalists' Club Records, etc.) NHIC, and OBBA counts.

h = Uncommon (21-200 breeding pairs in the City of Hamilton)

H = Rare (1-20 breeding pairs in the City of Hamilton)

⁵MNR Significant Wildlife Habitat Technical Guide Area Sensitive Species

Area Sensitivity is defined as species requiring large areas of suitable habitat in order to sustain population numbers

From: Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section. Science Development and Transfer Branch, Southcentral Science Section. 151pp. + appendices.

⁶Relative Habitat Quality Definitions – refer to report Section 5.0

Wildlife habitat quality categories are as follows:

- ≠ **Very High** - exceptional quality; highly diverse habitat and species composition; many rare and / or sensitive habitats and species; large size; relatively undisturbed
- ≠ **High** – good species and habitat diversity; typically low levels of anthropogenic disturbance; specialized habitat (e.g. alvar – can be somewhat degraded); moderate to high numbers of rare avian species
- ≠ **Moderate** – typically smaller, more disturbed woodlands and / or cultural mosaics; lower relative species diversity and numbers of rare species;
- ≠ **Low** – small, isolated, highly disturbed features; common / tolerant habitats with limited avian diversity and few or no rare / specialized species

6.0 Conclusions

In this faunal inventory, we have conducted amphibian and avian surveys for the majority of natural and semi-natural areas within the Mid-Spencer Creek / Greensville RSA study area, with emphasis on areas not previously assessed (or with inadequate coverage). The faunal inventory focused on breeding amphibians and breeding birds, with migrant bird use and supplementary wildlife observations recorded. Key results from the study are as follows:

Amphibians

- ≠ Several larger open-water systems are present. These provide breeding and adult habitat for common amphibians and herptiles.
- ≠ Many smaller ponds and vernal pools / seasonally wet areas are present throughout the study area. These provide additional breeding habitat for amphibians.
- ≠ A number of amphibian calling stations are notable for the diversity and / or abundance of amphibians recorded (Stations 4, 6, 7, 10, 11, 13, 14, 24, 26, 27, 31, 37, 38 and 51). Many of these are riparian zones along Spencer Creek. Additional habitats not assessed during the calling surveys provide additional amphibian habitat (confirmed by visual amphibian observations during avian surveys).
- ≠ Vernal pools within some of the woodlands in the study area have potential for woodland amphibian breeding (frogs and salamanders), given their longevity into the summer months. Wildlife Survey Unit 5 is particularly notable in this regard.

Migrant Birds

- ≠ Within the broader landscape context, avian migrants typically follow major landform features such as the Lake Ontario shoreline and the Niagara Escarpment. Since these areas are nearby, a wide variety of avian migrants would be expected to also use various habitats within the study area.
- ≠ As shown by the migrant survey, there is indeed a wide variety of vegetation types within the study area that provide habitat for a diverse suite of avian migrants (e.g. forest, thicket, marsh, open water and cultural associations).
- ≠ Several units had relatively higher numbers of migrant species (e.g. Units 9, 10 and 15). However, avian migrants will use a wide variety of habitat types during migration (not necessarily the 'higher quality' habitats where more conservative species might be found during the breeding season).
- ≠ In addition, it is expected that the larger ESA blocks (Hayesland Swamp, Hayesland Alvar, Christie Lake, Donald Farm Complex and Dundas Valley) would provide habitat for a diversity and abundance of avian migrants.
- ≠ Christie Lake / Spencer Creek backwater area could potentially provide specialized migrant habitat in the form of open water and mud flats.

Breeding Birds

- ≠ The study area includes a broad range of habitats that support a relatively high number of breeding bird species
- ≠ A large number of avian species of conservation concern were also recorded in the study area, including regionally and provincially significant species, area sensitive species and COSEWIC / MNR designated species at risk. Many of these are associated with specific habitat types found in the study area, as discussed in the next point.
- ≠ The study area includes a number of specialized habitat types which support rare / sensitive species with specific habitat requirements. Notable areas include:
 - ‘Alvars’ or cultural habitats with alvar characteristics, which support Golden-winged Warbler, Clay-colored Sparrow and Red-headed Woodpecker.
 - Open water (e.g. Christie Lake, Unit 5), which support Belted Kingfisher and several species of herons; Green Heron (*Butorides virescens*), Great-blue Heron (*Ardea herodias*) and Black-crowned Night-heron (*Nycticorax nycticorax*).
 - Larger woodlands, which support forest ‘interior’ or more sensitive species such as Pileated Woodpecker (*Dryocopus pileatus*), Veery (*Catharus fuscescens*), Ovenbird (*Seiurus aurocapillus*), Winter Wren (*Troglodytes troglodytes*), Wood Thrush (*Hylocichla mustelina*) and Scarlet Tanager (*Piranga olivacea*).
 - Conifer Plantations / large woodlands with conifers, which support conifer associated species or species typically with more northern distributions (e.g. Red-breasted Nuthatch (*Sitta canadensis*), Cooper’s Hawk (*Accipiter cooperii*), White-throated Sparrow (*Zonotrichia albicollis*), Pine Warbler, Black-and-white Warbler (*Mniotilta varia*) and Nashville Warbler (*Vermivora ruficapilla*)).
 - Carolinian woodlands, which support more ‘southern’ species such as Tufted Titmouse, Carolina Wren and Louisiana Waterthrush (the latter species also typically requires running water – ideal habitat is present in Spencer Gorge).
- ≠ Other notable observations include: Northern Mockingbird (*Mimus polyglottos*) in Unit 10; high numbers of Clay-colored Sparrow in Unit 16 and Black-and-white Warbler in Units 3 and 20; Orchard Oriole (*Icterus spurius*) in Units 7 and 14); wide distribution and abundance of numerous ‘successional-habitat species’, including Yellow-billed Cuckoo found in 9 units, Black-billed Cuckoo (*Coccyzus erythrophthalmus*) found in 5 units, Brown Thrasher found in 9 units, Blue-winged Warbler found in 9 units and Eastern Towhee found in 8 units.

Incidental Wildlife Observations

- ≠ A diverse suite of common butterflies and Odonates was recorded across the study area.
 - A number of these species are regionally and provincially significant.
 - Some of the recorded species are dependent on specialized habitat (including areas with an abundance of their larval host plants). These include Spicebush

Swallowtail (*Papilio troilus*), Giant Swallowtail (widespread in the study area) and sedge skippers / Mulberry Wing (sedge meadow specialists).

- ≠ Several common mammal species were recorded. Additional urban-adapted and / or generalist species are likely present (e.g. Opossum (*Didelphis virginiana*), Red Fox (*Vulpes vulpes*), Groundhog (*Marmota monax*)).
- ≠ Two reptile (snake) species were recorded. Additional species are undoubtedly present, including turtles and other snake species. Aside from open water, no specialized habitat or hibernacula were noted during field surveys.

Wildlife Habitat Assessment

- ≠ **Significant Wildlife Habitat.** Based on presence of rare species and / or specialized habitat (primarily alvar), a number of the Wildlife Survey Units could potentially be considered 'significant wildlife habitat' per the *Provincial Policy Statement* (MMAH 2005) and guidelines found in the *Natural Heritage Reference Manual* (OMNR 1999) and *Significant Wildlife Habitat Technical Guide* (OMNR 2000).
- ≠ **Habitat Quality.** Five of the Wildlife Survey Units have been identified as having 'Very High' habitat quality (Units 7, 20, 21, 22 and 26), based on a number of ecological attributes. These are all within existing ESAs. Of the remaining units, many are identified as 'High' quality based on habitat / species diversity and specialized habitats (e.g. alvar, open water, forest interior). The 'Moderate' quality areas are generally smaller, more isolated and support relatively less avian / amphibian diversity. The 'Low' areas are the smallest / most degraded habitats with few wildlife habitat attributes.
- ≠ A diverse suite of common butterflies and Odonates was recorded across the study area.
 - A number of these species are regionally and provincially significant.
 - Specialized butterfly habitat includes a small patch of sedge meadow (Unit 7) and habitats with host plants for significant species (Spicebush – Spicebush Swallowtail; Prickly Ash – Giant Swallowtail).
 - The alvar units, especially Units 20, 21 and 22, provide exceptional habitat for Butterflies and Odonates. A very broad cross-section of species was recorded, many species in higher densities than would be expected elsewhere. It is probable that the alvar habitats host many uncommon / rare species that more extensive surveys would reveal.

7.0 Recommendations

Although all representative habitats and most natural / semi-natural features within the study area were covered as part of this faunal inventory, some areas were not covered or visited only once. In addition, targeted searches for other wildlife groups (e.g. snakes, hawks / owls) were either not completed or included only partial coverage for the study area. In our opinion, the study would benefit from inclusion of these additional studies and more thorough coverage.

This report is intended to direct future work, but it is anticipated that any development applications or infrastructure projects within / adjacent to natural areas discussed in this report would be subject to further studies (e.g. Environmental Impact Study, Environmental Assessment). Faunal inventories and vegetation work should be refined in those future studies.

All of which is respectfully submitted;
Ecoplans Limited



Jeff Gross, MSc.,
Ecologist



Sherri Flegel, BES
Biologist

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Appendix H
ELC Datasheets

Weirs Lane

Marshboro Avenue

Brock Road and Concession Road 4West

ELC Community Description (Part A)

Metadata

Site: Brock Rd + Concession 4
Polygon: F
UTM:
Date: Aug 15/11 Time: 14:15
Surveyor(s): JCB, KGB
Weather: 28°C, clouds = 60%, wind = 3

Community Classification

Vegetation Type: MAAMI-3 - Red Canary Mineral Marsh
Inclusion:
Complex:

Polygon Description

System	Substrate	Topo Feature	Community
<input type="checkbox"/> Terrestrial <input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Aquatic	<input type="checkbox"/> Organic <input checked="" type="checkbox"/> Mineral Soil <input type="checkbox"/> Parent Min. <input type="checkbox"/> Acidic Bedrock <input type="checkbox"/> Basic Bedrock <input type="checkbox"/> Carb. Bedrock	<input type="checkbox"/> Lacustrine <input type="checkbox"/> Riverine <input type="checkbox"/> Bottomland <input type="checkbox"/> Terrace <input type="checkbox"/> Valley Slope <input checked="" type="checkbox"/> Tabloid <input type="checkbox"/> Roll, Upland <input type="checkbox"/> Cliff	<input type="checkbox"/> Talus <input type="checkbox"/> Crevice/Cave <input type="checkbox"/> Alvar <input type="checkbox"/> Rockland <input type="checkbox"/> Beach/Bar <input type="checkbox"/> Sand Dune <input type="checkbox"/> Bluff <input type="checkbox"/> Fen <input type="checkbox"/> Bog
<input type="checkbox"/> Lake <input type="checkbox"/> Pond <input type="checkbox"/> River <input type="checkbox"/> Stream <input checked="" type="checkbox"/> Marsh <input type="checkbox"/> Swamp	<input type="checkbox"/> Barren <input type="checkbox"/> Meadow <input type="checkbox"/> Prairie <input type="checkbox"/> Thicket <input type="checkbox"/> Savannah <input type="checkbox"/> Woodland <input type="checkbox"/> Forest <input type="checkbox"/> Plantation		
History <input checked="" type="checkbox"/> Natural <input type="checkbox"/> Cultural		Site	
Cover <input checked="" type="checkbox"/> Open <input type="checkbox"/> Shrub <input type="checkbox"/> Treed	<input type="checkbox"/> Open Water <input type="checkbox"/> Shallow Water <input checked="" type="checkbox"/> Surficial Dep. <input type="checkbox"/> Bedrock	Plant Form <input type="checkbox"/> Plankton <input type="checkbox"/> Submerged <input type="checkbox"/> Floating-Lvd. <input checked="" type="checkbox"/> Graminoid <input type="checkbox"/> Forb <input type="checkbox"/> Lichen <input type="checkbox"/> Bryophyte <input type="checkbox"/> Deciduous	<input type="checkbox"/> Coniferous <input type="checkbox"/> Mixed

Stand Description

Layer	HT	Cover	Species
1 Canopy	4	4	Red canary grass - clean pine
2 Sub-canopy			N/A
3 Understorey	5	2	Golden rods = asters - m. weed = field saw this
4 Groundcover	1	1	bittersweet nightshade - gt. thrs wart

HT Codes: 1: >25m 2: 25 - 10m 3: 10 - 2m 4: 2 - 1m 5: 1 - 0.5m 6: 0.5 - 0.2m 7: <0.2m

Cover Codes: 0: none 1: 0 - 10% 2: 10 - 25 3: 25 - 60% 4: >60%

Size Class Analysis	N < 10	N 10 - 24	N 25 - 50	N > 50
Snags	N < 10	N 10 - 24	N 25 - 50	N > 50
Deadfall/Logs	N < 10	N 10 - 24	N 25 - 50	N > 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	<input type="checkbox"/> Pioneer	<input checked="" type="checkbox"/> Young	<input type="checkbox"/> Mid-age	<input type="checkbox"/> Mature	<input type="checkbox"/> Old Growth
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PLANT SPECIES LIST

Metadata

Site: Brock rd. & Conc. 4
 Polygon: F
 UTM:
 Date: Aug 15/11 Time: 14:15
 Surveyor(s): JEB, KGB
 Weather: clouds=20%; 28°C, wind=3

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample		
	1	2	3	4			1	2	3	4			
Kud canarygrass	D												
Common milkweed		O											
wild carrot		O											
Canada goldenrod		O											
Common burdock		R											
Panicum-leaved aster		O											
Elecampane		O											
Field sow-thistle		O											
Hairy willow herb		R											
dark green bitush		R											
grass-leaved goldenrod		O											
brilliant sedge		R											
Timothy		R											
bitter-sweet nightshade		O											
Red osier dogwood		R											
Common st. johns wort		R											
Riverbank grape		R											
early goldenrod		R											
Rough Aster		R											
New Eng. Aster		O											
curly dock		R											

Source of common names: _____

Wildlife Observation Form

Metadata

Site: Brock Knob Can 4
 Polygon: F
 UTM:
 Date: Aug. 15/2011 Time: 1415
 Surveyor(s): J. Eby, K.B.
 Weather: 28 C, 48% CC

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor wintering
 Fallen Logs Deer wintering yards Bat Hibernacula
 Snags Migratory stopover Reptile Hibernacula

Species Observed

TY	Species	EV	Notes	#		TY	Species	EV	Notes	#
B	Bobolink		.			L	Cabbage White	.		
B	Red-tailed Hawk		.	0						
B	Turkey Vulture		..							
B	A. Goldfinch		.							
B	Barn Swallow		.			O	Cherry-faced Nuthawk	.		
						M	White-tailed Deer			10

Faunal Type Codes (TY)
 B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

Evidence Codes (EV)

Breedign Birds	Other Wildlife
SH-Suitable Habitat	OS- Observed
SM- Singing Male	DP-Distinctive Parts
T-Territory	TK- Tracks
A-Anxient Behavior	VO- Vocalization
D-Courtship Display	HO- House/Den
N-Nest Building	FE- Feeding Evidence
P-Pair	CA-Carcass/Bones
V-Visiting Nest	FY- Eggs or young
DD- Distraction Display	SC-Scat
NE-Nest with Eggs	SI- Other Signs (Specify)
AE-Adult entering nest	
NU- Used nest	
FY-Fledged Young	
FS- Food/Fecal Sac	

Metadata

Site: Brock Rd. & Con 4	Date: Aug. 15/2011
Polygon: F	Surveyor(s): JFC, KGB
UTM:	Weather: 28°C, 40% cc,

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	___	Other: _____
European Buckthorn	___	_____
Manitoba Maple	___	_____
Norway Maple	___	_____
Tartarian Honeysuckle	None	_____
Purple Loosetrife	___	_____
Common reed	___	_____
Multiflora Rose	___	_____
Periwinkle	___	_____
Dame's Rocket	___	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails	N	Other (please specify): _____
Walking	N	_____
ATV's, bikes, etc		_____

Dumping (Indicate abundance code for each)

Garbage	B	Other (please specify): _____
Yard Waste		_____

Recreational Use (Indicate polygon abundance code for each)

Walking	N	Other (please specify): _____
Biking	N	_____
Forts	N	_____
Squatting	N	_____
Campfires	N	_____

Tree Disease (Indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus	___	Leaf spots	___	Cankers	___	Dieback	___
Species:	Fungus	___	Leaf spots	___	Cankers	___	Dieback	___
Species:	Fungus	___	Leaf spots	___	Cankers	___	Dieback	___
Species:	Fungus	___	Leaf spots	___	Cankers	___	Dieback	___
Specific Diseases or Other (please specify): _____								

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____

List Species if known: _____

Flooding (pools and puddling) _____

Evidence of Fire _____

Trampling _____

Earth Displacement _____

Wind Throw (Blow Down) _____

Beaver Activity _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage _____ Invasive Species Removal _____

Monitoring program _____

Disturbance Location(s):

Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

Wildlife Observation Form

Metadata

Site: <u>Bank Rd. & Con. 4</u>	
Polygon: <u>E</u>	
UTM:	
Date: <u>Aug. 15/2011</u>	Time: <u>1320</u>
Surveyor(s): <u>SEB, LGB</u>	
Weather: <u>79°C, 80% CC, NE-3</u>	

Significant Wildlife Habitat (Check those that apply)

<input type="checkbox"/> Vernal Pools	<input type="checkbox"/> Turtle Nesting Sites	<input type="checkbox"/> Raptor wintering
<input type="checkbox"/> Fallen Logs	<input type="checkbox"/> Deer wintering yards	<input type="checkbox"/> Bat Hibernacula
<input type="checkbox"/> Snags	<input type="checkbox"/> Migratory stopover	<input type="checkbox"/> Reptile Hibernacula

Species Observed									
TY	Species	EV	Notes	#	TY	Species	EV	Notes	#
B	A. Crow			••	L	E. Tiger Swallowtail			••
B	A. Robin			••	L	C. Kinglet			••
B	A. Goldfinch			••	L	Cabbag White			••
B	Cedar Waxwing			••	L	Red-bellied Purple			••
B	Black-capped Chickadee			••	L	Giant Swallowtail			••
B	Common Grackle			•	L	Clouded Sulphur			••
					L	Monarch			•

Faunal Type Codes (TY)
 B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

- Evidence Codes (EV)**
- | | |
|-------------------------|---------------------------|
| Breedign Birds | Other Wildlife |
| SH- Suitable Habitat | OB- Observed |
| SM- Singing Male | DP- Distinctive Parts |
| T- Territory | TK- Tracks |
| A- Anxiety Behavior | VO- Vocalization |
| D- Courtship Display | HO- House/Den |
| N- Nest Building | FE- Feeding Evidence |
| P- Pair | CA- Carcass/Bones |
| V- Visiting Nest | FY- Eggs or young |
| DD- Distraction Display | SC- Scat |
| NE- Nest with Eggs | SI- Other Signs (Specify) |
| AE- Adult entering nest | |
| NU- Used nest | |
| FY- Fledged Young | |
| FS- Food/Fecal Sac | |

Management/Disturbance Data Sheet (Part A)

Metadata

Site: <u>Brook Rd + Conc. 4</u>	Date: <u>Aug 15/2011</u>
Polygon: <u>E</u>	Surveyor(s): <u>JEG, KBB</u>
UTM:	Weather: <u>23°C, 70% CC, NE-3</u>

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard		Other: _____
European Buckthorn	<u>VA</u>	_____
Manitoba Maple	_____	_____
Norway Maple	_____	_____
Tartarian Honeysuckle	<u>O</u>	_____
Purple Loosestrife	_____	_____
Common reed	_____	_____
Multiflora Rose	_____	_____
Periwinkle	_____	_____
Dame's Rocket	_____	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails <u>N</u>	Other (please specify): _____
Walking <u>N</u>	<u>17 Ladders</u>
ATV's, bikes, etc	

Dumping (Indicate abundance code for each)

Garbage <u>O</u>	Other (please specify): _____
Yard Waste	

Recreational Use (Indicate polygon abundance code for each)

Walking <u>N</u>	Other (please specify): _____
Biking <u>N</u>	
Forts <u>N</u>	
Squatting <u>N</u>	
Campfires <u>N</u>	

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Specific Diseases or Other (please specify):				

Management/Disturbance Data Sheet (Part B)

Tree Damage (indicate species, type of damage, abundance: I S
 Species: _____ S
 Species: _____ S
 Species: _____ S
 Species: _____ S
 Other (please specify): _____

Browse Damage (Indicate abundance code)

List Species if known: _____
 Flooding (pools and puddling) _____
 Evidence of Fire _____
 Trampling _____
 Earth Displacement _____
 Wind Throw (Blow Down) _____
 Beaver Activity _____

MANAGEMENT

Restoration/Management Activities (check those that apply)

Plantings _____ Species: _____

 Pesticide Use _____ Type: _____
 Tree Cutting _____ Authorized Trail: _____
 Signage _____ Invasive Species: _____
 Monitoring program _____

Disturbance Location(s):

Type: Abandoned Farm equip. GPS Co. x171
 Type: _____ GPS Co. x
 Type: _____ GPS Co. x
 Type: _____ GPS Co. x

Sketch a "bird's eye view" of the polygon and indicate the appropriate management/restoration activities (i.e. planting, clumps of invasive species, etc.)

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____

List Species if known: _____

Flooding (pools and puddling) _____

Evidence of Fire _____

Trampling _____

Earth Displacement _____

Wind Throw (Blow Down) _____

Beaver Activity _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage _____ Invasive Species Removal _____

Monitoring program _____

Disturbance Location(s):

Type: Abandoned Farm equip. GPS Co. x171 0579953 y4794903

Type: _____ GPS Co. x y

Type: _____ GPS Co. x y

Type: _____ GPS Co. x y

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

ELC Community Description (Part A)

Metadata

Site:	Brook Rd. i Conc Rd 4		
Polygon:	D		
UTM:			
Date:	Aug 15/11	Time:	12:30
Surveyor(s):	JEB, KGB		
Weather:	25°C, 50% cloud cover, wind=3		

Community Classification

Vegetation Type:	W0MM3 - Dry-Fresh Mixed Woodland
Inclusion:	SVD - deciduous savannah (Pear, buckthorn, apple)
Complex:	- lively old orchard

Polygon Description

System	Substrate	Topo Feature	Community		
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus	Lake	Barren
<input type="checkbox"/> Wetland	Mineral Soil	Riverine	Crevice/Cave	Pond	Meadow
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar	River	Prairie
	Acidic Bedrock	Terrace	Rockland	Stream	Thicket
	Basic Bedrock	Valley Slope	Beach/Bar	Marsh	Savannah
	Carb. Bedrock	<input checked="" type="checkbox"/> Tableland	Sand Dune	Swamp	<input checked="" type="checkbox"/> Woodland
		Roll. Upland	Bluff	Fen	Forest
		Cliff		Bog	Plantation
History					
<input checked="" type="checkbox"/> Natural					
<input type="checkbox"/> Cultural					
Cover		Plant Form			
<input type="checkbox"/> Open	Open Water	Plankton	Forb	Coniferous	
<input checked="" type="checkbox"/> Shrub	Shallow Water	Submerged	Lichen	<input checked="" type="checkbox"/> Mixed	
<input checked="" type="checkbox"/> Tree	<input checked="" type="checkbox"/> Surficial Dep.	Floating-Lvd.	Bryophyte		
	Bedrock	Graminoid	Deciduous		

Stand Description

Layer	HT	Cover	Species
1 Canopy	2	3	White Spruce > White Ash > Scots Pine > balsam poplar
2 Sub-canopy	3	3	Common buckthorn > apple > pear
3 Understorey	5	2	Gray dogwood = Common buckthorn > pear > hawthorn
4 Groundcover	6	4	Grasses > wild carrot > golden-rod

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0: none 1: 0-10% 2: 10-25 3: 25-60% 4: >60%

Size Class Analysis	C < 10	C 10-24	R 25-50	N > 50
Snags	R < 10	R 10-24	N 25-50	N > 50
Deadfall/Logs	R < 10	R 10-24	N 25-50	N > 50

Abundance Codes: N: None R: Rare C: Occasional A: Abundant

Community Age	Pioneer	<input checked="" type="checkbox"/> Young	Mid-age	Mature	Old Growth
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Metadata

Site: Brock rd i. Conc A	UTM:
Polgon: D	Surveyor(s): JFG, KGB
Date: Aug. 15/11	Weather:
Time: 12:30	

Soils

1 2 3

Tree Tally N/A

Position:	1	2	3	Species	Tally 1	Tally 2	Tally 3
Aspect:	280						
%	20%						
Type:	S						
Class:	A						
Strata: Texture	S/L						
Depth	22cm						
Strata: Texture	/						
Depth	/						
Strata: Texture	/						
Depth	/						
Strata: Texture	/						
Depth	/						
Effective Texture	S/L						
Surface Stoniness	N/A						
Surface Rockiness	N/A						
Depth to:							
Mottles	N/A						
Gley	N/A						
Bedrock	23cm						
Water table	N/A						
Carbonates	N/A						
Depth of Organics							
Pore Size Disc #1							
Pore Size Disc #2							
Pore Size Disc #3							
Moisture Regime	OIR						
				Total:			
				Basal Area			
				Snags			

NOTES:

Photos - 100-479-480

PLANT SPECIES LIST

Metadata

Site: Brock rd. concession 4
 Polygon: P
 UTM:
 Date: Aug 15/11 Time: 12:00
 Surveyor(s): JFB, KGB
 Weather:

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample
	1	2	3	4	
Common Apple		O	O		
Common buckthorn	A	A			
Teasle				O	
banjo grass				O	
White spruce	O				
balsam poplar	O				
bitter dock				O	
Wild carrot				O	
Riverbank grass			O		
Prickly ash			O		
Asparagus				R	
Canada goldenrod				O	
White Pine	O	O			
Tartarian honey-suckle			O		
black walnut			R		
Staghorn sumac			O		
hickory				O	
grass-leaved goldenrod				O	
Plum			R		
gray goldenrod				O	
Bluish Geranium				O	
Hawthorn sp.	O	O			
narrow-leaved plantain				O	
grass-leaved				O	
Pedicularis		O	O		
Sundew				R	
white Ash	O	O			
Red-barked dogwood				O	
Red cedar			O		
Honeyberry			R		

Species	Layer				Sample
	1	2	3	4	
Common St. John's wort				O	
Pine cherry			O	O	
Scots pine	O				
Yarrow				O	
New Eng. Aster				O	
Wild Strawberry				O	
blue vervain				O	
Poison Ivy				R	
Common milkweed				R	
N. bugleweed				R	
Timothy				O	
oak leaf				O	
foxglove beard-tongue				R	
common cattail				R	
White Elm	R				
Missouri willow	R				
Lamb-ear				R	
bittersweet nightshade				R	
barberry				R	
Juncus pyramidalis				K	
N. willow herb				R	
Slender willow			R		
purple loosestrife				R	
dark green bulrush				R	
broad-leaf cattail				K	

wet ditch
 but
 is
 very
 dry

Source of common names: _____

Wildlife Observation Form

Metadata

Site: Brock Rd. 3 Can 4
 Polygon: 0
 UTM:
 Date: Aug 19/2011 Time: 1200
 Surveyor(s): JEL, KRB
 Weather: 25°C, 50% CC, NE-3

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor wintering
 Fallen Logs Deer wintering yards Bat Hibernacula
 Snags Migratory stopover Reptile Hibernacula

Species Observed

TY	Species	EV	Notes	#	TY	Species	EV	Notes	#
B	E. Meadowlark			**	L	Cabbage White		**	
B	Black-capped Chickadee			**	L	Clouded Sulphur		*	
B	A. Goldfinch			**	L	E-Tailed Blue		*	
B	Song Sparrow			**	L	Viceroy		*	
B	Blue Jay			**	M	E. Cottontail		*	
B	E. Towhee			*					
B	Mourning Dove			**					
B	Co. Creeper			*	L	Black Swallowtail		*	
B	Turkey Vulture			*					
					M	White-tailed Deer		TK	
					M	Chipmunk		*	
					L	Rear Crescent		*	
					L	Giant Swallowtail		*	
					L	Red-spotted Purple		*	
					L	Common Wood-Nymph		*	

Faunal Type Codes (TY)

B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

Evidence Codes (EV)

Breedign Birds

- SH-Suitable Habitat
- SM- Singing Male
- T-Territory
- A-Anxiety Behavior
- D-Courtship Display
- N-Nest Building
- P-Pair
- V-Visiting Nest
- DD- Distraction Display
- NE-Nest with Eggs
- AE-Adult entering nest
- NU- Used nest
- FY-Fledged Young
- FS- Food/Fecal Sac

Other Wildlife

- OB- Observed
- DP-Distinctive Parts
- TK- Tracks
- VO- Vocalization
- HO- House/Den
- FE- Feeding Evidence
- CA-Carcass/Bones
- FY- Eggs or young
- SC-Scat
- SI- Other Signs (Specify)

Metadata

Site: Brock Rd, Con 4	Date: Aug 15/2011
Polygon: D	Surveyor(s): JEG, KGB
UTM:	Weather: 25°C, 50% CC, NE-3

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard		Other:	
European Buckthorn	A		
Manitoba Maple			
Norway Maple			
Tartarian Honeysuckle	A		
Purple Loosetrife			
Common reed			
Multiflora Rose			
Periwinkle			
Dame's Rocket			

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails	N	Other (please specify):	
Walking	N		
ATV's, bikes, etc			

Dumping (Indicate abundance code for each)

Garbage	0	Other (please specify):	
Yard Waste			

Recreational Use (Indicate polygon abundance code for each)

Walking	N	Other (please specify):	
Biking	N		
Forts	N		
Squatting	N		
Campfires	N		

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback

Specific Diseases or Other (please specify):

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: Hawthorn Sp. Source Tent Caterpillars Abundance R

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____

List Species if known: _____

Flooding (pools and puddling) _____

Evidence of Fire _____

Trampling _____

Earth Displacement _____

Wind Throw (Blow Down) _____

Beaver Activity _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage _____ Invasive Species Removal _____

Monitoring program _____

Disturbance Location(s):

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

ELC Community Description (Part A)

Metadata

Site: <i>Brax rd i Conc. 4</i>
Polygon: <i>C</i>
UTM:
Date: <i>Aug. 15/11</i> Time: <i>11:15</i>
Surveyor(s): <i>JEB, KGB</i>
Weather:

Community Classification

Vegetation Type: <i>MEMF1 - New - Fresh Febr Meadow</i>
Inclusion:
Complex:

Polygon Description

System	Substrate	Topo Feature	Community		
<input checked="" type="checkbox"/> Terrestrial	<input type="checkbox"/> Organic	<input type="checkbox"/> Lacustrine	<input type="checkbox"/> Talus	<input type="checkbox"/> Lake	<input type="checkbox"/> Barren
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	<input type="checkbox"/> Riverine	<input type="checkbox"/> Crevice/Cave	<input type="checkbox"/> Pond	<input checked="" type="checkbox"/> Meadow
<input type="checkbox"/> Aquatic	<input type="checkbox"/> Parent Min.	<input type="checkbox"/> Bottomland	<input type="checkbox"/> Alvar	<input type="checkbox"/> River	<input type="checkbox"/> Prairie
	<input type="checkbox"/> Acidic Bedrock	<input type="checkbox"/> Terrace	<input type="checkbox"/> Rockland	<input type="checkbox"/> Stream	<input type="checkbox"/> Thicket
	<input type="checkbox"/> Basic Bedrock	<input type="checkbox"/> Valley Slope	<input type="checkbox"/> Beach/Bar	<input type="checkbox"/> Marsh	<input type="checkbox"/> Savannah
	<input type="checkbox"/> Carb. Bedrock	<input checked="" type="checkbox"/> Tableland	<input type="checkbox"/> Sand Dune	<input type="checkbox"/> Swamp	<input type="checkbox"/> Woodland
History		<input type="checkbox"/> Roll. Upland	<input type="checkbox"/> Bluff	<input type="checkbox"/> Fen	<input type="checkbox"/> Forest
<input checked="" type="checkbox"/> Natural		<input type="checkbox"/> Cliff		<input type="checkbox"/> Bog	<input type="checkbox"/> Plantation
<input type="checkbox"/> Cultural					
	Site				
Cover	<input type="checkbox"/> Open Water	Plant Form			
<input checked="" type="checkbox"/> Open	<input type="checkbox"/> Shallow Water	<input type="checkbox"/> Plankton	<input checked="" type="checkbox"/> Forb	<input type="checkbox"/> Coniferous	
<input type="checkbox"/> Shrub	<input checked="" type="checkbox"/> Surficial Dep.	<input type="checkbox"/> Submerged	<input type="checkbox"/> Lichen	<input type="checkbox"/> Mixed	
<input type="checkbox"/> Treed	<input type="checkbox"/> Bedrock	<input type="checkbox"/> Floating-Lvd.	<input type="checkbox"/> Bryophyte		
		<input type="checkbox"/> Graminoid	<input type="checkbox"/> Deciduous		

Stand Description

Layer	HT	Cover	Species
1 Canopy	2	1	<i>White Ash</i>
2 Sub-canopy	3	1	<i>Common buckethorn >> red osier dogwood >> gray dogwood</i>
3 Understorey	5	4	<i>Golden rods > Asters > grasses > Canada thistle</i>
4 Groundcover	6	3	<i>bird foot trefoil = cow vetch > wild strawberry</i>

HT Codes: 1: >25m 2: 25 - 10m 3: 10 - 2m 4: 2 - 1m 5: 1 - 0.5m 6: 0.5 - 0.2m 7: <0.2m

Cover Codes: 0:none 1: 0 - 10% 2: 10 - 25 3: 25 - 60% 4: >60%

Size Class Analysis	O < 10	R 10 - 24	N 25 - 50	N > 50
Snags	N < 10	N 10 - 24	N 25 - 50	N > 50
Deadfall/Logs	R < 10	N 10 - 24	N 25 - 50	N > 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	<input checked="" type="checkbox"/> Pioneer	<input type="checkbox"/> Young	<input type="checkbox"/> Mid-age	<input type="checkbox"/> Mature	<input type="checkbox"/> Old Growth
---------------	---	--------------------------------	----------------------------------	---------------------------------	-------------------------------------

PLANT SPECIES LIST

Metadata

Site: Brock Rd i conc. 4
 Polygon: C
 UTM:
 Date: Aug 15/11 Time: 11:15
 Surveyor(s): JEB, KGB
 Weather:

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample
	1	2	3	4			1	2	3	4	
Canada thistle			O			broad-leaf cattail			R		
bitter nightshade			O			Apple	R				
Common milkweed			O			Field sunthistle				O	
Timothy			O								
orchard grass			O								
Common burdock		O									
Low wetch				O							
quack grass			O								
Barnyard grass			O								
New Eng. Aster			O								
purple-leaf Aster			O								
Canada goldenrod			O								
bitter dock			O								
wild carrot			A								
Rough-fruited amaranth			O								
Rough amaranth			O								
Cannabis sativa				R	Plank A						
birdfoot trefoil				A							
Common st. Johns wort			O								
Ternstroem humphestry			O								
P. chinensis			O								
Gray dogwood			O								
Red-owar dogwood			O								
White Ash			R								
belahs sedge			O								
grass-leaved nutmeg			O								
Red-canary grass			R								
Teasel			R								
chickory			O								
white clover			O								

Source of common names: _____

Wildlife Observation Form

Metadata

Site: Con. 47 Brock Rd.
 Polygon: C
 UTM:
 Date: Aug. 15/2011 Time: 11:20
 Surveyor(s): JFG, KOR
 Weather: 24°C, 60% CC

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor wintering
 Fallen Logs Deer wintering yards Bat Hibernacula
 Snags Migratory stopover Reptile Hibernacula

Species Observed

TY	Species	EV	Notes	#	TY	Species	EV	Notes	#
B	Blue Jay		..		L	Giant Swallowtail			
B	Willow Flycatcher		..		L	Cabbage White			
B	A. Goldfinch		..		L	Monarch			
B	Barn Swallow		..		L	Clouded Sulphur			
B	Indigo Bunting		..						
B	A. Goldfinch		..		D	Green Darter			
B	Bobolink		..		D	Blue sp.			
B	Song Sparrow		..		D	Cherry-bellied Noddyhawk			
B	E. Starling		..						
B	A. Crow		..						
B	C. Yellowthroat		..						
B	Turkey Vulture		..						

Faunal Type Codes (TY)

B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

Evidence Codes (EV)

Breedign Birds

- SH-Suitable Habitat
- SM- Singing Male
- T-Territory
- A-Anxiety Behavior
- D-Courtship Display
- N-Nest Building
- P-Pair
- V-Visiting Nest
- DD- Distraction Display
- NE-Nest with Eggs
- AE-Adult entering nest
- NU- Used nest
- FY-Fledged Young
- FS- Food/Fecal Sac

Other Wildlife

- OB- Observed
- DP-Distinctive Parts
- TK- Tracks
- VO- Vocalization
- HO- House/Den
- FE- Feeding Evidence
- CA-Carcass/Bones
- FY- Eggs or young
- SC-Scat
- SI- Other Signs (Specify)

Pic #0477 & 0478

Management/Disturbance Data Sheet (Part A)

Metadata

Site: <u>Brake Rd to Can 4</u>	Date: <u>Aug 15/2011</u>
Polygon: <u>C</u>	Surveyor(s): <u>J.F.G., KGB</u>
UTM:	Weather: <u>24°C, 10% CC, NE-2</u>

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	<u> </u>	Other: <u> </u>
European Buckthorn	<u>0</u>	<u> </u>
Manitoba Maple	<u> </u>	<u> </u>
Norway Maple	<u> </u>	<u> </u>
Tartarian Honeysuckle	<u>0</u>	<u> </u>
Purple Loosestrife	<u> </u>	<u> </u>
Common reed	<u> </u>	<u> </u>
Multiflora Rose	<u> </u>	<u> </u>
Periwinkle	<u> </u>	<u> </u>
Dame's Rocket	<u> </u>	<u> </u>

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails	<u>N</u>	Other (please specify):
Walking	<u>N</u>	
ATV's, bikes, etc		

Dumping (Indicate abundance code for each)

Garbage	<u>0</u>	Other (please specify): <u>Rock pile - Snake habitat</u>
Yard Waste		

Recreational Use (Indicate polygon abundance code for each)

Walking	<u>N</u>	Other (please specify):
Biking	<u>N</u>	
Forts	<u>N</u>	
Squatting	<u>N</u>	
Campfires	<u>N</u>	

Tree Disease (Indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus <u> </u>	Leaf spots <u> </u>	Cankers <u> </u>	Dieback <u> </u>
Species:	Fungus <u> </u>	Leaf spots <u> </u>	Cankers <u> </u>	Dieback <u> </u>
Species:	Fungus <u> </u>	Leaf spots <u> </u>	Cankers <u> </u>	Dieback <u> </u>
Species:	Fungus <u> </u>	Leaf spots <u> </u>	Cankers <u> </u>	Dieback <u> </u>
Specific Diseases or Other (please specify):				

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)		
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Other (please specify): _____		
Browse Damage (Indicate abundance code)		Other (please be specific)
List Species if known:	<u>White Ash - R</u>	
Flooding (pools and puddling)	_____	
Evidence of Fire	_____	
Trampling	_____	
Earth Displacement	_____	
Wind Throw (Blow Down)	_____	
Beaver Activity	_____	

MANAGEMENT

Restoration/Management Activities (check those that apply)		
Plantings _____	Species: _____	_____

Pesticide Use _____	Type: _____	
Tree Cutting _____	Authorized Trails _____	
Signage _____	Invasive Species Removal _____	
Monitoring program _____		
Disturbance Location(s):		
Type: _____	GPS Co. <u>x</u>	<u>y</u>
Type: _____	GPS Co. <u>x</u>	<u>y</u>
Type: _____	GPS Co. <u>x</u>	<u>y</u>
Type: _____	GPS Co. <u>x</u>	<u>y</u>

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

ELC Community Description (Part A)

Metadata

Site:	Brook rd + Conc. 4		
Polygon:	B		
UTM:			
Date:	Aug 15/11	Time:	10:30
Surveyor(s):	JFB, KGB		
Weather:	clouds 60%; 22°C; wind=2		

Community Classification

Vegetation Type:	RBSRZ - Non-Calcareous Shrub Rock Barren
Inclusion:	#1 - THON 2-4 - gray dogwood thicket
Complex:	#2 - MAAMI-2 - Catail marsh

Polygon Description

System	Substrate	Topo Feature	Community			
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus	Lake		Barren
<input type="checkbox"/> Wetland	Mineral Soil	Riverine	Crevice/Cave	Pond		Meadow
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	<input checked="" type="checkbox"/> Alvar	River		Prairie
	Acidic Bedrock	Terrace	Rockland	Stream		<input checked="" type="checkbox"/> Thicket
History	<input checked="" type="checkbox"/> Basic Bedrock	Valley Slope	Beach/Bar	Marsh		Savannah
<input checked="" type="checkbox"/> Natural	Carb. Bedrock	Tableland	Sand Dune	Swamp		Woodland
<input type="checkbox"/> Cultural		Roll. Upland	Bluff	Fen		Forest
	Site	Cliff		Bog		Plantation
Cover	Open Water	Plant Form				
<input type="checkbox"/> Open	Shallow Water	Plankton	Forb		Coniferous	
<input checked="" type="checkbox"/> Shrub	Superficial Dep.	Submerged	Lichen		Mixed	
<input type="checkbox"/> Treed	<input checked="" type="checkbox"/> Bedrock	Floating-Lvd.	Bryophyte			
		Graminoid	<input checked="" type="checkbox"/> Deciduous			

Stand Description

Layer	HT	Cover	Species
1 Canopy	3	4	Common buckthorn 22 red-osier dogwood + choke cherry
2 Sub-canopy			N/A
3 Understorey	6	4	Goldenrods = grasses 7 wild carrot
4 Groundcover	7	3	Narrow-leaved plantain 2 strawberry

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0: none 1: 0-10% 2: 10-25 3: 25-60% 4: >60%

Size Class Analysis	D < 10	R 10-24	N 25-50	N > 50
Snags	0 < 10	N 10-24	N 25-50	N > 50
Deadfall/Logs	R < 10	N 10-24	N 25-50	N > 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	<input checked="" type="checkbox"/> Pioneer	<input type="checkbox"/> Young	<input type="checkbox"/> Mid-age	<input type="checkbox"/> Mature	<input type="checkbox"/> Old Growth
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Metadata

Site: Brook rd & Co. 4	UTM:
Polgon: B	Surveyor(s): JFG, KGB
Date: Aug. 15/11	Weather: 22°C, clouds 60%, wind 2
Time: 10:30	

Soils		1	2	3	Tree Tally N/A			
Position:		1			Species	Tally 1	Tally 2	Tally 3
Aspect:		180°						
%		1%						
Type:		S						
Class:		A						
Strata: Texture		SL						
Depth		10cm						
Strata: Texture		/						
Depth		/						
Strata: Texture		/						
Depth		/						
Strata: Texture		/						
Depth		/						
Effective Texture		SL						
Surface Stoniness		/						
Surface Rockiness		/						
Depth to:								
Mottles		/						
Gley		/						
Bedrock		11cm						
Water table		/						
Carbonates		/						
Depth of Organics		2cm						
Pore Size Disc #1								
Pore Size Disc #2								
Pore Size Disc #3								
Moisture Regime		O/R						
					Total:			
					Basal Area			
					Snags			

NOTES:
 photos - 100-475-476

PLANT SPECIES LIST

Metadata

Site: Brock Rd: Conc. 4
 Polygon: B
 UTM:
 Date: Aug 15/11 Time: 10:30
 Surveyor(s): JTB, KGB
 Weather:

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample	
	1	2	3	4			1	2	3	4		
Red-osier dogwood						Virginia creeper					0	
Nissan willow						RH cherry	R					
Common buckthorn						clay ground cherry						0
N. willow herb				R		bur oak	R					
grass-leaved goldenrod						apple	R					
Common st. John's Wort					0	fox weed					R	
wild mandarin					0	Scots pine	R					
Fireglare beardtongue				R	A ✓							
leaf-leaved Aster					0							
Trout sp.					0							
Common milkweed					0							
Asparagus				R								
burd. fruit tree					0							
wild carrot					0							
Canada goldenrod					0							
Rough Asters					0							
Northern milk					R							
white Elm	R											
wild strawberry					A							
goldenrod s.p.					0	1 → Solidago gigantea						
backyard grass					0							
Common evening primrose					0							
narrow-leaved plantain					A							
heat-ill					0							
leafy sorrel					0							
grass goldenrod					0							
bitter dock					0							
Pinkish Ash	0											
Riverbank grass	0											
Red Raspberry					0							

Source of common names: _____

Wildlife Observation Form

Metadata

Site: Cent + Brock Rd.
 Polygon: B
 UTM:
 Date: Aug 15 2011 Time: 1030
 Surveyor(s): JEG, KGB
 Weather: 22°C, 60% CC, NE-Z

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor wintering
 Fallen Logs Deer wintering yards Bat Hibernacula
 Snags Migratory stopover Reptile Hibernacula

Species Observed

TY	Species	EV	Notes	#	TY	Species	EV	Notes	#
B	Yellow Warbler		••	H	D	Darter sp.	-•		
B	Town Sparrow		••	S	D	Green Heron	-•		
B	Mockingbird		••	H					
B	Willow Flycatcher		•	H					
B	Rain Swallow		H	H					
B	Field Sparrow		•	S	L	Cabbage White	••		
B	N. Cardinal		••	S					
B	A. Goldfinch		••	H					
B	Blue Jay		••	H					
B	E. Starling		••	X					
B	Red-winged Blackbird		••	H	B	Black-capped Chickadee	-••		H
B	Common Grackle		••	H					
B	E. Towhee		-••	S					
B	A. Crow		••	H					
B	Horned Lark		•	H					
B	Gray Catbird		•	S					
B	Downy Woodpecker		•	H					

Faunal Type Codes (TY)

B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

Evidence Codes (EV)

Birds

- SH- Suitable Habitat
- SM- Singing Male
- T- Territory
- A- Anxiety Behavior
- D- Courtship Display
- N- Nest Building
- P- Pair
- V- Visiting Nest
- DD- Distraction Display
- NE- Nest with Eggs
- AE- Adult entering nest
- NU- Used nest
- FY- Fledged Young
- FS- Food/Fecal Sac

Other Wildlife

- OB- Observed
- DP- Distinctive Parts
- TK- Tracks
- VO- Vocalization
- HO- House/Den
- FE- Feeding Evidence
- CA- Carcass/Bones
- FY- Eggs or young
- SC- Scat
- SI- Other Signs (Specify)

Metadata

Site: <u>Con 41 Brock Rd.</u>	Date: <u>Aug 15/2011</u>
Polygon: <u>B</u>	Surveyor(s): <u>JEG, KGB</u>
UTM:	Weather: <u>22°C, 60% CC, NE-2</u>

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard		Other:	
European Buckthorn	<u>D</u>		
Manitoba Maple	<u>—</u>		
Norway Maple	<u>—</u>		
Tartarian Honeysuckle	<u>O</u>		
Purple Loosestrife	<u>—</u>		
Common reed	<u>—</u>		
Multiflora Rose	<u>—</u>		
Periwinkle	<u>—</u>		
Dame's Rocket	<u>—</u>		

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails N Other (please specify): _____
 Walking O
 ATV's, bikes, etc

Dumping (Indicate abundance code for each)

Garbage O Other (please specify): _____
 Yard Waste

Recreational Use (Indicate polygon abundance code for each)

Walking N Other (please specify): _____
 Biking N
 Farts N
 Squatting N
 Campfires N

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback
Specific Diseases or Other (please specify):				

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____

List Species if known: _____

Flooding (pools and puddling) _____

Evidence of Fire _____

Trampling _____

Earth Displacement _____

Wind Throw (Blow Down) _____

Beaver Activity _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage _____ Invasive Species Removal _____

Monitoring program _____

Disturbance Location(s):

Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

Metadata

Site:	Brook rd & Conc. A		
Polygon:	A		
UTM:			
Date:	Aug 15/11	Time:	
Surveyor(s):	JFB, KGB		
Weather:	Clouds - 60%, 70°C, wind = 2		

Community Classification

Vegetation Type:	RBTB2 - Non-calcareous Treed Rock Barren
Inclusion:	#1 - R30 - open rock barren;
Complex:	#2 MFKZ - Dry - Fresh Non-calcareous bedrock Mixed Meadow

Polygon Description

System	Substrate	Topo Feature		Community
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus	Lake Barren
<input type="checkbox"/> Wetland	Mineral Soil	Riverine	Crevical/Cave	Pond Meadow
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	<input checked="" type="checkbox"/> Abar	River Prairie
	Acidic Bedrock	Terrace	Rockland	Stream Thicket
History	<input checked="" type="checkbox"/> Basic Bedrock	Valley Slope	Beach/Bar	Marsh Savannah
<input checked="" type="checkbox"/> Natural	Carb. Bedrock	Tableland	Sand Dune	Swamp Woodland
<input type="checkbox"/> Cultural		Roll. Upland	Bluff	Fen <input checked="" type="checkbox"/> Forest
	Site	Cliff		Bog Plantation
Cover	Open Water	Plant Form		
<input type="checkbox"/> Open	Shallow Water	Plankton	Forb	<input checked="" type="checkbox"/> Coniferous
<input type="checkbox"/> Shrub	Surficial Dep.	Submerged	Lichen	<input type="checkbox"/> Mixed
<input checked="" type="checkbox"/> Treed	<input checked="" type="checkbox"/> Bedrock	Floating-Lvd.	Bryophyte	
		Graminoid	Deciduous	

Stand Description

Layer	HT	Cover	Species
1 Canopy	2	A	Scots Pine >> Red Ash = balsam poplar
2 Sub-canopy	3	3	Common buckthorn
3 Understorey	A	3	haratian honey suckle > common buckthorn
4 Groundcover	6	3	Common buckthorn > canada golderoed > wild strawberry

HT Codes: 1: >25m 2: 25 - 10m 3: 10 - 2m 4: 2 - 1m 5: 1 - 0.5m 6: 0.5 - 0.2m 7: <0.2m

Cover Codes: 0: none 1: 0 - 10% 2: 10 - 25 3: 25 - 60% 4: >60%

Size Class Analysis	A	D	N	N
Snags	0 < 10	0 10 - 24	N 25 - 50	N > 50
Deadfall/Logs	A < 10	0 10 - 24	N 25 - 50	N > 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	Young	<input checked="" type="checkbox"/> Mid-age	Mature	Old Growth
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Metadata

Site: Brock Rd. Conv. #4	UTM:
Polygon: A	Surveyor(s): Jessica Greeley & Ken Brunell
Date: Aug 13/2011	Weather: 20°C, NE-2, 40% CC
Time: 9:13	

Soils	1	2	3	Tree Tally
Position:	1	1		Species
Aspect:	90°	90°		Tally 1
%	2	2		Tally 2
Type:	S	S		Tally 3
Class:	A	A		Scott's Pine
Strata: Texture	SiL	SiL		E. Buckthorn
Strata: Depth	6cm	65cm		White Elm
Strata: Texture	/	/		Common Apple
Strata: Depth	/	/		
Strata: Texture	/	/		
Strata: Depth	/	/		
Strata: Texture	/	/		
Strata: Depth	/	/		
Effective Texture	SiL	SiL		
Surface Stoniness	N/A	N/A		
Surface Rockiness	N/A	N/A		
Depth to:				
Mottles	N/A	N/A		
Gley	N/A	N/A		
Bedrock	7cm	7cm		
Water table	N/A	N/A		
Carbonates	N/A	N/A		
Depth of Organics	.02	.5		Total:
Pore Size Disc #1				Basal Area
Pore Size Disc #2				Snags
Pore Size Disc #3				
Moisture Regime	O/R	O/R		

NOTES:

Pics 0471 + 0472 - Alvar adjacent to polygon A
 0473 : 047A - polygon A

PLANT SPECIES LIST

Metadata

Site: Brock Rd i Conc. A
 Polygon: A
 UTM:
 Date: Aug. 15/11 Time: 0915
 Surveyor(s): JEB, KGB
 Weather: cloud 100%, 20°C, wind=2

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample	
	1	2	3	4			1	2	3	4		
Common buckthorn	R	D	A	A		White Ash	R					
White Elm	R					Trask					R	
Scots Pine	D	O	O			Curly dock					R	
Canada goldenrod				O		Common Apple	R					
grass-leaved goldenrod				O		choke cherry		R				
bur oak			R			Timothy					R	
wild strawberry				O		Prunus sp.		R				
Wild carrot				O		Foxglove beardtongue					R	1 ✓
Red Ash	R	O	O			common fleabane					R	
Tartarian honey-suckle		A				Common lilac		R				
Riverbank grape				O		black walnut					R	
heat-all				O		Red osier dogwood		O				
hatter i eggs				O		Missouri willow		R				
Sundrops				R		Trembling Aspen		R				
Rough-leaved goldenrod				O		hairy wood grass					O	
Poison lily				R		New Eng. Asker					O	
Orchard grass				R		Smooth brom					O	
Rough-fruited cinquefoil				R		Yarrow					R	
White clover				R		Common mullein					R	
honey-suckle sp.				O		Canada thistle					R	
philadelphia fleabane				O		chickweed					R	
Common st. Johns wort				O		Field Sow thistle					R	
common ragweed				R		narrow-leaved plantain					R	
Hearthorn sp.				O		penicill-leaved aster					R	
Silky dogwood				O								
White cedar				R								
Balsam poplar	R											
crack willow		R										
Strawberry sumac				R								
bird foot tree				O								

Source of common names: NewCombs

Wildlife Observation Form

Metadata

Site: Brock Rd. & Con. #4
 Polygon: R
 UTM:
 Date: Aug 15 2011 Time: 9:15
 Surveyor(s):
 Weather: 70°C, RH=2, 40% CC

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor wintering
 Fallen Logs Deer wintering yards Bat Hibernacula
 Snags Migratory stopover Reptile Hibernacula

Species Observed

TY	Species	EV	Notes	#	TY	Species	EV	Notes	#
B	N. Cardinal		"	S	M	Mammal sp. den			
B	House Sparrow		"	H					
B	House Finch	::	"	H	M	Red Fox - scat			
B	Canada Warbler	::	"	H					
B	A. Goldfinch	□	"	H	D	Cherry-faced Woodpecker	-		
B	Black-capped Chickadee	□	"	H	D	Downy Woodpecker	-		
B	Canada Goose		"	X					
B	Mourning Dove	"	"	X	L	Common Wood Nymph	-		
B	House Wren	"	"	S	L	Agabus White	-		
B*	Common Raven		→ flew over calling ↑ heading north (low)						
B	Indigo Bunting	"	"	S					
B	Chipping Sparrow	"	"	H	B	Ar. Robin	"	H	
B	Barn Swallow	"	"	H					
B	Gray Catbird	"	"	H					
B	Downy Woodpecker	"	"	H					
B	Common Grackle	"	"	H					

Faunal Type Codes (TY)

B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

Evidence Codes (EV)

Breedign Birds

- SH-Suitable Habitat
- SM- Singing Male
- T-Territory
- A-Anxiety Behavior
- D-Courtship Display
- N-Nest Building
- P-Pair
- V-Visiting Nest
- DD- Distraction Display
- NE-Nest with Eggs
- AE-Adult entering nest
- NU- Used nest
- FY-Fledged Young
- FS- Food/Fecal Sac

Other Wildlife

- OB- Observed
- DP-Distinctive Parts
- TK- Tracks
- VO- Vocalization
- HO- House/Den
- FE- Feeding Evidence
- CA-Carcass/Bones
- FY- Eggs or young
- SC-Scat
- SI- Other Signs (Specify)

Metadata

Site: <u>Brock Rd. & Conc. #4</u>	Date: <u>Aug 15/2011</u>
Polygon: <u>A</u>	Surveyor(s): <u>Jess Grealy & Ken Brunel</u>
UTM:	Weather: <u>20°C, W 2, 40% CC</u>

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard		Other: _____
European Buckthorn	<u>✓ A</u>	_____
Manitoba Maple	_____	_____
Norway Maple	_____	_____
Tartarian Honeysuckle	<u>✓ A</u>	_____
Purple Loosestrife	_____	_____
Common reed	_____	_____
Multiflora Rose	_____	_____
Periwinkle	_____	_____
Dame's Rocket	_____	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails	<u>N</u>	Other (please specify): _____
Walking	<u>N</u>	_____
ATV's, bikes, etc		_____

Dumping (Indicate abundance code for each)

Garbage	<u>0</u>	Other (please specify): _____
Yard Waste		_____

Recreational Use (Indicate polygon abundance code for each)

Walking	<u>N</u>	Other (please specify): _____
Biking	<u>N</u>	_____
Foris	<u>N</u>	_____
Squatting	<u>N</u>	_____
Campfires	<u>N</u>	_____

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Specific Diseases or Other (please specify): _____				

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____

List Species if known: Missouri Willow - R

Flooding (pools and puddling) _____

Evidence of Fire _____

Trampling _____

Earth Displacement _____

Wind Throw (Blow Down) _____

Beaver Activity _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings Species: Scot's Pine - D

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage Invasive Species Removal _____

Monitoring program _____

Disturbance Location(s):

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

Brock Road and Concession Road 5 West

Metadata Greenville

Site: Black Rd N of Conc. 5

Polygon: F

UTM: 17T 0579718 4798123

Date: Aug. 12 / 11 Time: 0950

Surveyor(s): Tara B. Chavlatte M

Weather: 20°C sunny, wind, 5% cloud, no precip

Community Classification

Vegetation Type: FO.CS3-1 - White Cedar ~~occasional~~ Blacklock Con Forest

Inclusion:

Complex:

Polygon Description

System	Substrate	Topo Feature	Community			
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus	Lake	Barren	
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	Riverine	Crevice/Cave	Pond	Meadow	
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar	River	Prairie	
History	Acidic Bedrock	Terrace	Rockland	Stream	Thicket	
	Basic Bedrock	Valley Slope	Beach/Bar	Marsh	Savannah	
	Carb. Bedrock	<input checked="" type="checkbox"/> Tableland	Sand Dune	Swamp	Woodland	
		Roll. Upland	Bluff	Fen	<input checked="" type="checkbox"/> Forest	
	Site	Cliff	Bog		Plantation	
Cover		Plant Form				
<input type="checkbox"/> Open	Open Water	Plankton	Forb	<input checked="" type="checkbox"/> Coniferous		
<input type="checkbox"/> Shrub	Shallow Water	Submerged	Lichen	<input type="checkbox"/> Mixed		
<input checked="" type="checkbox"/> Treed	Surficial Dep.	Floating-Lvd.	Bryophyte			
	Bedrock	Graminoid	Deciduous			

Stand Description

Layer	HT	Cover	Species
1 Canopy	2	3	<u>east. white cedar >>> white pine</u>
2 Sub-canopy	1	1	
3 Understorey	4/3	3	<u>N. prickly ash >> comm burkthorn</u>
4 Groundcover	6/4	4	<u>N. prickly ash > herb robert > crowsfoot > v. nightshade = garlic mustard</u>

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0: none 1: 0-10% 2: 10-25 3: 25-60% 4: >60%

Size Class Analysis	O	A	B	N
Snags	<input type="checkbox"/> < 10	<input checked="" type="checkbox"/> 10-24	<input type="checkbox"/> 25-50	<input type="checkbox"/> > 50
Deadfall/Logs	<input type="checkbox"/> < 10	<input checked="" type="checkbox"/> 10-24	<input type="checkbox"/> 25-50	<input type="checkbox"/> > 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	Young	<input checked="" type="checkbox"/> Mid-age	Mature	Old Growth
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600

ELC Community Description (Part B)

Metadata Greenville

Site: Brock Rd. Ng/Con. 5	UTM: 17T 0579718 4798122
Polygon: E	Surveyor(s): Tara B, Charlotte M
Date: Aug. 12/11	Weather: 20.0, sunny, wind 1, 5% cloud
Time: 0950	no precip.

Soils	1	2	3
Position:	6		
Aspect:	150°		
%	0.2		
Type:	S		
Class:	A		
Strata: Texture	S/L		
Depth	5cm		
Strata: Texture	See below for		
Depth	comments		
Strata: Texture	/		
Depth	/		
Strata: Texture	/		
Depth	/		
Effective Texture	S/L		
Surface Stoniness	0		
Surface Rockiness	0		
Depth to:			
Mottles	N/A		
Gley	N/A		
Bedrock	5cm		
Water table	N/A		
Carbonates	N/A		
Depth of Organics	0.5cm		
Pore Size Disc #1	/		
Pore Size Disc #2	/		
Pore Size Disc #3	/		
Moisture Regime	2		

Tree Tally	Tally 1	Tally 2	Tally 3
Species			
E. white cedar	10		
White pine			
Total:	19		
Basal Area	28		
Snags			

NOTES:

Photos: 0889-0891

Tried to pull @ least 8 cores and hit rock every attempt

• approx. 5cm in depth.

PLANT SPECIES LIST

Metadata Greenville

Site: Brook Rd. N of Gnc. 5
 Polygon: E
 UTM: 17T 0579718 4798122
 Date: Aug 12/11 Time: 0950
 Surveyor(s): Tara B, Charlotte M
 Weather: 20°C, sunny, wind 1, 5% cloud, no precip.

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample
	1	2	3	4			1	2	3	4	
east white cedar	A					celandine				R	
common buckthorn			O			white bambermy				R	
chicory				D							
wild carrot				R							
Common St. John's wort				R							
black cherry	R										
N. prickly ash			A	A							
canada goldenrod				R							
coltsfoot				R							
pigeon ivy				O							
Common burdock				O							
enchanted nightshade				A							
false Solomon's Seal				R							
herb robert				A							
climber's rocket				R							
Zigzag goldenrod				R							
sassailla				R							
white pine	R										
wild mint				R							
Yellow wood sorrel				R							
pink bark grape				R							
mass sp.				O							
yellow aster				O							
red raspberry			R								
garlic mustard				A							
wild cucumber			R								
begonias				R							
european yarrow				R							
downy yellow violet				R							
danthonia				R							

Source of common names: Newcomb's

Wildlife Observation Form

Metadata Greenville

Site: Black Rd. North of concession 5
 Polygon: E
 UTM: 17T 0579718 4798122
 Date: Aug 12/11 Time: 0950
 Surveyor(s): Charlotte M Taca B
 Weather: 30°f, Sunny, Wind: C.R. 59, No precip.

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor wintering
 Fallen Logs Deer wintering yards Bat Hibernacula
 Snags Migratory stopover Reptile Hibernacula

Species Observed										
TY	Species	EV	Notes	#		TY	Species	EV	Notes	#
B	Am. Goldfinch		SM	;						
B	Am. Crow		SM	;						
B	Am. Robin		SM	°						
B	Red-tailed Hawk		SM	°						
L	Gr. Sp. Flycatcher		OB	°						
R	Killdeer		SM	°						
R	Downy Woodpecker		SM	°						

Faunal Type Codes (TY)
 B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

Evidence Codes (EV)

- | | |
|-------------------------|---------------------------|
| Breedign Birds | Other Wildlife |
| SH-Suitable Habitat | OB- Observed |
| SM- Singing Male | DP-Distinctive Parts |
| T-Territory | TK- Tracks |
| A-Anxiety Behavior | VO- Vocalization |
| D-Courtship Display | HO- House/Den |
| N-Nest Building | FE- Feeding Evidence |
| P-Pair | CA-Carcass/Bones |
| V-Visiting Nest | FY- Eggs or young |
| DD- Distraction Display | SC-Scat |
| NE-Nest with Eggs | SI- Other Signs (Specify) |
| AE-Adult entering nest | |
| NU- Used nest | |
| FY-Fledged Young | |
| FS- Food/Fecal Sac | |

Management/Disturbance Data Sheet (Part A)

Metadata Greenville

Site: <u>Brock Rd N&C Conc. 5</u>	Date: <u>Aug 12/11</u>
Polygon: <u>E</u>	Surveyor(s): <u>Tara B Charl</u>
UTM: <u>17T 0579718 4798122</u>	Weather: <u>20°C, sunny, wind</u>

DISTURBANCE c.c 59%, no precip.

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	<u>A</u>	Other:	
European Buckthorn	<u>O</u>	<u>Celandin</u>	<u>R</u>
Manitoba Maple	<u>N</u>	<u>herb robert</u>	<u>A</u>
Norway Maple	<u>N</u>		
Tartarian Honeysuckle	<u>N</u>		
Purple Loosestrife	<u>N</u>		
Common reed	<u>N</u>		
Multiflora Rose	<u>N</u>		
Periwinkle	<u>N</u>		
Dame's Rocket	<u>R</u>		

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails N Other (please specify):
 Walking N
 ATV's, bikes, etc N

Dumping (Indicate abundance code for each)

Garbage R Other (please specify):
 Yard Waste N

Recreational Use (Indicate polygon abundance code for each)

Walking N Other (please specify):
 Biking N
 Farts N
 Squatting N
 Campfires N

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species: <u>none</u>	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species: _____	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species: _____	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species: _____	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____

Specific Diseases or Other (please specify):

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: none Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____

List Species if known: _____

Flooding (pools and puddling) N

Evidence of Fire N

Trampling N

Earth Displacement N

Wind Throw (Blow Down) R

Beaver Activity N

MANAGEMENT

Restoration/Management Activities (check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails - laneway

Signage _____ Invasive Species Removal _____

Monitoring program _____

Disturbance Location(s):

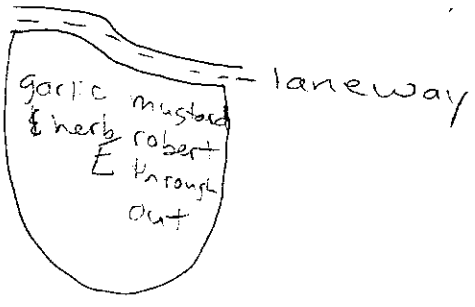
Type: _____ GPS Co. _____ _____

Type: _____ GPS Co. _____ _____

Type: _____ GPS Co. _____ _____

Type: _____ GPS Co. _____ _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)



ELC Community Description (Part A)

Metadata Greenville

Site:	Rock Pt. N of Concession 5
Polygon:	1
UTM:	17T 0579788 4798247
Date:	Aug 12/11
Time:	0848
Surveyor(s):	Tara R, Charlotte M
Weather:	

Community Classification

Vegetation Type:	SNDM 2-2 Green ash Min. Decid. Swamp
Inclusion:	Inclusion #1 MEFM 1-1 Goldenrod Meadow
Exclusion:	Inclusion #2 FHDMD-6 Buckthorn Thicket

Polygon Description

System	Substrate	Topo Feature	Community		
<input type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus	Lake	Barren
<input checked="" type="checkbox"/> Wetland	Mineral Soil	Riverine	Crevices/Cave	Pond	Meadow
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar	River	Prairie
	Acidic Bedrock	Terrace	Rockland	Stream	Thicket
	Basic Bedrock	Valley Slope	Beach/Bar	Marsh	Savannah
	Carb. Bedrock	<input checked="" type="checkbox"/> Tableland	Sand Dune	<input checked="" type="checkbox"/> Swamp	Woodland
		Roll, Upland	Bluff	Fen	Forest
	Site	Cliff		Bog	Plantation

Cover	Open Water	Plant Form		
<input type="checkbox"/> Open	Shallow Water	Plankton	Forb	Coniferous
<input type="checkbox"/> Shrub	<input checked="" type="checkbox"/> Surficial Dep.	Submerged	Lichen	Mixed
<input checked="" type="checkbox"/> Treed	Bedrock	Floating-Lvd.	Bryophyte	
		Graminoid	<input checked="" type="checkbox"/> Deciduous	

Stand Description

Layer	HT	Cover	Species
1 Canopy	2	3	green ash >> h.w. oak >> black cherry
2 Sub-canopy	2	2	green ash >> hawthorn sp.
3 Understorey	3	4	common buckthorn >> green ash >> choke cherry
4 Groundcover	4/7	3	zig-zag goldenrod > lanceolate nightshade > yellow aster

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0:none 1: 0-10% 2: 10-25 3: 25-60% 4: >60%

Size Class Analysis	A < 10	O 10-24	R 25-50	N > 50
Snags	R < 10	R 10-24	N 25-50	N > 50
Deadfall/Logs	A < 10	R 10-24	N 25-50	N > 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	Young	Mid-age	Mature	Old Growth
			<input checked="" type="checkbox"/>		

Metadata Greenville

Site: Brack Rd N. on .5 UTM: 17T 0579788 47982 47
 Polygon: D Surveyor(s): Tara B. Charlotte M
 Date: Aug. 12 / 11 Weather: 19°C Sunny wind 2,
 Time: 0848 590 c.c., no precip

Soils	1	2	3
Position:	6		
Aspect:	260°		
%	0.29		
Type:	S		
Class:	A		
Strata: Texture	Sil		
Depth	9cm		
Strata: Texture	Sil		
Depth	30cm		
Strata: Texture			
Depth			
Strata: Texture			
Depth			
Effective Texture	Sil		
Surface Stoniness	0		
Surface Rockiness	0		
Depth to:			
Mottles	12cm		
Gley	N/A		
Bedrock	? 31cm		
Water table	N/A		
Carbonates	N/A		
Depth of Organics	0cm		
Pore Size Disc #1	/		
Pore Size Disc #2	/		
Pore Size Disc #3	/		
Moisture Regime	6		

Tree Tally	Tally 1	Tally 2	Tally 3
Species			
Green Ash	☒		
Bur Oak	•		
European Buck	•		
Total:	13		
Basal Area	26		
Snags	•		

NOTES: * could not go further than 30cm, hitting solid rock (bedrock?)

Photos: 0886-0888
 Photo Incl. #2 - 0892, 0893

PLANT SPECIES LIST

Metadata Greenville

Site: Brock Rd. N of Conc. 5
 Polygon: D
 UTM: 17T 0579788 4798247
 Date: Aug. 12/11 Time: 848
 Surveyor(s): Tara R, Charlotte M
 Weather: 19°C, sunny, wind 2, 5% cloud, no precip

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample	
	1	2	3	4			1	2	3	4		
green ash	D	A	A			tough stemmed goldenrod					O	
Common buckthorn			A			White Elm					R	
Garlic mustard				R		Silver maple	R					
maple sp.				O		Riverside grass				R		
Yellow acer				O		grass lvd. goldenrod					O	
enchanted nightshade				O								
wild Strawberry				O								
early goldenrod				O	1c							
galico aster				R	2c							
Red oak				R								
self heal				R								
Zig-zag goldenrod				A								
Small white aster				R								
virginia creeper				R								
herb robert				R								
Sedge sp.				R								
choke cherry				R								
black cherry	R											
Sassailla				R								
running strawberry bush				R								
red raspberry				R								
heart lvd. aster				R								
False Solomon's Seal				R								
hawthorn sp.		R										
coarse aster				R								
wild mint				R								
east white cedar	R											
dandelion				R								
field hawkweed				R								
bloodroot				R								

no
plant
had

Source of common names: Newcomb's

Metadata Greenville

Site: <u>Brock Rd N. Compression S</u>	Date: <u>Aug. 12 / 11</u>
Polygon: <u>D</u>	Surveyor(s): <u>Tara & Charlotte M</u>
UTM: <u>17T 0579788 4798247</u>	Weather: <u>19°C sunny, wind 2</u>
DISTURBANCE <u>590 c.c., NO precip!</u>	

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	<u>R</u>	Other:	
European Buckthorn	<u>A</u>	<u>Verb Robert</u>	<u>R</u>
Manitoba Maple	<u>N</u>		
Norway Maple	<u>N</u>		
Tartarian Honeysuckle	<u>N</u>		
Purple Loosetrife	<u>N</u>		
Common reed	<u>N</u>		
Multiflora Rose	<u>N</u>		
Periwinkle	<u>N</u>		
Dame's Rocket	<u>N</u>		

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails N Other (please specify):
 Walking R - mowed trail near adjacent home,
 ATV's, bikes, etc N ownership?

Dumping (Indicate abundance code for each)

Garbage R Other (please specify):
 Yard Waste R

Recreational Use (Indicate polygon abundance code for each)

Walking R Other (please specify): Sheds - R
 Biking N
 Farts N
 Squatting N
 Campfires N

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species: Chokecherry Fungus R Leaf spots N Cankers N Dieback N
 Species: Fungus ___ Leaf spots ___ Cankers ___ Dieback ___
 Species: Fungus ___ Leaf spots ___ Cankers ___ Dieback ___
 Species: Fungus ___ Leaf spots ___ Cankers ___ Dieback ___
 Specific Diseases or Other (please specify):

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: none Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____

List Species if known: _____

Flooding (pools and puddling) N

Evidence of Fire N

Trampling N

Earth Displacement N

Wind Throw (Blow Down) N

Beaver Activity N

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

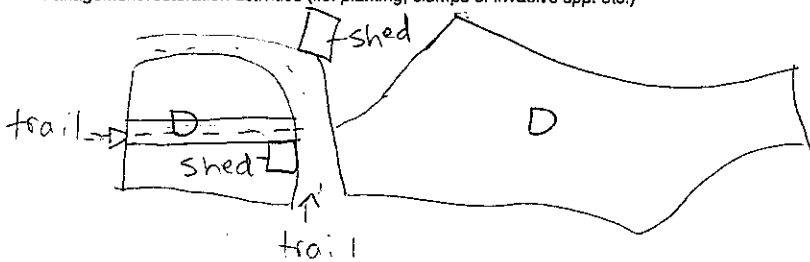
Signage _____ Invasive Species Removal _____

Monitoring program _____

Disturbance Location(s):

Type: <u>shed w/ garbage</u>	GPS Co. <u>17T 0579679</u>	<u>4798199</u>
Type: <u>walking trail</u>	GPS Co. <u>17T 0579662</u>	<u>4798201</u>
Type: <u>Shed w/ garbage</u>	GPS Co. <u>17T 0579683</u>	<u>4798176</u>
Type: _____	GPS Co. x _____	y _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)



Metadata

Site: Brock Road North of Concession 5
Polygon: B
UTM: 17T 0579 602 4798342
Date: Aug. 11 2011 Time: 12:00
Surveyor(s): Christy Humphrey, Kaitlin Powers
Weather: 22°C Wind 3 cc 35% no precip.

Community Classification

Vegetation Type:	FOOR 1 - Dry-Fresh Sugar Maple - Hardwood Calcareous Shallow Deciduous Forest
Inclusion:	SWDR 1 Calcareous Bedrock Deciduous Swamp
Complex:	

Polygon Description

System	Substrate	Topo Feature	Community
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	Riverine	Crevice/Cave
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar
	Acidic Bedrock	Terrace	Rockland
	Basic Bedrock	Valley Slope	Beach/Bar
	Carb. Bedrock	Tableland	Sand Dune
<input checked="" type="checkbox"/> Natural		<input checked="" type="checkbox"/> Roll. Upland	Bluff
<input type="checkbox"/> Cultural		Cliff	
	Site		
	Open Water	Plant Form	
	Shallow Water	Plankton	Forb
	<input checked="" type="checkbox"/> Surficial Dep.	Submerged	Lichen
	Bedrock	Floating-Lvd.	Bryophyte
		Graminoid	<input checked="" type="checkbox"/> Deciduous

Stand Description

Layer	HT	Cover	Species
1 Canopy	3	4	White Ash - Black Cherry > Burr Oak & Basswood
2 Sub-canopy	3	3	Black Cherry & White Common Ash & Buckthorn
3 Understorey	4	2	White Common Ash & Buckthorn > Black Cherry & Alternate-leaved Dogwood
4 Groundcover	6	3	Zig-zag Goldenrod > Virginia Creeper & Rattle Snake & Common Grape & Buckthorn

HT Codes: 1: >25m 2: 25 - 10m 3: 10 - 2m 4: 2 - 1m 5: 1 - 0.5m 6: 0.5 - 0.2m 7: <0.2m

Cover Codes: 0: none 1: 0 - 10% 2: 10 - 25 3: 25 - 60% 4: >60%

Size Class Analysis	A < 10	O 10 - 24	O 25 - 50	R > 50
Snags	O < 10	R 10 - 24	N 25 - 50	N > 50
Deadfall/Logs	A < 10	O 10 - 24	N 25 - 50	N > 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	Young	<input checked="" type="checkbox"/> Mid-age	Mature	Old Growth
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Metadata

Site: Bridge Road North of Co	SUTM: 17T 0579602	4798342
Polgon: B	Surveyor(s): Christy Humphrey, Kaitlin Powers	
Date: Aug 11, 2011	Weather: 22 °C, Wind 3 cc35%	
Time: 12:00	no precipitation	

Soils	1	2	3	Tree Tally																																																																								
Position:	0			<div style="text-align: center;">INCLUSION</div> <table border="1"> <thead> <tr> <th>Species</th> <th>Tally 1</th> <th>Tally 2</th> <th>Tally 3</th> </tr> </thead> <tbody> <tr><td>White Elm</td><td>•</td><td></td><td>•</td></tr> <tr><td>Willow</td><td>•••</td><td></td><td></td></tr> <tr><td>Green Ash</td><td>••</td><td></td><td>•</td></tr> <tr><td>Trembling aspen</td><td></td><td>•</td><td></td></tr> <tr><td>White Ash</td><td></td><td>•</td><td>•</td></tr> <tr><td>White Oak</td><td></td><td>•••</td><td></td></tr> <tr><td>Basswood</td><td></td><td>••</td><td>•</td></tr> <tr><td>Black Cherry</td><td></td><td></td><td>•••</td></tr> <tr><td>Red maple</td><td></td><td></td><td>••</td></tr> <tr><td> </td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td></tr> <tr><td> </td><td></td><td></td><td></td></tr> <tr> <td>Total:</td> <td>9</td> <td>8</td> <td></td> </tr> <tr> <td>Basal Area</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Snags</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Species	Tally 1	Tally 2	Tally 3	White Elm	•		•	Willow	•••			Green Ash	••		•	Trembling aspen		•		White Ash		•	•	White Oak		•••		Basswood		••	•	Black Cherry			•••	Red maple			••																					Total:	9	8		Basal Area				Snags			
Species	Tally 1	Tally 2	Tally 3																																																																									
White Elm	•		•																																																																									
Willow	•••																																																																											
Green Ash	••		•																																																																									
Trembling aspen		•																																																																										
White Ash		•	•																																																																									
White Oak		•••																																																																										
Basswood		••	•																																																																									
Black Cherry			•••																																																																									
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Depth to:																																																																												
Mottles	10cm																																																																											
Gley	—																																																																											
Bedrock	21cm																																																																											
Water table	—																																																																											
Carbonates	—																																																																											
Depth of Organics	0.5cm																																																																											
Pore Size Disc #1																																																																												
Pore Size Disc #2																																																																												
Pore Size Disc #3																																																																												
Moisture Regime	0																																																																											

Prism Factor 2

NOTES:
 Photo 100-0468 → inclusion.

Metadata

Site: Brock Rd North of Concession 5	Date: Aug 11, 2011 Time: 12:15
Polygon: B	Surveyor(s): Christy Humphrey, Kaitlin Powers
UTM: 17T0579602 4798340	Weather: 22°C, 25% cloud cover, wind speed 3 from W

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard		Other:	
European Buckthorn	O		
Manitoba Maple			
Norway Maple			
Tartarian Honeysuckle			
Purple Loosestrife			
Common reed (Fragmites)			
Multiflora Rose			
Periwinkle			
Dame's Rocket			

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails		Other (please specify):	
Walking			
ATV's, bikes, etc			

Dumping (Indicate abundance code for each)

Garbage		Other (please specify):	farm machinery equipment
Yard Waste			

Recreational Use (Indicate polygon abundance code for each)

Walking		Other (please specify):	
Biking			
Forts			
Squatting			
Campfires			

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback
Specific Diseases or Other (please specify):				

Tree Damage (Indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____

List Species if known: _____

Flooding (pools and puddling) _____

Evidence of Fire _____

Trampling _____

Earth Displacement _____

Wind Throw (Blow Down) _____

Beaver Activity _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage _____ Invasive Species Removal _____

Monitoring program _____

Disturbance Location(s):

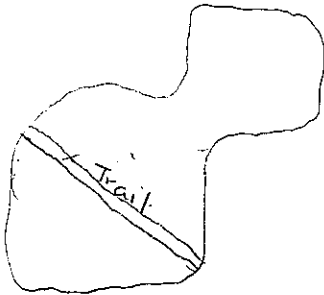
Type: _____ GPS Co. _____ _____

Type: _____ GPS Co. _____ _____

Type: _____ GPS Co. _____ _____

Type: _____ GPS Co. _____ _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)





Metadata

Site: <u>Brock Road North of Concession 5</u>
Polygon: <u>A</u>
UTM: <u>17T 0579648 4798659</u>
Date: <u>Aug. 11 2011</u> Time: <u>0850</u>
Surveyor(s): <u>Christy Humphrey, Kaithin Powers</u>
Weather: <u>16°C, 00%</u>

Community Classification

Vegetation Type: <u>SVDR 1 Dry-Fresh Calcareous Bedrock Deciduous Savannah.</u>
<input checked="" type="checkbox"/> Inclusion: <u>THDM-6 Subtropical Deciduous Shrub Thicket type</u>
Complex:

Polygon Description

System	Substrate	Topo Feature	Community
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	Riverine	Crevice/Cave
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar
	Acidic Bedrock	Terrace	Rockland
History	Basic Bedrock	Valley Slope	Beach/Bar
<input checked="" type="checkbox"/> Natural	Carb. Bedrock	Tableland	Sand Dune
<input type="checkbox"/> Cultural		<input checked="" type="checkbox"/> Roll. Upland	Bluff
	Site	Cliff	
Cover	Open Water	Plant Form	
<input type="checkbox"/> Open	Shallow Water	Plankton	<input checked="" type="checkbox"/> Forb
<input type="checkbox"/> Shrub	<input checked="" type="checkbox"/> Surficial Dep.	Submerged	Lichen
<input type="checkbox"/> Treed	Bedrock	Floating-Lvd.	Bryophyte
		Graminoid	<input checked="" type="checkbox"/> Deciduous

Stand Description

Layer	HT	Cover	Species
1 Canopy	2	1	Pin cherry > White Ash
2 Sub-canopy	3	3	Pin cherry > White Ash > Common Buckthorn > Hawthorn sp.
3 Understorey	4	2	Pin cherry > Common Buckthorn > Tartarian Honeysuckle > Early Goldenrod
4 Groundcover	4	4	Kentucky Bluegrass > Gray Goldenrod > New England Aster > Early Goldenrod

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0:none 1:0-10% 2: 10-25 3: 25-60% 4: >60%

Size Class Analysis	O	I	C	N
Snags	< 10	10-24	25-50	> 50
Deadfall/Logs	< 10	10-24	25-50	> 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	<input checked="" type="checkbox"/> Young	Mid-age	Mature	Old Growth
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PLANT SPECIES LIST

Metadata

Site: Brock Rd North of Concession 5	
Polygon: A	
UTM: 17 0579648 4798659	
Date: Aug. 11, 2011	Time: 08:50
Surveyor(s): Christy Humphrey, Kaitlin Powers	
Weather: 16 °C	

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample
	1	2	3	4	
Pink Cherry	R	O	O	A	
White Ash	R	O			
Basswood		R			
Red Pine		R	O		
Sugar Maple		R			
White Pine		O	O		
Trembling Aspen	R				
Fridley Ash		O	O		
Rubus allegheniensis				O	
Red Osier Dogwood			O	O	
Alder-leaved Buckthorn?		R		(2)	
Kawthorn Sp		O	O		(1)
Riverbank Sassafras			O	O	
Tartarian Amelanchier		O	O		
Red Raspberry			O	R	
Spiny-leaved Dogwood		O	O		
Virginia Creeper				R	
Covered Buckthorn		O			

Species	Layer				Sample
	1	2	3	4	
Garlic Mustard				R	
Large-leaved Arvens				O	
Lance-leaved Goldenrod			O		
Poison Ivy				O	
Wild Basil				O	
New England Aster				O	
Purple-stem Aster			R	O	
Wild Cornut.			O		
Gallica Aster				O	
Solidago altissima			O		
Thimbleweed			R	O	
Bird's-foot trefoil				O	
Yarrow				O	
Kentucky Bluegrass				O	
Phleum pratense				O	
Asparagus			R		
Goldenrod sp.				O (3)	
Evening Primrose			R		
Wild Strawberry				O	
Goldenrod sp. Basal leaves only				O	Photo 10-0465
Early Saururus				O	
Viper's Bugloss				R	
Mullein			R		
Rough Cinquefoil			O		
Early Goldenrod?			O	O (4)	
Wood Anemone				R	
Aster sp.				O (5)	
Daisy Fleabane			R		
Arrow-leaved Aster			R		
Canada Anemone				O	

Source of common names: Newcomb's

- ① → Crataegus crus-galli cut
- ② → Alder-leaved Buckthorn
- ③ Gray Goldenrod cut
- ④ Early Goldenrod cut
- ⑤ Sky Blue Aster cut

Wildlife Observation Form

Metadata

Site: Black Rd North of Concession 5
 Polygon: A
 UTM: 17T 0577648 479 8659
 Date: Aug 11, 2011 Time: 08:50
 Surveyor(s): Christy Humphrey, Kaitlin Powers
 Weather: 16°C Sunny, 0% cloud cover

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor wintering
 Fallen Logs Deer wintering yards Bat Hibernacula
 Snags Migratory stopover Reptile Hibernacula

Species Observed

TY	Species	EV	Notes	#	TY	Species	EV	Notes	#
B	Cardinal	VO		*					
B	Mourning dove	VO		**					
B	Indigo Bunting	VO		*					
B	Robin	OB		**					
B	Bay Swallow	OB		*					
B	Cedar Waxwing	VO		**					
B	Common Grackle	OB		**					
L	Mourning dove	OB		*					
L	Cabbage Pea	OB		*					
B	Towhee	VO		*					
B	Warbling vireo	VO		*					
B	Blue Jay	VO		*					
M	Gray Squirrel	OB		*					
D	dragonfly	OB	Unknown species	*					
L	red-naped sapsucker	OB		*					
B	Northern Flicker								

Faunal Type Codes (TY)

B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

Evidence Codes (EV)

- | | |
|-------------------------|---------------------------|
| Breedign Birds | Other Wildlife |
| SH-Suitable Habitat | OB-Observed |
| SM- Singing Male | DP-Distinctive Parts |
| T-Territory | TK- Tracks |
| A-Anxiety Behavior | VO- Vocalization |
| D-Courtship Display | HO- House/Den |
| N-Nest Building | FE- Feeding Evidence |
| P-Pair | CA-Carcass/Bones |
| V-Visiting Nest | FY- Eggs or young |
| DD- Distraction Display | SC-Scat |
| NE-Nest with Eggs | SI- Other Signs (Specify) |
| AE-Adult entering nest | |
| NU- Used nest | |
| FY-Fledged Young | |
| FS- Food/Fecal Sac | |

Observations

~ 2m² rock pile that is a possible, but weak candidate for snake hibernacula
 5-6 snags scattered throughout area; not suitable bat habitat; no cavities, minimal ex-foliating bark. Dbk ranges 15-35cm. PC: 100-0467
 0-15cm diameter den without tracks and parts of wasp nest around opening

Management/Disturbance Data Sheet (Part A)

Page 5 of 6
Time 08:50

Metadata

Site: Brock Rd North of Concession 5	Date: Aug 11, 2011
Polygon: A	Surveyor(s): C. M. St. Humphrey, K. K. Lin
UTM: 17T 0574248 4798659	Weather: 16°C, 76% cloud, 10% cover

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)		Other:
Garlic Mustard	R	_____
European Buckthorn	R	_____
Manitoba Maple	_____	_____
Norway Maple	_____	_____
Tartarian Honeysuckle	O	_____
Purple Loosestrife	_____	_____
Common reed	_____	_____
Multiflora Rose	_____	_____
Periwinkle	_____	_____
Dame's Rocket	_____	_____

Unauthorized Trails (Indicate polygon abundance code for each)	
Bike trails _____	Other (please specify): _____
Walking _____	
ATV's, bikes, etc _____	

Dumping (Indicate abundance code for each)	
Garbage _____	Other (please specify): Litter blown in from road
Yard Waste _____	

Recreational Use (Indicate polygon abundance code for each)	
Walking _____	Other (please specify): _____
Biking _____	
Forts _____	
Squatting _____	
Campfires _____	

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)				
Species: Hawthorn	Fungus _____	Leaf spots <input checked="" type="checkbox"/>	Cankers _____	Dieback _____
Species: Elm	Fungus <input checked="" type="checkbox"/>	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Specific Diseases or Other (please specify):				

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: Alternate leaved dogwood Source Agricultural Spray Abundance 0

Species: Red Raspberry Source Agricultural Spray Abundance 0

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____

List Species if known: _____

Flooding (pools and puddling) _____

Evidence of Fire _____

Trampling _____

Earth Displacement _____

Wind Throw (Blow Down) _____

Beaver Activity _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage _____ Invasive Species Removal _____

Monitoring program _____

Disturbance Location(s):

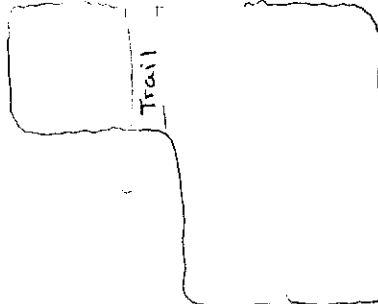
Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)



Metadata

Site: Brock Rd North of concession 5	Date: Aug 11, 2011 Time: 14:30
Polygon: C	Surveyor(s): Christy Humphrey, Karla Powers
UTM: 17T 0579759	Weather: 22°C, 30% cloud cover, wind speed 3 from SE

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard		Other:	
European Buckthorn	O		
Manitoba Maple			
Norway Maple			
Tartarian Honeysuckle			
Purple Loosestrife			
Common reed			
Multiflora Rose			
Periwinkle			
Dame's Rocket			

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails		Other (please specify):	
Walking			
ATV's, bikes, etc			

Dumping (Indicate abundance code for each)

Garbage		Other (please specify):	Debris blown in from surrounding areas
Yard Waste			

Recreational Use (Indicate polygon abundance code for each)

Walking		Other (please specify):	
Biking			
Forts			
Squatting			
Campfires			

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species: White Elm	O	Fungus	✓	Leaf spots		Cankers		Dieback	
Species:		Fungus		Leaf spots		Cankers		Dieback	
Species:		Fungus		Leaf spots		Cankers		Dieback	
Species:		Fungus		Leaf spots		Cankers		Dieback	
Specific Diseases or Other (please specify):									

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species:	Source	Abundance
Species:	Source	Abundance
Species:	Source	Abundance
Species:	Source	Abundance

Other (please specify):

Browse Damage (Indicate abundance code)	Other (please be specific)
List Species if known:	
Flooding (pools and puddling)	
Evidence of Fire	
Trampling	
Earth Displacement	
Wind Throw (Blow Down)	
Beaver Activity	

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings	Species:	

Pesticide Use

Type:	
-------	--

Tree Cutting

Authorized Trails	
-------------------	--

Signage

Invasive Species Removal	
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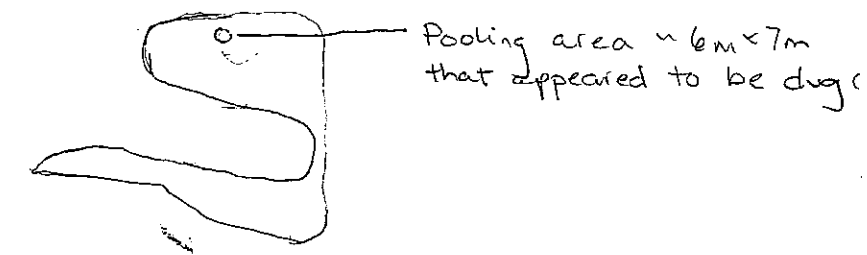
Monitoring program

--	--

Disturbance Location(s):

Type:	GPS Co.	x	y
Type:	GPS Co.	x	y
Type:	GPS Co.	x	y
Type:	GPS Co.	x	y

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)



Brock Road and Harvest Road

ELC Community Description (Part A)

Metadata

Site: Brock & Harvest Rd.
 Polygon: J
 UTM:
 Date: Aug 16/11 Time: 14:15 hrs
 Surveyor(s): JEG, KGB
 Weather: 25°C, 0% clouds, wind E

Community Classification

Vegetation Type: THOM2-1 - Staghorn Sumac Thicket
 Inclusion:
 Complex:

Polygon Description

System	Substrate	Topo Feature	Community			
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus	Lake	Barren	
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	Riverine	Crevice/Cave	Pond	Meadow	
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar	River	Prairie	
	Acidic Bedrock	Terrace	Rockland	Stream	<input checked="" type="checkbox"/> Thicket	
	Basic Bedrock	Valley Slope	Beach/Bar	Marsh	Savannah	
History	Carb. Bedrock	Tableland	Sand Dune	Swamp	Woodland	
<input checked="" type="checkbox"/> Natural		<input checked="" type="checkbox"/> Roll, Upland	Bluff	Fen	Forest	
<input type="checkbox"/> Cultural		Cliff		Bog	Plantation	
	Site					
Cover	Open Water	Plant Form				
<input type="checkbox"/> Open	Shallow Water	Plankton	Forb	Coniferous		
<input checked="" type="checkbox"/> Shrub	<input checked="" type="checkbox"/> Surficial Dep	Submerged	Lichen	Mixed		
<input type="checkbox"/> Treed	Bedrock	Floating-Lvd.	Bryophyte			
		Graminoid	<input checked="" type="checkbox"/> Deciduous			

Stand Description

Layer	HT	Cover	Species
1 Canopy	2	2	White Ash > black walnut > poplar
2 Sub-canopy	3	4	staghorn sumac = white ash
3 Understorey	3	4	staghorn sumac > grey dogwood = <i>Riverbank grape</i>
4 Groundcover	6	3	Rough awns > heal all = buckthorn

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0: none 1: 0-10% 2: 10-25% 3: 25-60% 4: >60%

Size Class Analysis	< 10	10-24	25-50	> 50
Snags	0	N	N	N
Deadfall/Logs	0	N	N	N

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	Young	Mid-age	Mature	Old Growth
		<input checked="" type="checkbox"/>			

PLANT SPECIES LIST

Metadata

Site: Brock + Harvest Road
 Polygon: J
 UTM:
 Date: Aug 16/11 Time: 14:50
 Surveyor(s): JTB, KGB
 Weather:

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample
	1	2	3	4			1	2	3	4	
White Ash	O	O				highbush cranberry		O			
Black walnut	O	O				Manitoba maple		O			
Staghorn sumac		A	D			dandelion				O	
Red clover				O		Common speedwell				O	
Kiverbanu grass			A								
Shagbark hickory											
orchard grass				G							
Red aster downy			O								
blue veinain				R							
Gray dogwood			A								
daisy fleabane				O							
black cherry	R										
elderberry			O								
calico aster				O							
Red Raspberry				O							
Tartarian honeysuckle			O								
burdock				O							
wild carrot				O							
curly dock				O							
Rough avena				O							
heal all				O							
asparagus				K							
black medic				O							
Canada goldenrod				O							
balsam poplar				R							
crack willow				R							
Broad-leaf plantain				O							
Field horsetail				O							
smooth brome				O							
False Solomon's seal				O							

Source of common names: _____

Management/Disturbance Data Sheet (Part A)

Metadata

Site: 1288 - Brock Harvest	Date: Aug 16/2011
Polygon: 5	Surveyor(s): JEB, Y6B
UTM:	Weather: 28°C, 0% CC, N1

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	1	Other: _____
European Buckthorn	ppp	_____
Manitoba Maple	ppp	_____
Norway Maple	ppp	_____
Tartarian Honeysuckle	ppp	_____
Purple Loosestrife	ppp	_____
Common reed	ppp	_____
Multiflora Rose	ppp	_____
Periwinkle	ppp	_____
Dame's Rocket	ppp	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails _____ Other (please specify): _____
 Walking _____
 ATV's, bikes, etc A

Dumping (Indicate abundance code for each)

Garbage D Other (please specify): _____
 Yard Waste O

Recreational Use (Indicate polygon abundance code for each)

Walking N Other (please specify): _____
 Biking N
 Forts N
 Squatting N
 Campfires N

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____

Specific Diseases or Other (please specify):

Management/Disturbance Data Sheet (Part B)

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____

List Species if known: _____

Flooding (pools and puddling) _____

Evidence of Fire _____

Trampling _____

Earth Displacement _____

Wind Throw (Blow Down) _____

Beaver Activity _____

Disturbance Location(s):

Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage _____ Invasive Species Removal _____

Monitoring program _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

ELC Community Description (Part A)

Metadata

Site: Brock & Harvest
 Polygon: I
 UTM:
 Date: Aug 16/11 Time: 1300
 Surveyor(s): JTB, KLB
 Weather: 28°C, 10% cloud cover, Wind: 1

Community Classification

Vegetation Type: FOCM 6-3 - Dry-Fresh Scots Pine
 Inclusion: Naturalized Plantation
 Complex:

Polygon Description

System	Substrate	Topo Feature	Community
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	Riverine	Crevice/Cave
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar
	Acidic Bedrock	Terrace	Rockland
	Basic Bedrock	Valley Slope	Beach/Bar
History	Carb. Bedrock	Tableland	Sand Dune
<input checked="" type="checkbox"/> Natural		<input checked="" type="checkbox"/> Roll. Upland	Bluff
<input type="checkbox"/> Cultural		Cliff	
	Site		
Cover	Open Water	Plant Form	
<input type="checkbox"/> Open	Shallow Water	Plankton	<input checked="" type="checkbox"/> Coniferous
<input type="checkbox"/> Shrub	<input checked="" type="checkbox"/> Surficial Dep	Submerged	<input type="checkbox"/> Mixed
<input checked="" type="checkbox"/> Treed	Bedrock	Floating-Lvt.	
		Graminoid	
			Deciduous

Stand Description

Layer	HT	Cover	Species
1 Canopy	3	A	Scots pine > white spruce > trembling Aspen
2 Sub-canopy	3	3	Scots pine = white spruce
3 Understorey	A	2	Red asier dog wood = wild carrot = Canada goldenro
4 Groundcover	0	A	Aster sp. > woodland strawberry > wild carrot

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0: none 1: 0-10% 2: 10-25 3: 25-60% 4: >60%

Size Class Analysis	A < 10	O 10-24	N 25-50	N > 50
Snags	0 < 10	0 10-24	N 25-50	N > 50
Deadfall/Logs	A < 10	0 10-24	N 25-50	N > 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age: Pioneer Young Mid-age Mature Old Growth

PLANT SPECIES LIST

Metadata

Site: Brock & Harvest Rd
 Polygon: I
 UTM:
 Date: Aug 16/11 Time: 1300
 Surveyor(s): JFB, KGB
 Weather:

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample	
	1	2	3	4			1	2	3	4		
Scots pine	A	O				Rough-leaf goldenrod					O	
barberry sp.			O		-cinamome							
Trembling aspen	O											
Red osier dogwood			O									
Early goldenrod				O								
Sweet white clover				O								
Aster sp. - collected				O								
Wild carrot				O								
white pine	O	O										
white spruce	O	O		O								
Riverbank grape			O									
Canada goldenrod				O								
narrow				O								
Field horsetail				O								
woodland strawberry				O								
heal all				O								
Red clover				O								
Field hawthorn				O								
daisy fleabane				O								
grass-leaf goldenrod				O								
Balsam poplar	R	R	R									
white birch				R								
white cedar	R			R								
St. John's wort				O								
Sundrop				R								
gray goldenrod				R								
Asparagus												
Crack willow												
Common buckthorn				O								
White Ash	R											

Source of common names: _____

Management/Disturbance Data Sheet (Part A)

Metadata

Site: <u>Brock Rd & Harvest Rd.</u>	Date: <u>Aug 16/10</u>
Polygon: <u>I</u>	Surveyor(s): <u>SEG, YGB</u>
UTM:	Weather: <u>28°C, 10% CC, N-1</u>

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard		Other:	
European Buckthorn	<u>B</u>		
Manitoba Maple			
Norway Maple			
Tartarian Honeysuckle			
Purple Loosestrife			
Common reed			
Multiflora Rose			
Periwinkle			
Dame's Rocket			

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails Other (please specify):
 Walking
 ATVs, bikes, etc D

Dumping (Indicate abundance code for each)

Garbage Other (please specify):
 Yard Waste

Recreational Use (Indicate polygon abundance code for each)

Walking N Other (please specify):
 Biking N
 Fords N
 Squatting N
 Campfires N

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus <u> </u>	Leaf spots <u> </u>	Cankers <u> </u>	Dieback <u> </u>
Species:	Fungus <u> </u>	Leaf spots <u> </u>	Cankers <u> </u>	Dieback <u> </u>
Species:	Fungus <u> </u>	Leaf spots <u> </u>	Cankers <u> </u>	Dieback <u> </u>
Species:	Fungus <u> </u>	Leaf spots <u> </u>	Cankers <u> </u>	Dieback <u> </u>

Specific Diseases or Other (please specify):

Management/Disturbance Data Sheet (Part B)

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____

List Species if known: _____

Flooding (pools and puddling) _____

Evidence of Fire _____

Trampling _____

Earth Displacement _____

Wind Throw (Blow Down) _____

Beaver Activity _____

Disturbance Location(s):

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings Species: Like Scots pine ?
white spruce were
planted

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage _____ Invasive Species Removal _____

Monitoring program _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

ELC Community Description (Part A)

Metadata

Site:	Brock & Harvest		
Polygon:	H		
UTM:			
Date:	Aug 16/11	Time:	12:30
Surveyor(s):	JTB, KGB		
Weather:	28°C, 10% cloud cover, wind=1		

Community Classification

Vegetation Type:	MEMM3 - Dry - Fresh Mixed Meadow
Inclusion:	
Complex:	

Polygon Description

System	Substrate	Topo Feature	Community			
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus	Lake	Barren	
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	Riverine	Crevice/Cave	Pond	<input checked="" type="checkbox"/> Meadow	
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar	River	Prairie	
	Acidic Bedrock	Terrace	Rockland	Stream	Thicket	
	Basic Bedrock	Valley Slope	Beach/Bar	Marsh	Savannah	
<input checked="" type="checkbox"/> Natural	Carb. Bedrock	Tableland	Sand Dune	Swamp	Woodland	
<input type="checkbox"/> Cultural		<input checked="" type="checkbox"/> Roll. Upland	Bluff	Fen	Forest	
	Site	Cliff		Bog	Plantation	
Cover	Open Water	Plant Form				
<input checked="" type="checkbox"/> Open	Shallow Water	Plankton	<input checked="" type="checkbox"/> Forb	Coniferous		
<input type="checkbox"/> Shrub	<input checked="" type="checkbox"/> Surficial Dep.	Submerged	Lichen	Mixed		
<input type="checkbox"/> Treed	Bedrock	Floating-Lvd.	Bryophyte			
		Graminoid	Deciduous			

Stand Description

Layer	HT	Cover	Species
1 Canopy	3	1	White Ash
2 Sub-canopy	3	1	Manitoba maple & white Ash
3 Understorey	A	2	Staghorn Sumac & barberry & Gray dogwood
4 Groundcover	S	4	Smooth bromus = Canada goldenrod

HT Codes: 1 >25m 2: 25 - 10m 3: 10 - 2m 4: 2 - 1m 5: 1 - 0.5m 6: 0.5 - 0.2m 7: <0.2m

Cover Codes: 0: none 1: 0 - 10% 2: 10 - 25 3: 25 - 60% 4: >60%

Size Class Analysis	N < 10	N 10 - 24	N 25 - 50	N > 50
Snags	N < 10	N 10 - 24	N 25 - 50	N > 50
Deadfall/Logs	N < 10	N 10 - 24	N 25 - 50	N > 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	<input checked="" type="checkbox"/> Pioneer	<input type="checkbox"/> Young	<input type="checkbox"/> Mid-age	<input type="checkbox"/> Mature	<input type="checkbox"/> Old Growth
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PLANT SPECIES LIST

Metadata

Site: Brock & Harvest Koa
 Polygon: H
 UTM:
 Date: Aug 16/11 Time: 1230
 Surveyor(s): JCB, KGS
 Weather:

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample
	1	2	3	4			1	2	3	4	
Pine cherry			O			Rough hardsells				R	
Strawberry sumac			O			highbush cranberry		O			
wild carrot				O		hale		O			
Canada goldenrod				O		Virginia creeper		O			
Red clover				O		clethra pink				R	
Sweet white clover				O		curly dock				R	
Smooth brome				O		evening primrose				K	
timothy				O		wild bergamot				O	
Common buckwheat			O			Sugar maple	R				
asparagus				O		Eur. mountain ash	R				
manitoba maple		O	O			trifolium witch				O	
Gray dogwood			A			Barberry		O			
Tartarian horse-suckle				O		Devils paintbrush				O	
orchard grass				O		Vipers bluegrass				O	
Poison lily				O		alpha				O	
Apple			R			Russian olive		R			
Riverbank grass			O								
Field horsetail				O							
flax			O								
Yarrow				O							
White Ash	O										
dandelion				O							
crack willow	O										
chickory				O							
Norfolk			R								
Common mullein				O							
Norway maple		R									
Jap. barberry			R								
c. milkweed				O							

Rough Avenas
 + Hardsell
 → Confirm barberry or blackberry.

A * cool!

Source of common names: _____

Wildlife Observation Form
Metadata

Site: Brook & Harvest
 Polygon: H
 UTM:
 Date: Aug 16/2011 Time: 1240
 Surveyor(s): JEG, KGB
 Weather: 28°C, 10% CC, N-1

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor wintering
 Fallen Logs Deer wintering yards Bat Hibernacula
 Snags Migratory stopover Reptile Hibernacula

Species Observed									
TY	Species	EV	#	Notes	TY	Species	EV	#	Notes
B	Turkey Vulture			• X	L	Viceroy		•	
B	A. Goldfinch			• H	L	Cabbage Butterfly		□	
B	Black-capped Chickadee			• H	L	Common Kinglet		••	
B	A. Crow			• H					
B	Indigo Bunting			• H					
B	C. Grackle			• H					
B	Gray Catbird			• H					
B	Cedar Waxwing			• H					
B	N. Cardinal			• S					
B	A. Robin			• S	M	Gray Squirrel		•	
D	Field Sparrow			• H					
B	Song Sparrow			• H					

Faunal Type Codes (TY)
 B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

- Evidence Codes (EV)
- | | |
|-------------------------|---------------------------|
| Breedign Birds | Other Wildlife |
| SH-Suitable Habitat | OB- Observed |
| SM- Singing Male | DP-Distinctive Parts |
| T-Territory | TK- Tracks |
| A-Anxiety Behavior | VO- Vocalization |
| D-Courtship Display | HO- House/Den |
| N-Nest Building | FE- Feeding Evidence |
| P-Pair | CA-Carcass/Bones |
| V-Visiting Nest | FY- Eggs or young |
| DD- Distraction Display | SC-Scat |
| NE-Nest with Eggs | SI- Other Signs (Specify) |
| AE-Adult entering nest | |
| NU- Used nest | |
| FY-Fledged Young | |
| FS- Food/Fecal Sac | |

Management/Disturbance Data Sheet (Part A)

Metadata

Site: Brock	Date: Aug 16, 2011
Polygon: #	Surveyor(s): JEC, KGB
UTM:	Weather: 28°C, 10% CC, N-1

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	_____	Other: _____
European Buckthorn	0	_____
Manitoba Maple	0	_____
Norway Maple	_____	_____
Tartarian Honeysuckle	_____	_____
Purple Loosestrife	_____	_____
Common reed	_____	_____
Multiflora Rose	_____	_____
Periwinkle	_____	_____
Dame's Rocket	0	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails _____ Other (please specify): _____
 Walking _____
 ATVs, bikes, etc A

Dumping (Indicate abundance code for each)

Garbage 0 Other (please specify): _____
 Yard Waste 0 -> grass clippings

Recreational Use (Indicate polygon abundance code for each)

Walking 0 Other (please specify): _____
 Biking _____
 Forts _____
 Squatting _____
 Campfires _____

Tree Disease (Indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____

Specific Diseases or Other (please specify): _____

Management/Disturbance Data Sheet (Part B)

Tree Damage (Indicate species, type of damage, abundance)
 Species: _____
 Species: _____
 Species: _____
 Species: _____
 Other (please specify): _____

Browse Damage (Indicate abundance code)

List Species if known: _____
 Flooding (pools and puddling) _____
 Evidence of Fire _____
 Trampling _____
 Earth Displacement _____
 Wind Throw (Blow Down) _____
 Beaver Activity _____

Disturbance Location(s):

Type: _____ GPS Co. _____
 Type: _____ GPS Co. _____
 Type: _____ GPS Co. _____
 Type: _____ GPS Co. _____

MANAGEMENT

Restoration/Management Activities (check those that apply)

Plantings _____ Species: _____

 Pesticide Use _____ Type: _____
 Tree Cutting _____ Authorize _____
 Signage _____ Invasive Sp _____
 Monitoring program _____

Sketch a "bird's eye view" of the polygon and indicate the management/restoration activities (i.e. planting, clumps of)

Management/Disturbance Data Sheet (Part B)

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: _____ Source _____ Abundance _____
 Species: _____ Source _____ Abundance _____
 Species: _____ Source _____ Abundance _____
 Species: _____ Source _____ Abundance _____

Other (please specify):

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____
 List Species if known: _____
 Flooding (pools and puddling) _____
 Evidence of Fire _____
 Trampling _____
 Earth Displacement _____
 Wind Throw (Blow Down) _____
 Beaver Activity _____

Disturbance Location(s):

Type: _____ GPS Co. _____ _____
 Type: _____ GPS Co. _____ _____
 Type: _____ GPS Co. _____ _____
 Type: _____ GPS Co. _____ _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage _____ Invasive Species Removal _____

Monitoring program _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

ELC Community Description (Part A)

Metadata

Site: Brock rd & Harvest Rd.
 Polygon: G
 UTM:
 Date: Aug 16/11 Time: 1200
 Surveyor(s): JED, KGB
 Weather: 26°C, 0% clouds, wind=3

Community Classification

Vegetation Type: FODNA-11 - Dry-Fresh Black Locust Forest
 Inclusion:
 Complex:

Polygon Description

System	Substrate	Topo Feature	Community		
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus	Lake	Barren
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	Riverine	Crevice/Cave	Pond	Meadow
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar	River	Prairie
	Acidic Bedrock	Terrace	Rockland	Stream	Thicket
	Basic Bedrock	Valley Slope	Beach/Bar	Marsh	Savannah
	Carb. Bedrock	<input checked="" type="checkbox"/> Tableland	Sand Dune	Swamp	Woodland
		Roll Upland	Bluff	Fen	<input checked="" type="checkbox"/> Forest
		Cliff		Bog	Plantation
History					
<input checked="" type="checkbox"/> Natural					
<input type="checkbox"/> Cultural					
	Site				
Cover		Plant Form			
<input type="checkbox"/> Open	Open Water	Plankton	Forb	Coniferous	
<input type="checkbox"/> Shrub	Shallow Water	Submerged	Lichen	Mixed	
<input checked="" type="checkbox"/> Treed	<input checked="" type="checkbox"/> Surficial Dep.	Floating-Lvd.	Bryophyte		
	Bedrock	Graminoid	<input checked="" type="checkbox"/> Deciduous		

Stand Description

Layer	HT	Cover	Species
1 Canopy	2	4	Black locust >> black walnut > balsam poplar
2 Sub-canopy	3	3	Black locust > black walnut > Manitoba maple
3 Understorey	A	3	Red raspberry = garlic mustard
4 Groundcover	5	4	Garlic mustard > rayn-avenue > dandelion

HT Codes: 1 >25m 2 25-10m 3 10-2m 4 2-1m 5 1-0.5m 6 0.5-0.2m 7 <0.2m

Cover Codes: 0 none 1 0-10% 2 10-25 3 25-60% 4 >60%

Size Class Analysis	O	R	N	A
Snags	< 10	10-24	25-50	> 50
Deadfall/Logs	< 10	10-24	25-50	> 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	Young	Mid-age	Mature	Old Growth
			<input checked="" type="checkbox"/>		

PLANT SPECIES LIST

Metadata

Site: Porcupine & Harvest Rd.
 Polygon: G
 UTM:
 Date: Aug 16/11 Time: 1200
 Surveyor(s): JEB, KGB
 Weather: 26°C, wind=3, clouds=0%

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample	
	1	2	3	4			1	2	3	4		
Red raspberry			A									
Sugar maple	R	R										
White Ash		R	O									
black locust	D	O										
dames rocket				O								
Common burdock				R								
garlic mustard			A	D								
Balsam poplar	O											
Kiverbark grape			O									
Manitoba maple		O	O									
C. buckthorn			O									
Red pine			R									
wild cucumber				O								
Scots pine			R									
motherwort				O								
black walnut	O	O										
yellow axon				R								
Norway spruce	R											
Pin cherry		R										
wood sorrel				O								
sweet white clyx				O								
bittersweet nightshade				O								
dandelion				O								
orchard grass				R								
Virginia creeper				O								
Zacharias nightshade				O								
Black cherry	R											
Tartarian honey sucker				R								
ribwort				R								

Source of common names: _____

Wildlife Observation Form

Metadata

Site: Brock-Hannus Rd. - 1268

Polygon: C

UTM:

Date: Time: 1705

Surveyor(s): JEB, KGB

Weather: 25°C, 0% CC, N-2

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor wintering

Fallen Logs Deer wintering yards Bat Hibernacula

Snags Migratory stopover Reptile Hibernacula

Species Observed										
TY	Species	EV	Notes	#		TY	Species	EV	Notes	#
B	Black-capped Chickadee			00		L	Cabbage White			00
B	Indigo Bunting									
						M	Gray Squirrel			00

Faunal Type Codes (TY)
 B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

Evidence Codes (EV)

Breedign Birds	Other Wildlife
SH-Suitable Habitat	OB- Observed
SM- Singing Male	DP-Distinctive Parts
T-Territory	TK- Tracks
A-Anxiety Behavior	VO- Vocalization
D-Courtship Display	HO- House/Den
N-Nest Building	FE- Feeding Evidence
P-Pair	CA-Carcass/Bones
V-Visiting Nest	FY- Eggs or young
DD- Distraction Display	SC-Scat
NE-Nest with Eggs	SI- Other Signs (Specify)
AE-Adult entering nest	
NU- Used nest	
FY-Fledged Young	
FS- Food/Fecal Sac	

Management/Disturbance Data Sheet (Part A)

Metadata

Site: <u>Brect & Harvest</u>	Date: <u>Aug 16/2011</u>
Polygon: <u>B</u>	Surveyor(s): <u>TEG, KGB</u>
UTM:	Weather: <u>25°C, 0% CC, N-2</u>

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	✓ <u>A</u>	Other: _____
European Buckthorn	✓ <u>O</u>	_____
Manitoba Maple	✓ <u>O</u>	_____
Norway Maple	_____	_____
Tartarian Honeysuckle	✓ <u>O</u>	_____
Purple Loosestrife	_____	_____
Common reed	_____	_____
Multiflora Rose	✓ <u>O</u>	_____
Periwinkle	_____	_____
Dame's Rocket	✓ <u>O</u>	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails	<u>N</u>	Other (please specify): _____
Walking	<u>N</u>	_____
ATV's, bikes, etc	_____	_____

Dumping (Indicate abundance code for each)

Garbage	<u>O</u>	Other (please specify): _____
Yard Waste	_____	_____

Recreational Use (Indicate polygon abundance code for each)

Walking	<u>R</u>	Other (please specify): _____
Biking	<u>N</u>	_____
Forts	<u>N</u>	_____
Squatting	<u>N</u>	_____
Campfires	<u>N</u>	_____

Tree Disease (Indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Specific Diseases or Other (please specify): _____				

Management/Disturbance Data Sheet (Part B)

Tree Damage (Indicate species, type of damage, abundance)

Species: _____
 Species: _____
 Species: _____
 Species: _____
 Other (please specify): _____

Browse Damage (Indicate abundance code)

List Species if known: _____
 Flooding (pools and puddling) _____
 Evidence of Fire _____
 Trampling _____
 Earth Displacement _____
 Wind Throw (Blow Down) _____
 Beaver Activity _____

Disturbance Location(s):

Type: _____ GPS Co. _____
 Type: _____ GPS Co. _____
 Type: _____ GPS Co. _____
 Type: _____ GPS Co. _____

MANAGEMENT

Restoration/Management Activities (check those that apply)

Plantings _____ Species: _____

 Pesticide Use _____ Type: _____
 Tree Cutting _____ Authorized _____
 Signage _____ Invasive Sp _____
 Monitoring program _____

Sketch a "bird's eye view" of the polygon and indicate the management/restoration activities (i.e. planting, clumps o

Management/Disturbance Data Sheet (Part B)

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: _____ Source _____ Abundance _____
 Species: _____ Source _____ Abundance _____
 Species: _____ Source _____ Abundance _____
 Species: _____ Source _____ Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____
 List Species if known: _____
 Flooding (pools and puddling) _____
 Evidence of Fire _____
 Trampling _____
 Earth Displacement _____
 Wind Throw (Blow Down) _____
 Beaver Activity _____

Disturbance Location(s):

Type: _____ GPS Co. _____ _____
 Type: _____ GPS Co. _____ _____
 Type: _____ GPS Co. _____ _____
 Type: _____ GPS Co. _____ _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage _____ Invasive Species Removal _____

Monitoring program _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

ELC Community Description (Part A)

Metadata

Site: Brock + Harvest +
 Polygon: F
 UTM:
 Date: Aug 16/11 Time: 11:30
 Surveyor(s): JEL, KGB
 Weather:

Community Classification

Vegetation Type: FOD - Deciduous Forest +
 Inclusion:
 Complex:

Polygon Description

System	Substrate	Topo Feature	Community		
<input checked="" type="checkbox"/> Terrestrial	<input type="checkbox"/> Organic	<input type="checkbox"/> Lacustrine	<input type="checkbox"/> Talus	<input type="checkbox"/> Lake	<input type="checkbox"/> Barren
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	<input type="checkbox"/> Riverine	<input type="checkbox"/> Crevice/Cave	<input type="checkbox"/> Pond	<input type="checkbox"/> Meadow
<input type="checkbox"/> Aquatic	<input type="checkbox"/> Parent Min	<input type="checkbox"/> Bottomland	<input type="checkbox"/> Alvar	<input type="checkbox"/> River	<input type="checkbox"/> Prairie
	<input type="checkbox"/> Acidic Bedrock	<input type="checkbox"/> Terrace	<input type="checkbox"/> Rockland	<input type="checkbox"/> Stream	<input type="checkbox"/> Thicket
History	<input type="checkbox"/> Basic Bedrock	<input type="checkbox"/> Valley Slope	<input type="checkbox"/> Beach/Bar	<input type="checkbox"/> Marsh	<input type="checkbox"/> Savannah
<input checked="" type="checkbox"/> Natural	<input type="checkbox"/> Carb. Bedrock	<input checked="" type="checkbox"/> Tableland	<input type="checkbox"/> Sand Dune	<input type="checkbox"/> Swamp	<input type="checkbox"/> Woodland
<input type="checkbox"/> Cultural		<input type="checkbox"/> Roll. Upland	<input type="checkbox"/> Bluff	<input type="checkbox"/> Fen	<input checked="" type="checkbox"/> Forest
		<input type="checkbox"/> Cliff		<input type="checkbox"/> Bog	<input type="checkbox"/> Plantation
Cover	Site	Plant Form			
<input type="checkbox"/> Open	<input type="checkbox"/> Open Water	<input type="checkbox"/> Plankton	<input type="checkbox"/> Forb	<input type="checkbox"/> Coniferous	
<input type="checkbox"/> Shrub	<input type="checkbox"/> Shallow Water	<input type="checkbox"/> Submerged	<input type="checkbox"/> Lichen	<input type="checkbox"/> Mixed	
<input checked="" type="checkbox"/> Tree	<input checked="" type="checkbox"/> Surficial Dep.	<input type="checkbox"/> Floating-Lvd.	<input type="checkbox"/> Bryophyte		
	<input type="checkbox"/> Bedrock	<input type="checkbox"/> Graminoid	<input checked="" type="checkbox"/> Deciduous		

Stand Description

Layer	HT	Cover	Species
1 Canopy	2	4	Black cherry > Hickory > Balsam poplar
2 Sub-canopy	3	4	Manitoba maple = staghorn sumac
3 Understorey	4	2	grapes Red raspberry > elderberry
4 Groundcover	5	4	Canada goldenrod > smooth brome

HT Codes: 1: >25m 2: 25 - 10m 3: 10 - 2m 4: 2 - 1m 5: 1 - 0.5m 6: 0.5 - 0.2m 7: <0.2m

Cover Codes: 0: none 1: 0 - 10% 2: 10 - 25 3: 25 - 60% 4: >60%

Size Class Analysis	<input type="checkbox"/> < 10	<input type="checkbox"/> 10 - 24	<input type="checkbox"/> 25 - 50	<input checked="" type="checkbox"/> > 50
Snags	<input checked="" type="checkbox"/> < 10	<input type="checkbox"/> 10 - 24	<input type="checkbox"/> 25 - 50	<input checked="" type="checkbox"/> > 50
Deadfall/Logs	<input type="checkbox"/> < 10	<input type="checkbox"/> 10 - 24	<input checked="" type="checkbox"/> 25 - 50	<input checked="" type="checkbox"/> > 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	Young	Mid-age	Mature	Old Growth
			<input checked="" type="checkbox"/>		

PLANT SPECIES LIST

Metadata

Site: Brock & Harvest Rd.
 Polygon: F
 UTM:
 Date: Aug 16/11 Time: 11:30
 Surveyor(s):
 Weather:

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample	
	1	2	3	4			1	2	3	4		
Staghorn sumac			O									
Manitoba maple	A		O									
black cherry	O											
white mulberry			R									
elderberry			O									
Riverbank grape			O									
Balsam poplar	R											
black currant			R									
Canada goldenrod				A								
multi-flora rose			R									
hickory sp.	O				1✓	windlocking						
Vine sp.			R		2✓	Shepherd.						
Common buckthorn			O			carriac flower						
Red raspberry			O									
daisy fleabane				O								
Canada thistle				O								
orchard grass				O								
Tartarian knotweed			O									
Virginia creeper			O									
Shagbark hickory			O									
Siberian maple			R									
Siberian Elm			R									
choke cherry			R									
Smooth brome grass				O								
King Owens				O								
dames rocket				O								
Common burdock				O								
enchanters nightshade				O								

S. herbacea

Source of common names: _____

Wildlife Observation Form

Metadata

Site: Brock & Harvest
 Polygon: F
 UTM:
 Date: Aug 16, 2014 Time: 11:27
 Surveyor(s): JFG, KGS
 Weather: 75°F, 67% C, N-1

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor wintering
 Fallen Logs Deer wintering yards Bat Hibernacula
 Snags Migratory stopover Reptile Hibernacula

Species Observed									
TY	Species	EV	#	Notes	TY	Species	EV	#	Notes
B	E. Starling		40		L	Cabbage White		1	
B	Baltimore Oriole		1		L	Orange Sulphur		1	
B	Rose-breasted Grosbeak		1		L	Red-spotted Purple		1	
B	A. Goldfinch		1						
B	Turkey Vulture		1		O	Phoebe sp.		1	
					L	Monarch		1	
					L	Pearl Crescent		1	
					L	Common Nighthawk		1	
					L	Black Swallowtail		1	

Faunal Type Codes (TY)
 B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

Evidence Codes (EV)

- | | |
|-------------------------|---------------------------|
| Breedign Birds | Other Wildlife |
| SH-Suitable Habitat | OB- Observed |
| SM- Singing Male | DP-Distinctive Parts |
| T-Territory | TK- Tracks |
| A-Anxiety Behavior | VO- Volcalization |
| D-Courtship Display | HO- House/Den |
| N-Nest Building | FE- Feeding Evidence |
| P-Pair | CA-Carcass/Bones |
| V-Visiting Nest | FY- Eggs or young |
| DD- Distraction Display | SC-Scat |
| NE-Nest with Eggs | SI- Other Signs (Specify) |
| AE-Adult entering nest | |
| NU- Used nest | |
| FY-Fledged Young | |
| FS- Food/Fecal Sac | |

Management/Disturbance Data Sheet (Part A)

Metadata

Site: <u>Brock + Harvest Rd.</u>	Date: _____
Polygon: <u>F</u>	Surveyor(s): <u>JEG, KGB</u>
UTM: _____	Weather: <u>25°C, 0% CC, N-1</u>

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	<u>A</u>	Other: _____
European Buckthorn	<u>O</u>	_____
Manitoba Maple	<u>A</u>	_____
Norway Maple	_____	_____
Tartarian Honeysuckle	<u>O</u>	_____
Purple Loosestrife	_____	_____
Common reed	_____	_____
Multiflora Rose	_____	_____
Periwinkle	_____	_____
Dame's Rocket	<u>A</u>	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails	_____	Other (please specify): _____
Walking	_____	<u>Common - R (O)</u>
ATV's, bikes, etc	<u>R</u>	_____

Dumping (Indicate abundance code for each)

Garbage	<u>O</u>	Other (please specify): _____
Yard Waste	<u>O</u>	_____

Recreational Use (Indicate polygon abundance code for each)

Walking	<u>N</u>	Other (please specify): _____
Biking	<u>N</u>	_____
Forts	<u>N</u>	_____
Squatting	<u>N</u>	_____
Campfires	<u>N</u>	_____

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus	_____	Leaf spots	_____	Cankers	_____	Dieback	_____
Species:	Fungus	_____	Leaf spots	_____	Cankers	_____	Dieback	_____
Species:	Fungus	_____	Leaf spots	_____	Cankers	_____	Dieback	_____
Species:	Fungus	_____	Leaf spots	_____	Cankers	_____	Dieback	_____
Specific Diseases or Other (please specify): _____								

Management/Disturbance Data Sheet (Part B)

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code)

List Species if known: _____	Other (please be specific) _____
Flooding (pools and puddling) _____	
Evidence of Fire _____	
Trampling _____	
Earth Displacement _____	
Wind Throw (Blow Down) _____	
Beaver Activity _____	

Disturbance Location(s):

Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____	Species: _____	_____

Pesticide Use _____	Type: _____	
Tree Cutting _____	Authorized Trails _____	
Signage _____	Invasive Species Removal _____	
Monitoring program _____		

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

ELC Community Description (Part A)

Metadata

Site:	Brook + Harvest Rd.		
Polygon:	E		
UTM:			
Date:	Aug 16/11	Time:	11:00 hrs
Surveyor(s):	JTB, KSB		
Weather:	21°C, 0% clouds, wind=2		

Community Classification

Vegetation Type:	TAGM1 - Coniferous Plantation (Mixed conifers)
Inclusion:	Mixed Meadow (same as D) NEMM3
Complex:	

Polygon Description

System	Substrate	Topo Feature	Community			
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus	Lake	Barren	
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	Riverine	Crevice/Cave	Pond	Meadow	
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar	River	Prairie	
	Acidic Bedrock	Terrace	Rockland	Stream	Thicket	
History	Basic Bedrock	Valley Slope	Beach/Bar	Marsh	Savannah	
<input type="checkbox"/> Natural	Carb. Bedrock	<input checked="" type="checkbox"/> Tableland	Sand Dune	Swamp	Woodland	
<input checked="" type="checkbox"/> Cultural		Roll. Upland	Bluff	Fen	Forest	
	Site	Cliff		Bog	<input checked="" type="checkbox"/> Plantation	
Cover	Open Water	Plant Form				
<input type="checkbox"/> Open	Shallow Water	Plankton	Forb	<input checked="" type="checkbox"/> Coniferous		
<input type="checkbox"/> Shrub	<input checked="" type="checkbox"/> Surficial Dep.	Submerged	Lichen	<input type="checkbox"/> Mixed		
<input checked="" type="checkbox"/> Treed	Bedrock	Floating-Lwd	Bryophyte			
		Graminoid	Deciduous			

Stand Description

Layer	HT	Cover	Species
1 Canopy	2	A	Scots pine = Red pine = Norway spruce = blue spruce
2 Sub-canopy			N/A
3 Understorey	3	2	Manitoba maple > white Ash
4 Groundcover	5	3	Canada goldenrod > grape > moss

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0: none 1: 0-10% 2: 10-25 3: 25-60% 4: >60%

Size Class Analysis	O < 10	D 10-24	R 25-50	N > 50
Snags	N < 10	O 10-24	N 25-50	N > 50
Deadfall/Logs	O < 10	O 10-24	N 25-50	N > 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	Young	<input checked="" type="checkbox"/> Mid-age	Mature	Old Growth
---------------	---------	-------	---	--------	------------

PLANT SPECIES LIST

Metadata

Site: Brock rd & Harvest Rd.
 Polygon: E
 UTM:
 Date: Aug 16/11 Time: 11:00
 Surveyor(s): JTB, KGB
 Weather:

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample
	1	2	3	4			1	2	3	4	
Scots pine	O					Rough hawkweed					R
white spruce	O					broad-leaf plantain					G
blue spruce	O					bird-foot trefoil					O
dandelion				O		Common mullein					R
wild carrot				O		grass-leaf goldenrod					O
common buckthorn		O				Red pine	O				
white ash		O				Norway spruce	O				
black medic				O		Rough awen					O
Riverbank grape		O	A			wild cucumber					R
Lupinus				O							
Canada goldenrod				A							
calico aster				G							
New England Aster				O							
Manitoba maple		O									
field pussy toes				O							
enchanted nightshade				O							
Common burdock				O							
garlic mustard				O							
Virginia creeper				O							
butter & eggs				O							
Asparagus				R							
Red raspberry		O									
wood sorrel				O							
Common speedwell				R							
Red aster douglasii				R							
viburnum opulus				R							
field hawkweed				O							
European mountain ash				R							
Carex sp.				R							

Source of common names: _____

Wildlife Observation Form

Metadata

Site: Brack & Harvest
 Polygon: E
 UTM:
 Date: Aug 16/2011 Time: 1045
 Surveyor(s): JEG, KGB
 Weather: 72 F, 81% CC, N-2

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor wintering
 Fallen Logs Deer wintering yards Bat Hibernacula
 Snags Migratory stopover Reptile Hibernacula

Species Observed									
TY	Species	EV	#	Notes	TY	Species	EV	#	Notes
B	Black-capped Chickadee		00		L	Common Noddy		00	
B	Blue Jay		00		L	Common Ringlet		00	
B	A. Crow		00		L	Silver-spotted Skipper		00	
B	Gray Catbird		00						
B	N.C. Oriole		00						
B	A. Robin		00						
B	King-billed Gull		00						

Faunal Type Codes (TY)
 B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

- Evidence Codes (EV)
- | | |
|-------------------------|---------------------------|
| Breedign Birds | Other Wildlife |
| SH-Suitable Habitat | OB- Observed |
| SM- Singing Male | DP-Distinctive Parts |
| T-Territory | TK- Tracks |
| A-Anxient Behavior | VO- Vocalization |
| D-Courtship Display | HO- House/Den |
| N-Nest Building | FE- Feeding Evidence |
| P-Pair | CA-Carcass/Bones |
| V-Visiting Nest | FY- Eggs or young |
| DD- Distraction Display | SC-Scat |
| NE-Nest with Eggs | SI- Other Signs (Specify) |
| AE-Adult entering nest | |
| NU- Used nest | |
| FY-Fledged Young | |
| FS- Food/Fecal Sac | |

Management/Disturbance Data Sheet (Part A)

Metadata

Site: <u>Brock & Hannast</u>	Date: <u>Aug 16/2011</u>
Polygon: <u>F</u>	Surveyor(s): <u>TEB, KOB</u>
UTM:	Weather: <u>24°C, 0% CC, N-2</u>

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	<u>POP</u>	Other: _____
European Buckthorn	<u>POP</u>	_____
Manitoba Maple	<u>POP</u>	_____
Norway Maple	<u>POP</u>	_____
Tartarian Honeysuckle	<u>POP</u>	_____
Purple Loosestrife	<u>POP</u>	_____
Common reed	<u>POP</u>	_____
Multiflora Rose	<u>POP</u>	_____
Periwinkle	<u>POP</u>	_____
Dame's Rocket	<u>POP</u>	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails	<u>N</u>	Other (please specify): _____
Walking	<u>N</u>	_____
ATV's, bikes, etc		_____

Dumping (Indicate abundance code for each)

Garbage	<u>Litter Abundant</u>	Other (please specify): _____
Yard Waste	<u>N</u>	_____

Recreational Use (Indicate polygon abundance code for each)

Walking	<u>N</u>	Other (please specify): _____
Biking	<u>N</u>	_____
Forts	<u>N</u>	_____
Squatting	<u>N</u>	_____
Campfires	<u>N</u>	_____

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Specific Diseases or Other (please specify): _____				

Management/Disturbance Data Sheet (Part B)

Tree Damage (indicate species, type of damage, abundance)

Species: _____
 Species: _____
 Species: _____
 Other (please specify): _____

Browse Damage (Indicate abundance code)

List Species if known: _____
 Flooding (pools and puddling) _____
 Evidence of Fire _____
 Trampling _____
 Earth Displacement _____
 Wind Throw (Blow Down) _____
 Beaver Activity _____

Disturbance Location(s):

Type: _____ GPS Co. X
 Type: _____ GPS Co. X
 Type: _____ GPS Co. X
 Type: _____ GPS Co. X

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings Species: Scott's i

 Pesticide Use _____ Type: _____
 Tree Cutting _____ Authorized _____
 Signage _____ Invasive Spe _____
 Monitoring program _____

Sketch a "bird's eye view" of the polygon and indicate the management/restoration activities (i.e. planting, clumps o

Management/Disturbance Data Sheet (Part B)

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)		
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Other (please specify): _____		
Browse Damage (Indicate abundance code)		Other (please be specific)
List Species if known: _____		
Flooding (pools and puddling) _____		
Evidence of Fire _____		
Trampling _____		
Earth Displacement _____		
Wind Throw (Blow Down) _____		
Beaver Activity _____		
Disturbance Location(s):		
Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____
Type: _____	GPS Co. x _____	y _____

MANAGEMENT

Restoration/Management Activities (check those that apply)	
Plantings <input checked="" type="checkbox"/>	Species: <u>Scott's Pine</u>

Pesticide Use <input type="checkbox"/>	Type: _____
Tree Cutting <input type="checkbox"/>	Authorized Trails <input type="checkbox"/>
Signage <input type="checkbox"/>	Invasive Species Removal <input type="checkbox"/>
Monitoring program <input type="checkbox"/>	

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

ELC Community Description (Part A)

Metadata

Site:	Brack & Harvest Rd.		
Polygon:	D		
UTM:			
Date:	Aug 16/11	Time:	1000hrs
Surveyor(s):	JTB, KGB		
Weather:	20°C, 10% cloud cover, wind=2		

Community Classification

Vegetation Type:	MEHM3 - Dry-Fresh Mixed Meadow
Inclusion:	Coniferous plantation (TAGMI)
Complex:	

Polygon Description

System	Substrate	Topo Feature	Community		
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus	Lake	Barren
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	Riverine	Crevise/Cave	Pond	<input checked="" type="checkbox"/> Meadow
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar	River	Prairie
	Acidic Bedrock	Terrace	Rockland	Stream	Thicket
	Basic Bedrock	Valley Slope	Beach/Bar	Marsh	Savannah
	Carb. Bedrock	<input checked="" type="checkbox"/> Plateau	Sand Dune	Swamp	Woodland
History		Roll. Upland	Bluff	Fen	Forest
<input checked="" type="checkbox"/> Natural		Cliff		Bog	Plantation
<input type="checkbox"/> Cultural					
Cover	Open Water	Plant Form			
<input checked="" type="checkbox"/> Open	Shallow Water	Plankton	<input checked="" type="checkbox"/> Forb	Coniferous	
<input type="checkbox"/> Shrub	<input checked="" type="checkbox"/> Surficial Dep	Submerged	Lichen	Mixed	
<input type="checkbox"/> Treed	Bedrock	Floating-Lvd.	Bryophyte		
		Graminoid	Deciduous		

Stand Description

Layer	HT	Cover	Species
1 Canopy	3	1	White spruce = scots pine = trembling aspen
2 Sub-canopy	3	1	Trembling Aspen
3 Understorey	4	1	Red asic dogwood
4 Groundcover	5	4	Canada goldenrod = brome grass = wild carrot

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0: none 1: 0-10% 2: 10-25 3: 25-60% 4: >60%

Size Class Analysis	N < 10	R 10-24	O 25-50	A > 50
Snags	N < 10	N 10-24	N 25-50	N > 50
Deadfall/Logs	N < 10	N 10-24	N 25-50	N > 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	<input checked="" type="checkbox"/> Young	Mid-age	Mature	Old Growth
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PLANT SPECIES LIST

Metadata

Site: Brock & Harvest Rd.
 Polygon: D
 UTM:
 Date: Aug 16/11 Time: 1000hrs
 Surveyor(s): JEB, KGB
 Weather:

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample	
	1	2	3	4			1	2	3	4		
Canada goldenrod				A		Trembling Aspen	R	R				
Staghorn sumac			O			Red osier dogwood			O			
Common milkweed				O		Asparagus					R	
Canada thistle				O		White spruce	O					
Juniper			R			Small white aster					R	
Red raspberry				O		Scots pine	O					
Smooth brome grass				A		White birch	R					
Wild carrot				A								
Riverbank grape			O	A								
Early dock				R								
Sweet white clover				O								
Stinging nettle				R								
Reed canary grass				R								
New England Aster				O								
Common ragweed				O								
Tufted Vetch				O								
Common buckeye				O								
Broad-leaved plantain				O								
Black medic				O								
Rough-leaved goldenrod				O								
Large-leaf aster				R								
Virginia creeper				O								
Common st. John's wort				O								
Field horse tail				O								

J. communis
 A. pilosum pilosum

Source of common names: _____

Wildlife Observation Form

Metadata

Site: Brake Mt. Harvest
 Polygon: D
 UTM:
 Date: Aug 16/2011 Time: 1010
 Surveyor(s): JEO KGB
 Weather: 20°C, 0% CC, N-2

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor wintering
 Fallen Logs Deer wintering yards Bat Hibernacula
 Snags Migratory stopover Reptile Hibernacula

Species Observed									
TY	Species	EV	#	Notes	TY	Species	EV	#	Notes
B	Black-capped Chickadee			SH H	L	Cabbage White			..
B	Red-breasted Nuthatch			• S	L	Silver-spotted Skipper			•
B	Blue Jay			• H	L	Common Kinglet			••
B	Downy Woodpecker			• H	L	Hobomok Skipper			••
B	Red-tailed Hawk			• H	L	Clauded Sulphur			•
B	Bank Swallow			SH H					
B	Great Blue Heron			• X					
B	N. Cardinal			• H					
B	A. Goldfinch			• H					
B	Canada Goose			• H					
B	Spotted Skipper			• X					

Faunal Type Codes (TY)
 B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

- Evidence Codes (EV)**
- Breedign Birds
 - SH-Suitable Habitat
 - SM- Singing Male
 - T-Territory
 - A-Anxiety Behavior
 - D-Courtship Display
 - N-Nest Building
 - P-Pair
 - V-Visiting Nest
 - DD- Distraction Display
 - NE-Nest with Eggs
 - AE-Adult entering nest
 - NU- Used nest
 - FY-Fledged Young
 - FS- Food/Fecal Sac
- Other Wildlife**
- OB- Observed
 - DP-Distinctive Parts
 - TK- Tracks
 - VO- Vocalization
 - HO- House/Den
 - FE- Feeding Evidence
 - CA-Carcass/Bones
 - FY- Eggs or young
 - SC-Scat
 - SI- Other Signs (Specify)

Management/Disturbance Data Sheet (Part A)

Metadata

Site: <u>Brock & Harvest</u>	Date: <u>Aug 16/2011</u>
Polygon: <u>D</u>	Surveyor(s): <u>JEG, KGB</u>
UTM:	Weather: <u>70C, 15% CC, N-2</u>

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	___	Other: <u>see plant list -</u>
European Buckthorn	___	<u>many non-natives/</u>
Manitoba Maple	___	<u>invasives</u>
Norway Maple	___	___
Tartarian Honeysuckle	___	___
Purple Loosestrife	___	___
Common reed	___	___
Multiflora Rose	___	___
Periwinkle	___	___
Dame's Rocket	___	___

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails	___	Other (please specify):
Walking	___	
ATV's, bikes, etc	<u>A</u>	

Dumping (Indicate abundance code for each)

Garbage	<u>R</u>	Other (please specify):
Yard Waste	<u>R</u>	<u>→ grass clippings</u>

Recreational Use (Indicate polygon abundance code for each)

Walking	<u>O</u>	Other (please specify):
Biking	<u>R</u>	<u>in-rowed path</u>
Forts	<u>R</u>	
Squatting	<u>R</u>	
Campfires	<u>R</u>	

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus	___	Leaf spots	___	Cankers	___	Dieback	___
Species:	Fungus	___	Leaf spots	___	Cankers	___	Dieback	___
Species:	Fungus	___	Leaf spots	___	Cankers	___	Dieback	___
Species:	Fungus	___	Leaf spots	___	Cankers	___	Dieback	___
Specific Diseases or Other (please specify):								

ELC Community Description (Part A)

Metadata

Site: Brock rd + Harvest Rd.
 Polygon: C
 UTM:
 Date: Aug 16/11 Time: 0936
 Surveyor(s): JEL, XGB
 Weather:

Community Classification

Vegetation Type: TAGMI-Coniferous Plantation (white spruce)
 Inclusion:
 Complex:

Polygon Description

System	Substrate	Topo Feature	Community
<input checked="" type="checkbox"/> Terrestrial	<input type="checkbox"/> Organic	<input type="checkbox"/> Lacustrine	<input type="checkbox"/> Talus
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	<input type="checkbox"/> Riverine	<input type="checkbox"/> Crevice/Cave
<input type="checkbox"/> Aquatic	<input type="checkbox"/> Parent Min.	<input type="checkbox"/> Bottomland	<input type="checkbox"/> Alvar
	<input type="checkbox"/> Acidic Bedrock	<input type="checkbox"/> Terrace	<input type="checkbox"/> Rockland
	<input type="checkbox"/> Basic Bedrock	<input type="checkbox"/> Valley Slope	<input type="checkbox"/> Beach/Bar
	<input type="checkbox"/> Carb. Bedrock	<input checked="" type="checkbox"/> Tableland	<input type="checkbox"/> Sand Dune
		<input type="checkbox"/> Roll. Upland	<input type="checkbox"/> Bluff
		<input type="checkbox"/> Cliff	
			<input checked="" type="checkbox"/> Bog
			<input type="checkbox"/> Lake
			<input type="checkbox"/> Pond
			<input type="checkbox"/> River
			<input type="checkbox"/> Stream
			<input type="checkbox"/> Marsh
			<input type="checkbox"/> Swamp
			<input type="checkbox"/> Fen
			<input type="checkbox"/> Barren
			<input type="checkbox"/> Meadow
			<input type="checkbox"/> Prairie
			<input type="checkbox"/> Thicket
			<input type="checkbox"/> Savannah
			<input type="checkbox"/> Woodland
			<input type="checkbox"/> Forest
			<input checked="" type="checkbox"/> Plantation

Cover	Plant Form
<input type="checkbox"/> Open	<input type="checkbox"/> Plankton
<input type="checkbox"/> Shrub	<input type="checkbox"/> Submerged
<input checked="" type="checkbox"/> Treed	<input type="checkbox"/> Floating-Lvd
	<input type="checkbox"/> Graminoid
	<input type="checkbox"/> Forb
	<input type="checkbox"/> Lichen
	<input type="checkbox"/> Bryophyte
	<input type="checkbox"/> Deciduous
	<input checked="" type="checkbox"/> Coniferous
	<input type="checkbox"/> Mixed

Stand Description

Layer	HT	Cover	Species
1 Canopy	2	A	White spruce
2 Sub-canopy			N/A
3 Understorey			N/A
4 Groundcover	1	6	Balsam poplar > plantain > clonalichen

HT Codes: 1: >25m 2: 25 - 10m 3: 10 - 2m 4: 2 - 1m 5: 1 - 0.5m 6: 0.5 - 0.2m 7: <0.2m

Cover Codes: 0: none 1: 0 - 10% 2: 10 - 25 3: 25 - 60% 4: >60%

Size Class Analysis	N < 10	O 10 - 24	O 25 - 50	N > 50
Snags	N < 10	O 10 - 24	N 25 - 50	N > 50
Deadfall/Logs	R < 10	K 10 - 24	N 25 - 50	N > 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	Young	Mid-age	Mature	Old Growth
			<input checked="" type="checkbox"/>		

Metadata

Site: Brock rd. & Harvest Rd.
 Polygon: C
 UTM:
 Date: Aug. 16/11 Time: 0930
 Surveyor(s): JEB, VGB
 Weather: Sunny, 0% clouds, 72°C

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample	
	1	2	3	4			1	2	3	4		
white spruce	D											
balsam poplar				O								
field horsetail				O								
dandelion				O								
wild carrot				O								
broad-leaved plantain				O								
daun. fleabane				O								
burdock				O								
Rough-leaved goldenrod				O								
Enchanters nightshade				O								
pinson WY				R								
Canada golden-r				R								
Common buckthorn				O								
Riverbank grape				O								
Red raspberry				R								
Field horsetail				O								
Rough avens				O								
Virginia creeper				O								
heat-all				R								
tartaria hemysculu				R								
gray goldenrod				R								
white Ash				R								
orchard grass				R								
Red-oster downwood				R								
Colts Foot				R								
Creeping bellflower				O								
Aster sp.				O	Not Flower							
White Pine	R											

Source of common names: Newcombs

Management/Disturbance Data Sheet (Part A)

Metadata

Site: <u>Brack & Harvest Rd.</u>	Date: <u>Aug 16/2011</u>
Polygon: <u>C</u>	Surveyor(s): <u>JEG, K&B</u>
UTM:	Weather: <u>70°C, 0% CC, N-1</u>

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	___	Other: _____
European Buckthorn	___	_____
Manitoba Maple	___	_____
Norway Maple	___	_____
Tartarian Honeysuckle	<u>R</u>	_____
Purple Loosestrife	___	_____
Common reed	___	_____
Multiflora Rose	___	_____
Periwinkle	___	_____
Dame's Rocket	___	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails	___	Other (please specify): _____
Walking	___	<u>Campsite -> R (1)</u>
ATVs, bikes, etc	<u>R</u>	

Dumping (Indicate abundance code for each)

Garbage	<u>O</u>	Other (please specify): _____
Yard Waste	___	

Recreational Use (Indicate polygon abundance code for each)

Walking	<u>N</u>	Other (please specify): _____
Biking	<u>N</u>	
Forts	<u>N</u>	
Squatting	<u>N</u>	
Campfires	<u>R</u>	

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback
Specific Diseases or Other (please specify): _____				

Management/Disturbance Data Sheet (Part B)

Tree Damage (indicate species, type of damage, abundance)

Species: _____
 Species: _____
 Species: _____
 Other (please specify): _____

Browse Damage (Indicate abundance code)

List Species if known: _____
 Flooding (pools and puddling) _____
 Evidence of Fire _____
 Trampling _____
 Earth Displacement _____
 Wind Throw (Blow Down) _____
 Beaver Activity _____

Disturbance Location(s):

Type: Campsite (Party) GPS Co. X
 Type: _____ GPS Co. X
 Type: _____ GPS Co. X
 Type: _____ GPS Co. X

MANAGEMENT

Restoration/Management Activities (check those that apply)

Plantings _____ Species: _____

 Pesticide Use _____ Type: _____
 Tree Cutting _____ Authorized _____
 Signage _____ Invasive Spe _____
 Monitoring program _____

Sketch a "bird's eye view" of the polygon and indicate the management/restoration activities (i.e. planting, clumps of)

Management/Disturbance Data Sheet (Part B)

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____

Other (please specify): _____ Other (please be specific) _____

Browse Damage (Indicate abundance code) _____

List Species if known: _____

Flooding (pools and puddling) _____

Evidence of Fire _____

Trampling _____

Earth Displacement _____

Wind Throw (Blow Down) _____

Beaver Activity _____

Disturbance Location(s):

Type: <u>Campsite (Party)</u>	GPS Co. <u>X17T 0581907</u>	<u>y4793131</u>
Type: _____	GPS Co. <u>X</u>	<u>y</u>
Type: _____	GPS Co. <u>X</u>	<u>y</u>
Type: _____	GPS Co. <u>X</u>	<u>y</u>

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage _____ Invasive Species Removal _____

Monitoring program _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

Metadata

Site: Brock Rd & Hanover Rd
Polygon: B
UTM:
Date: Aug 15/11 Time: 1500
Surveyor(s): JTB, KLB
Weather: 28°C, cloud cover = 50%, wind = 2

Community Classification

Vegetation Type: MEFM1 - Dry - Fresh Forb Meadow
Inclusion:
Complex:

Polygon Description

System	Substrate	Topo Feature	Community
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	Riverine	Crevice/Cave
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar
	Acidic Bedrock	Terrace	Rockland
	Basic Bedrock	Valley Slope	Beach/Bar
	Carb. Bedrock	<input checked="" type="checkbox"/> Tablotland	Sand Dune
		Roll, Upland	Bluff
	Site	Cliff	
			Lake
			Pond
			River
			Stream
			Marsh
			Swamp
			Fen
			Bog
			Barren
			<input checked="" type="checkbox"/> Meadow
			Prairie
			Thicket
			Savannah
			Woodland
			Forest
			Plantation

Cover	Plant Form
<input checked="" type="checkbox"/> Open	Plankton
<input type="checkbox"/> Shrub	<input checked="" type="checkbox"/> Forb
<input type="checkbox"/> Treed	Submerged
	Floating-Lvd.
	Graminoid
	Lichen
	Bryophyte
	Deciduous
	Coniferous
	Mixed

Stand Description

Layer	HT	Cover	Species
1 Canopy	3	1	black walnut > Manitoba maple > sugar maple
2 Sub-canopy			N/A
3 Understorey	A	A	wild carrot > can. goldensrod > grasses
4 Groundcover	6	1	cow vetch > white clover > black medic

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0: none 1: 0-10% 2: 10-25 3: 25-50% 4: >50%

Size Class Analysis	R	O	N	N
Snags	< 10	10-24	25-50	> 50
Deadfall/Logs	< 10	10-24	25-50	> 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	Young	Mid-age	Mature	Old Growth
		<input checked="" type="checkbox"/>			

PLANT SPECIES LIST

Metadata

Site: Brock Road
 Polygon: B
 UTM:
 Date: Aug. 15/11 Time: 1600
 Surveyor(s): JEB, KGB
 Weather:

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample
	1	2	3	4			1	2	3	4	
wild carrot			A			Common milkweed				O	
Common Primrose			O								
white clover				O							
Canada thistle			O								
smooth brom grass			O								
garrow			O								
orchard grass			O								
Early adlerweed			O								
black Walnut	O										
Riverbank grass			O								
barnyard grass			O								
Timothy			O								
Common milkweed			O								
curly dock			O								
common mullen			R								
Galio aster			R								
cow vetch				O							
goats beard				O							
black medic				O							
dandelion				O							
New England aster			O								
daisy-flowered			O								
Basket willow	R										
white vervain			R								
Canada goldenrod			O								
white sweet clover			O								
pin cherry	R										
Norway maple	R										
field sun thistle				O							
Common burdock				O							

T. dubius

Source of common names: _____

Wildlife Observation Form

Metadata

Site: Brook & Harvest Rd.
 Polygon: B (Meadow)
 UTM:
 Date: Aug 15/2011 Time: 1510
 Surveyor(s): E.G. KGB
 Weather: 28% C, 50% C, NE 2/3

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor wintering
 Fallen Logs Deer wintering yards Bat Hibernacula
 Snags Migratory stopover Reptile Hibernacula

Species Observed

TY	Species	EV	Notes	#	TY	Species	EV	Notes	#
B	Timber Swift			1	L	Common Ringlet			1
B	Blue Jay			1	L	Cabbage White			1
B	A. Robin			1	L	Common Sulphur			1
B	Black-capped Chickadee			1					
B	A. Goldfinch			1					
					O	Sket sp.			1

Faunal Type Codes (TY)

B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damslefly

Evidence Codes (EV)

Breedign Birds

- SH-Suitable Habitat
- SM- Singing Male
- T-Territory
- A-Anxiety Behavior
- D-Courtship Display
- N-Nest Building
- P-Pair
- V-Visiting Nest
- DD- Distraction Display
- NE-Nest with Eggs
- AE-Adult entering nest
- NU- Used nest
- FY-Fledged Young
- FS- Food/Fecal Sac

Other Wildlife

- OB- Observed
- DP-Distinctive Parts
- TK- Tracks
- VO- Vocalization
- HO- House/Den
- FE- Feeding Evidence
- CA-Carcass/Bones
- FY- Eggs or young
- SC-Scat
- SI- Other Signs (Specify)

Management/Disturbance Data Sheet (Part A)

Metadata

Site: <u>Brock & Harvest Rd.</u>	Date: <u>Aug. 15/2011</u>
Polygon: <u>B (Meadow)</u>	Surveyor(s): <u>J.F.G., K.B.</u>
UTM:	Weather: <u>28°C, 50% CC, NE 2/3</u>

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	___	Other: _____
European Buckthorn	___	<u>See species list -</u>
Manitoba Maple	___	<u>many non-natives</u>
Norway Maple	___	_____
Tartarian Honeysuckle	___	_____
Purple Loosestrife	___	_____
Common reed	___	_____
Multiflora Rose	___	_____
Periwinkle	___	_____
Dame's Rocket	___	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails N Other (please specify): _____
 Walking O
 ATV's, bikes, etc

Dumping (Indicate abundance code for each)

Garbage O Other (please specify): _____
 Yard Waste O

Recreational Use (Indicate polygon abundance code for each)

Walking O Other (please specify): _____
 Biking 1
 Farts 2
 Squatting 2
 Campfires 2

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback
Species:	Fungus	Leaf spots	Cankers	Dieback
Specific Diseases or Other (please specify):				

Management/Disturbance Data Sheet (Part B)

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: _____ Sc
 Species: _____ Sc
 Species: _____ Sc
 Species: _____ Sc
 Other (please specify): _____

Browse Damage (Indicate abundance code)

List Species if known: _____
 Flooding (pools and puddling) _____
 Evidence of Fire _____
 Trampling _____
 Earth Displacement _____
 Wind Throw (Blow Down) _____
 Beaver Activity _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

 Pesticide Use _____ Type: _____
 Tree Cutting _____ Authorized Trails _____
 Signage _____ Invasive Species _____
 Monitoring program _____

Disturbance Location(s):

Type: _____ GPS Co. x
 Type: _____ GPS Co. x
 Type: _____ GPS Co. x
 Type: _____ GPS Co. x

Sketch a "bird's eye view" of the polygon and indicate the appropriate management/restoration activities (i.e. planting, clumps of invasive species)

-> Mowed trails throughout

Management/Disturbance Data Sheet (Part B)

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____

Other (please specify): _____ Other (please be specific) _____

Browse Damage (Indicate abundance code)

List Species if known: _____

Flooding (pools and puddling) _____

Evidence of Fire _____

Trampling _____

Earth Displacement _____

Wind Throw (Blow Down) _____

Beaver Activity _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails ? - mowed paths

Signage _____ Invasive Species Removal _____

Monitoring program _____

Disturbance Location(s):

Type: _____	GPS Co. <u>x</u>	<u>y</u>
Type: _____	GPS Co. <u>x</u>	<u>y</u>
Type: _____	GPS Co. <u>x</u>	<u>y</u>
Type: _____	GPS Co. <u>x</u>	<u>y</u>

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

-> Mowed trails throughout -> not sure if authorized

Metadata

Site:	Brock Rd & Harvest Rd		
Polygon:	A		
UTM:			
Date:	Aug 15/11	Time:	1500
Surveyor(s):	JEG, KGB		
Weather:	20°C, clouds 50%, wind=3		

Community Classification

Vegetation Type:	F0DM7A - Fresh-moist black walnut deciduous forest
Inclusion:	1) MANN-2 - Cattail Marsh 2) F0DM4-11 - Black Locust Forest
Complex:	1) F0DM2-1 - Sumac deciduous shrub thicket 2) MANN-6 - Joe Pic weed Terb Mineral Marsh

Polygon Description

System	Substrate	Topo Feature	Community			
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus	Lake	Barren	
<input type="checkbox"/> Wetland	Mineral Soil	Riverine	Crevice/Cave	Pond	Meadow	
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar	River	Prairie	
	Acidic Bedrock	Terrace	Rockland	Stream	Thicket	
History	Basic Bedrock	Valley Slope	Beach/Bar	Marsh	Savannah	
<input checked="" type="checkbox"/> Natural	Carb. Bedrock	<input checked="" type="checkbox"/> Tableland	Sand Dune	Swamp	Woodland	
<input type="checkbox"/> Cultural		Roll. Upland	Bluff	Fan	<input checked="" type="checkbox"/> Forest	
	Site	Cliff		Bog	Plantation	
Cover	Open Water	Plant Form				
<input type="checkbox"/> Open	Shallow Water	Plankton	Forb	Coniferous		
<input type="checkbox"/> Shrub	<input checked="" type="checkbox"/> Surficial Dep.	Submerged	Lichen	Mixed		
<input checked="" type="checkbox"/> Treed	Bedrock	Floating-Lvd.	Bryophyte			
		Graminoid	<input checked="" type="checkbox"/> Deciduous			

Stand Description

Layer	HT	Cover	Species
1 Canopy	1	A	black walnut > white Ash = sugar maple > Norway maple
2 Sub-canopy	2	3	black walnut = white Ash = sugar maple
3 Understorey	2	A	staghorn sumac = River bank grape
4 Groundcover	5	3	Virginia creeper > cackanters nightshade = garlic mustard.

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0: none 1: 0-10% 2: 10-25 3: 25-60% 4: >60%

Size Class Analysis	A < 10	P 10-24	O 25-50	R > 50
Snags	A < 10	O 10-24	R 25-50	N > 50
Deadfall/Logs	A < 10	O 10-24	R 25-50	N > 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	Young	Mid-age	<input checked="" type="checkbox"/> Mature	Old Growth

Metadata

Site: Brock rd. E. Harvest 120	UTM:
Polygon: A	Surveyor(s): JEG, KGB
Date: Nov 15/11	Weather:
Time: 1500	

Soils	1	2	3
Position:	A		
Aspect:	280°		
%	10%		
Type:	S		
Class:	6		
Strata: Texture	Scl		
Depth	30cm		
Strata: Texture	S1		
Depth	170cm		
Strata: Texture	—		
Depth	—		
Strata: Texture	—		
Depth	—		
Effective Texture			
Surface Stoniness	—		
Surface Rockiness	—		
Depth to:			
Mottles	20cm		
Gley	—		
Bedrock	—		
Water table	—		
Carbonates	—		
Depth of Organics	—		
Pore Size Disc #1			
Pore Size Disc #2			
Pore Size Disc #3			
Moisture Regime	6		

Tree Tally	Tally 1	Tally 2	Tally 3
Species			
black walnut	••	••	••
white ash	••	•	•
sugar maple	•	•	•
E. Blackthorn			•
Willow sp. (Cock)			•
Total:	7	5	5
Basal Area	14	10	10
Snags	•		

NOTES:

photos-100-487 & 488

Community has mature trees but understory very disturbed - invasives, abundant trash

PLANT SPECIES LIST

Metadata

Site: Brock Road + Harvest Road
 Polygon: A
 UTM:
 Date: Aug 15/11 Time: 1500
 Surveyor(s): JFB, KGB
 Weather: 28°, clouds = 30%, wind = 1

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample	
	1	2	3	4			1	2	3	4		
Black walnut	D	A	O			Timothy					O	
Balsam poplar	O					lg-toothed Aspen			R			
Canada goldenrod				O		multiflora rose			R			
Red Raspberry			O			Tartarian hennipiece			O			
Erchankes nightshade				O		blackberry			O			
Virginia creeper			A	A		priset				R		
Rough Avenas				O		Japanese knotweed			R			
dandelion				O		Manitoba maple			R	R		
choke cherry			O			curl dock					O	
wild carrot				O		Pin cherry	O	O				
daisy-flabers				O		Japanese barked			R			
Norway maple	R					Bur oak	O					
Smooth bromi grass				O		Tulip tree	R					
upright wood sawel				O		balsam fir				R		
Sugar maple	O	O	O			asparagus					R	
crack willow	R					wild cucumber					K	
garlic mustard				O		shearhack hickam	R					
black cherry	O					Jiber maple	K					
Riverbank grape	A	A				philadelphia					O	
celandine				O		Atabana						
false salomons teal				O		multiflora rose						
orchard grass				O		Green Ash						
Palico aster				O		Highbush Cranberry						
white Ash	O	C				swine cabbage						
white Avenas				O		yellow birch	R					
Red cedar				R								
bull thistle				R								
tiger lily				R								
dams rocket				K								
gray dewweed			O									

Source of common names: _____

Wildlife Observation Form

Metadata

Site: Brock & Harvest Rd.
 Polygon: A
 UTM:
 Date: Aug 15/2011 Time: 18:28
 Surveyor(s): JEG, KGB
 Weather: 78°C, 60%CC, NE-3

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor wintering
 Fallen Logs Deer wintering yards Bat Hibernacula
 Snags Migratory stopover Reptile Hibernacula

Species Observed

TY	Species	EV	Notes	#	TY	Species	EV	Notes	#
B	House Wren			1	L	Carolina White			1
B	Black-capped Ch.			1	L	Mourning Dove			1
B	M. Cardinal			1	L	Eu. Tanager Smalltail			1
B	Gray Catbird			1	L	Monarch			1
B	A. Goldfinch			1					
B	Blue Jay			1					
B	C. Grackle			1					
B	A. Crow			1					
B	song Sparrow			1					
B	Hi. Robin			1					
B	Red. Wren			1					
B	C. Yellowthroat			1					
B	N. Water-thrush			0				fall migrant	

Faunal Type Codes (TY)

B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

Evidence Codes (EV)

Breedign Birds

- SH- Suitable Habitat
- SM- Singing Male
- T- Territory
- A- Anxious Behavior
- D- Courtship Display
- N- Nest Building
- P- Pair
- V- Visiting Nest
- DD- Distraction Display
- NE- Nest with Eggs
- AE- Adult entering nest
- NU- Used nest
- FY- Fledged Young
- FS- Food/Fecal Sac

Other Wildlife

- OB- Observed
- DP- Distinctive Parts
- TK- Tracks
- VO- Vocalization
- HO- House/Den
- FE- Feeding Evidence
- CA- Carcass/Bones
- FY- Eggs or young
- SC- Scat
- SI- Other Signs (Specify)

Management/Disturbance Data Sheet (Part A)

Metadata

Site: <u>Rock Rd + Harvest Rd</u>	Date: <u>Aug 15/2011</u>
Polygon: <u>A (Woodland)</u>	Surveyor(s): <u>JEB, KGB</u>
UTM:	Weather: <u>28°C, 50%cc, NBZ/S</u>

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	<u>A</u>	Other: _____
European Buckthorn	<u>A</u>	_____
Manitoba Maple	<u>O</u>	_____
Norway Maple	_____	_____
Tartarian Honeysuckle	_____	_____
Purple Loosestrife	_____	_____
Common reed	_____	_____
Multiflora Rose	<u>B</u>	_____
Periwinkle	_____	_____
Dame's Rocket	_____	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails	<u>N</u>	Other (please specify): _____
Walking	<u>N</u>	_____
ATV's, bikes, etc	_____	_____

Dumping (Indicate abundance code for each)

Garbage	_____	Other (please specify): _____
Yard Waste	<u>A</u>	_____

Recreational Use (Indicate polygon abundance code for each)

Walking	<u>O</u>	Other (please specify): _____
Biking	<u>N</u>	_____
Forts	<u>N</u>	_____
Squatting	<u>N</u>	_____
Campfires	<u>N</u>	_____

Tree Disease (Indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____

Specific Diseases or Other (please specify): _____

Management/Disturbance Data Sheet (Part B)

Tree Damage (indicate species, type of damage, abundance: i

Species:	_____	S
Species:	_____	S
Species:	_____	S
Species:	_____	S

Other (please specify):

Browse Damage (Indicate abundance code)	_____
List Species if known:	_____
Flooding (pools and puddling)	_____
Evidence of Fire	_____
Trampling	_____
Earth Displacement	_____
Wind Throw (Blow Down)	_____
Beaver Activity	_____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings	_____	Species: _____
	_____	_____
	_____	_____
	_____	_____
Pesticide Use	_____	Type: _____
Tree Cutting	_____	Authorized Trails _____
Signage	_____	Invasive Species _____
Monitoring program	_____	

Disturbance Location(s):

Type:	_____	GPS Co.	<u>x</u>
Type:	_____	GPS Co.	<u>x</u>
Type:	_____	GPS Co.	<u>x</u>
Type:	_____	GPS Co.	<u>x</u>

Sketch a "bird's eye view" of the polygon and indicate the appropriate management/restoration activities (i.e. planting, clumps of invasives)

mowed trails -> not sure

Tree Damage (Indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: _____ Source _____ Abundance _____
 Species: _____ Source _____ Abundance _____
 Species: _____ Source _____ Abundance _____
 Species: _____ Source _____ Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____
 List Species if known: _____
 Flooding (pools and puddling) _____
 Evidence of Fire _____
 Trampling _____
 Earth Displacement _____
 Wind Throw (Blow Down) _____
 Beaver Activity _____

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage _____ Invasive Species Removal _____

Monitoring program _____

Disturbance Location(s):

Type: _____ GPS Co. _____ _____
 Type: _____ GPS Co. _____ _____
 Type: _____ GPS Co. _____ _____
 Type: _____ GPS Co. _____ _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)

• mowed trails -> not sure if authorized or not



Concession Road 4 West and Middletown Road

ELC Community Description (Part A)

Metadata Greenville

Site: 4th Concession → Middletown Rd
 Polygon: A
 UTM: 17T 0577377 4795220
 Date: Aug 12/11 Time: 11:20
 Surveyor(s): Tara B, Charlotte M
 Weather: 28°C, sunny, wind 1, 20% cloud, no precip

Community Classification

Vegetation Type: RBSA1 Alvar Shrub Rock Barren
 Inclusion:
 Complex:

Polygon Description

System	Substrate	Topo Feature	Community
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	Riverine	Crevice/Cave
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	<input checked="" type="checkbox"/> Alvar
	Acidic Bedrock	Terrace	Rockland
	Basic Bedrock	Valley Slope	Beach/Bar
	Carb. Bedrock	Tableland	Sand Dune
		Roll. Upland	Bluff
		Cliff	
			Lake
			Pond
			River
			Stream
			Marsh
			Swamp
			Fen
			Bog
			Barren
			Meadow
			Prairie
			<input checked="" type="checkbox"/> Thicket
			Savannah
			Woodland
			Forest
			Plantation

History	Site	Plant Form
<input type="checkbox"/> Natural		Plankton
<input checked="" type="checkbox"/> Cultural		Submerged
		Floating-Lvd.
		Graminoid
		Forb
		Lichen
		Bryophyte
		<input checked="" type="checkbox"/> Deciduous
		Coniferous
		Mixed

Cover	Open Water
<input type="checkbox"/> Open	Shallow Water
<input checked="" type="checkbox"/> Shrub	Surficial Dep.
<input type="checkbox"/> Treed	<input checked="" type="checkbox"/> Bedrock

Stand Description

Layer	HT	Cover	Species
1 Canopy	2	1	red ash >> shagbark hickory
2 Sub-canopy	3	3	comm. buckthorn >> red ash > apple
3 Understorey	4	2	comm. buckthorn > N. prickly ash >> grey dogwood
4 Groundcover	6/7	4	grasses > goldenrods > moss > biol. carrot

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0: none 1: 0-10% 2: 10-25 3: 25-60% 4: >60%

Size Class Analysis	A	B	C	N
Snags	< 10	10-24	25-50	> 50
Deadfall/Logs	< 10	10-24	25-50	> 50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	Young	Mid-age	Mature	Old Growth
		<input checked="" type="checkbox"/>			

PLANT SPECIES LIST

Metadata Greensville

Site: 4th Concession > Middletown Rd
 Polygon: A
 UTM: 17T 0577377 4795220
 Date: Aug 12/11 Time: 11:20
 Surveyor(s): Tara B, Charlotte M
 Weather: 28°C, sunny, wind 1, 35% cloud, no precip.

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample	
	1	2	3	4			1	2	3	4		
Common buckthorn		O	O			rough fruited clematis					D	
Smooth brome grass				A		curly dock					R	
Orchard grass				A		Kentucky bluegrass					O	
N. prickly ash			O			mullein					D	
wild carrot				A		yellow axillars					D	
						small sundrops					D	
						ox-eyed daisy					D	
Common St. John's wort				O		grass lvd. goldenrod					O	
brn lvd. plantain				R		white leaved dogwood					O	4
red. ash	R	R				Scots pine			R			
apple		R				field horsetail					D	
Shagbark hickory	R					tall goldenrod					O	
virginian grape				R		tatarian honeysuckle	R					
Canada goldenrod				O		wild asparagus					D	
Stygian aster				O	3	bull thistle					D	
purple stemmed aster				R		Common milkweed					D	
red cedar			R			Birdsfoot trefoil					O	
gray dogwood			O			Canada thistle					R	
new Engl. aster				R		hack walnut			R			
wild strawberry				O		teasel					R	
Common ragweed				R		eastern cottonwood	R					
timothy				O		black locust	R					
mass sp.				A		Staghorn sumac			R			
poth. rush				O		deftford pine					D	
yellow				O								
evening primrose				D								
rose sp.				R								
gray goldenrod				O								
chick cherry			R									
daisy fleabane				R								

Source of common names: Newcomb's

Wildlife Observation Form

Metadata Greenville

Site: 4th CONC. 9 MIDTOWN RD
 Polygon: A
 UTM: 17T 0577377 4795220
 Date: Aug. 12/11 Time: 11:24
 Surveyor(s): Tara R Charlotte M
 Weather: 29°C, Sunny, wind 1, 29.6, no precip

Significant Wildlife Habitat (Check those that apply)

Vernal Pools Turtle Nesting Sites Raptor Wintering
 Fallen Logs Deer wintering yards Bat Hibernacula
 Snags Migratory stopover Reptile Hibernacula

Species Observed										
TY	Species	EV	Notes	#		TY	Species	EV	Notes	#
B	m. dove	SM		*						
B	Song Sparrow	SM		*						
B	Am. Goldfinch	SM		*						
B	E. Kingbird	SM		*						
B	E. Meadowlark	SM		*						
B	Field Sparrow	SM		*						
L	Clouded Sailer	OB		*						
L	Crimson White	OB		*						
L	Rear Crescent	OB		*						
B	Wren	SM		*						
B	Am. Crow	SM		*						
B	Euc. Starling	SH		**						
B	Carrollian	OB-X		*						

Faunal Type Codes (TY)
 B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

Evidence Codes (EV)

<p>Breeding Birds</p> SH-Suitable Habitat SM- Singing Male T-Territory A-Anxiety Behavior D-Courtship Display N-Nest Building P-Pair V-Visiting Nest DD- Distraction Display NE-Nest with Eggs AE-Adult entering nest NU- Used nest FY-Fledged Young FS- Food/Fecal Sac	<p>Other Wildlife</p> OB- Observed DP-Distinctive Parts TK- Tracks VO- Vocalization HO- House/Den FE- Feeding Evidence CA-Carcass/Bones FY- Eggs or young SC-Scat SI- Other Signs (Specify)
---	---

Metadata Greenville

Site: 4 th Conc. & Middletown Rd	Date: Aug. 12/11
Polygon: A	Surveyor(s): Tara R. Charlotte
UTM: 17T 0577377 4795220	Weather: 28°C, sun, wind 1, 30% h.c. m

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	N	Other: _____
European Buckthorn	N	_____
Manitoba Maple	N	_____
Norway Maple	N	_____
Tartarian Honeysuckle	R	_____
Purple Loosetrife	N	_____
Common reed	N	_____
Multiflora Rose	N	_____
Periwinkle	N	_____
Dame's Rocket	N	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails N Other (please specify): _____

Walking N

ATV's, bikes, etc N

Dumping (Indicate abundance code for each)

Garbage R Other (please specify): _____

Yard Waste R

Recreational Use (Indicate polygon abundance code for each)

Walking R Other (please specify): _____

Biking N

Forts N

Squatting N

Campfires N

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species: none	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____

Specific Diseases or Other (please specify): _____

Tree Damage (Indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: NONE Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____

List Species if known: _____

Flooding (pools and puddling) N

Evidence of Fire N

Trampling N

Earth Displacement N

Wind Throw (Blow Down) N

Beaver Activity N

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails - mowed paths/trails

Signage _____ Invasive Species Removal _____

Monitoring program _____

Disturbance Location(s):

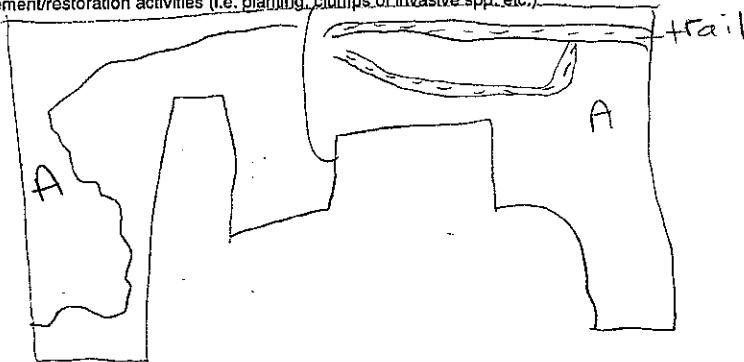
Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp., etc.)



ELC Community Description (Part A)

Metadata Greensville

Site: 4th Congregation + Middletown Rd

Polygon: B
 UTM: 17T 0577167 4795095

Date: Aug. 12/11 Time: 1230

Surveyor(s): Jara B. Charlotte M

Weather: 28°C, 45% cloud, wind 3, no precip.

Community Classification

Vegetation Type: WOCM1 dry-fresh coniferous woodland

Inclusion:

Complex:

Polygon Description

System	Substrate	Topo Feature	Community
<input checked="" type="checkbox"/> Terrestrial	<input checked="" type="checkbox"/> Organic	<input type="checkbox"/> Lacustrine	<input type="checkbox"/> Lake
<input type="checkbox"/> Wetland	<input type="checkbox"/> Mineral Soil	<input type="checkbox"/> Talus	<input type="checkbox"/> Pond
<input type="checkbox"/> Aquatic	<input type="checkbox"/> Parent Min.	<input type="checkbox"/> Riverine	<input type="checkbox"/> River
	<input type="checkbox"/> Acidic Bedrock	<input type="checkbox"/> Bottomland	<input type="checkbox"/> Stream
	<input type="checkbox"/> Basic Bedrock	<input type="checkbox"/> Terrace	<input type="checkbox"/> Marsh
	<input type="checkbox"/> Carb. Bedrock	<input type="checkbox"/> Valley Slope	<input type="checkbox"/> Swamp
History		<input type="checkbox"/> Tableland	<input type="checkbox"/> Fen
<input type="checkbox"/> Natural		<input type="checkbox"/> Roll. Upland	<input type="checkbox"/> Bog
<input checked="" type="checkbox"/> Cultural		<input type="checkbox"/> Sand Dune	<input type="checkbox"/> Barren
		<input type="checkbox"/> Bluff	<input type="checkbox"/> Meadow
		<input type="checkbox"/> Cliff	<input type="checkbox"/> Prairie
			<input type="checkbox"/> Thicket
			<input type="checkbox"/> Savannah
			<input checked="" type="checkbox"/> Woodland
			<input type="checkbox"/> Forest
			<input type="checkbox"/> Plantation
Cover	Site	Plant Form	
<input type="checkbox"/> Open	<input type="checkbox"/> Open Water	<input type="checkbox"/> Plankton	
<input type="checkbox"/> Shrub	<input type="checkbox"/> Shallow Water	<input type="checkbox"/> Submerged	<input checked="" type="checkbox"/> Coniferous
<input checked="" type="checkbox"/> Treed	<input checked="" type="checkbox"/> Surficial Dep.	<input type="checkbox"/> Floating-Lvd.	<input type="checkbox"/> Mixed
	<input type="checkbox"/> Bedrock	<input type="checkbox"/> Graminoid	
		<input type="checkbox"/> Forb	
		<input type="checkbox"/> Lichen	
		<input type="checkbox"/> Bryophyte	
		<input type="checkbox"/> Deciduous	

Stand Description

Layer	HT	Cover	Species
1 Canopy	2	3	white spruce & blue spruce >> white pine
2 Sub-canopy	1	1	
3 Understorey	4	2	common buckthorn >> gray dogwood >> tan an honeycuckle
4 Groundcover	5/7	4	Kentucky blue grass & timothy > grasses lud goldenrod

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0:none 1: 0-10% 2: 10-25 3: 25-60% 4: >60%

Size Class Analysis

Snags	<input type="checkbox"/> <10	<input type="checkbox"/> 10-24	<input type="checkbox"/> 25-50	<input type="checkbox"/> >50
Deadfall/Logs	<input type="checkbox"/> <10	<input type="checkbox"/> 10-24	<input type="checkbox"/> 25-50	<input type="checkbox"/> >50
Abundance Codes:	<input type="checkbox"/> <10	<input type="checkbox"/> 10-24	<input type="checkbox"/> 25-50	<input type="checkbox"/> >50

N: None R: Rare O: Occasional A: Abundant

Community Age: Pioneer Young Mid-age Mature Old Growth

ELC Community Description (Part B)

Metadata Greenville

Site: 4th conc. Middletown Rd	UTM: 17T 0577167 4795095
Polygon: B	Surveyor(s): Tara B, Charlotte M
Date: Aug. 12/11	Weather: 18°C 45% cloud, wind?
Time: 1230	no precip

Soils	1	2	3	Tree Tally
Position:	G			Species
Aspect:	N/A			Tally 1
%	0%			Tally 2
Type:	S			Tally 3
Class:	A			
Strata: Texture	SCL			
Depth	12cm			
Strata: Texture	Bedrock			
Depth				
Strata: Texture				
Depth				
Strata: Texture				
Depth				
Effective Texture	SCL			
Surface Stoniness	10			
Surface Rockiness	0			
Depth to:				
Mottles	N/A			
Gley	N/A			
Bedrock	12cm			
Water table	N/A			
Carbonates	N/A			
Depth of Organics	0cm			Total:
Pore Size Disc #1	-			Basal Area
Pore Size Disc #2	-			Snags
Pore Size Disc #3	-			
Moisture Regime	2			

NOTES: Photos: 0897, 0898

PLANT SPECIES LIST

Metadata Greenville

Site: 4th Concession ? Middletown Rd
 Polygon: B
 UTM: 17T 0577167 4795095
 Date: Aug 12/11 Time: 1230
 Surveyor(s): Tara B, Charlotte M
 Weather: 28°C, 45% cloud, wind 3, no precip

Layers: 1=canopy 2=sub-canopy 3=understorey 4=ground layer
 Abundance Codes: R=rare O=occasional A=abundant D=dominant

Species	Layer				Sample	Species	Layer				Sample
	1	2	3	4			1	2	3	4	
Scots pine	O					wild cucumber			R		
white pine	O					bull thistle				R	
blue spruce	A					European honey suckle		O			
white spruce	A					wild strawberry			R	O	
Common buckthorn			O			hawthorn sp			R	R	
red ash			R			gray dogwood			O		
black walnut			R			garrow				R	
white beard tongue				O	4L	wild magnolia				R	
Common St. John's wort				O		Norway maple				R	
gray goldenrod			O			mass sp.				O	
path rush				O		choke cherry			D		
timothy				A		N. prickly ash			R		
Kentucky bluegrass				A		Sky blue aster				O	3L
New eng. aster				R		narrow lsd plantain				R	
red raspberry			O			glico aster				R	
wild carrot				O		red oak	R			R	
grass lsd goldenrod				A		Norway spruce	R				
smooth leaved grass				O							
mullein				R							
birds-foot trefoil				O							
common milkweed				R							
daisy fleabane				R							
heat-all				R							
Canada thistle				R							
yellow ovens				R							
Canada goldenrod				O							
cow vetch				R							
rough fruited cinquefoil				R							
curly dock				R							
river bank grape			R								

Source of common names: Newcomb's

Wildlife Observation Form

Metadata Greenville

Site: Congression 4 & Middletown Rd
 Polygon: B
 UTM: 17T 0577167 4795095
 Date: Aug 12/11 Time: 12:30
 Surveyor(s): Tara B. Charlotte M
 Weather: 29°C, c.c. 45%, wind 3, sunny, no precip

Significant Wildlife Habitat (Check those that apply)

<input type="checkbox"/> Vernal Pools	<input type="checkbox"/> Turtle Nesting Sites	<input type="checkbox"/> Raptor wintering
<input type="checkbox"/> Fallen Logs	<input type="checkbox"/> Deer wintering yards	<input type="checkbox"/> Bat Hibernacula
<input type="checkbox"/> Snags	<input type="checkbox"/> Migratory stopover	<input type="checkbox"/> Reptile Hibernacula

Species Observed										
TY	Species	EV	Notes	#		TY	Species	EV	Notes	#
B	C. Waxwing	SM		1						
B	BC chickadee	-SM		1						
L	Cabbage white	-OB		1						
L	Giant Swallowtail	-OB		1						
B	Am. Gold Finch	-SM		1						
B	N. Cardinal	-CH		1						
H	Leopard Frog	-OS		1						
L	Common Ringlet	-OB		1						
B	E. Wood Pewee	-SM		1						
B	Wren sp.	SI		1						

Faunal Type Codes (TY)
 B=Bird M=Mammal H=Herpetofauna L=Lepidoptera F=Fish D=Dragonfly or Damselfly

Evidence Codes (EV)

Breedign Birds	Other Wildlife
SH-Suitable Habitat	OB- Observed
SM- Singing Male	DP-Distinctive Parts
T-Territory	TK- Tracks
A-Anxiety Behavior	VO- Vocalization
D-Courtship Display	HQ- House/Den
N-Nest Building	FE- Feeding Evidence
P-Pair	CA-Carcass/Bones
V-Visiting Nest	FY- Eggs or young
DD- Distraction Display	SC-Scat
NE-Nest with Eggs	SI- Other Signs (Specify)
AE-Adult entering nest	
NU- Used nest	
FY-Fledged Young	
FS- Food/Fecal Sac	

Management/Disturbance Data Sheet (Part A)

Metadata Greenville

Site: <u>Conc. 4 Middle town Rd.</u>	Date: <u>Aug. 12/11</u>
Polygon: <u>B</u>	Surveyor(s): <u>Tara R. Charles</u>
UTM: <u>17T 0577167 4795095</u>	Weather: <u>29°C. Sunny, wind 3,</u>
DISTURBANCE <u>c.c. 45% , no precip.</u>	

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	<u>N</u>	Other: _____
European Buckthorn	<u>O</u>	_____
Manitoba Maple	<u>N</u>	_____
Norway Maple	<u>R</u>	_____
Tartarian Honeysuckle	<u>N</u>	_____
Purple Loosestrife	<u>N</u>	_____
Common reed	<u>N</u>	_____
Multiflora Rose	<u>N</u>	_____
Periwinkle	<u>N</u>	_____
Dame's Rocket	<u>N</u>	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails	<u>N</u>	Other (please specify): _____
Walking	<u>R</u>	_____
ATV's, bikes, etc	<u>N</u>	_____

Dumping (Indicate abundance code for each)

Garbage	<u>R</u>	Other (please specify): _____
Yard Waste	<u>N</u>	_____

Recreational Use (Indicate polygon abundance code for each)

Walking	<u>R</u>	Other (please specify): _____
Biking	<u>N</u>	_____
Forts	<u>N</u>	_____
Squatting	<u>N</u>	_____
Campfires	<u>N</u>	_____

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species: <u>None</u>	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species: _____	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species: _____	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species: _____	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____

Specific Diseases or Other (please specify):

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: none Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Species: _____ Source _____ Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____

List Species if known: _____

Flooding (pools and puddling) N

Evidence of Fire N

Trampling N

Earth Displacement N

Wind Throw (Blow Down) N

Beaver Activity N

MANAGEMENT

Restoration/Management Activities(check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage _____ Invasive Species Removal _____

Monitoring program _____

Disturbance Location(s):

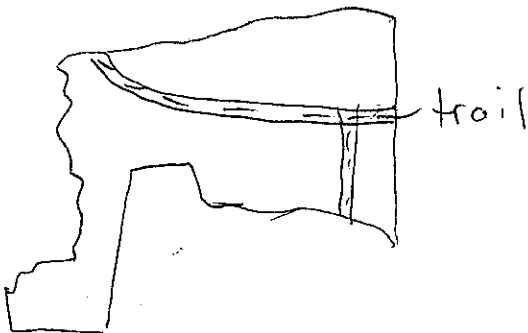
Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Type: _____ GPS Co. x _____ y _____

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)



[Handwritten signature]

ELC Community Description (Part A)

Metadata Greenville

Site: 4th Concession & Middletown Rd
 Polygon: C
 UTM: 17T 0577240 4795011
 Date: Aug. 12/11 Time: 13:51
 Surveyor(s): Tara B, Charlotte M
 Weather: 28°C, Sunny, Wind 2, r.c. 3090, no precip.

Community Classification

Vegetation Type: FOCMB-1 Dry-Fresh White Pine Naturalized
 Inclusion: cont. Plantation
 Complex:

Polygon Description

System	Substrate	Topo Feature	Community			
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus	Lake	Barren	
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	Riverine	Crevice/Cave	Pond	Meadow	
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar	River	Prairie	
	Acidic Bedrock	Terrace	Rockland	Stream	Thicket	
	Basic Bedrock	Valley Slope	Beach/Bar	Marsh	Savannah	
History	Carb. Bedrock	<input checked="" type="checkbox"/> Tableland	Sand Dune	Swamp	Woodland	
<input type="checkbox"/> Natural		Roll, Upland	Skullf	Fen	Forest	
<input checked="" type="checkbox"/> Cultural		Cliff		Bog	<input checked="" type="checkbox"/> Plantation	
Cover	Open Water	Plant Form				
<input type="checkbox"/> Open	Shallow Water	Plankton	Forb	<input checked="" type="checkbox"/> Coniferous		
<input type="checkbox"/> Shrub	<input checked="" type="checkbox"/> Surficial Dep.	Submerged	Lichen	<input type="checkbox"/> Mixed		
<input checked="" type="checkbox"/> Tree	Bedrock	Floating-Lvd.	Bryophyte			
		Graminoid	Deciduous			

Stand Description

Layer	HT	Cover	Species
1 Canopy	2	4	White pine >>> basswood.
2 Sub-canopy	1	1	
3 Understorey	4	2	choke cherry >> common buckthorn > red oak
4 Groundcover	6/1	1	gray dogwood > green sedge > common speedwell

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0:none 1:0-10% 2:10-25 3:25-80% 4:>80%

Size Class Analysis	O	A	N	N
Snags	<10	10-24	25-50	>50
Deadfall/Logs	<10	10-24	25-50	>50

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age: Pioneer Young Mid-age Mature Old Growth

Metadata Greenville

Site: <u>4th corner on Middletown Rd</u>	Date: <u>Aug 12/11</u>
Polygon: <u>C</u>	Surveyor(s): <u>Tara B, Charlotte M</u>
UTM: <u>17T0577240 4795011</u>	Weather: <u>29°C, sunny, wind 3, no precip</u>

DISTURBANCE

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	<u>A</u>	Other: _____
European Buckthorn	<u>A</u>	_____
Manitoba Maple	<u>A</u>	_____
Norway Maple	<u>A</u>	_____
Tartarian Honeysuckle	<u>A</u>	_____
Purple Loosestrife	<u>A</u>	_____
Common reed	<u>A</u>	_____
Multiflora Rose	<u>A</u>	_____
Periwinkle	<u>A</u>	_____
Dame's Rocket	<u>A</u>	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails N Other (please specify): _____
 Walking R
 ATV's, bikes, etc N

Dumping (Indicate abundance code for each)

Garbage O Other (please specify): _____
 Yard Waste N

Recreational Use (Indicate polygon abundance code for each)

Walking R Other (please specify): _____
 Biking N
 Farts N
 Squatting N
 Campfires N

Tree Disease (Indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species: <u>None</u>	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species: _____	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species: _____	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species: _____	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____

Specific Diseases or Other (please specify): _____

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)

Species: <u>None</u>	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____

Other (please specify): _____

Browse Damage (Indicate abundance code) _____ Other (please be specific) _____

List Species if known: _____

Flooding (pools and puddling) ZZ

Evidence of Fire ZZ

Trampling ZZ

Earth Displacement ZZ

Wind Throw (Blow Down) ZZ

Beaver Activity ZZ

MANAGEMENT

Restoration/Management Activities (check those that apply)

Plantings _____ Species: _____

Pesticide Use _____ Type: _____

Tree Cutting _____ Authorized Trails _____

Signage _____ Invasive Species Removal _____

Monitoring program _____

Disturbance Location(s):

Type: <u>dumping</u>	GPS Co. <u>x</u>	<u>y</u>
Type: _____	GPS Co. <u>x</u>	<u>y</u>
Type: _____	GPS Co. <u>x</u>	<u>y</u>
Type: _____	GPS Co. <u>x</u>	<u>y</u>

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)



Metadata Greenville

Site:	Conc. 4' Middletown Rd.
Polygon:	D
UTM:	17T 0577165 4794920
Date:	Aug 12/11
Time:	1451
Surveyor(s):	Tova B. Charlotte M
Weather:	30°C, sunny, wind 7, no precip, 15% cloud

Community Classification

Vegetation Type:	THAM2 Dry-fresh Deciduous Shrub Thicket
Inclusion:	
Complex:	

Polygon Description

System	Substrate	Topo Feature	Community		
<input checked="" type="checkbox"/> Terrestrial	Organic	Lacustrine	Talus	Lake	Barren
<input type="checkbox"/> Wetland	<input checked="" type="checkbox"/> Mineral Soil	Riverine	Crevice/Cave	Pond	Meadow
<input type="checkbox"/> Aquatic	Parent Min.	Bottomland	Alvar	River	Prairie
	Acidic Bedrock	Terrace	Rockland	Stream	<input checked="" type="checkbox"/> Thicket
	Basic Bedrock	Valley Slope	Beach/Bar	Marsh	Savannah
History	Carb. Bedrock	<input checked="" type="checkbox"/> Tableland	Sand Dune	Swamp	Woodland
<input type="checkbox"/> Natural		Roll. Upland	Bluff	Fen	Forest
<input checked="" type="checkbox"/> Cultural		Cliff		Bog	Plantation
	Site				

Cover	Open Water	Plant Form		
<input type="checkbox"/> Open	Shallow Water	Plankton	Forb	Coniferous
<input checked="" type="checkbox"/> Shrub	<input checked="" type="checkbox"/> Surficial Dep.	Submerged	Lichen	Mixed
<input type="checkbox"/> Treed	Bedrock	Floating-Lvd.	Bryophyte	
		Graminoid	<input checked="" type="checkbox"/> Deciduous	

Stand Description

Layer	HT	Cover	Species
1 Canopy	3	1	red ash & black walnut
2 Sub-canopy	3	4	lilac >> common buckthorn > Manitoba maple
3 Understorey	4	2	choke cherry >> Manitoba maple > tartarian honey suckle
4 Groundcover	7	1	moss > anch. anter. c. nightshade > comm. buckthorn

HT Codes: 1: >25m 2: 25-10m 3: 10-2m 4: 2-1m 5: 1-0.5m 6: 0.5-0.2m 7: <0.2m

Cover Codes: 0:none 1: 0-10% 2: 10-25 3: 25-60% 4: >60%

Size Class Analysis	N	R	O	A
< 10	N	R	O	A
10-24	N	R	O	A
25-50	N	R	O	A
> 50	N	R	O	A

Abundance Codes: N: None R: Rare O: Occasional A: Abundant

Community Age	Pioneer	Young	Mid-age	Mature	Old Growth
			<input checked="" type="checkbox"/>		

Metadata Greenville

Site: Conc. 4? Middletown Rd	UTM: 17T0577165	4794940
Polygon: D	Surveyor(s): Tara & Charlotte M	
Date: Aug 12/11	Weather: 30°r, sunny, wind 2, no precip	
Time: 1:51	15% cloud	

Soils	1	2	3	Tree Tally
Position:	6			Species
Aspect:	PA			Tally 1
%	0%			Tally 2
Type:	S			Tally 3
Class:	A			
Strata: Texture	CL			N/A - lilacs & buckthorn
Depth	39cm			
Strata: Texture	Si			
Depth	43cm			
Strata: Texture	/			
Depth				
Strata: Texture	/			
Depth				
Effective Texture	CL			
Surface Stoniness	0			
Surface Rockiness	0			
Depth to:				
Mottles	N/A			
Gley	N/A			
Bedrock	N/A			
Water table	N/A			
Carbonates	10cm			
Depth of Organics	0cm			Total:
Pore Size Disc #1	-			Basal Area
Pore Size Disc #2	-			Snags
Pore Size Disc #3	-			0
Moisture Regime	2			

NOTES:

could go further w soil core

Photos: 0902, 0903, 0905

Management/Disturbance Data Sheet (Part A)

Metadata Greenville

Site: <u>Conc 4 & Middletown Rd</u>	Date: <u>Aug. 12/11</u>
Polygon: <u>D</u>	Surveyor(s): <u>Tara B. Charlotte m</u>
UTM: <u>17T 0577165 4794920</u>	Weather: <u>30°C, Sunny</u>

DISTURBANCE wind 2 c.c. 1598, no precip.

Abundance Codes:

N (None)- not found in polygon R (Rare)- one to a few O (Occasional)- scattered throughout polygon
 A (Abundant)- represented by large numbers throughout polygon

Invasive Species (Indicate polygon abundance code for each)

Garlic Mustard	<u>2</u>	Other: _____
European Buckthorn	<u>1</u>	_____
Manitoba Maple	<u>1</u>	_____
Norway Maple	<u>1</u>	_____
Tartarian Honeysuckle	<u>1</u>	_____
Purple Loosestrife	<u>1</u>	_____
Common reed	<u>1</u>	_____
Multiflora Rose	<u>1</u>	_____
Periwinkle	<u>1</u>	_____
Dame's Rocket	<u>1</u>	_____

Unauthorized Trails (Indicate polygon abundance code for each)

Bike trails N Other (please specify): _____
 Walking N
 ATV's, bikes, etc N

Dumping (Indicate abundance code for each)

Garbage N Other (please specify): _____
 Yard Waste N

Recreational Use (Indicate polygon abundance code for each)

Walking N Other (please specify): _____
 Biking N
 Farts N
 Squatting N
 Campfires N

Tree Disease (indicate species and disease abundance: N=None R=rare O=occasional A=abundant)

Species: <u>None</u>	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____
Species:	Fungus _____	Leaf spots _____	Cankers _____	Dieback _____

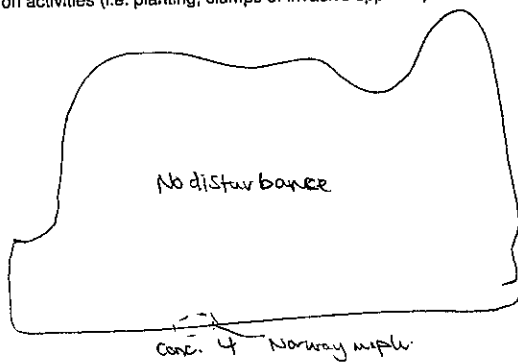
Specific Diseases or Other (please specify): _____

Tree Damage (indicate species, type of damage, abundance: N=None R=rare O=occasional A=abundant)		
Species: <u>None</u>	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Species: _____	Source _____	Abundance _____
Other (please specify): _____		
Browse Damage (Indicate abundance code)		Other (please be specific)
List Species if known:	_____	
Flooding (pools and puddling)	<u>RR</u>	
Evidence of Fire	<u>RR</u>	
Trampling	<u>RR</u>	
Earth Displacement	<u>RR</u>	
Wind Throw (Blow Down)	<u>RR</u>	
Beaver Activity	<u>RR</u>	

MANAGEMENT

Restoration/Management Activities(check those that apply)		
Plantings _____	Species: _____	_____
	_____	_____
	_____	_____
	_____	_____
Pesticide Use _____	Type: _____	
Tree Cutting _____	Authorized Trails _____	
Signage _____	Invasive Species Removal _____	
Monitoring program _____		
Disturbance Location(s):		
Type: <u>None</u>	GPS Co. <u>x</u>	<u>y</u>
Type: _____	GPS Co. <u>x</u>	<u>y</u>
Type: _____	GPS Co. <u>x</u>	<u>y</u>
Type: _____	GPS Co. <u>x</u>	<u>y</u>

Sketch a "bird's eye view" of the polygon and indicate the approximate location of disturbances and management/restoration activities (i.e. planting, clumps of invasive spp. etc.)



Appendix I
Breeding Bird Datasheets

Point County Survey Data Sheet

Station #: OCBB4 Visit #: 1 Start time: 1140

Duration: 10 End time: 1150

UTM Coordinates: 580325 Easting, 4750722 Northing

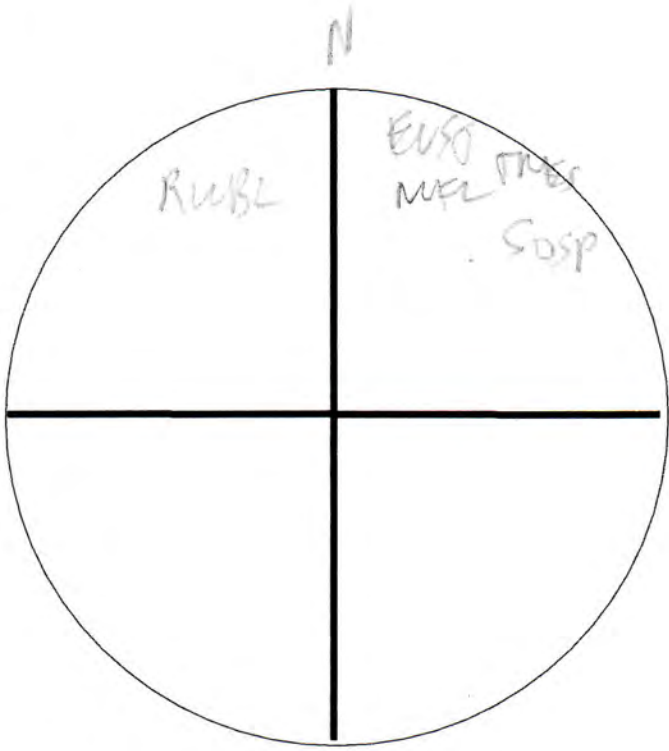
Weather: Sunny warm Wind: 1-2

Cloud: 7/10 Temp: 26°C

in PHAERUN
MAMMI-3

Breeding Evidence

Species Code	Highest Evidence of Breeding	Proximity
RUBL	PU	near
SOSP	PU	near
EUSO	PU	near
MPL	PU	near
TRES	PU	near



Greenville Area search Raw Data Sheet

Page 1 of 2

Date: June 23, 2014

Recorder: DJ

Wind Speed: 0-1

Temperature: 17-26°C

Cloud Cover: 1-3/10

Species/Frequency	Time (24 hr)	WSU	Distance	Direction	Observer	Comments
RWBL	0542	I	—	—	DJ	OB
EAKI	0557	I	—	—	DJ	OB
RWBL	0557	I	—	—	DJ	OB
YWAR	0557	I	—	—	DJ	SM
AMCR	0605	VI	—	—	DJ	OB
BHCO	0605	VI	—	—	DJ	OB
BLTA	0619	II	—	—	DJ	SM
AMCR	0619	VI	—	—	DJ	OB
EUST	0619	VI	—	—	DJ	OB
NUCA	0650	IX	—	—	DJ	SM
AMGO	0701	X	—	—	DJ	SM
NOFL	0705	X	—	—	DJ	OB
CARW	0705	X	—	—	DJ	SM
REVI	0705	X	—	—	DJ	SM
AMRO	0714	X	—	—	DJ	SM
BLTA	0716	X	—	—	DJ	SM
WOTH	0721	X	—	—	DJ	SM
BLTA	0730	X	—	—	DJ	SM
AMCR	0745	V	—	—	DJ	OB
PIWA	0758	V	—	—	DJ	SM
AMRO	0759	V	—	—	DJ	SM
NDWR	0759	V	—	—	DJ	SM
INBU	0800	V	—	—	DJ	SM
RWBL	0810	IV	—	—	DJ	SM
SOBP	0823	TV	—	—	DJ	SM
JOSP	0830	OCBB1	—	—	DJ	SM
GRCA	0830	OCBB1	—	—	DJ	SM
INBU	0831	OCBB1	—	—	DJ	SM
RBGR	0831	OCBB1	—	—	DJ	OB
SASP	0833	OCBB1	—	—	DJ	SM
SOSP (pair)	0847	OCBB1	—	—	DJ	OB
EUST	0849	OCBB1	—	—	DJ	OB
YWAR	0849	OCBB1	—	—	DJ	SM
BHCO	0855	OCBB1	—	—	DJ	OB
HOWR	0900	OCBB1	—	—	DJ	SM
REVI	0902	OCBB1	—	—	DJ	SM
AMRO	0902	OCBB1	—	—	DJ	SM
AMRE	0903	OCBB1	—	—	DJ	SM
YWAR	0903	OCBB1	—	—	DJ	SM
WOTH	0904	OCBB1	—	—	DJ	SM
NUCA	0904	OCBB1	—	—	DJ	SM
AMGO	0922	OCBB1	—	—	DJ	SM
NOFL	0930	OCBB1	—	—	DJ	OB
BHCO	0931	OCBB1	—	—	DJ	OB
TUVU	0931	OCBB1	—	—	DJ	OB

Point County Survey Data Sheet

Station #: IV Visit #: 2 Start time: 0810

Duration: 10 WP 049 End time: 0820

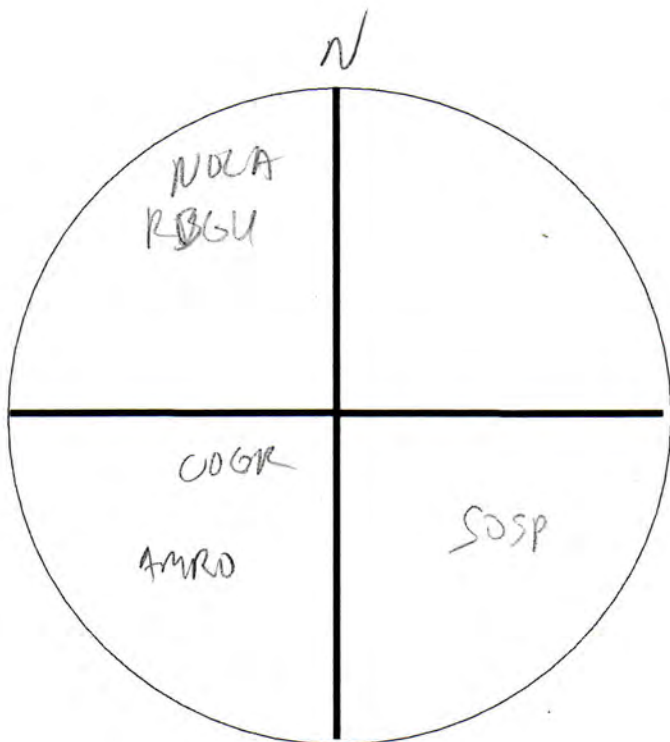
UTM Coordinates: 580855 Easting, 4792068 Northing

Weather: cool, sunny Wind: 0

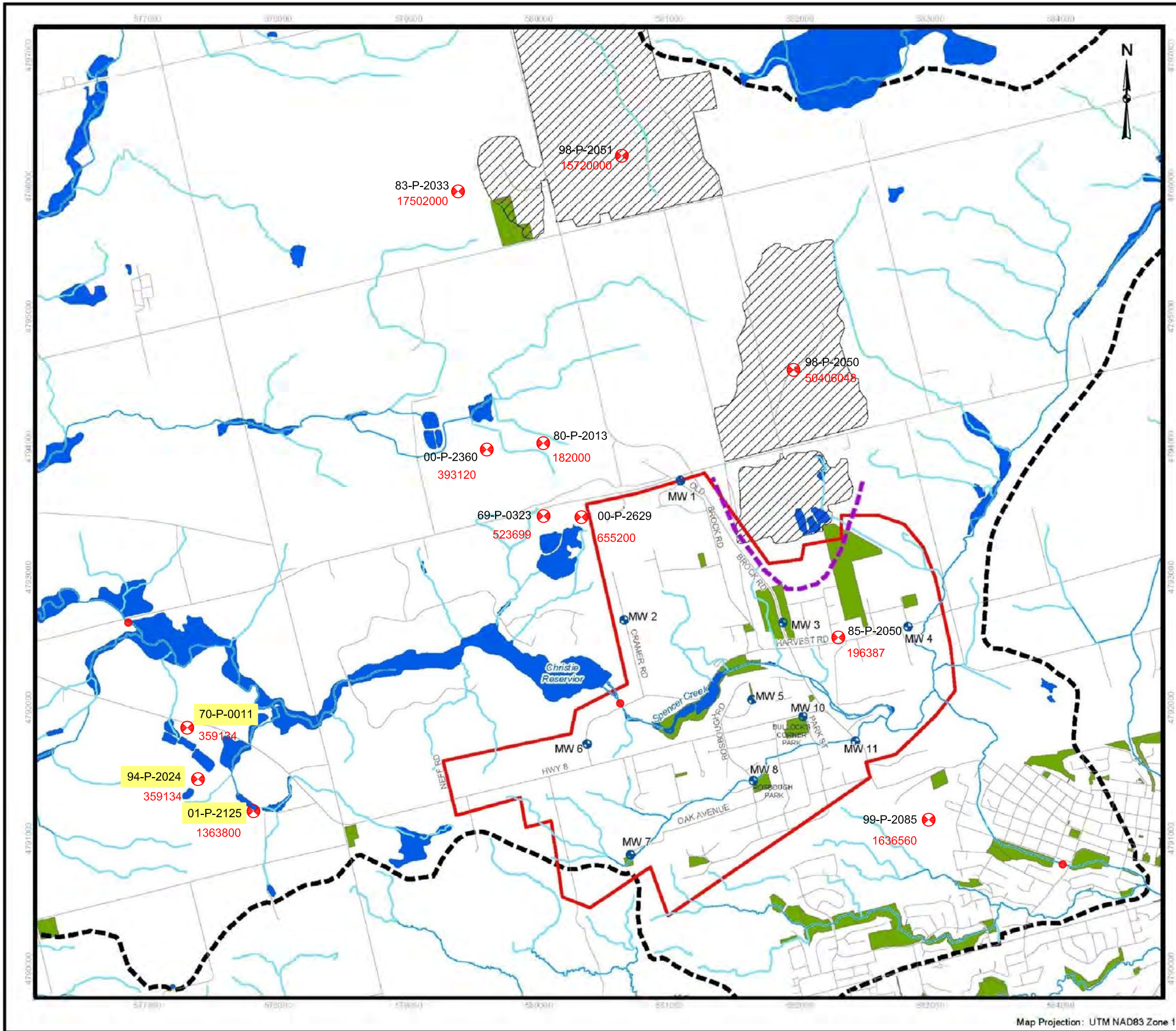
Cloud: 3/10 Temp: 20°C

Breeding Evidence

Species Code	Highest Evidence of Breeding	Proximity
AMRO	PO	near
SDSP	PO	near
COGR	PO	near
NOCA	PO	near
RBGU	PO	near



Appendix J
Benthic Raw Data



Mid-Spencer Creek / Greenville Rural Settlement Area Subwatershed Study

- Legend**
- ⊗ PTTW 98-P-2050 Permit ID
⊗ 50406048 Water Taking Limit (L/day)
 - Monitoring Wells
 - Groundwater Divide - Quarry Dewatering
 - Major Watercourses
 - Rivers/Streams
 - Streets
 - Greenville Settlement
 - City Owned Parcels
 - Study Area
 - Quarries
 - Water Bodies
 - PTTW Expired in 2004 or 2006 - unsure if renewed
 - Benthic Survey Site



Disclaimer: This map is intended for illustrative purposes only.
 Date: November, 2007
 FN: 3060377 TN: 2144

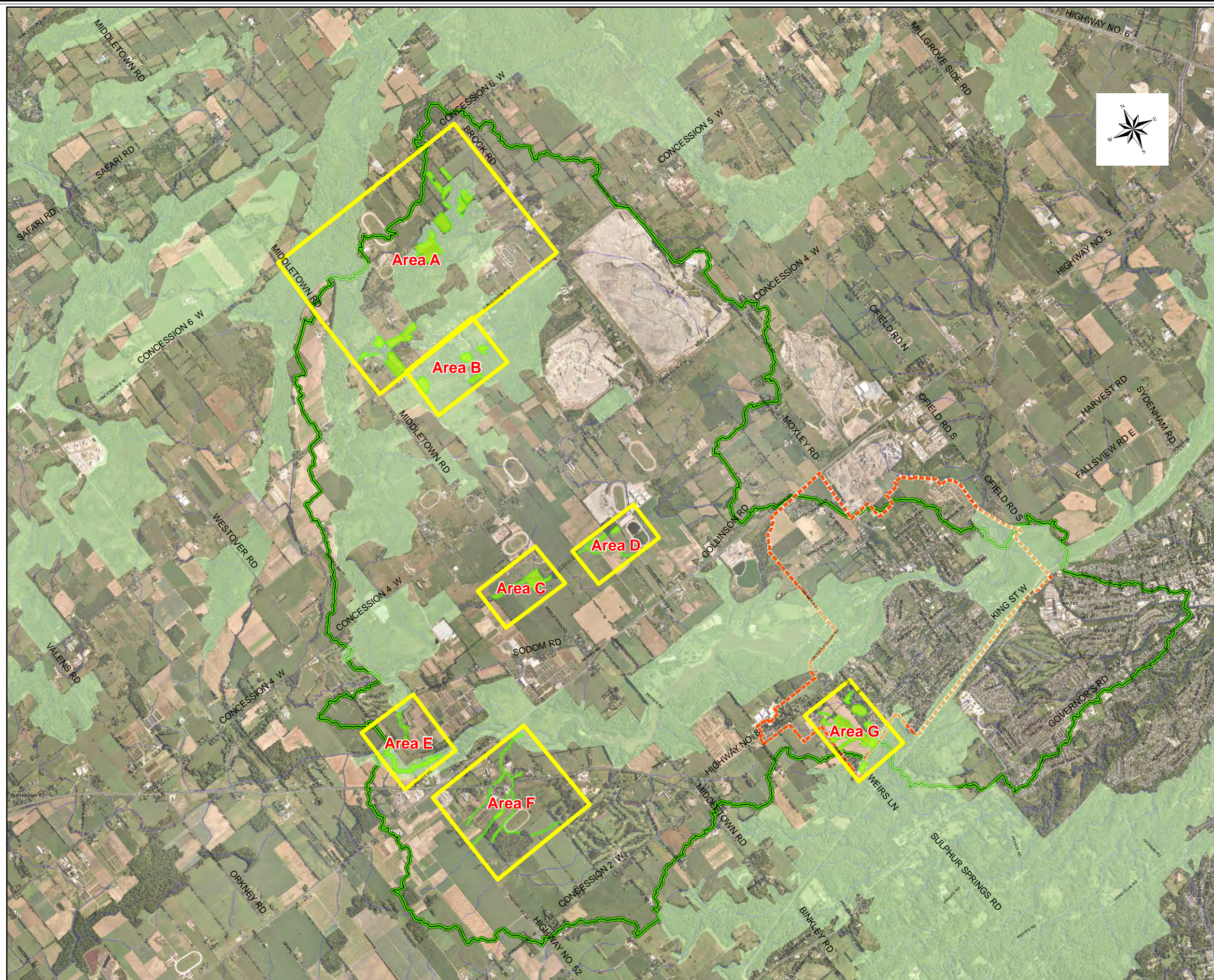


Figure 1-6: All Active Permits to Take Water

Map Projection: UTM NAD83 Zone 17






Appendix K

Rehabilitation and Enhancement Opportunities

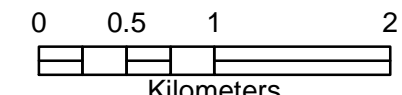


KEY MAP


LEGEND:

-  Mid-Spencer Creek Subwatershed Boundary
-  Rural Settlement Area
-  Preliminary Natural Heritage System
-  Rehabilitation and Enhancement Opportunities
-  Rehabilitation and Enhancement Opportunities Areas Index

NOTES:



0 0.5 1 2
Kilometers

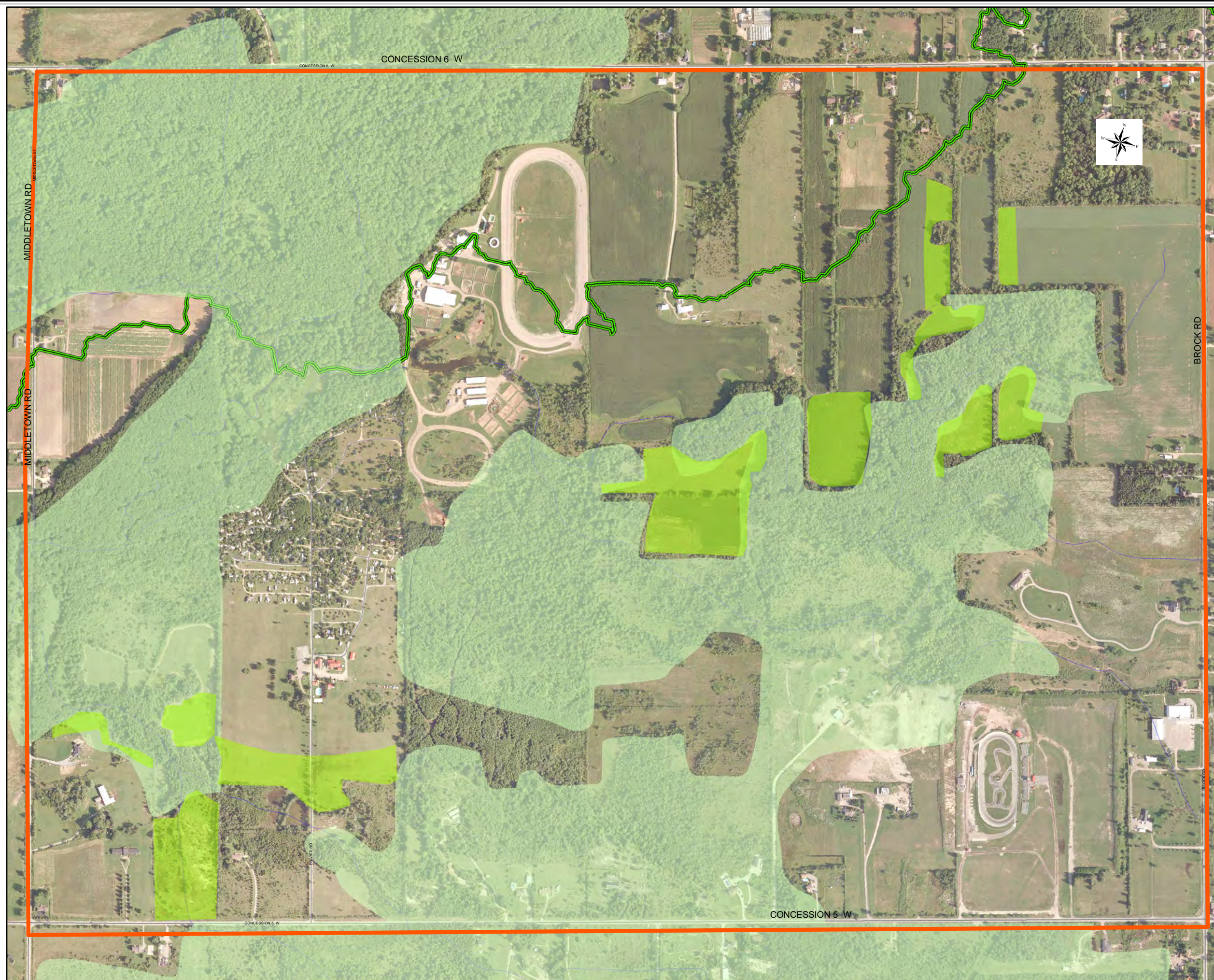
77 James Street North
Hamilton ON
L8R 2K3
Phone: (905) 546-2424
Fax: (905) 546-4435

**GREENSVILLE
SUBWATERSHED STUDY**

Rehabilitation and Enhancement Opportunities:
Subwatershed Overview. Areas A - G


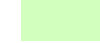


FIGURE: 8.4.1

DATE: April 2012

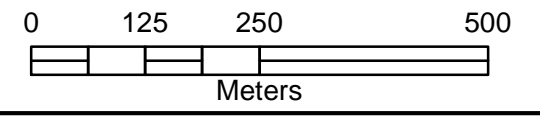


KEY MAP

LEGEND:

-  Mid-Spencer Creek Subwatershed Boundary
-  Preliminary Natural Heritage System
-  Rehabilitation and Enhancement Opportunities
-  Area A

NOTES:



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


**GREENSVILLE
SUBWATERSHED STUDY**
Rehabilitation and Enhancement Opportunities:
Area A

FIGURE: 8.4.2

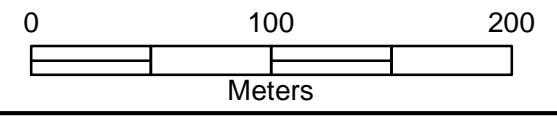
DATE: April 2012



KEY MAP

- LEGEND:
-  Mid-Spencer Creek Subwatershed Boundary
 -  Preliminary Natural Heritage System
 -  Rehabilitation and Enhancement Opportunities
 -  Area B

NOTES:




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**GREENSVILLE
SUBWATERSHED STUDY**
Rehabilitation and Enhancement Opportunities:
Area B




FIGURE: 8.4.3

DATE: April 2012

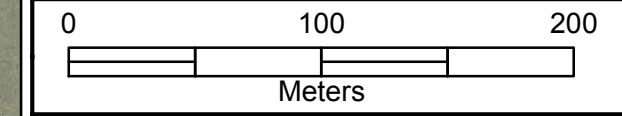



KEY MAP

LEGEND:

-  Mid-Spencer Creek Subwatershed Boundary
-  Rehabilitation and Enhancement Opportunities
-  Area C

NOTES:

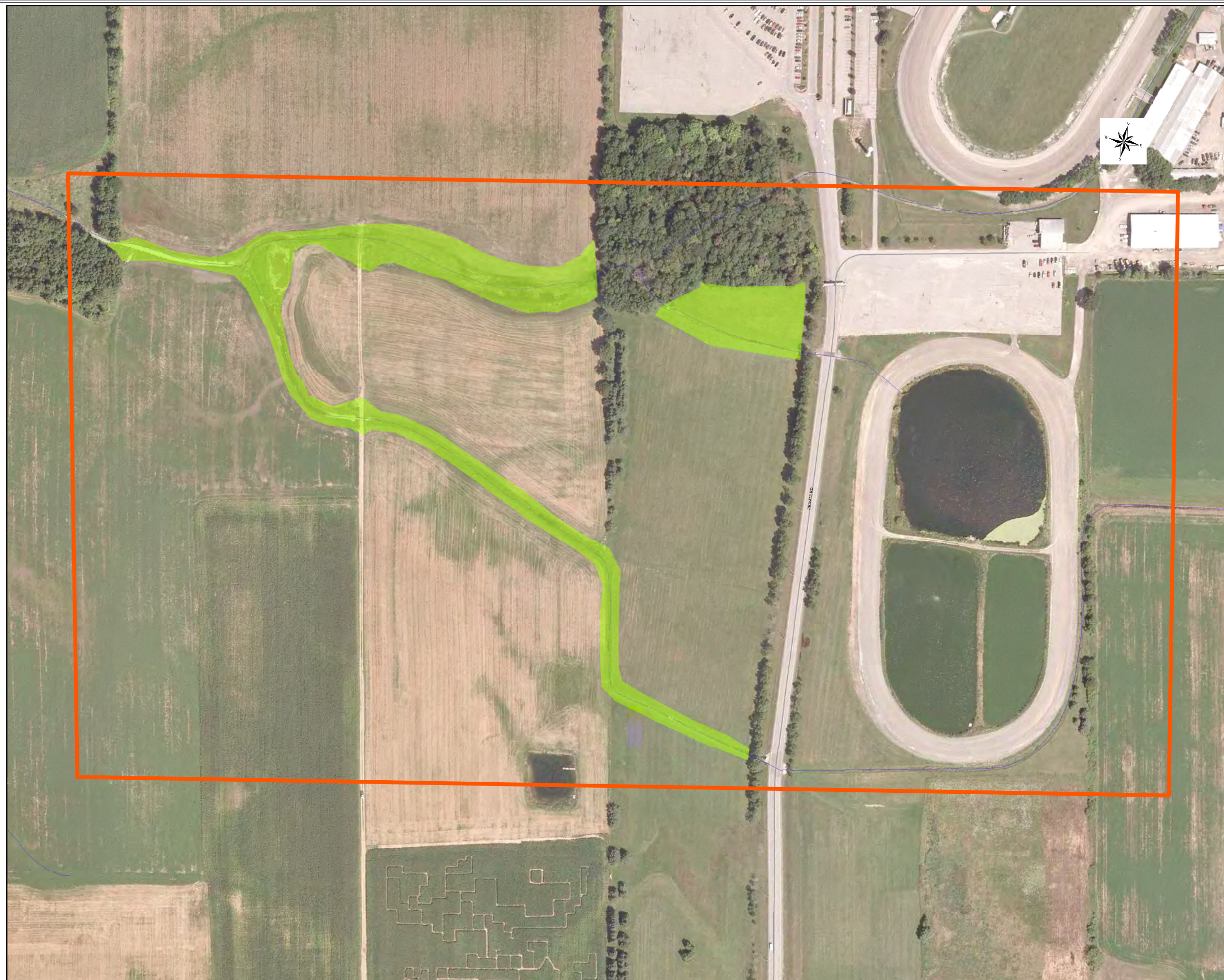



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Phone: (905) 546-2424
Fax: (905) 546-4435

**GREENSVILLE
SUBWATERSHED STUDY**
Rehabilitation and Enhancement Opportunities:
Area C




FIGURE: 8.4.4

DATE: April 2012

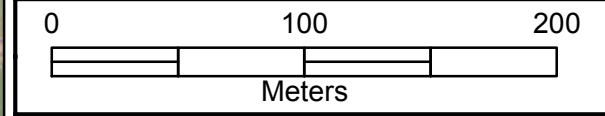



KEY MAP

LEGEND:

-  Mid-Spencer Creek Subwatershed Boundary
-  Rehabilitation and Enhancement Opportunities
-  Area D

NOTES:

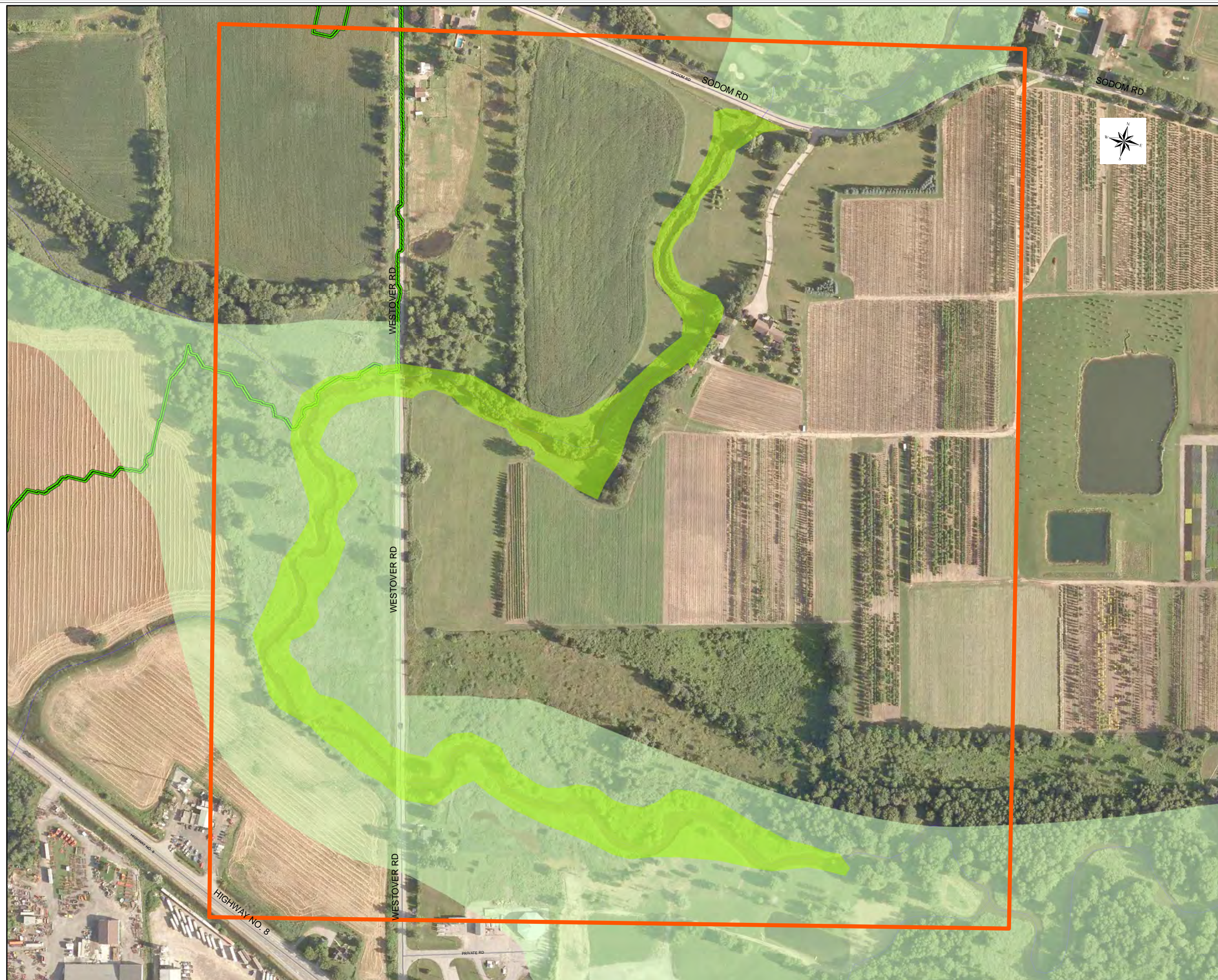



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Hamilton ON
L8R 2K3
Phone: (905) 546-2424
Fax: (905) 546-4435





**GREENSVILLE
SUBWATERSHED STUDY**
Rehabilitation and Enhancement Opportunities:
Area D

FIGURE: 8.4.5

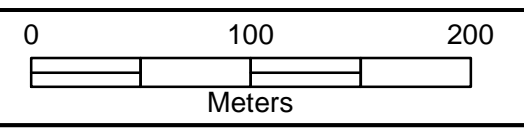
DATE: April 2012



KEY MAP

- LEGEND:
-  Mid-Spencer Creek Subwatershed Boundary
 -  Preliminary Natural Heritage System
 -  Rehabilitation and Enhancement Opportunities
 -  Area E

NOTES:

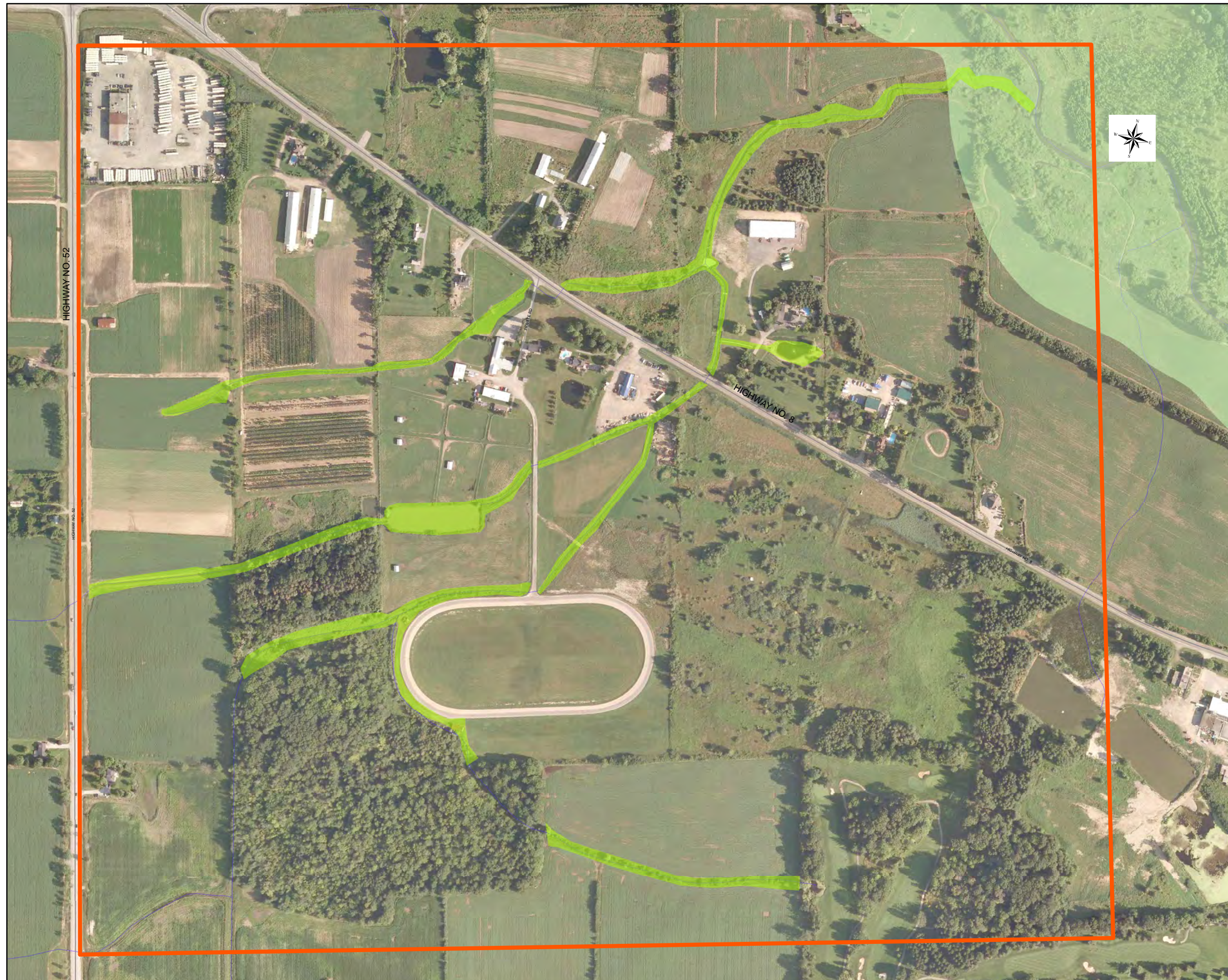


77 James Street North
Hamilton ON
L8R 2K3
Phone: (905) 546-2424
Fax: (905) 546-4435

**GREENSVILLE
SUBWATERSHED STUDY**
Rehabilitation and Enhancement Opportunities:
Area E





FIGURE: 8.4.6

DATE: April 2012

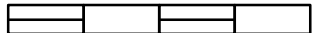


KEY MAP

LEGEND:

-  Mid-Spencer Creek Subwatershed Boundary
-  Preliminary Natural Heritage System
-  Rehabilitation and Enhancement Opportunities
-  Area F

NOTES:

0 100 200

 Meters



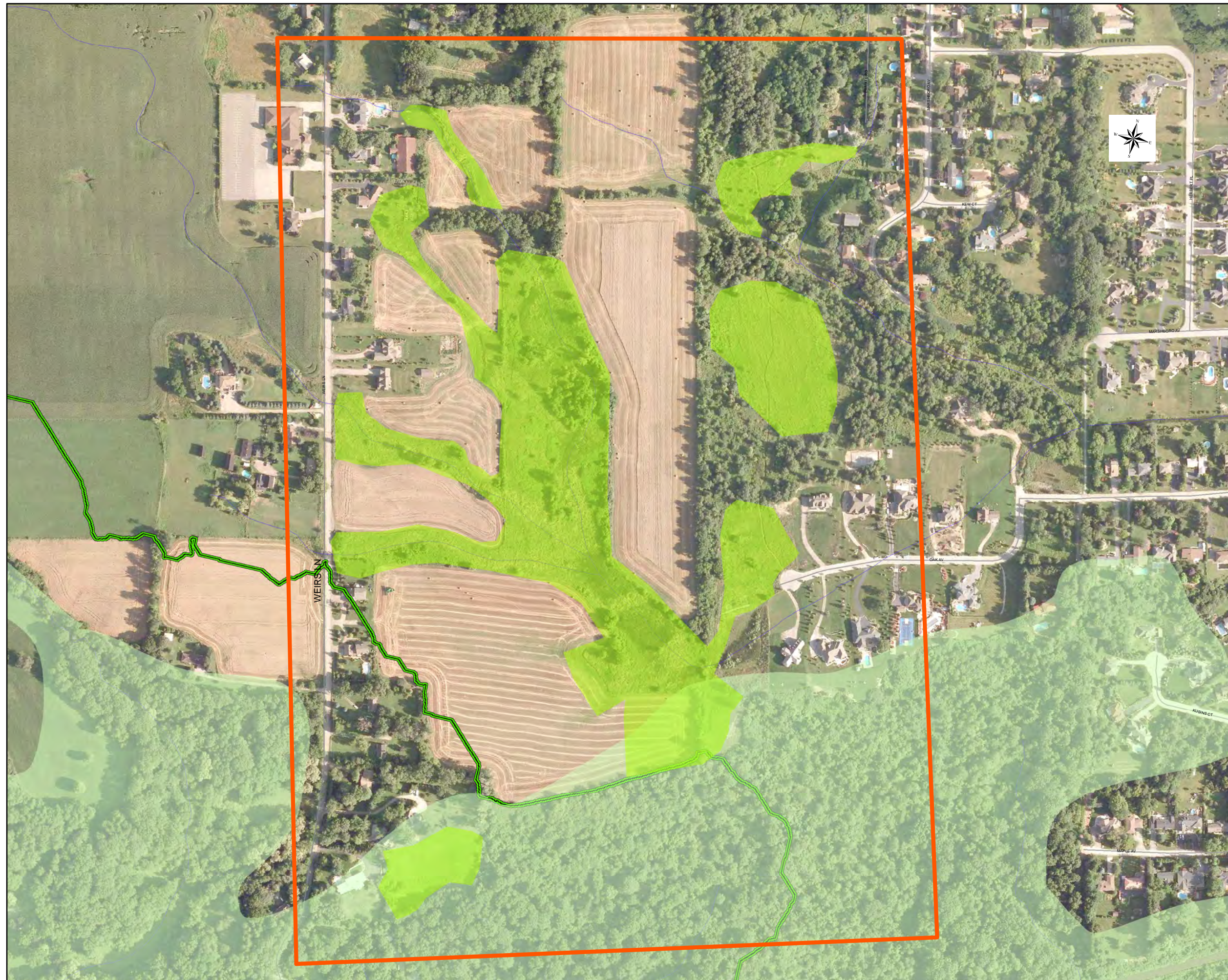

77 James Street North
 Hamilton ON
 L8R 2K3
 Phone: (905) 546-2424
 Fax: (905) 546-4435

**GREENSVILLE
 SUBWATERSHED STUDY**





Rehabilitation and Enhancement Opportunities:
 Area F

FIGURE: 8.4.7

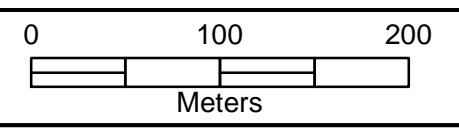
DATE: April 2012



KEY MAP

- LEGEND:
-  Mid-Spencer Creek Subwatershed Boundary
 -  Preliminary Natural Heritage System
 -  Rehabilitation and Enhancement Opportunities
 -  Area G

NOTES:



77 James Street North
Hamilton ON
L8R 2K3
Phone: (905) 546-2424
Fax: (905) 546-4435

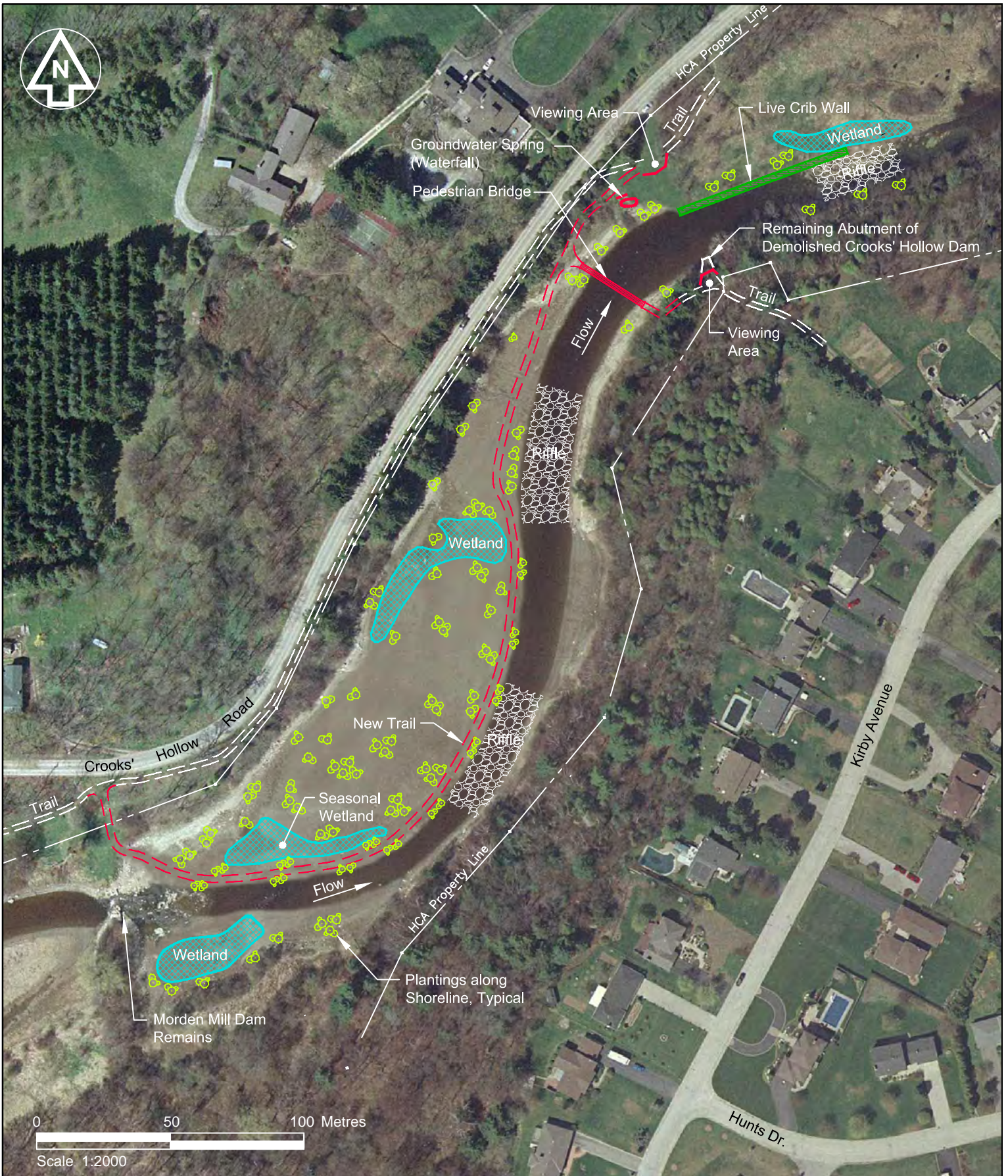
**GREENSVILLE
SUBWATERSHED STUDY**
Rehabilitation and Enhancement Opportunities:
Area G

FIGURE: 8.4.8

DATE: April 2012

Appendix L

Hamilton Conservation Authority: Crook's Hollow Dam Removal and Restoration of Spencer Creek Project Summary



Crooks' Hollow Dam Removal and Restoration of Spencer Creek



INNOVATIVE SITE FEATURES

- Relocation of stream bed to historical pre-dam flow path using natural channel design principles. Key features include pools and riffles, crib wall, and seasonal and permanent wetlands.
- Remnant portions of the dam have been left in place, including the cast iron pipe that once delivered drinking water to the Town of Dundas. Two wells have also been left in place.
- Two lookouts have been created using portions of the railing from the dam in areas where steep slopes would have been hazardous.
- A small waterfall, uncovered during the creation of the by-pass channel while Spencer Creek was being restored, was left in place and now feeds a downstream wetland.
- The new pedestrian bridge was designed with a rustic look and located to allow Spencer Creek to migrate as all natural stream channels do, as well provide optimal upstream and downstream views of the valley.
- The access road that was created for construction purposes was converted to a trail now allowing visitors to the area better access to the stream for fishing etc.
- There was no waste created or transferred offsite with the exception of sediment showing elevated levels of mercury. All other material was re-used on site (e.g. bridge railings, dam structure). The old bridge deck is being stored for use in other conservation areas.



LESSONS LEARNED

Proponents for similar dam removal projects may want to consider some of the following to avoid delays and impacts to cost.

Good communication: Early consultation with the public and the approval agencies is essential in order to understand the additional requirements to the project beyond the technical aspects. Receiving input as the project proceeds will avoid surprises and costly expenditures.

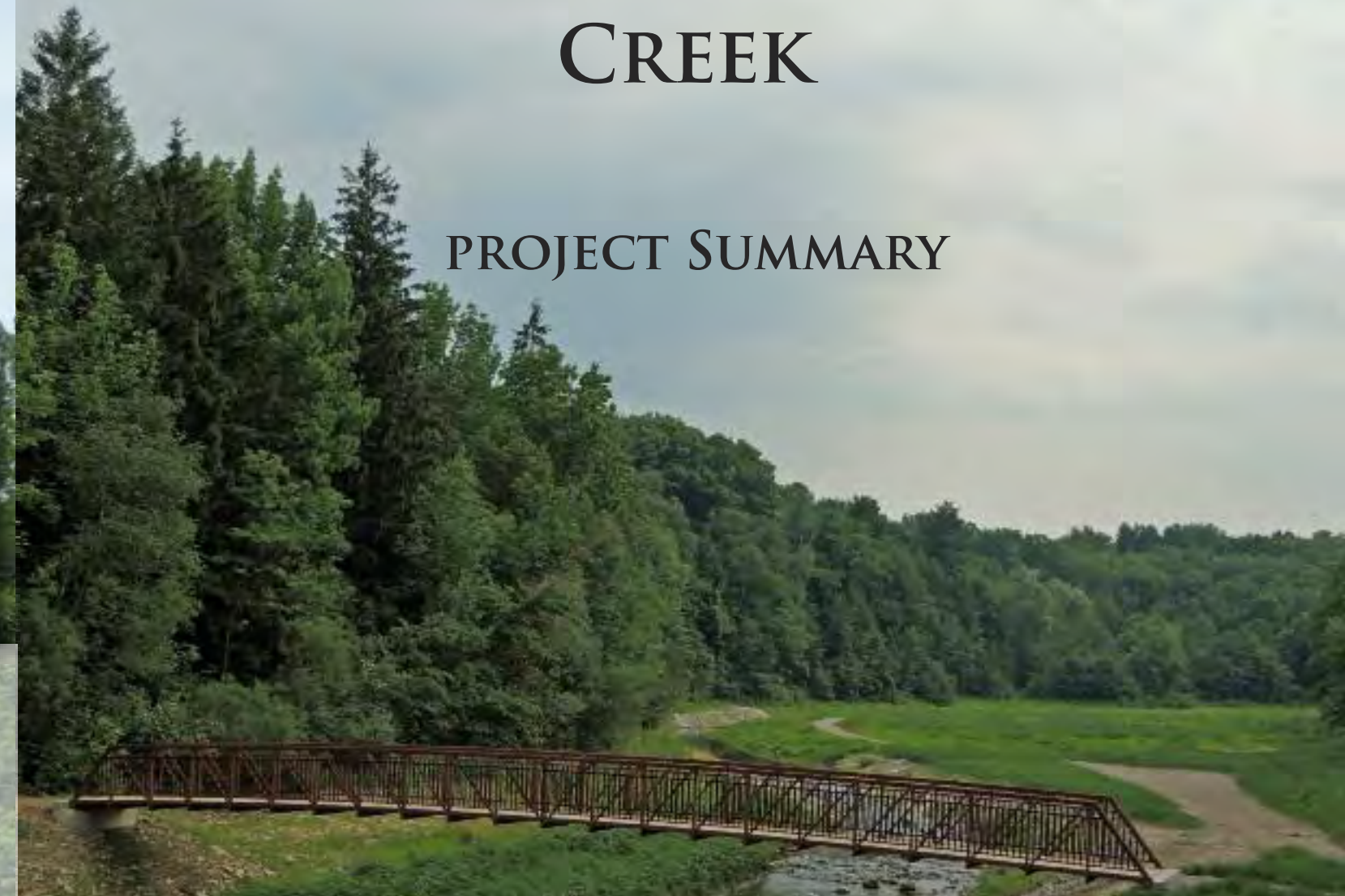
Technical Expertise: Dam removal and stream restoration is a complex undertaking involving many technical disciplines working together towards a common goal. It is essential that the selected contractor has significant experience in dam removal and stream restoration and that good communication is maintained as the project proceeds.

Approvals Process: The approvals process is in place to ensure that the project proceeds in compliance with a suite of legislative requirements. There are opportunities to work with the approval agencies but the process is not streamlined. Until streamlining is achieved dam removal in Ontario will continue to be a challenging and costly process.



CROOKS' HOLLOW DAM REMOVAL AND RESTORATION OF SPENCER CREEK

PROJECT SUMMARY



The History

The Crooks' Hollow Dam was located on Spencer Creek near the community of Greenville. The dam was situated amongst a series of historic dams that were built in the late 18th century to provide water power to a number of grist mills, sawmills and paper mills. The Crooks' Hollow Dam was constructed in 1916 to supply water to the community of Dundas, a function that ceased when a municipal water supply was established for Dundas. Between 1959 and 2001, the Dundas Valley Golf and Curling Club used the reservoir as a source of water for irrigation. The reservoir and surrounding lands were used for recreation including hiking, fishing and limited boating. In 2000, the ownership of the Crooks' Hollow Dam along with 9.9 hectares of land was transferred to the Hamilton Conservation Authority (HCA).

The Issue

Over the years, several dam condition assessments identified concerns relating to the integrity and stability of the dam. These studies, along with a Dam Stability and Assessment Study conducted in 2005, further confirmed the need to restore, modify or remove the dam to ensure its safety during major storm events.

PROJECT SUMMARY

EA Process

Responding to the need for action, in 2005, HCA initiated a Class Environmental Assessment (Class EA) to review the options for the dam. The review identified a number of alternatives and involved consultation with stakeholders, the neighbouring community and the public. The Class EA concluded that the dam should be removed to address safety concerns regarding the dam's deteriorated condition, eliminate long-term operating and maintenance costs and enhance local and downstream environmental conditions with no net long-term negative impacts to the environment. There were four Part II Order requests to the Ministry of the Environment (MOE) citing concerns for sediment management, cultural heritage significance and recreational enjoyment of the area.

Sediment Management Plan

In May 2009, the Class EA was approved by the Minister of the Environment with conditions that a Sediment Management Plan be developed to show how sediment will be managed during and after dam removal. A Sediment Management Plan was generated and supported by MOE in October 2010. Additional comments were accepted by MOE in May of 2012.

Public Process

As a first step in the removal of the dam and the restoration of Spencer Creek, HCA hosted three public meetings between February and June 2011. The first focused on a future vision for a restored Spencer Creek. The second public meeting focused on the process for dam removal and sediment management, options for stream restoration and bridge replacement, and the information generated in a Cultural Heritage Study. A final public meeting was held to present the final details of the design. These meetings allowed HCA to engage the community in a meaningful way by providing information, answering questions, offering up design options on various aspects of the work, obtaining feedback, and allowing the community to follow project progress. The clear message that was sent to HCA from the community was to make the site safe, keep it rustic while allowing access to and across the stream, and commemorate the historic uses of the area. This input influenced the project design and construction.

Detailed Design/Approvals Process

Detailed design was initiated in January 2011. In total, the project would need 8 separate approvals from 7 agencies. Although there was widespread support for the project the approvals process was challenging. This in part was as a result of the unique nature of the undertaking; it did not fit neatly into the approval processes. In the end, all of the agencies were able to come to terms with the objectives of the project (protecting public safety, restoring the environment, and building a self-sustaining environment that would require nominal capital investment in the future). All approvals were received by February 10, 2012.



PROJECT SUMMARY

Construction

Construction was initiated on February 14, 2012 and concluded on May 11, 2012. A construction sequence was devised that recognized time constraints such as fisheries timing guidelines, half load road restrictions, etc. The in-water works were accelerated and contingencies were put in place in the event of spring freshet flows. An access road was built through the site followed by a temporary by-pass channel. Flows were then diverted from Spencer Creek and restoration of the creek began that followed the principles of natural channel design.

Fish rescues were performed throughout the process as needed. The dam structure was dismantled, leaving remnant portions that were deemed safe. Key features constructed include returning the stream channel to its pre-dam configuration, installation of three riffle/pool sequences to maintain grade control and provide in-stream fish habitat, construction of a crib wall for bank protection that also affords fish habitat, and utilizing creative grading to establish a number of permanent and seasonal wetlands adjacent to the restored stream within the new floodplain.

Flows were returned to the restored stream over a period of one day. The bypass channel was filled and portions were left as depressions to create terrestrial habitat. The waterfall that was created in excavating the bypass channel was left in place to feed one of the existing wetlands. The site was re-vegetated with a number of native species suitable for this newly created environment. A pedestrian bridge was installed to maintain access to both sides of the stream. Finally, the access road was converted to a walking trail which will allow greater access to Spencer Creek and its floodplain area.

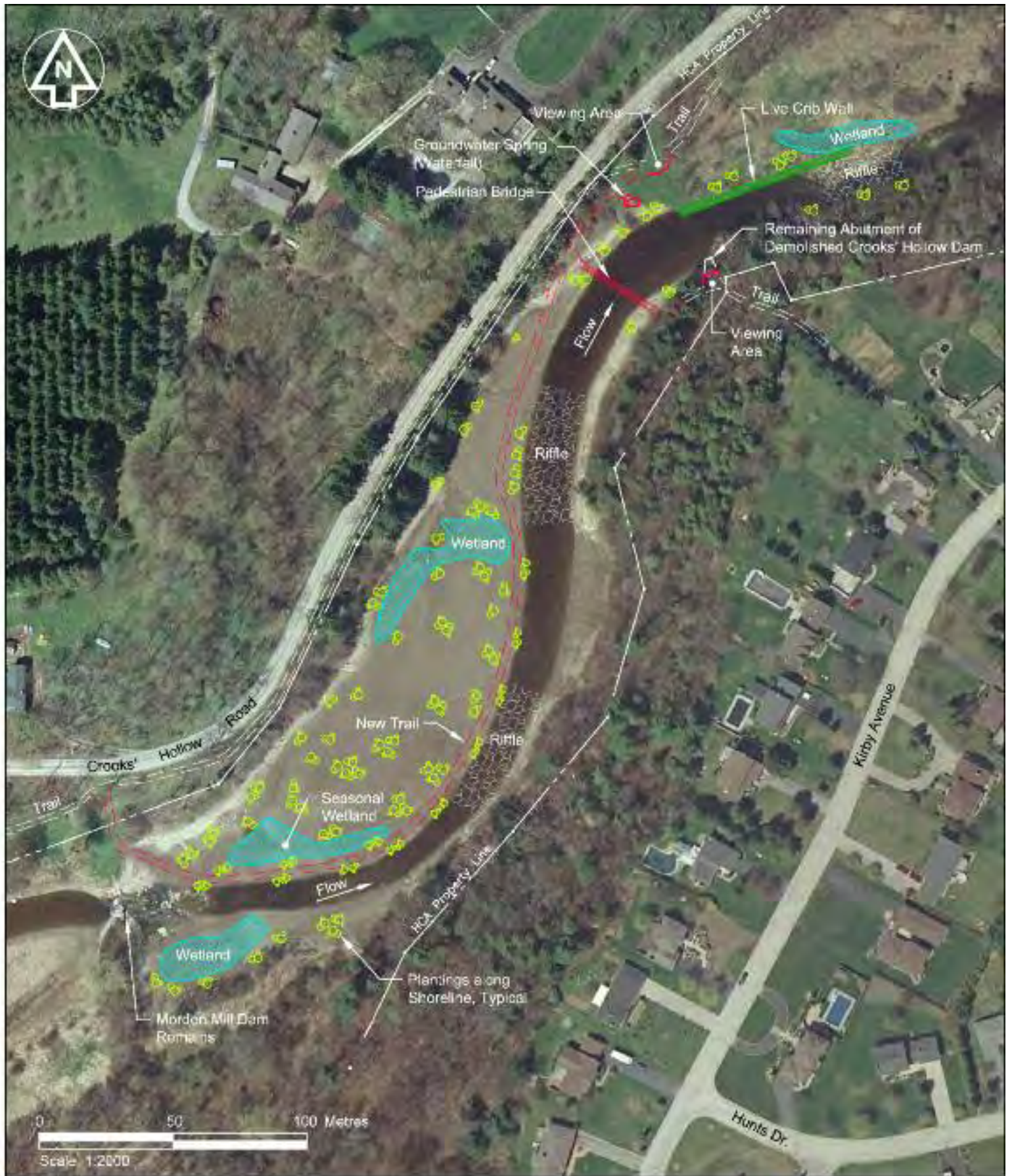
Monitoring

In keeping with the principle of adaptive environmental management, pre project monitoring was undertaken to set baseline conditions on stream form, water temperature and other water quality parameters. Some information has also been collected on aquatic and terrestrial flora and fauna. Follow up monitoring is planned over the next 5 years at predetermined locations for water quality assessment, stream form, and more generally throughout the site for aquatic and terrestrial features and functions.

Funding

Funding was provided by the City of Hamilton and the Ministry of Natural Resources under the Water and Erosion Control Infrastructure program. Total cost of the project for design and construction was \$1.4M.





Crooks' Hollow Dam Removal and Restoration of Spencer Creek



SITE FEATURES

Crib wall before



Crib wall after



Tadpoles



Leopard frog



Riffle



Riffle



Bridge



Morden's Dam



Appendix M
Public Information Centre

Appendix M

Public Information Centre Documentation

M -1	PIC #1	November 2007
	M-1-1 Notice of Commencement	
	M-1-2 Sign-in Sheet	
	M-1-3 Comment Sheets	
	M-1-4 Public Consultation Displays	
	M-1-5 Presentation	
	M-1-6 Agency / Public Communications	
M-2	Greenville Community Liasion Committee (CLC) Meeting#1	October 2008
	M-2-1 Term of Reference	
	M-2-2 Newsletter	
	M-2-3 Meeting Agenda	
	M-2-4 Meeting Minutes	
M-3	Greenville Community Liasion Committee (CLC) Meeting#2	January 2009
	M-3-1 Meeting Agenda	
	M-3-2 Meeting Minutes	
	M-3-3 Presentation and Handout	
M-4	PIC#2	January 2015
	M-4-1 Notice of Public Information Centre No.2	
	M-4-2 Sign-in Sheet	
	M-4-3 Comment Sheets	
	M-4-4 Public Consultation Displays	
	M-4-5 Agency Consultation	
	M-4-6 Agency Contact List	
	M-4-7 Agency Communications	
	M-4-8 Public Consultation	

Appendix M-1-1

Public Information Centre #1

Notice of Commencement

November 2007

The Study will be conducted as a Master Plan and satisfy Phases 1 and 2 of the Municipal Engineers Association (MEA) Municipal Class Environment Assessment Act (Class EA) process. Stakeholder consultation is an important part of the EA process, and a key component of the study.

PUBLIC INFORMATION CENTRE No. 1

This Public Information Centre will be held to present existing conditions information, and obtain feedback about the study.

The Public Information Centre will also have information about the Clean Water Act which has been passed by the Ontario Legislature to protect municipal drinking water sources. There will be a presentation and workshop about related issues concerning well and septic systems. Staff from the City, the Hamilton-Halton Watershed Stewardship Program and the Ontario Rural Wastewater Centre will be available to speak with residents and provide information about best management practices associated with well and septic system management.

DATE: Wednesday, November 21, 2007
TIME: 5:00 p.m. to 9:00 p.m.
5:00 p.m. to 7:00 p.m. Open House
7:00 p.m. to 9:00 p.m. Presentations and Workshop
LOCATION: Christ Church, 92 Highway #8, Flamborough

A second public information centre will be held at a later date to present the recommended solutions. Upon completion of the study, a Project File Report will be available for public review and comment. Another advertisement will be published at that time, indicating where and how the public can have access to the report.

PUBLIC COMMENTS INVITED

There is an opportunity at any time during this process for interested persons to review outstanding issues and bring concerns to the attention of the Project Managers. If you have any questions or comments or wish to be added to the study mailing list, please contact:

Elizabeth Panicker, P.Eng.
Project Manager
City of Hamilton
Water & Wastewater Division
Public Works Department
55 John St. North, 6th Floor
Hamilton, ON L8R 3M8
P: 905.546.2424 Ext. 6393
F: 905.546.4491
greenvillestudy@hamilton.ca

Dave Maunder, P.Eng.
Project Manager
Aquafor Beech Ltd.
8177 Torbram Road
Brampton, ON L6T 5C5
P: 905.790.3885 Ext.290
F: 905.790.4090
maunder.d@aquaforbeech.com

Information will be collected in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record. This Notice issued November 12 and 19, 2007.



Hamilton
Public Works

Act for Clean and Safe Source Water for Greensville

Join us for a joint **Public Information Centre** to learn
about the Greensville subwatershed study
and
Source water protection

The City of Hamilton is conducting the Greensville Community Subwatershed Study, which will set a management strategy for ground and surface water, community servicing and natural areas within the Greensville Rural Settlement Area. We are committed to hearing from area residents at every stage of the study. We invite you to attend all or part of our Public Information Centre. This is your opportunity to learn about the state of water resources in your watershed and to share your concerns and thoughts on how to protect the watershed.

Concurrent with the Greensville study, the City of Hamilton and Halton-Hamilton Source Protection Region are promoting source water protection programs and initiatives. Resources are available to help you protect the quality and quantity of water in your area. Come to the Public Information Centre to learn about the Abandoned Water Well Decommissioning Program, Clean Water Act, Septic System management, Septic System Inspection, raffle and much more.

We need your participation to make this a success!

Come and share your **KNOWLEDGE**, your **CONCERNS** and your **RECOMMENDATIONS** for the future of your watershed.

When: WEDNESDAY, NOVEMBER 21, 2007
Where: Christ Church 92 Highway #8, Flamborough

5:00 p.m. to 7:00 p.m. Open House
7:00 p.m. to 9:00 p.m. Presentations and Workshop

For more information, visit us at www.hamilton.ca/greensville or call Elizabeth Panicker, Project Manager, Water and Wastewater at 905.546.2424 x.6393 or email greensvillestudy@hamilton.ca

Appendix M-1-2

Public Information Centre #1

Sign-in Sheet

November 2007

Last Name	First Name	Organization	Address	Email	Summary Received?	Primary Interest (Greenville or SWP)	How Notified
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Weirs Lane PO Box [REDACTED] West Flamboro [REDACTED]	[REDACTED].ca	yes	Source Water Protection	Mail
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] HWY 8	[REDACTED].ca	yes		letter and newspaper flyer
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Weir's Lane	[REDACTED].ca	yes		
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Wesite Ave	[REDACTED].ca	yes		
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Oak Ave	[REDACTED].ca	yes		mailing
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Crooks Hollow Rd. [REDACTED] Dundas, Ont [REDACTED]	[REDACTED].ca	yes		Mail flyer
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Sodom Rd	[REDACTED].com	yes		
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Concession 2 W, Lynden [REDACTED]	[REDACTED].ca	yes	Greenville Study	Spectator
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Moxley Rd, Greenville	[REDACTED].ca	yes	Source Water Protection	Spectator
Brown	Robert	Box 2	293 Hwy # 8 West Flamboro L0R2K0	[REDACTED].ca	yes	Source Water Protection	Spectator
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Maple Ave	[REDACTED].ca	yes	Both	
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Haines	[REDACTED].ca	yes	Both	Mailing Flyer
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Crooks Hollow Rd. [REDACTED] Dundas [REDACTED]	[REDACTED].ca	yes		
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Maple Ave	[REDACTED].ca	yes		
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Poyntz St. Barrie	[REDACTED].com	yes		Flamborough Review paper
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Middletown Rd. [REDACTED] Dundas	[REDACTED].ca	yes	Source Water Protection	Spectator
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Harvest Rd, Greenville L9H5K5	[REDACTED].ca	yes	Both	Letter
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Jameson Dr. Dundas	[REDACTED].ca	yes	Source Water Protection	Flyer
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Meldrum Ave	[REDACTED].ca	no		
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Herbert Pl	[REDACTED].ca	yes		
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Hyw	[REDACTED].ca	yes	Source Water Protection	
Cutbert	Doug	Halton- Hamilton SWP Committee	779 Portridge Drive Burlington	[REDACTED].ca	yes	Source Water Protection	Newsletter
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Short Rd	[REDACTED].ca	yes	Both	Flyer
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Mountainview	[REDACTED].ca	yes		
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Park Ave	[REDACTED].ca	yes	Greenville Study	mail
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] 4th Concession [REDACTED] Waterdown	[REDACTED].com	yes		mail
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Forest Ave. Greenville	[REDACTED].com	yes		Neighbour Spectator
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] 1/2 Short Rd	[REDACTED].com	yes		
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Hwy 8	[REDACTED].ca	yes	Both	Flyer
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Jameson Dr. Dundas [REDACTED]	[REDACTED].ca	yes	Source Water Protection	letter
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Taylor Cr. Greenville	[REDACTED].ca	yes	Source Water Protection	Flyer
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Herbert Pl	[REDACTED].com	yes		
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Valleydale Cr. Dundas [REDACTED]	[REDACTED].ca	yes		Flyer
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Maple Ave	[REDACTED].ca	yes		mail
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Grant Blvd. Dundas [REDACTED]	[REDACTED].com	yes	Both	
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Hwy 52	[REDACTED].com	yes		Letter
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] HWY 8	[REDACTED].ca	yes	both	Notice in Newspaper and Letter
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Moxley Rd	[REDACTED].com	yes	Both	mail
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Kirby	[REDACTED].ca	yes		Flyer
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Maple Ave	[REDACTED].ca	yes		Letter
Howthy	Mark	Aquator	[REDACTED] Harvest Rd. Greenville	[REDACTED].ca	yes		Paper
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Hillcrest	[REDACTED].ca	yes	Both	flyer
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Hwy 8	[REDACTED].ca	yes	Both	
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Old Brock Rd, Greenville	[REDACTED].ca	yes	Source Water Protection	flyer
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Wssite Ave, Greenville L9H5M2	[REDACTED].ca	yes	Source Water Protection	Flyer
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Jameson Dr	[REDACTED].ca	yes		Notice
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Kirby Ave, Greenville	[REDACTED].ca	yes		
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Maple Ave	[REDACTED].com	yes		
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Maple Ave, Greenville	[REDACTED].com	yes	Source Water Protection	Letter
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Marshboro Ave	[REDACTED].ca	yes	Source Water Protection	
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Maple Ave	[REDACTED].ca	yes	Both	Flamborough Review
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Highway 8, West Flamborough	[REDACTED].ca	yes	Both	Flyer
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Moxley Rd	[REDACTED].ca	yes		
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Harvest St	[REDACTED].ca	yes	Source Water Protection	
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] 4th Concession W [REDACTED] Waterdown	[REDACTED].ca	yes		Letter
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED] Crooks Hollow Rd	[REDACTED].ca	yes		Spectator

Appendix M-1-3

Public Information Centre #1

Comment Sheets

November 2007

Greenville Community Subwatershed Study & Act for Clean Water

Public Information Centre #1

Wednesday, November 21, 2007

Workshop Participant Workbook

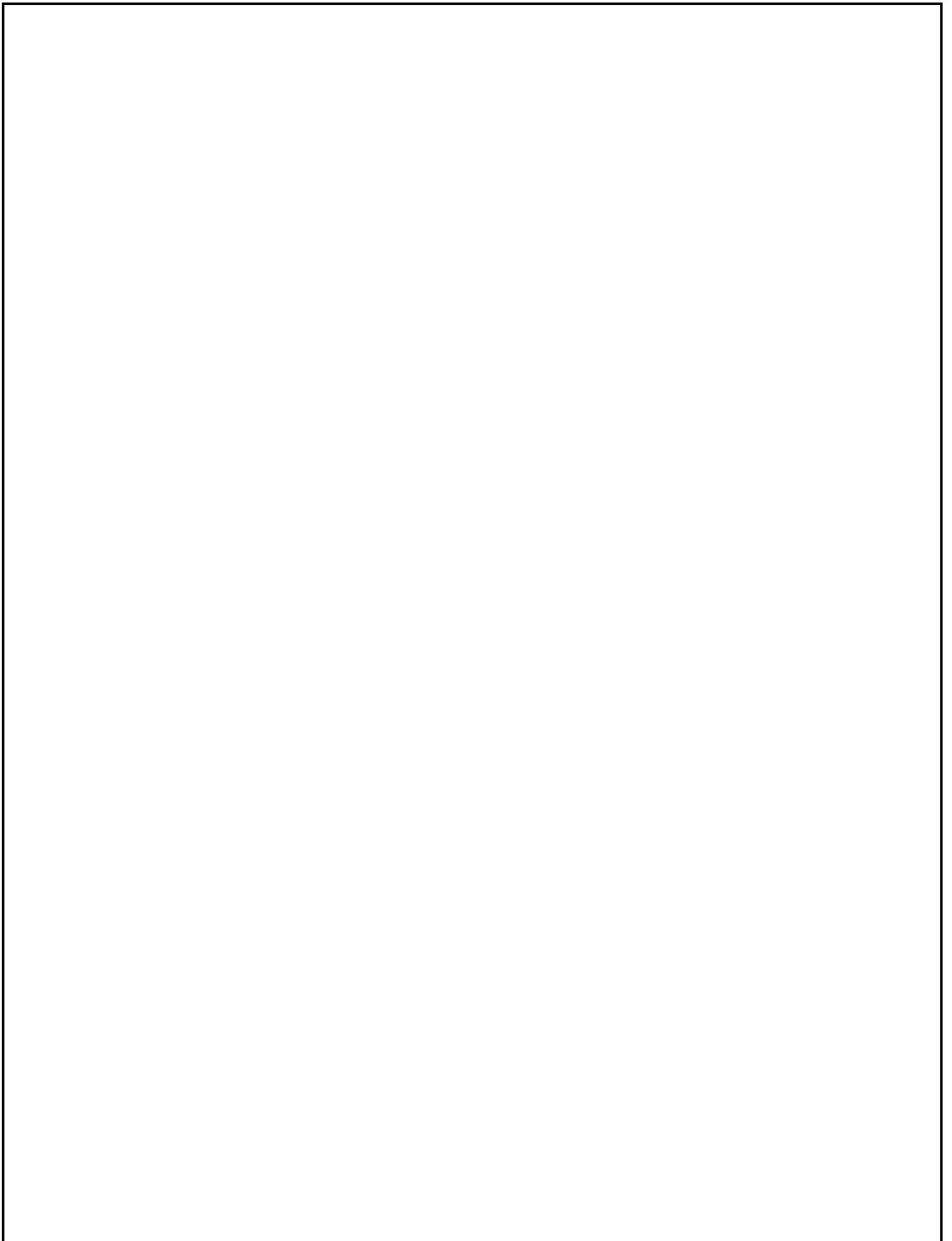
(OPTIONAL)

Name: _____

Organization: _____

Phone: _____ Email: _____





Greensville Community Subwatershed Study & Act for Clean Water Public Information Centre #1

Wednesday, November 21, 2007

5:00 p.m. - 9:00 p.m.

Christ Church, 92 Highway #8

Flamborough, Ontario

AGENDA

Purpose of the Public Information Centre:

- *Introduce Greensville Community Subwatershed Study and the planning team*
- *Share ideas on issues, goals and objectives for the future of the subwatershed*
- *Share information on Septic System Management Awareness and the Clean Water Act*
- *Build awareness of the Abandoned Water Well Decommissioning Program, water conservation and other best management practices, and funding opportunities*

5:00 pm Open House

7:00 pm Welcome to Participants
Elizabeth Panicker, City of Hamilton

Meeting Purpose and Agenda Review
Susan Hall, Lura Consulting

7:05 pm Overview of the Greensville Community Subwatershed Study
Dave Maunder, Aquafor Beech
Question and Answer

7:20 pm Source Water Protection Issues
Sheila O'Neal, Hamilton Conservation Authority
Katherine Rentsch, Ontario Rural Wastewater Centre
Question and Answer

8:00 pm Workshop – Roundtable Discussions

8:55 pm Closing Remarks/Next Steps
Susan Hall, Lura Consulting

Raffle Draw

9:00 pm Adjourn

Greenville Community Subwatershed Study & Act for Clean Water

WATERSHED RESOURCES OF VALUE

Question 1: What features, resources or elements do you value in the Greenville Subwatershed?

Greenville Community Subwatershed Study & Act for Clean Water

WATERSHED RESOURCES - PRELIMINARY LIST OF ISSUES

Question 2a:

Some potential issues that have been identified in the Greenville subwatershed are listed below. Please rank each issue which is important to you on a scale from 1 to 5 (1 - most important, 5 - least important). Tell us why this issue is important to you.

	Most Important	Somewhat Important	Important	Not Very Important	Least Important	Don't Know	Why?
Quality of water for domestic consumption	①	②	③	④	⑤		
Quantity of water for domestic consumption	①	②	③	④	⑤		
Erosion and sedimentation of watercourses	①	②	③	④	⑤		
Private property flooding/erosion	①	②	③	④	⑤		
Stormwater management	①	②	③	④	⑤		
Development impacts to well water quality	①	②	③	④	⑤		
Development impacts to well water quantity	①	②	③	④	⑤		
Groundwater recharge/wells running dry	①	②	③	④	⑤		
Well contamination from urban runoff (e.g., streets, roofs,	①	②	③	④	⑤		

Question 2a:

Some potential issues that have been identified in the Greenville subwatershed are listed below. Please rank each issue which is important to you on a scale from 1 to 5 (1 - most important, 5 - least important). Tell us why this issue is important to you.

	Most Important	Somewhat Important	Important	Not Very Important	Least Important	Don't Know	Why?
lawn pesticides)							
Well contamination from agricultural runoff	①	②	③	④	⑤		
Watercourse contamination from suburban development	①	②	③	④	⑤		
Watercourse contamination from agricultural practices	①	②	③	④	⑤		
Groundwater contamination from existing septic systems	①	②	③	④	⑤		
Groundwater contamination from upstream aggregate quarries	①	②	③	④	⑤		
Loss of riparian and stream habitat	①	②	③	④	⑤		
Loss of natural stream functions	①	②	③	④	⑤		
Sustainability of municipal water supply	①	②	③	④	⑤		

Question 2b:

As you look at the list of issues are there any other issues that should be added?

Greenville Community Subwatershed Study & Act for Clean Water

RECOMMENDATIONS

Question 3: What recommendations (if any) do you have to address the key issues you've identified as important?

Question 4: Which recommendations (if any) would you be willing to implement?

Question 5: What do you see as the barriers to implementing the recommendations you suggested in Question 3

Question 6: What tools or information do you need to help you implement your recommendations?

Question 7: Do you have any LOCAL INFORMATION OR DATA that you believe would be useful for the Greensville Subwatershed Study?

Additional Comments:

THANK YOU!

PLEASE RETURN completed workbooks by December 7, 2007 to:

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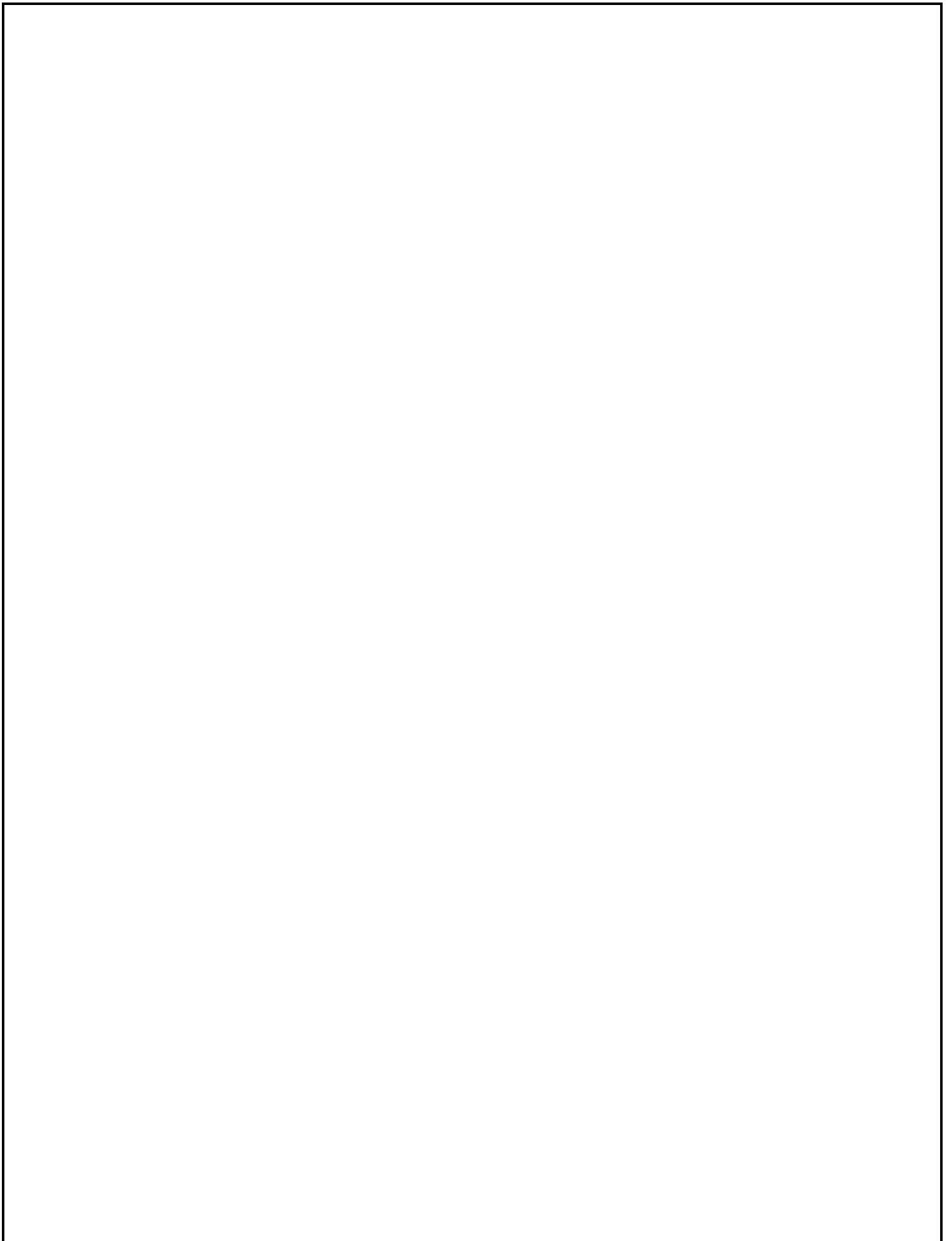
**Greensville Community
Subwatershed Study &
Act for Clean Water**

Public Information Centre #1

Wednesday, November 21, 2007

***Workshop Participant Workbook
Comments***





Greenville Community Subwatershed Study & Act for Clean Water

WATERSHED RESOURCES OF VALUE

Question 1: What features, resources or elements do you value in the Greenville Subwatershed?

#2 – First of all the City of Hamilton needs to keep meticulous records of any wells and septic systems installed. It is my understanding that NO RECORDS of inspection are on file for septic systems installed in Spencer Estates- developed only 30 years ago at max. We need to respect homeowners' right to keep their wells if they choose to. We pay a tremendous tax and still have to (or had to!) pay for new well equipment (casing repairs in thousands of dollars sometimes and also triple the amount for septic systems. We KNOW the costs – we are aware of environmental issues but in past no one seemed to care. Now environmental issues and Walkerton catastrophe brings all this to the forefront. If you anticipate city water coming our way, there will be much opposition unless you implement financial incentives. We move to the area knowing the situation.

#4 -Can you give specific information about my well e.g. depth, source of water 111 Hillcrest Ave

#5 (group xx)- The nature amenities of Christie falls and nature (close to) birds, animals and etc

#6 - Clean quality of H2O for us and the wild life

- Please continue to provided public education to maintain septic and wells

#7 – Rural setting

- crowded

- Nature trails

#8 – Christies conservation/wildlife

#9 – Natural features, trails, Niagara Escarpment

- Unchlorinated water, space for organic food saving

- Waste disposal which doesn't degrade the ecology

#13 – Crooks Hollow Dam and Christie Dam

- Nature, animals, birds

- Do not want- any more houses, buildings, businesses that use water, the aquifer cannot keep up

#15 - Availability for domestic existing

- Availability for wildlife

- Sustainability

Greenville Community Subwatershed Study & Act for Clean Water

WATERSHED RESOURCES - PRELIMINARY LIST OF ISSUES

Question 2a: Some potential issues that have been identified in the Greenville subwatershed are listed below. Please rank each issue which is important to you on a scale from 1 to 5 (1 - most important, 5 – least important). Tell us why this issue is important to you.

	Most Important	Somewhat Important	Important	Not Very Important	Least Important	Don't Know	Why?
Quality of water for domestic consumption	12	4	0	0	0	0	-simply water for residents is the most important resource -can be treated to improve quality - health, economy and lifestyle - health, personal and environment - life
Quantity of water for domestic consumption	13	1	0	0	0	0	-no water, no life - property drainage - health, personal and environment - life - well becoming more problematic
Erosion and sedimentation of watercourses	3	3	6	1	0	0	- I cannot impact this very much - property drainage - health, personal and environment - environmental
Private property flooding/erosion	1	5	3	2	2	0	- I don't think this is a problem - property drainage - health, personal and environment
Stormwater management	3	2	5	0	2	0	- I don't think this is a problem - Property drainage - health, personal and environment
Development impacts to well water quality	12	3	2	0	0	0	- Need to ensure eater supply for current properties first - health density - health, personal and environment - have gone dry
Development impacts to well water quantity	12	3	0	0	0	0	- Need to ensure eater supply for current properties first - health, personal and environment
Groundwater recharge/wells running dry	10	1	1	0	0	0	- neighbours using excess water in drought conditions (watering town) - No water! - health, personal and environment
Well contamination from urban runoff (e.g., streets, roofs, lawn pesticides)	7	3	2	0	1	0	- I don't think this is an issue - (2) health

Question 2a:

Some potential issues that have been identified in the Greenville subwatershed are listed below. Please rank each issue which is important to you on a scale from 1 to 5 (1 - most important, 5 – least important). Tell us why this issue is important to you.

	Most Important	Somewhat Important	Important	Not Very Important	Least Important	Don't Know	Why?
Well contamination from agricultural runoff	7	4	1	0	1	0	- I don't think this is an issue - Runoff - Health
Watercourse contamination from suburban development	7	2	4	0	1	0	- Septic system contamination
Watercourse contamination from agricultural practices	5	5	2	0	1	0	- health
Groundwater contamination from existing septic systems	8	4	1	0	1	0	- (2) health concerns
Groundwater contamination from upstream aggregate quarries	5	3	2	1	1	0	- quality of life
Loss of riparian and stream habitat	5	5	1	1	1	0	- quality of life
Loss of natural stream functions	8	4	1	0	1	0	- impact to maintain balance
Sustainability of municipal water supply	6	1	3	0	2	0	- n/a we are on individual water supply - Does not effect my property? - Don't want municipal supply

Question 2b:

As you look at the list of issues are there any other issues that should be added?

Greenville Community Subwatershed Study & Act for Clean Water RECOMMENDATIONS

Question 3: What recommendations (if any) do you have to address the key issues you've identified as important?

#1 – Development Moratorium

#2 – Keep the dialogue going with the residents of Greenville. Don't have hidden agendas

#3 – Make ground water levels public knowledge (historical and current data)

#5 (group xx) – Water quantity- control companies that draw spring water at an astronomical gallon per day and bottle it. No money is returned to replenish the groundwater. If these companies are located north of this study area, it will affect the quantities available here

#7 – control development

- development with little pollution as possible
- install municipal water

#8 – Limit bottlers of water in our area taking “free” water

- look at quantity of water used by quarries to see the effect of neighbours, who are seeing lower levels in the last five years
- Home owners should keep log on well water levels and provide information to the ministry on a yearly basis

#9 – Limit new development to minimum 2 acre lots

- Promote (and press for municipal subsidies for) low flow toilets and shower heads

#13 – No development

#16 – Need Help to:

- to install back up water cistern in basement
- drilling deeper well

Question 4: Which recommendations (if any) would you be willing to implement?

#1 – Liaison Committee

#2 – see question 7

#3 – Upgrade septic system, drill new deeper well

#7 – Install municipal water, this will eat out pollution from septic systems etc.

#8 – see question 3 – willing to provide information to ministry

#9 – Willing to lobby our councilor and health department

- Already have implemented

13- No development, this area is supposed to be a protected Biosphere (Note signs on the road)

16- both

Question 5: What do you see as the barriers to implementing the recommendations you suggested in Question 3

#1- Politics, Developer Lobbying

#2- City of Hamilton, Quarry Operations, Urban Sprawl

#3 – Cost! When paying so much in taxes

- #5 (group xx) - Where there is money, influence involved the politicians tend to listen more readily to the business rather than private individuals
- #7 – Lack of unity amongst the residents
 - lack of political will
 - lack of funds
- #8 – I'm sure the two industry heads would probably protest
- #9 – Pressure on council and staff from developers
- #13 – Hamilton City Councils
- #16 – Lack of professional help

Question 6: What tools or information do you need to help you implement your recommendations?

- #3 – need information about best location and depth to drill new wells
- #8 – reporting system – possibly via web, for homeowners to report to ministry
- #9 – More full information on water quality
- #13 – Mc Master Professors
- # 16 – see question 3

Question 7: Do you have any LOCAL INFORMATION OR DATA that you believe would be useful for the Greenville Subwatershed Study?

- #1- EA- strictly landfill
 - Hydrogeological Studies
- #2- Do something with the Crooks Hollow Water Reservoir, replace the dam, keep water in reservoir all year, stock with fish etc.
- # 10- Observing for first time
- #13- Check with the former G.A.S.P Association of Greenville
- #16 – Yes, my well is gradually running dry

Additional Comments:

- #8 – We would like to know:
 - 1) How many new wells have been dug in the area by local businesses?
 - 2) Are there regulatory means to limit local businesses from taking too much water?
 - 3) Why are we having such low levels in the past 3-5 years?
 - We have had to purchase water 3 times per year even though we have a well, cistern, and 3rd holding tank
 - There are only two people living at this house, and we conserve water diligently
- #14 – If the aquifer runs N to S and if the neighbour to the north runs their wash water into the stream between our properties should we be concerned?
- #16- need professional help to help me with question 3

Appendix M-1-4

Public Information Centre #1

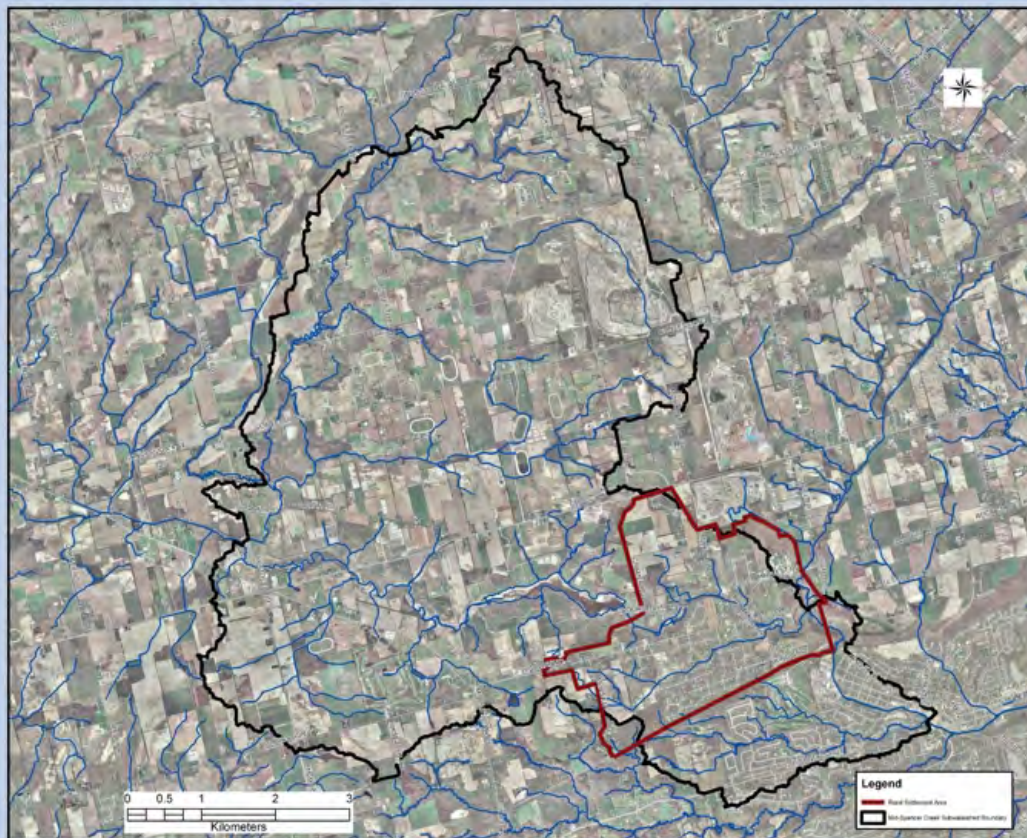
Public Consultation Displays

November 2007

WELCOME:
TO THE FIRST
PUBLIC OPEN HOUSE
FOR THE
MID-SPENCER CREEK/GREENSVILLE RURAL
SETTLEMENT AREA SUBWATERSHED STUDY



The City of Hamilton is undertaking this study for the Greensville Rural Settlement Area (RSA) and surrounding Mid-Spencer Creek Subwatershed. The purpose of the study is to investigate and inventory the natural resources within the two areas and identify constraints and opportunities through which future growth may be established in a manner which is environmentally sound and socially and economically sustainable.



Objectives of the First Public Open House

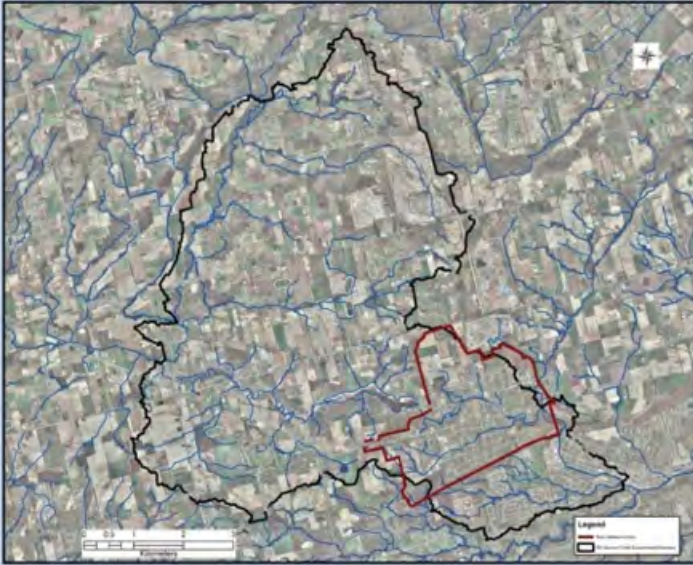
This Public Open House will provide opportunity for the public and property owners to review and evaluate information relating to land uses and environmental conditions. The inputs from this Open House will then be used to refine the environmental inventory and to formulate future Management Strategies.



STUDY AREA LAND USES

Existing Land Uses

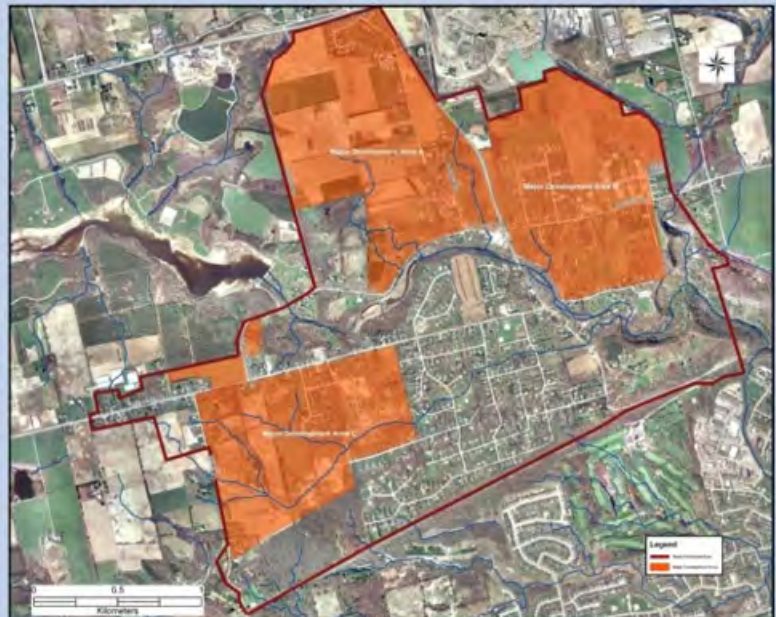
The Mid-Spencer Creek Subwatershed Area supports a variety of rural and agricultural land uses including farms, natural heritage features, aggregate pits and nurseries. Within the Greenville RSA residential land uses predominate with localized pockets of commercial and institutional services. Residences in the Greenville RSA and Mid-Spencer Creek Subwatershed Area are currently serviced by private septic systems with municipal communal, private communal or individual wells. There are approximately 1,000 residences within the Greenville RSA.



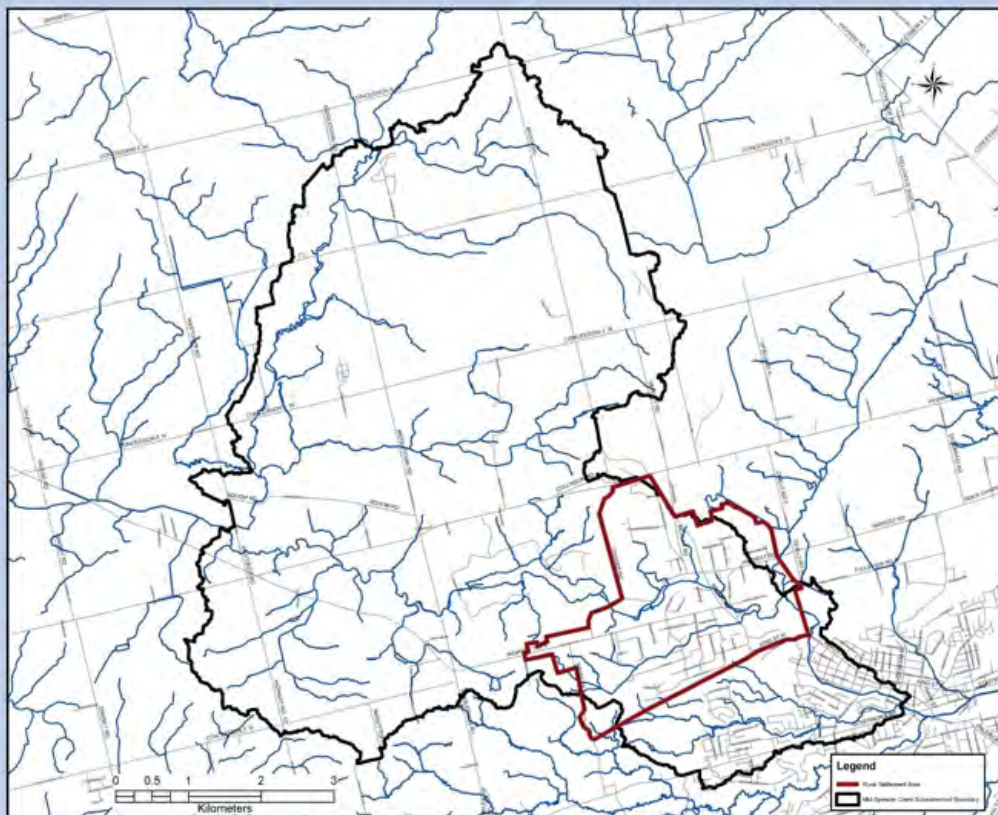
Proposed Land Uses

Land uses within the Mid-Spencer Creek Subwatershed Area, outside of the Greenville RSA, are not expected to change significantly over time. Potential land use changes within the Greenville RSA are outlined in the Greenville Secondary Plan (OPA13). The Secondary Plan, which was prepared in 1992, identified three general growth areas (see accompanying figure). Development within each of these areas, some of which has already occurred, was to take place in phases.

A maximum of 12 lots were permitted in the first phase. Monitoring of surface and groundwater conditions for a two year period was then to take place prior to proceeding with the second phase. In addition to the above, the Secondary Plan allowed for a maximum of five dwellings per year to be created by consent or Plan of Subdivision.



STUDY GOAL, OBJECTIVES AND KEY TASKS



Study Goal

The study goal is defined as:

“to protect, maintain and enhance the ecological processes, functions and significant natural features of the area, providing a framework through which future growth may be established and undertaken in a manner which is environmentally sound and socially and economically sustainable.”

Study Objective

The objective of the study is to provide a basis for the protection, maintenance and enhancement of surface water and groundwater quantity and quality. The resulting plan will provide recommendations as to where and how future development activity can safely occur so as to minimize flood risks, stream erosion, degradation of water quality and negative impacts on natural systems, including groundwater. Recommendations may also identify opportunities for ecological enhancement where deemed integral to the function of the plan.

Key Tasks

The study will be carried out in three stages. The key tasks to be undertaken for each stage are outlined below.

STAGE 1 – SUBWATERSHED CHARACTERIZATION

- Define existing environmental conditions
- Identify and evaluate natural features and functions of the study area and their potential interrelationships with other natural features
- Summarize constraints and opportunities

STAGE II – DEVELOP AND EVALUATE SUBWATERSHED MANAGEMENT STRATEGIES

- Identify alternative Subwatershed Management Strategies
- Establish criteria to evaluate the alternative strategies
- Elect a Preferred Subwatershed Management Strategy.

STAGE III – DEVELOP AN IMPLEMENTATION AND MONITORING PLAN

- Develop an Implementation and Monitoring Plan to ensure the long term integrity of the Preferred Subwatershed Management Strategy



MID-SPENCER CREEK / GREENSVILLE RURAL SETTLEMENT AREA SUBWATERSHED STUDY GROUNDWATER RESOURCES

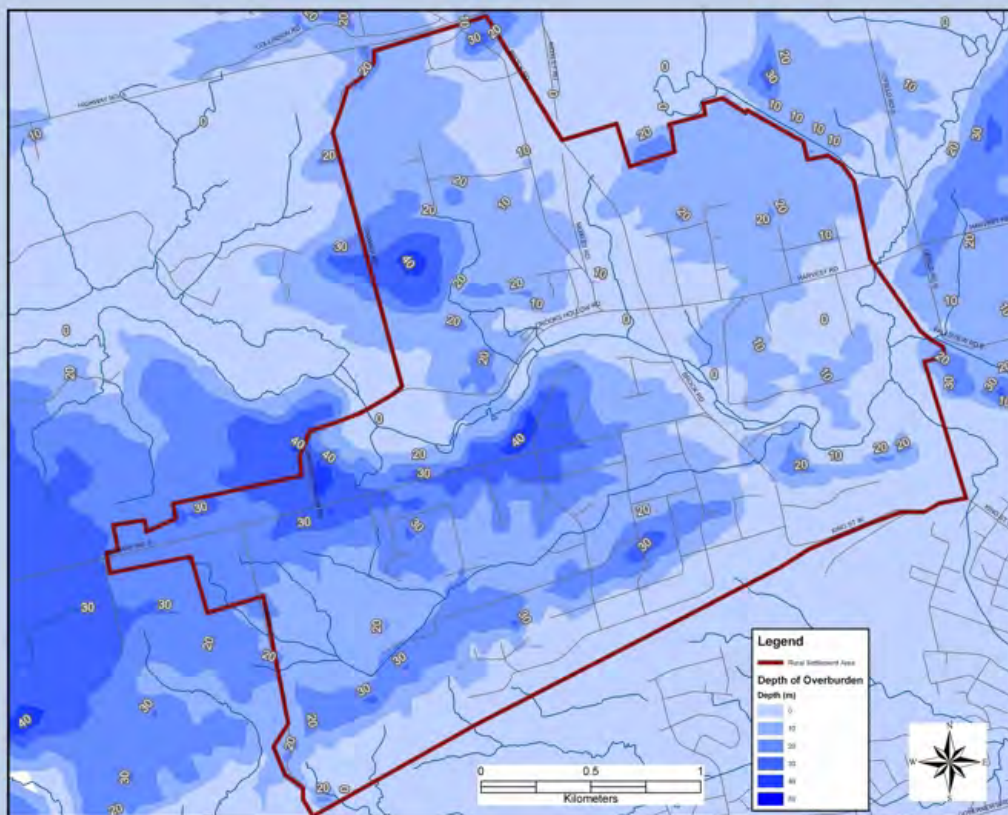
Introduction

Hydrogeology is the study of the water movement below the ground surface. In general rainwater infiltrates and is stored underground in sand and gravel deposits, or bedrock fractures called aquifers, which may supply drinking water to local wells or supply baseflows to adjacent streams.

Recharge areas, where water infiltrates into the groundwater system, are usually areas of highly permeable soils such as sands and gravels or areas of exposed fractured bedrock. Springs and seepage areas, where groundwater exits the soils, are said to be discharge areas. These discharge zones supply streams with cold baseflows which benefit aquatic life.

What was done

Water well records, geology and soils maps were reviewed to characterize the groundwater system with the RSA. In addition a total of 10 wells were drilled into the ground at representative locations within the RSA in order to assist in the characterization.

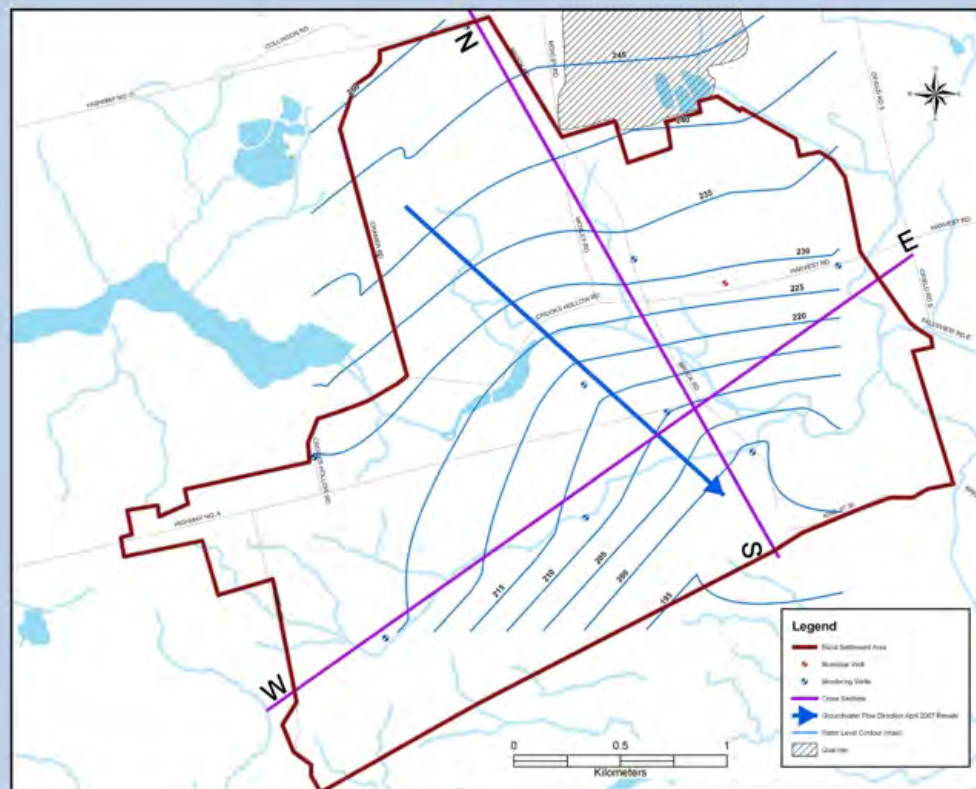


Depth of Overburden
Distance (or depth) from the land surface to bedrock surface



MID-SPENCER CREEK / GREENSVILLE RURAL SETTLEMENT AREA SUBWATERSHED STUDY GROUNDWATER RESOURCES

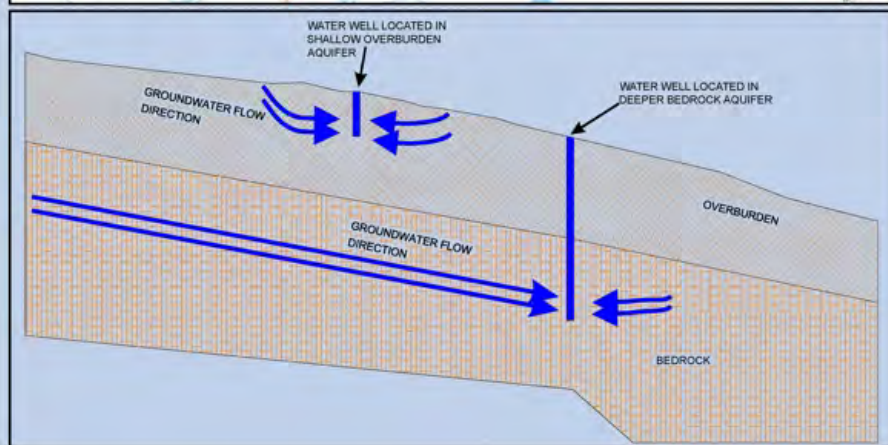
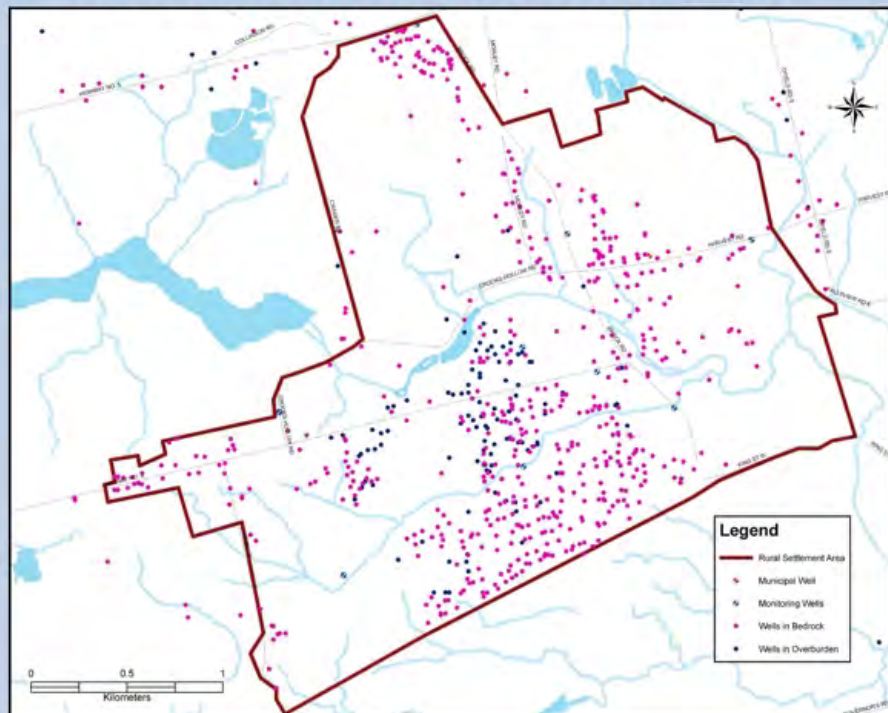
The accompanying map illustrates the flow direction of groundwater below the surface together with the water table elevation within the RSA. As is illustrated on the figure the groundwater flow direction is from north to south. Furthermore, the groundwater table is typically 5 to 20 meters below the surface and there is a significant (40m) drop in the groundwater table from the north to the south limit of the RSA. The drop may be attributed to the presence of the Niagara Escarpment.



Also shown are the locations of two hydrogeologic cross sections (denoted as N – S and W – E). The two cross sections, which are shown on another poster board, illustrate the geologic conditions together with the location of water wells as well as the groundwater table elevation.



MID-SPENCER CREEK / GREENSVILLE RURAL SETTLEMENT AREA SUBWATERSHED STUDY GROUNDWATER RESOURCES



In a general sense, there are two aquifers within the RSA; a shallow overburden aquifer and which is compromised of gravel, sand, silts and clays and a deeper bedrock aquifer.

The accompanying figure illustrates the general location and type (overburden or bedrock) of water wells in the area. A majority of the wells (approximately 85%) are located in the deeper bedrock aquifer. The remaining water wells are located in the shallow overburden aquifer.

The origin of groundwater in the deeper bedrock aquifer extends from a large area, generally well beyond the Mid-Spencer Creek Subwatershed boundaries. Furthermore, the quality of the bedrock groundwater is generally quite good, and less susceptible to contamination.

The origin of groundwater in the shallow overburden is more localized. The quality of groundwater is less reliable and may be more susceptible to contamination.



MID-SPENCER CREEK / GREENSVILLE RURAL SETTLEMENT AREA SUBWATERSHED STUDY GROUNDWATER RESOURCES

Field Program

A total of 10 wells were drilled into the shallow and deep aquifer at representative locations with the RSA in December 2006. The objective was to gather further information with respect to:

- groundwater levels, including fluctuations through the year;
- groundwater quality; and
- groundwater temperature

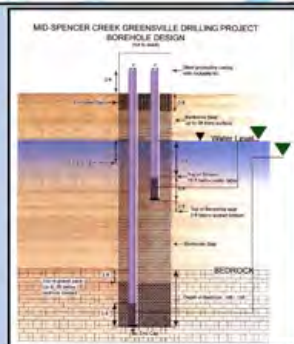
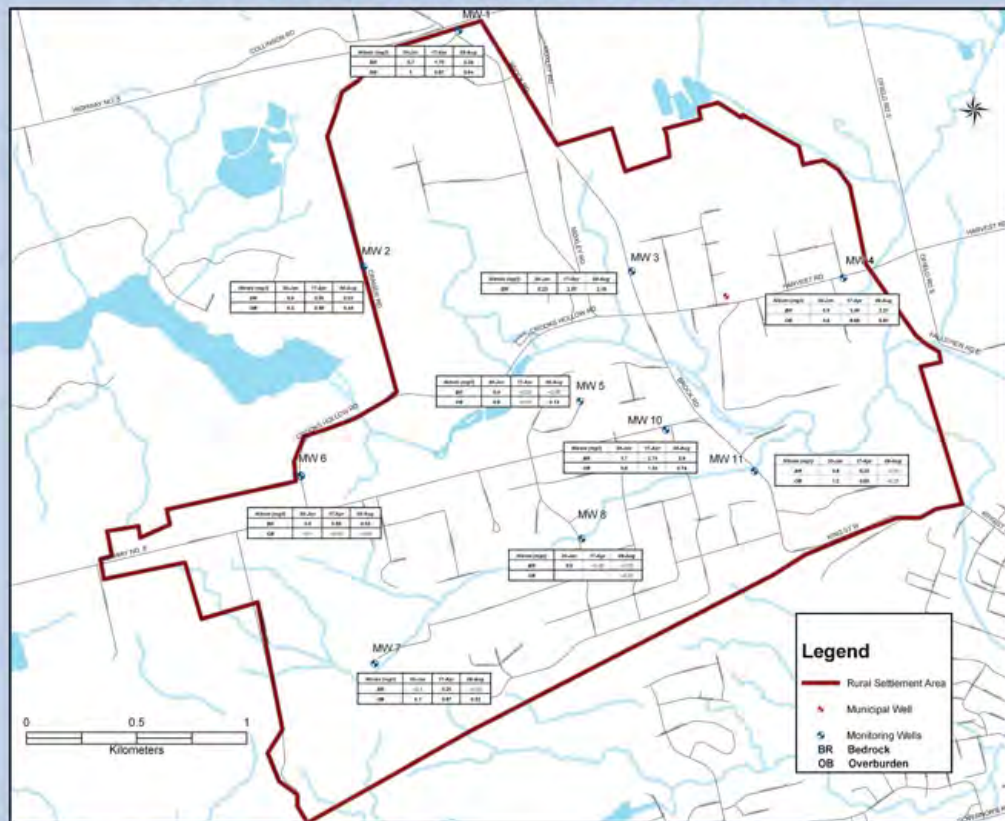
Conditions in both the shallow and deep aquifers were recorded in each well.

What we found

A summary of Nitrate levels that were measured at each well during the January, April and August sampling period is shown on the accompanying figure. Health Canada specifies a maximum allowable drinking water concentration of 10 mg/l of Nitrate in drinking water. The elevated levels are one of concern because they can cause methemoglobinemia in infants (or blue baby syndrome) and eutrophication in surface waters.

The results, in general, suggest that groundwater quality in both aquifers is good as Nitrate levels were found to be well below the Ontario Drinking Water Standard (ODWS). The one exception would be at well MW4 where higher levels were recorded in the shallow overburden well.

It was also found that the groundwater table, at a given location, drops throughout the year. Measurements at the wells typically showed a reduction of 2 metres. The drop in the water level may reduce baseflows to streams and result in a reduction in reliable yield for wells located in the shallow aquifer.



MID-SPENCER CREEK / GREENSVILLE RURAL SETTLEMENT AREA SUBWATERSHED STUDY - GEOMORPHIC CHARACTERISTICS

Stream Morphology:

The study of the physical environments of streams is called fluvial geomorphology. The nature and distribution of stream flow and sediment movement in streams creates habitats for aquatic life and causes stream channels to alter their shape and pattern, sometimes leading to flooding and erosion issues. As land uses change, the amount of surface runoff and sediment reaches the stream also changes, often leading to erosion and flooding problems and poor aquatic habitats for fish. By undertaking stream restoration works that restore the natural stream morphology through natural channel design, these impacts can be mitigated.

Mid Spencer Creek and its tributaries were divided into reaches based on their morphological characteristics. For each reach, the following information was collected:

- the channel and its general form were described.
- the channel was assessed in terms of stability and evidence of erosion problems.
- the characteristics of the stream banks and the adjacent valley vegetation was noted.
- general aquatic habitat characteristics were noted.

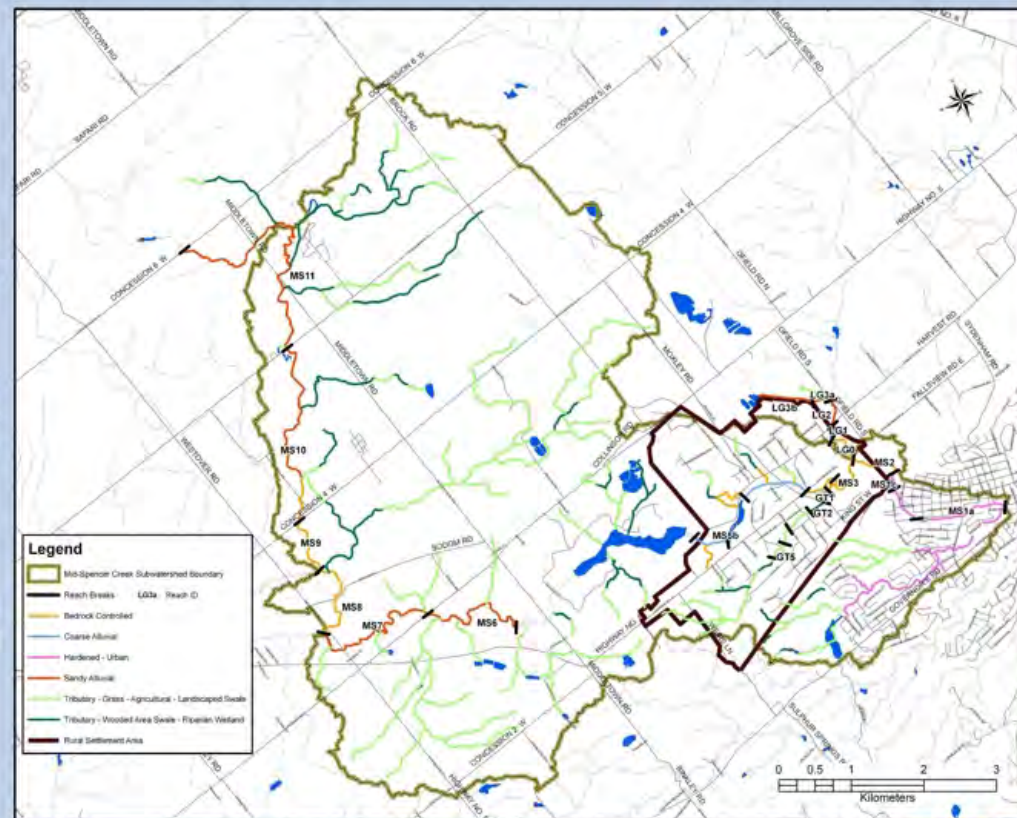
Eleven segments of Mid Spencer Creek were inventoried and are characterized as Hardened(urban), Bedrock Controlled, or Alluvial (coarse or sandy) channels (see accompanying map)

Within the Greensville Rural Settlement Area, tributaries draining the settlement areas A, B, and C were also inventoried and characterized as Vegetated Swales, Ditch-like, Sandy Alluvial, or Bedrock Controlled Channels (see accompanying map)

The tributaries within the Mid-Spencer Study Area are generally ephemeral and/or intermittent in nature (exceptions Logies Ck and urban tributary) and are typically characterized as either:

- Tributary – Wooded Area Swale / Riparian Wetland
- Tributary – Grass / Agricultural / Landscaped Swale

In generally the main creek and its tributaries are stable with limited evidence of stream erosion problems. Urban reaches including lower Spencer Creek and the urban tributary downstream of Greensville have been extensively modified.



MID-SPENCER CREEK / GREENSVILLE RURAL SETTLEMENT AREA SUBWATERSHED STUDY - HYDROLOGY MODEL

GREENSVILLE HYDROLOGY MODEL

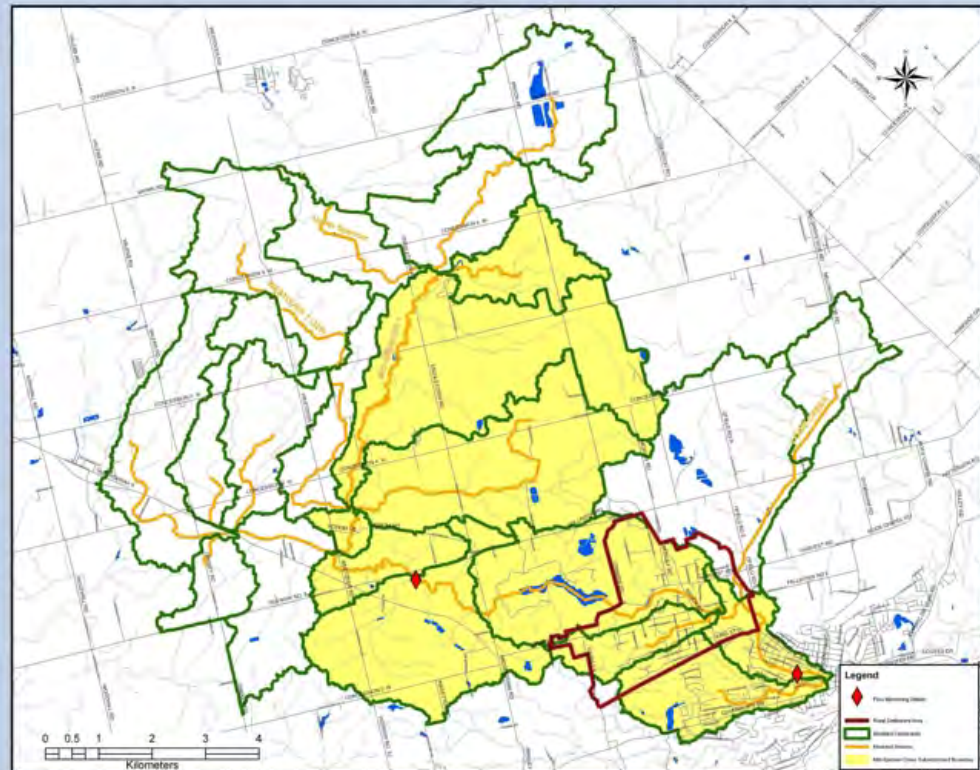
A detailed hydrologic model called MIKE11 has been setup in order to estimate the flows in Spencer Creek at specified points along the channel. The model of the middle section of Spencer Creek starts at Safari Road and ends in the Town of Dundas at Market Street. Rainfall data was obtained from Hamilton Conservation Authority between 2003 and 2006 inclusive as input for the model. The flow at Safari Road is measured by Environment Canada and was used as input to the Mid Spencer Creek flow model. Similar stations at HWY 5 and Market St. (Town of Dundas) were also used to check the accuracy of the model. The following creeks were included in the model:

- West Spencer Creek
- Westover Creek
- Flamboro Creek
- Logies Creek
- Ann St. Creek

The model estimates the amount of water in the creek throughout a particular year. In some places it is known that groundwater flows into the creek bed or some water from the creek works its way into the groundwater system. The surface water model has been linked to the groundwater model (Visual MODFLOW, discussed on another poster) to better understand how water moves between these two systems.

GREENSVILLE FLOOD LINE MAPPING

In order to prepare a map illustrating the location of “high water” (flood lines) during a specified flow event the peak flows and the topography of land in which these waters flow needs to be known. The hydrologic model described above provides the flows. A detailed topographic survey of watercourse crossings within the RSA was conducted. Detailed digital topographic mapping from the City of Hamilton for the area. These data, including the flow data, were used to develop another model called HEC-RAS to estimate the elevation of the water surface along a given watercourse. This model was used to determine the “high water” mark for a specific storm event (pre-determined by Hamilton Conservation Authority).

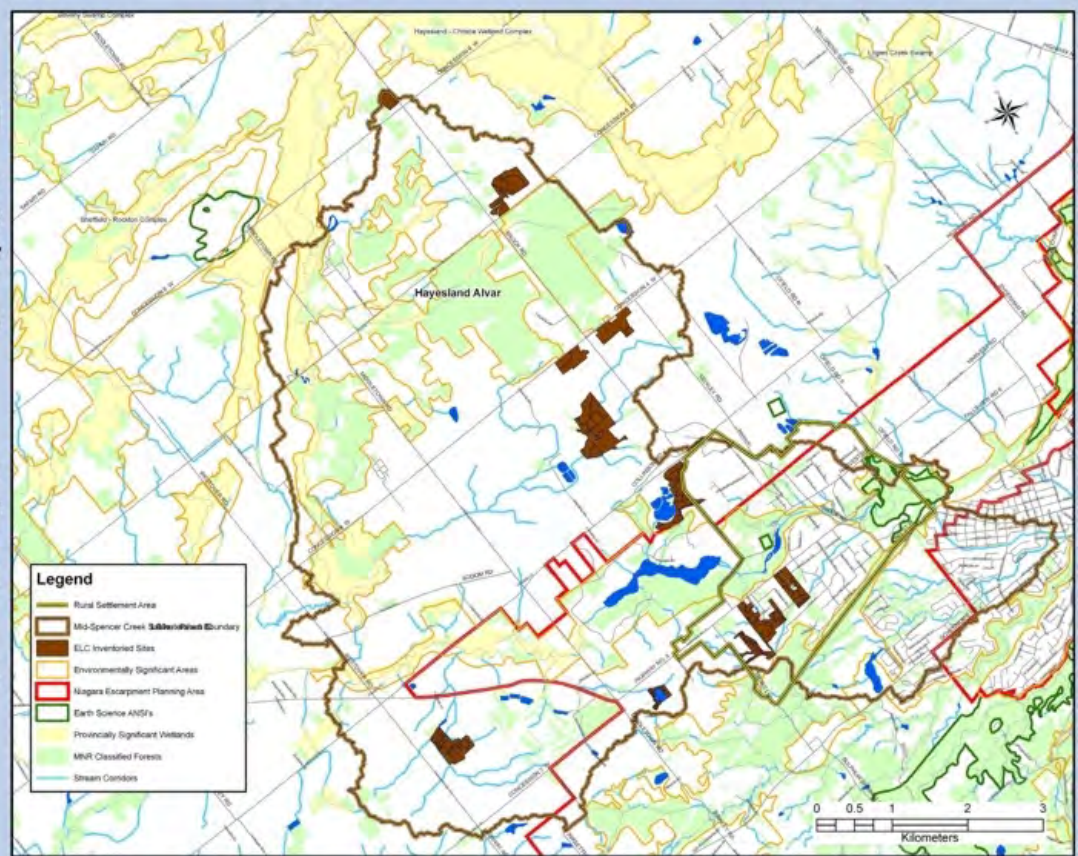


MID-SPENCER CREEK / GREENSVILLE RURAL SETTLEMENT AREA SUBWATERSHED STUDY - TERRESTRIAL RESOURCES

Terrestrial resources include the plants, animals, amphibians and birds and their habitats that occur within the subwatershed. In southern Ontario landscapes, once extensive forests and wetlands have been dramatically reduced in size as a result of a long history of human settlement patterns until only fragments of these features exist. The amount of natural habitat present, the size of individual features and the presence of naturally vegetated corridors linking the features together is called a Natural Heritage System. The health of this system can be assessed based on the diversity of plant and animal communities present, the amount of disturbance from human activities and colonization by non-native species and other measures.

Following a review of existing information on terrestrial communities, inventories of plants and animals were completed on the urbanizing areas of Greensville and on selected features throughout the watershed.

Relative to other parts of southern Ontario, there is an abundance of natural heritage features covering about 30% of the subwatershed. These features are illustrated on the accompanying figure.



MID-SPENCER CREEK / GREENSVILLE RURAL SETTLEMENT AREA SUBWATERSHED STUDY - AQUATIC RESOURCES

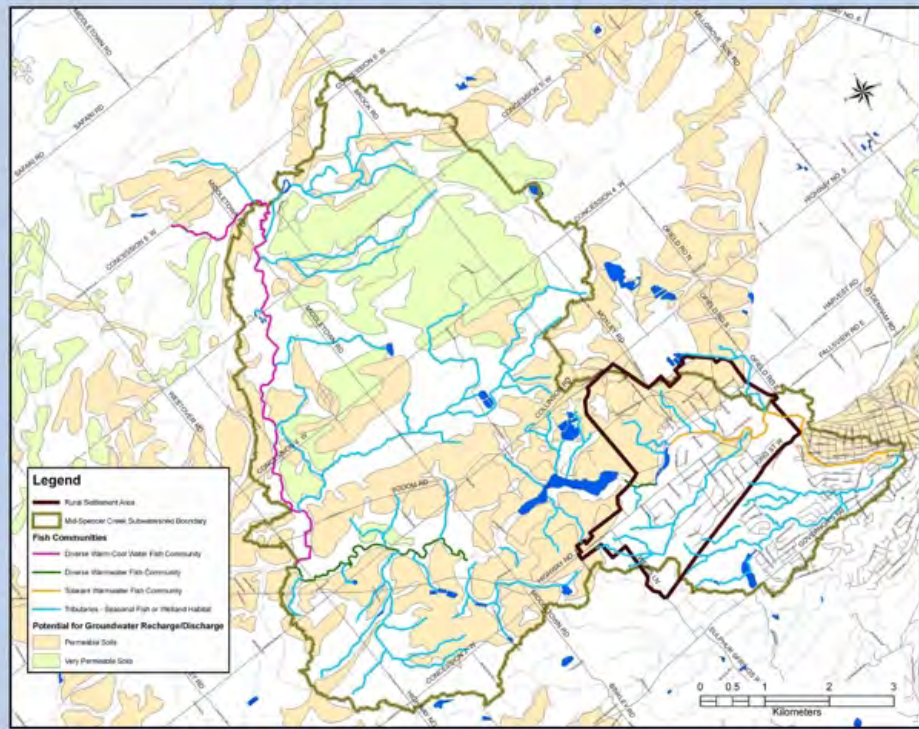
The type and diversity of fish species present in rivers and streams is a barometer of environmental health, and the habitat preferences or tolerances of individual species can provide information on the physical condition of the habitat, water quality and quantity. By identifying fish species targets typical of healthy streams, stream restoration efforts can be designed to create/restore the habitats needed to maintain healthy stream environments.

Historical fisheries data on Mid Spencer Creek was supplemented by inventories of a number of tributaries and general habitat conditions for the stream segments and the tributaries.

The Mid Spencer Creek is characterized by three types of fish communities:

- Tolerant warmwater fish community represented by blacknose dace, longnose dace, creek chub and white sucker
- Diverse warmwater fish community represented by largemouth bass, pumpkinseed, yellow perch, Johnny darter, emerald shiner, spottail shiner
- Diverse warm/cool water fish community represented by the previous species plus northern pike, mottled sculpin, blackside darter

Tributaries are intermittent and provide seasonal fish habitat and/or wetland habitat. While these headwater features are intermittent, they may provide groundwater recharge that supports baseflows in Mid Spencer Creek.



MID-SPENCER CREEK / GREENSVILLE RURAL SETTLEMENT AREA SUBWATERSHED STUDY KEY FINDINGS

Terrestrial Resources

- Abundant natural heritage features – ANSI's, PSW's, ESA's – 30% of watershed
- Limited natural features within the RSA, except Christie Mills and Escarpment lands
- Significant portions of natural heritage features are in private ownership

Aquatic Resources

- Mid Spencer Creek supports a diverse warm/cool water fish community
- Christie Mills Reservoir supports a warmwater fishery
- Intermittent tributaries provide limited seasonal fish habitat

Groundwater Resources

- The groundwater flow direction is from north to south
- There are two aquifers; a shallow overburden aquifer and deeper bedrock aquifer
- A majority of the wells (85%) are located in the deeper bedrock aquifer
- The groundwater table, at a given location, fluctuates throughout the year
- The groundwater monitoring program suggests that groundwater quality in both aquifers is good. The one exception would be at MW4 in the shallow overburden well.

Surface Water Resources

- Water quality in streams fair to good – nutrient enrichment, high nitrates and chloride, low trace metal levels
- Hydrologic modeling of subwatershed completed to characterize surface water – groundwater inter-relationships
- Floodplain mapping through Greensville updated to identify areas of flooding and undersized culverts

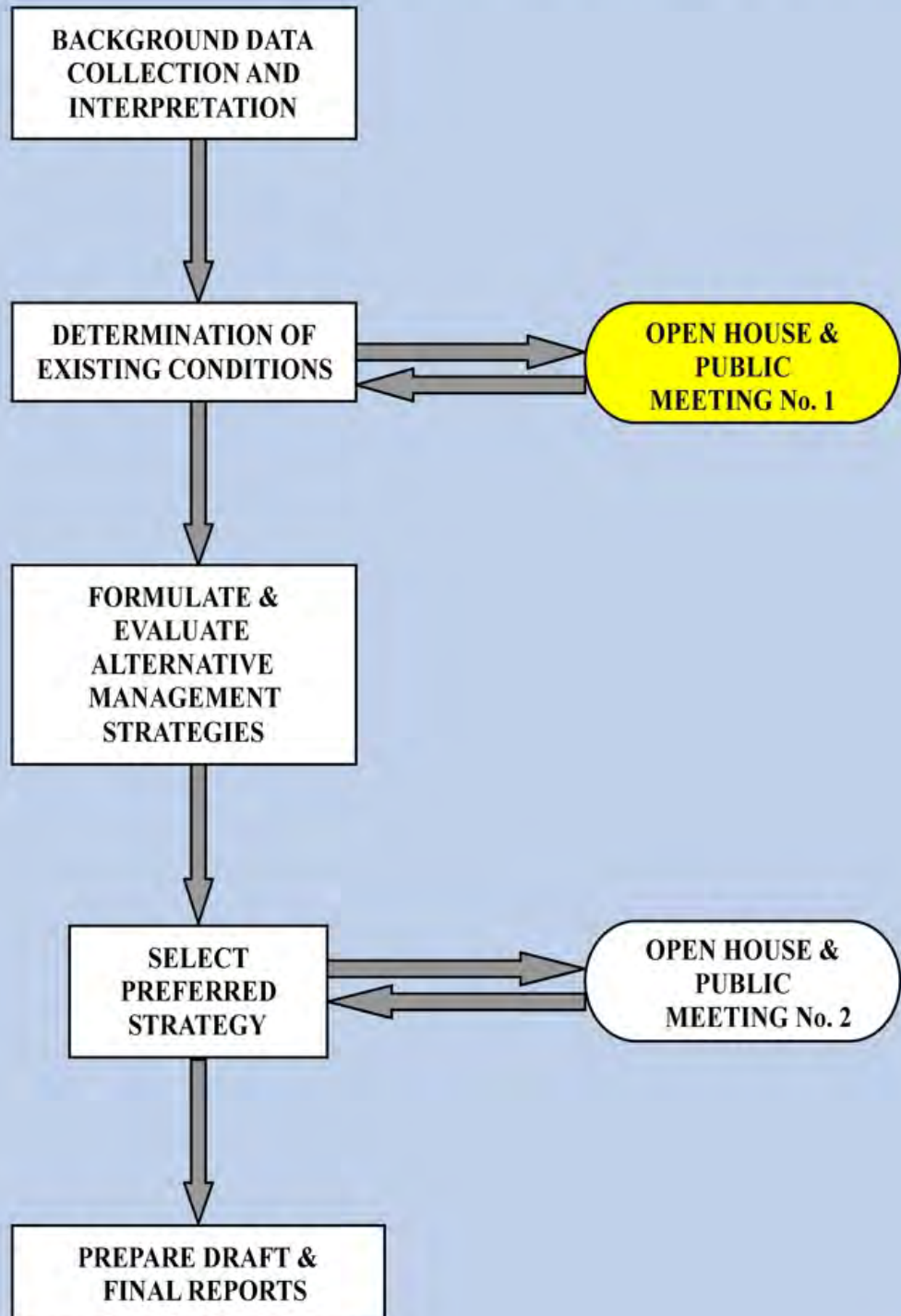
Stream Morphology

- Most Tributaries are ephemeral and/or intermittent, poorly defined
- Mid Spencer Creek is cobble-bed or bedrock controlled downstream of Christie Mills
- Mid Spencer Creek is low gradient with vegetated banks upstream of Christie Mills
- Main creek generally stable with limited evidence of erosion problems; tributaries within the Rural Settlement Area are generally stable with only minor local/gradual adjustments; urban tributaries show some instability with minor erosion concerns.

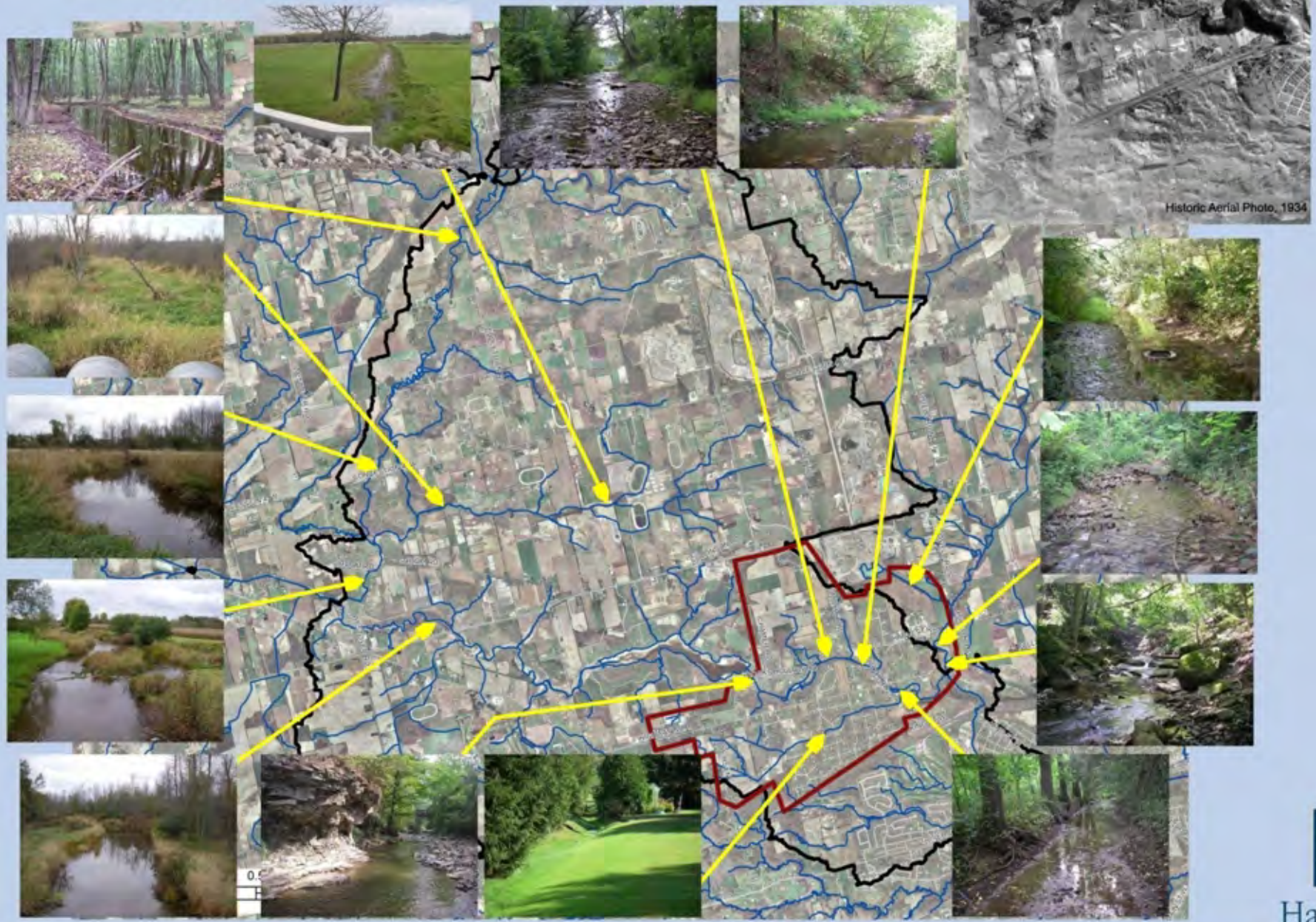


MID-SPENCER CREEK / GREENSVILLE RURAL SETTLEMENT AREA SUBWATERSHED STUDY

The Municipal Class Environmental Assessment Planning – Master Plan Process



MID-SPENCER CREEK / GREENSVILLE RURAL SETTLEMENT AREA SUBWATERSHED STUDY REPRESENTATIVE STREAMS



Appendix M-1-5

Public Information Centre #1

Presentations

November 2007

GREENSVILLE RSA – MIDDLE SPENCER CREEK SUBWATERSHED STUDY

First Public Open House
November 21, 2007



STUDY GOAL AND OBJECTIVE

Study Goal

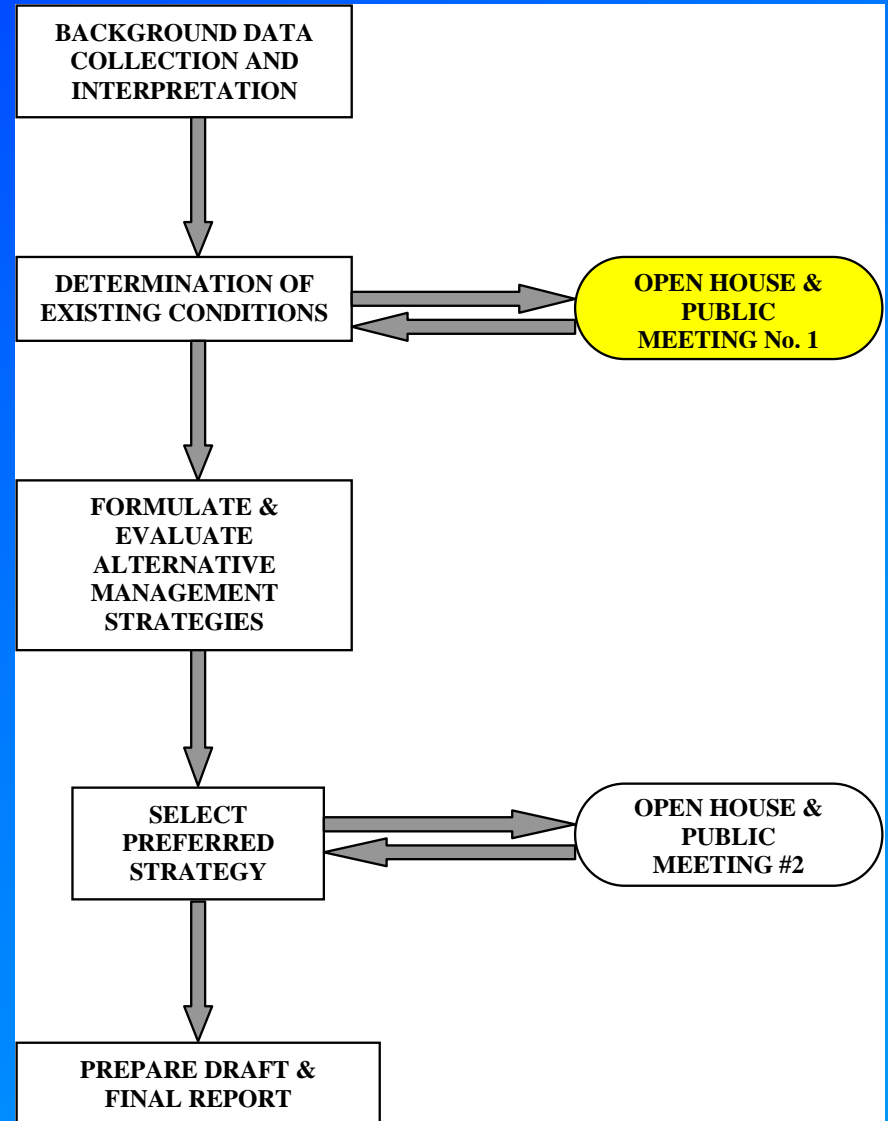
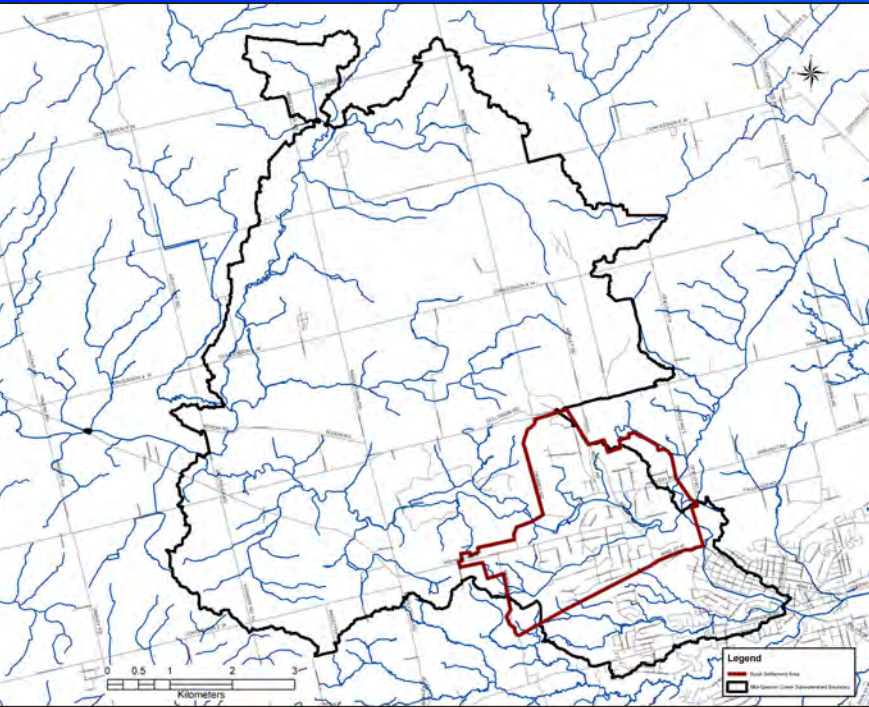
- The study goal is defined as:
 - “to protect, maintain and enhance the ecological processes, functions and significant natural features of the area, providing a framework through which future growth may be established and undertaken in a manner which is environmentally sound and socially and economically sustainable.”



Study Objective

- The objective of the study is to provide a basis for the protection, maintenance and enhancement of surface water and groundwater quality. The resulting plan will provide recommendations as to where and how future development activity can safely occur so as to minimize flood risks, stream erosion, degradation of water quality and negative impacts on natural systems, including groundwater.

STUDY CONTEXT



WHAT HAS BEEN DONE TO DATE

Key Tasks

- Background documents reviewed
- Field and Technical studies undertaken
- Existing Conditions have been defined

Disciplines Considered

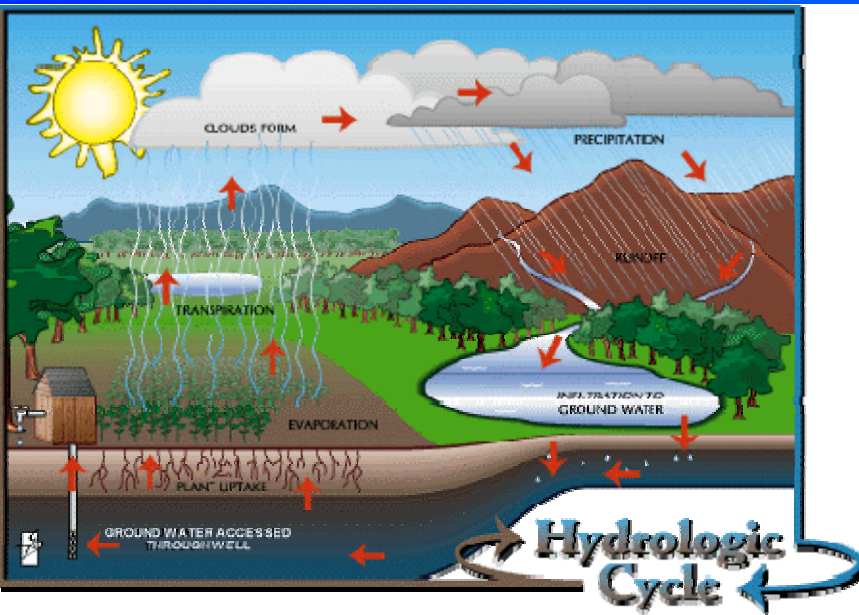
- Groundwater (hydrogeology)
- Surface Water (Flooding, erosion)
- Aquatic Resources (fisheries)
- Terrestrial Resources (plants, animals, amphibians and birds)



GROUNDWATER RESOURCES

Introduction:

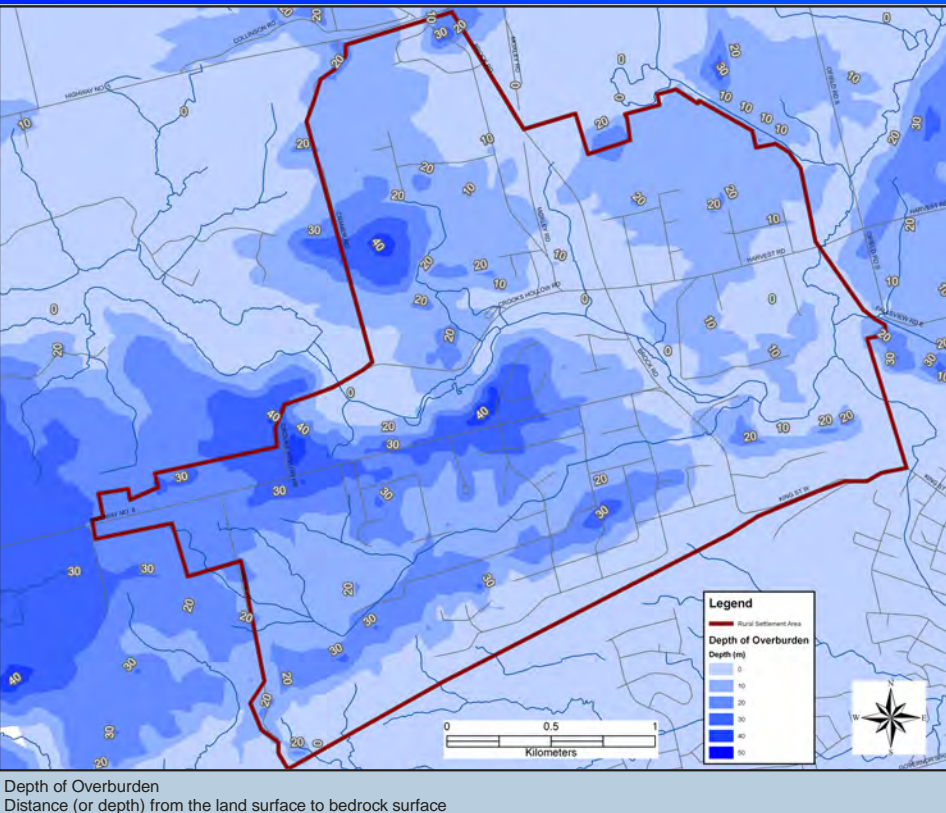
- Hydrogeology is the study of water movement below the ground surface.
- Rainwater infiltrates and is stored underground in sand and gravel deposits, called aquifers
- This water may be used by local wells or supply baseflows to adjacent streams



GROUNDWATER RESOURCES

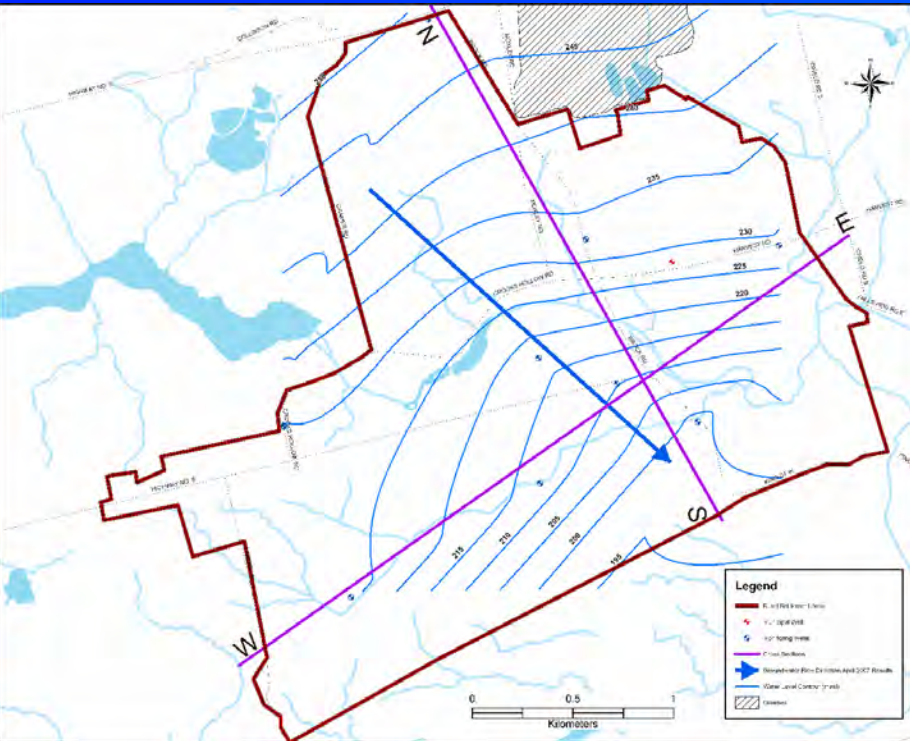
What was done?

- Water well records, geology and soils maps were reviewed to characterize the groundwater system within the RSA.
- In addition a total of 10 wells were drilled into the ground at representative locations within the RSA in order to assist in the characterization.



GROUNDWATER RESOURCES

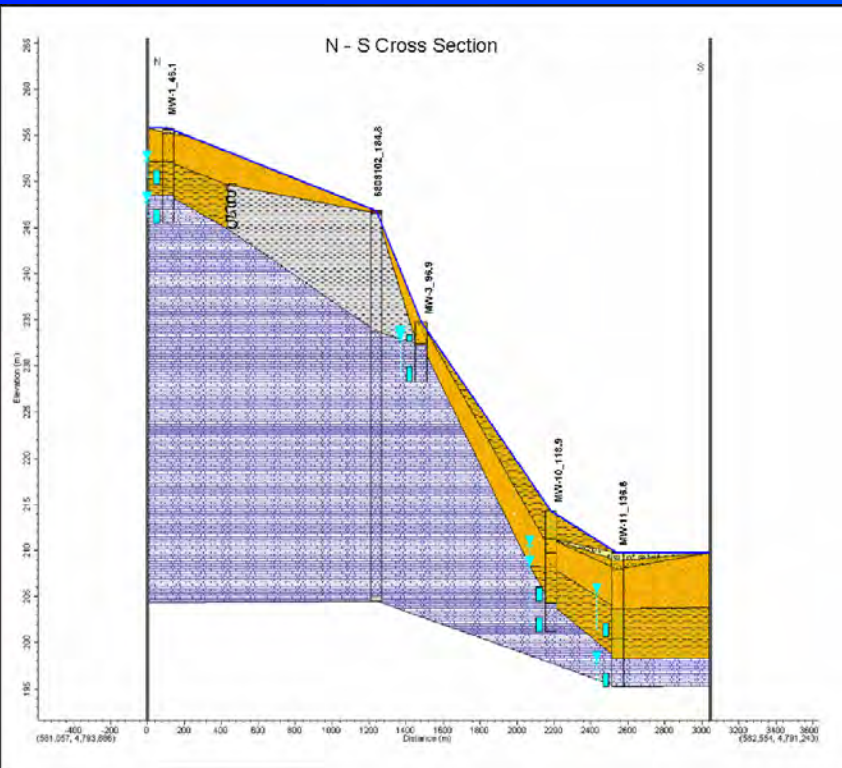
- The accompanying map illustrates the flow direction of groundwater below the surface together with the water table elevation within the RSA.
- Also shown are the locations of two hydrogeological cross sections (denoted as N – S and W – E).



GROUNDWATER RESOURCES

Hydrogeological Cross Section

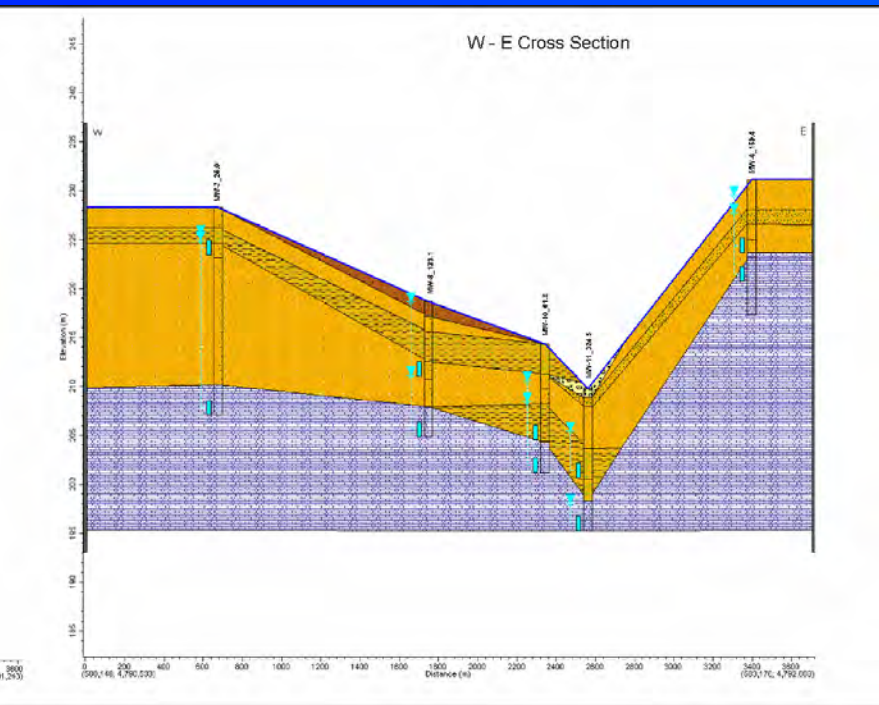
- The accompanying figure illustrates the geology and water table within the RSA



GROUNDWATER RESOURCES

Hydrogeologic Cross Section

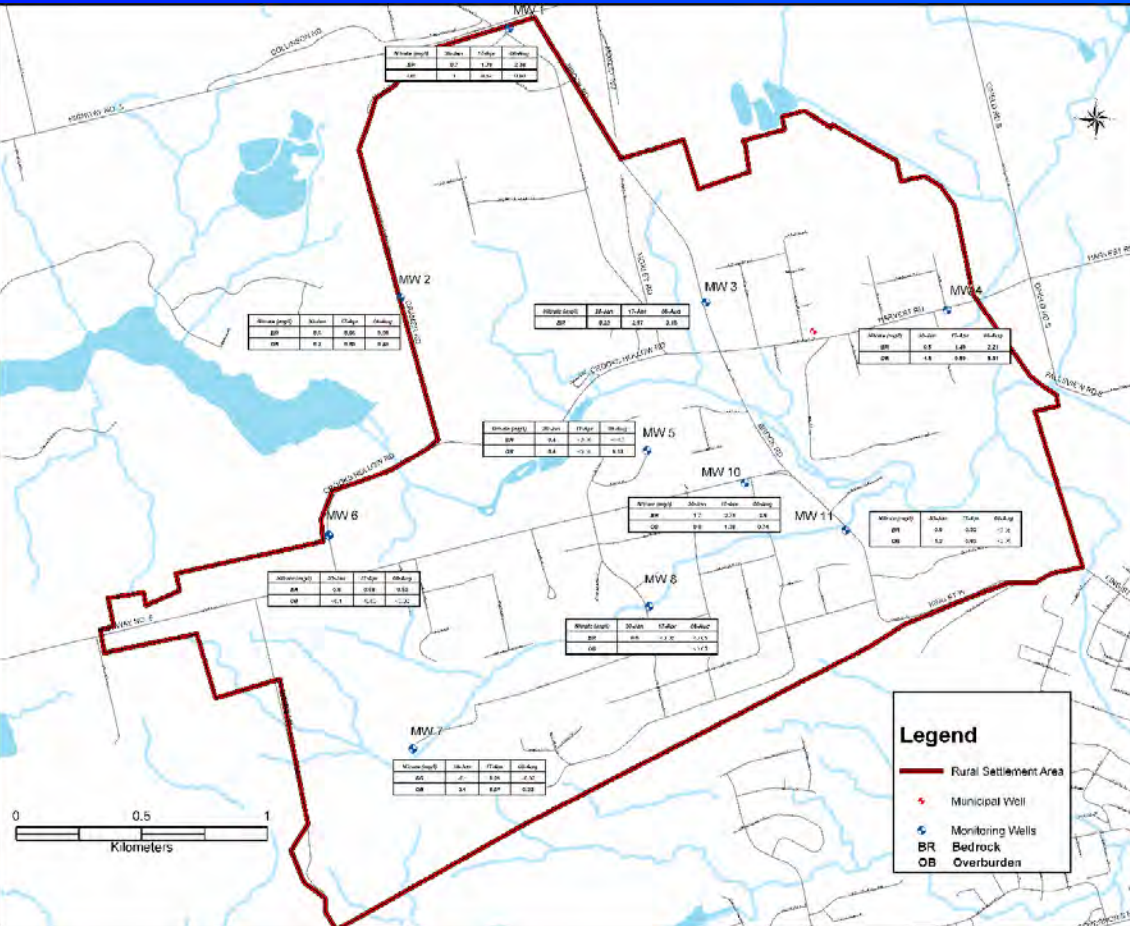
- The accompanying figure illustrates the geology and water table within the RSA



GROUNDWATER RESOURCES

Field Program

- A total of 10 wells were drilled into the ground at representative locations
- Groundwater levels, quality and temperature were monitored.



SUMMARY OF KEY FINDINGS

Terrestrial Resources

- Abundant natural heritage features – ANSI's, PSW's, ESA's – 30% of watershed
- Limited natural features within the RSA, except Christie Mills and Escarpment lands
- Significant portions of natural heritage features are in private ownership

Aquatic Resources

- Mid Spencer Creek supports a diverse warm/cool water fish community
- Christie Mills Reservoir supports a warmwater fishery
- Intermittent tributaries provide limited seasonal fish habitat

Groundwater Resources

- The groundwater flow direction is from north to south
- There are two aquifers; a shallow overburden aquifer and deeper bedrock aquifer
- A majority of the wells (85%) are located in the deeper bedrock aquifer
- The groundwater table, at a given location, fluctuates throughout the year
- The groundwater monitoring program suggests that groundwater quality in both aquifers is good. The one exception would be at MW4 in the shallow overburden well.



SUMMARY OF KEY FINDINGS

Surface Water Resources

- Water quality in streams fair to good – nutrient enrichment, high nitrates and chloride, low trace metal levels
- Hydrologic modeling of subwatershed completed to characterize surface water – groundwater inter-relationships
- Floodplain mapping through Greenville updated to identify areas of flooding and undersized culverts

Stream Morphology

- Most Tributaries are ephemeral and/or intermittent, poorly defined
- Mid Spencer Creek is cobble-bed or bedrock controlled downstream of Christie Mills
- Mid Spencer Creek is low gradient with vegetated banks upstream of Christie Mills
- Main creek generally stable with limited evidence of erosion problems; tributaries within the Rural Settlement Area are generally stable with only minor local/gradual adjustments;
- urban tributaries show some instability with minor erosion concerns.



NEXT STEPS

- Summarize and incorporate findings tonight's Open House
- Identify and evaluate alternative Subwatershed Management Strategies
- Hold a Second Open House (March 2008) in order to select a Preferred Strategy
- Prepare a report for general circulation

ANY QUESTIONS



Hamilton

Greenville RSA/Mid Spencer Creek

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Act for Clean Water Source Water Protection Issues

Hamilton-Halton Watershed Stewardship Program
(HHWSP)
of
Hamilton Conservation Authority and
Conservation Halton
Sheila O'Neal, Coordinator

Greensville Community Subwatershed Study & Act for Clean Water Public
Information Centre #1
Christ Church, 92 Highway #8
Flamborough, Ontario
November 21, 2007



HHWSP



Landowners Take Action for Clean Water

Background:

- 2004 – City of Hamilton and HHWSP – Septic Awareness Survey and Open Houses
- 2005 – Survey results recommendation:
Landowners should have their septic system treatment or holding tanks inspected every one or two years and pumped out every three to five years.
This is especially applicable to the community of Greensville where the highest number of older treatment/holding tanks was reported.



HHWSP





Landowners Take Action for Clean Water

Background:

- 2005 – Survey results recommendations:

Landowners should become familiar with signs of a failing septic system or leaching bed in order to identify when a treatment tank or leaching bed needs to be replaced.

This is especially applicable in Greenville where the highest number of leaching beds between the ages of 25 and 50 was reported.





Clean Water Act

- 2006 - Clean Water Act is part of the Ontario government's commitment to implement all of the recommendations of the Walkerton Inquiry.
- For the first time, communities will be required to create and carry out a plan to protect the sources of their municipal drinking water supplies.
- The source protection process includes identifying drinking water threats, assessing the risk of those threats, preventing threats, and monitoring remaining threats.



HHWSP



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Ministry of the Environment Funding for Education and Outreach

City of Hamilton as lead partner with the HHWSP will be offering:

- Open houses in four municipal well areas and one in the intake protection zone
- Presentations on Septic System Management
- Septic Tanks Pumped - Raffle
- Informational brochures
- Providing Well Aware and Septic System Management DVDs to local libraries
- On-site visits to some landowners in 100 m radius zone



HHWSP



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Raffle Tonight

- Two landowners in the Flamborough area will win a free pump out of their septic tank from:

Rankin's Septic Tank Pumping and Environmental Services

- Winners will invite a neighbour or two to come and learn the importance of septic system maintenance – demonstration opportunity



HHWSP

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Ministry of the Environment Funding Coming Soon

To landowners of properties:

- within 100 m radius of a municipal well
- within 200 m radius of a municipal surface water intake

Examples of this funding are:

Water Well Decommissioning and Upgrading –
50% up to \$6,000

Septic System Inspections and Upgrades – 50% up
to \$10,000 and up to \$20,000 for advanced systems

Runoff and Erosion Protection – 50% up to \$20,000



HHWSP

City of Hamilton Funding Available Now

For Landowners in the City of Hamilton to:

- Decommission their Abandoned Water Wells
- 100% of the cost up to \$1,000 with a limit of 2 wells per property

An abandoned well that is not properly filled, sealed and capped poses risks such as a safety hazards for children and animals and it provides a route for contaminants to enter groundwater reserves. Protect yourself, your family and neighbours by properly decommissioning your well.



HHWSP



At Home Solutions for your Onsite System



Greenville Source Water
Protection Open House

November 21, 2007

Katherine Rentsch, P. Eng.

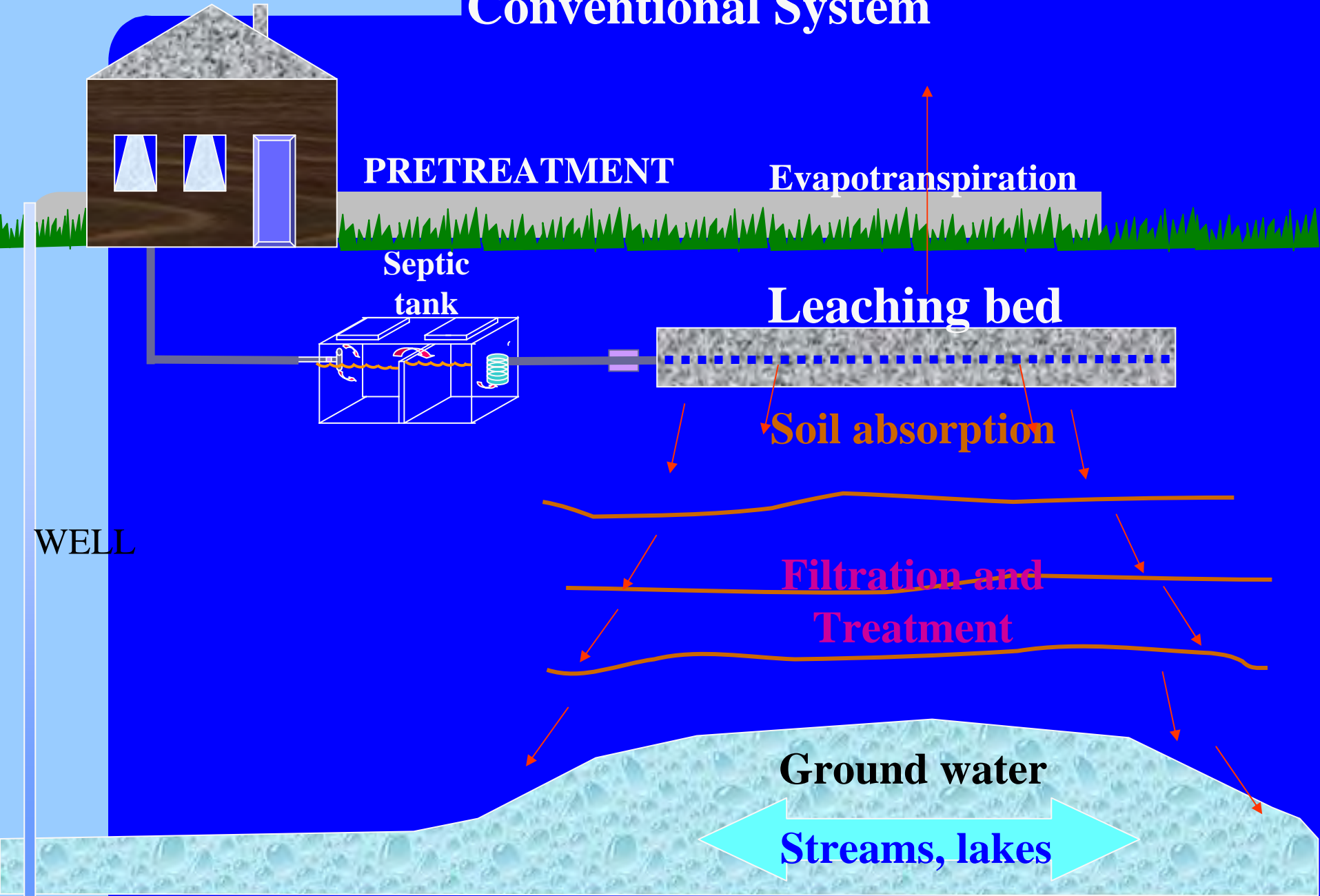
Today's Topics

- Review Basics of Onsite Systems
- Operation & Maintenance – Do's & Don'ts
- How to assess the health of your system
- What to do in case of Failure
- Reinspection Programs

Current Situation

- most rural residences serviced by on-site systems
- ~ 1 million of these in province
- About 30% of Province serviced by onsite systems
- Discharge about 100 billion L/yr to environment
- Last approximately 25 – 30 years

Basic Operation of a Conventional System



Reasons for Concern

- Once systems are in place, they are largely unmanaged and unmonitored
- Reaction to failure, if known, is the responsibility of the owner
- Most studies of existing systems show a high % of failures (30-60%)

Operation & Maintenance Do's

- Pump your tank – 1/3 full of solids (OBC) or every 2 – 5 years
- Practice good water use habits – try to conserve, spread out your flows, only do one load of laundry per day & check for leaks
- Use an effluent filter – clean it every 6 months
- Check your bed for breakout once a year
- If repair is required, get a permit and use a licensed contractor

Operation & Maintenance – Don'ts

- Don't flush things like paint or solvents down the drain
- Limit use of anti-bacterial cleaners, toilet pucks etc.
- Protect your bed: no trees, no driveway, no ice rink!
- Divert surface water (e.g. roof drains) away from the leaching bed
- Don't hook the sump pump into the septic tank
- Don't use garburators
- Don't change the use of your home without considering the impact on your onsite system

System Failed after 25 years of use



System Failed Due to Poor Design



Potential Impacts of Impaired Systems

- Contamination of ground and surface waters
- Contact with sewage can lead to
 - E. coli
 - Hepatitis
 - Baby blue syndrome (due to excess nitrate)
- Algal blooms in surface water – blue green algae outbreaks in Ontario & Quebec
- Who has had their well tested lately?

Assessing the Health of your System

- Signs and Symptoms that your system may be failing include:
 - Slowing drains, or sewage back up into the house
 - Odour in the vicinity of the leaching bed
 - Wet or mushy areas in the leaching bed
 - Unusual striping, lush grass or patchy growth in the leaching bed

In Case of Failure

- Call a licensed sewage hauler or installer
- If you have breakout in your bed, get it looked after immediately
- Systems rarely fix themselves
- Fence or rope off the area of breakout to keep kids and pets away from the area



Reinspection Programs

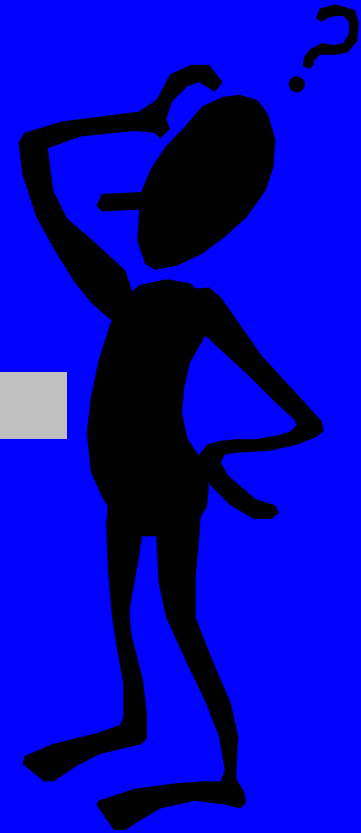
- Formal programs established by municipality or Part 8 delivery agency to periodically inspect existing onsite systems
- Clean Water Act makes provision for future regulations for reinspection programs
- 23 municipalities across Ontario have initiated their own programs
- Will promote better management of onsite systems with respect to source water protection

Summary

- On-site systems can and do provide cost effective treatment for many years
- the homeowner is responsible for ensuring the system works properly
- proper care and maintenance of your on-site system will help to ensure adequate treatment before it becomes drinking water.
- Be Aware

Questions?

- For more information, visit our website at www.orwc.uoguelph.ca
- Email me at krentsch@uoguelph.ca
- Ontario Onsite Wastewater Association – www.ooowa.org



Appendix M-1-6

Public Information Centre #1

Agency / Public Communications

November 2007

GREENSVILLE COMMUNITY SUBWATERSHED STUDY

PUBLIC INFORMATION CENTRE #1 SUMMARY REPORT

November 21, 2007
Christ Church, 92 Highway #8
Hamilton, Ontario



Hamilton
Public Works

This public information centre (PIC) summary was prepared by Lura Consulting. Lura is providing third-party public consultation services as part of the Greensville Community Subwatershed Study. This summary captures the key discussion points from the November 21, 2007 PIC #1. It is not intended as a verbatim transcript, and is subject to review by PIC participants. If you have any questions or comments regarding the summary, please contact:

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Public Works Department
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F: 905.546.4491
greensvillestudy@hamilton.ca

Dave Maunder, P.Eng.
Project Manager
Aquafor Beech Ltd.
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maunder.d@aquaforbeech.com

Susan Hall
Senior Consultant
Lura Consulting
P: 416.410.3888 x.3
F: 416.536.3453
shall@lura.ca



GREENSVILLE COMMUNITY SUBWATERSHED STUDY PUBLIC INFORMATION CENTRE #1: SUMMARY REPORT

NOVEMBER 21, 2007, 5:00-9:00 P.M.
HAMILTON, ONTARIO

1. ABOUT THE GREENSVILLE COMMUNITY SUBWATERSHED STUDY

The November 21st Public Information Centre (PIC) was the first PIC hosted by the City of Hamilton Water & Wastewater Division to receive feedback from the public as part of the Greensville Community Subwatershed Study. Specifically, PIC #1 was designed to provide a forum for community members to learn about the project, clarify their interests and potential concerns, meet members of the Project Team, and provide input about their concerns and interests related to the project.

This summary report focuses primarily on the feedback and comments made by the meeting participants. It provides a high level summary of the key presentation points, group discussions and feedback received following the PIC.

Approximately 160 people attended PIC #1, including City staff, members of the Project Team, members of local community groups, and members of the general public. The PIC agenda is attached as Appendix A and the list of participants who registered is included in Appendix B.

2. ABOUT THE PROJECT TEAM

The Project Team is being lead by the City of Hamilton Water and Wastewater Division, with input from the City Planning Department and other departments as needed. The consultant team for the project is being lead by Aquafor Beech Ltd., a local engineering and environmental services firm with expertise in watershed planning, environmental restoration, stormwater management, fluvial geomorphology, environmental assessment/permitting, water resources engineering and municipal infrastructure design. Additionally, the Project Team includes Waterloo Hydrogeologic Inc., The Planning Partnership, and Lura Consulting, whose role is to facilitate the public consultation component of the project, including the organization of PICs.

3. PIC #1 FORMAT

The PIC was organized into three segments: an open house, a presentation and a workshop. Each segment is described below.

OPEN HOUSE. The open house began at 5:00 p.m. Boards explaining the Greensville study were provided and Project Team staff were available to answer questions and receive feedback. As well, displays and representatives from the following organizations were available to provide information about septic systems, water quality, the Clean Water Act and related topics: Hamilton-Halton Watershed Stewardship Program, Halton-Hamilton Source Protection Region and Ontario Rural Wastewater Centre. Participants were free to walk around the hall and read the project boards and displays, speak to City and other Project Team representatives, and speak to the community groups present.

PRESENTATION. The presentation segment of the evening began at 7:00 p.m. The presentations are described in more detail in Sections 4 and 5 below. In addition to the presentations about the Greensville Subwatershed Study specifically, two presentations were made by members of local conservation organizations. The presenters shared information and expertise about wastewater, septic systems and water conservation to help provide residents with the tools they need to maximize the efficiency and health of

their water, wastewater and septic systems. The complete PowerPoint presentations are available on the Greensville project website at <http://www.hamilton.ca/greensville>.

WORKSHOP. Following the presentation, participants were asked to stay to participate in the workshop. Individuals formed small groups and discussed the questions posed in the workshop booklets that were handed out upon arrival. Those who did not stay for the workshop were invited to fill out a booklet either at the event or at home and mail it in. Due to a shortage of booklets, participants were instructed to visit the website to download a booklet if they wished to submit their comments following the PIC. After discussing their issues and the booklet questions, group members submitted a group workshop booklet that represented the group's collective concerns. As well, individuals submitted their feedback via their individual booklets.

4. PRESENTATION WELCOME AND OPENING REMARKS

Elizabeth Panicker, City of Hamilton

Elizabeth Panicker welcomed participants to the meeting and thanked them for coming. She briefly explained the purpose of the PIC, which was to present existing conditions information, clarify the interests and concerns of interested parties, and obtain feedback about the study. Ms. Panicker also described the format of the evening.

Susan Hall, Lura Consulting, Facilitator

Ms. Hall welcomed participants and explained that Lura Consulting has been retained to assist the City and the consulting team with the public consultation and communications component of this project. She reviewed the agenda and indicated that copies of the agenda and workshop booklet would be made available for participants following the meeting. Ms. Hall explained that there would be several presentations and that time would be permitted for questions, answers and comments.

5. OVERVIEW PRESENTATION

The consultant team, lead by project manager Dave Maunder of Aquafor Beech, began the presentations by providing an overview of the Greensville Subwatershed Study.

Mr. Maunder began with an overview of the Subwatershed Study's goals and objectives:

- **Study Goal.** "to protect, maintain and enhance the ecological processes, functions and significant natural features of the area, providing a framework through which future growth may be established and undertaken in a manner which is environmentally sound and socially and economically sustainable."
- **Study Objective.** To provide a basis for the protection, maintenance and enhancement of surface water and groundwater quality.

Mr. Maunder stated that the resulting plan will provide recommendations as to where and how future development activity can safely occur so as to minimize flood risks, stream erosion, degradation of water quality and negative impacts on natural systems, including groundwater.

As Mr. Maunder explained, PIC #1 corresponds with the second step in the study process, *Determination of Existing Conditions*, which included field and technical studies. (The first step involved background data collection and interpretation.) The next step will be to formulate and evaluate alternative management strategies for the area. After a preferred alternative has been selected, a second PIC will be held to inform

the public about the alternatives and receive feedback to help select a preferred alternative. Then the draft and final reports will be prepared.

At this point in the project, background data collection and existing conditions analysis have been completed. As Mr. Maunder explained, the scope of the data collection and existing conditions assessment included the following:

- Groundwater (hydrogeology)
- Surface Water (Flooding, erosion)
- Aquatic Resources (fisheries)
- Terrestrial Resources (plants, animals, amphibians and birds)

Water well records, geology and soils maps were reviewed to characterize the groundwater system within the Greenville Rural Settlement Area (RSA). In addition, a total of 10 wells were drilled into the ground at representative locations within the RSA in order to assist in the characterization. Groundwater levels, quality and temperature were monitored.

The presentation map illustrated the flow direction of groundwater below the surface together with the water table elevation within the RSA. Also shown were the locations of two hydrogeological cross sections. These graphics are provided in Mr. Maunder's presentation, which is available online at the City's Greenville project website (see website addressed noted above).

To conclude his presentation, Mr. Maunder summarized the key findings of the existing conditions analysis as follows:

Terrestrial Resources

- Abundant natural heritage features – ANSI's, PSW's, ESA's –30% of watershed
- Limited natural features within the RSA, except Christie Mills and Escarpment lands
- Significant portions of natural heritage features are in private ownership

Aquatic Resources

- Mid Spencer Creek supports a diverse warm/cool water fish community
- Christie Mills Reservoir supports a warm water fishery
- Intermittent tributaries provide limited seasonal fish habitat

Groundwater Resources

- The groundwater flow direction is from north to south
- There are two aquifers; a shallow overburden aquifer and deeper bedrock aquifer
- A majority of the wells (85%) are located in the deeper bedrock aquifer
- The groundwater table, at a given location, fluctuates throughout the year
- The groundwater monitoring program suggests that groundwater quality in both aquifers is good. The one exception would be at MW4 in the shallow overburden well.

Surface Water Resources

- Water quality in streams fair to good –nutrient enrichment, high nitrates and chloride, low trace metal levels
- Hydrologic modeling of subwatershed completed to characterize surface water –groundwater inter-relationships
- Floodplain mapping through Greenville updated to identify areas of flooding and undersized culverts

Stream Morphology

- Most Tributaries are ephemeral and/or intermittent, poorly defined
- Mid Spencer Creek is cobble-bed or bedrock controlled downstream of Christie Mills
- Mid Spencer Creek is low gradient with vegetated banks upstream of Christie Mills
- Main creek generally stable with limited evidence of erosion problems; tributaries within the Rural Settlement Area are generally stable with only minor local/gradual adjustments;
- Urban tributaries show some instability with minor erosion concerns.

As Mr. Maunder explained, the next steps in the project will be to summarize and incorporate findings from the PIC and identify and evaluate alternative Subwatershed Management Strategies.

6. SOURCE WATER PROTECTION ISSUES: PRESENTATION #1

The second presentation at PIC #1 was given by Sheila O'Neal, Hamilton-Halton Watershed Stewardship Program (HHWSP) .. She was the first of two speakers who were invited to speak about source water protection issues as a means of providing valuable educational information, particularly about septic systems and well water decommissioning, to area residents.

Ms. O'Neal provided a brief overview of source water protection and well decommissioning in Ontario in the last 15 years. Of particular relevance to the Greensville community are the activities of Hamilton Conservation Authority through the HHWSP and the provincial Clean Water Act.

Since 2003, the HHWSP, along with the City of Hamilton and other partners, has been operating the Decommissioning Abandoned Water Wells Program. In 2004, a Septic Awareness Survey and Open Houses were conducted and two key recommendations resulted. These are summarized below, along with their relevance to the Greensville community:

- Landowners should have their septic system treatment or holding tanks inspected every one or two years and pumped out every three to five years. This is especially applicable to the community of Greensville where the highest number of older treatment/holding tanks was reported.
- Landowners should become familiar with signs of a failing septic system or leaching bed in order to identify when a treatment tank or leaching bed needs to be replaced. This is especially applicable in Greensville where the highest number of leaching beds between the ages of 25 and 50 was reported.

In 2006, the Ontario government passed the Clean Water Act as the government's commitment to implement all of the recommendations of the Walkerton Inquiry. For the first time, communities will be required to create and carry out a plan to protect the sources of their municipal drinking water supplies.

As such, the City of Hamilton (lead partner) and the HHWSP will be offering:

- Open houses in four municipal well areas and one in the intake protection zone
- Presentations on Septic System Management
- Septic Tanks Pump out - Raffle
- Informational brochures
- Providing Well Aware and Septic System Management DVDs to local libraries
- On-site visits to some landowners in 100 m radius zone

Ms. O'Neal explained that two landowners in the Flamborough area would be in the inaugural winners of the first free pumping of their septic tank from Rankin's Septic Tank Pumping and Environmental Services. In the interest of knowledge sharing and community building, the winners would invite a

neighbour or two to come and learn the importance of septic system maintenance – demonstration opportunity. The winners was announced following the presentations.

Ms. O’Neal noted that Ministry of the Environment funding would be available shortly to landowners of properties within 100 m radius of a municipal well or within 200 m radius of a municipal surface water intake to decommission or upgrade wells. The funding details are provided in the presentation slides available on the City’s website noted above.

Ms. O’Neal concluded the presentation with a reminded of the safety and water quality hazards of well systems that are abandoned and not properly maintained.

7. SOURCE WATER PROTECTION ISSUES: PRESENTATION #2

Katherine Rentsch of the Ontario Rural Wastewater Centre made the second presentation related to source water protection issues. The focus of the first part of her discussion was “At Home Solutions for Your Onsite System.”

Ms. Rentsch began with an overview of the basics of onsite systems, including the components (e.g., leaching bed) and basic operation. She noted that most rural residences are serviced by on-site systems and that there are over a million of such systems in Ontario (or 30% of the province). These systems discharge about 100 billion L/yr to the environment and generally last about 25 to 30 years.

Septic systems should be of concern to residents, Ms. Rentsch noted, for several reasons including: Once systems are in place, they are largely unmanaged and unmonitored

- Reaction to failure, if known, is the responsibility of the owner
- Most studies of existing systems show a high % of failures (30-60%)

To assist well-owners to make informed decision, Ms. Rentsch explained how the Ontario Rural Wastewater Centre could help and provided some operation and maintenance tips. The full list of tips can be found in the presentation slides on the City’s website noted above. To help explain why these tips should be followed, Ms. Rentsch discussed the potential impacts of impaired systems, including groundwater contamination and its effect on human health. She provided a list of signs to look for to assess the health of systems and explained what to do in case of failure.

For the second part of her presentation, Ms. Rentsch focused on private well testing and maintenance. She began by noting that 3 million Ontarians rely on groundwater for their water supply (private and municipal supply) and that many of these people are not testing their wells regularly for bacteria and few are testing for anything beyond the Ministry of Health complimentary bacterial test. Not surprisingly, many wells have levels of bacteria and/or nitrogen above drinking water standards.

To help well owners better care for their systems, Ms. Rentsch provided a list of well maintenance tips, which are available in the presentation slides posted on the City’s website. As well, she explained why it is important to decommission wells properly and how well maintenance relates to source water protection. In conclusion, Ms. Rentsch provided an overview of the Well Aware Program and provided resources that people could contact for more information.

8. PARTICIPANT FEEDBACK

This section provides an overview of the feedback received from participants at the PIC and through written comments following the PIC. This summary is a collection of comments obtained following the presentations, from table discussions, and from individual feedback provided through workbooks.

General Questions, Comments and Concerns:

Immediately following the presentations, and prior to commencing the small table discussions, Susan Hall asked participants if they had any questions or comments directly related to the presentation. The following identifies the participants' area of concern and response provided.

Q1: Is the City going to put future development on hold? Does that include current applications?

Response: City Planner replied that he was not aware of any current applications in the area and that the Greenville study is not a precursor to a planned development. Rather, it is a study to develop a preferred management strategy for the area, with the interest of protecting water resources to the extent possible.

Q2: Will neighbouring areas be affected by the study?

Response: Neighbouring areas outside of Greenville are not in the catchment area and would need to undergo their own studies.

Q3: Were nitrate levels measured in data collection?

Response: Mr. Maunder noted that nitrates can affect drinking water potential and result in blue baby syndrome. He noted that in the next phase of the study, they will sample other parameters.

Q5: What were the depths of borings for the test wells?

Response: Mr. Maunder stated that 10 test wells were drilled and that the depths varied depending on location; some locations had to go deeper than others to get appropriate testing.

Q6: Why does HHWSP funding only apply to homes near municipal wells?

Response: Ms. O'Neal noted that since it is the first year of program and funding is limited, the decision was made to begin with those residences. In time, as the program grows, additional residences are expected to be added.

Q7: How do you know when your septic system is ready to be pumped?

Response: Ms. Rentsch replied that you should have your system pumped when it is 1/3 full; every 2-5 years; when sewage is backing up into your house; when there is odour near the leaching bed; when you see wet, mushy areas near the bed; or when you see patchy growth of grass. She recommended that landowners call contractors to have an assessment done.

Q8: How bad are toilet pucks for septic systems?

Response: Since they usually contain bleach, Ms. Rentsch said that some pucks are bad because you're adding bleach slowly to your septic. Everyday bleach use (e.g., Tide) is not good for the systems.

Q9: What's the alternative to putting laundry water down septic system?

Response: Ms. Rentsch suggested spreading your laundry loads out over time so that the system is not overloaded all at once. Septic systems can absorb better over a week than all in one day.

Q10: What is your opinion on septic additives?

Response: Ms. Rentsch said that no independent research has been conducted to verify manufacturing claims that they work. She doesn't think we need to add more bacteria. If you do use an additive, she says to use an Environment Canada approved product.

Q11: Who does system testing?

Response: Ms. Rentsch replied that haulers, home inspectors and some cities do testing but she was unsure of Hamilton's policy. She said whoever is issuing system permits would likely send out staff to inspect. Her understanding is that City of Hamilton is not doing that.

Q12: Can you explain more about when to be concerned about lawn striping?

Response: Ms. Rentsch said that sandy soils in summer can be striped. Striping in wetter parts of the year or in winter is of greater concern because it means that water is not getting away from pipes.

Q13: Is 2-ply or 1-ply tissue better for septic systems?

Response: Ms. Rentsch said that she was not aware of any studies proving that one is better than the other for septic systems. She added that baby wipes don't biodegrade and thus should not be flushed.

Q14: Comment about septic beds and that the presentation should be made to the tax assessment board. Since the City isn't doing anything, it should be reflected in the taxes.

9. WORKSHOP BOOKLET QUESTIONS

QUESTION 1: WHAT FEATURES, RESOURCES OR ELEMENTS DO YOU VALUE IN THE GREENSVILLE SUBWATERSHED?

Ten responses to the first question were submitted by workshop participants. The responses indicate that the features, resources and elements of value to the participants include the following:

- rural setting
- clean (no chemicals) and uncontaminated (bacterial) water for people and the wildlife
- unchlorinated water
- nature and wildlife amenities of Christie Falls
- birds, animals, nature, in general
- nature trails
- natural features of the Niagara Escarpment
- space for organic food saving
- waste disposal which doesn't degrade the ecology
- Crooks Hollow Dam and Christie Dam
- Sustainability
- My well/well water

QUESTION 2: SOME POTENTIAL ISSUES THAT HAVE BEEN IDENTIFIED IN THE GREENSVILLE SUBWATERSHED ARE LISTED BELOW. PLEASE RANK EACH ISSUE WHICH IS IMPORTANT TO YOU ON A SCALE FROM 1 TO 5 (1 - MOST IMPORTANT, 5 – LEAST IMPORTANT). TELL US WHY THIS ISSUE IS IMPORTANT TO YOU.

For this question, participants were asked to rate issues on a scale from "most important" to "least important." The number of responses per issue varied. Not all respondents rated all issues. A list of the issues and a summary of the number of responses received for each is provided in the table on the following page.

QUESTION 3: WHAT RECOMMENDATIONS (IF ANY) DO YOU HAVE TO ADDRESS THE KEY ISSUES YOU'VE IDENTIFIED AS IMPORTANT?

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Respondents provided a range of responses to this question. Generally, the responses can be grouped into the following categories. A brief description of the recommendation follows:

- **Development Control.** Suggestions included a moratorium/stop on development, development that minimizes pollution, and limiting new development to minimum 2 acre lots.
- **Open Process.** Ongoing dialogue with the Greenville community about the project and development planned in the area.
- **Access to Data.** Make groundwater data (historical and current) available to the public.
- **Recording of Data.** Home owners keep a log of well water levels and provide this information to the Ministry of the Environment annually.
- **Limits on Water Bottlers.** Limits on the activities of water bottling companies in the watershed and north of the project area.
- **Municipal Water.** Installation of municipal water systems.
- **Quarries.** Suggested looking at the effects of quarry water use on surrounding area.
- **Promotions.** Promotion and subsidization of low flow toilets and shower heads.
- **Maintenance/Operation Assistance.** Assistance with installing backup water cisterns and digging deeper wells. The form of assistance (e.g., financial, informational) was not specified.

QUESTION 4: WHICH RECOMMENDATIONS (IF ANY) WOULD YOU BE WILLING TO IMPLEMENT?

Respondents indicated that they would be willing to implement a variety of actions towards their recommendations. These include the following:

- Participate on the Community Liaison Committee
- Upgrade their septic system
- Drill a new deeper well
- Install municipal water
- Provide information/data to the Ministry of the Environment for tracking purposes
- Lobby local councillor and health department regarding development limits
- Install low flow shower heads and toilets (respondent has done this already)

	Most Important	Somewhat Important	Important	Not Very Important	Least Important	Don't Know	
Quality of water for domestic consumption	15	4	0	0	0	0	-simply water fit -important resou -can be treated -health, econo -health, person -life
Quantity of water for domestic consumption	16	1	0	0	0	0	-no water, no li -property drain -health, person -life -well becoming
Erosion and sedimentation of watercourses	6	3	6	1	0	0	-I cannot impa -property drain -health, person -environmenta
Private property flooding/erosion	4	5	3	2	2	0	-I don't think t -property drain -health, person
Stormwater management	6	2	5	0	2	0	-I don't think t -Property drain -health, person
Development impacts to well water quality	15	3	2	0	0	0	-Need to ensur -properties first -health density -health, person -have gone dry
Development impacts to well water quantity	15	3	0	0	0	0	-Need to ensur -properties first -health, person
Groundwater recharge/wells running dry	13	1	1	0	0	0	-neighbours us -conditions (wat -No water! -health, person
Well contamination from urban runoff (e.g., streets, roofs, lawn pesticides)	10	3	2	0	1	0	-I don't think t -(2) health
Well contamination from agricultural runoff	10	4	1	0	1	0	-I don't think t -Runoff -Health
Watercourse contamination from suburban development	10	2	4	0	1	0	-Septic system

	Most Important	Somewhat Important	Important	Not Very Important	Least Important	Don't Know	
Watercourse contamination from agricultural practices	8	5	2	0	1	0	- health
Groundwater contamination from existing septic systems	11	4	1	0	1	0	- (2) health con
Groundwater contamination from upstream aggregate quarries	8	3	2	1	1	0	- quality of life
Loss of riparian and stream habitat	8	5	1	1	1	0	- quality of life
Loss of natural stream functions	11	4	1	0	1	0	- impact to mai
Sustainability of municipal water supply	9	1	3	0	2	0	- n/a we are on - Does not affe - Don't want m

QUESTION 5: WHAT DO YOU SEE AS THE BARRIERS TO IMPLEMENTING THE RECOMMENDATIONS YOU SUGGESTED IN QUESTION 3?

Respondents indicated several barriers to implementing their recommendations:

- politics/lack of political will/overcoming political interest in businesses over individuals
- City of Hamilton/City Council
- developer lobbying/pressure on Council and City staff
- protest by local industry/quarry operations
- urban sprawl
- cost/lack of funds
- lack of unity among residents
- lack of professional help
- regulations and inspections needed

QUESTION 6: WHAT TOOLS OR INFORMATION DO YOU NEED TO HELP YOU IMPLEMENT YOUR RECOMMENDATIONS?

Only 5 responses to this question were received. These respondents indicated they needed the following forms of assistance and tools:

- information about best location and depth to drill new wells
- a reporting system – possibly via web, for homeowners to report to the Ministry of the Environment
- more information on water quality
- McMaster Professors (respondent was not specific about how professors could be involved)
- help installing backup water cistern in basement and with drilling a deeper well
- municipal assistance

QUESTION 7: DO YOU HAVE ANY LOCAL INFORMATION OR DATA THAT YOU BELIEVE WOULD BE USEFUL FOR THE GREENSVILLE SUBWATERSHED STUDY?

The responses received to this question included notes about available data, suggestions and comments about personal circumstances:

- Data: EAs (Steeley Landfill) and hydrogeological studies; a report examining the water resources of the Greenville area prepared by Gartner Lee sometime in the 1970s
- Suggestion: do something with the Crooks Hollow Water Reservoir (e.g., replace the dam, keep water in reservoir all year, stock with fish)
- Suggestion: check with the former G.A.S.P Association of Greenville
- Personal Circumstance: well is gradually running dry

ADDITIONAL COMMENTS:

The additional comments received included a series of questions and comments, as listed below.

Questions:

- 1) How many new wells have been dug in the area by local businesses?
- 2) Are there regulatory means to limit local businesses from taking too much water?
- 3) Why are we having such low levels in the past 3-5 years?

- 4) If the aquifer runs north to south and if the neighbour to the north runs their wash water into the stream between our properties should we be concerned?
- 5) What are the future plans for the area?
- 6) If we continue to experience summers of drought, what are the options?
- 7) Is there enough water in the aquifer for a deeper well?
- 8) Is a cistern my only other option?
- 9) Will City water be brought in and what kind of cost will this incur?
- 10) If there is a plan to install municipal sewers and/or water in the next 5-7 years, why do inspections on septic systems with resulting costs?

Comments:

- We have had to purchase water 3 times per year even though we have a well, cistern, and third holding tanks.
- There are only two people living at this house, and we conserve water diligently.
- Developers have huge resources and no consideration for residents. Developers have recontoured land, removed trees, added pavement and not planned for drainage, causing havoc on community. Complaints to City have gone unheard.
- New residents to Greenville have no restraint regarding water consumption and in the summer use automatic irrigation systems daily and pesticides. Neighbour's behaviour is appalling.
- Issues: Groundwater contamination from agriculture, quarries and domestic pesticide/septic systems
- Any future development must take into account the limited and finite supply of groundwater provided by the aquifer, especially since the city is not required to provide the community with municipal water.

APPENDIX A: AGENDA

Greensville Community Subwatershed Study & Act for Clean Water Public Information Centre #1

Wednesday, November 21, 2007

5:00 p.m. - 9:00 p.m.

Christ Church, 92 Highway #8
Hamilton, Ontario

AGENDA

Purpose of the Public Information Centre:

- *Introduce Greensville Community Subwatershed Study and the planning team*
- *Share ideas on issues, goals and objectives for the future of the subwatershed*
- *Share information on Septic System Management Awareness and the Clean Water Act*
- *Build awareness of the Abandoned Water Well Decommissioning Program, water conservation and other best management practices, and funding opportunities*

5:00 pm Open House

7:00 pm Welcome to Participants
Elizabeth Panicker, City of Hamilton

Meeting Purpose and Agenda Review
Susan Hall, Lura Consulting

7:05 pm Overview of the Greensville Community Subwatershed Study
Dave Maunder, Aquafor Beech
Question and Answer

7:20 pm Source Water Protection Issues
Sheila O'Neal, Hamilton Conservation Authority
Katherine Rentsch, Ontario Rural Wastewater Centre
Question and Answer

8:00 pm Workshop – Roundtable Discussions

8:55 pm Closing Remarks/Next Steps
Susan Hall, Lura Consulting

Raffle Draw

9:00 pm Adjourn

Act for Clean and Safe Source Water!

Septic System & Wells Questionnaire Summary

Greenville

1. Property Type

56% of respondents said their property is a subdivision lot.
38% said they live on a rural lot

2. Number of people residing in household

38% of the homes have 2 people living there
31% of the homes had 3 people living there

3. Roughly how old is your home

56% of the homes are 25-50 years old
19% of the homes are over 50 years old

4. How have you been informed about the operations and maintenance of your septic system?

23% of people learned from information they received when they purchased the property.
23% of people talked to neighbors to learn about their system.
38% of people learned from other areas including personal research, previous experience, and contractors

5. What type of septic system do you have?

All the houses have a conventional septic system (100%)

6. What is the approximate age of your septic system's treatment or holding tank?

50% of septic systems were 25-50 years old
10-25years and 1-10 years were both 25%

7. What type of leaching bed/tile bed do you have?

83% of homes have Conventional beds

8. How often is your septic system's treatment tank pumped out?

83% of owners pump their tank every 3-5 years

9. How often is your holding tank pumped out?

50% Never and 50% Unknown (only 2 responded)

10. How often is your effluent filter cleaned?

75% responded that they don't have an effluent filter. The remaining 25% responded Unknown.

11. From where does your household receive its drinking water?

80% of households get their drinking water from a private well

12. From where does your household receive its domestic water supply

94% of homes receive their domestic water from private wells

13. If you receive your water from a private well, is your well dug or drilled

75% of wells are drilled wells

14. Are there any private wells on your property that are no longer in use

91% of properties have no private wells not being used (8% did not know)

15. How often do you test your drinking water

23% of owners test their water 2 times a year,
23% of owners test their water annually
23% of owners have tested their water in the past three years

16. What do you test for

33% used the Health Lab Tests
33% specifically tested for ecoli and 22% tested for coli-forms in general

17. Would you be interested in attending locally held workshops about wells and septic systems

64% of attendees would be interested in attending a workshop

18. If you have an abandoned or unused water well on your property, would you be willing to have it decommissioned by a licensed well contractor

67% of respondents would not want the wells decommissioned

19. Would you be interested in having a septic system inspection

62% of people would be interested in having their septic system inspected

Appendix M-2-1

Greenville Community Liaison Committee Meeting #1

Term of Reference

October 2008



Hamilton

MID-SPENCER CREEK/GREENSVILLE RURAL SETTLEMENT AREA SUBWATERSHED STUDY COMMUNITY LIAISON COMMITTEE – TERM OF REFERENCE

THE STUDY

The City of Hamilton is undertaking the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed Study. The Subwatershed Study will set a management strategy for surface water (streams, stormwater), community servicing (water and septic) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the Greensville Rural Settlement Area (RSA). The City of Hamilton is committed to involving their citizens in projects and processes that contribute to and enhance their quality of life. Forming a Community Liaison Committee (CLC) will provide a forum where key stakeholders can be involved early and throughout the decision making process. The City believes the Agency and Ministry consultation entity established by Greensville Secondary Plan policy (the Technical Advisory Committee, TAC) further provides opportunity and structure to facilitate a formal community liaison component for the Study.

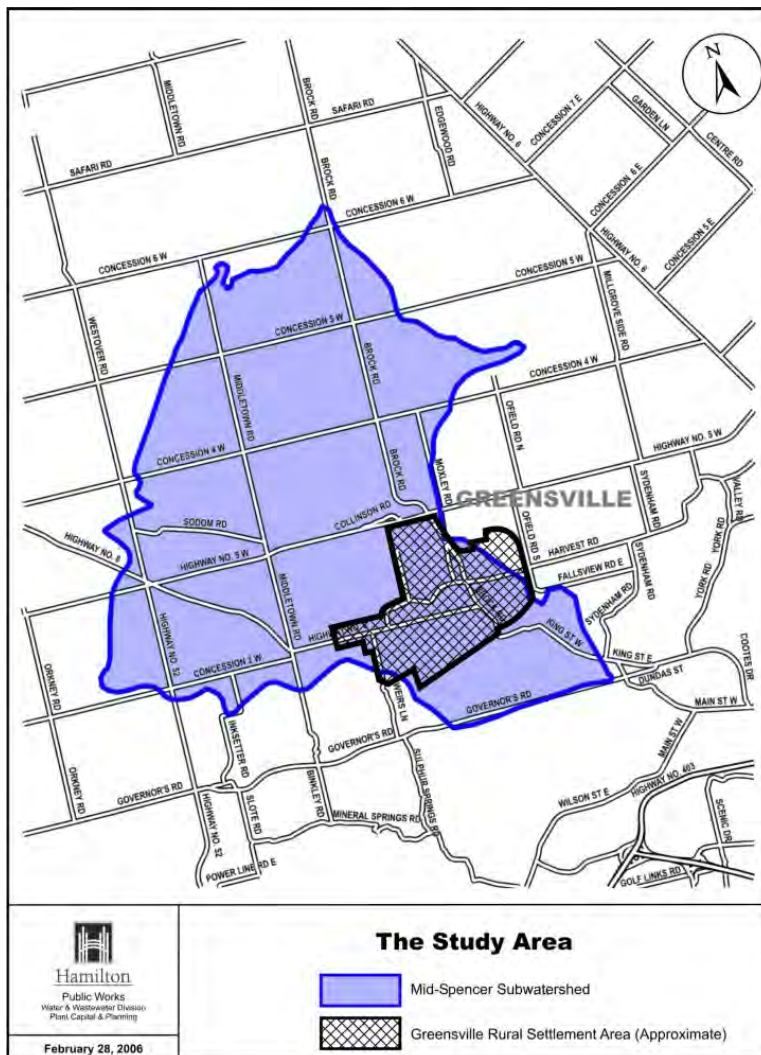


Figure 1 Study Area

PURPOSE AND MANDATE

The CLC has a consultative role and serves as a means to better facilitate community-sourced public input and dialogue. The CLC will solicit and encourage the timely exchange of topical information and views of the study's TAC and a representative cross-section of citizens, constituent organizations and local interests in the Mid-Spencer/Greenville Subwatershed area.

The CLC ensures that the interests, local knowledge, historical nuances and views of subwatershed landowners, residents and local organizations are properly acknowledged and represented in the decisions and assessments made through the study process. As importantly, the CLC provides peer review within the members' respective professional and personal knowledge for all aspects of the Study.

The CLC will provide advice and input on establishing overall goals, reviewing priorities and recommendations for study.

MEMBERSHIP AND STRUCTURE

Study area landowners and members of the business community, local organizations and service groups will be considered for membership. Persons with experience serving on similar committees, with demonstrated interests in community issues and/or knowledge of community planning are encouraged to express interest in participation.

Members will be selected by the City, drawn from a pool of applicants. CLC membership will be limited to 10-12 participants. Interested applicants are requested to complete the enclosed Request for Participants form.

CLC members are expected to serve for the full extent of the study.

FUNCTION AND RESPONSIBILITIES

The purpose of the CLC is to ensure a healthy flow of information between the TAC, the City and the constituents and organizations represented on the CLC. The TAC and the City will provide the CLC with timely and accurate information about project plans and activities. CLC members will serve as a sounding board for the TAC and the City, providing a representative cross-section of community views, concerns, and ideas on project plans and activities. The CLC will not be a decision making forum nor will it undertake to lobby a particular position, and the CLC should interact with the Study only through the TAC.

Specifically, the CLC will:

- ask questions and offer advice about the project;
- keep constituent organizations abreast of project plans, progress and activities;
- draw the City's and TAC's attention to issues that concern constituent organizations;
- convey community views, concerns, and wishes to the City and the TAC;
- offer the City and the TAC suggestions on how to enhance the project's benefits;
- provide feedback on project issues, as requested by the City and the TAC;
- provide input to the City and the TAC regarding future site uses; and;
- have access to technical experts involved in the project through, and with the agreement of the City and the TAC.

The principles of respect and accountability will guide the operations of the CLC. The CLC is mandated to provide the City and the TAC with a diverse range of views, questions, and concerns about the project. This requires an atmosphere of mutual respect for individual viewpoints, and for honest differences of opinion. Members are encouraged to express diverse opinions, but will be expected to demonstrate respect by listening attentively and using courteous language.

The CLC and its members will be accountable to the City and to the TAC, to its constituent organizations, and to fellow committee members.

MEETINGS STRUCTURE, AGENDA AND MINUTES

The CLC will meet on a regular basis throughout the term of the study at a frequency agreed to by its members and endorsed by its executive. It is anticipated that the CLC would have about 4-5 three hour long evening meetings during the study period. The first meeting is anticipated for late June 2007.

All members may contribute to a meeting's draft agenda which will be formulated, endorsed and distributed to all members by the CLC Chair 24 hours before each meeting.

Meeting minutes are to be recorded by the City/the Chair and distributed in draft form for review by the members present, with action items to be acknowledged by those responsible. Final minutes will be forwarded to the TAC Chair and study project manager for placement in the study and public record.

Appendix M-2-2

Greenville Community Liaison Committee Meeting #1

Newsletter

October 2008



Greensville Community Sub-Watershed Study Newsletter



September 2006

Welcome to the First Edition!

*WELCOME TO THE
GREENSVILLE
NEWSLETTER
FIRST EDITION !!!*

Greensville Community Study

The City of Hamilton has started a new study for the Greensville Community and the surrounding rural area. Officially the study is called the Mid-Spencer Creek/Greensville Subwatershed Study. We'll refer to it from now on as the Greensville Community Subwatershed Study.

In 1992, the Town of Flamborough created the land use planning requirements for the Greensville Community through the adoption of the Greensville Secondary Plan (Amendment No. 13 to the Official Plan for the Town of Flamborough). The Greensville Secondary Plan sets out land uses, densities of development, requirements for servicing for wells and septic systems, and other details. The Greensville Secondary Plan also requires that a servicing study be completed to determine how the area will be serviced when all the land is developed. The Greensville Community Subwatershed Study, when completed, will fulfill the requirements of the servicing study in the Greensville Secondary Plan.

Study Area

There's more to the Greensville Community Subwatershed Study than just servicing for development! The study area is shown on the map in this newsletter. It includes a lot of the rural area around Greensville - the Mid-Spencer Creek Subwatershed is the formal name. We've chosen to look at a bigger area because of the creeks and their location, the groundwater and aquifers that service Greensville, and the natural heritage features and linkages. The study, when completed, will provide a management strategy for surface water (creeks, storm water), servicing (groundwater and aquifer management, private wells, and the City's communal well), private septic system management, and a management strategy for the natural areas in and around the Greensville Community.

Duration of Study

This study is going to take approximately two years to complete. We and the Hamilton Conservation Authority believe its very important that we have the most up to date information on the creeks, the aquifer, wells, the soils, wildlife, and natural habitat. In order to do this, we will be out collecting field data in and around Greensville for several months. This will give us the best and most current picture of water, wildlife, and habitat in and around the Greensville Community.

We are working with a highly qualified team of consultants. The project team is lead by Aquafor Beech, a well experienced consulting team on water resources.

Contact us at any time during the study.

If you wish to be added to our mailing list in order to receive notices of Public Information Centres please contact us.

Here's how to reach us:

Chris Shrive, M.Sc., P.Ag.
Project Manager,
Water/Wastewater Division,
Public Works Department,
City of Hamilton
PH (905) 546-2424, Ext. 1233
greensvillestudy@hamilton.ca

City of Hamilton
Public Works Dept.

320-77 James
Street North
Hamilton ON
L8R 2K3

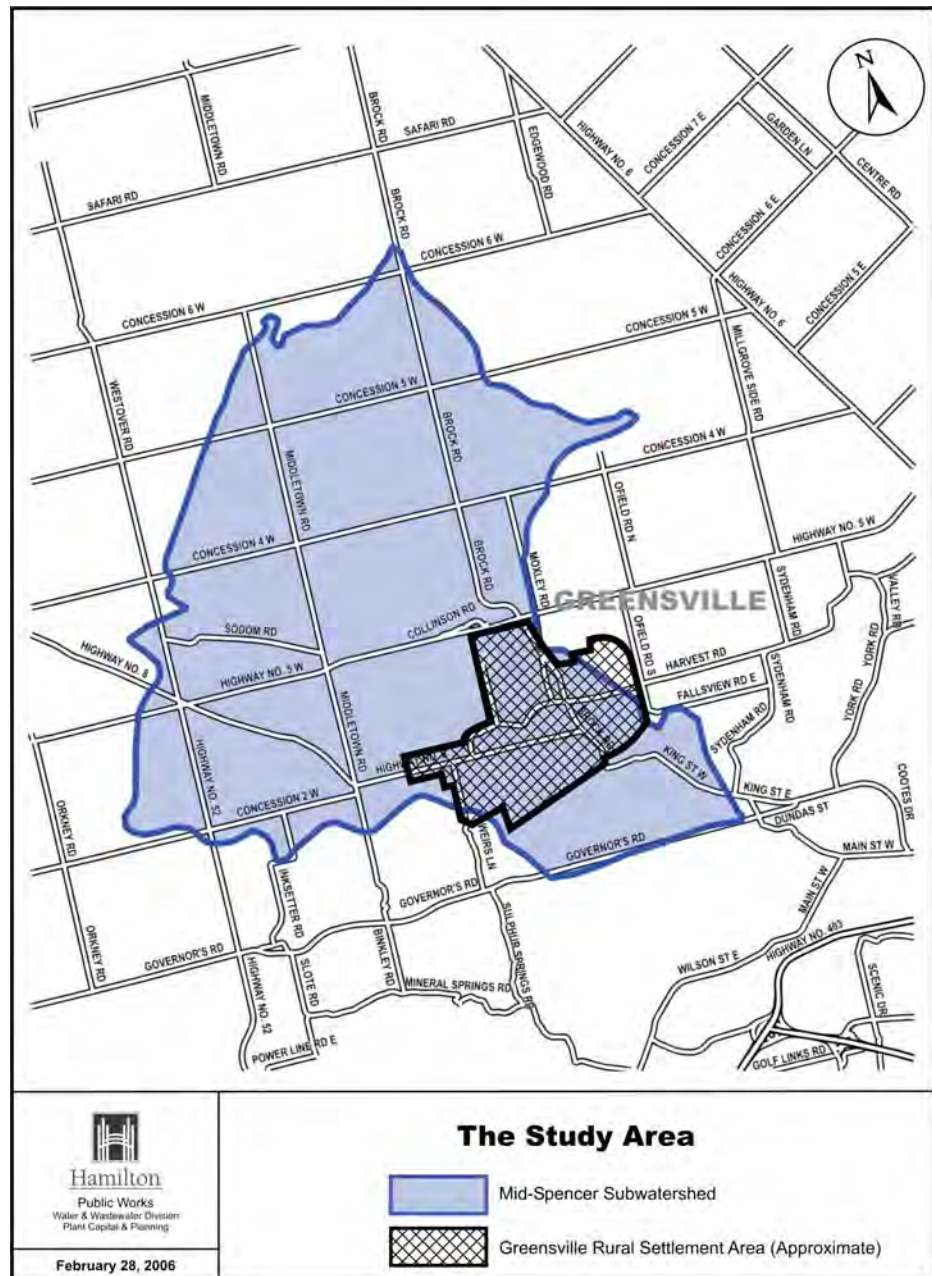
We're on the Web!
www.hamilton.ca/greensville



We Hope You Want to Stay in Touch ...

Because we want to hear from you. This is a very important study for the Greensville Community as it will be the basis on which development goes ahead in Greensville. Your feedback is important to us, no matter what the issue. Starting in the fall of 2006, we will hold regular public information centres in Greensville. As of the writing of this newsletter, we have not set the date for the fall public information centre. There will be a notice in the Hamilton Spectator, the Dundas Star as well as the Flamborough Review about the Information Centre. We will also have information on the City's website at: www.hamilton.ca/greensville

Mid-Spencer Creek Subwatershed and Greensville Rural Settlement Area



Appendix M-2-3

Greenville Community Liaison Committee Meeting #1

Meeting Agenda

October 2008



Mid-Spencer/Greensville RSA Subwatershed Study

**Greensville Community Liaison Committee
Meeting 1 – Wednesday October 8, 2008 - 7pm – 9pm
Flamborough Christ Church – 92 Highway No. 8**

MEETING AGENDA

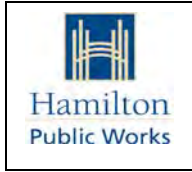
- | No. | Item |
|------------|--|
| 1. | Greetings & Introductions |
| 2. | Background to the Greensville Sub-Watershed Study & Objectives of the Community Liaison Committee |
| 3. | Overview of First Public Open House & Public Input |
| 4. | Concept of Water Balance |
| 5. | Overview of Well Testing Program |
| 6. | Issues and Potential Alternatives |
| 7. | Discussion |
| 8. | Other Items |
| 9. | Next Steps & Schedule |

Appendix M-2-4

Greenville Community Liaison Committee Meeting #1

Meeting Minutes

October 2008



Mid-Spencer/Greenville RSA Subwatershed Study

GREENSVILLE COMMUNITY LIAISON COMMITTEE

MEETING #1 NOTES

Date: October 8, 2008, 7pm – 10 pm

Location: Flamborough Christ Church, 92 Highway No. 8

Attendees:

AW - Al Warring, resident

AV - Annette Van Boxmeer, resident

DR - Dave Robinson, resident

JC - Jill Campure, resident

KM - Kelsey MacCormack, resident

MZ - Michael Zimmerman, landowner

PB - Peter Beardwood, resident

SE - Syd Evans, resident

DM - Dave Maunder, Aquafor Beach

BG - Barry Gorman, Aquafor Beach

CS - Chris Shrive, City of Hamilton

CC - Carmen Ches, City of Hamilton

Regrets:

Mark Shurvin, resident

Notes of Meeting:

1. Greetings & Introductions

Each of the attendees introduced themselves, highlighting issues or/and interests as regards the study.

AW - resident and business owner in Greenville; wants to learn more about water quality;

AV - resident; environmental science background; has water quality concerns; her well has run dry in the past;

DR - resident in Greenville for more than 50 years; fights for community integrity; participated in different committees (including GASP) in Greenville;

JC - resident; concerned about water quality, past GASP committee member;

KM - resident and PhD geography/geology student at McMaster University; has an academic and residential interest in this study;

MZ - resident-related and landowner/developer;

Mid-Spencer/Greenville RSA Subwatershed Study

- PB - resident; interested in water quantity issues as his well has run dry;
SE - resident for more than 30 years; concerned about water quality and quantity as his neighbors had to install cisterns for water supply; served on GASP..

2. Background to the Greenville Sub-Watershed Study & Objectives of the Community Liaison Committee (CLC)

Chris Shrive (CS) gave an overview of the study background.

Objectives of the CLC:

- Meet at least twice. Ideally the Committee should meet three or four times until the study is finished.
- Bring forward development concerns, water quality and water quantity issues and concerns.

3. Overview of First Public Open House & Public Input

Nov 21, 2007 – first open house. The public had a chance to review the preliminary findings of the study, to attend presentations about the best practices for wells and septic systems maintenance. The public expressed their concerns related to the water quality and water quantity.

Copies of the boards displayed at the first open house were distributed to the Committee members.

DM gave an overview of the Greenville Subwatershed Study (goals, objectives, findings).

4. Concept of Water Balance

DM explained (Power Point Presentation) the groundwater flow, the water balance concept and the hydrogeological cross-section.

Questions:

- Can water quantity be addressed by drilling a deeper well?
Answer: It depends on the situation. A deeper well may be detrimental from a water quality perspective.
- Is topography an important component of the water balance?
Answer: Topography conditions may affect how fast the water infiltrates. i.e. level, shallow overburden fractured limestone permits water to infiltrate an aquifer more quickly. The water may carry contaminants that can get into the aquifer.

Mid-Spencer/Greenville RSA Subwatershed Study

DM: Quarries account for water quantity impact (fluctuations of the groundwater table level) and the septic systems account for some water quality impact. Water quality can be addressed through stewardship practices.

- Impact of nitrate?
Answer: Maximum acceptable concentration for nitrate in groundwater is 10 mg/L. Nitrates generates blue baby syndrome. Nitrate plumes are of concerns.
- How do the swimming pools impact the groundwater quality or quantity?
Answer: The Secondary Plan states that no swimming polls should be filled by groundwater. Also the sprinkler systems should not be supplied from a groundwater source.
One way to translate this in a by-law is through a subdivision agreement.
The filling of the swimming pools has a point source impact on the groundwater supply especially at the beginning of June.

5. Overview of Well Testing Program (2008)

BG described the program. 700 questionnaires were mailed out in early 2008 and 148 responses were received back. 20% response rate is considered a good rate. 30 houses were selected and the well water was tested.

The meaning of the test results was clarified.

- Were the results of the tests conducted in 1983 considered based on the regulations at that time or based on the present objectives? – **Action item: BG will check.**

The 1983 survey indicated clusters of E-coli contamination.

- Did the recent surveys follow up on those areas? Are the contamination sources consistent?
The wells surveyed were picked up based on the owners' willingness to have their wells surveyed. Diverse wells from a depth and location point of view were selected.

2005 Well Testing Program

- There is a 22 year water quality data gap?
Public Health Department tested the well water on a case by case situation based on the frequency of the water samples submitted by the well owners.
- What was the growth in the area in the last 25 years?
About 172 houses were added to the Greenville Rural Settlement Area.
- Are the sodium levels accurate considering that the softener increases the sodium level in the drinking water? Syd stated that he had the water sample

Mid-Spencer/Greenville RSA Subwatershed Study

taken from the kitchen tap after the water passed through the softener. –
Action item: BG will check.

6. Issues and Potential Alternatives

1. Bring up Municipal water

CS: Expensive; contrary to the Green Belt policies; high stress on the septic systems; there is no partial servicing permitted unless MOH declares a health issue.

2. Control/Limit proposed development

The post-development area should maintain the pre-development infiltration rates.

3. Strengthen and enforce existing policies and by-laws

More water friendly landscaping is needed.

In Carlisle, for example, 35% of the water consumption is due to lawn watering.

4. Replace degraded septic systems.

Building Department inspects the septic systems on a case-by-case complaint basis.

The septic system is expensive to maintain and improve so the residents are reluctant in providing information about their septic systems.

Incentives for septic system upgrades are considered beneficial.

Residents should be encouraged to take proactive measures (i.e. pump their septic system every 2-3 years) especially in certain areas of concerns.

People that moved from the urban area do not have the necessary knowledge to manage their private services.

5. Change policies for existing / proposed PTTW

PTTW are posted for public review before MOE takes a decision. The public has the opportunity to provide input.

7. Discussion

Recommendations on behalf of the CLC:

- No communal wells
- No municipal water
- Changes in development policies
- Educational programs for septic system maintenance, for developers and for landscapers
- By-law enforcement increasing over time

Mid-Spencer/Greenville RSA Subwatershed Study

CS: City does not have the power to enforce all the aspects of water on private property.

- Close monitoring of the quarry's activity

SE complained that the water level dropped 50 ft over a period of 30 years possible due to the quarry activities.

- A list of the septic system contractors should be available
- Consistent guidelines for hydrogeological assessment.

CS: Hydrogeological Guidelines for private systems are in progress.

- Education about groundwater and groundwater flow.
- Sustainable development practices for the new development and education about the stewardship measures for the established residents.
- Water conservation education
- Simple, easy to access, non-threatening, concise information on water supply alternatives made available to residents
- Monetary incentives and moral suasion.
- One-on-one discussions, easy programs.
- Maintain the country flavor of the area even in the situation when all the water quantity and quality issues are addressed.

CS: The Rural Official Plan requires minimum 1 acre size lot.

- Threats assessment community wide.
- The City and consultants will further develop and explore opportunities and frameworks for the discussion items for CLC review. **Action: CS, DM, BG.**

8. **Other items.**

No other items were brought forward.

9. **Next Steps & Schedule**

Next meeting in four or five weeks.

Appendix M-3-1

Greenville Community Liaison Committee Meeting #2

Meeting Agenda

January 2009



Mid-Spencer/Greensville RSA Subwatershed Study

**Greensville Community Liaison Committee
Meeting 2 – Wednesday January 14, 2009 - 7pm – 9pm
Flamborough Christ Church – 92 Highway No. 8**

MEETING AGENDA

- | No. | Item |
|-----|--|
| 1. | Greetings & Introductions |
| 2. | Review of October 2008 meeting minutes and outstanding items (CS) |
| 3. | Concept & Development of Greensville Programs with CLC Input <ul style="list-style-type: none">• Stormwater Management and Water Efficiency (CC)• Stewardship – Septic and Well Programs (SO & DM)• Plan Basis & Basics – potential deliverables and City/Conservation Authority support and participation |
| 4. | Discussion (All) |
| 5. | 'Friends of Greensville Creek' Initiative (NB) |
| 6. | Halton Hamilton Source Protection Committee (CS) |
| 6. | Other Items |
| 7. | Next Steps & Schedule |

NOTE:

CC – Colleen Clark, Community Outreach, City of Hamilton

SO – Sheila O'Neal, Watershed Stewardship, Hamilton Conservation Authority

DM – Dave Maunder, Aquafor Beech

NB – Neal Bonner, Greensville Resident

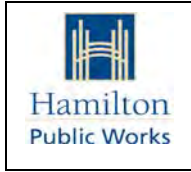
CS – Chris Shrive, Source Protection Planning, City of Hamilton

Appendix M-3-2

Greenville Community Liaison Committee Meeting #2

Meeting Minutes

January 2009



Mid-Spencer/Greenville RSA Subwatershed Study

GREENSVILLE COMMUNITY LIAISON COMMITTEE

MEETING # 2 NOTES

Date: January 14, 2009 7pm – 9:30 pm

Location: Flamborough Christ Church, 92 Highway No. 8

Attendees:

MS - Mark Shurvin, resident

AV - Annette Van Boxmeer, resident

DR - Dave Robinson, resident

KM - Kelsey MacCormack, resident

MZ - Michael Zimmerman, landowner

PB - Peter Beardwood, resident

SE - Syd Evans, resident

NB – Neal Bonnor, resident

DM - Dave Maunder, Aquafor Beach

SO – Sheila O’Neal, HCA

CS - Chris Shrive, City of Hamilton

CC - Carmen Ches, City of Hamilton

Regrets:

AW - Al Warring, resident

JC - Jill Campure, resident

Notes of Meeting:

1. Greetings & Introductions

CS welcomed the members of the committee and introduced MS as a newly attending member, as well as CC, SO and NB as speakers.

2. Review of October 2008 meeting minutes and outstanding items (CS)

CS noted that no comments were received with circulation of the draft Meeting 1 minutes and responded to follow-up action items, as indicated in the revised minutes (attached).

CS summarized the minutes discussion from Meeting 1 and indicated that DM and he had been working with internal City staff to develop policies and action plans to

Mid-Spencer/Greenville RSA Subwatershed Study

address. He reiterated that much of the character with respect to water balance is at the whim of mother nature, but that there are proactive and positive management initiatives that can be undertaken to 'balance' and mitigate impacts on water quality and quantity. Some of these initiatives would be the focus of tonight's discussion. CS also challenged the committee to consider and propose unique and effective methods and procedures to disseminate this information so as to interest and fully engage the majority of landowners

3 & 4. Concept & Development of Greenville Programs with CLC Input - Discussion

CS introduced CC who reviewed the City outreach programs and indicated a willingness to further develop and support specific and targeted programs appropriate to Greenville residents on private services. The City is developing a water use efficiency master plan this year, and while this is not directed only to those on private services there will be opportunities to address some related and specific issues.

CS again encouraged the committee to consider the ways of disseminating information and ensuring that those residents who require and seek applicable material on private servicing will find it.

Various delivery and access modes were discussed by the committee. AV indicated that she would respond more favourably to mail that is personally addressed rather than to bulk mailings. It also agreed that the perception by the recipient of the initiative is important, that area residents remain skeptical of City initiatives after amalgamation, and that the initiative should not be perceived as 'prying'.

DM reviewed the Greenville water budget, noting again that residents remove only about 0.8% of flow while PTTWs upgradient of the RSA account for significantly more potential use. DM also reviewed/emphasized the benefits of maintaining/enhancing infiltration on individual lots as development proceeds and furthering the promoting of supportive practices on lots within the existing developed areas. DM identified two approaches that may be taken: a 'passive' approach whereby residents may be directed to such information as it is sought by them; or, a proactive approach whereby focus groups and workshops are initiated by the City and directed by professionals with an objective to develop longterm stakeholder engagement in the community. The latter approach would take place subsequent to the completion of the subwatershed study and its establishment could comprise one of the study's recommendations.

AV noted that this approach best benefits the 20% of existing landowners with shallow wells and for those with wells in the bedrock not as much. The PTTWs upgradient of the RSA remain a concern to addressing the impacts upon many bedrock wells. PB noted that as one of the 20%, he would support such an

Mid-Spencer/Greensville RSA Subwatershed Study

approach. MS noted that people may participate not necessarily because it will benefit themselves, but because they regard it as the right thing to do, and gave the Blue Box programme as an example.

There was committee discussion with respect to gaining public awareness and participation in such an initiative. AV suggested it as being promoted through the Conserver Society (www.conserversociety.ca) or recognized through a special Trillium Award (see www.hamilton.ca). Model lots were suggested (DR) or yearly garden tours of 'infiltration enabled' residences may further promote the initiative.

KM noted that the proximity of services, smaller lot sizes and physiography in some areas such as Grand Vista make remedial and replacement initiatives for private services very difficult to undertake effectively. She suggested that the initiatives may be more successful if planned and executed in a coordinated manner initiated by and involving groups of landowners.

Discussion turned to the effectiveness and application of the existing watering bylaws and policies. CS was asked by MS whether the bylaw controlled the practice or the source. *Follow-up: the bylaw controls through the source, i.e. those on private wells are not affected unless provision is made through subdivision agreements.*

CS asked MZ what his experience was with new house owners' requirements for sprinkler systems. MZ indicated that lawn watering during the summer was not a priority with purchasers, and that just as long as the lawn had consistency during drought there was no desire to keep it green through irrigation.

SO provided an outline on the history and application of the HCA's Well Awareness & Septic Awareness Programmes. The original programme has been in place since 1994 and initially centred on restoration projects but has expanded to the provision and dissemination of information on well and septic stewardship for rural landowners. The main tool is moral suasion, but some funds are available in association with the City for the application of well abandonment. One of the main problems is landowners' reactive, rather than proactive, attitude towards private servicing and particularly to septic maintenance. More recent stewardship programmes under the Clean Water Act, the Source Protection and Early Action programmes may be better funded and support rehabilitation and counter-contamination initiatives in specific areas.

SO distributed examples of the information literature commonly distributed to landowners interested in improving their land management skills and stewardship knowledge. *Follow-up: The Rural Landowner Stewardship Guide for the Ontario Landscape can be found at www.stewardshipmanual.ca/.*

5. 'Friends of Greensville Creek'

Mid-Spencer/Greensville RSA Subwatershed Study

CS introduced NB to the Committee. NB provided some background to his FGC initiative, and his desire to coordinate activities among landowners in the area to improve the water quality, natural function and habitat of the creek that runs through the Grand Vista Gardens area. Objectives include an annual cleanup and the encouragement of buffer development.

CS suggested that initiatives demonstrating the desire of area residents to improve the ecological health of the natural areas and features of the community further indicate that similar initiatives related to well/septic stewardship and lot level water management should be welcomed and engaging to the majority of residents.

6. Halton Hamilton Source Protection Committee

CS indicated the activities by the City in support of the Halton Hamilton Source Protection Committee (HHSPC) under the Provincial Clean Water Act. The recent Draft Report on Tier 1 Water Budget had identified the Mid-Spencer Creek Subwatershed as 'significantly stressed' and to be the subject of a further tier 2 assessment. CS indicated that the Chair of the HHSPC, in recognition of the Greensville CLC being an established and informed group discussing water issues, had recently suggested that the CLC act in the capacity of a focus group for upcoming workshops on the SPC Assessment Report. CS requested that the CLC members consider participating and the majority indicated that they would be interested in doing so. CS committed to liaise with the SPC and ensure that the CLC members would be continue to be informed of the opportunity and its schedule.

Follow-up: CS has been advised that this may be scheduled for late April/early May and will be confirmed at the next SPC meeting March 24th. See

www.protectingwater.ca

7. Other items

No other items were brought forward.

8. Next Steps & Schedule

CS indicated that the City would take the ideas generated this evening to further develop policy and recommendations for public review at the next PIC. The decision as to whether another CLC meeting would be scheduled before or after the PIC when a better understanding is realized of any information gaps remaining in addressing private servicing policy and outreach initiative recommendations. CLC members may be asked to participate if a focus/workshop group approach is considered for the PIC as they have a good understanding of issues to facilitate constructive discussion.

Appendix M-3-3

Greenville Community Liaison Committee Meeting #2

Presentation and Handout

January 2009

-
-
-

Act for Clean Water Source Water Protection Issues

Hamilton-Halton Watershed Stewardship Program
(HHWSP)
of
Hamilton Conservation Authority and
Conservation Halton
Sheila O'Neal, Coordinator

Greensville Community Subwatershed Study & Act for Clean Water Public
Information Centre #1
Christ Church, 92 Highway #8
Flamborough, Ontario
November 21, 2007



HHWSP





Landowners Take Action for Clean Water

Background:

- 2004 – City of Hamilton and HHWSP – Septic Awareness Survey and Open Houses
- 2005 – Survey results recommendation:
Landowners should have their septic system treatment or holding tanks inspected every one or two years and pumped out every three to five years.
This is especially applicable to the community of Greensville where the highest number of older treatment/holding tanks was reported.



HHWSP





Landowners Take Action for Clean Water

Background:

- 2005 – Survey results recommendations:

Landowners should become familiar with signs of a failing septic system or leaching bed in order to identify when a treatment tank or leaching bed needs to be replaced.

This is especially applicable in Greenville where the highest number of leaching beds between the ages of 25 and 50 was reported.





Clean Water Act

- 2006 - Clean Water Act is part of the Ontario government's commitment to implement all of the recommendations of the Walkerton Inquiry.
- For the first time, communities will be required to create and carry out a plan to protect the sources of their municipal drinking water supplies.
- The source protection process includes identifying drinking water threats, assessing the risk of those threats, preventing threats, and monitoring remaining threats.



HHWSP



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•
•

Ministry of the Environment Funding for Education and Outreach

City of Hamilton as lead partner with the HHWSP will be offering:

- Open houses in four municipal well areas and one in the intake protection zone
- Presentations on Septic System Management
- Septic Tanks Pumped - Raffle
- Informational brochures
- Providing Well Aware and Septic System Management DVDs to local libraries
- On-site visits to some landowners in 100 m radius zone



HHWSP

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-
-

Raffle Tonight

- Two landowners in the Flamborough area will win a free pump out of their septic tank from:

Rankin's Septic Tank Pumping and Environmental Services

- Winners will invite a neighbour or two to come and learn the importance of septic system maintenance – demonstration opportunity



HHWSP

Ministry of the Environment Funding Coming Soon

To landowners of properties:

- within 100 m radius of a municipal well
- within 200 m radius of a municipal surface water intake

Examples of this funding are:

Water Well Decommissioning and Upgrading –
50% up to \$6,000

Septic System Inspections and Upgrades – 50% up
to \$10,000 and up to \$20,000 for advanced systems

Runoff and Erosion Protection – 50% up to \$20,000



HHWSP



City of Hamilton Funding Available Now

For Landowners in the City of Hamilton to:

- Decommission their Abandoned Water Wells
- 100% of the cost up to \$1,000 with a limit of 2 wells per property

An abandoned well that is not properly filled, sealed and capped poses risks such as a safety hazards for children and animals and it provides a route for contaminants to enter groundwater reserves. Protect yourself, your family and neighbours by properly decommissioning your well.



HHWSP



**Greenville Community
Subwatershed Study &
Act for Clean Water**

Public Information Centre #2

Workshop Participant Workbook

**MID-SPENCER CREEK/GREENSVILLE RURAL
SETTLEMENT AREA SUBWATERSHED STUDY**

The objectives of this public open house and workshop are to:

- Provide a long list of Management Actions together with the approach used to evaluate each Management Action
- Provide participants an opportunity to discuss the evaluation approach together with the short list of management Actions
- Provide direction with respect to the preferred Management Actions

A number of the Preferred Management Actions will require cooperation from existing residents to implement the measures. A series of questions follows, to be answered by the participants.

MANAGEMENT ACTIONS

Question 1: Looking at the Management Actions that are provided below. Did we miss any?

Question 2: Are there any of the recommendations that you disagree with? If so, please list the Management Alternative(s) and state why.

LONG LIST OF MANAGEMENT ALTERNATIVES

Alternatives	Recommended (Y/N)
• Bring up Municipal Water	N
• Control/Limit proposed development	N
• Strengthen and enforce existing policies and bylaws	Y
• Replace degraded septic systems	Y
• Ensure proposed developments replenish groundwater	Y
• Change policies to existing/proposed PTTW	N
• Improve agricultural practices	Y
• Dig Deeper Wells	Y
• Provide more communal wells	Y

LANDOWNER PARTICIPATION

Several of the recommended Management Actions will require cooperation by landowners to implement the measure. The accompanying pages illustrate several measures relating to:

- Monitoring or replacement of septic systems
- Water conservation
- Conservations of Stormwater
- Replacement of private well

We need to emphasis that the measures are voluntary, carried out via a stewardship program, and City, Conservation Authority would provide assistance as needed (or requested)

MONITORING OR REPLACEMENT OF SEPTIC SYSTEMS

LIST OF ACTIONS

The accompanying page illustrates typical actions that could be undertaken by the homeowner to reduce the impact of septic systems on the groundwater system. These include:

- Periodic monitoring of system
- Replacement, as required

WILLINGNESS TO IMPLEMENT

Would you, or do you already, implement the following measures? If not, why?

- Monitoring Yes No _____
- Replacement Yes No _____

MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures

- Technical Support
- Financial Assistance
- Brochures/Pamphlets
- Help Line

MONITORING OR REPLACEMENT OF SEPTIC SYSTEMS

WATER CONSERVATION

LIST OF ACTIONS

WILLINGNESS TO IMPLEMENT

MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures

- Technical Support
- Financial Assistance
- Brochures/Pamphlets
- Help Line

WATER CONSERVATION

If you answered no to any of the above please check off any barriers to implementation.

a) Disconnecting Downspouts

- Lack of time Lack of Space Lack of Interest Lack of Help
 Money Lack of Information Other _____

b) Planting of additional shrubs & trees

- Lack of time Lack of Space Lack of Interest Lack of Help
 Money Lack of Information Other _____

c) Installation of soak-away pits

- Lack of time Lack of Space Lack of Interest Lack of Help
 Money Lack of Information Other _____

d) Installation of Rain barrels

- Lack of time Lack of Space Lack of Interest Lack of Help
 Money Lack of Information Other _____

e) Replacement of impermeable surfaces (asphalt/concrete) with porous (grass, interlock) ones

- Lack of time Lack of Space Lack of Interest Lack of Help
 Money Lack of Information Other _____

f) Installation of a Rain Garden

- Lack of time Lack of Space Lack of Interest Lack of Help
 Money Lack of Information Other _____

MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures

- Technical Support
- Financial Assistance
- Brochures/Pamphlets
- Help Line

REPLACEMENT OF PRIVATE WELL

LIST OF ACTIONS

On the list of actions mention existing programs

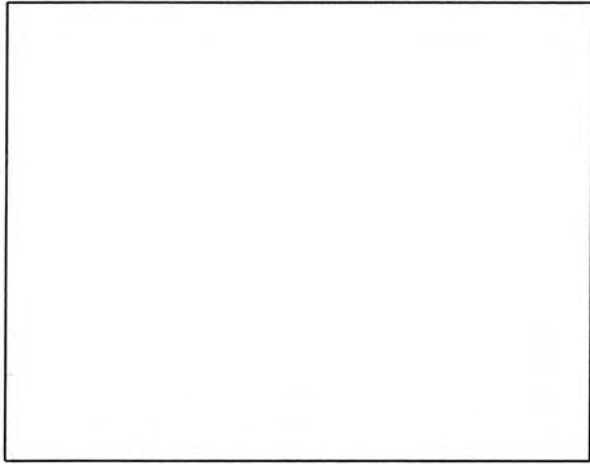
WILLINGNESS TO IMPLEMENT

MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures

- Technical Support
- Financial Assistance
- Brochures/Pamphlets
- Help Line

REPRESENTATIVE STORMWATER CONSERVATION MEASURES



Downspout Disconnection



Rain Garden



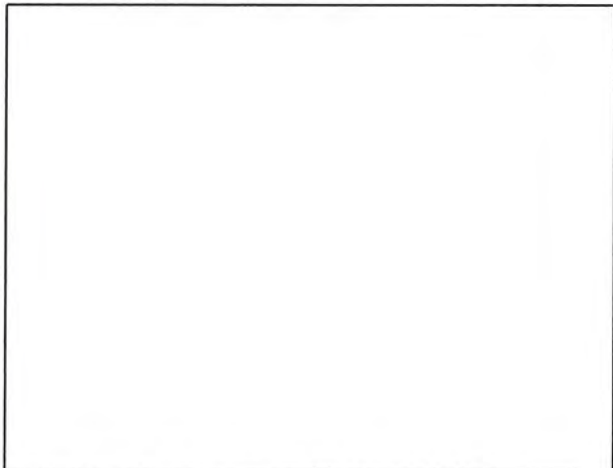
Soakaway Pit



Rain Barrel



Porous (permeable) driveway



Planting Additional Shrubs & Trees

Appendix M-4-1

Public Information Centre #2

Notice of Public Information Centre No. 2

January 2015

Notice of Public Information Centre No. 2 Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

Project Background

The City of Hamilton has initiated a Subwatershed and Class Environmental Assessment (EA) study for the Mid-Spencer Creek and Greensville Rural Settlement Area (RSA). Residents in the Greensville RSA and the subwatershed are currently serviced by private septic systems and groundwater-sourced municipal communal, private communal or individual wells.

The study will set a management strategy for surface water (streams, storm water), groundwater, community servicing (water and septic) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA. The study includes public and review agency consultation, evaluation of alternatives, assessment of the impacts of the proposed works, and identification of measures to mitigate any adverse impacts. Upon completion of the study, a Report documenting the planning and decision making process followed, will be prepared and made available for public review.

The Study Process

This Study will follow the planning and design process as defined in the Municipal Engineers Association Municipal Class Environmental Assessment document (October 2000, as amended in 2007 & 2011). The Master Plan (Approach 1) will address Phases 1 and 2 of the Class EA requirements for any Schedule B projects that are identified, and outline additional work that will be required to implement any Schedule C projects that are identified as part of the study.

Public Information Centre (PIC) No. 2

Two (2) PIC sessions are required for this Study. PIC No. 1 was held on November 21, 2007. PIC No. 2 will present the evaluation of the alternative solutions and identify the recommended solutions and is scheduled for:

Date: January 22, 2015

Time: 4:00 pm to 7:00 pm

Location: Christ Church, 92 Highway #8, Flamborough

We would like to hear from you

We are interested in hearing any comments or concerns you may have with respect to this study. Comments received through the course of the study will be considered in selecting the recommended solutions. Information will be collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record. If you would like more information or would like to be placed on the Study mailing list, please contact:

Marco Silverio, M.Sc.

Project Manager

City of Hamilton

77 James Street North, Suite 400

Hamilton, ON L8R 2K3

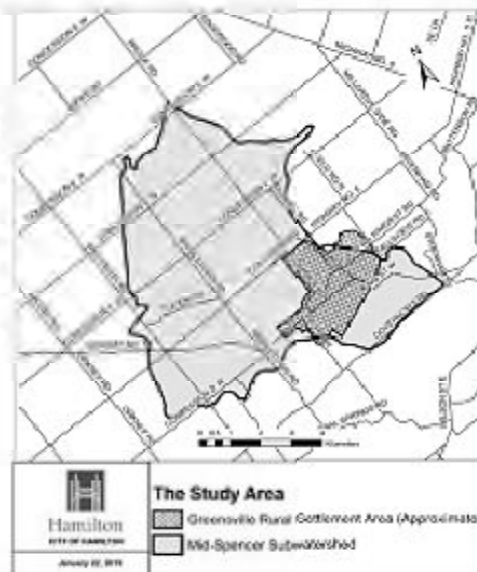
Phone: 905-546-2424 ext. 6099

Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 8th and January 15th, 2015.



Hamilton

Appendix M-4-2

Public Information Centre #2

Sign-in Sheet

January 2015

Mid Spencer Creek/Greensville
Rural Settlement Area Subwatershed and
Class Environmental Assessment Study

Sign In Sheet

Public Information Centre No. 2
Thursday, January 22, 2015 – Hamilton
Christ Church
92 Highway #8, Flamborough, Ontario

PLEASE PRINT					
Name	Affiliation	Address	Telephone	Add to Mailing List?	
				Yes	No
[REDACTED]	resident	[REDACTED] Jameson Dr.	[REDACTED]	✓	
[REDACTED]	(DEVELOPER) WINGBURY	[REDACTED] SANDHILL DR. ANCISTEN	[REDACTED]	✓	
[REDACTED]	"	"	[REDACTED]	✓	
[REDACTED]	yes	[REDACTED] Park Ave Dundas	[REDACTED]	✓	
[REDACTED]	resident	[REDACTED] Hwy 8	[REDACTED]	✓	
[REDACTED]	RESIDENT	[REDACTED] MAPLE AVE	[REDACTED]	✓	
[REDACTED]		[REDACTED] old Brock Rd	[REDACTED]	✓	
[REDACTED]	RESIDENT	[REDACTED] Hwy #8	[REDACTED]	✓	Possible etc members

[REDACTED] -EMAIL → [REDACTED].COM

[REDACTED] ~~ca@~~

[REDACTED] -ca

Mid Spencer Creek/Greensville
Rural Settlement Area Subwatershed and
Class Environmental Assessment Study

Sign In Sheet

Public Information Centre No. 2
Thursday, January 22, 2015 – Hamilton
Christ Church
92 Highway #8, Flamborough, Ontario

PLEASE PRINT					
Name	Affiliation	Address	Telephone	Add to Mailing List?	
				Yes	No
[REDACTED]	RESIDENT	[REDACTED] FLAMBORO CRT	[REDACTED]	✓	
[REDACTED]	Ramacieri	[REDACTED] Queen St South Ham. On.	[REDACTED]		
[REDACTED]	Rozdond	[REDACTED] maple ave	[REDACTED]	✓	
[REDACTED]	Resident	[REDACTED] Harvest Rd.	[REDACTED]	✓	
[REDACTED]	Resident	[REDACTED] Flamboro Court	[REDACTED]	✓	
[REDACTED]	"	[REDACTED] Brock Rd.	[REDACTED]	✓	
[REDACTED]	"	[REDACTED] Harvest Rd.	[REDACTED]	✓	
[REDACTED]	RESIDENT	[REDACTED] KIRBY AVE	[REDACTED]	✓	

Mid Spencer Creek/Greensville
Rural Settlement Area Subwatershed and
Class Environmental Assessment Study

Sign In Sheet

Public Information Centre No. 2
Thursday, January 22, 2015 – Hamilton
Christ Church
92 Highway #8, Flamborough, Ontario

PLEASE PRINT					
Name	Affiliation	Address	Telephone	Add to Mailing List?	
				Yes	No
[REDACTED]	Residents	[REDACTED] Middletown Dundas [REDACTED]	[REDACTED]	X	
[REDACTED]	"	[REDACTED] Granders et Dundas	[REDACTED]	X	
[REDACTED]	MMK Engine	[REDACTED]	[REDACTED]	X	
[REDACTED]	RESIDENT	Oakville, [REDACTED] Hwy #8 Dundas	[REDACTED]	✓	
[REDACTED]	Resident	[REDACTED] Park Ave Dundas [REDACTED]	[REDACTED]	✓	
[REDACTED]	"	[REDACTED] HICKORY AV. DUNDAS [REDACTED]	[REDACTED]	✓	
[REDACTED]	Resident	[REDACTED] Flamboro Crt	[REDACTED]	/	
[REDACTED]	"	[REDACTED] HERBERT PLACE DUNDAS	[REDACTED]	✓	

Mid Spencer Creek/Greensville
Rural Settlement Area Subwatershed and
Class Environmental Assessment Study

Sign In Sheet

Public Information Centre No. 2
Thursday, January 22, 2015 – Hamilton
Christ Church
92 Highway #8, Flamborough, Ontario

PLEASE PRINT					
Name	Affiliation	Address	Telephone	Add to Mailing List?	
				Yes	No
[REDACTED]	RESIDENTS	[REDACTED] OAK AVE	[REDACTED]	X	
[REDACTED]	CANADAINC.	[REDACTED] COLLIER STREET BARRIE, ON	[REDACTED]		
[REDACTED]	Resident	[REDACTED] Highway 8, Greensville	[REDACTED]	X	
[REDACTED]	Resident	[REDACTED] Kirby Ave. Dundas	[REDACTED]	✓	
[REDACTED]	Resident	[REDACTED] Hwy 8	[REDACTED]	✓	
[REDACTED]	Resident	[REDACTED] Forest	[REDACTED]	✓	
[REDACTED]	Resident	[REDACTED] Main St	[REDACTED]	✓	
[REDACTED]	Resident	[REDACTED] Hwy 8	[REDACTED]		

Mid Spencer Creek/Greensville
Rural Settlement Area Subwatershed and
Class Environmental Assessment Study

Sign In Sheet

Public Information Centre No. 2
Thursday, January 22, 2015 – Hamilton
Christ Church
92 Highway #8, Flamborough, Ontario

PLEASE PRINT					
Name	Affiliation	Address	Telephone	Add to Mailing List?	
				Yes	No
[Redacted]		Valleydale Cr.	[Redacted]	✓	
[Redacted]		Briencrest	[Redacted]	✓	
[Redacted]	Neighbour to Spencer Creek	Crooks' Hollow Rd	[Redacted]	✓	
Rob Pasuta	Councillor Ward 14				

Appendix M-4-3

Public Information Centre #2

Comment Sheets

January 2015



PUBLIC WORKS DEPARTMENT
Hamilton Water Division
Sustainable Initiatives

Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

The City of Hamilton is interested in hearing the community's comments, questions, concerns and suggestions regarding the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. Please take a few minutes to complete this brief comment sheet. All comments will be carefully considered in the Environmental Assessment Process.

1. Do you have any comments related to the **evaluation process** used to select the preferred alternative?

2. Do you have any comments, concerns, questions or suggestions regarding the **preferred alternative**?

3. Do you have any comments, concerns, questions or suggestions related to the **potential impacts** and/or **proposed mitigation measures** to address the impacts for this project?

4. Additional comments related to the project.

Contact Details

Name: _____

Address: _____

Phone Number: _____

Email: _____

NOTE: Personal information requested on this form is collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please return this completed Comment Sheet to the project team at the Registration Table or you can fax it or mail it by February 6th 2015 to:

Project Contacts:

Marco Silverio
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424, Ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Dave Maunder
Consultant
Aquafor Beech Ltd.
2600 Skymark Ave, Suite 202, Building 6
Mississauga, ON L4W 5B2
Phone: 905-629-0099 Ext. 290
Fax: 905-629-0089
Email: maunder.d@aquaforbeech.com

Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed Study

Public Information Centre #2

Thursday, January 22, 2015

Christ Church
92 Highway #8, Flamborough, Ontario

Workshop Participant Questionnaire

Please complete and hand in your questionnaire before you leave tonight's meeting.

If you would like more time, please return your completed questionnaire by February 5, 2015 to:

Marco Silverio

fax: 905-546-4491

email: Marco.Silverio@hamilton.ca

What street do you live or work on? _____



Hamilton

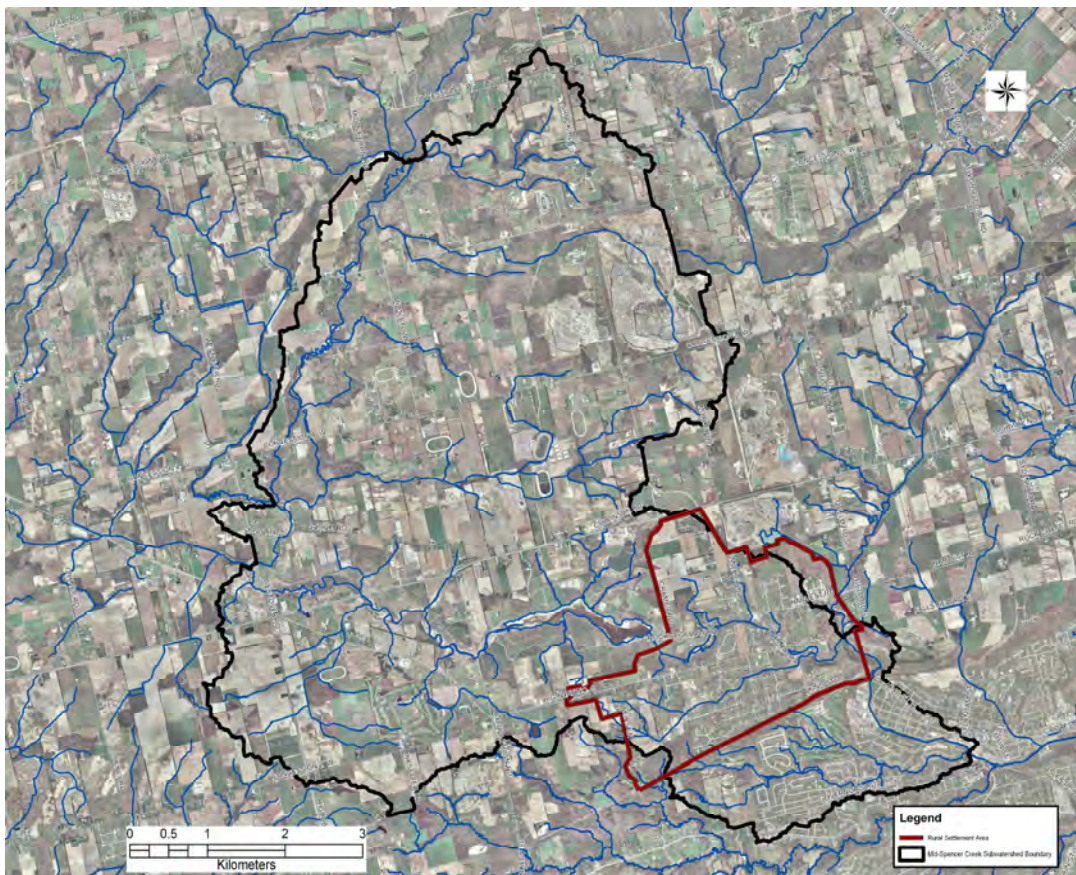
Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed Study

BACKGROUND

The City of Hamilton is undertaking this study for the Greensville Rural Settlement Area (RSA) and surrounding Mid-Spencer Creek Subwatershed. The purpose of the study is to investigate and inventory the natural resources within the two areas and identify constraints and opportunities through which future growth may be established in a manner which is environmentally sound and socially and economically sustainable.

The study is being completed as a Master Plan (Approach No.1) and is intended to address Phase 1 and 2 of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment Act (Class EA) process.

The approximate boundaries of the Rural Settlement Area and Mid-Spencer Creek Subwatershed are shown below.



Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

STORMWATER MANAGEMENT

A number of alternatives to address flooding, erosion and water balance issues (collectively referred to as stormwater management) for lands to be developed within the Rural Settlement Area are shown on the accompanying boards (Boards 9 to 16)

Please take a few minutes to respond to the questions as provided below.

Question 1:

Do you agree with the criteria that were used for evaluating the alternative?

Yes

No

Question 2:

If not, which criteria should be excluded?

Question 3:

Are there any additional criteria that should be considered? Please list.

Question 4:

Are there other alternatives that should have been included?

Question 5:

Do you have any questions or comments on the preferred alternative?

Question 6:

Do you have additional comments?

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

MUNICIPAL WATER SUPPLY

A number of alternatives to provide municipal water to existing and future residents and businesses within the Rural Settlement Area were considered. The alternatives are shown on the accompanying boards

(Boards 17 to 20)

Please take a few minutes to respond to the questions as provided below.

Question 1:

Do you agree with the criteria that were used for evaluating the alternative?

Yes

No

Question 2:

If not, which criteria should be excluded?

Question 3:

Are there any additional criteria that should be considered? Please list.

Question 4:

Are there other alternative that should have been included?

Question 5:

Do you have any questions or comments on the preferred alternative?

Question 6:

Do you have additional comments?

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

LANDOWNER STEWARDSHIP

There are a number of actions that landowners could undertake to improve environmental conditions within the Rural Settlement Area or with the Mid-Spencer Creek Subwatershed.

1. Monitoring or replacement of septic systems
2. Water conservation
3. Conservations of Stormwater
4. Monitoring and replacement of private well

It is envisioned that these measures are voluntary, and may, or may not be undertaken with the assistance of the City of Hamilton, Hamilton Conservation Authority, or other agency.

Please take a few minutes to respond to the following questions on the following pages.

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study
MONITORING OR REPLACEMENT OF SEPTIC SYSTEMS

LIST OF ACTIONS

The accompanying page illustrates typical actions that could be undertaken by the homeowner to reduce the impact of septic systems on the groundwater system. These include:

- Periodic monitoring and maintenance of system
- Replacement, as required

WILLINGNESS TO IMPLEMENT

Would you, or do you already, implement the following measures? If not, why?

- Monitoring Yes No _____
- Replacement Yes No _____

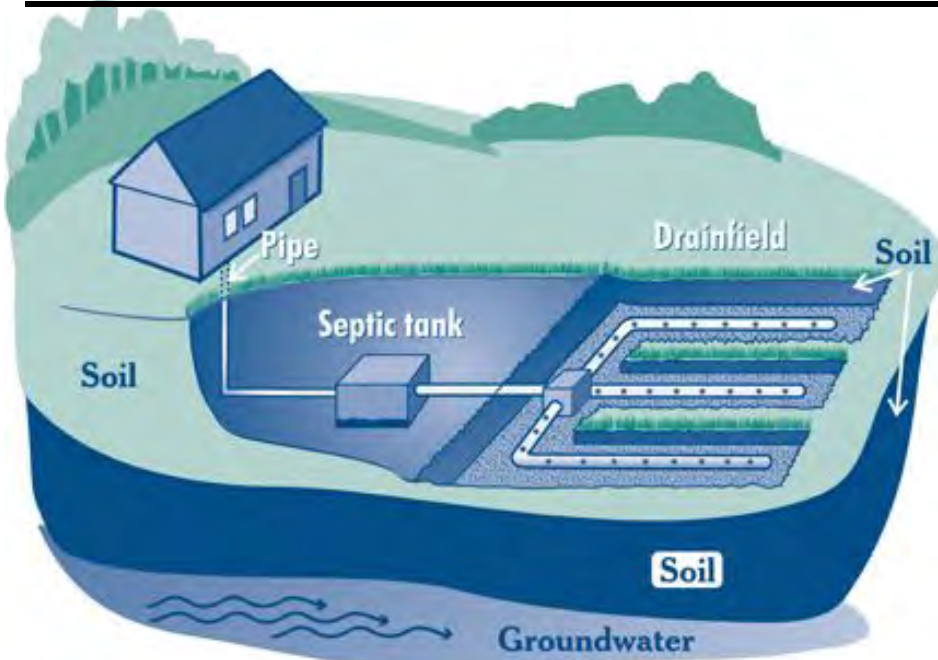
MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures? Please circle:

- Technical Support
- Financial Assistance
- Brochures/Pamphlets
- Help Line
- Other (please specify)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

MONITORING OR REPLACEMENT OF SEPTIC SYSTEMS



Septic Schematic (Source US EPA)



Failed Septic System (Source ORWC)



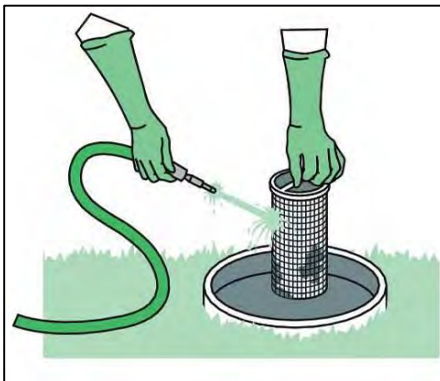
Septic Bed Replacement (Source SW Soil)



Inspection of Septic Tank (Source CJ Septic)



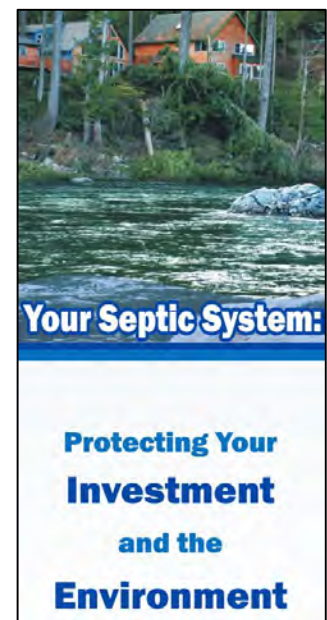
Pumping of Septic Tank (Source US EPA)



Cleaning of Effluent Filter (Source CCS)



Septic Tank Replacement (Source US EPA)



Septic Owners Information Pamphlet (Source ORWC)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

WATER CONSERVATION

LIST OF ACTIONS

The accompanying page illustrates typical actions that could be undertaken by the homeowner to reduce usage of municipal potable water. These include:

- Monitoring household water use
- Installing a rain barrel for outdoor watering
- Use reservoirs not filled from on-site well for irrigation system
- Reducing watering of lawn and garden
- Installing low-flow shower heads
- Replacing old toilets with modern low-flow models
- Replacing old washing machines with modern EnerGuide models
- Refill pools by trucking in water

WILLINGNESS TO IMPLEMENT

The installation of stormwater conservation measures will increase infiltration and may permit the result of rainfall. Which of the following measures would you consider undertaking on your property?

- Monitoring household water use
 Very willing Somewhat willing Not interested
- Installing a rain barrel for outdoor watering
 Very willing Somewhat willing Not interested
- Use reservoirs not filled from on-site well for irrigation system
 Very willing Somewhat willing Not interested
- Reducing watering of lawn and garden
 Very willing Somewhat willing Not interested
- Installing low-flow shower heads
 Very willing Somewhat willing Not interested
- Replacing old toilets with modern low-flow models
 Very willing Somewhat willing Not interested
- Replacing old washing machines with modern EnerGuide models
 Very willing Somewhat willing Not interested
- Leak detection and elimination
 Very willing Somewhat willing Not interested
- Refill pools by trucking in water
 Very willing Somewhat willing Not interested

MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures? Please circle:

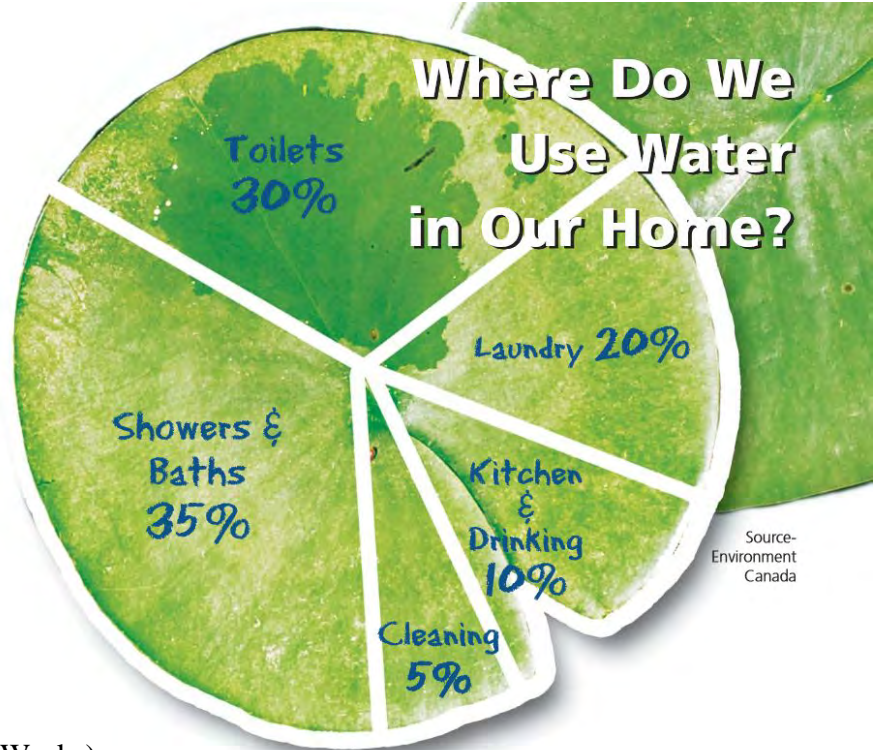
- Technical Support
- Financial Assistance
- Brochures/Pamphlets
- Help Line
- Other (please specify)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

WATER CONSERVATION



Rain Barrel (Source Hamilton Public Works)



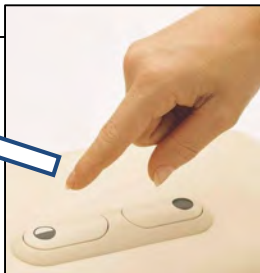
Source-Environment Canada



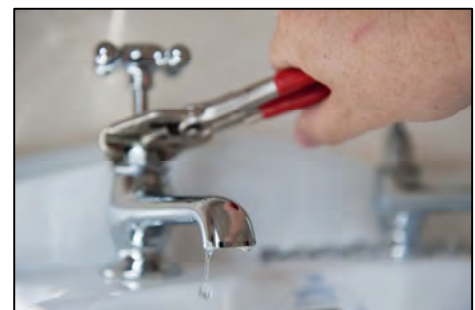
Monitoring Water Use (Source Hamilton Public Works)



Low-Flow Shower Heads
(Source Hamilton Public Works)



Low-Flush Toilet
(Source Rona)



Leak Detection and Elimination
(Source Farmers' Almanac)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

CONSERVATION OF STORMWATER

LIST OF ACTIONS

The accompanying page illustrates typical actions that could be undertaken by the homeowner to increase the amount of rainfall and stormwater that infiltrates into the ground or can be reused for irrigation. These include:

- Disconnecting your downspout
- Installing a rain barrel
- Installing soakaway pits
- Installing rain gardens
- Replacement of impermeable surfaces (asphalt/concrete) with porous (grass, interlock) ones.
- Modifying landscape to promote infiltration

WILLINGNESS TO IMPLEMENT

The installation of stormwater conservation measures will increase infiltration and may permit the result of rainfall. Which of the following measures would you consider undertaking on your property?

- Disconnecting Downspouts
 - Very willing
 - Somewhat willing
 - Not interested
- Planting of additional shrubs & trees
 - Very willing
 - Somewhat willing
 - Not interested
- Installation of soak-away pits
 - Very willing
 - Somewhat willing
 - Not interested
- Installation of Rain barrels
 - Very willing
 - Somewhat willing
 - Not interested
- Replacements of impermeable surfaces (asphalt/concrete) with porous (grass, interlock) ones
 - Very willing
 - Somewhat willing
 - Not interested
- Installation of a Rain Garden
 - Very willing
 - Somewhat willing
 - Not interested

MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

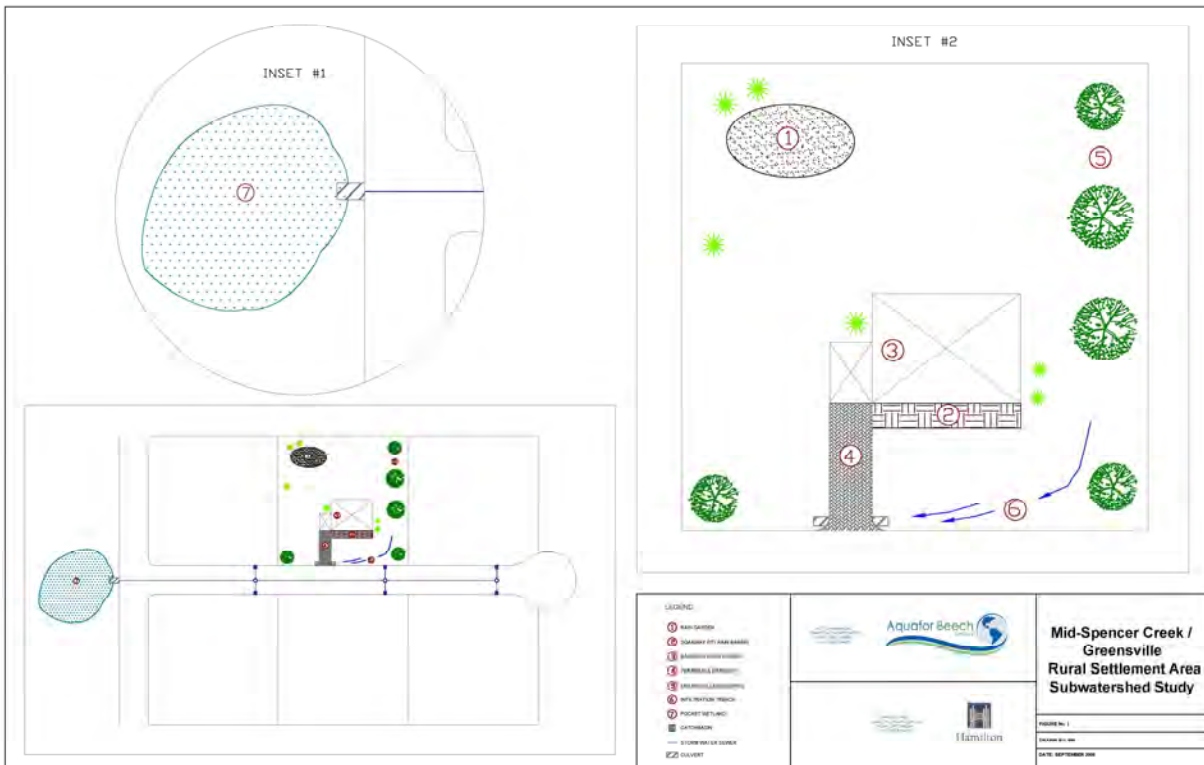
What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures? Please circle:

- Technical Support
- Financial Assistance
- Brochures/Pamphlets
- Help Line
- Other (please specify)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

CONSERVATION OF STORMWATER

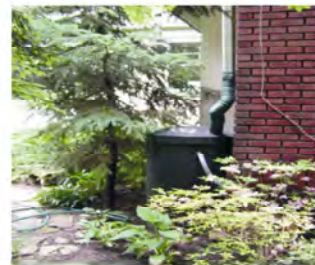
REPRESENTATION STORMWATER CONSERVATION MEASURES



1. RAIN GARDEN



2. SOAKWAY PIT



2. RAIN BARREL



4. PERMEABLE DRIVEWAY



6. INFILTRATION TRENCH



7. POCKET WETLAND

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

MONITORING & REPLACEMENT OF PRIVATE WELL

LIST OF ACTIONS

- Regular water quality testing (3 times per year after heavy rain)
- Regular well inspections (grading, well cap, and area around well)
- Professionally decommission unused wells (licensed well contractors)
- Drill a new well on your property

WILLINGNESS TO IMPLEMENT

Keeping an existing well in good condition or having a new well properly constructed can keep your family safe and help protect local groundwater resources. Which of the following measures would you consider undertaking on your property?

- Regular water quality testing
 Very willing Somewhat willing Not interested
- Regular well inspections
 Very willing Somewhat willing Not interested
- Professionally decommission unused wells
 Very willing Somewhat willing Not interested
- Drill a new well on your property
 Very willing Somewhat willing Not interested

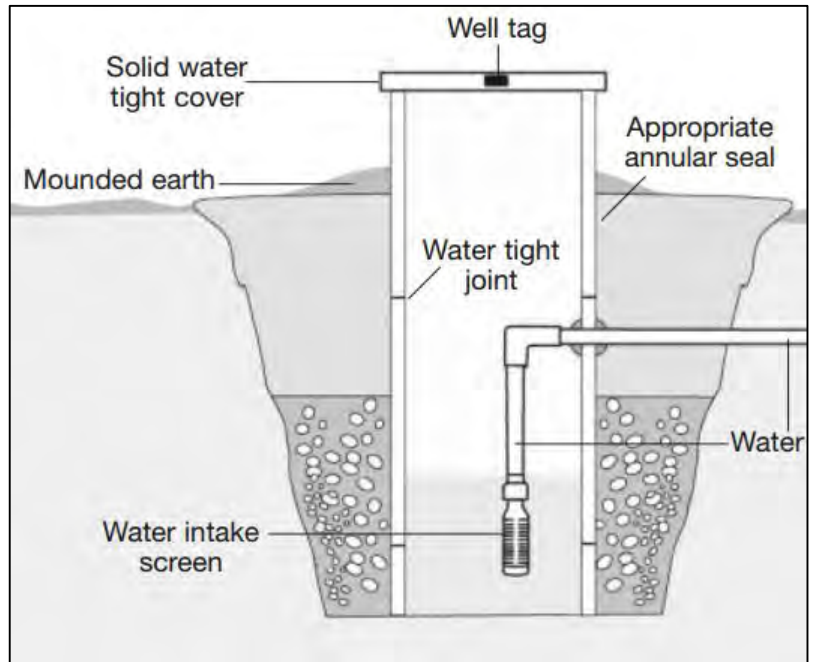
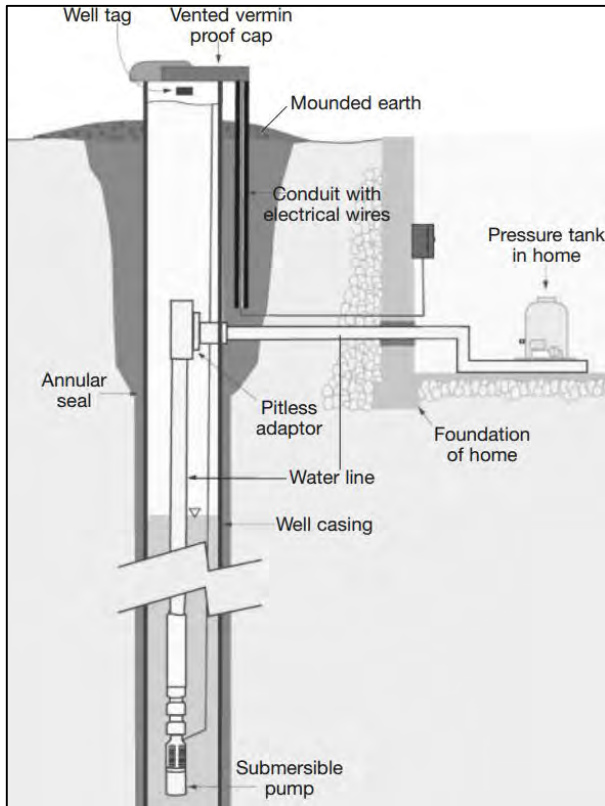
MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures? Please circle:

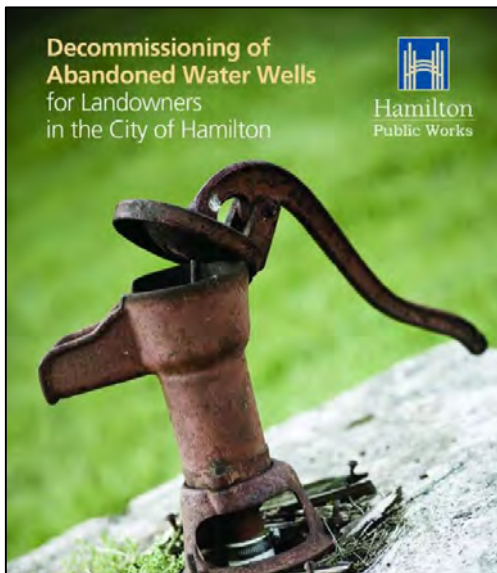
- Technical Support
- Financial Assistance
- Brochures/Pamphlets
- Help Line
- Other (please specify)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

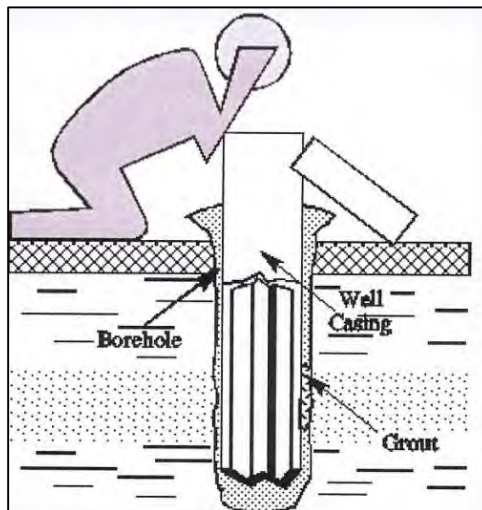
REPLACEMENT OF PRIVATE WELL



A **Drilled Well** (left) is much less susceptible to surface water contamination than a **Dug Well** (above). (Source WellAware.ca)



Hamilton Conservation and the City of Hamilton should be consulted regarding **Funding opportunities for Abandoned Well Decommissioning**. (Source Hamilton Public Works)



Check for **Cracked, Corroded or Damaged Well Casing**.



A **leaky cement casing** could lead to contamination. (Source WellAware.ca)



Ground around your wellhead should be **graded away** to ensure surface runoff does not flow in. The area should be maintained with **low-growing grass**. (Source WellAware.ca)

Appendix M-4-4

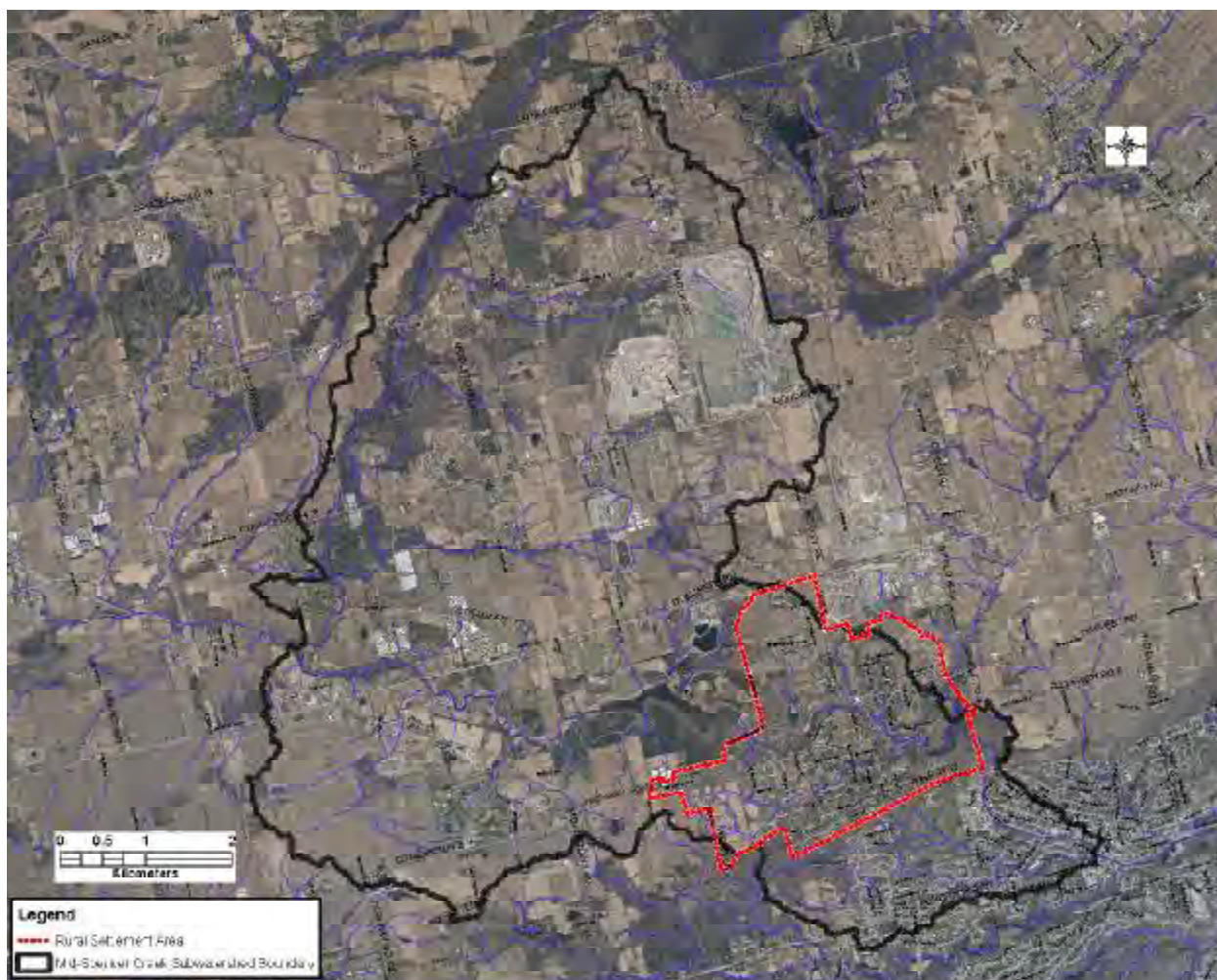
Public Information Centre #2

Public Consultation Displays

January 2015

WELCOME:
TO THE SECOND
PUBLIC OPEN HOUSE
FOR THE
MID-SPENCER CREEK/GREENSVILLE RURAL
SETTLEMENT AREA SUBWATERSHED STUDY

The City of Hamilton is undertaking this study for the Greensville Rural Settlement Area (RSA) and surrounding Mid-Spencer Creek Subwatershed. The purpose of the study is to investigate and inventory the natural resources within the two areas and identify constraints and opportunities through which future growth may be established in a manner which is environmentally sound and socially and economically sustainable.



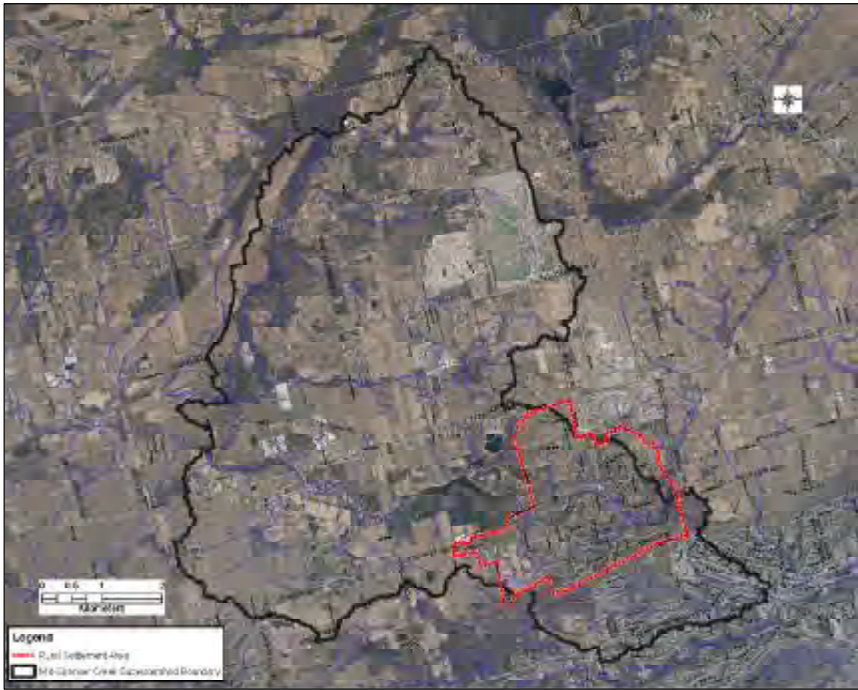
Objectives of the Second Public Open House

This Public Open House will provide opportunity for the public and property owners to review and evaluate information relating to the Management Strategies together with the approach used to evaluate each Strategy.

1

STUDY AREA LAND USES

Existing Land Uses

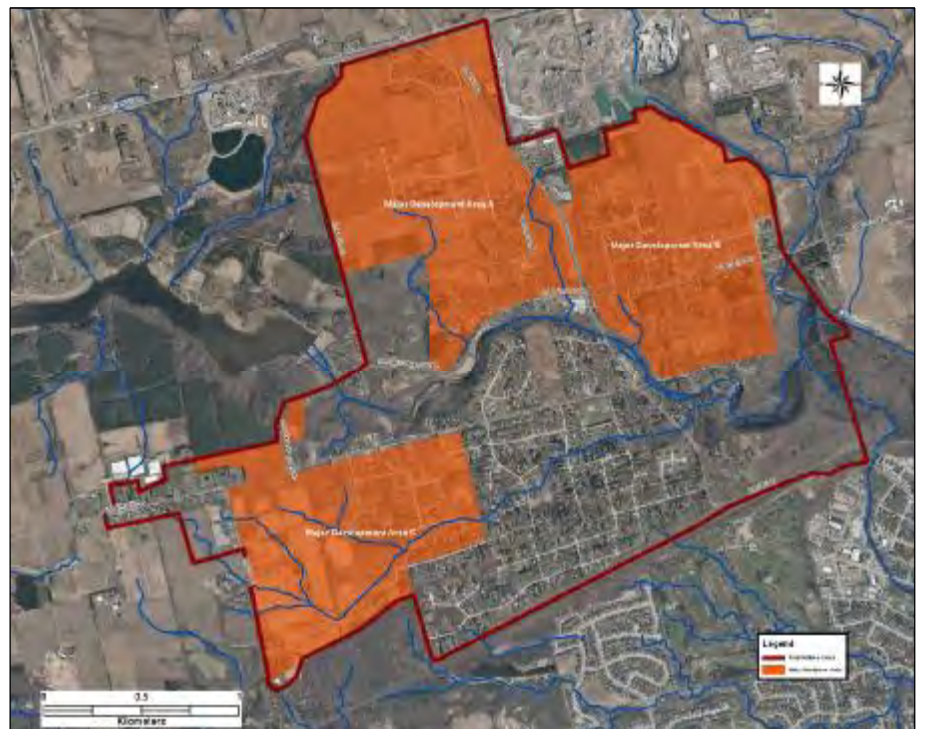


The Mid-Spencer Creek Subwatershed Area Supports a variety of rural and agricultural land uses including farms, natural heritage features, aggregate pits and nurseries. Within the Greensville RSA residential land uses predominate with localized pockets of commercial and institutional services. Residences in the Greensville RSA and Mid-Spencer Creek Subwatershed Area are currently serviced by private septic systems with municipal communal, private communal or individual wells. There are approximately 1,000 residences within the Greensville RSA.

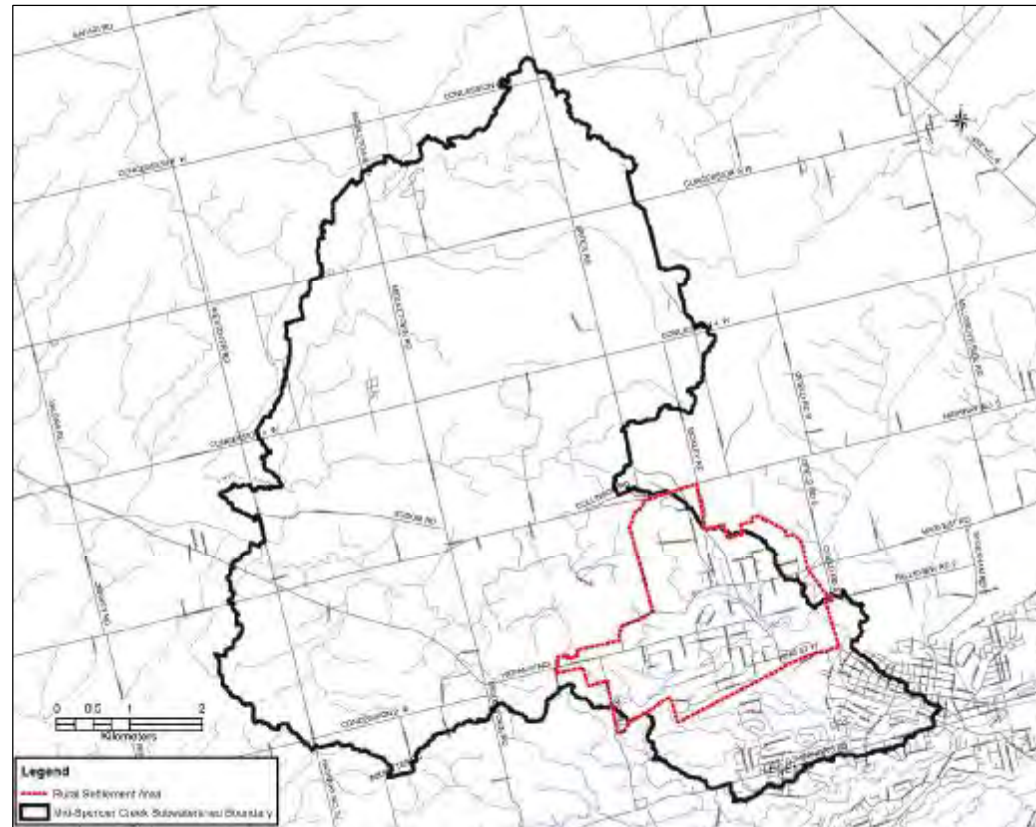
Proposed Land Uses

Land uses within the Mid-Spencer Creek Subwatershed Area, outside of the Greensville RSA, are not expected to change significantly over time. Potential land use changes within the Greensville RSA are outlined in the Greensville Secondary Plan (OPA13). The Secondary Plan, which was prepared in 1992, identified three general growth areas (see accompanying figure). Development within each of these areas, some of which has already occurred, was to take place in phases.

A maximum of 12 lots were permitted in the first phase. Monitoring of surface and groundwater conditions for a two year period was then to take place prior to proceeding with the second phase. In addition to the above, the Secondary Plan allowed for a maximum of five dwellings per year to be created by consent or Plan of Subdivision.



STUDY GOAL, OBJECTIVES AND KEY TASKS



Study Goal

The study goal is defined as:

“to protect, maintain and enhance the ecological processes, functions and significant natural features of the area, providing a framework through which future growth may be established and undertaken in a manner which is environmentally sound and socially and economically sustainable.”

Study Objective

The objective of the study is to provide a basis for the protection, maintenance and enhancement of surface water and groundwater quantity and quality. The resulting plan will provide recommendations as to where and how future development activity can safely occur so as to minimize flood risks, stream erosion, degradation of water quality and negative impacts on natural systems, including groundwater. Recommendations may also identify opportunities for ecological enhancement where deemed integral to the function of the plan.

Key Tasks

The study will be carried out in three stages. The key tasks to be undertaken for each stage are outlined below.

STAGE I – SUBWATERSHED CHARACTERIZATION

- Define existing environmental conditions
- Identify and evaluate natural features and functions of the study area and their potential interrelationships with other natural features
- Summarize constraints and opportunities

STAGE II – DEVELOP AND EVALUATE SUBWATERSHED MANAGEMENT STRATEGIES

- Identify alternative Subwatershed Management Strategies
- Establish criteria to evaluate the alternative strategies
- Elect a Preferred Subwatershed Management Strategy

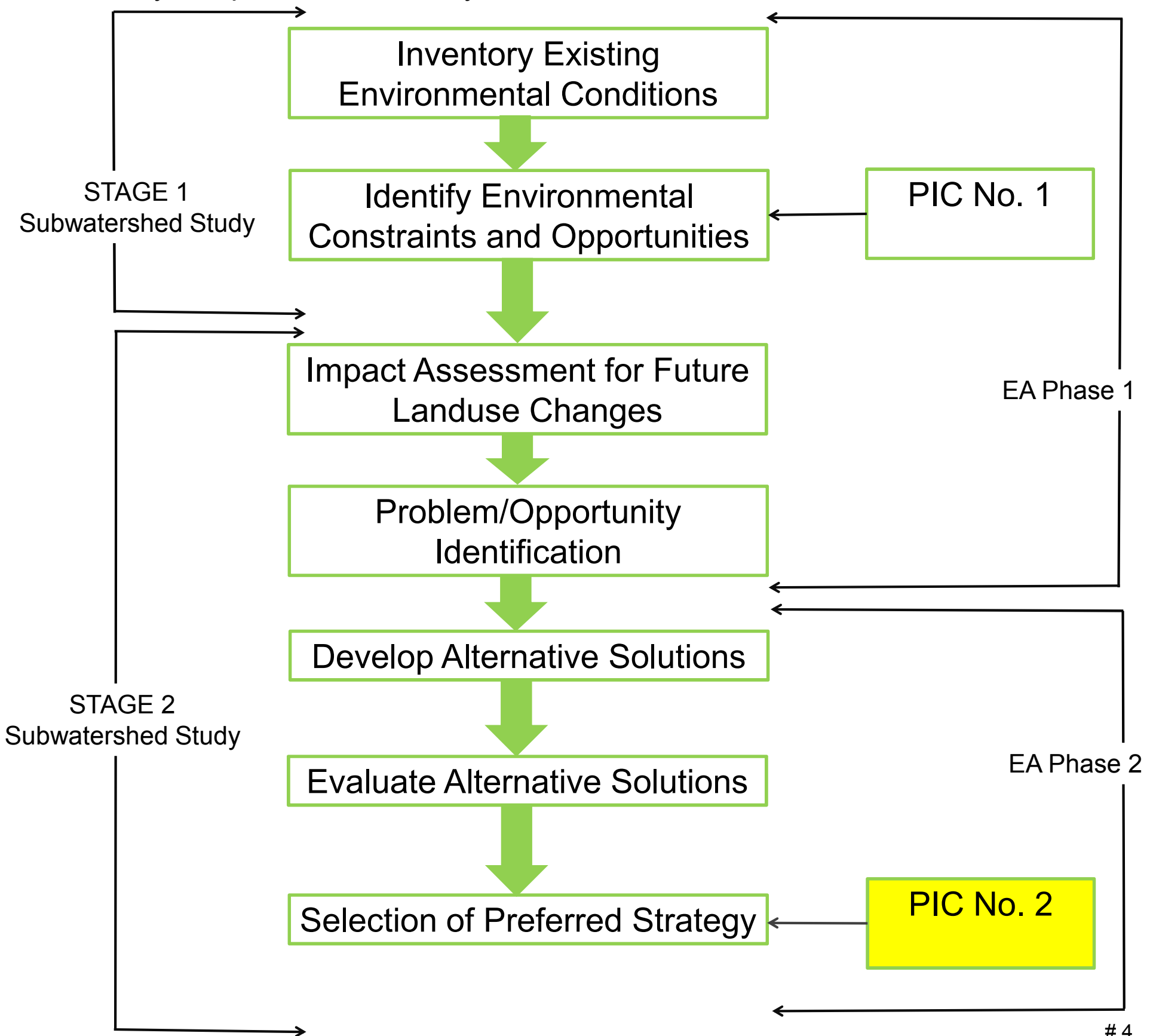
STAGE III – DEVELOP AN IMPLEMENTATION AND MONITORING PLAN

- Develop an Implementation and Monitoring Plan to ensure the long term integrity of the Preferred Subwatershed Management Strategy

3

ENVIRONMENTAL ASSESSMENT PROCESS

The Study is being conducted as a Master Plan and is intended to satisfy Phases 1 and 2 of the Municipal Engineers Association (MEA) Municipal Class Environment Assessment Act (Class EA) process. This will involve a process of problem / opportunity identification, evaluation of alternative solutions, and selection of a preferred solution. Stakeholder consultation is an important part of the EA process, and a key component of the study.



KEY FINDINGS

Terrestrial Resources

- Abundant natural heritage features – ANSI's, PSW's, ESA's – 30% of watershed
- Limited natural features within the RSA, except Christie Mills and Escarpment lands
- Significant portions of natural heritage features are in private ownership

Aquatic Resources

- Mid Spencer Creek supports a diverse warm/cool water fish community
- Christie Mills Reservoir supports a warm water fishery
- Intermittent tributaries provide limited seasonal fish habitat

Groundwater Resources

- The groundwater flow direction is from north to south
- There are two aquifers; a shallow overburden aquifer and deep bedrock aquifer
- A majority of the wells (85%) are located in the deeper bedrock aquifer
- The groundwater table, at a given location, fluctuates throughout the year
- The groundwater monitoring program suggests that groundwater quality in both aquifers is good. The one exception would be at MW4 in the shallow overburden well.

Surface Water Resources

- Water quality in streams fair to good – nutrient enrichment, high nitrates and chloride, low trace metals levels
- Hydrologic modeling of subwatershed completed to characterize surface water – groundwater inter-relationships
- Floodplain mapping through Greensville updated to identify areas of flooding and undersized culverts

Stream Morphology

- Most Tributaries are ephemeral and/or intermittent, poorly defined
- Mid Spencer Creek is cobble-bed or bedrock controlled downstream of Christie Mills
- Mid Spencer Creek is low gradient with vegetated banks upstream of Christie Mills
- Main creek generally stable with limited evidence of erosion problems; tributaries within the Rural Settlement Area are generally stable with only minor local/gradual adjustments; urban tributaries show some instability with minor erosion concerns.

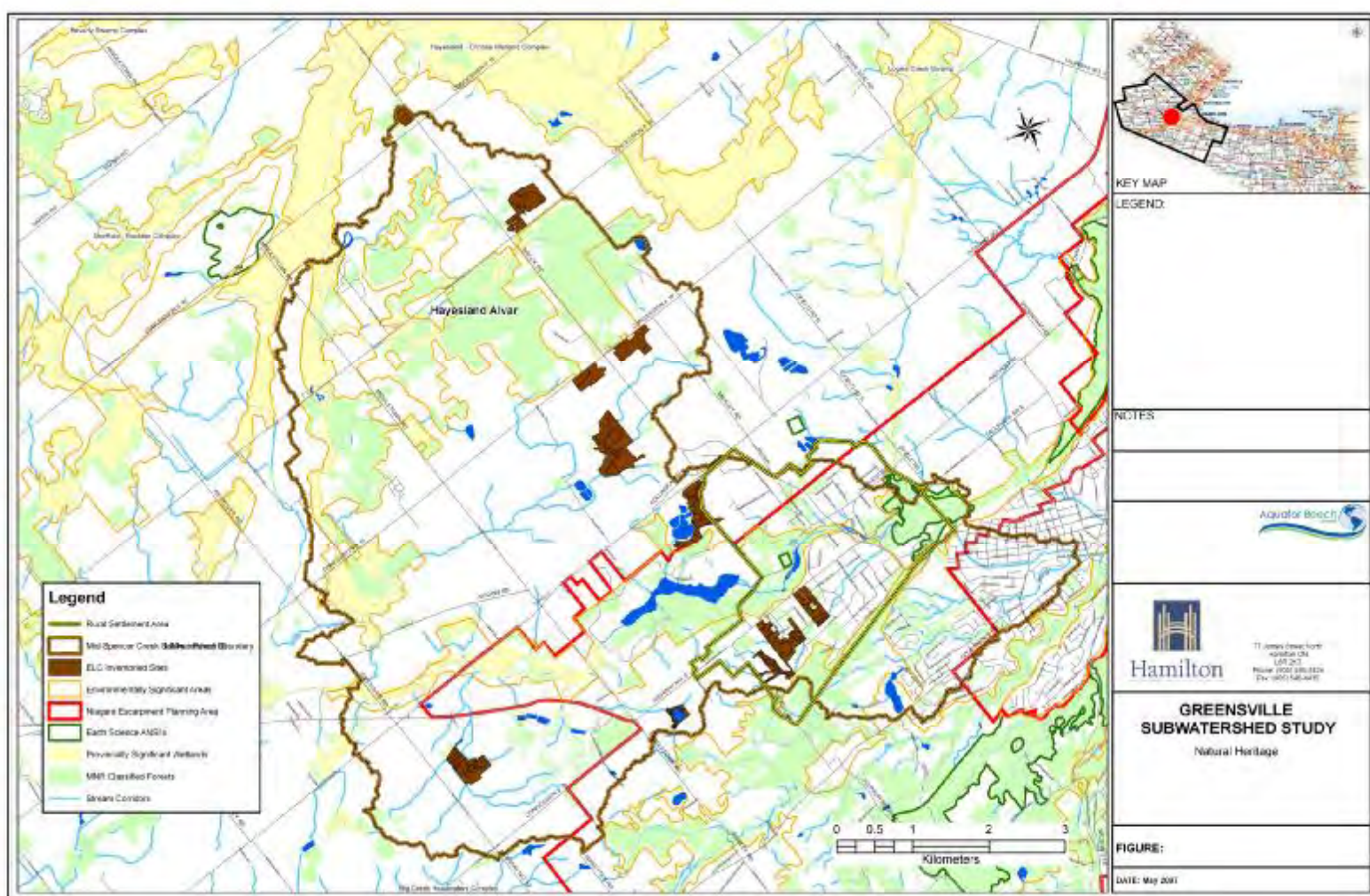
5

NATURAL ENVIRONMENTAL CONTEXT – RURAL SETTLEMENT AREA

Subwatershed Study
Public Information Centre No.# 2
Date: January 22, 2015

The first stage of the Study identified environmental features and functions within the RSA, and assessed the ecological significance and sensitivity of the natural heritage features.

This stage of the Study identified potential development impacts and developed a management plan for the long term protection of a Greenlands Network consisting of habitat cores, corridors and buffers.



Analysis included review of the following scientific disciplines:

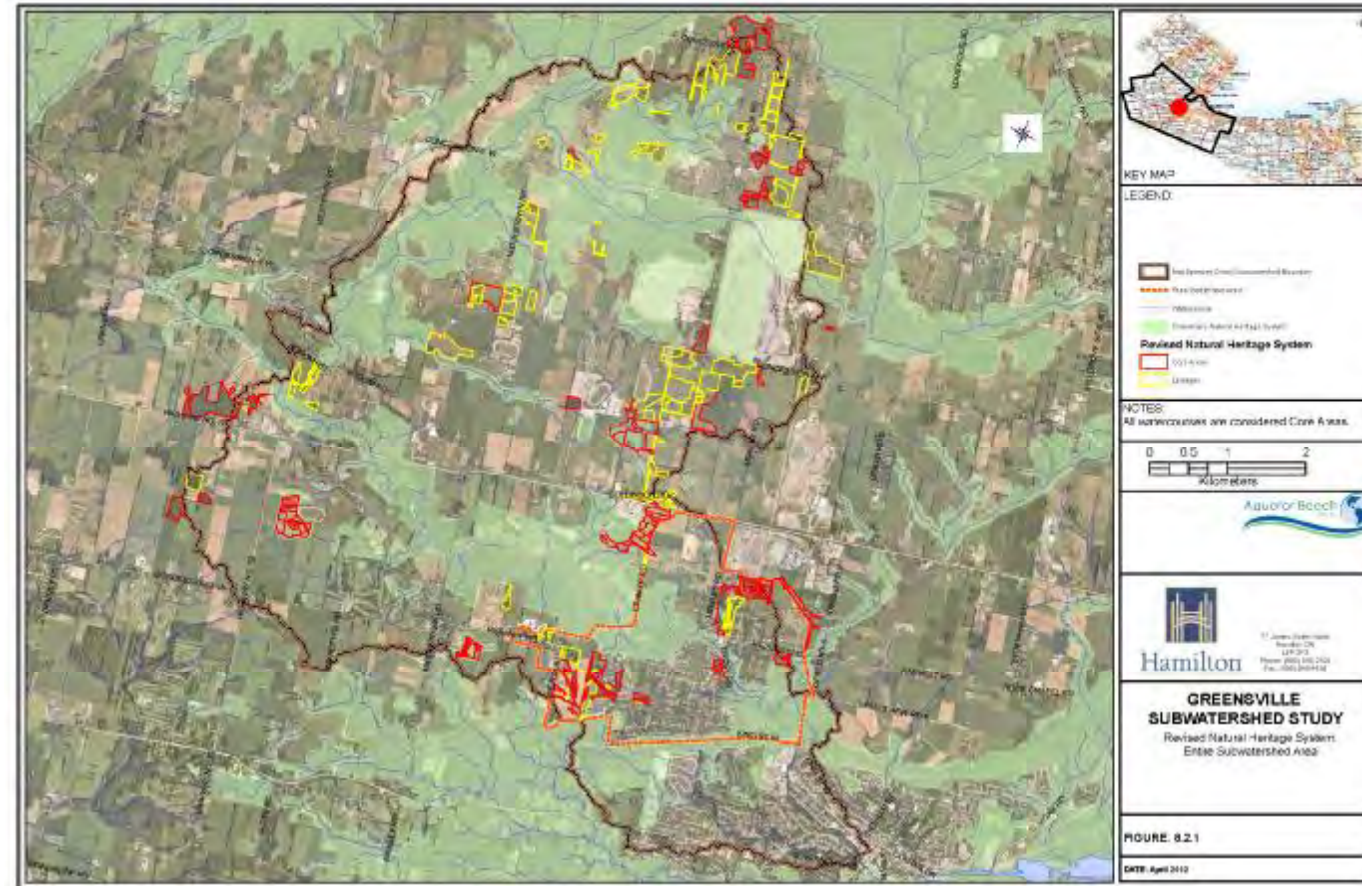
- Natural Heritage System (Terrestrial and Aquatic Ecology)
- Groundwater Resources
- Stormwater Management (water balance, erosion, flooding)

These natural environment components were synthesized and described as part of the Greenlands Network.

All ecological inventories and assessments were completed as per relevant municipal and provincial standards.

6

NATURAL HERITAGE SYSTEM



The Natural Heritage System for the Mid-Spencer Creek subwatershed, including the Rural Settlement Area (RSA), is an interconnected mosaic of existing forests, wetlands, meadows, alvars, valleys, and watercourses (i.e. *direct and indirect fish habitat*). Some of the above features comprise Environmentally Significant Areas, of which there are six in the subwatershed.

The primary aim of identifying a Natural Heritage System (NHS) is to protect the form and function of significant ecological resources within the subwatershed.

What Comprises the NHS in Middle Spencer Creek?

The NHS is comprised of **Core Areas** (i.e. *Key Natural Heritage Features, Key Hydrologic Features, Local Natural Areas*), and **Linkages**. Lands potentially suitable for ecological restoration activities have also been identified. Aquafor Beech Limited built upon the preliminary NHS identified by the City of Hamilton (green), identifying Core Areas (red) and Linkages (yellow) outside of the preliminary NHS through a combination of desktop and field exercises.

Key Natural Heritage Features in the study area include:

- Significant habitat of endangered, threatened, and special concern species;
- Fish habitat;
- Wetlands;
- Life Science Areas of Natural and Scientific Interest (ANSIs);
- Significant valleylands;
- Significant woodlands;
- Significant wildlife habitat; and
- Alvars.

Local Natural Areas in the study area include:

- Environmentally Significant Areas as identified by the City of Hamilton;
- Unevaluated wetlands; and
- Earth Science Areas of Natural and Scientific Interest (ANSIs).

Key Hydrologic Features in the study area include:

- Permanent and intermittent streams;
- Seepage areas and springs; and,
- Wetlands.

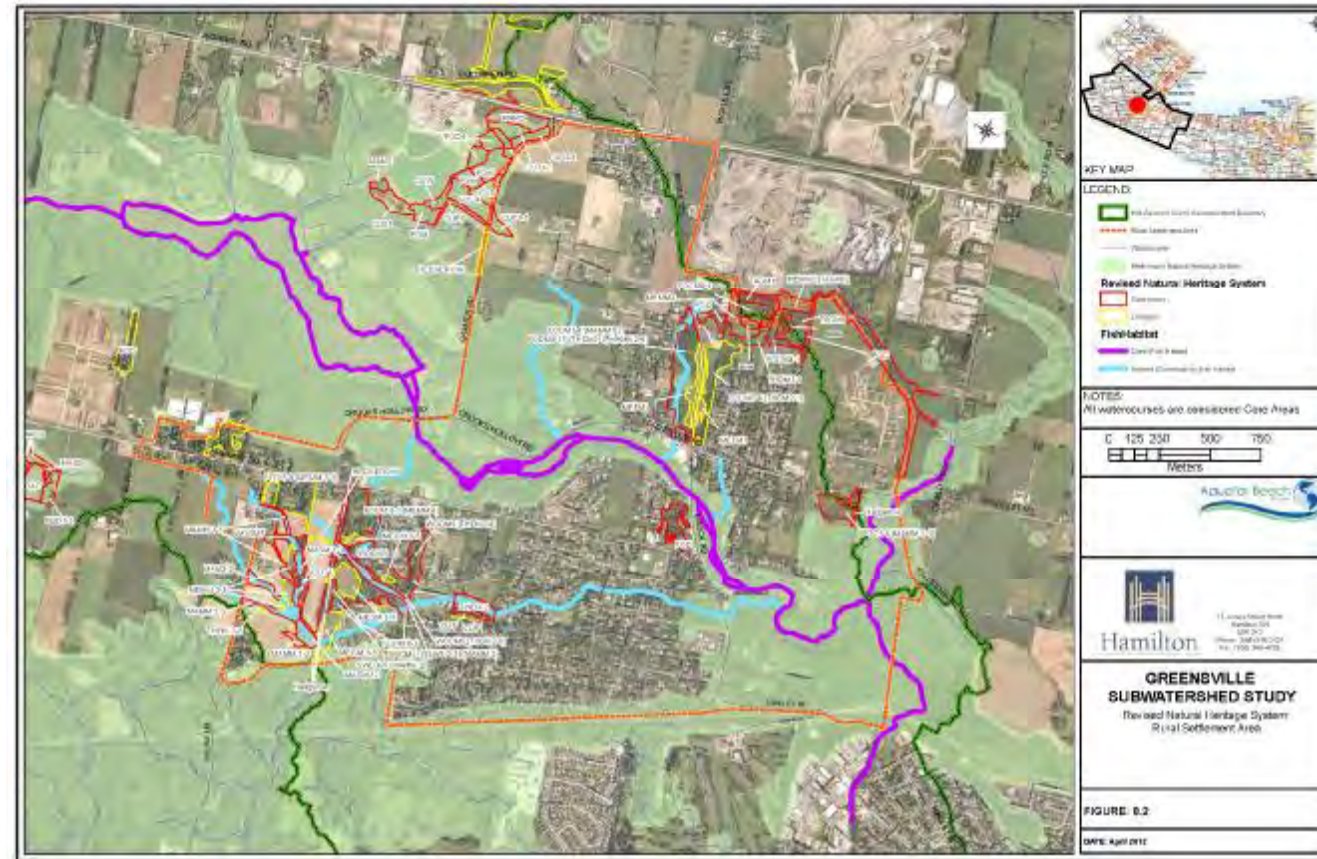


The City of Hamilton defines **Linkages** as landscape areas that connect natural areas.

Linkages in the study area include the following:

- Woodland linkages (e.g. small woodlands);
- Other natural vegetation types (e.g. meadows, old field, thickets); and
- Streams and watercourses that connect Core Areas.

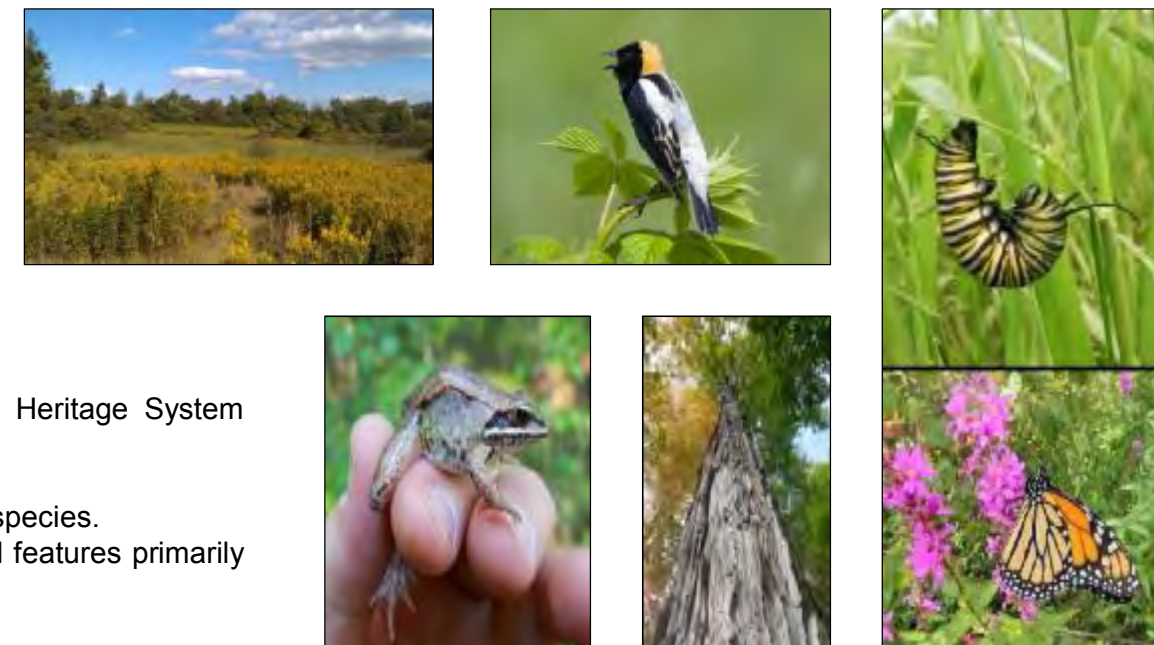
NATURAL HERITAGE SYSTEM



Ecological surveys conducted to inform the development of the Natural Heritage System include the following:

- Vegetation Communities;
- Breeding Birds;
- Migratory Birds;
- Hawks & Owls;
- Frogs;
- Benthic Invertebrates; and
- Fish.

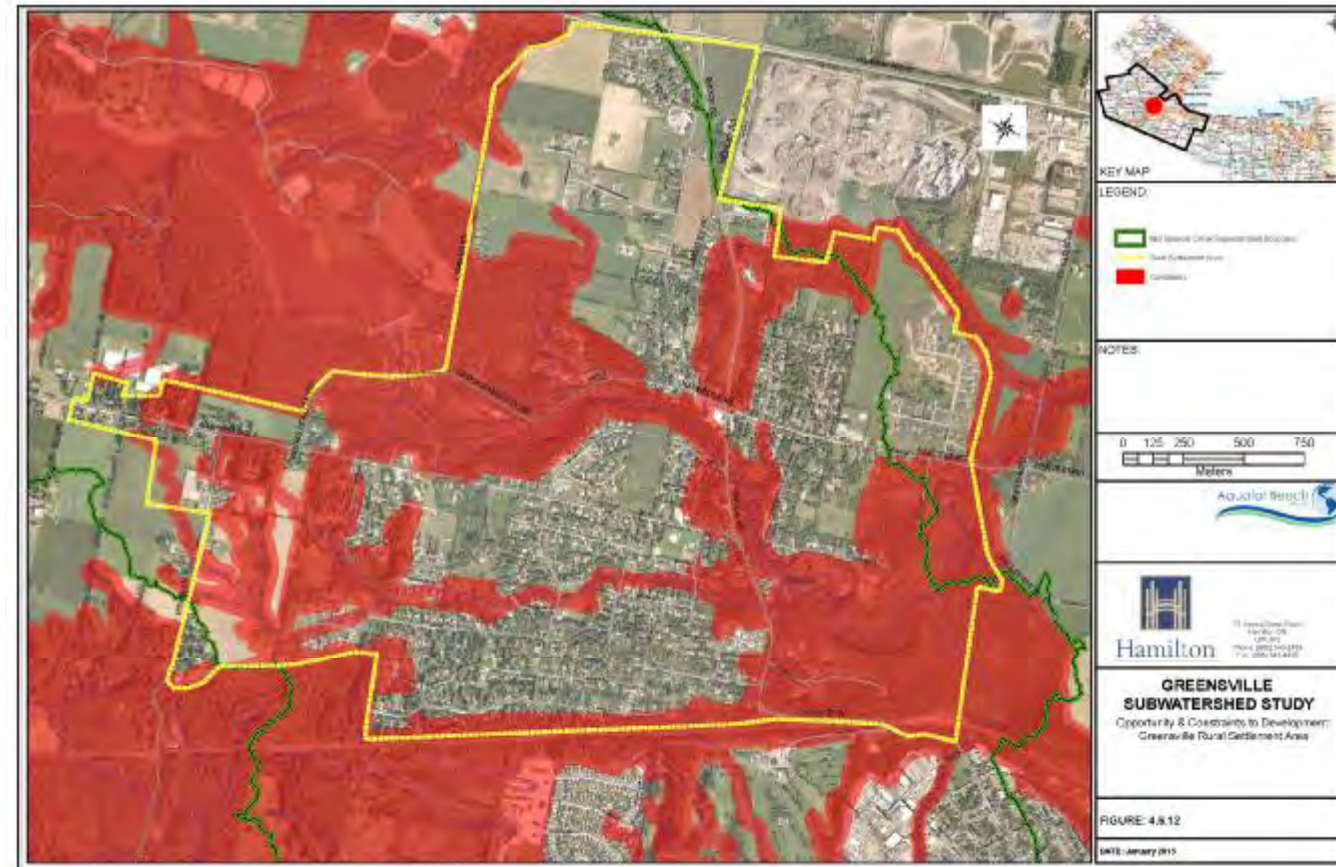
The primary area of development potential is limited to the Rural Settlement Area (pictured). Accordingly, detailed ecological studies were concentrated in the Rural Settlement Areas and the remainder of the subwatershed received a less detailed/general level of assessment.



Key Findings

- A number of Species at Risk were recorded in the Mid-Spencer subwatershed. The Natural Heritage System includes habitats used by these species where applicable.
- Several types of Significant Wildlife Habitat were identified.
- Large Environmentally Significant Areas (ESAs) support the greatest diversity of plant and animal species.
- Outside of the preliminary NHS identified by the City of Hamilton (shown above in green), natural features primarily consist of contributing fish habitat, wetlands, & woodlands.
- Recommended ecological enhancement measures will improve surface and groundwater quality.

Opportunities and Constraints to Development



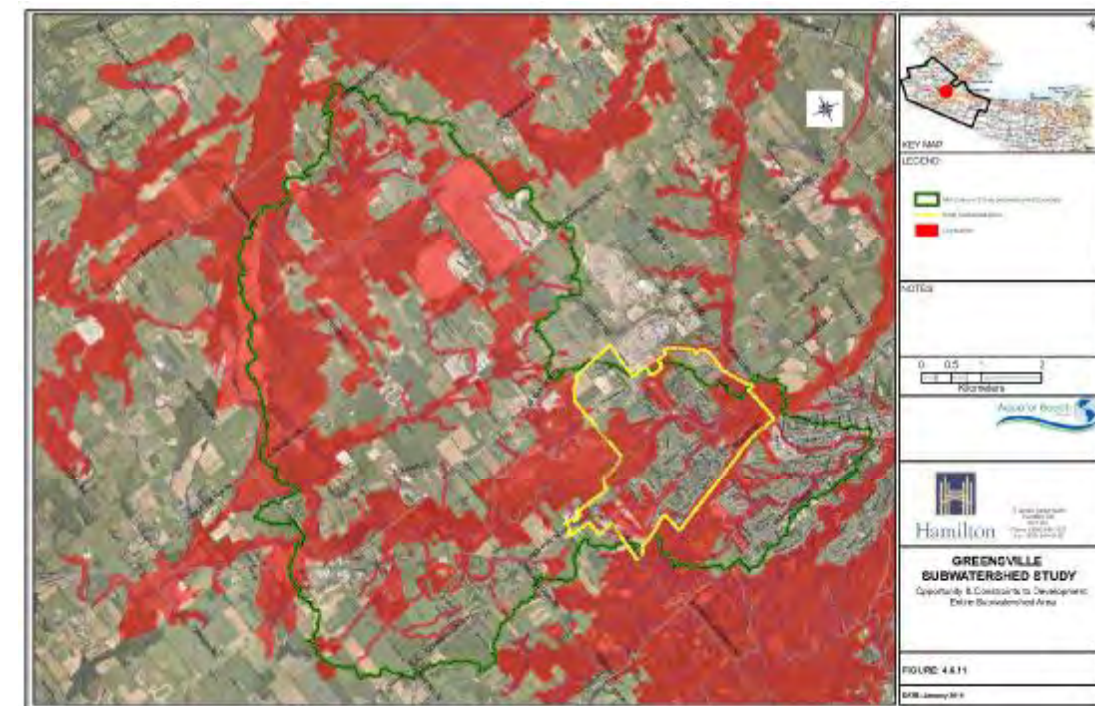
Minor refinements to the constraints shown may occur through a detailed site-specific study, such as an Environmental Impact Statement (EIS), watershed studies, or other appropriate studies accepted by the City of Hamilton without an amendment to the Official Plan. Major changes to the boundaries, such as the removal or addition of Core Natural Heritage Features, require an amendment to the Rural Official Plan.

An EIS will be required where development is proposed adjacent to the Natural Heritage System. The EIS will identify and mitigate the potential impacts of the development on the ecological features and functions of the NHS, to the satisfaction of the relevant review agencies (e.g. City of Hamilton, HCA, MNRF, etc.).

Opportunities and Constraints to Development

The inset maps illustrate the constraints to development within the Greenville Rural Settlement Area (left) and the Middle Spencer Creek Subwatershed (below). Constraints, shown in red, consist of Hazard Lands such as flooding and erosion hazard limits, wetlands, and unstable slopes; as well as the Natural Heritage System and its associated preliminary vegetation protection zones. Final flooding and erosion hazard limits for areas outside of the Rural Settlement Area will be determined through future studies.

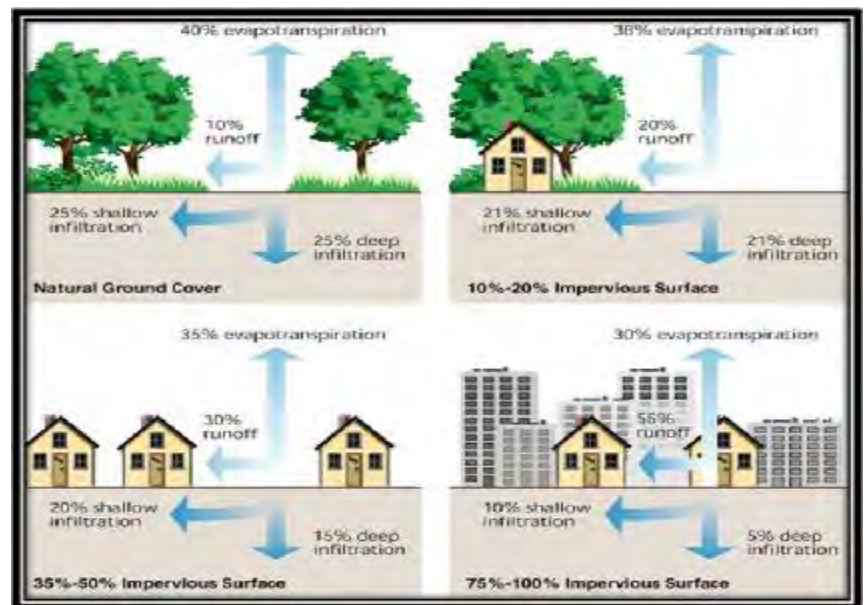
Opportunities to development exist outside of the constraint boundaries.



STORMWATER MANAGEMENT

IMPACTS FROM FUTURE DEVELOPMENT

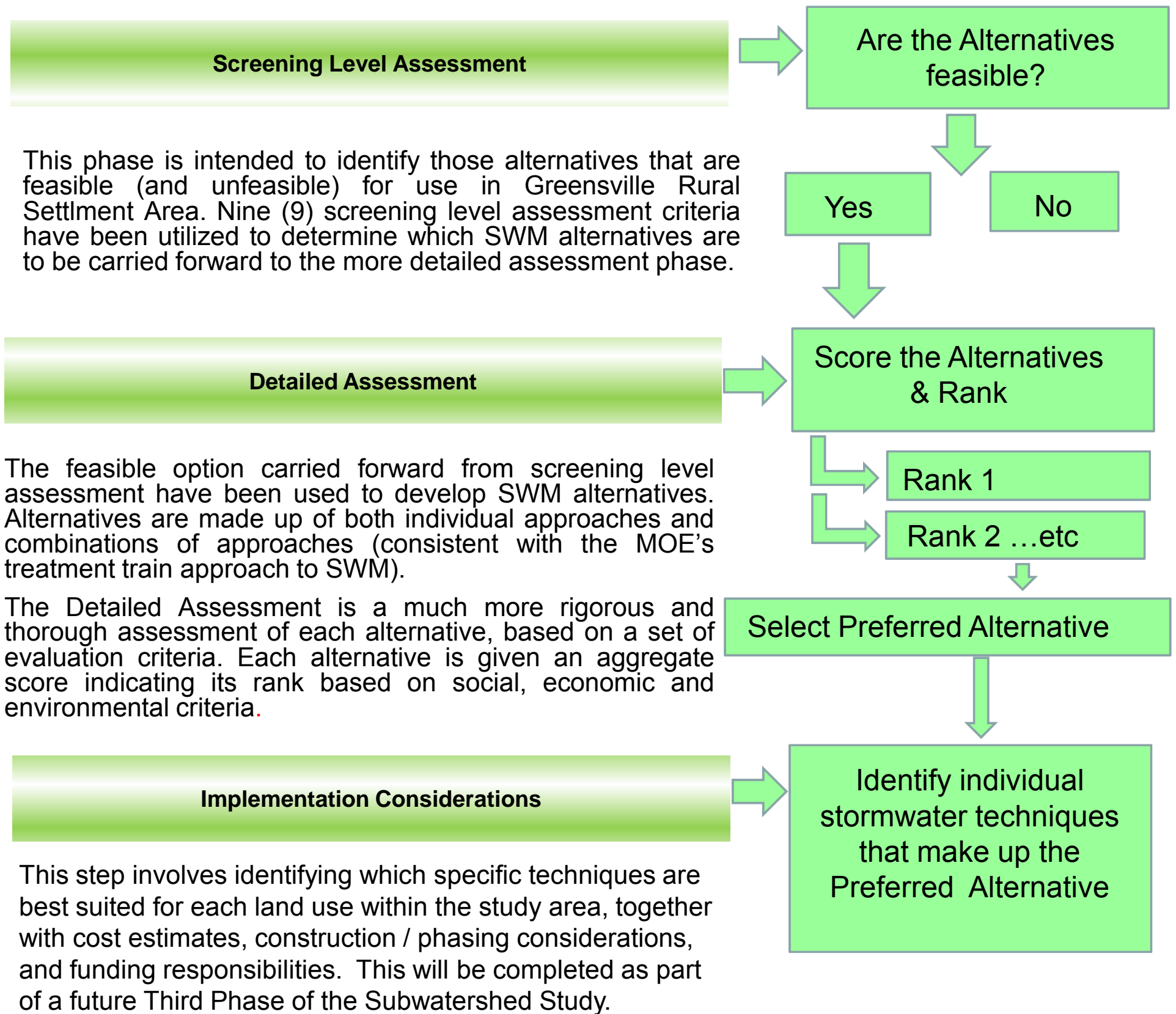
- Increased runoff volumes
- Increased flood flow
- Decreased water quality
- Lower groundwater recharge
- Potential decreased baseflow
- Negative impacts to downstream fisheries



STORMWATER MANAGEMENT

EVALUATION PROCESS

The project team has developed a set of Stormwater Management Alternatives for Greensville Rural Settlement Area. In order to manage the complexity and constraints inherent within the study area for stormwater management and to ensure a transparent selection process that considers all possible design alternatives, a two-phased approach has been used.



STORMWATER MANAGEMENT SCREENING LEVEL ASSESSMENT

Screening Level Criteria

The primary criteria used in the evaluation include:

- Technical feasibility;
- Ability to meet targets for flooding,
- Ability to meet targets for water quality,
- Ability to meet targets for erosion and
- Ability to meet targets for water balance;
- Cost effectiveness;
- Land requirements;
- Public acceptance; and
- Regulatory agency approval.



Stormwater Alternatives	Technical Feasibility	Flooding	Water Quality	Erosion	Water Balance	Cost Effectiveness	Land Requirements	Public Acceptance	Regulatory Agency Approval	Overall
Do Nothing	E	NA	NA	NA	NA	E	E	NA	NA	NA
LID Measures										
LID Source Control (infiltration / filtration)	E	P	E	E	E	P	F	G	E	G
LID Conveyance (infiltration / filtration)	E	F	G	G	G	G	G	G	G	G
Traditional Measures										
Traditional Source Control (storage)	E	E	P	G	P	G	G	G	F	G
Wet pond	E	E	G	F	P	G	F	E	E	G
Wetland	E	E	E	G	P	P	NA	G	G	NA
Dry Pond	E	E	P	G	P	G	F	NA	P	NA
E=Excellent, G= Good, F = Fair, P=Poor, NA = Not Acceptable										

Source Control Measures, including both traditional and LID methods, together with LID Conveyance Control Measures, and End-of-Pipe Wet Ponds have met the screening-level criteria and have been carried forward to the Detailed Assessment.

STORMWATER MANAGEMENT

DETAILED ASSESSMENT CRITERIA

Physical and Natural Environment

- Impact on vegetation, fish and wildlife; surface drainage and groundwater; soil and geology
- Impact on areas of natural and scientific interest, and environmentally-sensitive areas
- Disruption of topographical features



Social, Economic and Cultural Environment

- Impact on existing and proposed development
- Impact on archaeological and historic sites
- Impact on agricultural resources
- Impact on recreational areas
- Impact on other utilities
- Coordination with proposed roadway development



Technical Factors

- Level of service
- Security and reliability
- Impact on existing infrastructure
- Constructability
- Impact on operations and maintenance
- Meeting legislated criteria and regulations



Financial Factors

- Construction, operation and maintenance (life-cycle) costs
- Best use of existing infrastructure
- Flexibility for scheduling works



Legal and Jurisdictional Factors

- Provincial Policy Statement
- Greenbelt Plan
- Niagara Escarpment Commission
- City Water and Wastewater Policy
- Land Acquisition

STORMWATER MANAGEMENT

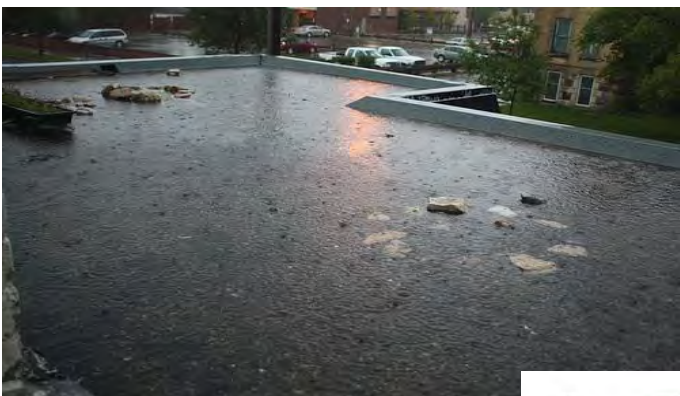
(SWM) ALTERNATIVES

Do Nothing

This option involves developing the Rural Settlement Area without stormwater management. This alternative would result in a substantial increase in runoff, flooding, erosion and also water quality degradation.

Traditional Source Controls

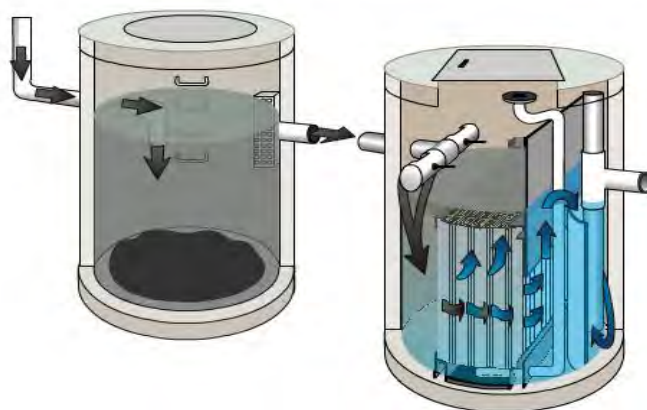
These measures are typically used within high-density forms of development such as commercial or industrial landuses. Rooftops, parking lots, or oversized storm sewers can be used to temporarily store rainfall from large storm events, while oil-grit separator devices can improve water quality.



Rooftop storage



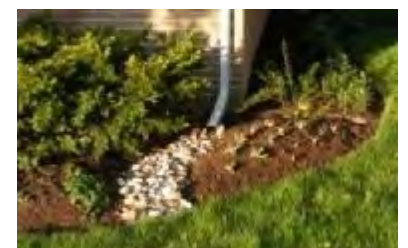
Parking lot storage



Oil & Grit separator

Low Impact Development (LID) Source Controls

This option involves addressing SWM using lot level controls/source controls that encourage the infiltration of water into the ground and reduce stormwater runoff. These systems would be integrated into the design of further urban developments and can include green roofs, permeable pavement, soakaway pits, bioretention, downspout disconnection etc.



STORMWATER MANAGEMENT

(SWM) ALTERNATIVES

Low Impact Development (LID) Conveyance Controls

These controls are linear stormwater transport systems that are generally located within the road right-of-way where they encourage infiltration of water into the ground, improve water quality and reduce runoff. They can include traditional curb and gutter systems, bio-swales, grassed channels and subsurface perforated pipe systems.



End-of-pipe Controls

This option involves addressing SWM using conventional stormwater facilities at the end of the flow conveyance system. These facilities are utilized for erosion, water quantity and quality control applications.



Wet pond



Dry pond



Wetland

STORMWATER MANAGEMENT

DETAILED ASSESSMENT

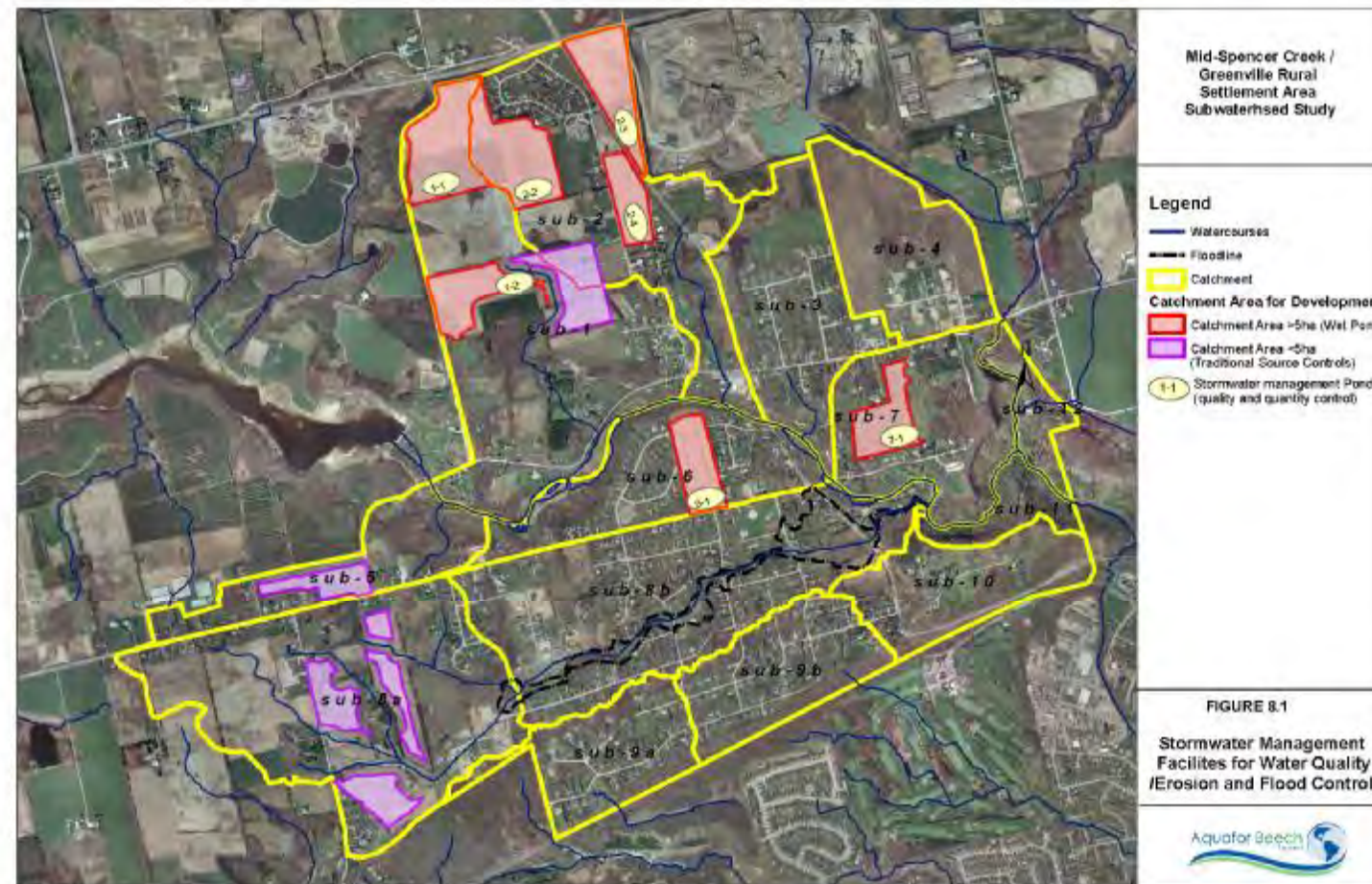
Following a Screening Assessment, the project team developed alternatives to address the EA SWM objectives. The criteria developed to satisfy the SWM objectives were used to score the alternatives and select/identify the preferred alternative.

Alternative #	Alternative Description	Physical and Natural Environment Criteria					Social and Cultural Environment Criteria				Technical Criteria					Financial Criteria					Aggregate Score
		Water Balance	Flooding	Surface Water Quality	Erosion	Terrestrial and Aquatic Habitat	Existing Land Uses	Aesthetic Value	Benefit to Community and Public Acceptance	Coordination with Infrastructure Design	Proven Effectiveness	Regulatory Agency Acceptance	Impact on Existing Infrastructure	Constructibility	Maintenance Requirements	Capital Costs	Operation and Maintenance Costs	Land Requirements	Impacts on Property Values	Phasing Consideration	
Traditional Measures																					
1	Traditional Measures – Traditional Source Control Only	1	3	1	3	1	2	1	1	3	3	3	3	3	3	3	4	4	1	4	47
2	Traditional Measures – Wet Ponds Only	1	4	3	3	2	3	3	3	4	4	4	3	4	3	2	3	1	3	2	55
3	Traditional Measures - Traditional Source Control and Wet Ponds	1	4	3	3	2	3	3	3	4	4	4	3	4	3	3	3	2	2	3	57
Low Impact Development (LID) Measures																					
4	LID Measures – Source Control Only	3	1	3	2	3	3	3	3	3	3	2	2	3	2	3	2	3	3	4	51
5	LID Measures – Conveyance Control Only	2	1	2	2	3	2	2	2	2	3	2	2	2	2	3	2	3	2	2	41
6	LID Measures – Source Control and Conveyance Control;	4	1	3	2	3	3	3	3	2	3	2	2	2	2	2	2	3	3	2	47
7	LID Source Control and Traditional Measures	4	4	4	4	4	3	4	4	4	4	3	3	2	2	2	2	1	3	2	59*

- **The preferred alternative for the Rural Settlement Area is Alternative 7, which consists of LID source control measures combined with Traditional measures, which include end-of-pipe wet ponds and oil and grit separators.**
- **Alternate Stormwater Management Strategy (for sites < 5ha):**
 - Traditional source controls (i.e. surface storage and Oil/Grit separators);
 - LID source controls

STORMWATER MANAGEMENT

PRELIMINARY PREFERRED STORMWATER MANAGEMENT STRATEGY



The Preliminary Preferred Stormwater Management Strategy consists of 3 key measures:

1. Low Impact Development (LID) Source Controls

These measures encourage infiltration of water into the ground.

Benefits:

- ✓ Reduces stormwater runoff
- ✓ Improves water quality
- ✓ Promotes baseflow in streams

Targets:

Water balance estimates for the study area indicate that in order to overcome the anticipated recharge deficit resulting from residential development within areas underlain by silt loam and sand loam soils, future infiltration measures would be required to capture and infiltrate a volume of 127m³/ac/yr of groundwater recharge per year on a residential lot.

2. Wet Ponds and Traditional Source Controls

These measures store and gradually release stormwater runoff.

Benefits:

- ✓ Controls flooding
- ✓ Improves water quality

Targets:

- ✓ **Industrial development:** Up to 105m³/ha of permanent pool storage
- ✓ **Residential development:** 65 m³/ha is permanent pool storage
- ✓ 360 – 590 m³/ha of active storage

DOMESTIC WATER SUPPLY

ALTERNATIVES

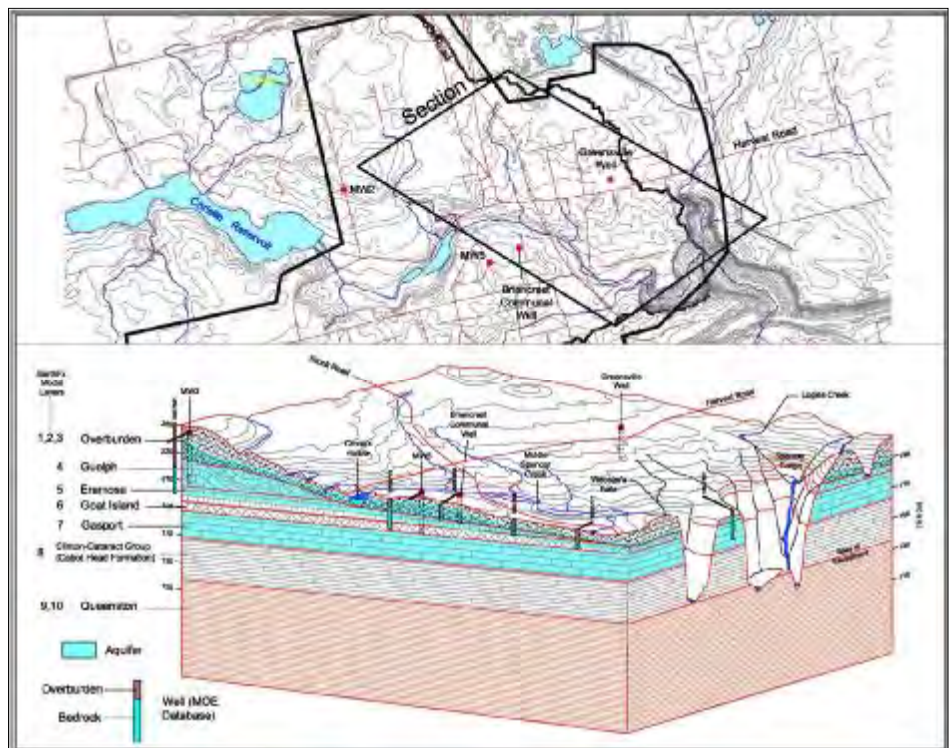
BACKGROUND

The Greensville Rural Settlement Area encompasses 655 hectares and a population of 2,525 persons who rely on groundwater wells for drinking water. There is one City-owned municipal well (supplying approximately 34 homes) and the Briencrest communal well which supplies 26 homes.

Future development within the RSA could entail construction of 317 residences with private wells and septic systems.

OBJECTIVES

One of the objectives of the study was to assess various alternatives to ensure reliable domestic water supply sources for existing and future residents.



The approach follows the Municipal Class EA process. The alternatives considered are:

- “Do Nothing”
 - This option maintains the status quo and continued use of the single municipal well, including necessary operation and maintenance practices.
- “Control / Limit Future Growth”
 - This alternative would limit growth to within existing system capabilities and would disallow further development and infills. This option also includes the use of the single municipal well, including necessary on-going operation and maintenance practices.
- “Bring up Municipal Water”
 - The alternative would extend City municipal water from Dundas (the Woodward Avenue Plant) up the Escarpment to Greensville and involve construction of an elevated tank and local water mains.
- “Provide more Communal Wells”
 - There is currently one communal well, the Briencrest well, which services 26 homes. The well and pump house are located on Haines Avenue. The well is currently owned by Infrastructure Ontario and is operated by the Ontario Clean Water Agency (OCWA). The well water is not potable due to elevated bacteria. For this alternative, new, or existing dwellings would be serviced by communal wells.
- “Maintain Status Quo and Add a Backup City Well”
 - The alternative is similar to the “Do Nothing” alternative except that a back-up municipal well would be added in the event that the existing well went off-line.

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DOMESTIC WATER SUPPLY

EVALUATION CRITERIA

Physical and Natural Environment

- Impact on vegetation, fish and wildlife; surface drainage and groundwater; soil and geology
- Impact on areas of natural and scientific interest, and environmentally-sensitive areas
- Disruption of topographical features



Social, Economic and Cultural Environment

- Impact on existing and proposed development
- Impact on archaeological and historic sites
- Impact on agricultural resources
- Impact on recreational areas
- Impact on other utilities
- Coordination with proposed roadway development



Technical Factors

- Level of service
- Security and reliability
- Impact on existing infrastructure
- Constructability
- Impact on operations and maintenance
- Meeting legislated criteria and regulations



Financial Factors

- Construction, operation and maintenance (life-cycle) costs
- Best use of existing infrastructure
- Flexibility for scheduling works



Legal and Jurisdictional Factors

- Provincial Policy Statement
- Greenbelt Plan
- Niagara Escarpment Commission
- City Water and Wastewater Policy
- Land Acquisition

DOMESTIC WATER SUPPLY

SUMMARY AND SELECTION OF PREFERRED DOMESTIC WATER SUPPLY ALTERNATIVES

Information Matrix for Domestic Water Supply Alternatives

Evaluation Criteria	Do Nothing – Maintain Status Quo	Control – Limit Community Growth	Bring Up Municipal Water	Provide More Communal Wells	Status Quo – Add Back-up Well
Natural Environment	<ul style="list-style-type: none"> Minimal impact to natural environment as ongoing activities are limited. Ecological processes likely to maintain current trajectory. 	<ul style="list-style-type: none"> Minimal impact as further construction activities would be halted 	<ul style="list-style-type: none"> Significant impact associated with crossing of existing streams and potential impact on the Natural Heritage System 	<ul style="list-style-type: none"> Moderate potential impact as a result of stream crossings, local impacts to vegetation and wildlife 	<ul style="list-style-type: none"> Minimal impact to natural environment as ongoing and proposed activities are limited
Socio-Economic	<ul style="list-style-type: none"> Impact on existing and proposed development, recreational areas and utilities limited 	<ul style="list-style-type: none"> Neutral impact as reduction in construction activities would be offset by economic impact 	<ul style="list-style-type: none"> Significant impacts due to construction including traffic disruption, noise 	<ul style="list-style-type: none"> Significant localized impacts due to construction noise, traffic disruption 	<ul style="list-style-type: none"> Impact on existing and proposed development, recreational areas and utilities limited
Legal–Jurisdictional	<ul style="list-style-type: none"> This alternative is consistent with existing municipal and provincial policies 	<ul style="list-style-type: none"> This alternative is not consistent with existing growth policies for the city 	<ul style="list-style-type: none"> This alternative is not consistent with Provincial or Municipal policy This would require review by the Niagara Escarpment Commission 	<ul style="list-style-type: none"> This alternative is not consistent with City Water and Wastewater policy and the Greensville RSA Plan on partial servicing This alternative is prohibited by the Greenbelt Plan and the Provincial Policy Statement 	<ul style="list-style-type: none"> This alternative is consistent with provincial policy and preferred by municipal policy requirements
Technical	<ul style="list-style-type: none"> Level of service is adequate Alternative is technically feasible Issues will arise if existing well malfunctions 	<ul style="list-style-type: none"> Level of service for existing homes is adequate 	<ul style="list-style-type: none"> Technical assessment would need to be confirmed as part of Regional assessment of water distribution system 	<ul style="list-style-type: none"> Technical assessment would be confirmed as part of subsequent, more detailed assessment 	<ul style="list-style-type: none"> Reliability of service for existing dwellings serviced by municipal well FDG01 would be improved Alternative is technically feasible <p>Two wells installed in Johnson Tew Park have required flows for backup</p>
Financial	<ul style="list-style-type: none"> Ongoing costs for operation and maintenance are quite low Future development costs borne by developer / landowner 	<ul style="list-style-type: none"> Ongoing costs for operation and maintenance are quite low 	<ul style="list-style-type: none"> This alternative would be significantly more costly than any of the other alternatives 	<ul style="list-style-type: none"> This alternative would be more costly than others, except the <i>Bring-up Municipal Water</i> alternative 	<ul style="list-style-type: none"> Ongoing costs for operation and maintenance are quite low Future development costs borne by developer / landowner Cost for back-up well tied into existing system is of moderate cost
Overall Alternative Rank	●	◐	○	◑	●

Most Preferred ● ◐ ◑ ○ Least Preferred

DOMESTIC WATER SUPPLY

PREFERRED DOMESTIC WATER SUPPLY ALTERNATIVE

RATIONALE FOR SELECTION OF PREFERRED SERVICING ALTERNATIVE

The preferred domestic water supply alternative is to maintain individual services (wells and septic systems) on future residential lots and to add a back-up well to the existing municipal well.

Rationale for Preferred Alternative and Key Findings from Phase 1 and Phase 2 are:

- There will be minimal impact to the natural environment.
- Groundwater Resources can accommodate future development as defined in the Official Plan with minimal impact to water levels.
- There will be limited impact on existing and proposed development.
- Placement of utilities (water and wastewater lines) will be eliminated.
- This alternative is consistent with the Greenbelt Act, the Provincial Policy Statement, the City Water and Wastewater Master Plan and the City of Hamilton Rural Office Plan.
- The costs of drilling individual wells on residential lots would be borne by the developer.
- A backup well would provide a better level of service and reliability to the 34 homes presently serviced.
- In 2013, two wells were constructed in the future Johnson Tew Park near the intersection of Harvest and Brock Roads. The wells were tested as a potential backup to the existing municipal well.
- On-going servicing and maintenance costs for the municipal well are relatively low. The cost to bring back-up well(s) on-line is of moderate cost.

NEXT STEPS

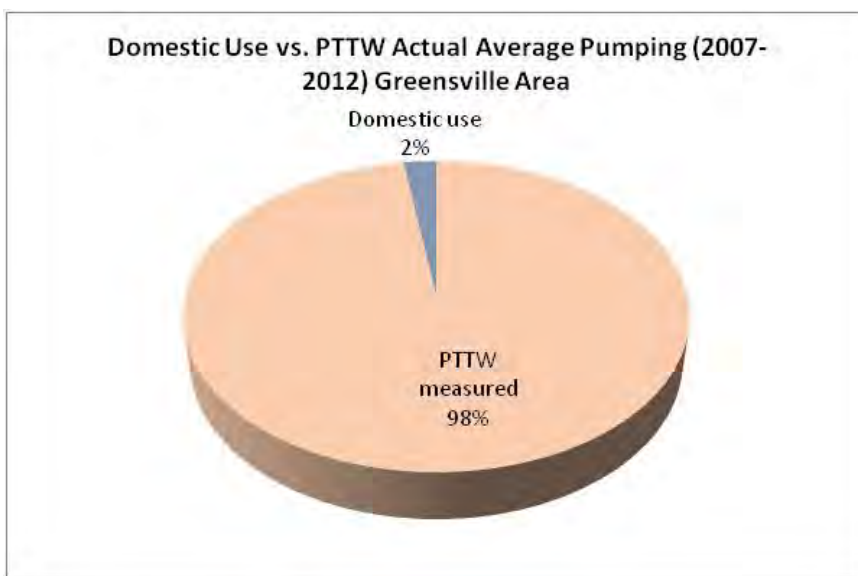
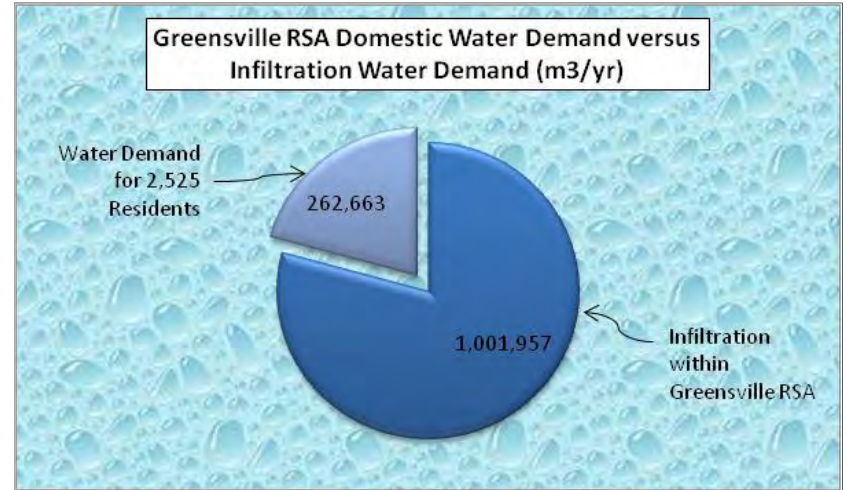
The location, sizing and preliminary design of the necessary infrastructure (treatment plant, storage tank) will be subject to further assessment to be undertaken under Schedule C of the Municipal Class Environmental Assessment.

GROUNDWATER MANAGEMENT

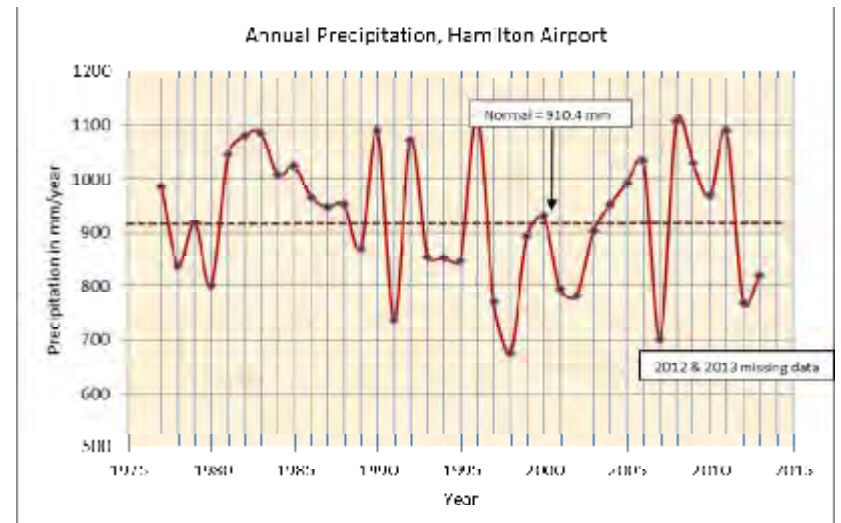
EXISTING GROUNDWATER CONDITIONS

APPLICATION OF THE PREFERRED DOMESTIC WATER SUPPLY ALTERNATIVE

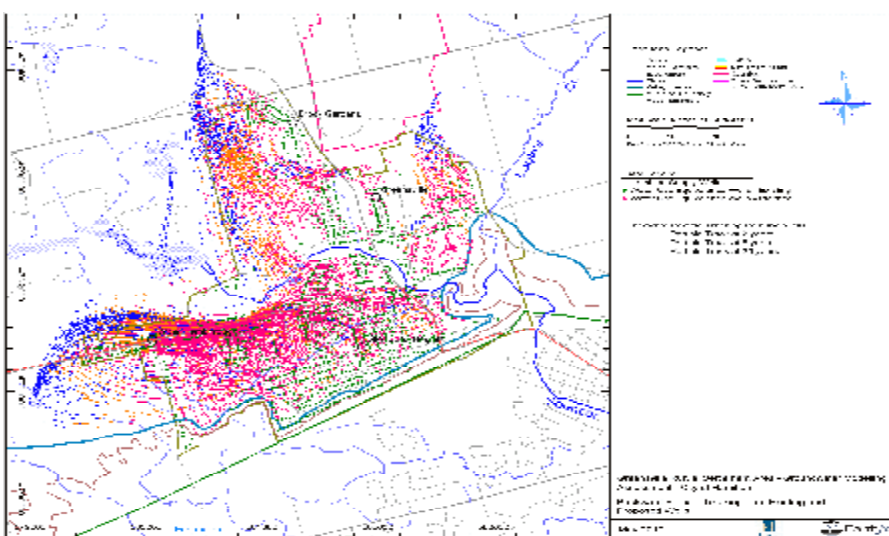
- Groundwater recharge by infiltration within the Greensville RSA amounts to over 1,000,000 cubic metres/year. Existing domestic water demand for 2,525 residents amounts to 262,663 cubic metres/year or 26% of the infiltration available.



- Groundwater demand within the Greensville RSA amounts to less than 2% of the average annual pumping rate for neighbouring Permits to Take Water (PTTW), including the quarries.



- The water table changes from year to year depending on the amount of precipitation, which can vary by up to 400 mm annually.



- Groundwater models demonstrate that the Greensville RSA is capable of supporting an additional 317 domestic wells without lowering the water table more than 50 centimetres.
- Modeling has shown that most of the groundwater demand in Greensville over a 2 to 25 year period is derived from within the RSA itself.
- Modeling has also demonstrated that drought conditions have a more profound effect on water levels, leading to drops between 1 and 7 metres.

- Appropriate lot sizing along with measures to provide the same amount of infiltration can be applied as development proceeds.

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GROUNDWATER MANAGEMENT

PREFERRED STRATEGY

INTRODUCTION

There are two primary elements to an appropriate groundwater management strategy:

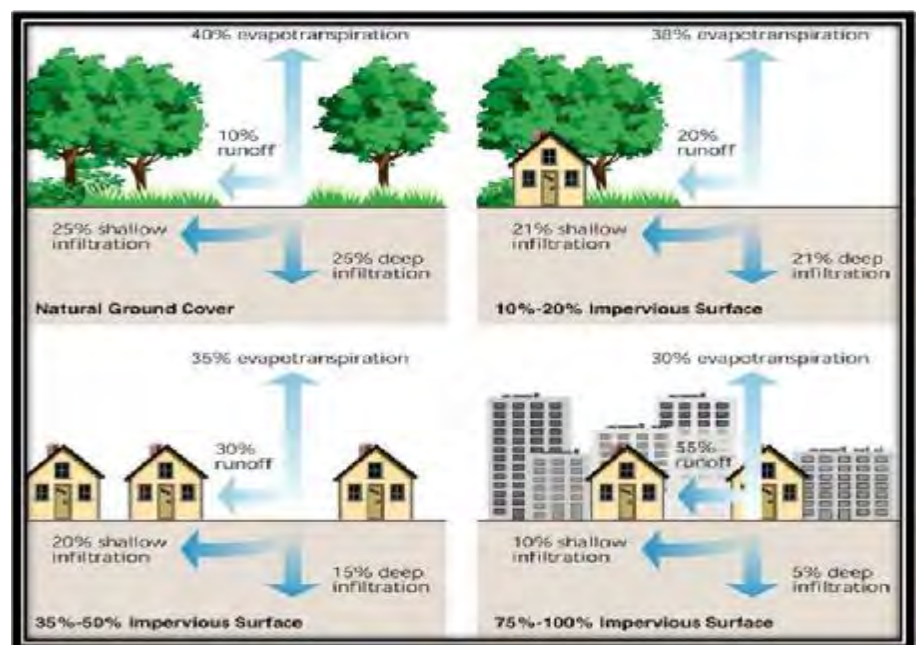
1. To maintain or enhance groundwater recharge as future development proceeds.
2. To determine appropriate lot sizes that will ensure that nitrate dilution from septic systems is below the Ontario Drinking Water Standard.

THE WATER BALANCE

The water balance for the entire Greensville RSA was modeled and indicated that the average annual infiltration rate of 210 mm/year is applicable for the entire RSA. This figure must be maintained as development proceeds in order to ensure that pre-existing groundwater recharge does not diminish.

The infiltration deficit due to post-development impervious surfaces (roofs, driveways, pools) on a residential lot is 31.5 mm/year (127 cubic metres/year on a 1-acre lot).

Based on rainfall distribution, this infiltration deficit can be made up by over-infiltration of the first 1.5 mm of rainfall events on the entire lot using LID measures.



LOT SIZE

Residential lot size is a minimum of 1 acre (0.4 hectare) or larger “as required by environmental and cumulative land use conditions for the discharge and dispersion of sewage system effluent” (Rural Hamilton Official Plan, Vol. 1, Ch. C.5.1.3).

The final lot size is determined by a hydrogeological investigation to confirm that the soils are capable of infiltrating a sufficient volume of water to dilute nitrate from the septic system. The objective is to assure that groundwater nitrate levels remain lower than the Ontario Drinking Water Standard of 10 mg/litre at the property boundary. The procedure is described in the **City of Hamilton Guidelines for Hydrogeological Studies and Technical Standards** (November 2013).

Calculating the appropriate lot size requires the services of a qualified professional, who will determine the predominate soil textures and their corresponding annual infiltration rates (from Appendix C in the City Guidelines), while accounting for the percentage of post-development impervious surfaces on the lot (roofs, driveways). Further details will be provided in the final report.

CONCLUSION

Collectively, these measures will protect the quality and quantity of groundwater within the Greensville RSA.

Next Steps

Following this Public Information Center, the following tasks will be completed:

- ✓ Finalize the recommended Stormwater, Groundwater and Natural Heritage Management Plan
- ✓ Develop an Implementation Plan

If you have any questions, comments, please contact.

Marco Silverio
Public Works Department
City of Hamilton
Phone: 905-546-2424 ext. 6099
Email: Marco.Silverio@hamilton.ca

Dave Maunder
Aquafor Beech Limited
Phone: 905-629-0099 ext. 290
Email: maunder.d@aquaforbeech.com

Appendix M-4-5

Public Information Centre #2

Agency Consultation

January 2015



City of Hamilton
City Hall, 71 Main Street West
Hamilton, Ontario,
Canada L8P 4Y5
www.hamilton.ca

Hamilton Water Division, Public Works Department
Physical Address: 77 James Street North, Suite 400, Hamilton, Ontario, L8R 2K3
Phone: 905-546-2424 ext. 6099 Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

January 8, 2015

**Re: Notice of Public Information Centre (PIC) No. 2
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

Dear Sir/Madam;

We have enclosed for your information a copy of the Notice of Public Information Centre No. 2 for the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. This notice will also appear in the Hamilton Spectator on January 9th and January 16th, 2015.

The purpose of this Class EA is to determine a management strategy for surface water (streams, stormwater), groundwater, community servicing (water and septic) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA. This Study will follow the Class EA planning and design process; the Master Plan (Approach 1) will address Phases 1 and 2 of the Class EA requirements for any Schedule B projects that are identified, and outline additional work that will be required to implement any Schedule C projects that are identified as part of the study.

For further information or if you wish to provide input regarding this project, please contact the undersigned at 905-546-2424 ext. 6099 or via email at Marco.Silverio@hamilton.ca.

Yours truly,

Marco Silverio, M.Sc.
Project Manager

Enclosure

Notice of Public Information Centre No. 2 Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

Project Background

The City of Hamilton has initiated a Subwatershed and Class Environmental Assessment (EA) study for the Mid-Spencer Creek and Greensville Rural Settlement Area (RSA). Residents in the Greensville RSA and the subwatershed are currently serviced by private septic systems and groundwater-sourced municipal communal, private communal or individual wells.

The study will set a management strategy for surface water (streams, storm water), groundwater, community servicing (water and septic) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA. The study includes public and review agency consultation, evaluation of alternatives, assessment of the impacts of the proposed works, and identification of measures to mitigate any adverse impacts. Upon completion of the study, a Report documenting the planning and decision making process followed, will be prepared and made available for public review.

The Study Process

This Study will follow the planning and design process as defined in the Municipal Engineers Association Municipal Class Environmental Assessment document (October 2000, as amended in 2007 & 2011). The Master Plan (Approach 1) will address Phases 1 and 2 of the Class EA requirements for any Schedule B projects that are identified, and outline additional work that will be required to implement any Schedule C projects that are identified as part of the study.

Public Information Centre (PIC) No. 2

Two (2) PIC sessions are required for this Study. PIC No. 1 was held on November 21, 2007. PIC No. 2 will present the evaluation of the alternative solutions and identify the recommended solutions and is scheduled for:

Date: January 22, 2015

Time: 4:00 pm to 7:00 pm

Location: Christ Church, 92 Highway #8, Flamborough

We would like to hear from you

We are interested in hearing any comments or concerns you may have with respect to this study. Comments received through the course of the study will be considered in selecting the recommended solutions. Information will be collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record. If you would like more information or would like to be placed on the Study mailing list, please contact:

Marco Silverio, M.Sc.

Project Manager

City of Hamilton

77 James Street North, Suite 400

Hamilton, ON L8R 2K3

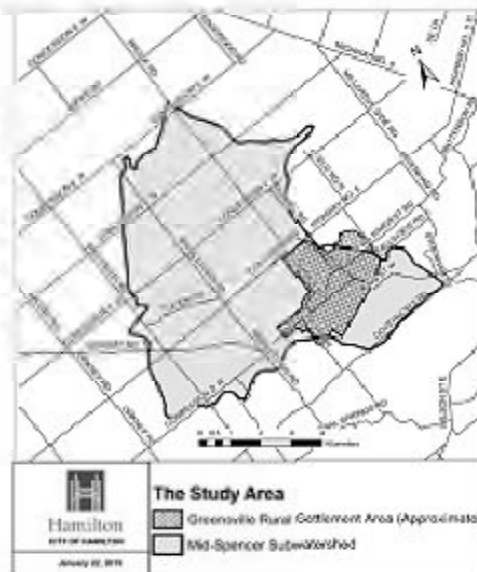
Phone: 905-546-2424 ext. 6099

Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 8th and January 15th, 2015.



Hamilton



Hamilton

**RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study**

1. Contact Name: _____

2. Ministry/Agency/Office: _____

3. Address: _____

_____ Postal Code: _____

Phone No.: _____

Email: _____

4. Please note specific comments and/or concerns (please attach additional sheets if necessary):

Signature _____

Date _____

Please return this form to:

Marco Silverio, M.Sc.
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

Appendix M-4-6

Public Information Centre #2

Agency Contact List

January 2015

Notice of PIC#2

<i>Last Name</i>	<i>First Name</i>	<i>Title</i>	<i>Job Title</i>	<i>Organization</i>	<i>Street Address</i>	<i>City and Province</i>	<i>Postal Code</i>	<i>Date Notice Sent</i>
City of Hamilton								
Bainbridge	Mark	Mr.	Director of Water & Wastewater Planning & Capital	Public Works	77 James Street North, Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
Barnhart	Steve	Mr.	Manager of Forestry & Horticulture	Environmental Services	77 James Street North, Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
Bradford	Anna	Ms.	Director of Tourism and Culture	Planning and Economic Development	28 James St. N., 2nd Floor	Hamilton, ON	L8R 2K1	Emailed January 8, 2015
Browett	Brent	Mr.	Director, Public Health Services	City of Hamilton	110 King Street West	Hamilton, ON	L8P 4S6	Emailed January 8, 2015
Brown	Jack	Mr.	Division Director, Recreation Community & Emergency Services Department	City of Hamilton	Lister Block, 28 James St. N., 3rd Floor Mailing Address: PO Box 2040	Hamilton, ON	L8P 4Y5 (for mailing address)	Emailed January 8, 2015
Chauvin	Dan	Mr.	Director of Woodward Upgrades	Public Works	77 James St. N., Suite 400	Hamilton, ON	L8H 6P4	Emailed January 8, 2015
Collins	Chad	Mr.	Councillor, Ward 5	City of Hamilton	71 Main Street West, 2nd Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Cunliffe	Dave	Mr.	Deputy Fire Chief	Hamilton Fire Department	1227 Stone Church Road East	Hamilton, ON	L8W 2C6	Emailed January 8, 2015
DeJager	Shawn	Mr.	Senior Project Manager	Hamilton Fire Department	1227 Stone Church Road East, 3rd Floor	Hamilton, ON	L8W 2C6	Emailed January 8, 2015
Duvall	Scott	Mr.	Councillor, Ward 7	City of Hamilton	71 Main Street West, 2nd Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Ehrenberg	Udo	Mr.	Manager of Infrastructure Planning & Systems Design	Hamilton Water	77 James Street North, Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
Everson	Neil	Mr.	Acting General Manager	Planning & Economic Development	71 Main St W 7th flr	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Farr	Jason	Mr.	Councillor, Ward 2	City of Hamilton	71 Main Street West, 2nd Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Ferguson	Lloyd	Mr.	Councillor, Ward 12	City of Hamilton	71 Main Street West, 2nd Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Golden	Alissa	Ms.	Cultural Heritage Planner (East)	Planning & Economic Development	71 Main Street West, 5th Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Grice	Andrew	Mr.	Manager of Policy and Programs	Public Works	77 James St. N., Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
Guilmette	Jodi	Ms.	Manager, Early Years System Management	Social Development & Early Childhood Services Division	Lister Block, 28 James St. N., 6th Floor	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
Hazell	Marty	Mr.	Senior Director, Parking & By-Law Services	Planning & Economic Development	77 James St. N., Suite 250	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
Hendry	Gillian	Ms.	Director, Housing Services	Community & Emergency Services	350 King Street East, Suite 110	Hamilton, ON	L8N 3Y3	Emailed January 8, 2015
Homerski	Philip	Mr.	Information and Business Advisor	Corporate Assets & Strategic Planning	77 James St N, Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
Hull	Don	Mr.	Director of Transportation	Public Works	2200 Upper James Street	Mount Hope, ON	L0R 1W0	Emailed January 8, 2015

Jackson	Tom	Mr.	Councillor, Ward 6	City of Hamilton	71 Main Street West, 2nd Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Janssen	Bill	Mr.	Director, Strategic & Business Planning	Planning & Economic Development	71 Mains St W 4th Flr	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Johnson	Brenda	Ms.	Councillor, Ward 11	City of Hamilton	71 Main Street West, 2nd Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Kiddie	Melissa	Ms.	Natural Heritage Planner (East)	Planning & Economic Development	71 Main Street W., 5th Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Kirkpatrick	Al	Mr.	Manager, Transportation Planning	Public Works	77 James St. N., Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
Lee-Morrison	Christine	Ms.	Manager, Mobility Programs and Special Projects	Public Works	77 James St. N., Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
Lubrick	Kerry	Ms.	Director, Employment and Income Support	Community Services	181 Main St W 3rd floor	Hamilton, ON	L8P 4S1	Emailed January 8, 2015
Lukasik	Laura	Ms	Manager, Partnerships & Outreach	Hamilton Public Library	55 York Boulevard, P.O. Box 2700	Hamilton, ON	L8N 4E4	Emailed January 8, 2015
MacAuley	Jim	Mr.	Acting Manager of Hansen 8 Implementation	Public Works	330 Wentworth Street North	Hamilton, ON	L8L 5W2	Emailed January 8, 2015
Maloney	Eileen	Ms.	Co-Ordinator Business Improvement Areas	Planning & Economic Development	71 Main St W 7th flr	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Mater	Grace	Ms.	Director, Social Development & Early Childhood	Community Services	Lister Block, 28 James St. N., 4th Floor	Hamilton, ON	L8R 3L5	Emailed January 8, 2015
Matthews-Malone	Betty	Ms.	Director of Operations	Public Works	77 James St. N., Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
McCauley	Shane	Mr.	Manager, Customer Service and Community Outreach	Public Works	330 Wentworth Street North	Hamilton, ON	L8L 5W2	Emailed January 8, 2015
McKinnon	Dan	Mr.	Director of Hamilton Water	Public Works	77 James St. N., Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
McMullen (replacing Tony Tollis)	Brian	Mr.	City Treasurer	Corporate Services	71 Main St W 1st Flr	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Merulla	Sam	Mr.	Councillor, Ward 4	City of Hamilton	71 Main Street West, 2nd Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Murdoch	Craig	Mr.	Director of Environmental Services	Public Works	77 James St. N., Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
Norman	Robert	Mr.	Director, Strategic Planning	Public Works	77 James St. N., Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
Norton	Glen	Mr.	Manager, Urban Renewal	Planning & Economic Development	71 Main Street West, 7th Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Osborne	Brenda	Ms.	Director, City Housing	City Housing Hamilton	55 Hess St S 23rd Flr	Hamilton, ON	L8N 4E5	Emailed January 8, 2015
Paparella	Guy	Mr.	Director of Growth Planning	Planning & Economic Development	71 main St W 6th flr	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Partridge	Judi	Ms.	Councillor, Ward 15	City of Hamilton	71 Main St W 2nd flr	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Pasuta	Robert	Mr.	Councillor, Ward 14	City of Hamilton	71 Main Street West, 2nd Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Pearson	Maria	Ms.	Councillor, Ward 10	City of Hamilton	71 Main Street West, 2nd Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Plosz	Catherine	Ms.	Natural Heritage Planner	Planning & Economic Development	71 Main St W 5th Flr	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Posedowski	Bert	Mr.	Manager of Sustainable Initiatives	Hamilton Water	77 James Street North, Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
Powers	Russ	Mr.	Councillor, Ward 13	City of Hamilton	71 Main St W 2nd Flr	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Prpic	Emil	Mr.	Manager, Recycling & Waste Disposal	Public Works	77 James Street North, Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015

Richardson	Elizabeth	Dr.	Medical Officer of Health	Pubic Health Services	1 Hughson St. N., 4th Floor	Hamilton, ON	L8R 3L5	Emailed January 8, 2015
Robichaud	Steve	Mr.	Director of Planning	Planning & Economic Development	71 Main Street West, 6th Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Seely	Le'Ann	Ms.	Manager, Landscape Architectual Services	Public Works	77 James Street North, Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
Sergi	Michelle	Ms.	Manager, Community Planning	Planning & Economic Development	71 Main St W 6th flr	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Sergi	Tony	Mr.	Senior Director, Growth Management	Planning & Economic Development	71 Main St W 6th flr	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Storey	Angela	Ms.	Manager of Business and Support Services	Public Works	77 James Street North, Suite 400	Hamilton, ON	L8R 2K3	Emailed January 8, 2015
Tomasik	Helen Hale	Ms.	Executive Director Human Resources	City Managers Office	120 King St. W 9th Flr	Hamilton, ON	L8P 4V2	Emailed January 8, 2015
White	Martin	Mr.	Manager, Traffic Operations	Public Works	1375 Upper Ottawa St.	Hamilton, ON	L8W 3L5	Emailed January 8, 2015
Whitehead	Terry	Mr.	Councillor, Ward 8	City of Hamilton	71 Main St W 2nd flr	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Zegarac	Mike	Mr.	Director, Financial Planning & Policy	Corporate Services	71 Main Street West, 1st Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Zinkewich	Lisa	Ms.	Acting Director of Corporate Initiatives	City Managers Office	71 Main St. W., 2nd Floor	Hamilton, ON	L8P 4Y5	Emailed January 8, 2015
Conservation Authority								
Guther	Raymond	Mr.	Manager, Watershed Engineering Services	Conservation Halton	2596 Britannia Rd. W.	Burlington, ON	L7P 0G3	Mailed January 6, 2015
Langley	Scott	Mr.	Cartographer	Bruce Trail Conservancy	PO Box 857	Hamilton, ON	L8N 3N9	Mailed January 6, 2015
Peck	Scott	Mr.	Director, Watershed Planning & Engineering	Hamilton Conservation Authority	838 Mineral Springs Road, Box 81067	Ancaster, ON	L9G 4X1	Mailed January 6, 2015
Stone	Michael	Mr.	Manager, Watershed Planning Services	Hamilton Conservation Authority	Box 81067 838 Mineral Springs Rd.	Ancaster, ON	L9G 4X1	Mailed January 6, 2015
Provincial Authorities								
Cunningham	Robert	Mr.		Ministry of Agriculture and Food	1 Stone Rd. W., 2nd Floor	Guelph, ON	N1G 4Y2	Mailed January 6, 2015
Durst	Joad	Mr.	Area Supervisor, Niagara Area Office	Ministry of Natural Resources	4890 Victoria Ave. N., P.O. Box 5000	Vineland, ON	L0R 2E0	Mailed January 6, 2015
Duval	Elizabeth	Ms.		Ministry of Citizenship & Immigration	119 King St. W., 14th Floor	Hamilton, ON	L8P 4Y7	Mailed January 6, 2015
Graham-Watson	Loraine	Ms.	Regional Director - Hamilton/Niagara Regional Office	Ministry of Community and Social Services	119 King St. W. 7th Floor	Hamilton, ON	L8P 4Y7	Mailed January 6, 2015
Head - Highway Engineering - Hamilton & Niagara				Ministry of Transportation	1201 Wilson Ave., Bldg. D., 3rd Floor	Downsview, ON	M4V 1L5	Mailed January 6, 2015
Johnson	Ashley	Ms.	Policy Advisor - Consultation Unit	Ministry of Aboriginal Affairs	160 Bloor Street East, 9th Floor	Toronto, ON	M7A 2E6	Mailed January 6, 2015
Ploss	Diane	Ms.	Municipal Advisor	Ministry of Municipal Affairs & Housing	777 Bay St., 13th Floor	Toronto, ON	M5G 2C8	Mailed January 6, 2015
Ruggero	Sue	Ms.		OAIA	144 Marita Place	Concord, ON	L4K 3J9	Mailed January 6, 2015
Selby	Craig	Mr.	District Manager, Guelph District Office	Ministry of Natural Resources	1 Stone Rd. W.	Guelph, ON	N1G 4Y2	Mailed January 6, 2015
Slattery	Barbara	Ms.	Environmental Assessment & Planning Co-ordinator	Ministry of the Environment	119 King St. W., 12th Floor	Hamilton, ON	L8P 4Y7	Mailed January 6, 2015

Stone	Michael	Mr.	District Planner - Guelph District	Ministry of Natural Resources	1 Stone Rd. W.	Guelph, ON	N1G 4Y2	Mailed January 6, 2015
Thornton	Ian	Mr.	Information Management Supervisor	Ministry of Natural Resources	1 Stone Rd. W.	Guelph, ON	N1G 4Y2	Mailed January 6, 2015
Troje	Corwin	Mr.		Ministry of Aboriginal Affairs Consultation Unit	160 Bloor Street East, 9th Floor	Toronto, ON	M7A 2E6	Mailed January 6, 2015
Van Room	Pauline	Ms.	Highway Engineering Hamilton	Ministry of Transportation	1201 Wilson Ave; Bldg. D. 4th Floor	Downsview, ON	M4V 1L5	Mailed January 6, 2015
von Kursell	Sybelle	Ms.		Municipal Affairs & Housing	777 Bay St., 13th Floor	Toronto, ON	M5G 2C8	Mailed January 6, 2015
Wallace	Marcia	Ms.	Regional Director	Ministry of Municipal Affairs & Housing	777 Bay St., 13th Floor	Toronto, ON	M5G 2C8	Mailed January 6, 2015
Whitebread	Ken	Mr.	Manager	Niagara Escarpment Commission	232 A Guelph Street	Georgetown, ON	L7G 4B1	Mailed January 6, 2015
Whittingham	Carlene	Ms.	Planner	Ministry of Municipal Affairs & Housing	777 Bay St., 13th Floor	Toronto, ON	M5G 2C8	Mailed January 6, 2015
Zirger	Rosi		Heritage Planner	Ministry of Tourism, Culture & Sport	401 Bay Street, 17th Floor	Toronto, ON	M7A 0A7	Mailed January 6, 2015
Federal Authorities								
COSEWIC - Secretariat		Sir/Madam	c/o Canadian Wildlife Services	Environment Canada		Ottawa, ON	K1A 0H3	Mailed January 6, 2015
Dobos	Rob	Mr.	EA Section	Environment Canada	867 Lakeshore Blvd.	Burlington, ON	L7R 4A6	Mailed January 6, 2015
Hall	John	Mr.	Remedial Action Plan (RAP)	Canadian Center for Inland Waters	867 Lakeshore Road P.O. Box 5050	Burlington, ON	L7R 4A6	Mailed January 6, 2015
Knox	Louise	Ms.	Director, Ontario Region	Canadian Environmental Assessment Agency	55 St. Clair Ave E. Room 907	Toronto, ON	M4T 1M2	Mailed January 6, 2015
Kozji	John	Mr.	Director, General Land and Environment Department	Aboriginal Affairs and Northern Development Land and Environment Department	10 Wellington St.	Gatineau, QC	K1A 0H4	Emailed January 8, 2015
Ministry of Health & Long Term Care		Sir/Madam	Integrated Policy & Planning Division		80 Grosvenor Street - 8th Floor, Hepburn Block	Toronto, ON	M7A 1R3	Mailed January 6, 2015
Ministry of Health & Long Term Care		Sir/Madam	Safe Water Unit - Infectious Diseases Branch		5700 Yonge Street, 8th Floor	Toronto, ON	M2M 4K5	Mailed January 6, 2015
Ministry of Public Infrastructure		Sir/Madam			7 Queen's Park Crescent, 6th Floor, Frost Bldg. South	Toronto, ON	M7A 1Y7	Mailed January 6, 2015
Moggy	Derrick	Mr.	Fish Habitat Biologist - Habitat Management	Dept. of Fisheries & Oceans	304 - 3027 Harvester Road	Burlington, ON	L7R 4K3	Mailed January 6, 2015
Morton	Emily	Ms.	Fish Habitat Biologis	Dept. of Fisheries & Oceans	304 - 3027 Harvester Road	Burlington, ON	L7R 4K3	Mailed January 6, 2015
National Heritage Information Centre		Sir/Madam			300 Water Street	Peterborough, ON	K9J 8M4	Mailed January 6, 2015
Neuman	Carol	Ms.	Rural Planner	Ministry of Agriculture, Food & Rural Affairs	6484 Wellington Rd. 7, Unit 10	Elora, ON	N0B 1S0	Mailed January 6, 2015
Ontario Region		Sir/Madam		Industry Canada	151 Young St - 4th Floor	Toronto, ON	M5C 2W7	Mailed January 6, 2015
Shaw	Mike	Mr.	Environmental Assessment Projects Officer	Environment Canada	867 Lakeshore Blvd.	Burlington, ON	L7R 4A6	Mailed January 6, 2015

Speller	Rachel	Ms.	Environment Officer- Environment Unit, Ontario Region	Lands and Trusts Services Env. Unit INAC	25 St. Clair Ave. E. 8th floor	Toronto, ON	M4T 1M2	Mailed January 6, 2015
Wood	Bruce	Mr.	Hamilton Port Authority		605 James St. N.	Hamilton, ON	L8L 1K1	Mailed January 6, 2015
Wright	Mark	Mr.	Navigable Waterways Program	Transport Canada	100 South Front Street	Sarnia, ON	N7T 2M4	Mailed January 6, 2015
			Environmental Coordinator	Transport Canada	4900 Yonge Street, 4th Floor (PHE)	North York, ON	M2N 6A5	Mailed January 6, 2015
				Canadian Transportation Agency	15 Eddy Street	Hull, QC	K1A 0N9	Mailed January 6, 2015

First Nations

Aboriginal Affairs and Northern Development				Environment Unit	25 St. Clair Avenue East 8th Flr	Toronto, ON	M4T 1M2	Mailed January 6, 2015
Donnelly	David	Mr.		Patent & Trademark Agents for Huron-Wendat	276 Carlaw Ave. Suite 203	Toronto, ON	M4M 3L1	Emailed January 8, 2015
Durand	Tina	Ms.	Secretary Political Sector	Huron-Wendat Nation Council	255 Place Chef Michel- Laveau	Wendake, QC	G0A 4V0	Mailed January 6, 2015
General	Paul	Mr.	Lands & Resources	Six Nations Eco-Centre	2676 Fourth Line Road P.O. Box 5000	Oshweken, ON	N0A 1M0	Emailed January 8, 2015
Hill	Ava	Chief	Director of Lands & Resources	Six Nations of the Grand River	P.O. Box 5000, 1695 Chiefswood Road	Oshweken, ON	N0A 1M0	Mailed January 6, 2015
Hill	Leroy	Mr.		Haudenosaunee Resource Centre	2634 Sixth Line RR2	Oshweken, ON	N0A 1M0	Mailed January 6, 2015
LaForme	Bryan	Chief		Mississaugas of New Credit First Nation	2789 Mississauga Road RR #6	Hagersville, ON	N0A 1H0	Emailed January 8, 2015
Sault	Margaret	Ms.	Director of Lands, Claims & Member Research	Mississaugas of New Credit First Nation	2789 Mississauga Road RR #6	Hagersville, ON	N0A 1H0	Mailed January 6, 2015
St.Clair	Jacqueline	Ms.		Center for Topographical Information Canadian Geographical Names Database	615 Booth Street Rm 634	Ottawa, ON	K1A0E3	Mailed January 6, 2015

NGOs

			Director of Implementation Rights Unit	Assembly of First Nations	55 Metcalfe Street, Suite 1600 Ottawa, ON K1P 6L5	Ottawa, ON	K1R 5B4	Mailed January 6, 2015
				Canadian Metis Council	445 Concession Street	Hamilton, ON	L9A 1C1	Emailed January 8, 2015
				Hamilton Region Indian Centre	712 Main Street East	Hamilton, ON	L8M 1K6	Emailed January 8, 2015
				Metis National Council	4-340 MacLaren Street	Ottawa, ON	K2P 0M6	Mailed January 6, 2015
Barberstock	Susan		Executive Director	Hamilton Regional Indian Centre	34 Ottawa Street North	Hamilton, ON	L8H 3Y7	Mailed January 6, 2015
Brennan	Jane	Ms.	Administrator	The Métis Nation of Ontario	500 Old St. Patric St. Unit 3	Ottawa, ON	K1N 9G4	Mailed January 6, 2015
Clark	Jerry	Mr.	President	Hamilton/Wentworth Métis Council	445 Concession St.	Hamilton, ON	L9A 1C1	Emailed January 8, 2015
Elijah	Rolanda	Ms.		Association of Iroquois and Allied Indians	387 Princess Avenue	London, ON	N6B 2A7	Mailed January 6, 2015
Ense	Linda		Executive Director	Native Women's Centre	Rosedale Postal Outlet, 1900 King St. East PO Box 69036	Hamilton, ON	L8K 1W1	Mailed January 6, 2015

Indigenous Studies Program				McMaster University	1280 Main Street West, Hamilton Hall Room 103	Hamilton, ON	L8S 4K1	Mailed January 6, 2015
Lannigan	Kathleen		Employment and Training Officer	Metis Nation of Ontario Training Initiative	445 Concession Street	Hamilton, ON	L9A 1C1	Emailed January 8, 2015
Laronde	Jason	Mr.	Director of Lands and Resou	Union of Ontario Indians - Nipissing First Nation	1 Migizii Miikan PO Box 711	North Bay, ON	P1B 8J8	Mailed January 6, 2015
Lavallee	Monique		Executive Director	Niwasa Aboriginal Early Learning Programs	1869 Main Street East	Hamilton, ON	L8H 1G2	Mailed January 6, 2015
Lewis	Janice		Executive Director	Urban Native Homes Incorporated	19 Albert Street	Hamilton, ON	L8M 2Y1	Mailed January 6, 2015
Maracle	Sylvia			Ontario Federation of Indian Friendship	219 Front Street East	Toronto, ON	M5A 1E8	Emailed January 8, 2015
Martin	Ted	Mr.			20 Kenilworth Avenue North	Hamilton, ON	L8H 4R3	Emailed January 8, 2015
McAulay	Melanie		Executive Director	Sacajawea Non-Profit Housing Inc	19 Albert Street	Hamilton, ON	L8M 2Y1	Mailed January 6, 2015
McCormack	Cindy Sue			Social Planning Research Council	162 King William St. Suite 103	Hamilton, ON	L8R 3N9	Mailed January 6, 2015
McKnight	Constance	Ms.	Executive Director	De dwa da dehs nye>s Aboriginal Health Centre	678 Main St. East	Hamilton, ON	L8M 1K2	Mailed January 6, 2015
McLester	Ron		Program Manager	Mohawk College - Aboriginal Student Services	Fennell & West 5th Streets	Hamilton, ON	L8N 3T2	Mailed January 6, 2015
Padulo	Kathleen	Ms.		Council of Ontario Chiefs	111 Peter Street, Suite 804	Toronto, ON	M4V 2H1	Mailed January 6, 2015
Utilities								
Ardelli	Terri	Ms.	Land Analyst, Urban Development	TransCanada Pipelines	450-1st Street S.W.	Calgary, AB	T2P 5H1	Mailed January 6, 2015
Blakely	John	Mr.	Senior Right-of-Way Agent	Enbridge Pipelines Inc.	801 Upper Canada Drive P.O. Box 128	Sarnia, ON	N7W 1A3	Mailed January 6, 2015
Greco	Enzo	Mr.	Mapping Supervisor	Union Gas	Box 10, 360 Strathearne Ave. N.	Hamilton, ON	L8N 3A5	Mailed January 6, 2015
Harten	Ron	Mr.	General Manager, Hamilton Community Energy	Hamilton Utilities Corporation	79 Bay Street North	Hamilton, ON	L8R 3P8	Mailed January 6, 2015
Hayes	Janice	Ms.		Cogeco Cable Inc.	695 Lawrence Road	Hamilton, ON	L8K 6P2	Mailed January 6, 2015
Oriotis	Jim	Mr.		Hydro One	483 Bay Street, North Tower 15th Floor	Toronto, ON	M5G 2P5	Mailed January 6, 2015
Lamoureux	Dave	Mr.	Operations Manager	Union Gas	360 Strathearne Ave. N.	Hamilton, ON	L8N 3A5	Mailed January 6, 2015
Lane	Paul	Mr.		Sun Canadian Pipeline	830 Highway 6 North P.O. Box 470	Waterdown, ON	L0R 2H0	Mailed January 6, 2015
Lerette	Kathy	Ms.	VP, Utility Operations	Horizon Utilities Corporation	55 John St. N., 6th Floor	Hamilton, ON	L8R 3M8	Mailed January 6, 2015
Linder	Stefan	Mr.	Manager, Public Works Design & Construction	CN	4 Welding Way off Administration Road	Vaughan, ON	L4K 1B9	Mailed January 6, 2015
Lukianow	David	Mr.	Manager - Public Works	Canadian Pacific Railway	1290 Central Parkway West, Suite 700	Mississauga, ON	L5C 4R3	Mailed January 6, 2015

MacTaggart	John	Mr.		CN Rail - Engineering & Environmental Services	1 Administration Road, 1st Floor Box 1000	Concord, ON	L4K 1B9	Mailed January 6, 2015
Milano	Bruno	Mr.	Planner/Designer	Source Cable	1090 Upper Wellington St	Hamilton, ON	L9A 3S6	Mailed January 6, 2015
Mitchell	Colleen	Ms.	Land Agent - Eastern Pipeline Operations	Imperial Oil Products & Chemical Division	100 - 5th Concession Rd. E.	Waterdown, ON	L0R 2H1	Mailed January 6, 2015
Newman	Ann	Ms.	Crossings Co-ordinator, Eastern Region	Enbridge Pipelines Inc.	801 Upper Canada Drive P.O Box 128	Sarnia, ON	N7W 1A3	Mailed January 6, 2015
Ontario Power Generation	Sir/Madam				700 University Avenue	Toronto, ON	M5G 1X6	Mailed January 6, 2015
Roberge	Daniel	Mr.	Manager of Capital Projects	Horizon Utilities Corporation	55 John St. N., 6th Floor	Hamilton, ON	L8R 3M8	Mailed January 6, 2015
Roth	Alf	Mr.		Union Gas Ltd.	360 Strathearne Ave. N.	Hamilton, ON	L8N 3A5	Mailed January 6, 2015
Sutton	Eleanor	Ms.	Bell Canada		20 Hunter St. W.	Hamilton, ON	L8N 3H2	Mailed January 6, 2015
Walker	Astle	Mr.		Cogeco Cable Inc - 950 Syscon Road	P.O. Box 5076, Station Main	Burlington, ON	L7R 4S6	Mailed January 6, 2015
Winkley	John	Mr.	Regional Director - Marketing	Southern Ontario Railway	241 Stuart St. W.	Hamilton, ON	L8N 3P9	Mailed January 6, 2015
Woods	Geoff	Mr.		Canadian National Railway	1 Administration Road Box 1000	Concord, ON	L4K 1B9	Mailed January 6, 2015
Schools								
Brennan	Jessica	Ms.	Chair	Hamilton-Wentworth District School Board	100 Main St. W. P.O. Box 2558	Hamilton, ON	L8N 3L1	Mailed January 6, 2015
Daly	Pat		Hamilton District Catholic School Board	90 Mulberry Street	P.O. Box 2012	Hamilton, ON	L8N 3R9	Mailed January 6, 2015
Pace	P.		Hamilton District Catholic School Board	90 Mulberry Street	P.O. Box 2012	Hamilton, ON	L8N 3R9	Mailed January 6, 2015
McKerrall	Dan	Mr.	Accommodation & Planning	Hamilton-Wentworth District School Board	100 Main St. W. P.O. Box 2558	Hamilton, ON	L8N 3L1	Mailed January 6, 2016

Appendix M-4-7

Public Information Centre #2

Agency Communications

January 2015



Hamilton

RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

1. Contact Name: Stefan Linder

2. Ministry/Agency/Office: CN

3. Address: 1 Administration Rd, Concord, ON L4K 1B9

Postal Code:

Phone No.: 905 669 8264

Email:

4. Please note specific comments and/or concerns (please attach additional sheets if necessary):

Please keep CN informed if the study of any time includes our property.

Signature [Handwritten Signature]

Date Feb 6, 2015

Please return this form to:

Marco Silverio, M.Sc.
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.



Hamilton

PUBLIC WORKS DEPARTMENT
Hamilton Water Division
Sustainable Initiatives

Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

The City of Hamilton is interested in hearing the community's comments, questions, concerns and suggestions regarding the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. Please take a few minutes to complete this brief comment sheet. All comments will be carefully considered in the Environmental Assessment Process.

1. Do you have any comments related to the **evaluation process** used to select the preferred alternative?

none at this time.

2. Do you have any comments, concerns, questions or suggestions regarding the **preferred alternative**?

If any alternative crosses CN property please continue to keep us informed.

3. Do you have any comments, concerns, questions or suggestions related to the **potential impacts** and/or **proposed mitigation measures** to address the impacts for this project?

see above, only if CN lands are impacted.

4. Additional comments related to the project.

Contact Details

Name: STEFAN LINDER
Address: 1 Administration Bld. Concord, ON L4K 1B9
Phone Number: 905 669 3264
Email: stefan.linder@cn.ca

NOTE: Personal information requested on this form is collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Please return this completed Comment Sheet to the project team at the Registration Table or you can fax it or mail it by February 6th 2015 to:

Project Contacts:

Marco Silverio
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424, Ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Dave Maunder
Consultant
Aquafor Beech Ltd.
2600 Skymark Ave, Suite 202, Building 6
Mississauga, ON L4W 5B2
Phone: 905-629-0099 Ext. 290
Fax: 905-629-0089
Email: maunder.d@aquaforbeech.com

BY E- MAIL

January 28, 2015

CEA-MUN/06-11

Marco Silverio
City of Hamilton
Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3

Dear Mr.Silverio:

**Re: Hamilton Conservation Authority Comments
Mid-Spencer/Greenville Rural Settlement Area Subwatershed Study
Notice Circulation for Public Information Centre No. 2**

The Hamilton Conservation Authority (HCA) has received the Notice for the Mid- Spencer/
Greenville Rural Settlement Area Subwatershed Study Public Information Centre (PIC) No. 2.

HCA staff involvement with the study to-date has been largely limited to assistance with the development of the study Terms of Reference, the provision of background data, and comment on the *Tier 3 Phase 1 Report for the Water Budget and Local Area Risk Assessment for the Greenville Groundwater Municipal System*. Comment on actual study progress has been periodic and largely informal.

While the HCA acknowledges that the main objective of the study is the protection of groundwater quality and quantity, it is also designed to identify constraints and opportunities for future growth within the Greenville Rural Settlement Area. The identification of constraints includes natural heritage and natural hazards which are discussed briefly in the PIC boards included with the circulation. The boards indicate that flooding and erosion issues have been evaluated and that development constraints (including hazards) have been assessed. This statement is of some concern to our office as the HCA has not been directly involved with or consulted on these assessments and we have not been provided the details of these assessments for review and comment or approval.

Specifically with regard to floodplain, the HCA was provided with draft floodplain mapping prepared by Aquafor Beech as part of the study in October, 2008. During a more recent meeting of HCA and City of Hamilton staff in March, 2014, we were informed that the floodplain mapping had not been finalized and that the consultant could not validate the hydraulic model.

The current PIC summary (page #5) states that floodplain mapping through Greenville has been updated to identify areas of flooding and undersized culverts. It is not clear if this statement refers to the 2008 draft mapping, or to newly completed floodplain mapping. Please note that any floodplain assessment or mapping completed for the study would have to be reviewed and approved by our office before being considered final.

Please also note that the assessment of stream morphology and floodplain or erosion hazards associated with the headwater tributaries of Greenville (Mid-Spencer Creek) itself, such as those located to the west of Oak Avenue has not involved or been reviewed by HCA staff to-date. These hazards may impact the available building envelope of the remaining growth areas identified for future development within the rural settlement area.

As the study has now reached the end of Stage 2, it is recommended prior to the development of Stage 3, that City of Hamilton staff, the project consultant and HCA staff meet to discuss the above-mentioned issues and ensure that the various assessments are satisfactorily completed. This meeting would also provide an opportunity for the HCA to provide technical input to the City for development and selection of the preferred alternatives for stormwater management as part of Stage 3.

If you have any questions regarding the above, please do not hesitate to contact the undersigned at ext. 131.

Yours truly,

A handwritten signature in cursive script that reads "Darren Kenny". The signature is written in black ink and is positioned above the printed name and title.

Darren Kenny
Watershed Officer

Ministry of Aboriginal Affairs

160 Bloor St. East, 9th Floor
Toronto, ON M7A 2E6
Tel: (416) 326-4740
Fax: (416) 325-1066
www.aboriginalaffairs.gov.on.ca

Ministère des Affaires Autochtones

160, rue Bloor Est, 9^e étage
Toronto ON M7A 2E6
Tél. : (416) 326-4740
Télé. : (416) 325-1066
www.aboriginalaffairs.gov.on.ca



Reference: EA #2015-14

Marco Silverio, M.Sc.
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3

**Re: Notice of Public Information Centre (PIC) No. 2
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

Dear Mr. Silverio:

Thank you for informing the Ministry of Aboriginal Affairs (MAA) of your project. Please note that MAA treats all letters, emails, general notices, etc. about a project as a request for information about which Aboriginal communities may have rights or interests in the project area.

As a member of the government review team, the Ministry of Aboriginal Affairs (MAA) identifies First Nation and Métis communities who may have the following interests in the area of your project:

- reserves;
- land claims or claims in litigation against Ontario;
- existing or asserted Aboriginal or treaty rights, such as harvesting rights; or
- an interest in the area of the project.

MAA is not the approval or regulatory authority for your project, and receives very limited information about projects in the early stages of their development. In circumstances where a Crown-approved project may negatively impact a claimed Aboriginal or treaty right, the Crown may have a duty to consult the Aboriginal community advancing the claim. The Crown often delegates procedural aspects of its duty to consult to proponents. Please note that the information in this letter should not be relied on as advice about whether the Crown owes a duty to consult in respect of your project, or what consultation may be appropriate. Should you have any questions about your consultation obligations, please contact the appropriate ministry.

You should be aware that many First Nations and/or Métis Communities either have or assert rights to hunt and fish in their traditional territories. For First Nations, these territories typically include lands and waters outside of their reserves.

In some instances, project work may impact aboriginal archaeological resources. If any Aboriginal archaeological resources could be impacted by your project, you should contact your regulating or approving Ministry to inquire about whether any additional Aboriginal communities should be contacted. Aboriginal communities with an interest in archaeological resources may include communities who are not presently located in the vicinity of the proposed project.

With respect to your project, and based on the brief materials you have provided, we can advise that the project appears to be located in an area where First Nations may have existing or asserted rights or claims in Ontario’s land claims process or litigation, that could be impacted by your project. Contact information is below:

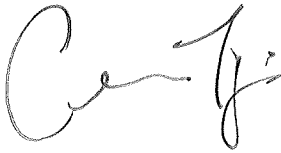
<p>Six Nations of the Grand River Territory P.O. Box 5000, 1695 Chiefswood Road OHSWEKEN, Ontario N0A 1M0</p>	<p>Chief Ava Hill (519) 445-2201 (Fax) 445-4208</p>
<p>Haudenosaunee Confederacy Chiefs Council 2634 6th Line Road RR 2 Ohsweken, ON N0A 1M0</p>	<p>Hohahes Leroy Hill Secretary to Haudenosaunee Confederacy Chiefs Council Cell 519 717 7326 jocko@sixnationsns.com</p>
<p>Mississaugas of the New Credit First Nation 2789 Mississauga Rd., R.R. #6 HAGERSVILLE, Ontario N0A 1H0</p>	<p>Chief Bryan LaForme (905) 768-1133 (Fax) 768-1225 bryanlaforme@newcreditfirstnation.com</p>

The information upon which the above comments are based is subject to change. First Nation or Métis communities can make claims at any time, and other developments can occur that could result in additional communities being affected by or interested in your undertaking.

Through Aboriginal Affairs and Northern Development (AANDC), the Government of Canada sometimes receives claims that Ontario does not receive, or with which Ontario does not become involved. AANDC’s Consultation and Accommodation Unit (CAU) established a “single window” to respond to requests for baseline information held by AANDC on established or potential Aboriginal Treaty and rights. To request information from the Ontario Subject Matter Expert send an email to: UCA-CAU@aadnc-aandc.gc.ca.

Additional details about your project or changes to it that suggest impacts beyond what you have provided to date may necessitate further consideration of which Aboriginal communities may be affected by or interested in your undertaking. If you think that further consideration may be required, please bring your inquiry to whatever government body oversees the regulatory process for your project. MAA does not wish to be kept informed of the progress of the project; please be sure to remove MAA from the mailing list.

Yours truly,

A handwritten signature in black ink, appearing to read 'Corwin Troje', written in a cursive style.

Corwin Troje
Manager, Ministry Partnerships Unit
Aboriginal Relations and Ministry Partnerships Branch

From: [Silverio, Marco](#)
To: [Dave Maunder \(maunder.d@aquaforbeech.com\)](mailto:maunder.d@aquaforbeech.com)
Subject: FW: request for presentation at February 10 SPC meeting
Date: January-29-15 11:50:15 AM

Dave

I would like to talk to you about this, do you have time to talk today?

Regards

Marco

From: Diane Bloomfield [mailto:dbloomfield@hrca.on.ca]
Sent: January-29-15 10:43 AM
To: Silverio, Marco
Cc: Posedowski, Bert; Partridge, Judi; SPC Chair
Subject: request for presentation at February 10 SPC meeting

Hello Marco. In light of the resurrection of the Greensville Subwatershed Study, I believe that the Source Protection Committee would be interested in hearing how drinking water source protection studies and the source protection policies were considered during your study and if there were any issues that came to light. The Source Protection Committee holds their next meeting on February 10 between 2 and 5 pm at the Conservation Halton administration office. Would you, or a colleague/consultant, be available to provide a 15 minute overview of the study, including its purpose, what was done, and the findings focusing on drinking water protection? I believe it would be good timing because I will also be discussing the proposed amendments to the Municipal Engineers Association Municipal Class EA document. Please let me know if this is feasible as soon as you can as the agenda will go out next Tuesday, February 3. Thanks.

Diane L. Bloomfield, M.Sc., P.Geo
Manager, Source Water Protection

Conservation Halton
4052 Milborough Line, RR#2 Campbellville, ON L0P 1B0
905-854-9229 ext. 223 | Fax 905-854-9220 | Cell 905-208-0030
www.protectingwater.ca

Thank you for thinking about the environment before printing this e-mail. If you are not an intended recipient, you must not disclose, copy, or distribute its contents or use them in any way. Please advise the sender immediately and delete this e-mail.

From: Silverio, Marco [Marco.Silverio@hamilton.ca]

Sent: January-14-15 2:20 PM

To: 'Monika Keliacius'

Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study

Attachments: Response Form - Agency - FINAL.doc; Mid-Spencer Creek-Greensville RSA Subwatershed Study - Notice of PIC#2 (Flamborough).pdf

Good Afternoon,

The City is completing the Mid-Spencer Creek/Greensville Rural Settlement Area (RSA) Subwatershed and Class Environmental Assessment (EA) study to determine a management strategy for surface water (streams, stormwater), groundwater, community servicing (water and wastewater) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA.

The Public Information Centre No.2 is scheduled for January 22nd from 4h00-7h00PM at the Christ Church 92 Highway #8.

Please find attached the Notice of Public Information Centre No. 2 and the Response Form for your perusal.

Please don't hesitate to contact if you require further information.

Kind Regards,



Marco Silverio

PM-Source Protection Planning
Sustainable Initiatives
City of Hamilton | Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
T: 905.546.2424 ext. 6099
Marco.Silverio@hamilton.ca

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Hamilton

**RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study**

1. Contact Name: _____

2. Ministry/Agency/Office: _____

3. Address: _____

_____ Postal Code: _____

Phone No.: _____

Email: _____

4. Please note specific comments and/or concerns (please attach additional sheets if necessary):

Signature _____

Date _____

Please return this form to:

Marco Silverio, M.Sc.
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

Notice of Public Information Centre No. 2 Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

Project Background

The City of Hamilton has initiated a Subwatershed and Class Environmental Assessment (EA) study for the Mid-Spencer Creek and Greensville Rural Settlement Area (RSA). Residents in the Greensville RSA and the subwatershed are currently serviced by private septic systems and groundwater-sourced municipal communal, private communal or individual wells.

The study will set a management strategy for surface water (streams, storm water), groundwater, community servicing (water and septic) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA. The study includes public and review agency consultation, evaluation of alternatives, assessment of the impacts of the proposed works, and identification of measures to mitigate any adverse impacts. Upon completion of the study, a Report documenting the planning and decision making process followed, will be prepared and made available for public review.

The Study Process

This Study will follow the planning and design process as defined in the Municipal Engineers Association Municipal Class Environmental Assessment document (October 2000, as amended in 2007 & 2011). The Master Plan (Approach 1) will address Phases 1 and 2 of the Class EA requirements for any Schedule B projects that are identified, and outline additional work that will be required to implement any Schedule C projects that are identified as part of the study.

Public Information Centre (PIC) No. 2

Two (2) PIC sessions are required for this Study. PIC No. 1 was held on November 21, 2007. PIC No. 2 will present the evaluation of the alternative solutions and identify the recommended solutions and is scheduled for:

Date: January 22, 2015

Time: 4:00 pm to 7:00 pm

Location: Christ Church, 92 Highway #8, Flamborough

We would like to hear from you

We are interested in hearing any comments or concerns you may have with respect to this study. Comments received through the course of the study will be considered in selecting the recommended solutions. Information will be collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record. If you would like more information or would like to be placed on the Study mailing list, please contact:

Marco Silverio, M.Sc.

Project Manager

City of Hamilton

77 James Street North, Suite 400

Hamilton, ON L8R 2K3

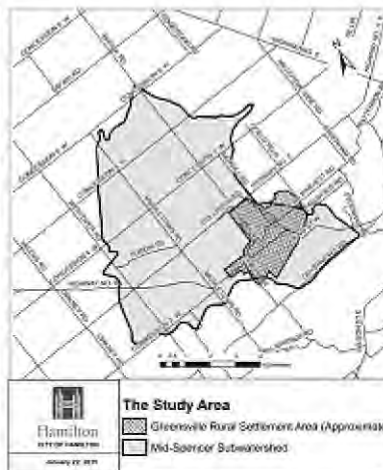
Phone: 905-546-2424 ext. 6099

Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 8th and January 15th, 2015.



Hamilton

From: Silverio, Marco [Marco.Silverio@hamilton.ca]

Sent: January-14-15 4:09 PM

To: Ghbn, Nahed; Moniruzzaman, Monir; Yong-Lee, Sally

Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study

Attachments: Greensville PIC Boards.pdf; Mid-Spencer Creek-Greensville RSA Subwatershed Study - Notice of PIC#2.pdf; Minutes-December 4 2014-Mid-Spencer Greensville RSA Subwatershed Study - Stormwater component - FINAL.doc

Hello,

The Public Information Centre No.2 for the Mid-Spencer Creek/Greensville Rural Settlement Area (RSA) Subwatershed and Class Environmental Assessment (EA) is scheduled for January 22nd from 4h00-7h00PM at the Christ Church 92 Highway #8.

Please find attached the Notice of Public Information Centre No. 2 and the PIC Boards (final draft version) for your perusal. I've also attached the Minutes of the meeting we had last December 4th.

Please don't hesitate to contact if you require further information.

Regards,



Marco Silverio

PM-Source Protection Planning
Sustainable Initiatives
City of Hamilton | Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
T: 905.546.2424 ext. 6099
Marco.Silverio@hamilton.ca

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Date: January 22, 2015

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We would like to hear from you

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Marco Silverio, M.Sc.

Project Manager

City of Hamilton

77 James Street North, Suite 400

Hamilton, ON L8R 2K3

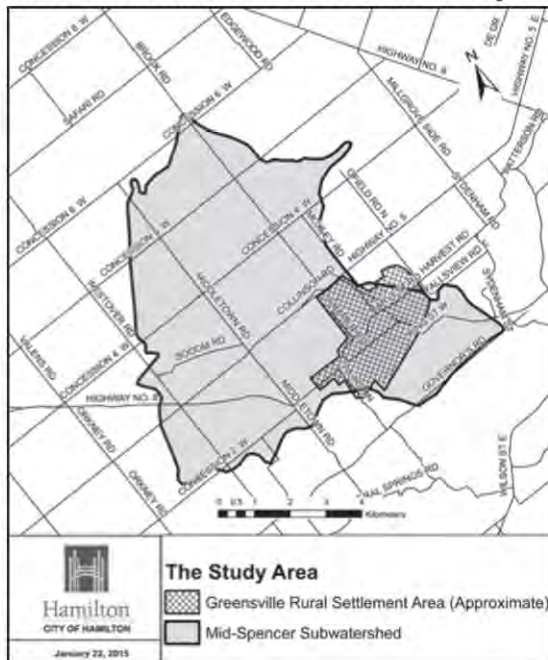
Phone: 905-546-2424 ext. 6099

Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.



City of Hamilton, Public Works Department

Hamilton Water Division

MEETING MINUTES: Mid-Spencer Creek/Greensville RSA Subwatershed Study – Stormwater Management strategies

DATE & TIME: December 4th, 2014 10:30 am to 11:30 am

LOCATION: 77 James St. North, Suite 400, Room 400G

CHAIR: Marco Silverio

ATTENDEES: Carmen Ches, Nahed Ghbn, Monir Moniruzzaman, Sally Yong-Lee

REGRETS: N/A

MINUTE RECORDER: Marco Silverio

Meeting Items:		RSP	Date
1	<p>Subwatershed Study, PIC information and Stormwater Management Strategies</p> <ul style="list-style-type: none"> • Confirm the assumptions to determine the need to promote infiltration in the order of 84m3; • Confirm if the recommendation of 84m3 per lot is based on 1ac lot size; probably the recommendation should read 84m3/acre; • Location of the ponds on Figure 8.1: what was the criteria for the location of the ponds; • Preferred option for Planning Dep. is to have a centralized approach with LID for the stormwater ponds, due to the nature of the development it might not be possible; • Recommendation from Planning Dep. to expand the Implementation (Phase III) component on the report to assist the Planning Dep.; • Request from Planning Dep. to include the stormwater ponds strategy in the hydrologic model development; • Request from Planning Dep. to include full size Pre and Post development drainage area plan to demonstrate the proposed SWM , LID's/groundwater recharge rate, pre and post development flow rates for each outlet; • Recommendation to circulate the report with MNR sooner rather than later; • Planning Dep. requested the input/output files for hydrologic model including integrated modelling details (surface water and groundwater); • Planning Dep. should be circulated on the draft report including 	Aquafo r Beech	

City of Hamilton, Public Works Department

Hamilton Water Division

MEETING MINUTES: Mid-Spencer Creek/Greensville RSA Subwatershed Study –
Stormwater Management strategies

Meeting Items:		RSP	Date
	appendices; <ul style="list-style-type: none">To assure that LID strategies are implemented in new sub-divisions, clear requirements on the type of LID need to be stated in the agreement.		
2	Flamboro Court Silting Project <ul style="list-style-type: none">To confirm if there is budget available for channel rehabilitation – confirmedInform Planning Dep. on the status of the project	MS	
3	Other information <ul style="list-style-type: none">MOE Guideline on LID to be made available in the near future.PIC scheduled for January 22nd.		

NEXT MEETING: TBD

From: Silverio, Marco [Marco.Silverio@hamilton.ca]

Sent: January-14-15 4:09 PM

To: Ghbn, Nahed; Moniruzzaman, Monir; Yong-Lee, Sally

Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study

Attachments: Greensville PIC Boards.pdf; Mid-Spencer Creek-Greensville RSA Subwatershed Study - Notice of PIC#2.pdf; Minutes-December 4 2014-Mid-Spencer Greensville RSA Subwatershed Study - Stormwater component - FINAL.doc

Hello,

The Public Information Centre No.2 for the Mid-Spencer Creek/Greensville Rural Settlement Area (RSA) Subwatershed and Class Environmental Assessment (EA) is scheduled for January 22nd from 4h00-7h00PM at the Christ Church 92 Highway #8.

Please find attached the Notice of Public Information Centre No. 2 and the PIC Boards (final draft version) for your perusal. I've also attached the Minutes of the meeting we had last December 4th.

Please don't hesitate to contact if you require further information.

Regards,



Marco Silverio

PM-Source Protection Planning
Sustainable Initiatives
City of Hamilton | Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
T: 905.546.2424 ext. 6099
Marco.Silverio@hamilton.ca

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Notice of Public Information Centre No. 2 Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

Project Background

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Marco Silverio, M.Sc.

Project Manager

City of Hamilton

77 James Street North, Suite 400

Hamilton, ON L8R 2K3

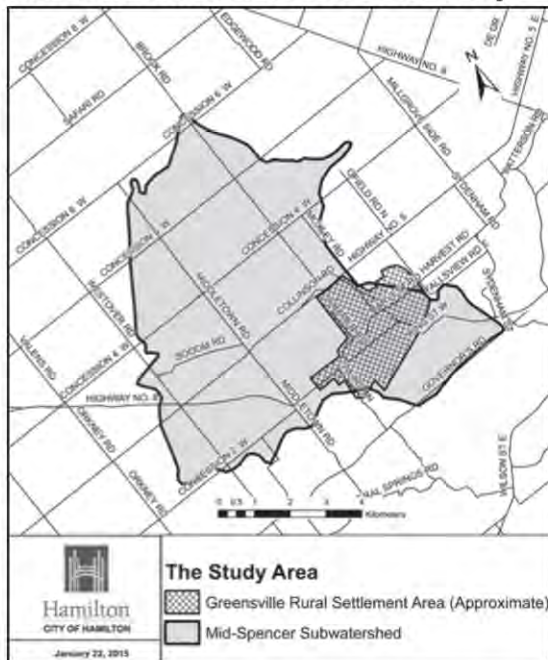
Phone: 905-546-2424 ext. 6099

Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.



City of Hamilton, Public Works Department

Hamilton Water Division

MEETING MINUTES: Mid-Spencer Creek/Greensville RSA Subwatershed Study – Stormwater Management strategies

DATE & TIME: December 4th, 2014 10:30 am to 11:30 am

LOCATION: 77 James St. North, Suite 400, Room 400G

CHAIR: Marco Silverio

ATTENDEES: Carmen Ches, Nahed Ghbn, Monir Moniruzzaman, Sally Yong-Lee

REGRETS: N/A

MINUTE RECORDER: Marco Silverio

Meeting Items:		RSP	Date
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City of Hamilton, Public Works Department

Hamilton Water Division

MEETING MINUTES: Mid-Spencer Creek/Greensville RSA Subwatershed Study –
Stormwater Management strategies

Meeting Items:		RSP	Date
	appendices; <ul style="list-style-type: none">To assure that LID strategies are implemented in new sub-divisions, clear requirements on the type of LID need to be stated in the agreement.		
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3	Other information <ul style="list-style-type: none">MOE Guideline on LID to be made available in the near future.PIC scheduled for January 22nd.		

NEXT MEETING: TBD

From: Silverio, Marco [Marco.Silverio@hamilton.ca]
Sent: January-22-15 9:58 AM
To: Nizharadze, Alex; Kenny, Darren; Peck, Scott
Subject: RE: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study
Attachments: !Greensville PICV4_Jan2015_1.pdf

Hello

Please find attached a copy of the Boards for the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study PIC No.2.

Please don't hesitate to contact if you require further information.

Regards



Marco Silverio

PM-Source Protection Planning
Sustainable Initiatives
City of Hamilton | Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
T: 905.546.2424 ext. 6099
Marco.Silverio@hamilton.ca

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From: Silverio, Marco
Sent: January-14-15 3:52 PM
To: Plosz, Catherine; Nizharadze, Alex; Kenny, Darren; Peck, Scott
Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study

Hello,

The Public Information Centre No.2 for the Mid-Spencer Creek/Greensville Rural Settlement Area (RSA) Subwatershed and Class Environmental Assessment (EA) is scheduled for January 22nd from 4h00-7h00PM at the Christ Church 92 Highway #8.

Please find attached the Notice of Public Information Centre No. 2 and the PIC Boards (final draft version) for your perusal.

Please don't hesitate to contact if you require further information.

Regards,



Marco Silverio

PM-Source Protection Planning
Sustainable Initiatives
City of Hamilton | Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
T: 905.546.2424 ext. 6099
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From: PW - ISWP Student 1 [ISWP.Student1@hamilton.ca]
Sent: January-13-15 11:54 AM
To: bbonspille@asn.ca
Subject: Notice of Public Information Centre No. 2 - Greensville Subwatershed Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf

Hello Barb,

Attached is an electronic copy of a mailout that was sent early last week regarding Public Information Centre (PIC) No. 2 for the Greensville Subwatershed Study. I was unable to confirm the reception of the mailout via phone call and as such have sent this as a backup. If you have not received the mailout, but wish to attend please fill out the attached response form. If you have already received the paper version of this package in the mail and have any questions please feel free to send them to marco.silverio@hamilton.ca

Thank you for your time,

Brandon Coveney

Brandon Coveney

Sustainable Initiatives Student
Hamilton Water |
City of Hamilton | Public Works Department
77 James Street North, Suite 400, Hamilton, Ontario L8R 2K3
| Phone: 905.546.2424 x 5180
| Email: Brandon.Coveney@hamilton.ca |





City of Hamilton
City Hall, 71 Main Street West
Hamilton, Ontario,
Canada L8P 4Y5
www.hamilton.ca

Hamilton Water Division, Public Works Department
Physical Address: 77 James Street North, Suite 400, Hamilton, Ontario, L8R 2K3
Phone: 905-546-2424 ext. 6099 Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

January 8, 2015

**Re: Notice of Public Information Centre (PIC) No. 2
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

Dear Sir/Madam;

We have enclosed for your information a copy of the Notice of Public Information Centre No. 2 for the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. This notice will also appear in the Hamilton Spectator on January 9th and January 16th, 2015.

The purpose of this Class EA is to determine a management strategy for surface water (streams, stormwater), groundwater, community servicing (water and septic) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA. This Study will follow the Class EA planning and design process; the Master Plan (Approach 1) will address Phases 1 and 2 of the Class EA requirements for any Schedule B projects that are identified, and outline additional work that will be required to implement any Schedule C projects that are identified as part of the study.

For further information or if you wish to provide input regarding this project, please contact the undersigned at 905-546-2424 ext. 6099 or via email at Marco.Silverio@hamilton.ca.

Yours truly,

A handwritten signature in black ink that reads "Marco Silverio".

Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

1. Contact Name: _____
2. Ministry/Agency/Office: _____
3. Address: _____
_____ Postal Code: _____
Phone No.: _____
Email: _____
4. Please note specific comments and/or concerns (please attach additional sheets if necessary):

Signature _____ Date _____

Please return this form to:

Marco Silverio, M.Sc.
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

Notice of Public Information Centre No. 2 Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

Project Background

The City of Hamilton has initiated a Subwatershed and Class Environmental Assessment (EA) study for the Mid-Spencer Creek and Greensville Rural Settlement Area (RSA). Residents in the Greensville RSA and the subwatershed are currently serviced by private septic systems and groundwater-sourced municipal communal, private communal or individual wells.

The study will set a management strategy for surface water (streams, stormwater), groundwater, community servicing (water and septic) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA. The study includes public and review agency consultation, evaluation of alternatives, assessment of

the impacts of the proposed works, and identification of measures to mitigate any adverse impacts. Upon completion of the study, a Report documenting the planning and decision making process followed, will be prepared and made available for public review.

The Study Process

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Public Information Centre (PIC) No. 2

Two (2) PIC sessions are required for this Study. PIC No. 1 was held on November 21, 2007. PIC No. 2 will present the evaluation of the alternative solutions and identify the recommended solutions and is scheduled for:

Date: January 22, 2015

Time: 4:00 pm to 7:00 pm

Location: Christ Church, 92 Highway #8, Flamborough

We would like to hear from you

We are interested in hearing any comments or concerns you may have with respect to this study. Comments received through the course of the study will be considered in selecting the recommended solutions. Information will be collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record. If you would like more information or would like to be placed on the Study mailing list, please contact:

Marco Silverio, M.Sc.

Project Manager

City of Hamilton

77 James Street North, Suite 400

Hamilton, ON L8R 2K3

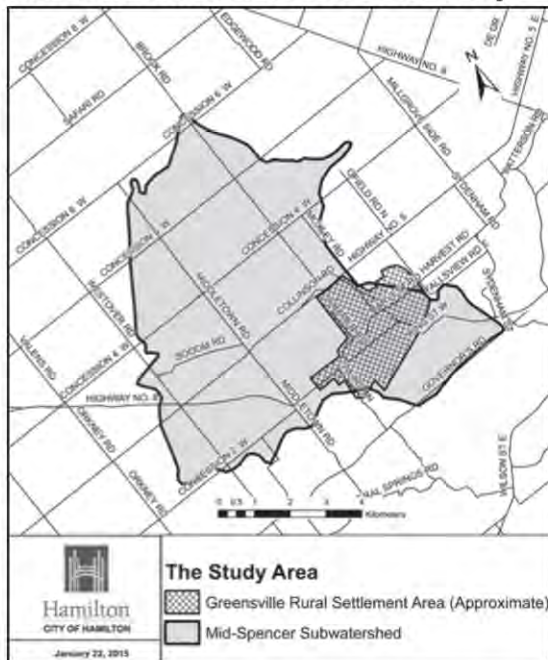
Phone: 905-546-2424 ext. 6099

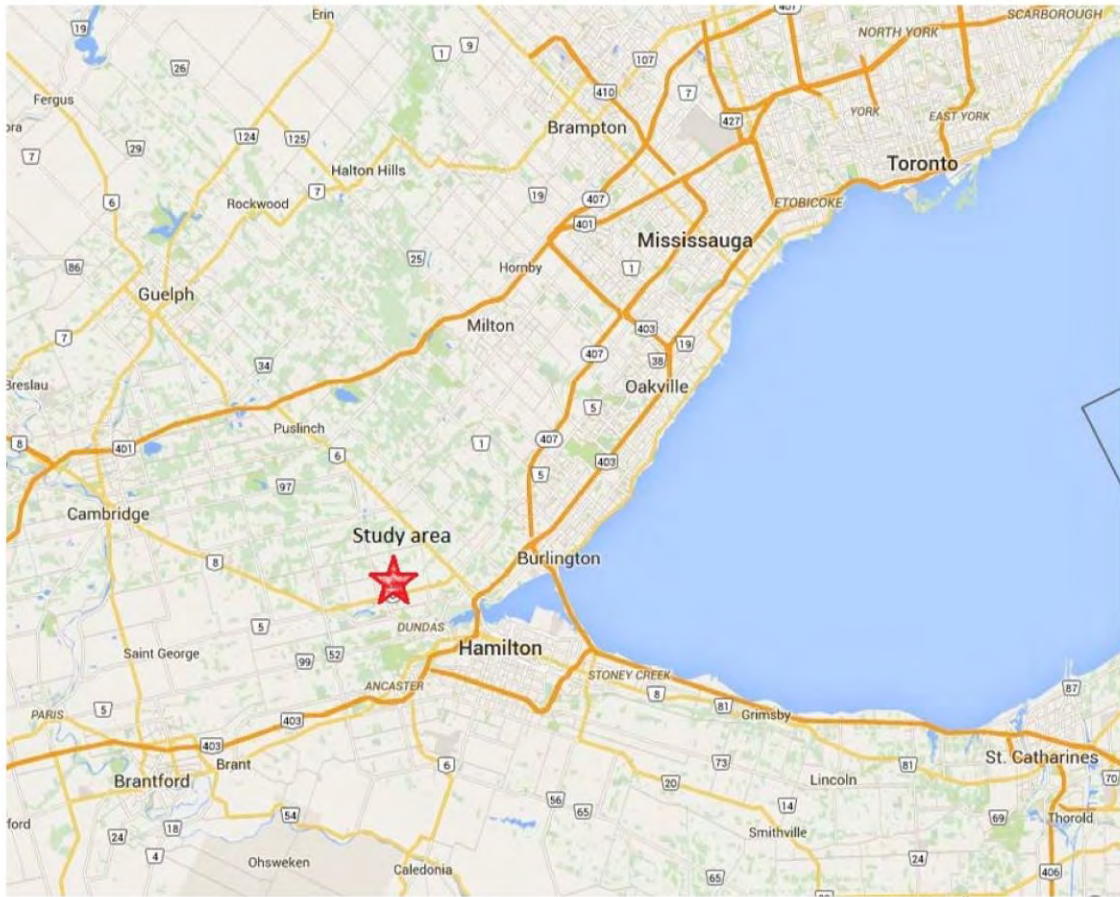
Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.







City of Hamilton
City Hall, 71 Main Street West
Hamilton, Ontario,
Canada L8P 4Y5
www.hamilton.ca

Hamilton Water Division, Public Works Department
Physical Address: 77 James Street North, Suite 400, Hamilton, Ontario, L8R 2K3
Phone: 905-546-2424 ext. 6099 Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

January 8, 2015

**Re: Notice of Public Information Centre (PIC) No. 2
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

Dear Sir/Madam;

We have enclosed for your information a copy of the Notice of Public Information Centre No. 2 for the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. This notice will also appear in the Hamilton Spectator on January 9th and January 16th, 2015.

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Yours truly,

A handwritten signature in black ink that reads "Marco Silverio".

Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

1. Contact Name: _____
2. Ministry/Agency/Office: _____
3. Address: _____
_____ Postal Code: _____
Phone No.: _____
Email: _____
4. Please note specific comments and/or concerns (please attach additional sheets if necessary):

Signature _____ Date _____

Please return this form to:

Marco Silverio, M.Sc.
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

Notice of Public Information Centre No. 2 Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

Project Background

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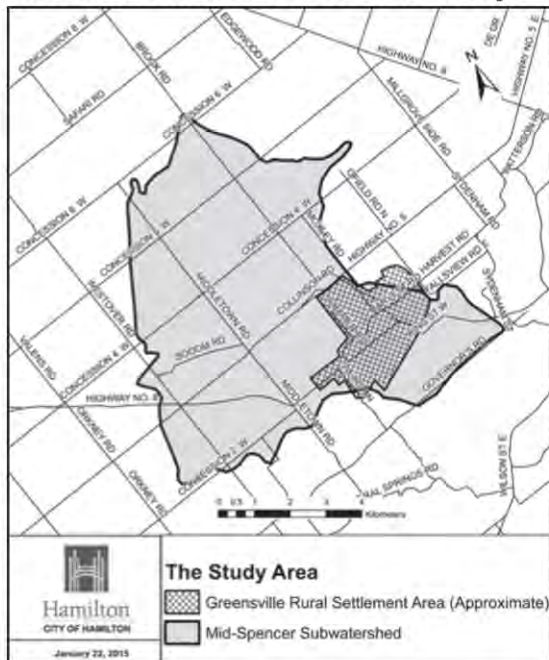
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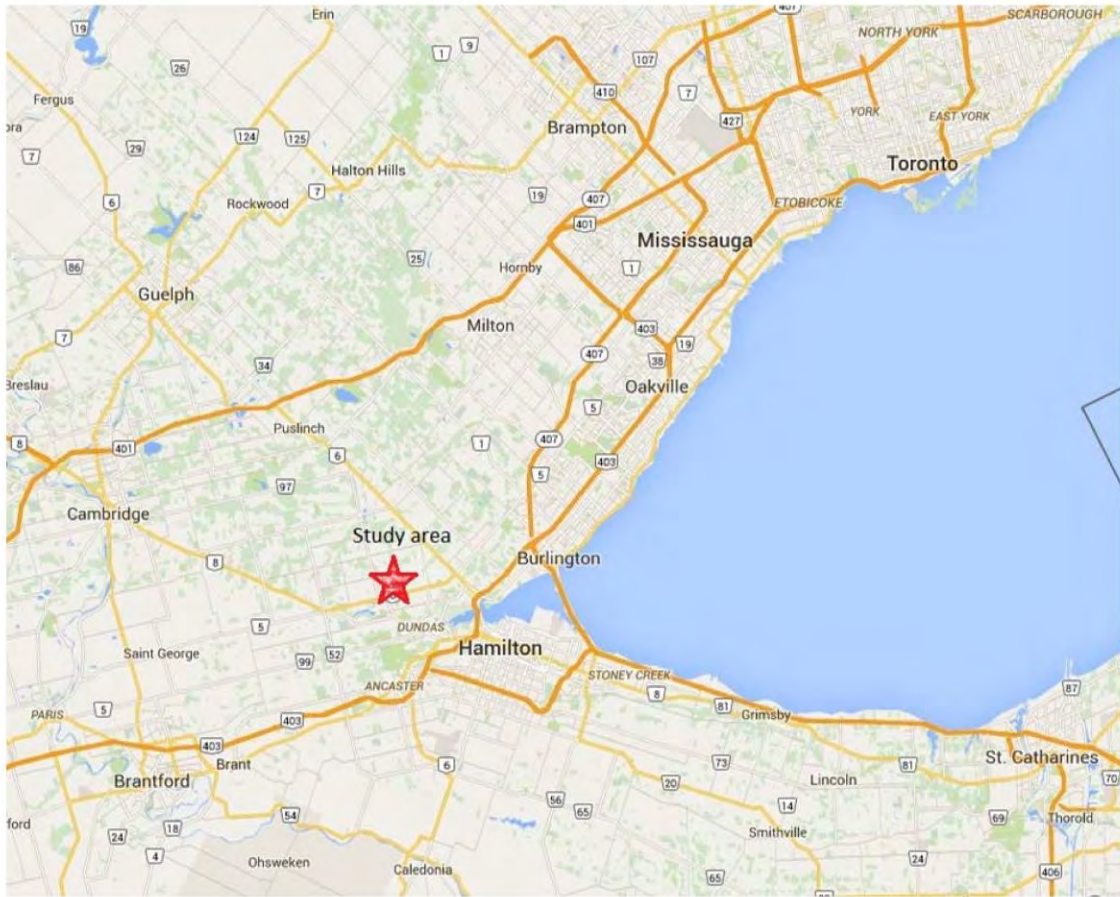
Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.





From: PW - ISWP Student 1 [ISWP.Student1@hamilton.ca]
Sent: January-16-15 3:40 PM
To: bbonspille@asn.ca
Subject: Notice of Public Information Centre No. 2 - Greensville Subwatershed Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf

Hello Barb,

Attached is an electronic copy of a mailout that was sent early last week regarding Public Information Centre (PIC) No. 2 for the Greensville Subwatershed Study. I was unable to confirm the reception of the mailout via phone call and as such have sent this as a backup. If you have not received the mailout, but wish to attend please fill out the attached response form. If you have already received the paper version of this package in the mail and have any questions please feel free to send them to marco.silverio@hamilton.ca

Thank you for your time,

Brandon Coveney

Brandon Coveney

Sustainable Initiatives Student
Hamilton Water |
City of Hamilton | Public Works Department
77 James Street North, Suite 400, Hamilton, Ontario L8R 2K3
| Phone: 905.546.2424 x 5180
| Email: Brandon.Coveney@hamilton.ca |



From: Silverio, Marco [Marco.Silverio@hamilton.ca]
Sent: January-08-15 3:40 PM
To: 'ccdev@hedac-aboriginal.com'
Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf; Response Form - Agency - FINAL.doc

Good Afternoon,

The City is completing the Mid-Spencer Creek/Greensville Rural Settlement Area (RSA) Subwatershed and Class Environmental Assessment (EA) study to determine a management strategy for surface water (streams, stormwater), groundwater, community servicing (water and wastewater) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA.

Please find attached the project information and study area map for your perusal. If your agency/office has any comments or input regarding this project, we invite you to complete and return the attached Response Form by February 6th, 2015. For your convenience the Response Form is attached as a Word document.

Kind Regards,



Marco Silverio

PM-Source Protection Planning
Sustainable Initiatives
City of Hamilton | Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
T: 905.546.2424 ext. 6099
Marco.Silverio@hamilton.ca

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City of Hamilton
City Hall, 71 Main Street West
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www.hamilton.ca

Hamilton Water Division, Public Works Department
Physical Address: 77 James Street North, Suite 400, Hamilton, Ontario, L8R 2K3
Phone: 905-546-2424 ext. 6099 Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

January 8, 2015

**Re: Notice of Public Information Centre (PIC) No. 2
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

Dear Sir/Madam;

We have enclosed for your information a copy of the Notice of Public Information Centre No. 2 for the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. This notice will also appear in the Hamilton Spectator on January 9th and January 16th, 2015.

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Yours truly,

A handwritten signature in black ink that reads "Marco Silverio".

Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

1. Contact Name: _____
2. Ministry/Agency/Office: _____
3. Address: _____
_____ Postal Code: _____
Phone No.: _____
Email: _____
4. Please note specific comments and/or concerns (please attach additional sheets if necessary):

Signature _____ Date _____

Please return this form to:

Marco Silverio, M.Sc.
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

Notice of Public Information Centre No. 2 Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

Project Background

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Date: January 22, 2015

Time: 4:00 pm to 7:00 pm

Location: Christ Church, 92 Highway #8, Flamborough

We would like to hear from you

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Project Manager

City of Hamilton

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Hamilton, ON L8R 2K3

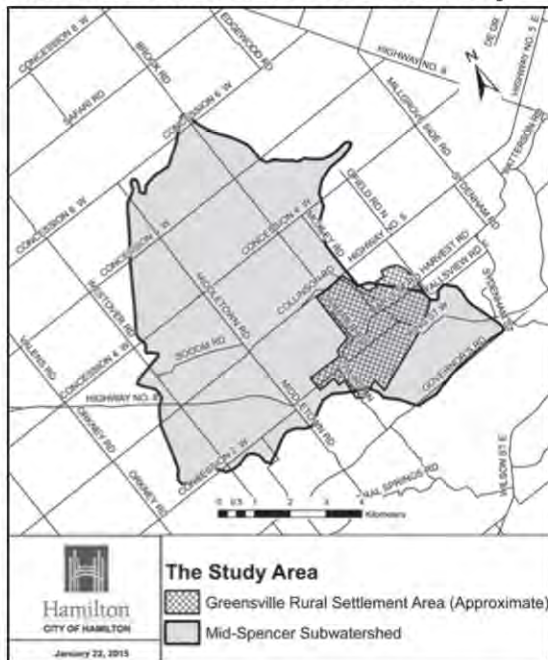
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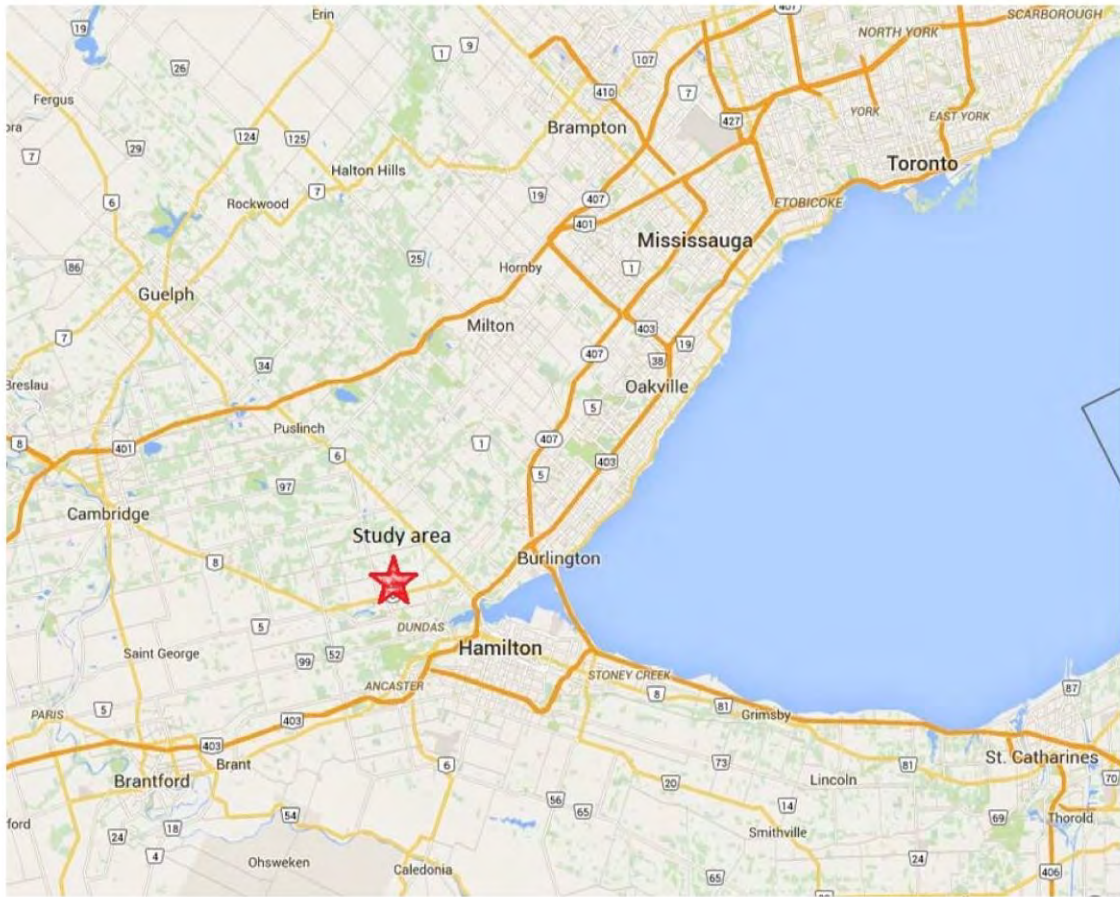
Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.







Hamilton

RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

1. Contact Name: _____

2. Ministry/Agency/Office: _____

3. Address: _____

_____ Postal Code: _____

Phone No.: _____

Email: _____

4. Please note specific comments and/or concerns (please attach additional sheets if necessary):

Multiple horizontal lines for writing comments and concerns.

Signature _____

Date _____

Please return this form to:

Marco Silverio, M.Sc.
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

From: PW - ISWP Student 1 [ISWP.Student1@hamilton.ca]
Sent: January-13-15 2:15 PM
To: csmccormack@sprc.hamilton.on.ca
Subject: Notice of Public Information Centre (PIC) No. 2 - Greensville Subwatershed Study

Hello Cindy Sue,

Attached is an electronic copy of a mailout that was sent early last week regarding Public Information Centre (PIC) No. 2 for the Greensville Subwatershed Study. I was unable to receive a confirmation of reception via phone call, but have left a voicemail message. If you have not received a copy of the Notice of Public Information Centre (PIC) No. 2 and wish to attend please fill out the attached response form. If you have already received the paper version of this package in the mail and have any questions please feel free to send them to marco.silverio@hamilton.ca

Thank you for your time,

Brandon Coveney

Brandon Coveney

Sustainable Initiatives Student
Hamilton Water |
City of Hamilton | Public Works Department
77 James Street North, Suite 400, Hamilton, Ontario L8R 2K3
| Phone: 905.546.2424 x 5180
| Email: Brandon.Coveney@hamilton.ca |



From: Silverio, Marco [Marco.Silverio@hamilton.ca]
Sent: January-08-15 3:38 PM
To: 'david@donnellylaw.ca'
Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf; Response Form - Agency - FINAL.doc

Good Afternoon,

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Kind Regards,



Marco Silverio

PM-Source Protection Planning
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City of Hamilton | Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
T: 905.546.2424 ext. 6099
Marco.Silverio@hamilton.ca

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City of Hamilton
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www.hamilton.ca

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Physical Address: 77 James Street North, Suite 400, Hamilton, Ontario, L8R 2K3
Phone: 905-546-2424 ext. 6099 Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

January 8, 2015

**Re: Notice of Public Information Centre (PIC) No. 2
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

Dear Sir/Madam;

We have enclosed for your information a copy of the Notice of Public Information Centre No. 2 for the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. This notice will also appear in the Hamilton Spectator on January 9th and January 16th, 2015.

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Yours truly,

A handwritten signature in black ink that reads "Marco Silverio".

Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
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1. Contact Name: _____
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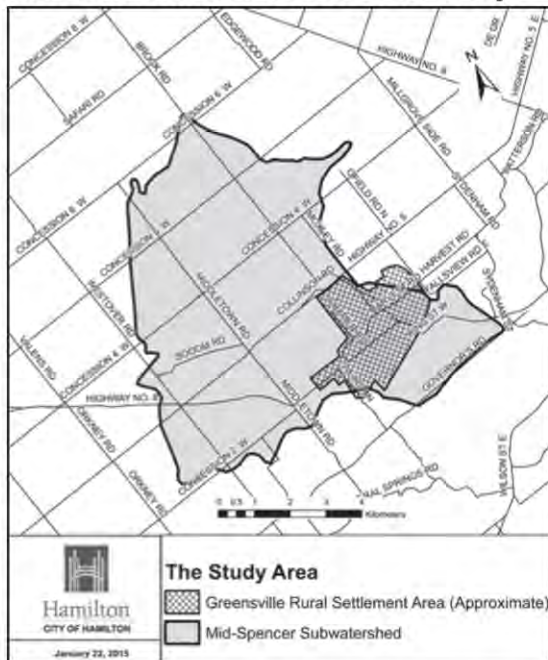
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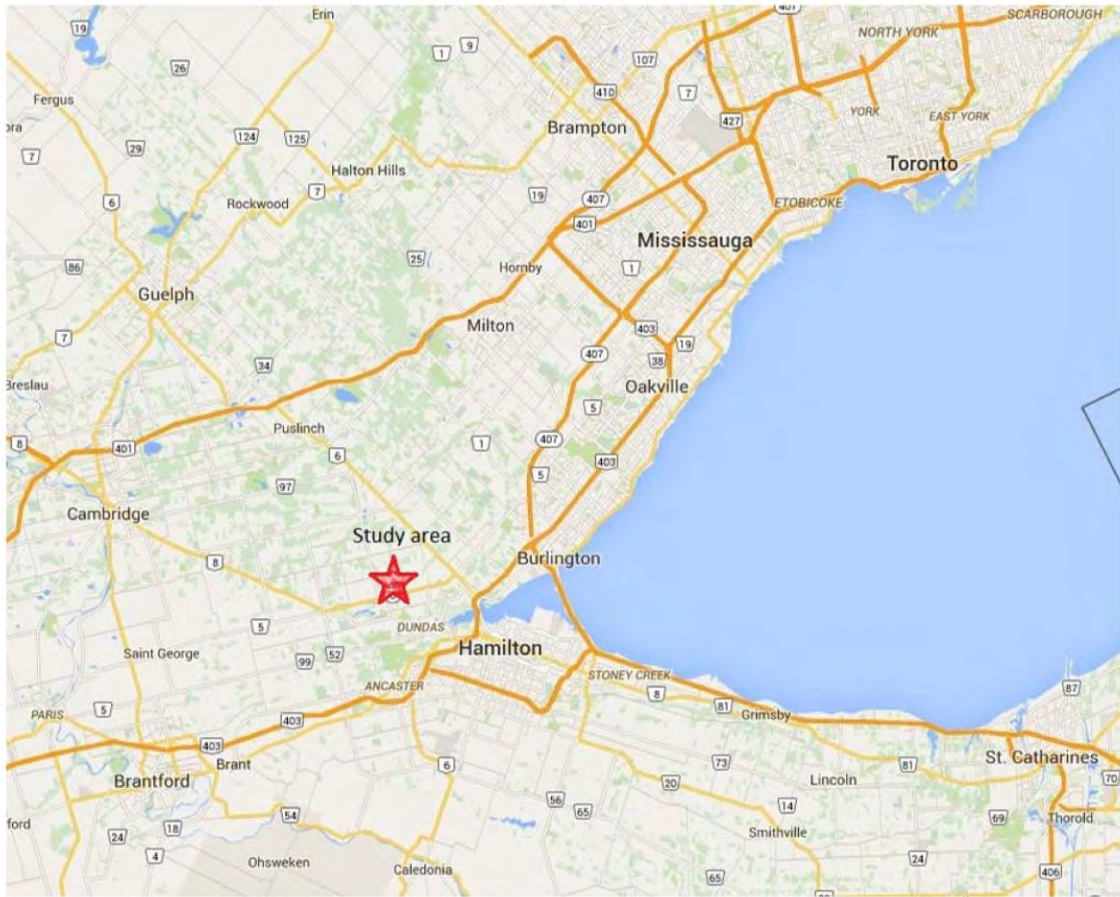
Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.







Hamilton

**RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
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Signature _____

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Please return this form to:

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Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

From: PW - ISWP Student 1 [ISWP.Student1@hamilton.ca]
Sent: January-13-15 2:23 PM
To: dedwada@cogeco.net
Subject: Notice of Public Information Centre (PIC) No. 2
Attachments: Mid-Spencer Creek-Greenville RSA Subwatershed Study EA.pdf

Hello,

This email is intended for Executive Director, Ms. Constance McKnight—

Attached is an electronic copy of a mailout that was sent early last week regarding Public Information Centre (PIC) No. 2 for the Greenville Subwatershed Study. I was unable to receive a confirmation of reception via phone call, but have left a voicemail message. If you have not received a copy of the Notice of Public Information Centre (PIC) No. 2 and wish to attend please fill out the attached response form. If you have already received the paper version of this package in the mail and have any questions please feel free to send them to marco.silverio@hamilton.ca

Thank you for your time,

Brandon Coveney

Brandon Coveney

Sustainable Initiatives Student
Hamilton Water |
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January 8, 2015

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Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

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Yours truly,

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Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

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Date: January 22, 2015

Time: 4:00 pm to 7:00 pm

Location: Christ Church, 92 Highway #8, Flamborough

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Marco Silverio, M.Sc.

Project Manager

City of Hamilton

77 James Street North, Suite 400

Hamilton, ON L8R 2K3

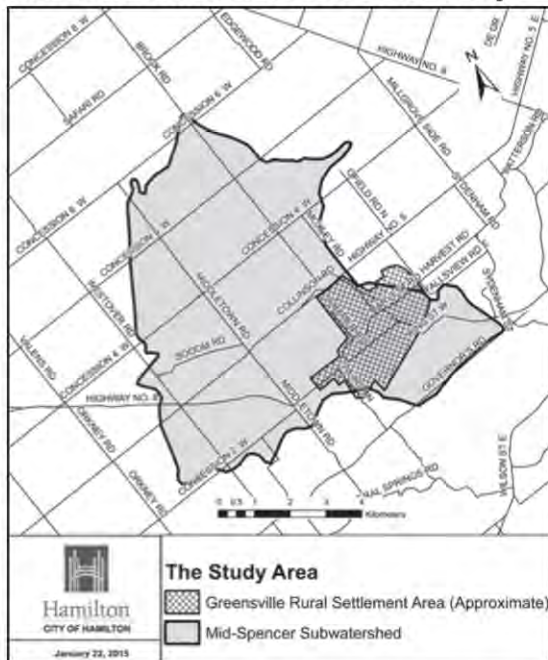
Phone: 905-546-2424 ext. 6099

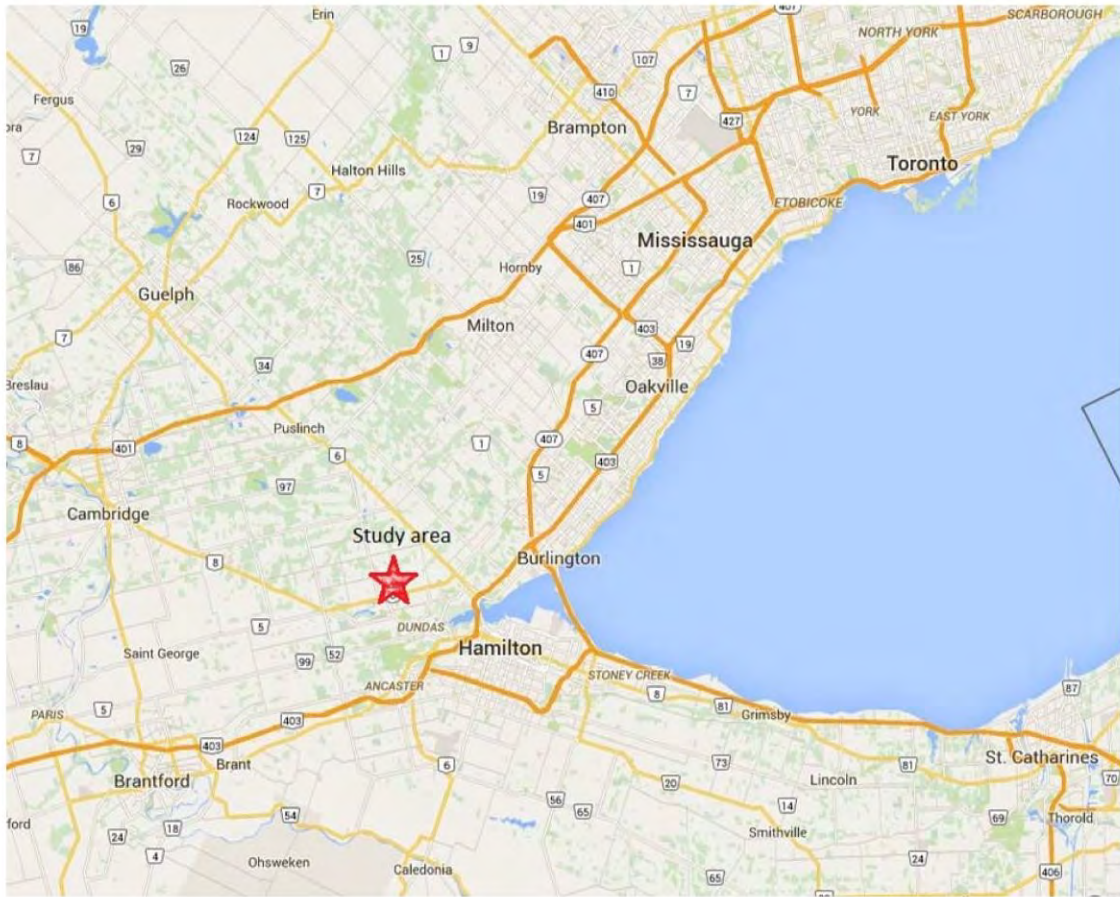
Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.





From: PW - ISWP Student 1 [ISWP.Student1@hamilton.ca]
Sent: January-13-15 2:34 PM
To: ed@nativewomenscenter.com
Subject: Notice of Public Information Centre (PIC) No. 2 - Greensville Subwatershed Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf

Hello Cindy,

As per our phone conversation—

Attached is an electronic copy of a mailout that was sent early last week regarding Public Information Centre (PIC) No. 2 for the Greensville Subwatershed Study. If you have not received a copy of the Notice of Public Information Centre (PIC) No. 2 and wish to attend please fill out the attached response form. If you have already received the paper version of this package in the mail and have any questions please feel free to send them to marco.silverio@hamilton.ca

Thank you for your time,

Brandon Coveney

Brandon Coveney

Sustainable Initiatives Student
Hamilton Water |
City of Hamilton | Public Works Department
77 James Street North, Suite 400, Hamilton, Ontario L8R 2K3
| Phone: 905.546.2424 x 5180
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Phone: 905-546-2424 ext. 6099 Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

January 8, 2015

**Re: Notice of Public Information Centre (PIC) No. 2
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

Dear Sir/Madam;

We have enclosed for your information a copy of the Notice of Public Information Centre No. 2 for the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. This notice will also appear in the Hamilton Spectator on January 9th and January 16th, 2015.

The purpose of this Class EA is to determine a management strategy for surface water (streams, stormwater), groundwater, community servicing (water and septic) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA. This Study will follow the Class EA planning and design process; the Master Plan (Approach 1) will address Phases 1 and 2 of the Class EA requirements for any Schedule B projects that are identified, and outline additional work that will be required to implement any Schedule C projects that are identified as part of the study.

For further information or if you wish to provide input regarding this project, please contact the undersigned at 905-546-2424 ext. 6099 or via email at Marco.Silverio@hamilton.ca.

Yours truly,

A handwritten signature in black ink that reads "Marco Silverio".

Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

1. Contact Name: _____
2. Ministry/Agency/Office: _____
3. Address: _____
_____ Postal Code: _____
Phone No.: _____
Email: _____
4. Please note specific comments and/or concerns (please attach additional sheets if necessary):

Signature _____ Date _____

Please return this form to:

Marco Silverio, M.Sc.
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

Notice of Public Information Centre No. 2 Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

Project Background

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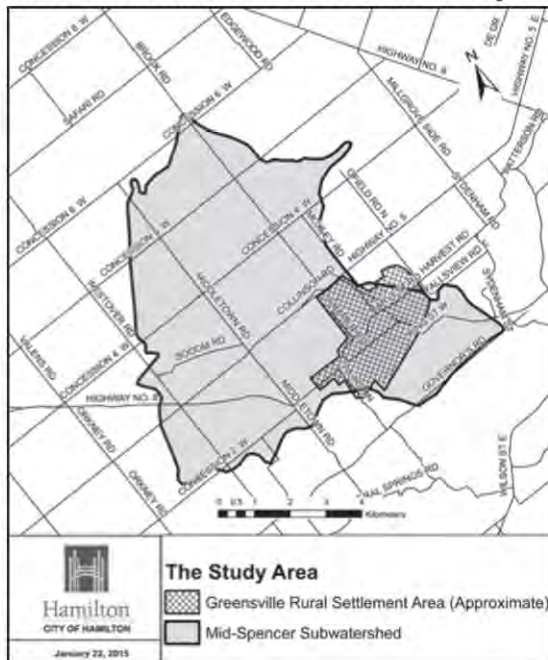
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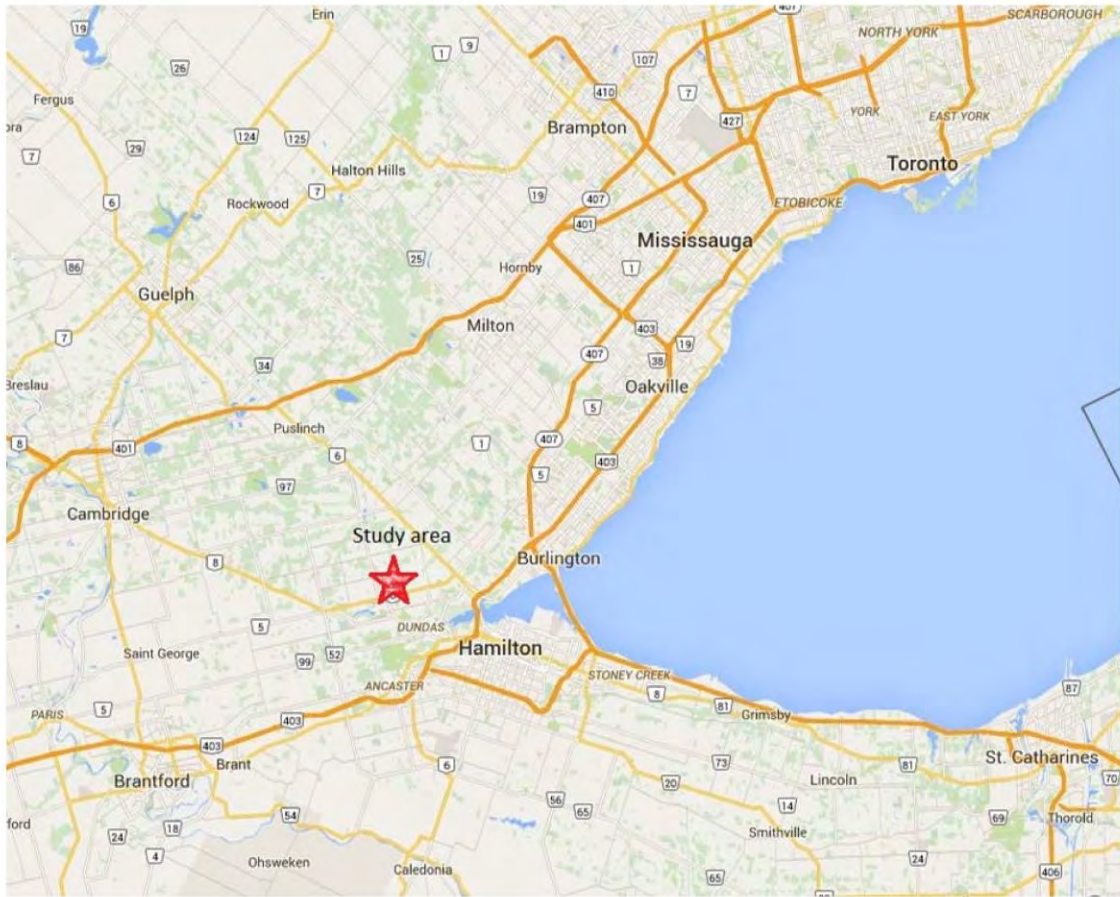
Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.





From: PW - ISWP Student 1 [ISWP.Student1@hamilton.ca]
Sent: January-13-15 2:36 PM
To: ed@nativewomenscentre.com
Subject: Notice of Public Information Centre (PIC) No.

Hello Cindy,

As per our phone conversation—

Attached is an electronic copy of a mailout that was sent early last week regarding Public Information Centre (PIC) No. 2 for the Greensville Subwatershed Study. If you have not received a copy of the Notice of Public Information Centre (PIC) No. 2 and wish to attend please fill out the attached response form. If you have already received the paper version of this package in the mail and have any questions please feel free to send them to marco.silverio@hamilton.ca

Thank you for your time,

Brandon Coveney

Brandon Coveney

Sustainable Initiatives Student
Hamilton Water |
City of Hamilton | Public Works Department
77 James Street North, Suite 400, Hamilton, Ontario L8R 2K3
| Phone: 905.546.2424 x 5180
| Email: Brandon.Coveney@hamilton.ca |



From: PW - ISWP Student 1 [ISWP.Student1@hamilton.ca]
Sent: January-13-15 2:05 PM
To: ed@unhinc.com
Subject: Notice of Public Information Centre (PIC) No. 2 - Greensville Subwatershed Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf

Hello Janice,

As per our conversation on the phone—

Attached is an electronic copy of a mailout that was sent early last week regarding Public Information Centre (PIC) No. 2 for the Greensville Subwatershed Study. If you have not received a copy of the Notice of Public Information Centre (PIC) No. 2 and wish to attend please fill out the attached response form. If you have already received the paper version of this package in the mail and have any questions please feel free to send them to marco.silverio@hamilton.ca

Thank you for your time,

Brandon Coveney

Brandon Coveney

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Phone: 905-546-2424 ext. 6099 Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

January 8, 2015

**Re: Notice of Public Information Centre (PIC) No. 2
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

Dear Sir/Madam;

We have enclosed for your information a copy of the Notice of Public Information Centre No. 2 for the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. This notice will also appear in the Hamilton Spectator on January 9th and January 16th, 2015.

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Yours truly,

A handwritten signature in black ink that reads "Marco Silverio".

Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

1. Contact Name: _____
2. Ministry/Agency/Office: _____
3. Address: _____
_____ Postal Code: _____
Phone No.: _____
Email: _____
4. Please note specific comments and/or concerns (please attach additional sheets if necessary):

Signature _____ Date _____

Please return this form to:

Marco Silverio, M.Sc.
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

Notice of Public Information Centre No. 2 Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

Project Background

The City of Hamilton has initiated a Subwatershed and Class Environmental Assessment (EA) study for the Mid-Spencer Creek and Greensville Rural Settlement Area (RSA). Residents in the Greensville RSA and the subwatershed are currently serviced by private septic systems and groundwater-sourced municipal communal, private communal or individual wells.

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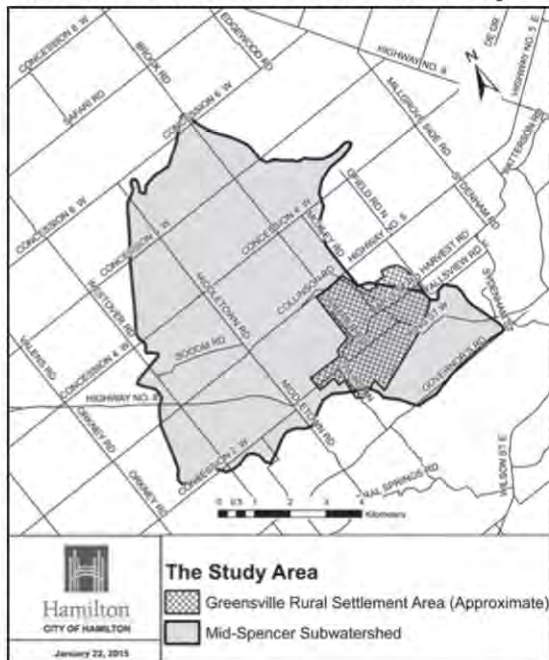
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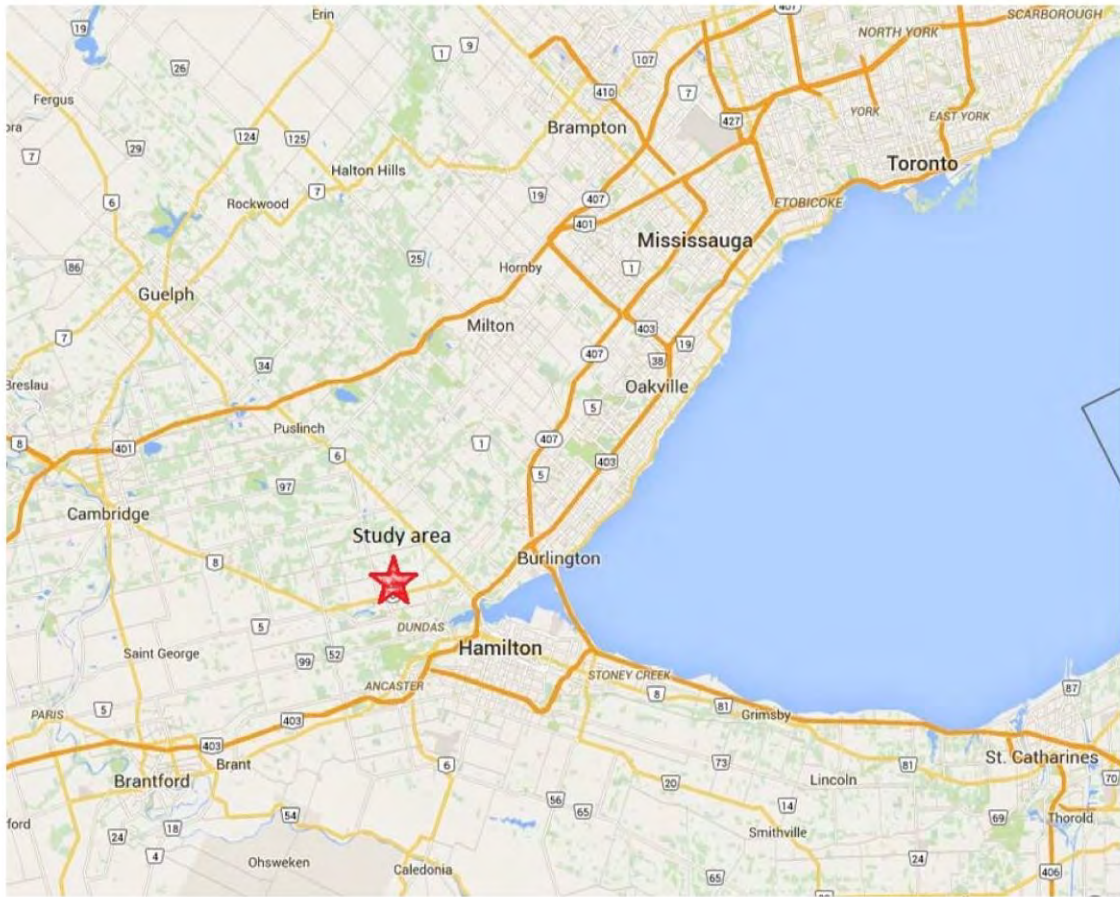
Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.





From: PW - ISWP Student 1 [ISWP.Student1@hamilton.ca]
Sent: January-13-15 11:44 AM
To: geonames@NRCan.gc.ca
Subject: Notice of Public Information Centre (PIC) No. 2 - Greensville Subwatershed Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf

Hello,

Attached is an electronic copy of a mailout that was sent early last week regarding Public Information Centre (PIC) No. 2 for the Greensville Subwatershed Study. I was unable to receive a confirmation of reception via phone call, but have left a voicemail message. If you have not received a copy of the Notice of Public Information Centre (PIC) No. 2 and wish to attend please fill out the attached response form. If you have already received the paper version of this package in the mail and have any questions please feel free to send them to marco.silverio@hamilton.ca

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Brandon Coveney

Sustainable Initiatives Student
Hamilton Water |
City of Hamilton | Public Works Department
77 James Street North, Suite 400, Hamilton, Ontario L8R 2K3
| Phone: 905.546.2424 x 5180
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Phone: 905-546-2424 ext. 6099 Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

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Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

1. Contact Name: _____
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Signature _____ Date _____

Please return this form to:

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Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
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Notice of Public Information Centre No. 2 Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

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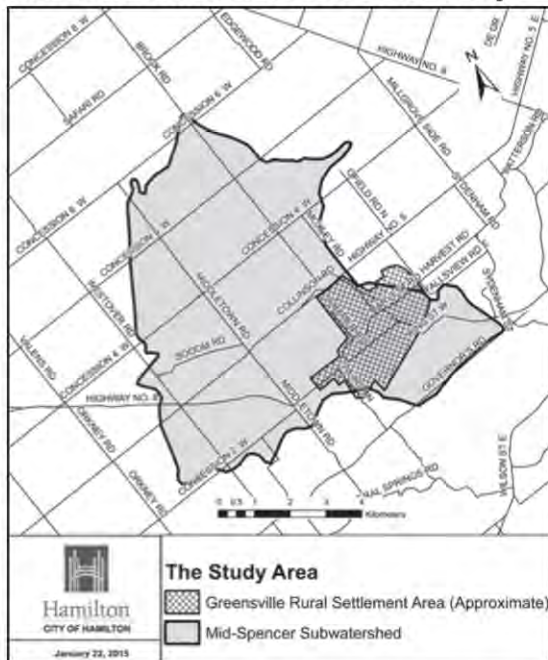
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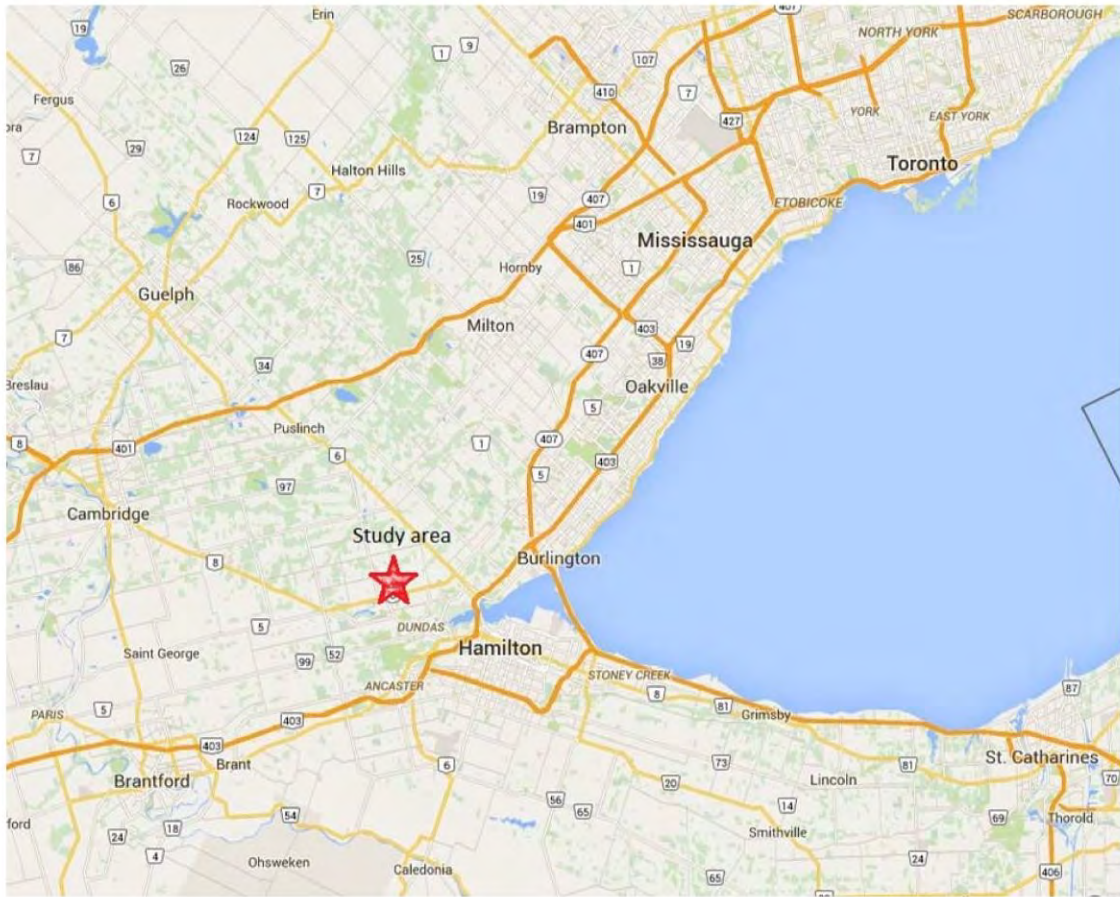
Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

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This Notice Issued January 9th and January 16th, 2015.





From: PW - ISWP Student 1 [ISWP.Student1@hamilton.ca]
Sent: January-13-15 1:24 PM
To: janeb@metisnation.org
Subject: Notice of Public Information Centre (PIC) No. 2 - Greensville Subwatershed Survey
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf

Hello,

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Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

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3. Address: _____
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Phone No.: _____
Email: _____
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Signature _____ Date _____

Please return this form to:

Marco Silverio, M.Sc.
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Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
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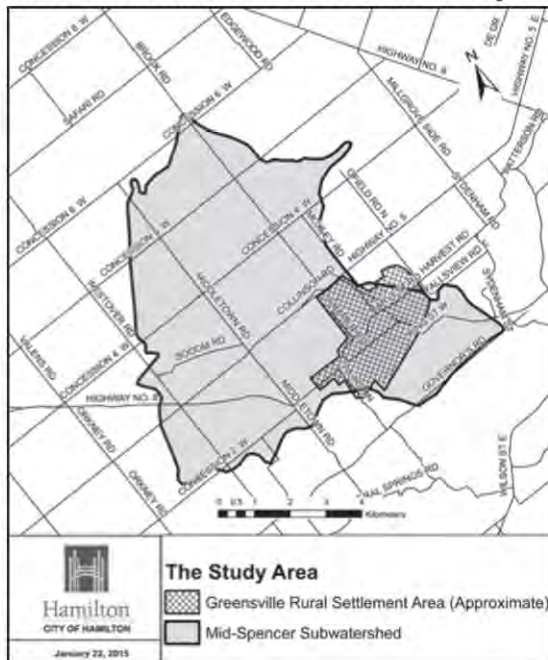
Phone: 905-546-2424 ext. 6099

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Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.



From: PW - ISWP Student 1 [ISWP.Student1@hamilton.ca]
Sent: January-13-15 11:35 AM
To: jocko@sixnations.com
Subject: Notice of Public Information Centre (PIC) No. 2 - Greensville Subwatershed Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf

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77 James Street North, Suite 400, Hamilton, Ontario L8R 2K3
| Phone: 905.546.2424 x 5180
| Email: Brandon.Coveney@hamilton.ca |





City of Hamilton
City Hall, 71 Main Street West
Hamilton, Ontario,
Canada L8P 4Y5
www.hamilton.ca

Hamilton Water Division, Public Works Department
Physical Address: 77 James Street North, Suite 400, Hamilton, Ontario, L8R 2K3
Phone: 905-546-2424 ext. 6099 Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

January 8, 2015

**Re: Notice of Public Information Centre (PIC) No. 2
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

Dear Sir/Madam;

We have enclosed for your information a copy of the Notice of Public Information Centre No. 2 for the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. This notice will also appear in the Hamilton Spectator on January 9th and January 16th, 2015.

The purpose of this Class EA is to determine a management strategy for surface water (streams, stormwater), groundwater, community servicing (water and septic) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA. This Study will follow the Class EA planning and design process; the Master Plan (Approach 1) will address Phases 1 and 2 of the Class EA requirements for any Schedule B projects that are identified, and outline additional work that will be required to implement any Schedule C projects that are identified as part of the study.

For further information or if you wish to provide input regarding this project, please contact the undersigned at 905-546-2424 ext. 6099 or via email at Marco.Silverio@hamilton.ca.

Yours truly,

A handwritten signature in black ink that reads "Marco Silverio".

Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

1. Contact Name: _____
2. Ministry/Agency/Office: _____
3. Address: _____
_____ Postal Code: _____
Phone No.: _____
Email: _____
4. Please note specific comments and/or concerns (please attach additional sheets if necessary):

Signature _____ Date _____

Please return this form to:

Marco Silverio, M.Sc.
Project Manager
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77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

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Date: January 22, 2015

Time: 4:00 pm to 7:00 pm

Location: Christ Church, 92 Highway #8, Flamborough

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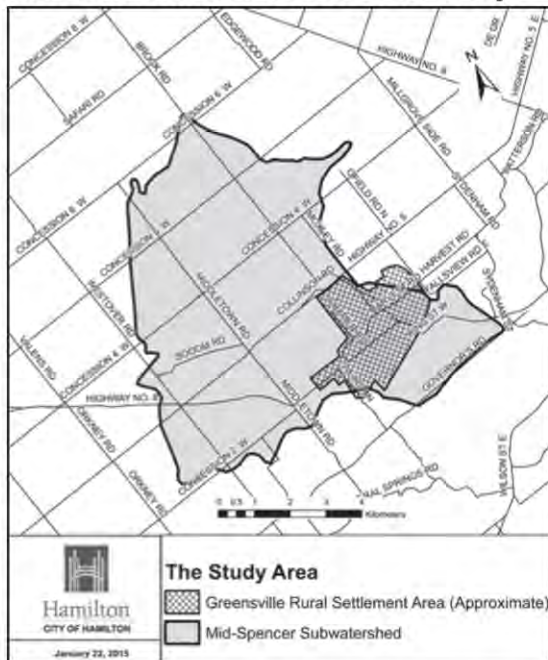
Phone: 905-546-2424 ext. 6099

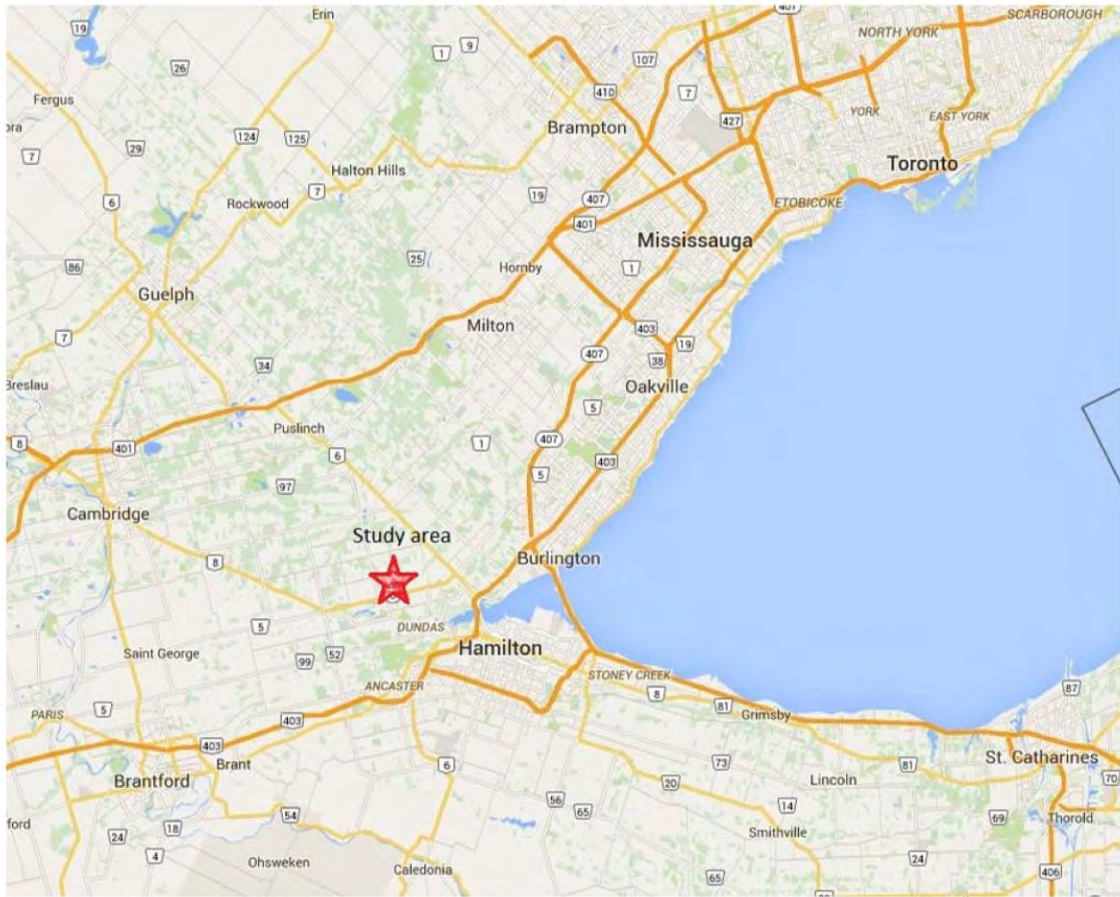
Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.





From: PW - ISWP Student 1 [ISWP.Student1@hamilton.ca]
Sent: January-16-15 3:39 PM
To: jocko@sixnations.com
Subject: Notice of Public Information Centre (PIC) No. 2 - Greensville Subwatershed Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf

Hello,

Attached is an electronic copy of a mailout that was sent early last week regarding Public Information Centre (PIC) No. 2 for the Greensville Subwatershed Study. If you wish to attend please fill out the attached response form. If you have already received the paper version of this package in the mail and have any questions please feel free to send them to marco.silverio@hamilton.ca

Thank you for your time,

Brandon Coveney

Brandon Coveney

Sustainable Initiatives Student
Hamilton Water |
City of Hamilton | Public Works Department
77 James Street North, Suite 400, Hamilton, Ontario L8R 2K3
| Phone: 905.546.2424 x 5180
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Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
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1. Contact Name: _____
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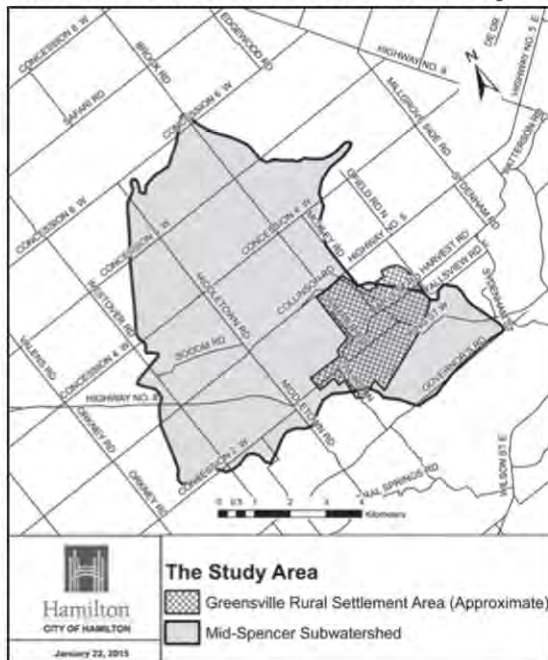
Phone: 905-546-2424 ext. 6099

Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.



From: Silverio, Marco [Marco.Silverio@hamilton.ca]
Sent: January-08-15 3:36 PM
To: 'john.kozji@aadnc-aadnc.gc.ca'
Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf; Response Form - Agency - FINAL.doc

Good Afternoon,

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Please find attached the project information and study area map for your perusal. If your agency/office has any comments or input regarding this project, we invite you to complete and return the attached Response Form by February 6th, 2015. For your convenience the Response Form is attached as a Word document.

Kind Regards,



Marco Silverio

PM-Source Protection Planning
Sustainable Initiatives
City of Hamilton | Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
T: 905.546.2424 ext. 6099
Marco.Silverio@hamilton.ca

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Yours truly,

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Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

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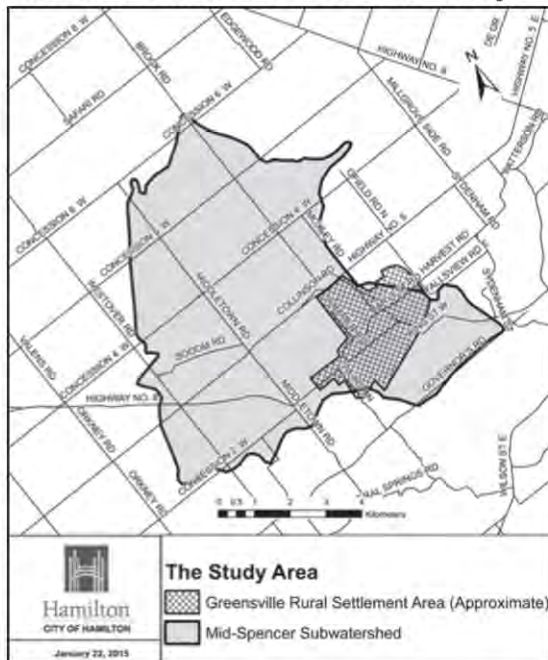
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Fax: 905-546-4491

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Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.





Hamilton

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City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
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Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

From: Silverio, Marco [Marco.Silverio@hamilton.ca]
Sent: January-08-15 4:06 PM
To: 'john.kozji@aadnc-aadnc.gc.ca'
Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf; Response Form - Agency - FINAL.doc

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Project Manager

Enclosure



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City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
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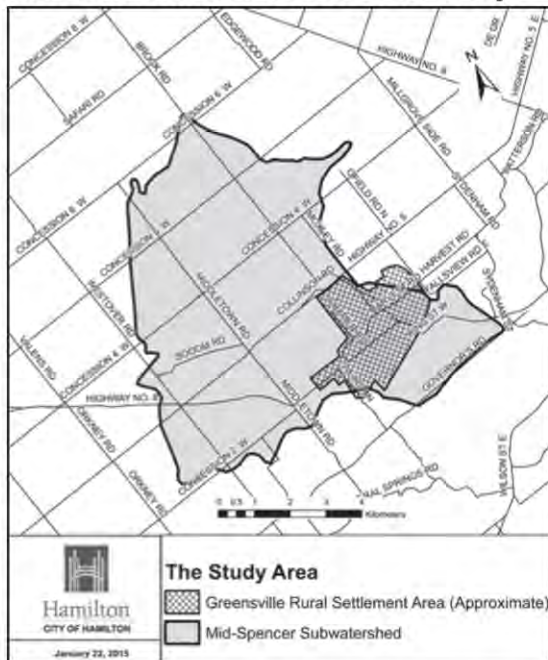
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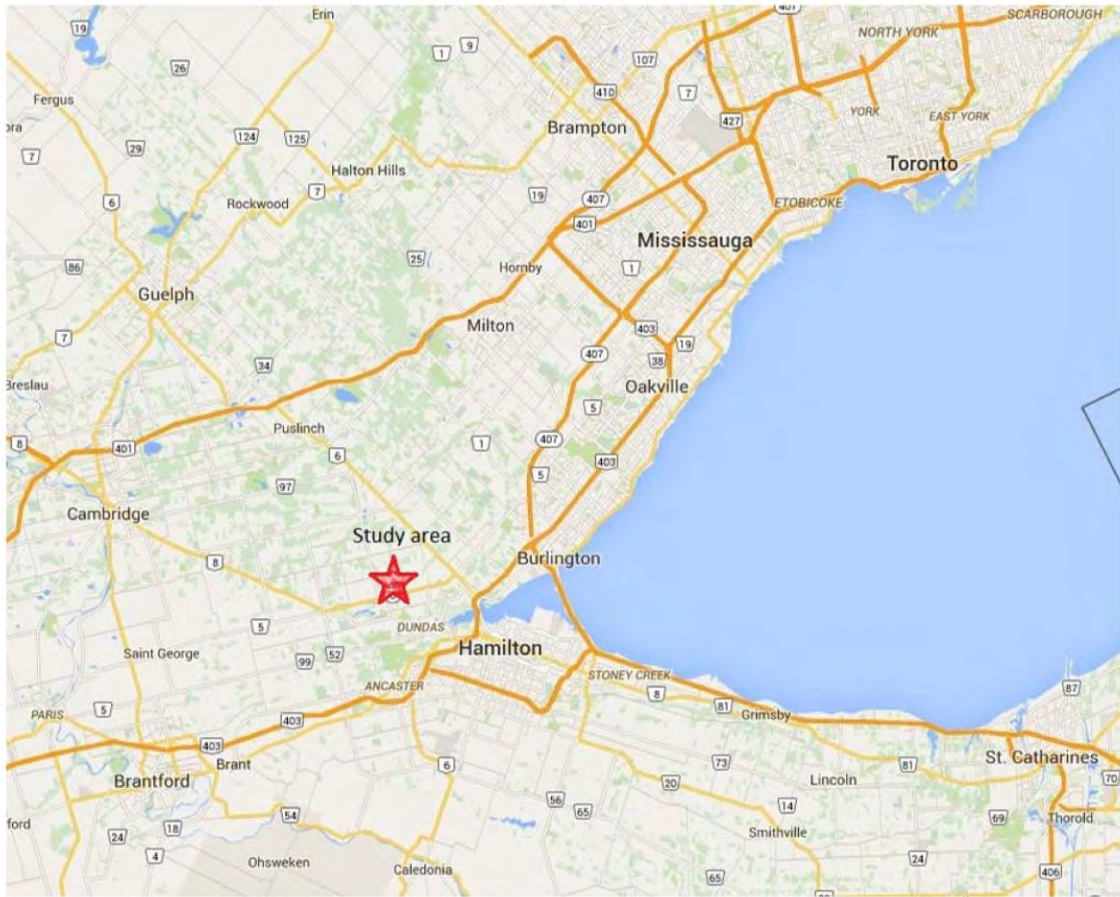
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From: Silverio, Marco [Marco.Silverio@hamilton.ca]
Sent: January-08-15 3:44 PM
To: 'kathleenl@metisnation.org'
Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf; Response Form - Agency - FINAL.doc

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Email: _____
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Signature _____ Date _____

Please return this form to:

Marco Silverio, M.Sc.
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

Notice of Public Information Centre No. 2 Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

Project Background

The City of Hamilton has initiated a Subwatershed and Class Environmental Assessment (EA) study for the Mid-Spencer Creek and Greensville Rural Settlement Area (RSA). Residents in the Greensville RSA and the subwatershed are currently serviced by private septic systems and groundwater-sourced municipal communal, private communal or individual wells.

The study will set a management strategy for surface water (streams, stormwater), groundwater, community servicing (water and septic) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA. The study includes public and review agency consultation, evaluation of alternatives, assessment of

the impacts of the proposed works, and identification of measures to mitigate any adverse impacts. Upon completion of the study, a Report documenting the planning and decision making process followed, will be prepared and made available for public review.

The Study Process

This Study will follow the planning and design process as defined in the Municipal Engineers Association Municipal Class Environmental Assessment document (October 2000, as amended in 2007 & 2011). The Master Plan (Approach 1) will address Phases 1 and 2 of the Class EA requirements for any Schedule B projects that are identified, and outline additional work that will be required to implement any Schedule C projects that are identified as part of the study.

Public Information Centre (PIC) No. 2

Two (2) PIC sessions are required for this Study. PIC No. 1 was held on November 21, 2007. PIC No. 2 will present the evaluation of the alternative solutions and identify the recommended solutions and is scheduled for:

Date: January 22, 2015

Time: 4:00 pm to 7:00 pm

Location: Christ Church, 92 Highway #8, Flamborough

We would like to hear from you

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Project Manager

City of Hamilton

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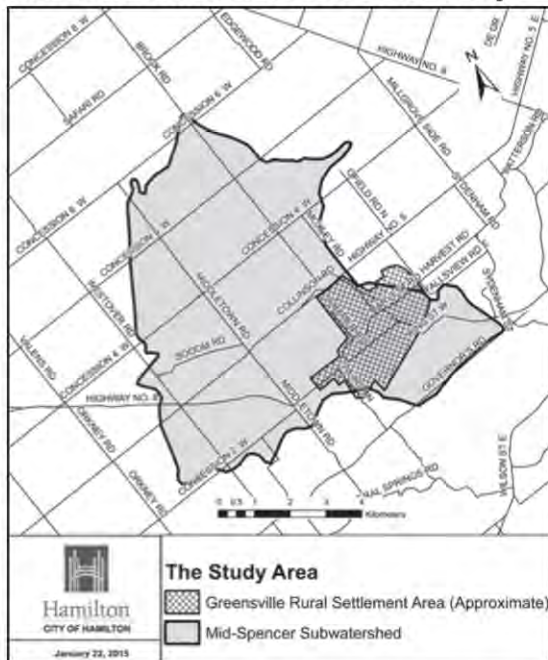
Phone: 905-546-2424 ext. 6099

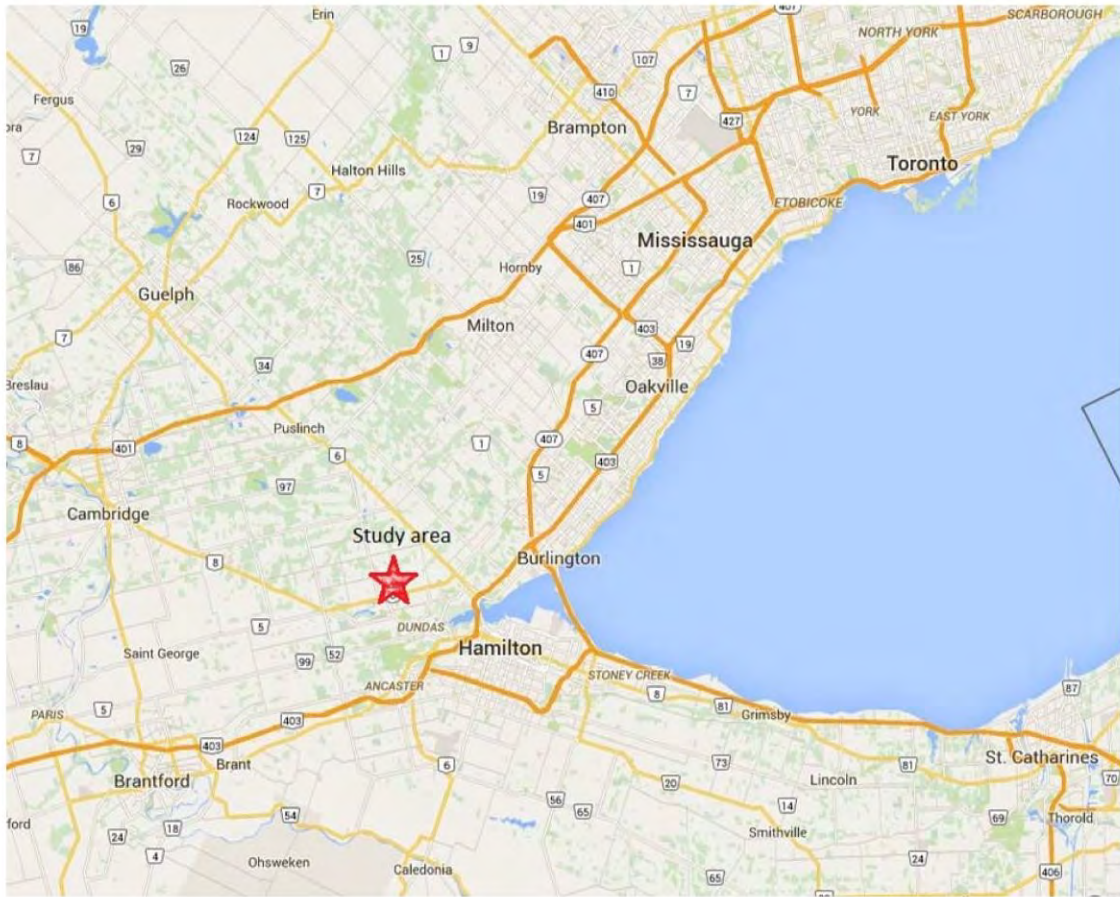
Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.







Hamilton

**RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study**

1. Contact Name: _____

2. Ministry/Agency/Office: _____

3. Address: _____

_____ Postal Code: _____

Phone No.: _____

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Date _____

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Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

From: Silverio, Marco [Marco.Silverio@hamilton.ca]
Sent: January-08-15 3:45 PM
To: 'manager@hedac-aboriginal.com'
Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf; Response Form - Agency - FINAL.doc

Good Afternoon,

The City is completing the Mid-Spencer Creek/Greensville Rural Settlement Area (RSA) Subwatershed and Class Environmental Assessment (EA) study to determine a management strategy for surface water (streams, stormwater), groundwater, community servicing (water and wastewater) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA.

Please find attached the project information and study area map for your perusal. If your agency/office has any comments or input regarding this project, we invite you to complete and return the attached Response Form by February 6th, 2015. For your convenience the Response Form is attached as a Word document.

Kind Regards,



Marco Silverio

PM-Source Protection Planning
Sustainable Initiatives
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City of Hamilton
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www.hamilton.ca

Hamilton Water Division, Public Works Department
Physical Address: 77 James Street North, Suite 400, Hamilton, Ontario, L8R 2K3
Phone: 905-546-2424 ext. 6099 Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

January 8, 2015

**Re: Notice of Public Information Centre (PIC) No. 2
Mid-Spencer Creek/Greenville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

Dear Sir/Madam;

We have enclosed for your information a copy of the Notice of Public Information Centre No. 2 for the Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. This notice will also appear in the Hamilton Spectator on January 9th and January 16th, 2015.

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Yours truly,

A handwritten signature in black ink that reads "Marco Silverio".

Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

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City of Hamilton

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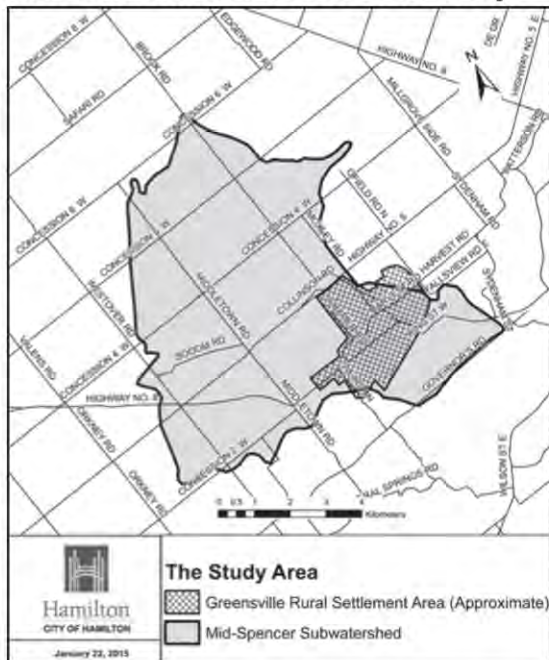
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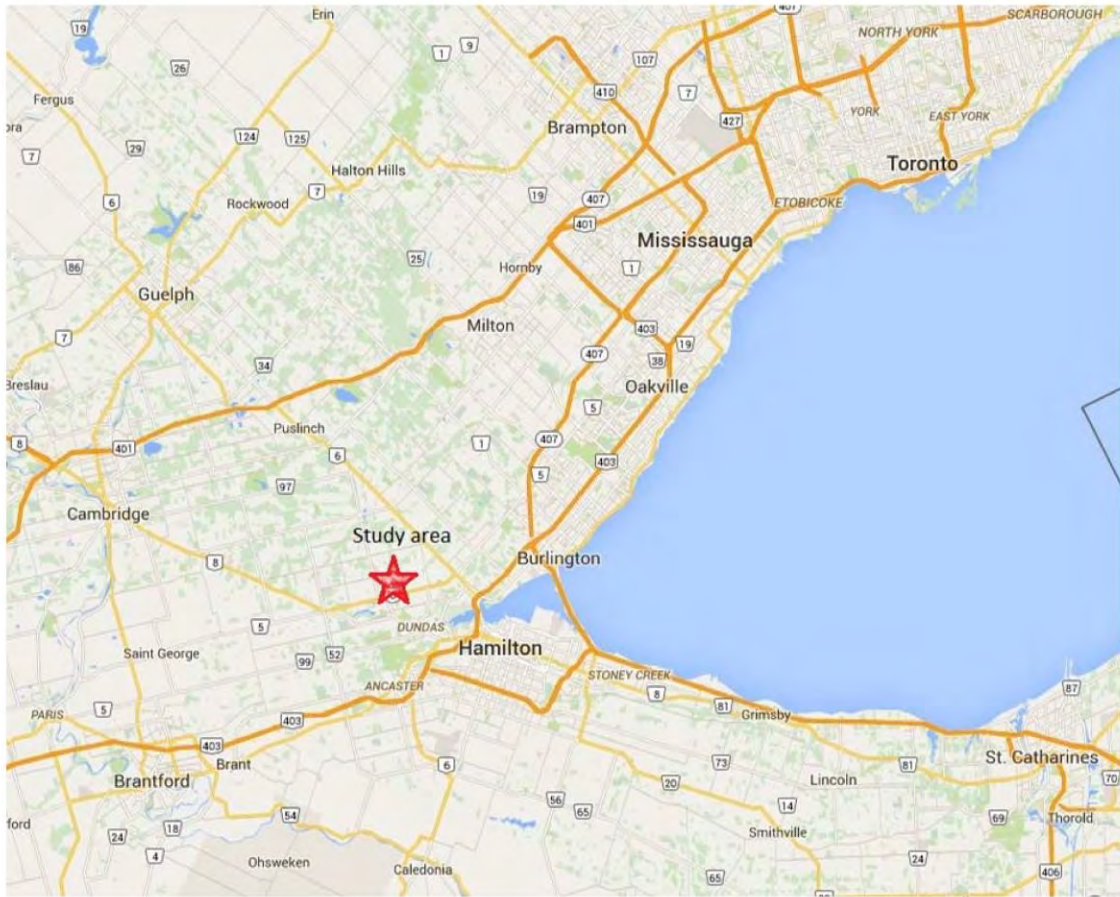
Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.







Hamilton

**RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study**

1. Contact Name: _____

2. Ministry/Agency/Office: _____

3. Address: _____

_____ Postal Code: _____

Phone No.: _____

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Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

From: Silverio, Marco [Marco.Silverio@hamilton.ca]
Sent: January-08-15 3:44 PM
To: 'ofifc@ofifc.org'
Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf; Response Form - Agency - FINAL.doc

Good Afternoon,

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Kind Regards,



Marco Silverio

PM-Source Protection Planning
Sustainable Initiatives
City of Hamilton | Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
T: 905.546.2424 ext. 6099
Marco.Silverio@hamilton.ca

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www.hamilton.ca

Hamilton Water Division, Public Works Department
Physical Address: 77 James Street North, Suite 400, Hamilton, Ontario, L8R 2K3
Phone: 905-546-2424 ext. 6099 Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

January 8, 2015

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Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

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Yours truly,

A handwritten signature in black ink that reads "Marco Silverio".

Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

1. Contact Name: _____
2. Ministry/Agency/Office: _____
3. Address: _____
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Thank you for your participation in this study.

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Project Background

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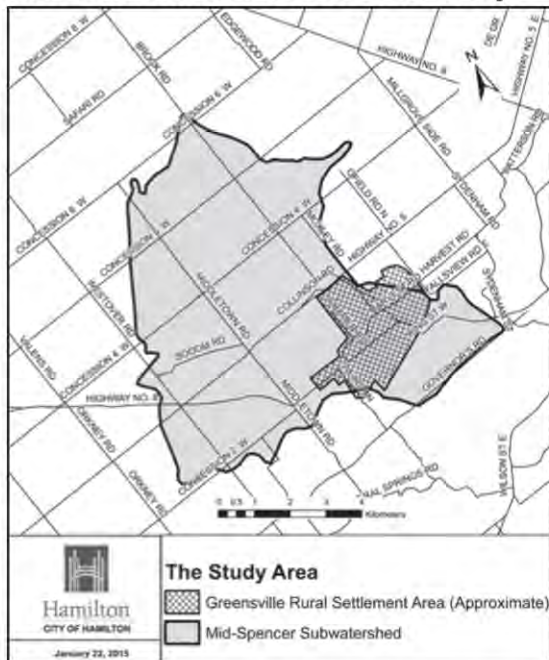
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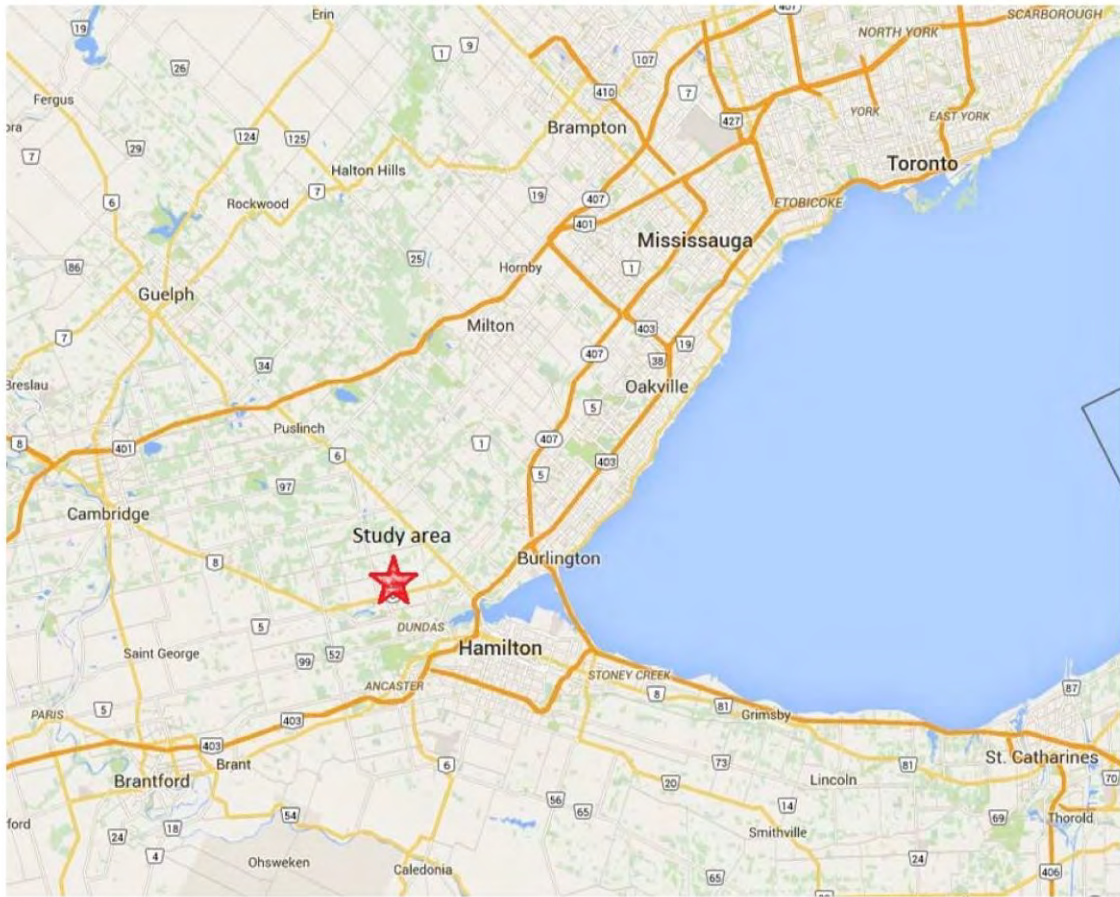
Fax: 905-546-4491

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Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.







Hamilton

**RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study**

1. Contact Name: _____

2. Ministry/Agency/Office: _____

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Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

From: Silverio, Marco [Marco.Silverio@hamilton.ca]
Sent: January-08-15 3:39 PM
To: 'pgeneral@sixnations.ca'
Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf; Response Form - Agency - FINAL.doc

Good Afternoon,

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Marco Silverio

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Sustainable Initiatives
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Marco.Silverio@hamilton.ca

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www.hamilton.ca

Hamilton Water Division, Public Works Department
Physical Address: 77 James Street North, Suite 400, Hamilton, Ontario, L8R 2K3
Phone: 905-546-2424 ext. 6099 Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

January 8, 2015

**Re: Notice of Public Information Centre (PIC) No. 2
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

Dear Sir/Madam;

We have enclosed for your information a copy of the Notice of Public Information Centre No. 2 for the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. This notice will also appear in the Hamilton Spectator on January 9th and January 16th, 2015.

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Yours truly,

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Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

1. Contact Name: _____
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Phone No.: _____
Email: _____
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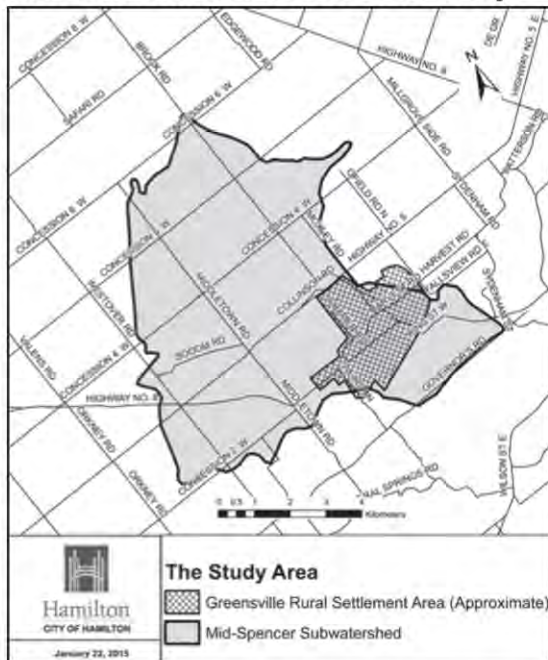
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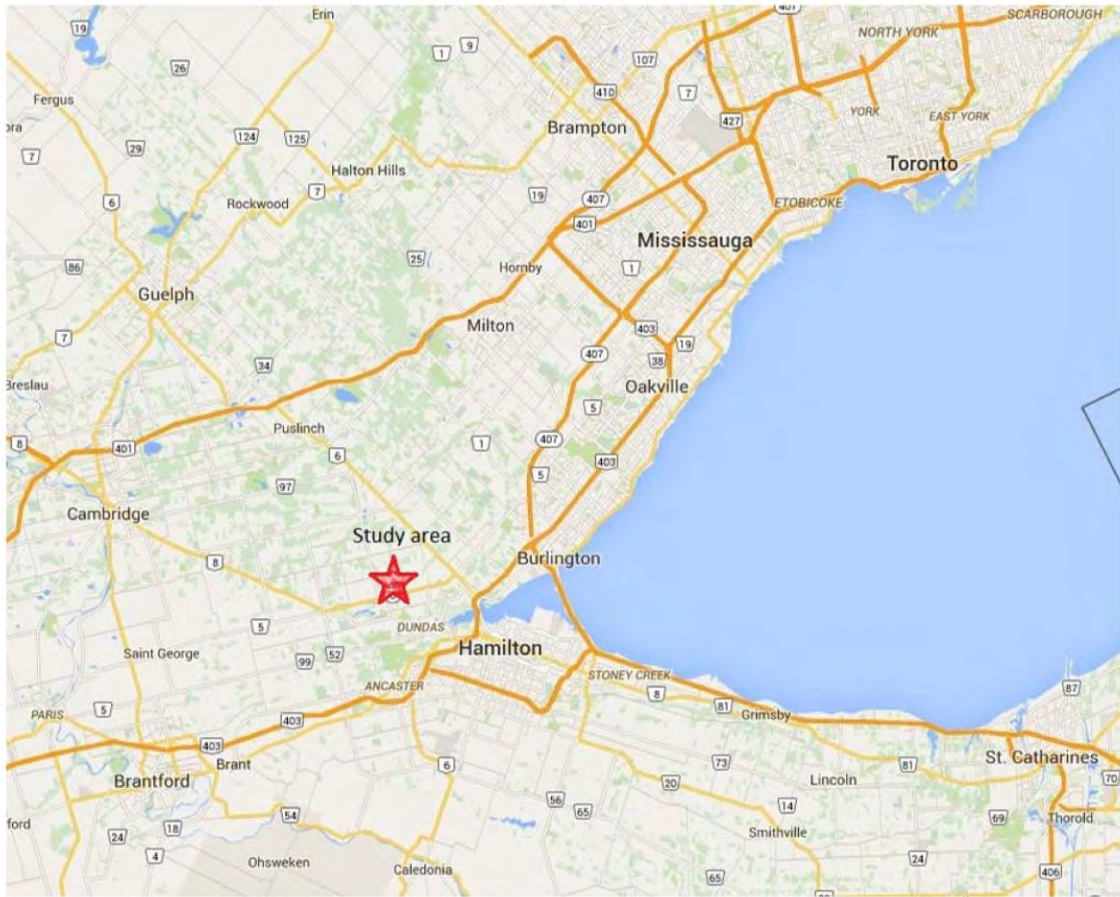
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Mid-Spencer Creek/Greensville Rural Settlement Area
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Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

From: PW - ISWP Student 1 [ISWP.Student1@hamilton.ca]
Sent: January-13-15 1:56 PM
To: sarah.louis@anishinabek.ca
Subject: the Notice of Public Information Centre (PIC) No. 2 - Greensville Subwatershed Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf

Hello Sarah,

As per our conversation on the phone—

Attached is an electronic copy of a mailout that was sent early last week regarding Public Information Centre (PIC) No. 2 for the Greensville Subwatershed Study. If you have not received a copy of the Notice of Public Information Centre (PIC) No. 2 and wish to attend please fill out the attached response form. If you have already received the paper version of this package in the mail and have any questions please feel free to send them to marco.silverio@hamilton.ca

Thank you for your time,

Brandon Coveney

Brandon Coveney

Sustainable Initiatives Student
Hamilton Water |
City of Hamilton | Public Works Department
77 James Street North, Suite 400, Hamilton, Ontario L8R 2K3
| Phone: 905.546.2424 x 5180
| Email: Brandon.Coveney@hamilton.ca |





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www.hamilton.ca

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Email: Marco.Silverio@hamilton.ca

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Marco Silverio, M.Sc.
Project Manager

Enclosure



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Subwatershed and Class Environmental
Assessment Study

1. Contact Name: _____
2. Ministry/Agency/Office: _____
3. Address: _____
_____ Postal Code: _____
Phone No.: _____
Email: _____
4. Please note specific comments and/or concerns (please attach additional sheets if necessary):

Signature _____ Date _____

Please return this form to:

Marco Silverio, M.Sc.
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

Notice of Public Information Centre No. 2 Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

Project Background

The City of Hamilton has initiated a Subwatershed and Class Environmental Assessment (EA) study for the Mid-Spencer Creek and Greensville Rural Settlement Area (RSA). Residents in the Greensville RSA and the subwatershed are currently serviced by private septic systems and ground water-sourced municipal communal, private communal or individual wells.

The study will set a management strategy for surface water (streams, stormwater), groundwater, community servicing (water and septic) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA. The study includes public and review agency consultation, evaluation of alternatives, assessment of

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Public Information Centre (PIC) No. 2

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Date: January 22, 2015

Time: 4:00 pm to 7:00 pm

Location: Christ Church, 92 Highway #8, Flamborough

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City of Hamilton

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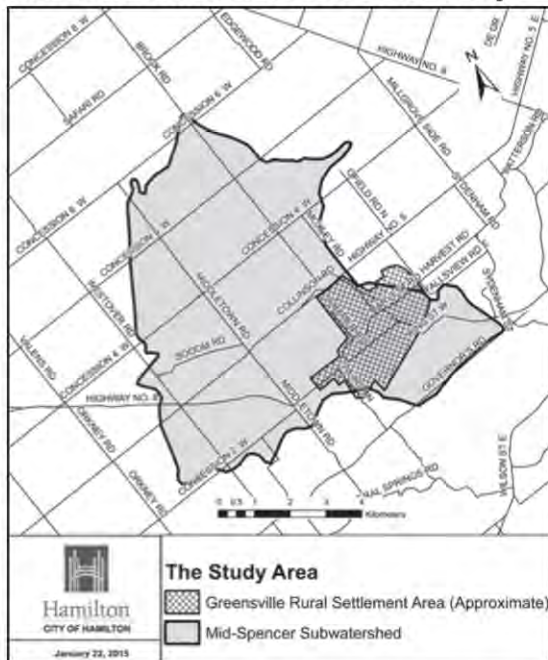
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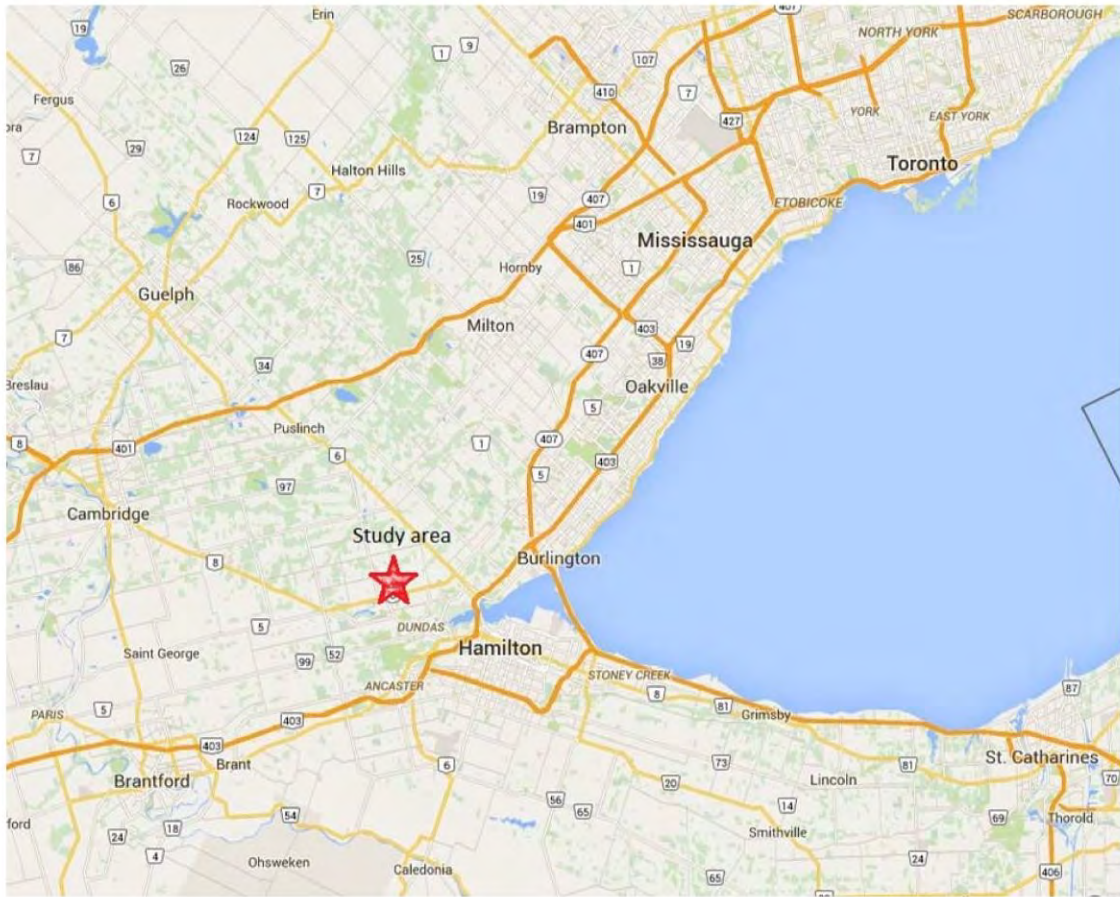
Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.





From: Silverio, Marco [Marco.Silverio@hamilton.ca]
Sent: January-08-15 3:40 PM
To: 'scottf@metisnation.org'
Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf; Response Form - Agency - FINAL.doc

Good Afternoon,

The City is completing the Mid-Spencer Creek/Greensville Rural Settlement Area (RSA) Subwatershed and Class Environmental Assessment (EA) study to determine a management strategy for surface water (streams, stormwater), groundwater, community servicing (water and wastewater) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA.

Please find attached the project information and study area map for your perusal. If your agency/office has any comments or input regarding this project, we invite you to complete and return the attached Response Form by February 6th, 2015. For your convenience the Response Form is attached as a Word document.

Kind Regards,



Marco Silverio

PM-Source Protection Planning
Sustainable Initiatives
City of Hamilton | Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
T: 905.546.2424 ext. 6099
Marco.Silverio@hamilton.ca

The contents of this email transmission are privileged and confidential, intended only for the recipients named above. This message may not be copied, reproduced or used in any manner without the express written permission of the sender. If you have received this email and are not the intended recipient, please destroy it and call 905 546 2424 ext. 6099, collect if long distance. Thank you.



City of Hamilton
City Hall, 71 Main Street West
Hamilton, Ontario,
Canada L8P 4Y5
www.hamilton.ca

Hamilton Water Division, Public Works Department
Physical Address: 77 James Street North, Suite 400, Hamilton, Ontario, L8R 2K3
Phone: 905-546-2424 ext. 6099 Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

January 8, 2015

**Re: Notice of Public Information Centre (PIC) No. 2
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

Dear Sir/Madam;

We have enclosed for your information a copy of the Notice of Public Information Centre No. 2 for the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. This notice will also appear in the Hamilton Spectator on January 9th and January 16th, 2015.

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Yours truly,

A handwritten signature in black ink that reads "Marco Silverio".

Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

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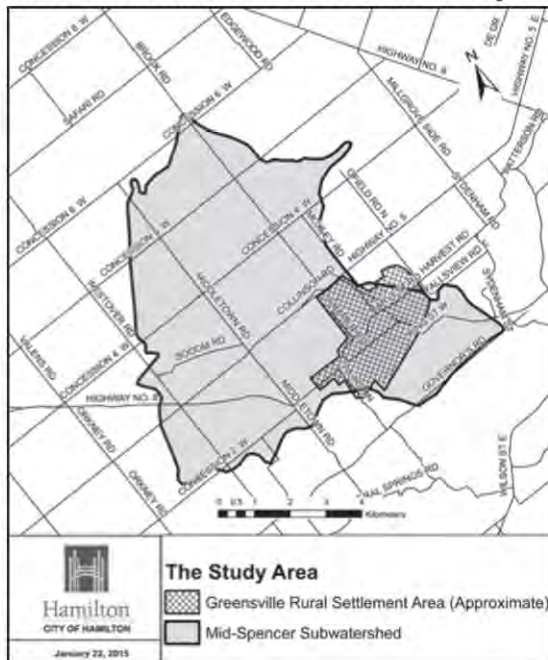
Phone: 905-546-2424 ext. 6099

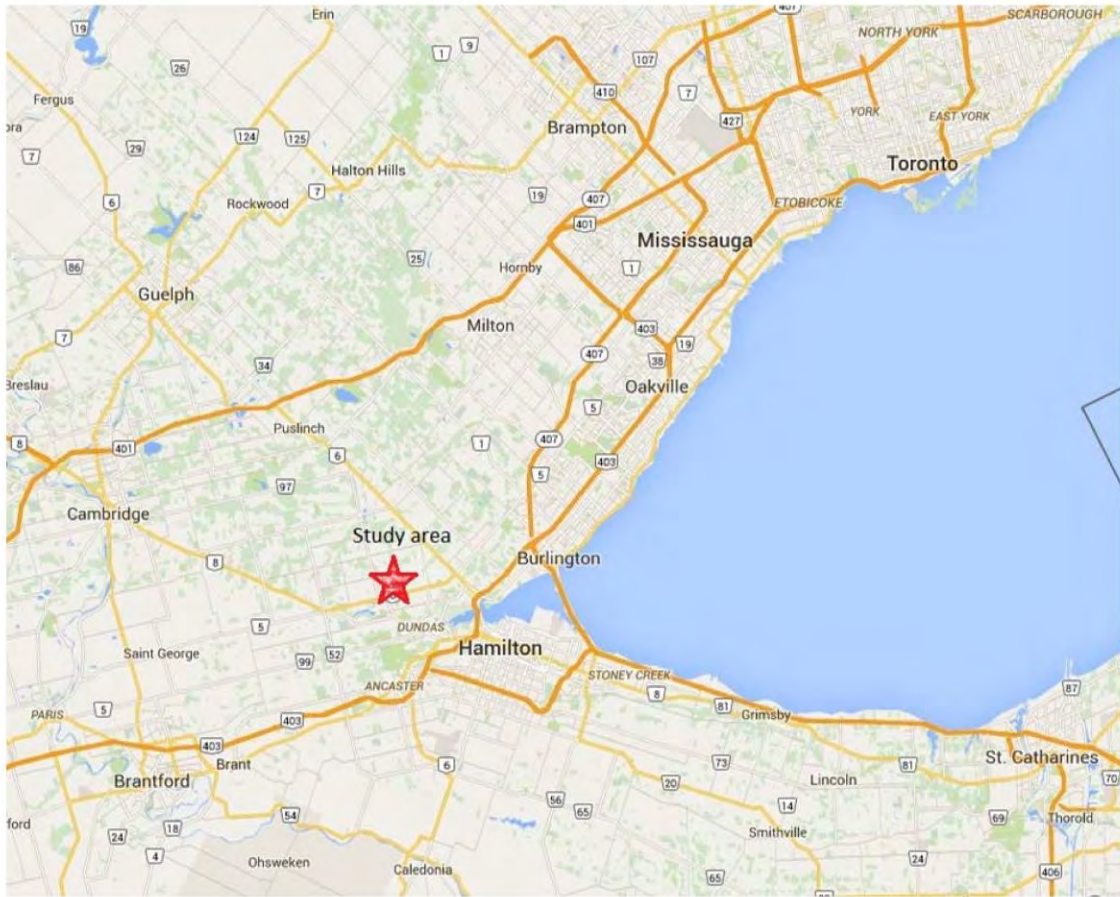
Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.







Hamilton

**RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study**

1. Contact Name: _____

2. Ministry/Agency/Office: _____

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_____ Postal Code: _____

Phone No.: _____

Email: _____

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Signature _____

Date _____

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Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

From: PW - ISWP Student 1 [ISWP.Student1@hamilton.ca]
Sent: January-13-15 3:25 PM
To: susan.waters@aandc.gc.ca
Subject: Public Information Centre (PIC) No. 2 - Greensville Subwatershed Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf

Hello,

We had originally sent this notice on January 8th to John Kozji, but it seems our contact information was outdated.

Attached is an information package regarding the Public Information Centre (PIC) No. 2 Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. If you wish to attend the Public Information Centre please fill out the attached response form. If you have any questions or concerns please feel free to send them to marco.silverio@hamilton.ca

Thank you for your time,

Brandon Coveney

Brandon Coveney

Sustainable Initiatives Student
Hamilton Water |
City of Hamilton | Public Works Department
77 James Street North, Suite 400, Hamilton, Ontario L8R 2K3
| Phone: 905.546.2424 x 5180
| Email: Brandon.Coveney@hamilton.ca |





City of Hamilton
City Hall, 71 Main Street West
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Physical Address: 77 James Street North, Suite 400, Hamilton, Ontario, L8R 2K3
Phone: 905-546-2424 ext. 6099 Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

January 8, 2015

**Re: Notice of Public Information Centre (PIC) No. 2
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental Assessment Study**

Dear Sir/Madam;

We have enclosed for your information a copy of the Notice of Public Information Centre No. 2 for the Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study. This notice will also appear in the Hamilton Spectator on January 9th and January 16th, 2015.

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For further information or if you wish to provide input regarding this project, please contact the undersigned at 905-546-2424 ext. 6099 or via email at Marco.Silverio@hamilton.ca.

Yours truly,

A handwritten signature in black ink that reads "Marco Silverio".

Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

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Signature _____ Date _____

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Thank you for your participation in this study.

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City of Hamilton

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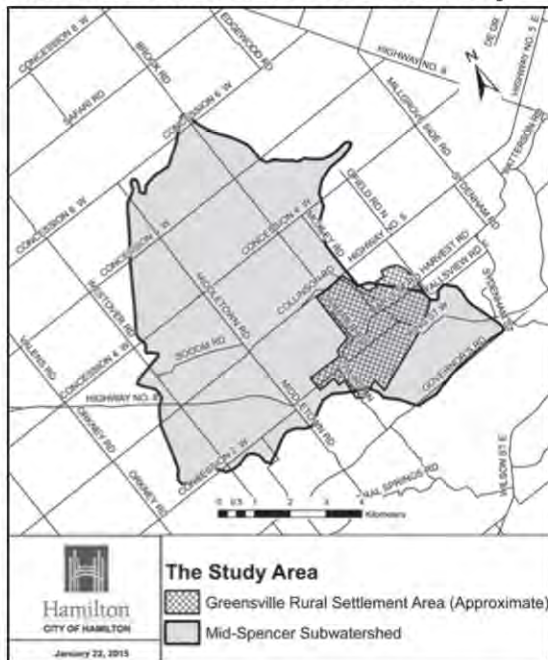
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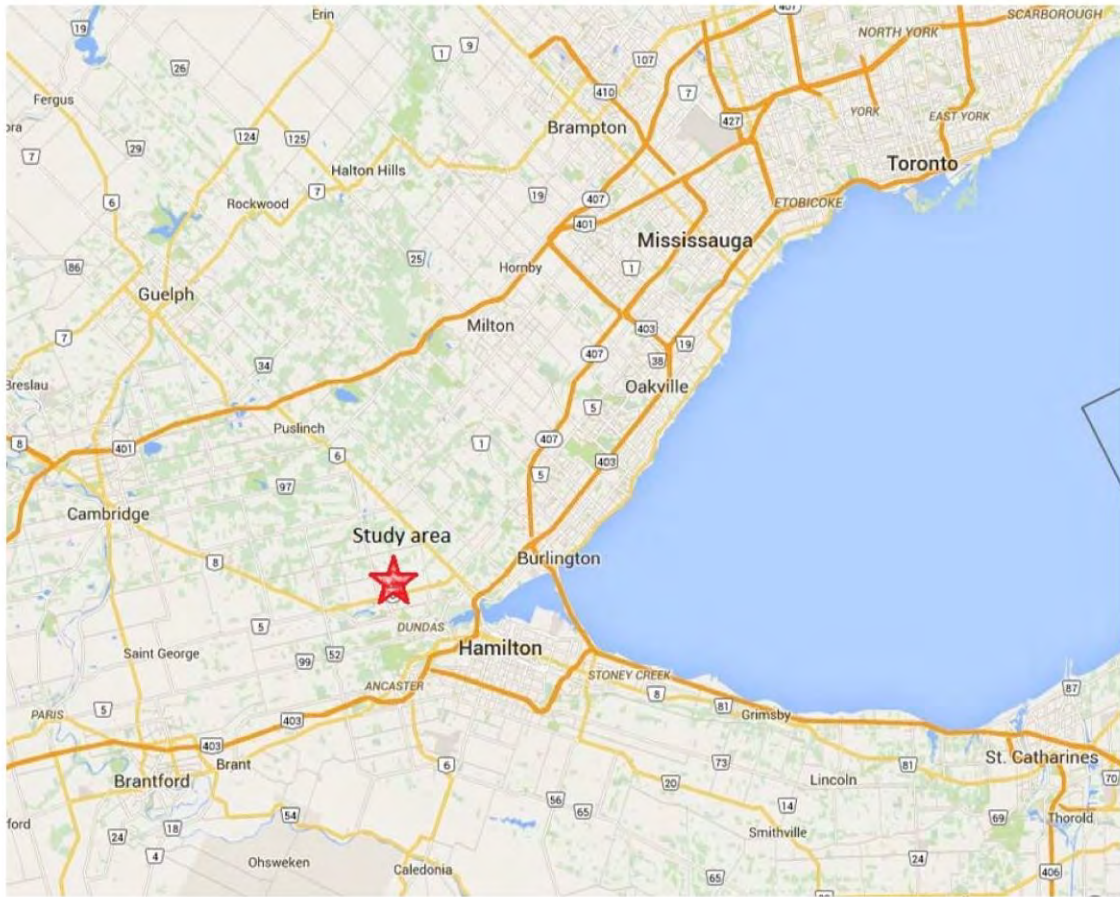
Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.





From: PW - ISWP Student 1 [ISWP.Student1@hamilton.ca]
Sent: January-13-15 11:18 AM
To: tina.durand@chnw.qc.ca
Subject: Notice of Public Information Centre (PIC) No. 2 - Greensville Subwatershed Study
Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study EA.pdf

Hello,

As discussed by phone, here is an electronic copy of the Notice of Public Information Centre (PIC) No. 2 for the Greensville Subwatershed Study.

Thank you,

Brandon Coveney

Brandon Coveney
Sustainable Initiatives Student
Hamilton Water |
City of Hamilton | Public Works Department
77 James Street North, Suite 400, Hamilton, Ontario L8R 2K3
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January 8, 2015

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Marco Silverio, M.Sc.
Project Manager

Enclosure



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
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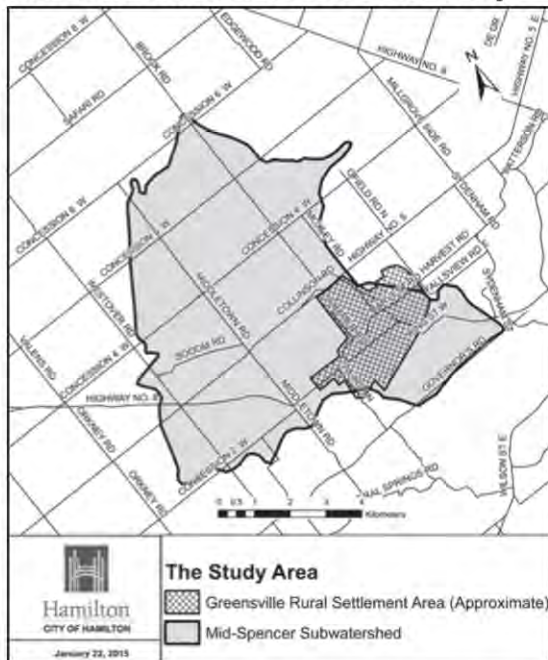
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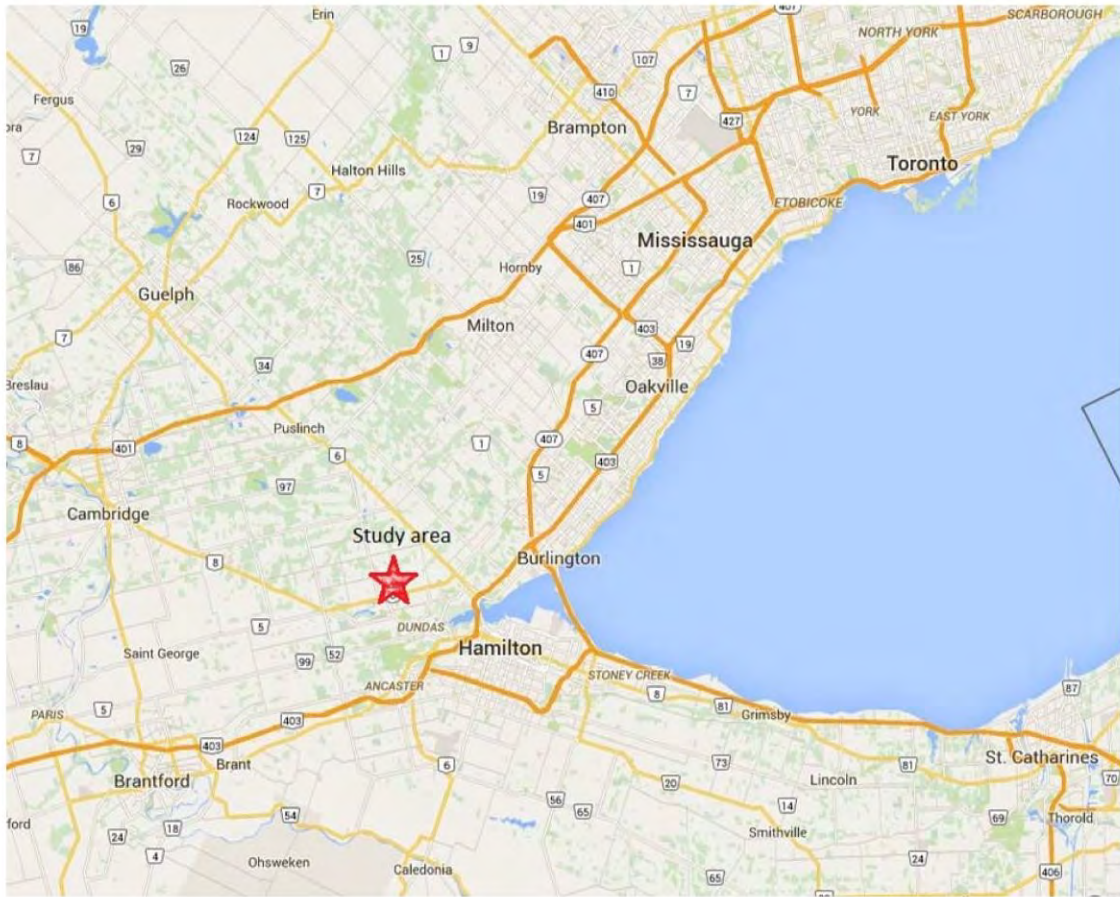
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City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
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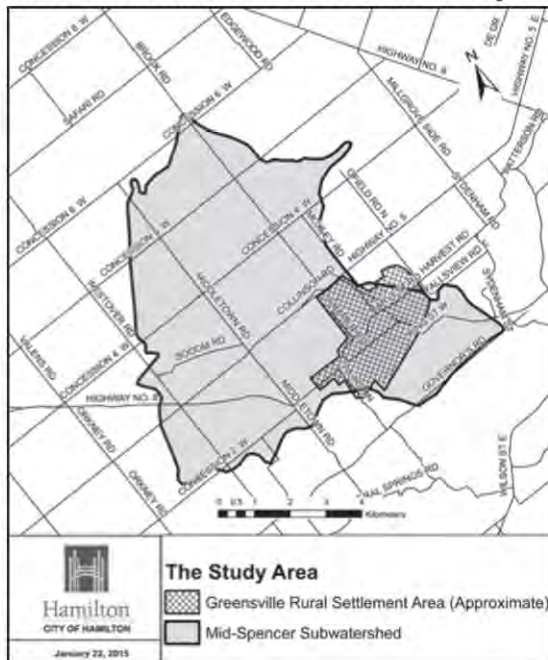
Phone: 905-546-2424 ext. 6099

Fax: 905-546-4491

Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 9th and January 16th, 2015.



Silverio, Marco

From: Silverio, Marco
Sent: January-12-15 5:03 PM
To: 'Al Warring'; 'Annette Van Boxmeer'; 'Dave Robinson'; 'Jill Campure'; 'Kelsey MacCormack'; 'Mark Shurvin'; 'Michael Zimmerman'; 'Peter Beardwood'; 'Syd Evans' O'Neal, Sheila; 'FGC Friends of Greenville Creek'; Wagner, Julia
Cc:
Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed EA Study
Attachments: Mid-Spencer Creek-Greenville RSA Subwatershed Study - Notice of PIC#2 (Flamborough).pdf; CLC Meeting 2 Minutes.pdf

Good Afternoon CLC Members,

The City is completing the Mid-Spencer Creek/Greenville Rural Settlement Area (RSA) Subwatershed and Class Environmental Assessment (EA) study to determine a management strategy for surface water (streams, stormwater), groundwater, community servicing (water and wastewater) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA.

The Public Information Centre No.2 is scheduled for January 22nd from 4h00-7h00PM at the Christ Church 92 Highway #8.

Please find attached the Notice of Public Information Centre No. 2 and the previous CLC Minutes for your perusal.

Please don't hesitate to contact if you require further information.

Kind Regards,

Marco



Marco Silverio

PM-Source Protection Planning
Sustainable Initiatives
City of Hamilton | Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
T: 905.546.2424 ext. 6099
Marco.Silverio@hamilton.ca

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Silverio, Marco

From: Silverio, Marco
Sent: January-08-15 12:05 PM
To: Bainbridge, Mark; Barnhart, Steven; Bradford, Anna; Browett, Brent; Brown, Jack; Chauvin, Dan; Conley, Doug; Collins, Chad; Cunliffe, Dave; DeJager, Shawn; Dixon, David; Duvall, Scott; Ehrenberg, Udo; Office of the Mayor; Everson, Neil; Farr, Jason; Ferguson, Lloyd; Golden, Alissa; Grice, Andrew; Guilmette, Jodi; Hazell, Marty; Hendry, Gillian; Homerski, Philip; Jackson, Tom; Janssen, Bill; Johnson, Aidan; Johnson, Brenda; Kiddie, Melissa; Kirkpatrick, Alan; Lee-Morrison, Christine; Lubrick, Kerry; Lukasik, Laura; MacAulay, Jim; Maloney, Eileen; Mater, Grace; Matthews-Malone, Betty; McCauley, Shane; McKinnon, Dan; McMullen, Brian; Merulla, Sam; Murdoch, Craig; Norman, Robert; Norton, Glen; Osborne, Brenda; Paparella, Guy; Partridge, Judi; Pasuta, Robert; Pearson, Maria; Plosz, Catherine; Posedowski, Bert; Prpic, Emil; Richardson, Dr. Elizabeth; Robichaud, Steve; Seely, Le Ann; Sergi, Michelle; Sergi, Tony; Storey, Angela; Tyers, Chelsey; Tomasik, Helen Hale; VanderBeek, Arlene; White, Martin; Whitehead, Terry; Wobschall, Peter; Yong-Lee, Sally; Zegarac, Mike; Zinkewich, Lisa
Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed EA Study
Attachments: Mid-Spencer Creek-Greenville RSA Subwatershed Study - Notice of PIC#2.pdf

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Appendix M-4-8

Public Information Centre #2

Public Consultation

January 2015

Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed Study

Public Information Centre #2

Thursday, January 22, 2015

Christ Church
92 Highway #8, Flamborough, Ontario

Workshop Participant Questionnaire

Please complete and hand in your questionnaire before you leave tonight's meeting.

If you would like more time, please return your completed questionnaire by February 5, 2015 to:

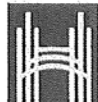
Marco Silverio

fax: 905-546-4491

email: Marco.Silverio@hamilton.ca

What street do you live or work on? [REDACTED]

Dundas (Greensville)
[REDACTED]



Hamilton

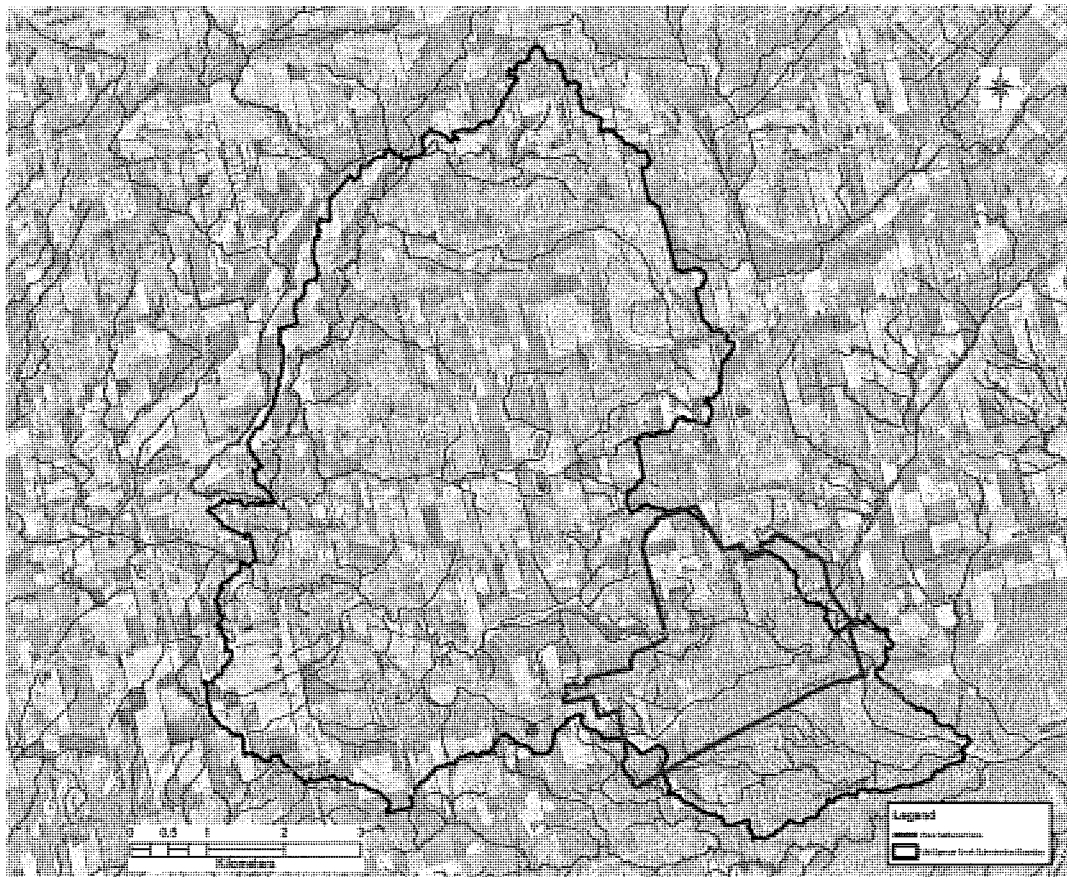
Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed Study

BACKGROUND

The City of Hamilton is undertaking this study for the Greensville Rural Settlement Area (RSA) and surrounding Mid-Spencer Creek Subwatershed. The purpose of the study is to investigate and inventory the natural resources within the two areas and identify constraints and opportunities through which future growth may be established in a manner which is environmentally sound and socially and economically sustainable.

The study is being completed as a Master Plan (Approach No.1) and is intended to address Phase 1 and 2 of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment Act (Class EA) process.

The approximate boundaries of the Rural Settlement Area and Mid-Spencer Creek Subwatershed are shown below.



Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

STORMWATER MANAGEMENT

A number of alternatives to address flooding, erosion and water balance issues (collectively referred to as stormwater management) for lands to be developed within the Rural Settlement Area are shown on the accompanying boards (Boards 10 to 17)

Please take a few minutes to respond to the questions as provided below.

Question 1:

Do you agree with the criteria that were used for evaluating the alternative?

Yes

No

Question 2:

If not, which criteria should be excluded?

Question 3:

Are there any additional criteria that should be considered? Please list.

Question 4:

Are there other alternatives that should have been included?

Question 5:

Do you have any questions or comments on the preferred alternative?

Question 6:

Do you have additional comments?

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

MUNICIPAL WATER SUPPLY

A number of alternatives to provide municipal water to existing and future residents and businesses within the Rural Settlement Area were considered. The alternatives are shown on the accompanying boards

(Boards 18 to 21)

Please take a few minutes to respond to the questions as provided below.

Question 1:

Do you agree with the criteria that were used for evaluating the alternative?

Yes

No

Question 2:

If not, which criteria should be excluded?

Question 3:

Are there any additional criteria that should be considered? Please list.

Question 4:

Are there other alternative that should have been included?

Question 5:

Do you have any questions or comments on the preferred alternative?

Question 6:

Do you have additional comments?

Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed Study

LANDOWNER STEWARDSHIP

There are a number of actions that landowners could undertake to improve environmental conditions within the Rural Settlement Area or with the Mid-Spencer Creek Subwatershed.

1. Monitoring or replacement of septic systems
2. Water conservation
3. Conservations of Stormwater
4. Monitoring and replacement of private well

It is envisioned that these measures are voluntary, and may, or may not be undertaken with the assistance of the City of Hamilton, Hamilton Conservation Authority, or other agency.

Please take a few minutes to respond to the following questions on the following pages.

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

MONITORING OR REPLACEMENT OF SEPTIC SYSTEMS

LIST OF ACTIONS

The accompanying page illustrates typical actions that could be undertaken by the homeowner to reduce the impact of septic systems on the groundwater system. These include:

- Periodic monitoring and maintenance of system
- Replacement, as required

WILLINGNESS TO IMPLEMENT

Would you, or do you already, implement the following measures? If not, why?

- Monitoring Yes No _____
- Replacement Yes No _____

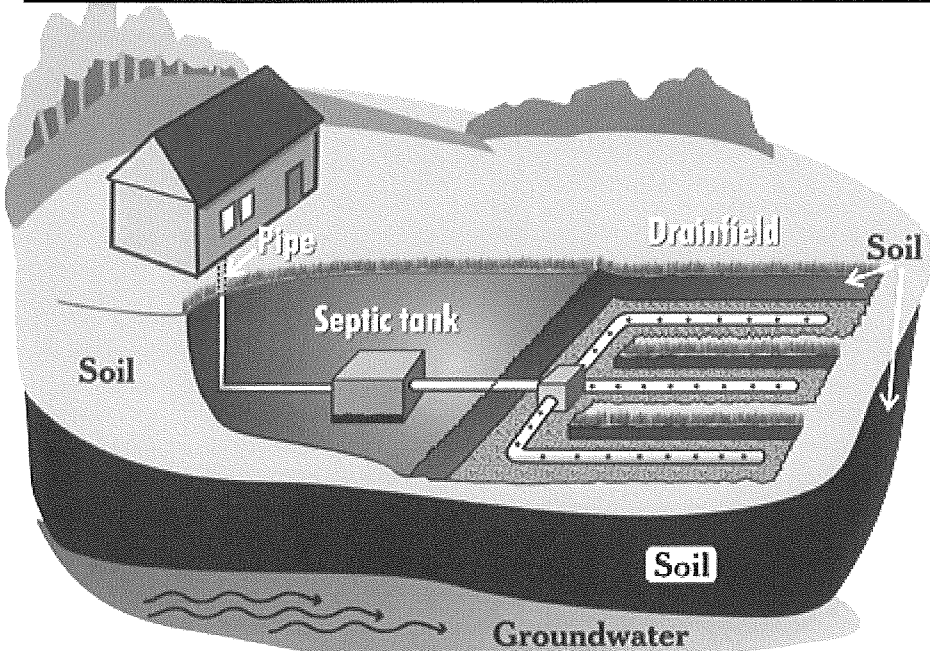
MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures? Please circle:

- Technical Support
- Financial Assistance
- Brochures/Pamphlets
- Help Line
- Other (please specify)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

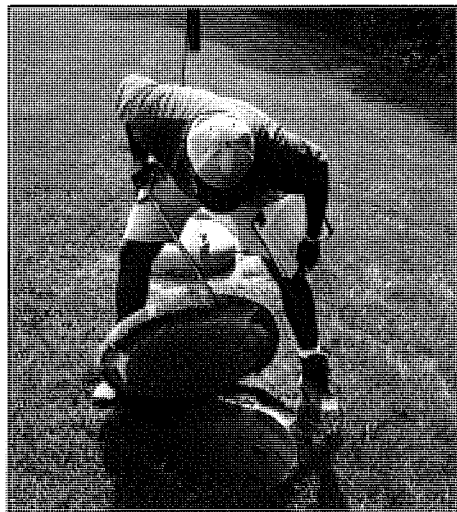
MONITORING OR REPLACEMENT OF SEPTIC SYSTEMS



Septic Schematic (Source US EPA)



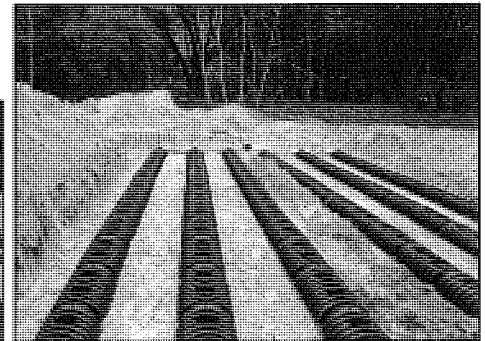
Failed Septic System (Source ORWC)



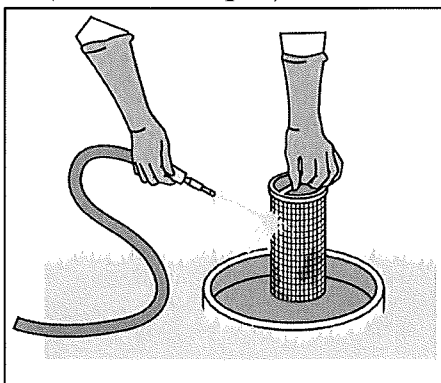
Inspection of Septic Tank (Source CJ Septic)



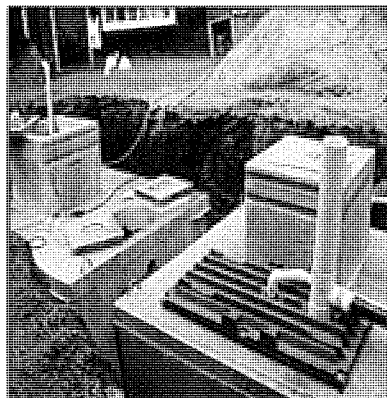
Pumping of Septic Tank (Source US EPA)



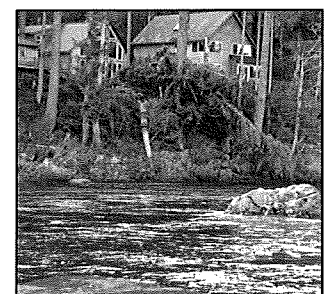
Septic Bed Replacement (Source SW Soil)



Cleaning of Effluent Filter (Source CCS)



Septic Tank Replacement (Source US EPA)



Your Septic System:

**Protecting Your
Investment
and the
Environment**

**Septic Owners
Information Pamphlet
(Source ORWC)**

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

WATER CONSERVATION

LIST OF ACTIONS

The accompanying page illustrates typical actions that could be undertaken by the homeowner to reduce usage of municipal potable water. These include:

- Monitoring household water use
- Installing a rain barrel for outdoor watering
- Use reservoirs not filled from on-site well for irrigation system
- Reducing watering of lawn and garden
- Installing low-flow shower heads
- Replacing old toilets with modern low-flow models
- Replacing old washing machines with modern EnerGuide models
- Refill pools by trucking in water

WILLINGNESS TO IMPLEMENT

The installation of stormwater conservation measures will increase infiltration and may permit the result of rainfall. Which of the following measures would you consider undertaking on your property?

- Monitoring household water use
 Very willing Somewhat willing Not interested
- Installing a rain barrel for outdoor watering
 Very willing Somewhat willing Not interested
- Use reservoirs not filled from on-site well for irrigation system
 Very willing Somewhat willing Not interested
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- Installing low-flow shower heads
 Very willing Somewhat willing Not interested
- Replacing old toilets with modern low-flow models
 Very willing Somewhat willing Not interested
- Replacing old washing machines with modern EnerGuide models
 Very willing Somewhat willing Not interested
- Leak detection and elimination
 Very willing Somewhat willing Not interested
- Refill pools by trucking in water
 Very willing Somewhat willing Not interested

MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures? Please circle:

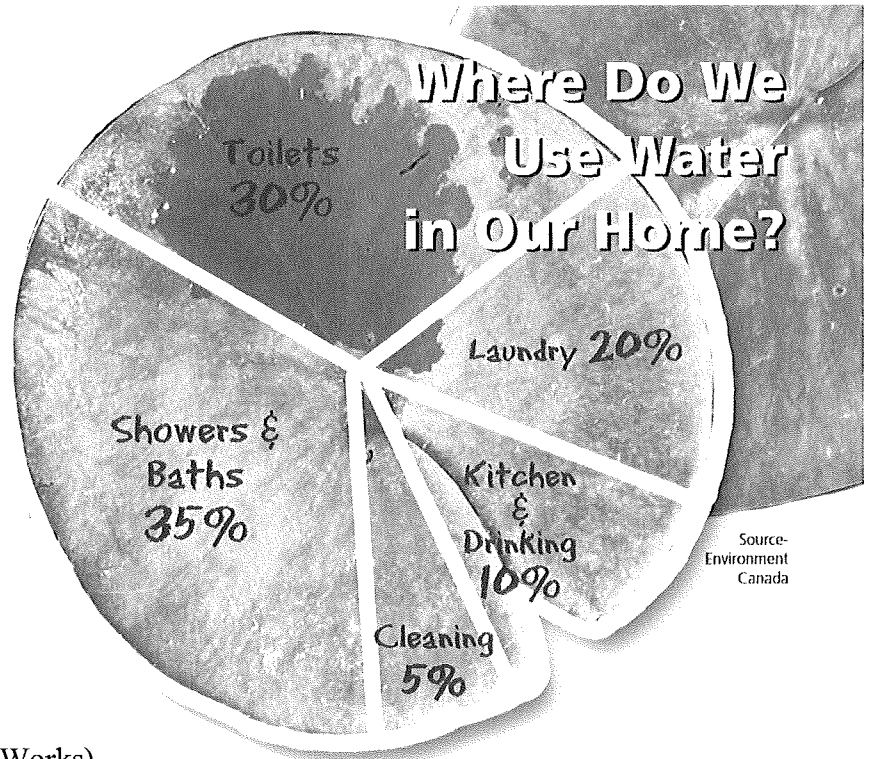
- Technical Support
- Financial Assistance
- Brochures/Pamphlets
- Help Line
- Other (please specify)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

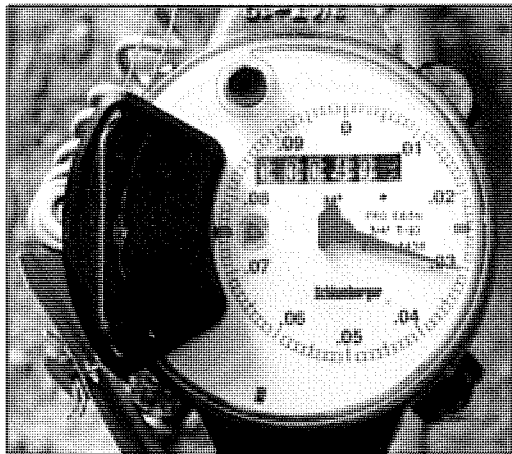
WATER CONSERVATION



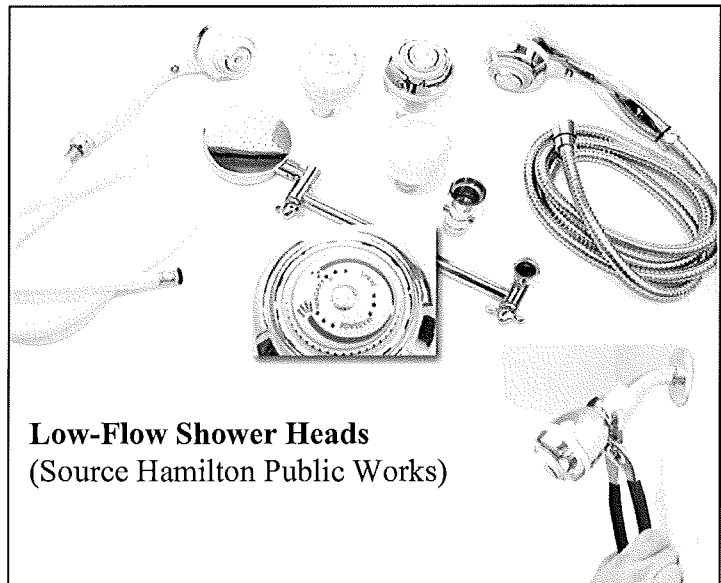
Rain Barrel (Source Hamilton Public Works)



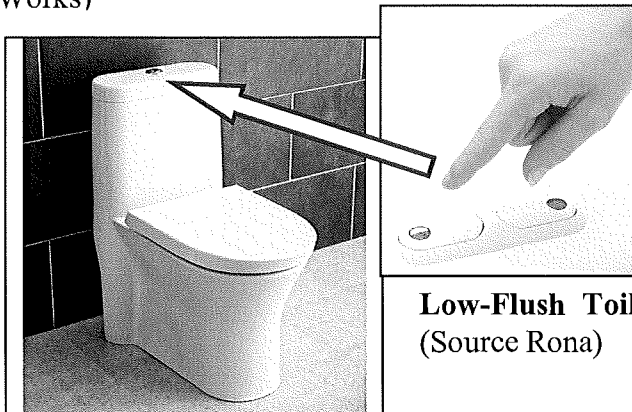
Source-
Environment
Canada



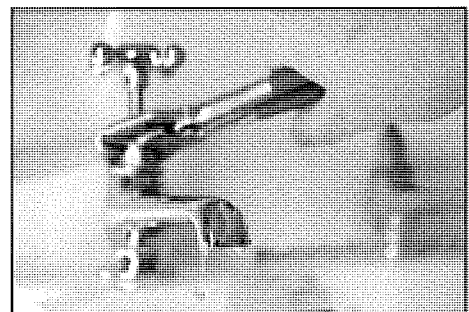
Monitoring Water Use (Source Hamilton Public Works)



Low-Flow Shower Heads
(Source Hamilton Public Works)



Low-Flush Toilet
(Source Rona)



Leak Detection and Elimination
(Source Farmers' Almanac)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

CONSERVATION OF STORMWATER

LIST OF ACTIONS

The accompanying page illustrates typical actions that could be undertaken by the homeowner to increase the amount of rainfall and stormwater that infiltrates into the ground or can be reused for irrigation. These include:

- Disconnecting your downspout
- Installing a rain barrel
- Installing soakaway pits
- Installing rain gardens
- Replacement of impermeable surfaces (asphalt/concrete) with porous (grass, interlock) ones.
- Modifying landscape to promote infiltration

WILLINGNESS TO IMPLEMENT

The installation of stormwater conservation measures will increase infiltration and may permit the result of rainfall. Which of the following measures would you consider undertaking on your property?

- Disconnecting Downspouts
 Very willing Somewhat willing Not interested
- Planting of additional shrubs & trees
 Very willing Somewhat willing Not interested
- Installation of soak-away pits
 Very willing Somewhat willing Not interested
- Installation of Rain barrels
 Very willing Somewhat willing Not interested
- Replacements of impermeable surfaces (asphalt/concrete) with porous (grass, interlock) ones
 Very willing Somewhat willing Not interested
- Installation of a Rain Garden
 Very willing Somewhat willing Not interested

MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

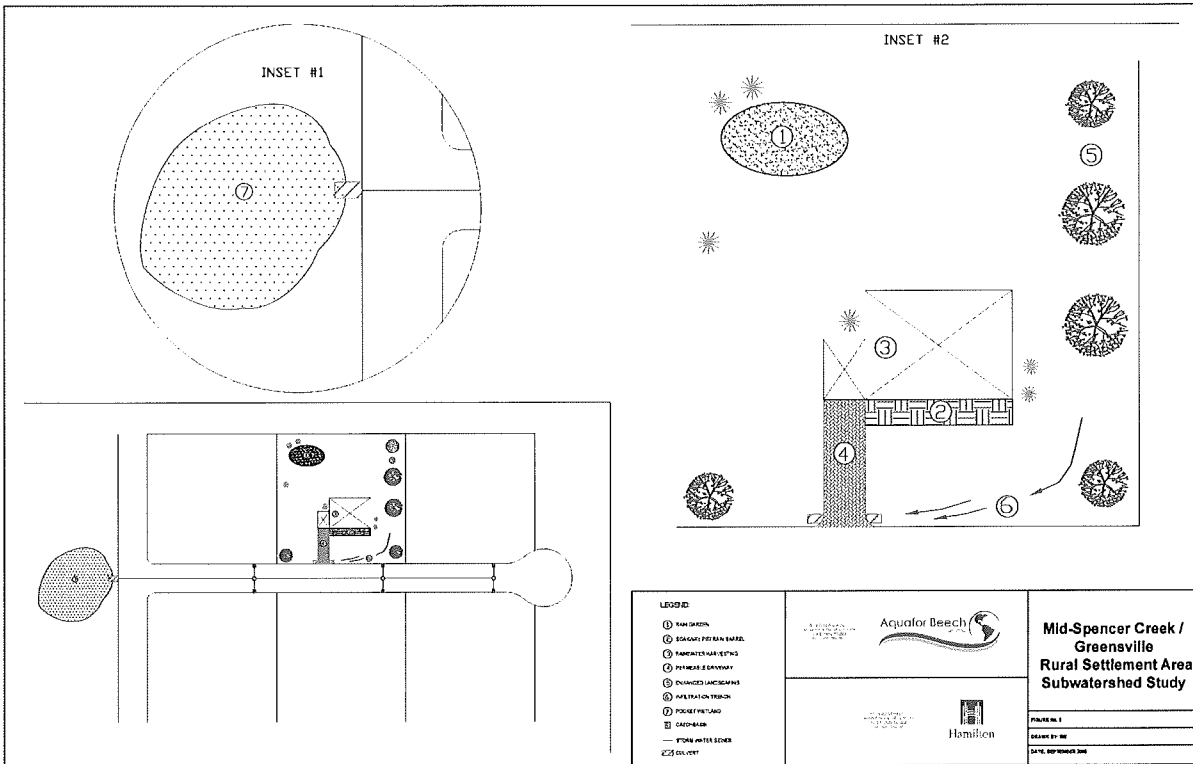
What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures? Please circle:

- Technical Support
- Financial Assistance
- Brochures/Pamphlets
- Help Line
- Other (please specify)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

CONSERVATION OF STORMWATER

REPRESENTATION STORMWATER CONSERVATION MEASURES



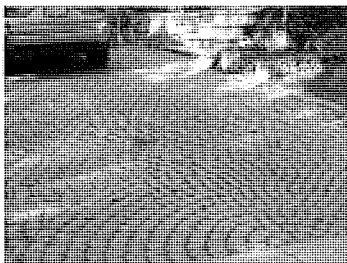
1. RAIN GARDEN



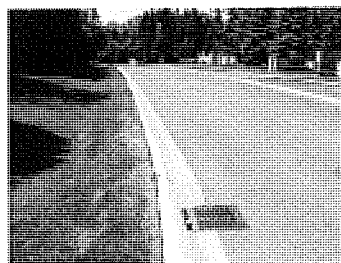
2. SOAKWAY PIT



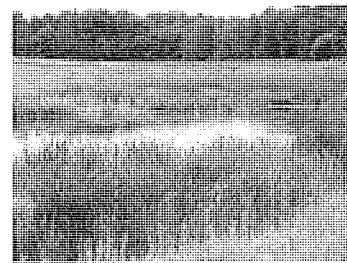
2. RAIN BARREL



4. PERMEABLE DRIVEWAY



6. INFILTRATION TRENCH



7. POCKET WETLAND

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

MONITORING & REPLACEMENT OF PRIVATE WELL

LIST OF ACTIONS

- Regular water quality testing (3 times per year after heavy rain)
- Regular well inspections (grading, well cap, and area around well)
- Professionally decommission unused wells (licensed well contractors)
- Drill a new well on your property

WILLINGNESS TO IMPLEMENT

Keeping an existing well in good condition or having a new well properly constructed can keep your family safe and help protect local groundwater resources. Which of the following measures would you consider undertaking on your property?

- Regular water quality testing
 Very willing Somewhat willing Not interested
- Regular well inspections
 Very willing Somewhat willing Not interested
- Professionally decommission unused wells
 Very willing Somewhat willing Not interested
- Drill a new well on your property
 Very willing Somewhat willing Not interested

MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures? Please circle:

- Technical Support
- Financial Assistance
- Brochures/Pamphlets
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- Other (please specify)

Completed by



Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed Study

Public Information Centre #2

Thursday, January 22, 2015

Christ Church

92 Highway #8, Flamborough, Ontario

Workshop Participant Questionnaire

Please complete and hand in your questionnaire before you leave tonight's meeting.

If you would like more time, please return your completed questionnaire by February 5, 2015 to:

Marco Silverio

fax: 905-546-4491

email: Marco.Silverio@hamilton.ca

What street do you live or work on?



GREENSVILLE

NB

It would be helpful to have an executive summary (in layman's terms) of the study & findings



Hamilton

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

STORMWATER MANAGEMENT

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Do you agree with the criteria that were used for evaluating the alternative?

Yes

No

Question 2:

If not, which criteria should be excluded?

Question 3:

Are there any additional criteria that should be considered? Please list.

NO

Question 4:

Are there other alternatives that should have been included?

No

Question 5:

Do you have any questions or comments on the preferred alternative?

NO

Question 6:

Do you have additional comments?

From the boards shown it seems that the Lafarge Quarry & Processing areas are not included but they should be given the large amount of water the company uses with resulting impacts on groundwater quality & quantity

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

MUNICIPAL WATER SUPPLY

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NO

Question 4:

Are there other alternative that should have been included?

NO

Question 5:

Do you have any questions or comments on the preferred alternative?

NO

Question 6:

Do you have additional comments?

Whatever source of water residents use the importance of conservation of water is the most important aspect and making the water would certainly encourage this 3

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

MONITORING OR REPLACEMENT OF SEPTIC SYSTEMS

LIST OF ACTIONS

The accompanying page illustrates typical actions that could be undertaken by the homeowner to reduce the impact of septic systems on the groundwater system. These include:

- Periodic monitoring and maintenance of system
- Replacement, as required

WILLINGNESS TO IMPLEMENT

Would you, or do you already, implement the following measures? If not, why?

- Monitoring Yes No
- Replacement Yes No No evidence that the septic system needs to be replaced.

MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures? Please circle:

- ✓ • Technical Support
- Financial Assistance
- ✓ • Brochures/Pamphlets
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Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

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- Replacing old washing machines with modern EnerGuide models
 Very willing Somewhat willing Not interested
- Leak detection and elimination
 Very willing Somewhat willing Not interested
- Refill pools by trucking in water
 Very willing Somewhat willing Not interested

N/A do not own a pool but would be v. willing if did

MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

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Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

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Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

MONITORING & REPLACEMENT OF PRIVATE WELL

LIST OF ACTIONS

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- Drill a new well on your property

WILLINGNESS TO IMPLEMENT

Keeping an existing well in good condition or having a new well properly constructed can keep your family safe and help protect local groundwater resources. Which of the following measures would you consider undertaking on your property?

- Regular water quality testing

Very willing

Somewhat willing

Not interested

- Regular well inspections

Very willing

Somewhat willing

Not interested

- Professionally decommission unused wells

Very willing

Somewhat willing

Not interested

- Drill a new well on your property

Very willing

Somewhat willing

Not interested

We are on the Brown creek Communal Well and it is tested regularly for water quality

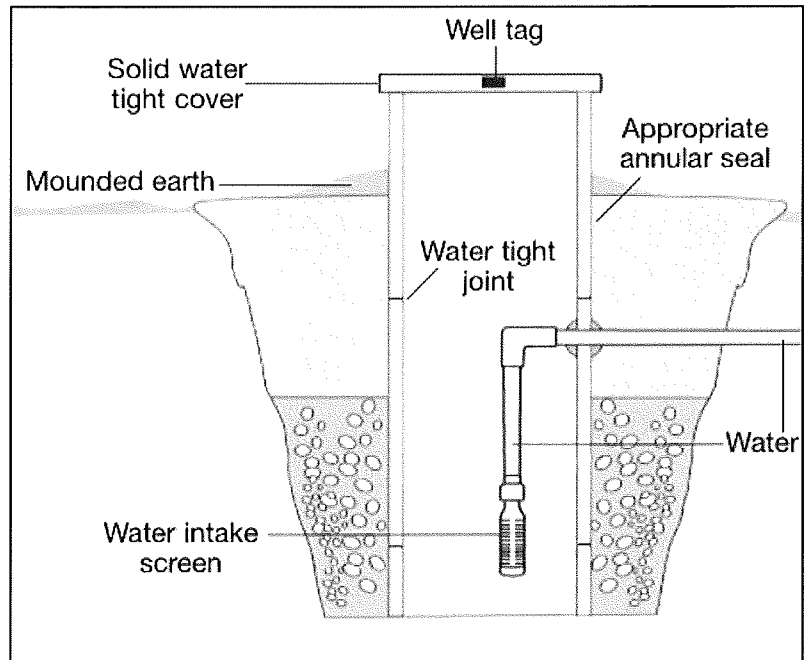
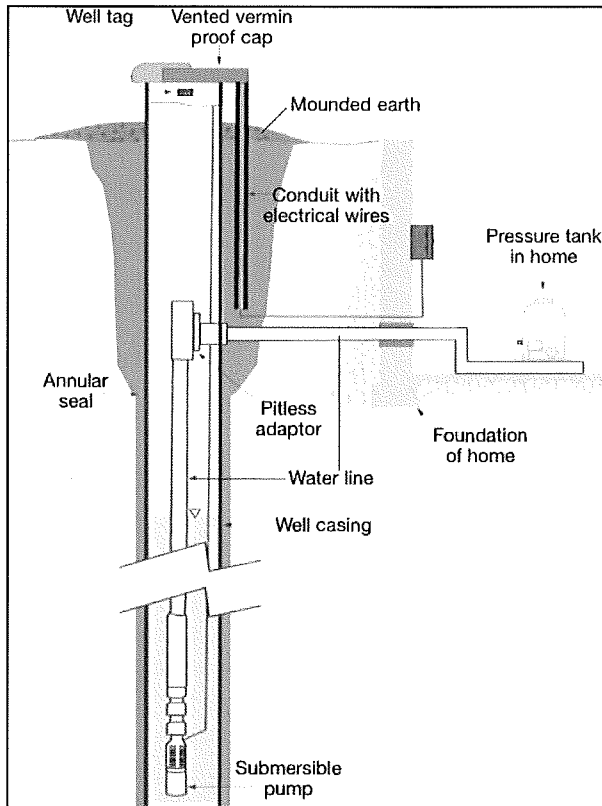
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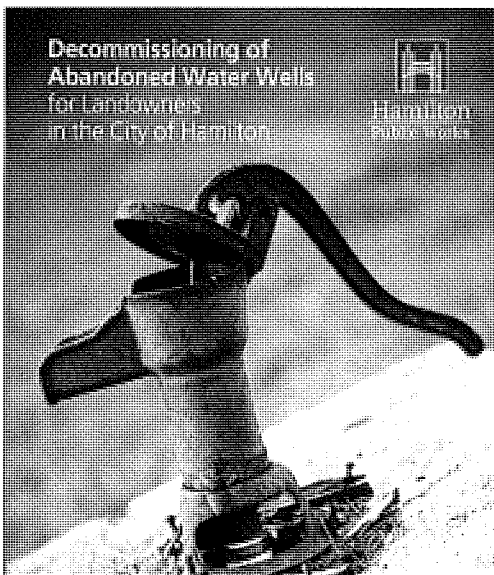
- Technical Support
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- Other (please specify)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

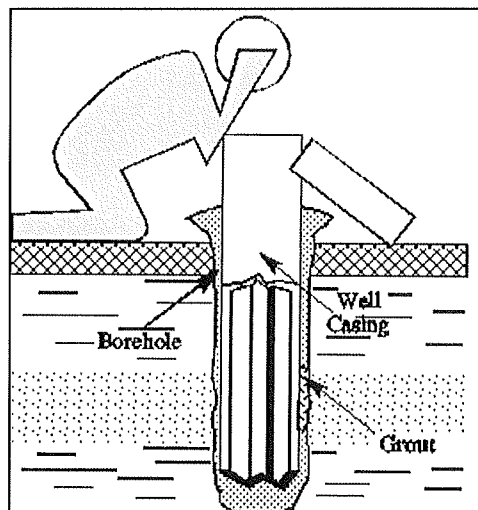
REPLACEMENT OF PRIVATE WELL



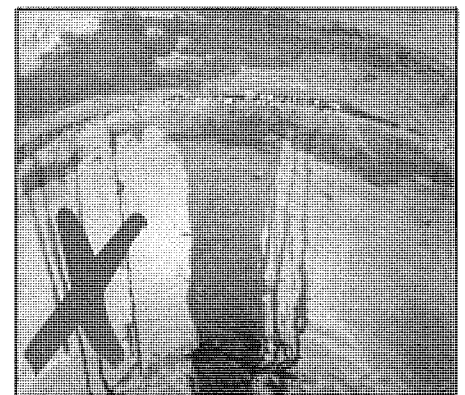
A **Drilled Well** (left) is much less susceptible to surface water contamination than a **Dug Well** (above). (Source WellAware.ca)



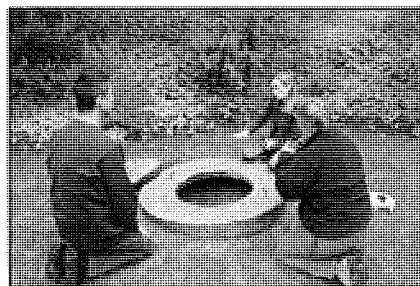
Hamilton Conservation and the City of Hamilton should be consulted regarding **Funding opportunities for Abandoned Well Decommissioning**. (Source Hamilton Public Works)



Check for **Cracked, Corroded or Damaged Well Casing**.



A **leaky cement casing** could lead to contamination. (Source WellAware.ca)



Ground around your wellhead should be **graded away** to ensure surface runoff does not flow in. The area should be maintained with **low-growing grass**. (Source WellAware.ca)

Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed Study

Public Information Centre #2

Thursday, January 22, 2015

Christ Church
92 Highway #8, Flamborough, Ontario

Workshop Participant Questionnaire

Please complete and hand in your questionnaire before you leave tonight's meeting.

If you would like more time, please return your completed questionnaire by February 5, 2015 to:

Marco Silverio

fax: 905-546-4491

email: Marco.Silverio@hamilton.ca

What street do you live or work on?

Park Ave



Hamilton

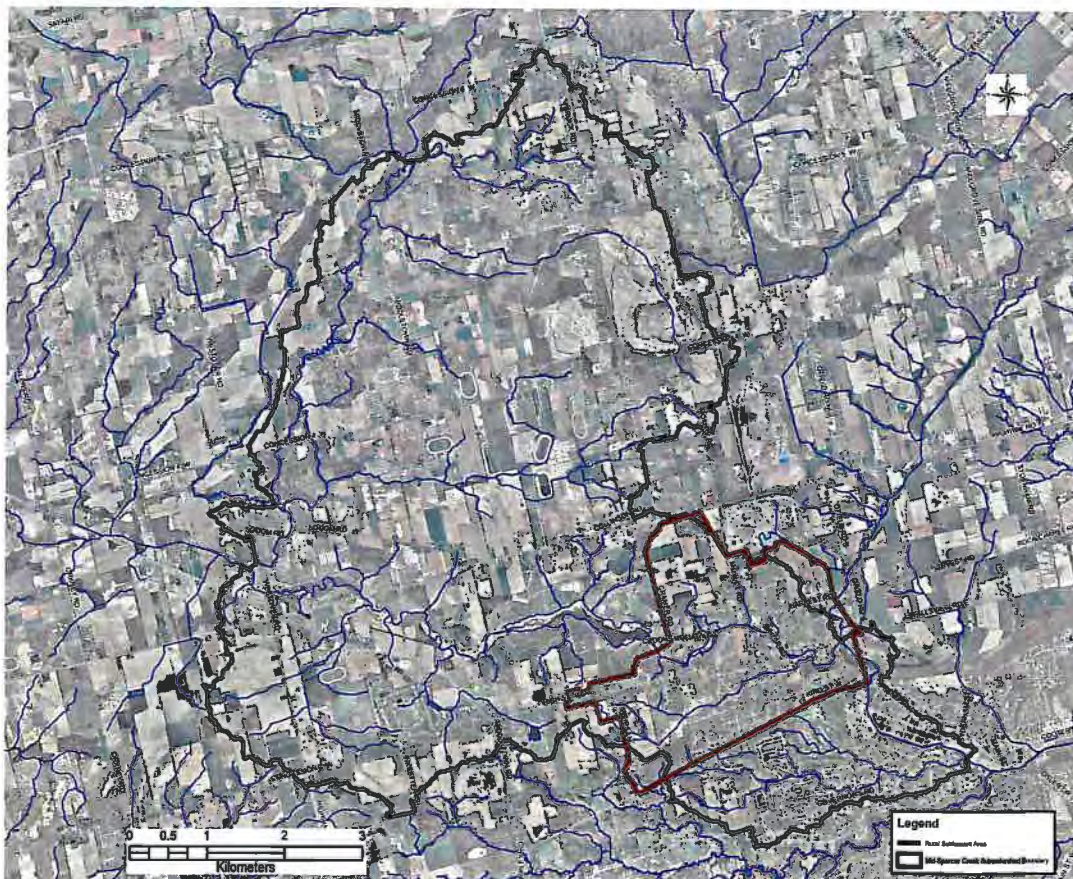
Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed Study

BACKGROUND

The City of Hamilton is undertaking this study for the Greensville Rural Settlement Area (RSA) and surrounding Mid-Spencer Creek Subwatershed. The purpose of the study is to investigate and inventory the natural resources within the two areas and identify constraints and opportunities through which future growth may be established in a manner which is environmentally sound and socially and economically sustainable.

The study is being completed as a Master Plan (Approach No.1) and is intended to address Phase 1 and 2 of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment Act (Class EA) process.

The approximate boundaries of the Rural Settlement Area and Mid-Spencer Creek Subwatershed are shown below.



Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

STORMWATER MANAGEMENT

A number of alternatives to address flooding, erosion and water balance issues (collectively referred to as stormwater management) for lands to be developed within the Rural Settlement Area are shown on the accompanying boards (Boards 10 to 17)

Please take a few minutes to respond to the questions as provided below.

Question 1:

Do you agree with the criteria that were used for evaluating the alternative?

Yes

No

Question 2:

If not, which criteria should be excluded?

Question 3:

Are there any additional criteria that should be considered? Please list.

Question 4:

Are there other alternatives that should have been included?

Question 5:

Do you have any questions or comments on the preferred alternative?

Difficult to discern what the difference was with the various alternatives
Excessive amount of information on the panels - overwhelming & not difficult to understand

Question 6:

Do you have additional comments?

Not clear how much private land required for the ponds. Have Each property owner should be contacted individually to advise them of the implications these decisions will have on their land
Panel / ~~not~~ walk through not an effective form of public consultation in 2015!!!!

where the ponds are proposed

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

MUNICIPAL WATER SUPPLY

A number of alternatives to provide municipal water to existing and future residents and businesses within the Rural Settlement Area were considered. The alternatives are shown on the accompanying boards (Boards 18 to 21)

Please take a few minutes to respond to the questions as provided below.

Question 1:

Do you agree with the criteria that were used for evaluating the alternative?

Yes

No

Question 2:

If not, which criteria should be excluded?

Question 3:

Are there any additional criteria that should be considered? Please list.

Question 4:

Are there other alternative that should have been included?

Question 5:

Do you have any questions or comments on the preferred alternative?

Question 6:

Do you have additional comments?

panels contained too much information. — Not enough people to explain clarify. — Not an effective form of public consultation (i.e. panel/walk-through) in 2015!!!

not

You note in your Notice that the 1st PIC was held on Nov. 21, 2007. I do not understand how you can state that this ~~is~~ second PIC, OVER SEVEN YEARS LATER, ~~constitutes~~ satisfies the EA requirements for public notice!!

I have no issue with the technical side of the analysis; however, the public process ~~and~~ is appalling. The information ~~to~~ to be conveyed is highly technical and requires a more effective means of communication with the public.

None of the panels illustrating mapping were large enough or ~~to~~ properly labeled with legible street names for people to figure out where they lived in relation to the drawings !!

↳ People need to be able to see how the study's recommendations affects their land. While ± 25 panels were available - none of the maps were large or clear enough to be able to do this.
VERY DISAPPOINTING!!

Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed Study

LANDOWNER STEWARDSHIP

There are a number of actions that landowners could undertake to improve environmental conditions within the Rural Settlement Area or with the Mid-Spencer Creek Subwatershed.

1. Monitoring or replacement of septic systems
2. Water conservation
3. Conservations of Stormwater
4. Monitoring and replacement of private well

It is envisioned that these measures are voluntary, and may, or may not be undertaken with the assistance of the City of Hamilton, Hamilton Conservation Authority, or other agency.

Please take a few minutes to respond to the following questions on the following pages.

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study
MONITORING OR REPLACEMENT OF SEPTIC SYSTEMS

LIST OF ACTIONS

The accompanying page illustrates typical actions that could be undertaken by the homeowner to reduce the impact of septic systems on the groundwater system. These include:

- Periodic monitoring and maintenance of system
- Replacement, as required

WILLINGNESS TO IMPLEMENT

Would you, or do you already, implement the following measures? If not, why?

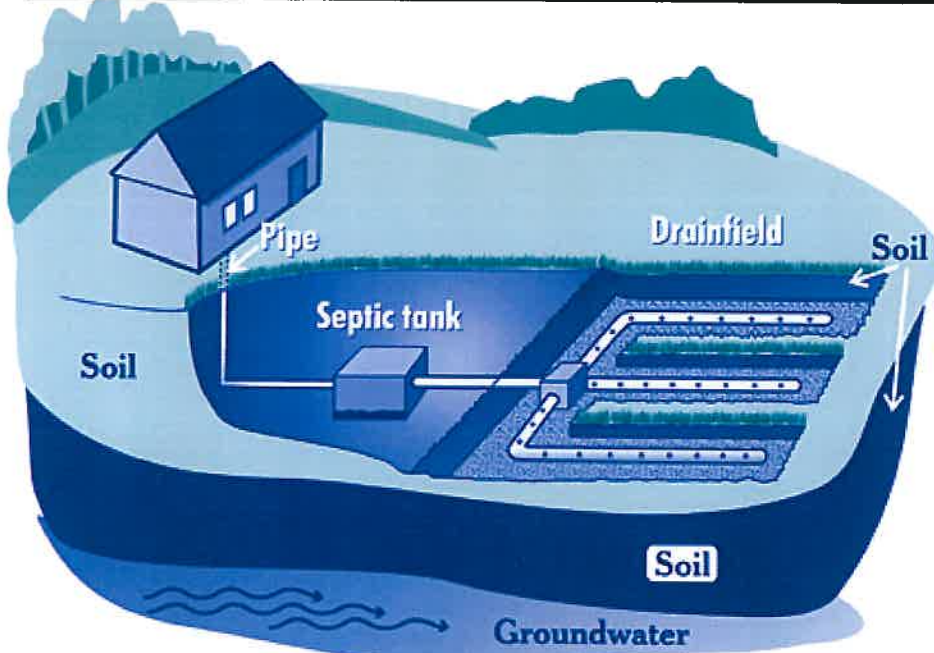
- Monitoring Yes No _____
- Replacement Yes No _____

MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures? Please circle:

- Technical Support
- Financial Assistance
- Brochures/Pamphlets
- Help Line
- Other (please specify)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study
MONITORING OR REPLACEMENT OF SEPTIC SYSTEMS



Septic Schematic (Source US EPA)



Failed Septic System (Source ORWC)



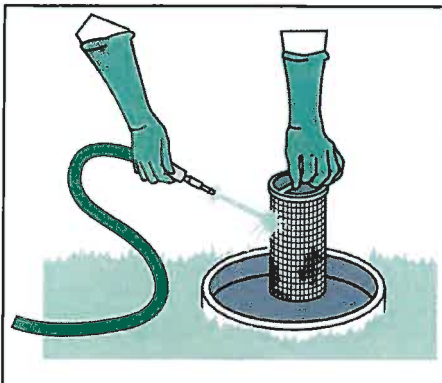
Septic Bed Replacement (Source SW Soil)



Inspection of Septic Tank (Source CJ Septic)



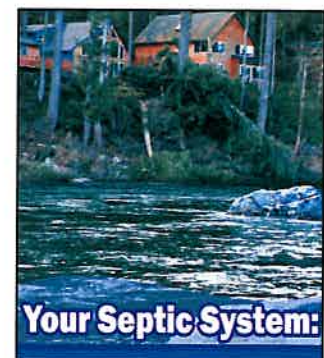
Pumping of Septic Tank (Source US EPA)



Cleaning of Effluent Filter (Source CCS)



Septic Tank Replacement (Source US EPA)



**Protecting Your
 Investment
 and the
 Environment**

Septic Owners
 Information Pamphlet
 (Source ORWC)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

WATER CONSERVATION

LIST OF ACTIONS

The accompanying page illustrates typical actions that could be undertaken by the homeowner to reduce usage of municipal potable water. These include:

- Monitoring household water use
- Installing a rain barrel for outdoor watering
- Use reservoirs not filled from on-site well for irrigation system
- Reducing watering of lawn and garden
- Installing low-flow shower heads
- Replacing old toilets with modern low-flow models
- Replacing old washing machines with modern EnerGuide models
- Refill pools by trucking in water

WILLINGNESS TO IMPLEMENT

The installation of stormwater conservation measures will increase infiltration and may permit the result of rainfall. Which of the following measures would you consider undertaking on your property?

- Monitoring household water use
 Very willing Somewhat willing Not interested
- Installing a rain barrel for outdoor watering
 Very willing Somewhat willing Not interested
- Use reservoirs not filled from on-site well for irrigation system
 Very willing Somewhat willing Not interested
- Reducing watering of lawn and garden
 Very willing Somewhat willing Not interested
- Installing low-flow shower heads
 Very willing *already done* Somewhat willing Not interested
- Replacing old toilets with modern low-flow models
 Very willing *already done* Somewhat willing Not interested
- Replacing old washing machines with modern EnerGuide models
 Very willing *already done* Somewhat willing Not interested
- Leak detection and elimination
 Very willing Somewhat willing Not interested
- Refill pools by trucking in water
 Very willing *already done* Somewhat willing Not interested

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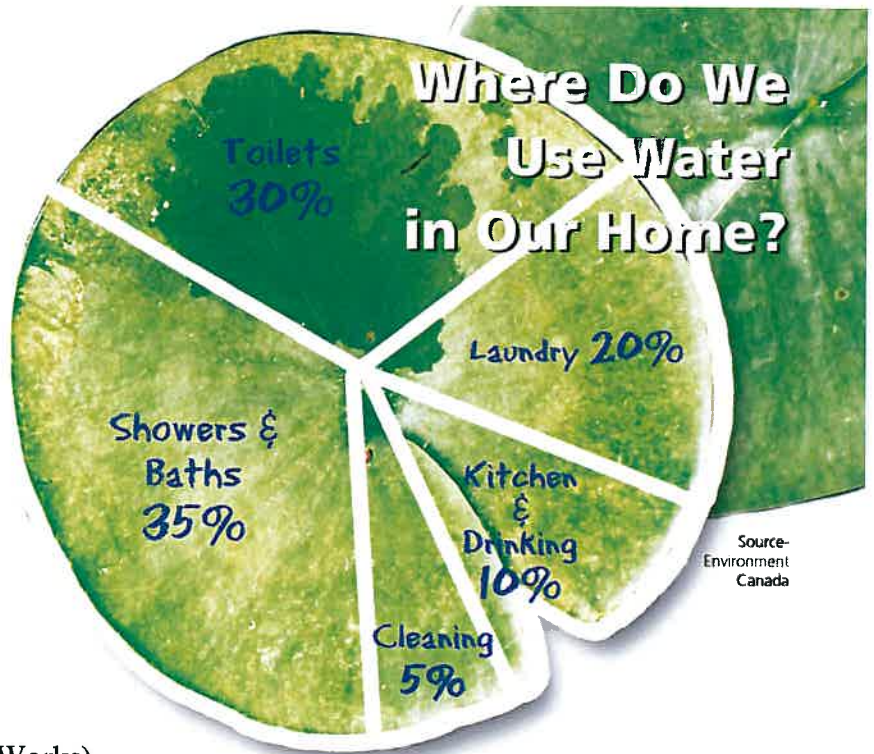
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- Other (please specify)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

WATER CONSERVATION



Rain Barrel (Source Hamilton Public Works)



Monitoring Water Use (Source Hamilton Public Works)



Low-Flow Shower Heads (Source Hamilton Public Works)



Low-Flush Toilet (Source Rona)



Leak Detection and Elimination (Source Farmers' Almanac)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

CONSERVATION OF STORMWATER

LIST OF ACTIONS

The accompanying page illustrates typical actions that could be undertaken by the homeowner to increase the amount of rainfall and stormwater that infiltrates into the ground or can be reused for irrigation. These include:

- Disconnecting your downspout
- Installing a rain barrel
- Installing soakaway pits
- Installing rain gardens
- Replacement of impermeable surfaces (asphalt/concrete) with porous (grass, interlock) ones.
- Modifying landscape to promote infiltration

WILLINGNESS TO IMPLEMENT

The installation of stormwater conservation measures will increase infiltration and may permit the result of rainfall. Which of the following measures would you consider undertaking on your property?

- Disconnecting Downspouts
 Very willing *done ✓* Somewhat willing Not interested
- Planting of additional shrubs & trees
 Very willing Somewhat willing Not interested
- Installation of soak-away pits
 Very willing Somewhat willing Not interested
- Installation of Rain barrels
 Very willing Somewhat willing Not interested
- Replacements of impermeable surfaces (asphalt/concrete) with porous (grass, interlock) ones
 Very willing Somewhat willing Not interested *-very little impervious surface on my property.*
- Installation of a Rain Garden
 Very willing Somewhat willing Not interested

MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

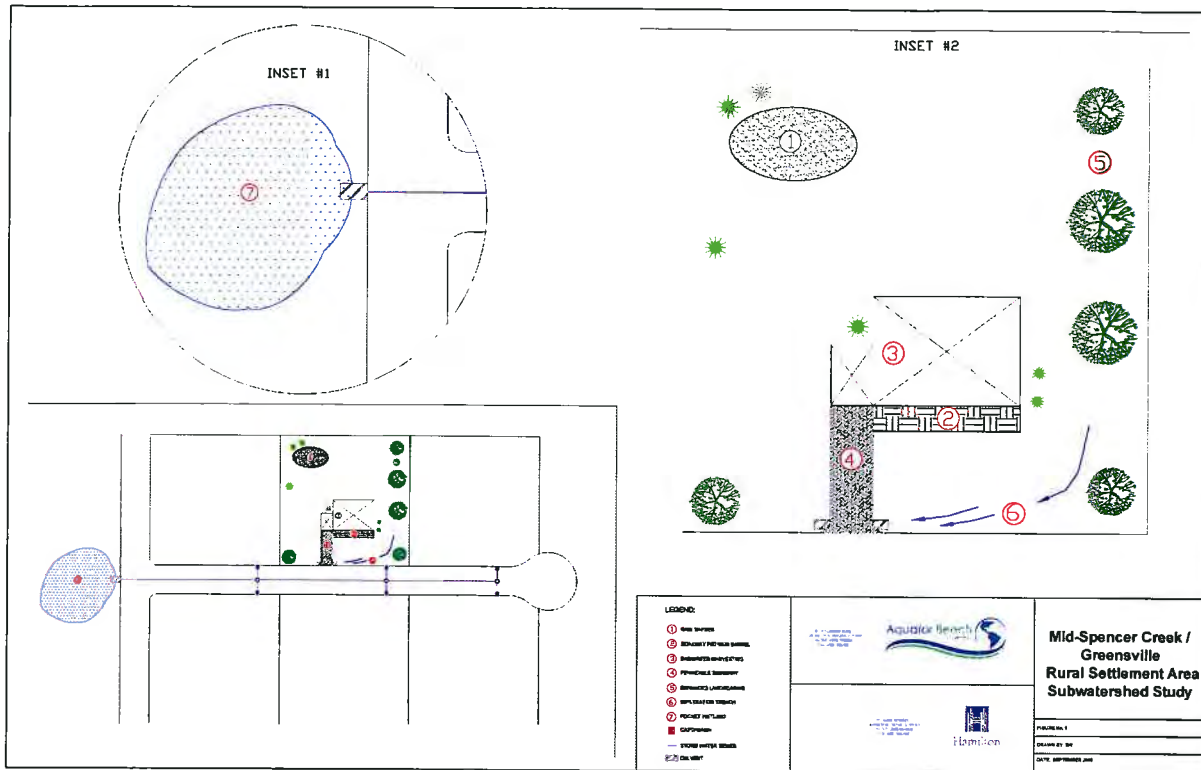
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Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

CONSERVATION OF STORMWATER

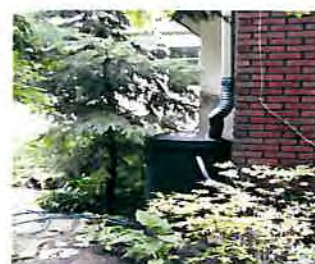
REPRESENTATION STORMWATER CONSERVATION MEASURES



1. RAIN GARDEN



2. SOAKWAY PIT



2. RAIN BARREL



4. PERMEABLE DRIVEWAY



6. INFILTRATION TRENCH



7. POCKET WETLAND

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

MONITORING & REPLACEMENT OF PRIVATE WELL

LIST OF ACTIONS

- Regular water quality testing (3 times per year after heavy rain)
- Regular well inspections (grading, well cap, and area around well)
- Professionally decommission unused wells (licensed well contractors)
- Drill a new well on your property

WILLINGNESS TO IMPLEMENT

Keeping an existing well in good condition or having a new well properly constructed can keep your family safe and help protect local groundwater resources. Which of the following measures would you consider undertaking on your property?

- Regular water quality testing
 - Very willing
 - Somewhat willing
 - Not interested
- Regular well inspections
 - Very willing
 - Somewhat willing
 - Not interested
- Professionally decommission unused wells
 - Very willing
 - Somewhat willing
 - Not interested
- Drill a new well on your property
 - Very willing
 - Somewhat willing
 - Not interested

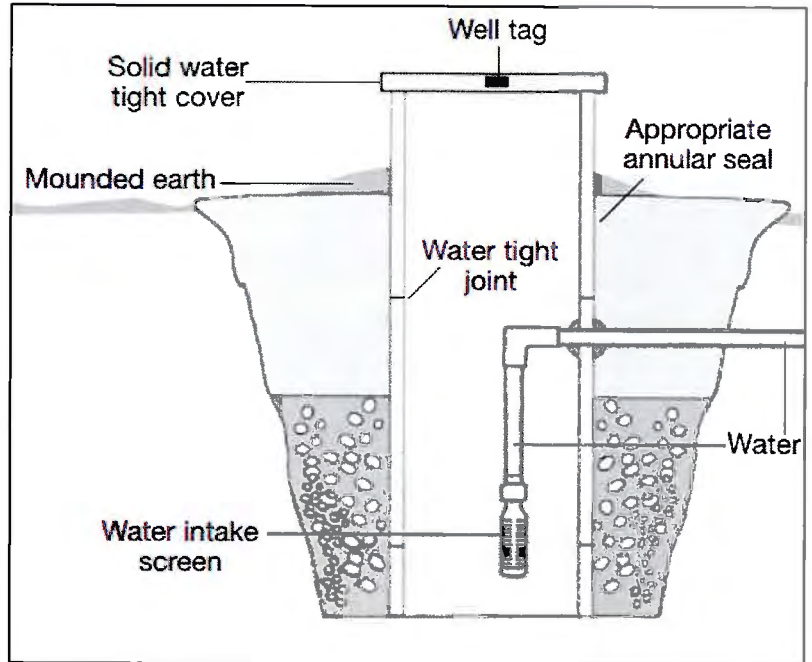
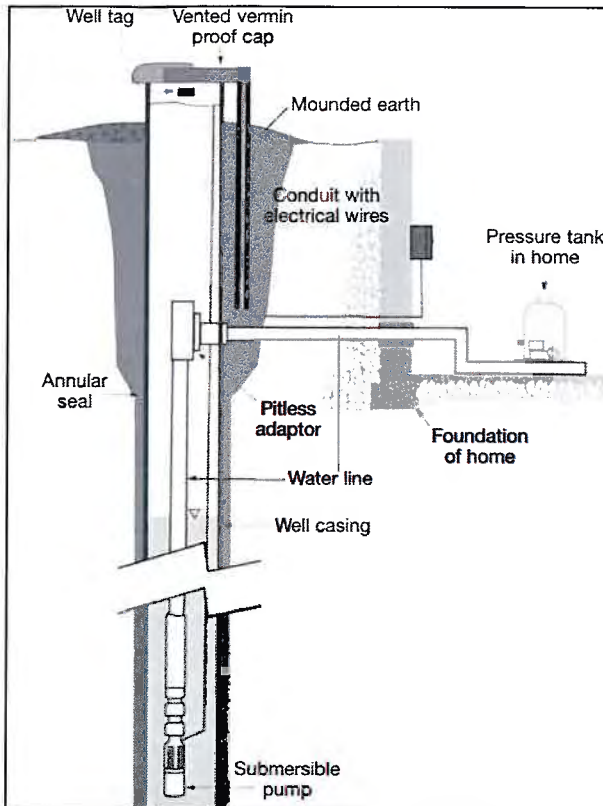
MUNICIPAL/CONSERVATION AUTHORITY ASSISTANCE

What type of assistance could the City or Conservation Authority offer to further your implementation of the above measures? Please circle:

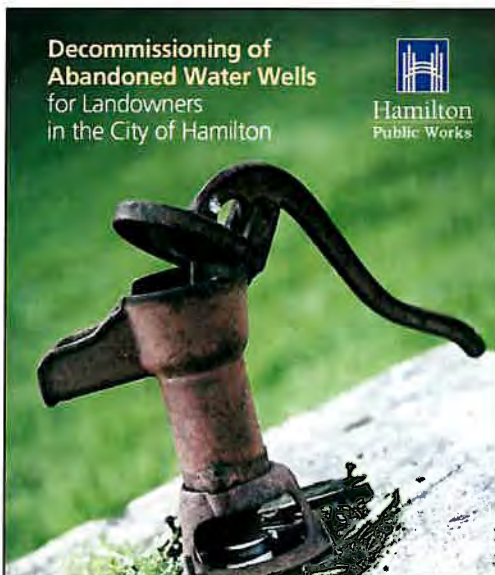
- Technical Support
- Financial Assistance
- Brochures/Pamphlets
- Help Line
- Other (please specify)

Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed Study

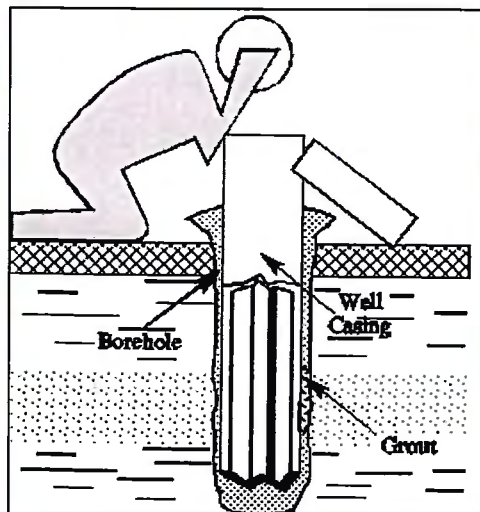
REPLACEMENT OF PRIVATE WELL



A **Drilled Well** (left) is much less susceptible to surface water contamination than a **Dug Well** (above). (Source WellAware.ca)



Hamilton Conservation and the City of Hamilton should be consulted regarding **Funding opportunities for Abandoned Well Decommissioning**. (Source Hamilton Public Works)



Check for **Cracked, Corroded or Damaged Well Casing**.



A **leaky cement casing** could lead to contamination. (Source WellAware.ca)



Ground around your wellhead should be **graded away** to ensure surface runoff does not flow in. The area should be maintained with **low-growing grass**. (Source WellAware.ca)



Hamilton

RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

1. Contact Name: [Redacted]

2. Ministry/Agency/Office: _____

3. Address: [Redacted] MAPLE CRESCENT

Postal Code: [Redacted]

Phone No.: [Redacted]

Email: [Redacted] .ca

4. Please note specific comments and/or concerns (please attach additional sheets if necessary):

NOT SURE HOW THIS AFFECTS US.
OUR YARD BACKS ON TO THE
MUNICIPAL WELL ON HARVEST. 12
YEARS AGO WE INSTALLED A \$25,000.00
FILTER BED SEPTIC REPLACEMENT. ARE
WE IN COMPLIANCE?

Signature [Redacted]

Date January 20/15

Please return this form to:

Marco Silverio, M.Sc.
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

From: Silverio, Marco [Marco.Silverio@hamilton.ca]

Sent: January-17-15 11:52 AM

To: Silverio, Marco

BCC: '██████████@mhbcplan.com'; '██████████@ispnet.ca'; '██████████@hotmail.com';
'██████████@cogeco.ca'; '██████████@thecreatechgroup.com'; '██████████@HHSC.CA';
'██████████@cogeco.ca'; '██████████@sympatico.ca'; '██████████@cogeco.ca'; '██████████@ryerson.ca';
'██████████@cogeco.ca'; '██████████@hwdsb.on.ca'; '██████████@cogeco.ca';
'██████████@oasisfootwear.com'; '██████████@yahoo.ca'; '██████████@sympatico.ca';
'██████████@Roberts-Law.ca'; '██████████@cogeco.ca'; '██████████@halton.ca';
'██████████@globalserve.net'; '██████████@cogeco.ca'; '██████████@mac.com';
'██████████@cogeco.ca'; '██████████@ca.inter.net'; '██████████@IBIGroup.com';
'██████████@cogeco.ca'; '██████████@cogeco.ca'; '██████████@sympatico.ca'; '██████████@istar.ca'

Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greenville Rural Settlement Area Subwatershed EA Study

Attachments: Mid-Spencer Creek-Greenville RSA Subwatershed Study - Notice of PIC#2 (...pdf)

Good Morning,

The City is completing the Mid-Spencer Creek/Greenville Rural Settlement Area (RSA) Subwatershed and Class Environmental Assessment (EA) study to determine a management strategy for surface water (streams, stormwater), groundwater, community servicing (water and wastewater) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA.

The Public Information Centre No.2 is scheduled for January 22nd from 4h00-7h00PM at the Christ Church 92 Highway #8.

Please find attached the Notice of Public Information Centre No. 2.

Please don't hesitate to contact if you require further information.

Kind Regards,



Marco Silverio

PM-Source Protection Planning
Sustainable Initiatives
City of Hamilton | Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
T: 905.546.2424 ext. 6099
Marco.Silverio@hamilton.ca

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Notice of Public Information Centre No. 2 Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed and Class Environmental Assessment Study

Project Background

The City of Hamilton has initiated a Subwatershed and Class Environmental Assessment (EA) study for the Mid-Spencer Creek and Greensville Rural Settlement Area (RSA). Residents in the Greensville RSA and the subwatershed are currently serviced by private septic systems and groundwater-sourced municipal communal, private communal or individual wells.

The study will set a management strategy for surface water (streams, storm water), groundwater, community servicing (water and septic) and natural areas (wetlands, woodlots) as development proceeds on designated lands within the RSA. The study includes public and review agency consultation, evaluation of alternatives, assessment of the impacts of the proposed works, and identification of measures to mitigate any adverse impacts. Upon completion of the study, a Report documenting the planning and decision making process followed, will be prepared and made available for public review.

The Study Process

This Study will follow the planning and design process as defined in the Municipal Engineers Association Municipal Class Environmental Assessment Class document (October 2000, as amended in 2007 & 2011). The Master Plan (Approach 1) will address Phases 1 and 2 of the Class EA requirements for any Schedule B projects that are identified, and outline additional work that will be required to implement any Schedule C projects that are identified as part of the study.

Public Information Centre (PIC) No. 2

Two (2) PIC sessions are required for this Study. PIC No. 1 was held on November 21, 2007. PIC No. 2 will present the evaluation of the alternative solutions and identify the recommended solutions and is scheduled for:

Date: January 22, 2015
Time: 4:00 pm to 7:00 pm
Location: Christ Church, 92 Highway #8, Flamborough

We would like to hear from you

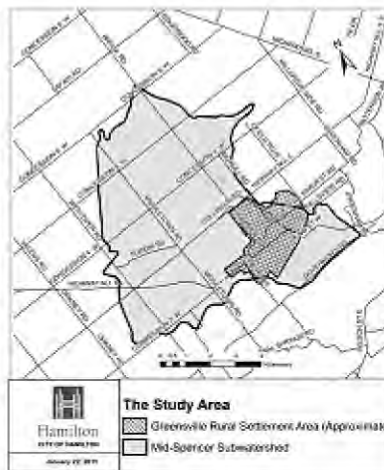
We are interested in hearing any comments or concerns you may have with respect to this study. Comments received through the course of the study will be considered in selecting the recommended solutions. Information will be collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record. If you would like more information or would like to be placed on the Study mailing list, please contact:

Marco Silverio, M.Sc.

Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 8th and January 15th, 2015.



Hamilton

From: Silverio, Marco [Marco.Silverio@hamilton.ca]

Sent: January-14-15 2:19 PM

To: [REDACTED]@gmail.com'; [REDACTED]@mmkengineering.ca'

Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study

Attachments: Mid-Spencer Creek-Greensville RSA Subwatershed Study - Notice of PIC#2 (...pdf; Response Form - Agency - FINAL.DOC

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Kind Regards,



Marco Silverio

PM-Source Protection Planning
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Marco.Silverio@hamilton.ca

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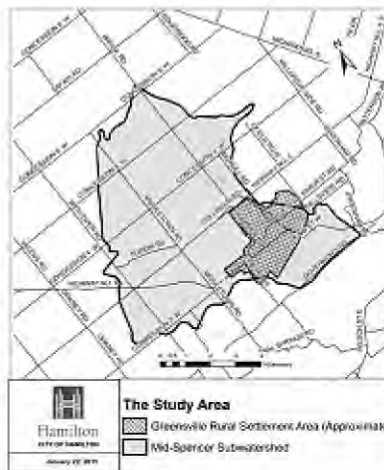
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Hamilton



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

1. Contact Name: _____

2. Ministry/Agency/Office: _____

3. Address: _____

_____ Postal Code: _____

Phone No.: _____

Email: _____

4. Please note specific comments and/or concerns (please attach additional sheets if necessary):

Signature _____

Date _____

Please return this form to:

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Sent: January-14-15 2:19 PM

To: [REDACTED]@ajclarke.com

Subject: Notice of PIC No. 2 - Mid-Spencer Creek/Greensville Rural Settlement Area Subwatershed EA Study

Attachments: Response Form - Agency - FINAL.doc; Mid-Spencer Creek-Greensville RSA Subwatershed Study - Notice of PIC#2 (Flamborough).pdf

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We would like to hear from you

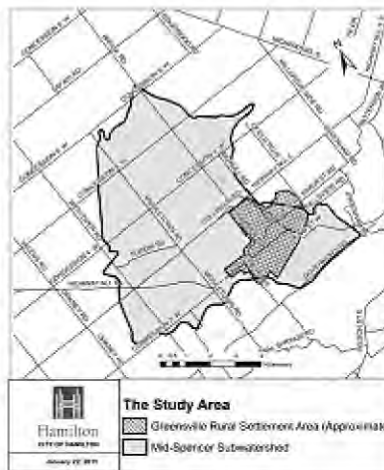
We are interested in hearing any comments or concerns you may have with respect to this study. Comments received through the course of the study will be considered in selecting the recommended solutions. Information will be collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record. If you would like more information or would like to be placed on the Study mailing list, please contact:

Marco Silverio, M.Sc.

Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Please contact the Project Manager regarding disability accommodation requirements.

This Notice Issued January 8th and January 15th, 2015.



Hamilton



RESPONSE FORM
City of Hamilton
Mid-Spencer Creek/Greensville Rural Settlement Area
Subwatershed and Class Environmental
Assessment Study

1. Contact Name: _____

2. Ministry/Agency/Office: _____

3. Address: _____

_____ Postal Code: _____

Phone No.: _____

Email: _____

4. Please note specific comments and/or concerns (please attach additional sheets if necessary):

Signature _____

Date _____

Please return this form to:

Marco Silverio, M.Sc.
Project Manager
City of Hamilton
77 James Street North, Suite 400
Hamilton, ON L8R 2K3
Phone: 905-546-2424 ext. 6099
Fax: 905-546-4491
Email: Marco.Silverio@hamilton.ca

Thank you for your participation in this study.

			Telephone
<p>[REDACTED]@gmail.com></p>	<p>Re: #2 mid Spencer Creek/Greenville rural settlement area sub watershed. Please place us on the mailing list for the above study. Thank you [REDACTED] [REDACTED]@gmail.com</p>	<p>[REDACTED]@gmail.com</p>	
<p>[REDACTED]@mdswireless.com></p>	<p>we are unable to attend meeting Jan 22 2015 but would like to be placed on the mailing list for information about this study. We live in the area under the study. Thank you [REDACTED] [REDACTED] Sodom Rd [REDACTED] Ontario [REDACTED]</p>	<p>[REDACTED]@mdswireless.com</p>	
<p>[REDACTED]@gmail.com> [REDACTED]@gmail.com></p>	<p>Re ad in Hamilton Spectator "Mid-Spencer Creek / Greenville Rural Settlement Area Sub-watershed and Class Environmental Assessment Study" please place our name on the Study mailing list. We own property adjoining Spencer Creek. Sincerely, [REDACTED] [REDACTED] Concession 6 W. Millgrove, ON [REDACTED] email: [REDACTED]@gmail.com</p>	<p>[REDACTED]@gmail.com [REDACTED]@gmail.com</p>	
<p>[REDACTED]</p>	<p>Thank you and please keep us apprised of any information on this. Voice mail</p>	<p>[REDACTED]@damseeds.com</p>	
<p>[REDACTED]</p>	<p>Good Afternoon Marco: Thank you for providing the notice. Could you please change your notification list from [REDACTED] to the following person at our office for all future notifications and correspondence related to this matter: [REDACTED] MHBC [REDACTED] Collier Street Barrie, Ontario [REDACTED] Telephone: [REDACTED] E-mail: [REDACTED]@mhbcplan.com Please confirm receipt of this email. If your require a more formal letter to change the notification contact, please advise. Thank you again for your assistance regarding this matter. Regards,</p>	<p>[REDACTED]@mhbcplan.com</p>	
<p>Van de Valk, Jackie (OMAFRA) <Jackie.VandeValk@ontario.ca></p>	<p>Hi Marco, I received your Notice of PIC 2 for the above project but I am not able to attend. Could you please forward me any recent report or link to the main project website with current findings and recommendations? Thank you, Jackie</p>	<p>Jackie.VandeValk@ontario.ca</p>	



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Tuesday, January, 27, 2015 - 4:04:56 PM

Environmental assessment of Mid-Spencer Creek, Greenville area nears completion

By Catherine O'Hara • Review Staff

A comprehensive study of the Mid-Spencer Creek and Greenville Rural Settlement Area is nearing completion with the City of Hamilton's Public Works department staff recommending a number of actions to mitigate the impacts of future development on the community's surface water and groundwater quality and quantity.

In 2007, the city initiated a Subwatershed and Class

Environmental Assessment study for

the area to identify its environmentally sensitive features and develop management strategies that aim to minimize flood risks, stream erosion, degradation of water quality and any negative impacts on natural systems that could result from development in three areas outlined in the 1992-approved Greenville Secondary Plan.

The study's findings and recommended solutions were presented to the community at a Public Information Centre, held Jan. 22 at Christ Church Flamborough, where city staff and members of consulting firm Aquafor Beech were on hand to explain the preferred subwatershed management strategy.

According to the study, the Greenville Rural Settlement Area is home to approximately 2,525 residents who occupy roughly 1,000 dwellings that are serviced by septic systems with municipal, private or individual wells. However, many of the systems are aging and in need of repair or replacement, said Dave Maunder, an Aquafor Beech principal.

As a result, part of the study includes garnering feedback from residents on their willingness to monitor or improve their systems for the betterment of the local environment. It also looks to determine if homeowners would voluntarily take part in water conservation measures.

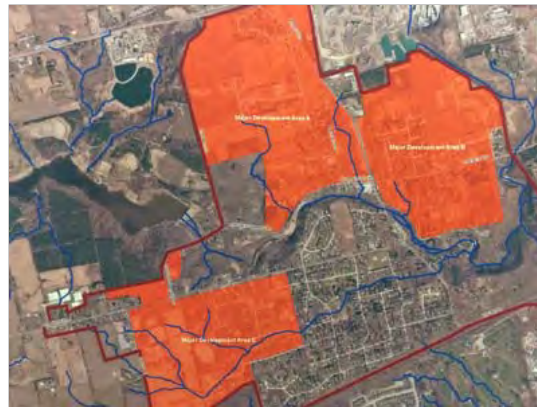
Future development in the Greenville Settlement Area, noted the study, could have negative impacts on the environment and residents' access to water. Increased runoff volumes and flood flow, decreased water quality, lower groundwater recharge and a potential decrease in baseflow were identified.

Recommended stormwater management alternatives to limit the impacts of development are proposed. They include the implementation of low-impact development source controls, like green roofs and permeable pavement that encourage water to seep into the ground, effectively reducing stormwater runoff. End-of-pipe controls, such as wet ponds, and traditional source controls like rooftops and parking lot storage, could serve to control flooding by gradually releasing stormwater runoff.

Instead of limiting future growth or providing municipal water to properties, staff is suggesting maintaining individual services on future residential lots with the addition of a back-up well to the existing municipal well. This, suggests the study's findings, will ensure reliable access to water.

The preferred measures, according to the study, would have minimal impacts on the natural environment and limited effects on existing and proposed development.

Although the study states that groundwater in the Greenville Rural Settlement Area has the ability to support more than 315 additional wells, groundwater management strategies were identified at the Jan. 22 PIC. They include the



A map of the Mid-Spencer Creek and Greenville Rural Settlement Area shows three areas of possible future development.

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implementation of low-impact development measures that would make up for the infiltration deficit caused by impervious surfaces like roofs and driveways.

"This is a very unique community," said Maunder. "In the bigger picture, we want to make sure that future development does not impact the environment...we've identified the requirements as to what they need to do on the property in order to develop."

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Flamborough Review

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Daily Newspapers

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Appendix N
Agency Letters and Responses

Hamilton Conservation Authority

BY E- MAIL

August 14, 2015

CEA-MUN/06-11

Marco Silverio
City of Hamilton
Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3

Dear Mr. Silverio:

**Re: Hamilton Conservation Authority Comments on Draft Final Report for the
Mid-Spencer/Greenville Rural Settlement Area Subwatershed Study**

The Hamilton Conservation Authority (HCA) has reviewed the Draft Final Report: *Mid Spencer / Greenville Rural Settlement Area Subwatershed Study*, prepared for the City of Hamilton by Aquafor Beech Limited, dated 17 June 2015 and offers the following comments related to floodplain modeling, erosion hazards, groundwater assessment and natural heritage assessment issues.

Floodplain Modeling and Mapping

The itemized comments below are provided further to our previous correspondence of January, 28, 2015 regarding the requirement for our review and approval of the floodplain assessment and mapping of the Middle Spencer Creek tributary. It is suggested that the requested additional information be provided to clarify the details of the assessment, as well as to allow for the assessment to be reproducible in the future. Some of the comments may be able to be addressed at the Functional Design or Detailed Design stages.

1. Dual Model Approach:

It is our understanding that the MIKE 11 NAM modeling included a coarser representation of the Greenville Rural Settlement Area (RSA) and represented existing conditions. Future conditions or proposed stormwater management (SWM) were not assessed with this modeling.

The MIKE 11 NAM modeling was used in continuous mode (for a four year period) to calibrate the model. The modeling was then used in design event mode (using City of Hamilton design events) to determine the 100 year and Regional event peak flow rates. These peak flow rates were used to validate the SWMHYMO modeling, as well as input for the flood plain mapping of the Greenville Unnamed Tributary.

The SMWHYMO modeling included a finer representation of the Greenville RSA and represented existing conditions, future conditions, and proposed SWM.

The SWMHYMO modeling was not directly calibrated, but was validated based on comparison of Regional Event peak flow rates to the MIKE 11 NAM results. The modeling was used in design event mode (using City of Hamilton design events) to determine the 2 - 100 year and Regional event peak flow rates. These peak flow rates were used for the impact assessment of the proposed developments and to preliminarily size the required SWM. It is suggested that the report include such additional details as to the deliverables derived from each modeling, and clarify why both MIKE 11 NAM modeling *and* SWMHYMO modeling was used.

2. Comparison of peak flows in Middle Spencer Creek at the Unnamed Tributary (MIKE 11 NAM model versus MacLaren 1990 study):

It is requested that additional explanation be provided to justify MIKE 11 NAM peak flow rates which are approximately 25% higher than MacLaren 1990 for the 100 year design storm, but approximately 25% lower than MacLaren for the Hurricane Hazel event.

3. Additional validation / calibration of the SWMHYMO modeling:

It is our understanding that the SWMHYMO modeling was not directly calibrated, but was validated based on comparison of Regional Event peak flow rates to the MIKE 11 NAM results. Given that the majority of the assessment has been based on the SWMHYMO modeling, it is highly recommended that additional validation of the modeling (including to MIKE 11 NAM model results for various design events and to MacLaren 1990 model results for various design events), and / or direct calibration of the SWMHYMO modeling, be undertaken.

4. Snow melt events:

Highest annual flows in Middle Spencer Creek at Highway 5 and Dundas are historically a result of a snowmelt, rain on snow, or rain on frozen soil events. The modeling approach by which design events are used has focused on summer / fall rainfall events. This may result in an under-estimation of peak flows and runoff volumes for design events. MacLaren 1990 and Lower Spencer Creek ISWS 2015 both used a continuous modeling approach in which snowmelt, rain on snow, and rain on frozen soil events were directly accounted for and included within the determination of return period peak flow rates.

It is our understanding that the primary objective of the hydrologic and hydraulic modeling is to preliminarily assess the potential impacts of future development, as well as to preliminarily size SWM. We would respectfully suggest that the provided evaluation may be suitable for the Secondary Planning stage, but would request that snow-related runoff events be directly accounted for during subsequent Functional Design and Detailed Design stages.

5. Appendix A – MIKE 11 NAM model parameter details:

It is recommended to include the MIKE 11 NAM model parameters, by sub-catchment in this appendix. A full listing of parameters (existing conditions) ensures that the modeling is reproducible. The following is a listing of the typical model parameters (including snow-melt parameters):

- Area
- Land Use Fraction
- % Imperviousness
- Soil Fraction
- Field Capacity
- Wilting Point
- Rooting Depth
- Fraction Imperviousness
- CQOF
- CKBF
- CKIF
- CQIF
- TOF
- TIF
- TG
- Lmax factor
- Umax factor
- CK1 factor
- Sy
- GWLBF0
- GWLBF1
- CQlow
- CKlow
- CSNOW
- T0

6. Appendix A – SWMHYMO model parameter details:

Please provide the full listing of SWMHYMO model parameters by sub-catchment (existing and future conditions), which ensures that the modeling is reproducible.

7. Appendix A – Dam operation details:

Please include the Christie Lake Dam operation details, as alluded to in the text.

8. Flood Plain Mapping: Middle Spencer Creek:

It is suggested that the report clarify the information that has been used for flood plain mapping on Middle Spencer Creek, which contributes to constraints to development (hazard lands) within the Greenville RSA.

9. Flood Plain Mapping: Greenville Unnamed Tributary:

Please provide the rationale for the use of the MIKE 11 NAM peak flow rates within the flood plain mapping, rather than the finer resolution SWMHYMO results.

Traditionally, official flood plain mapping is based on peak flow rates under future land conditions which omits any flow attenuation due to SWM or hydraulic structures.

The provided assessment, based on existing land use conditions, may underestimate the constraints to development (hazard lands) in this area.

Please provide clarification as to the information used as constraints to development for the area within sub-catchment 8a.

10. Surface Water Impact Assessment – Imperviousness Under Future and Existing Conditions:

It is suggested that a table be provided of the estimated imperviousness % of each subcatchment under both existing and future conditions, to enhance the understanding of the development impacts with respect to overall imperviousness of the sub-catchment.

Groundwater Assessment/Water Budget

11. Section 4.4.7 Summary and Conclusions. In Item 5 of the water quantity main conclusions, it is indicated that Mid Spencer creek was moderately stressed with the PRMS model. Based on this finding, the alternatives for servicing being considered would not appear to address this stress as they apply primarily to the municipal well system and most residents are on private wells.

12. Section 4.4.4 Groundwater Quantity and the Water Balance (pg. 76) last paragraph mentions that if 20% of the developed lots are covered in impervious surfaces, the potential for groundwater recharge will be correspondingly lowered, unless infiltration targets are implemented. There is discussion within the report of use of LIDs and source controls to address this reduction in infiltration, but it is the opinion of staff that there needs to be more discussion in the report as to how implementation of LIDs may be facilitated (i.e. special zoning provisions, etc.).

13. Water Budget – Land Use Assumptions:

Please clarify that the stated 80% pervious and 20% impervious is based on the available land use data.

14. Water Budget – Domestic Water Use:

The estimation has been based on 285 L / person / day, which was referenced to average daily use of water by urban residents according to Environment Canada 2005 data.

Is there literature to confirm that this estimate can also apply to rural residential areas on private groundwater wells? See comment 11 above.

15. Water Budget - Groundwater Supply and Demand:

According to the information provided, the average annual demand (PTTW actual average withdrawal plus estimated domestic use) is significantly greater than the available annual groundwater supply (recharge plus inflows from upstream plus return from domestic use via septic systems). It is recommended that additional discussion on this matter be provided in the report.

16. Groundwater Impact Assessment – Imperviousness Under Future Conditions:

It is requested that the report text be enhanced to include rationale for the adopted 15% increase in imperviousness under proposed development conditions. The adopted imperviousness is inconsistent between the groundwater impact assessment (15% increase over existing condition imperviousness) and the water quality control assessment (50% imperviousness). Please provide the explanation for this difference.

17. Recommended Groundwater Recharge Targets and Minimum Lot Size:

Please clarify the recommended proposed lot sizing. The report assesses the required groundwater recharge targets based on 1 acre (0.4 ha) lot sizes in Section 9.2.1.1 (Water Balance Targets), which is inconsistent with Figure 10.4.5.

18. Recommended Groundwater Recharge Targets:

Please provide supporting calculations of the calculated infiltration target of 1mm of additional infiltration for every precipitation event onto pervious areas, suggested in order to make up for the post-development infiltration shortfall.

Erosion Hazard

19. Fluvial Geomorphology – Erosion Hazard:

Please provide details as to the erosion hazard information that has been used to establish the constraints to development (hazard lands) within the Greensville RSA as this is not explicitly stated in the report.

20. Fluvial Geomorphology – Erosion Threshold analysis:

Please confirm that detailed erosion threshold analysis and critical discharge analysis will be undertaken at the Functional Design or Detailed Design stages.

Stormwater Management

21. Water Quality – Standard of Water Quality Treatment:

Enhanced (Level 1) standard of water quality treatment is the current standard for Middle Spencer Creek as established in the Hamilton Harbour Remedial Action Plan.

22. Water Quality – Required Storage Volumes:

It is suggested that Table 9.2.1 be revised to be consistent with the traditional definition of active storage control. Generally, the active storage control volume does not include the Permanent Pool volume, and is defined by the greater of the individual volume required for 100 year flood control or erosion control or water quality extended detention. It is also suggested that the Table include the Total Pond volume, equal to the Permanent Pool plus 100 yr Flood Control volumes.

23. Phase 1 Screening-Level Evaluation Matrix:

It would be appreciated if the report could provide additional supporting rationale for the screening level rankings.

24. Detailed Assessment Matrix for Selecting the Preferred Alternative:

It may not be optimal to base the assessment on equal weightings for all the evaluation criteria. For instance, it may not be appropriate to give the same weight to aesthetics value as to water balance, flooding or erosion.

Natural Heritage

25. Section 4.7.2.1.2 Fish Habitat. It may also be useful to incorporate the Department of Fisheries and Oceans definition of fish and fish habitat within this section, as they are the lead agency with regard to fisheries protection. HCA agrees with the fish habitat classification of watercourses with the Subwatershed Study Area.

26. Section 4.7.2.1.3 Wetlands. Although the wetland features (1-8) are included as Core Areas in the NHS, it is important to confirm and map the features, as the majority will be protected under HCA regulation and will directly impact the extent of the constraints to development and buildable area. It is also important to confirm the features as it comes down to planning stage/detail design, as it is at this stage where the features will be identified, studied further and firm boundaries established.

27. Figure 4.7.4. HCA mapping shows local wetland # 9 with a much larger area and #10 is not shown on the map or discussed in the previous section. Wetland feature #5 does not have a boundary outline shown.

28. Figure 4.7.12. Zone C shows the revised NHS, a portion of the core areas identified are within sub-8a (5). See also see figure 4.8.2 RSA new development and constraints. HCA is concerned about the developable area remaining for sub-8a (5), as it has been highlighted as both linkage and core area and may not include erosion hazards as spoken to previously. The same could be said for sub-8a (4).

It may be prudent to revisit this parcel prior to finalizing the report to refine the developable area again, as it will pose an issue during future planning stages.

29. Section 4.7.2.1.6 Significant woodlands. Page 195 last paragraph indicates that additional woodland features identified within the RSA are considered significant. Since they satisfy the City of Hamilton criteria, these features should be incorporated in the NHS. Consider including a statement that the following woodlands are considered to be significant and will be included within the City of Hamilton NHS. Also in figure 4.7.11 revised Greensville NHS, the woodlands identified are shown as Core Areas. It is suggested that the figure include both Significant Woodland status and Core Area.

30. Table 6.1.1 Is it possible to indicate that the area outside of the identified constraints area is a preliminary assessment, considering the boundaries or VPZ have not been established at this time?

31. 7.2.8 Woodland Edge Management. Within the possible mitigation measures, item 8 indicates restricting grading activities to areas outside of a 3 meter buffer from the dripline of trees. Please note that grading activities are considered part of construction and therefore are restricted outside of the VPZ established for the woodlands (10-15m or greater).

32. Figure 9.2.1 Storm Water Management. HCA understands the areas identified are considered preliminary and Aquafor Beech Ltd. mentions this in the report, but it should be noted that the preliminary SWM locations 7.1 and 1.2 encroach within the ESA and Significant Woodland areas. These facilities would need to be located outside of these features to ensure ecological function and services are not impacted.

33. As Eastern Meadowlark and Barn Swallow were noted during all birding bird surveys during all years in multiple habitat units as noted in Table 4.6.23 (page 164), it is recommended that Table 4.7.3 (page 182) be updated to reflect that additional surveys for these species should be conducted at future planning stages.

34. Please update this document to reflect that Hooded Warbler has been de-listed provincially and federally.

35. HCA would recommend that the document be amended to remove the recommendation of trails with a VPZ as stated on page 345 of the Subwatershed Study. HCA recommends all trails be outside of vegetation protection zones.

36. Table 10.4.2. The HCA should be added to the list of approval agencies for development or site alteration in ESAs, as this designation would overlap with the majority of wetlands, especially PSWs.

If you have any questions regarding the above or would like to arrange a meeting to discuss our comments, please do not hesitate to contact the undersigned at ext. 131.

Yours truly,

A handwritten signature in black ink that reads "Darren Kenny". The signature is written in a cursive style with a large, sweeping flourish at the end of the name.

Darren Kenny
Watershed Officer

Mid-Spencer/Greenville Rural Settlement Area Subwatershed Study
Responses to HCA comments on DRAFT FINAL REPORT - June 17, 2015

Hamilton Conservation Authority

The Hamilton Conservation Authority (HCA) has reviewed the Draft Final Report: *Mid Spencer / Greenville Rural Settlement Area Subwatershed Study*, prepared for the City of Hamilton by Aquafor Beech Limited, dated 17 June 2015 and offers the following comments related to floodplain modeling, erosion hazards, groundwater assessment and natural heritage assessment issues.

If you have any questions regarding the above or would like to arrange a meeting to discuss our comments, please do not hesitate to contact the undersigned at ext. 131.

Yours truly,
Darren Kenny
Watershed Officer

Floodplain Modeling and Mapping

The itemized comments below are provided further to our previous correspondence of January, 28, 2015 regarding the requirement for our review and approval of the floodplain assessment and mapping of the Middle Spencer Creek tributary. It is suggested that the requested additional information be provided to clarify the details of the assessment, as well as to allow for the assessment to be reproducible in the future. Some of the comments may be able to be addressed at the Functional Design or Detailed Design stages.

1. Dual Model Approach:

It is our understanding that the MIKE 11 NAM modeling included a coarser representation of the Greenville Rural Settlement Area (RSA) and represented existing conditions. Future conditions or proposed stormwater management (SWM) were not assessed with this modeling.

The MIKE 11 NAM modeling was used in continuous mode (for a four year period) to calibrate the model. The modeling was then used in design event mode (using City of Hamilton design events) to determine the 100 year and Regional event peak flow rates. These peak flow rates were used to validate the SWMHYMO modeling, as well as input for the flood plain mapping of the Greenville Unnamed Tributary.

The SMWHYMO modeling included a finer representation of the Greenville RSA and represented existing conditions, future conditions, and proposed SWM. The SWMHYMO modeling was not directly calibrated, but was validated based on comparison of Regional Event peak flow rates to the MIKE 11 NAM results. The modeling was used in design event mode (using City of Hamilton design events) to determine the 2 - 100 year and Regional event peak flow rates. These peak flow rates were used for the impact assessment of the proposed developments and to preliminarily size the required SWM. It is suggested that the report include such additional details as to the deliverables derived from each modeling, and clarify why both MIKE 11 NAM modeling *and* SWMHYMO modeling was used.

Response: Generally correct. With respect to the last point, the MIKE 11 NAM model was initially used based on the RFP and City wide intention to use integrated set of MIKE models. The SWMHYMO model was used due to limitations in MIKE 11 to model ponds.

2. Comparison of peak flows in Middle Spencer Creek at the Unnamed Tributary (MIKE 11 NAM model versus MacLaren 1990 study):

It is requested that additional explanation be provided to justify MIKE 11 NAM peak flow rates which are approximately 25% higher than MacLaren 1990 for the 100 year design storm, but approximately 25% lower than MacLaren for the Hurricane Hazel event.

Response: 25 % is a reasonable range given the fact that the original model is over 25 years old.

For Maclaren 100 year they used 26 years of record and then used a flood frequency analysis to generate the 100 year flow. We used a design event to define the 100 year flow.

For the Regional storm Maclaren used 212 mmm and AMC III conditions. Aquafor used 357 mm.

3. Additional validation / calibration of the SWMHYMO modeling:

It is our understanding that the SWMHYMO modeling was not directly calibrated, but was validated based on comparison of Regional Event peak flow rates to the MIKE 11 NAM results. Given that the majority of the assessment has been based on the SWMHYMO modeling, it is highly recommended that additional validation of the modeling (including to MIKE 11 NAM model results for various design events and to MacLaren 1990 model results for various design events), and / or direct calibration of the SWMHYMO modeling, be undertaken.

Response: the approach used is the same as used for SCUBE East

4. Snow melt events:

Highest annual flows in Middle Spencer Creek at Highway 5 and Dundas are historically a result of a snowmelt, rain on snow, or rain on frozen soil events. The modeling approach by which design events are used has focused on summer / fall rainfall events. This may result in an under-estimation of peak flows and runoff volumes for design events. MacLaren 1990 and Lower Spencer Creek ISWS 2015 both used a continuous modeling approach in which snowmelt, rain on snow, and rain on frozen soil events were directly accounted for and included within the determination of return period peak flow rates.

It is our understanding that the primary objective of the hydrologic and hydraulic modeling is to preliminarily assess the potential impacts of future development, as well as to preliminarily size SWM. We would respectfully suggest that the provided evaluation may be suitable for the Secondary Planning stage, but would request that snow-related runoff events be directly accounted for during subsequent Functional Design and Detailed Design stages.

Response: to the first paragraph, our flows are calibrated (i.e. based on actual events) and are higher than the Maclaren flows, so this should not be an issue. With respect to the second paragraph, the comment is not consistent with approaches used throughout Ontario when sizing stormwater facilities (i.e. stormwater runoff will not increase much in the winter as the change in runoff will not be significant).

5. Appendix A – MIKE 11 NAM model parameter details:

It is recommended to include the MIKE 11 NAM model parameters, by sub-catchment in this appendix. A full listing of parameters (existing conditions) ensures that the modeling is reproducible. The following is a listing of the typical model parameters (including snow-melt parameters):

- | | |
|--|--------------------------------------|
| <input type="checkbox"/> Area | <input type="checkbox"/> CQIF |
| <input type="checkbox"/> Land Use Fraction | <input type="checkbox"/> TOF |
| <input type="checkbox"/> % Imperviousness | <input type="checkbox"/> TIF |
| <input type="checkbox"/> Soil Fraction | <input type="checkbox"/> TG |
| <input type="checkbox"/> Field Capacity | <input type="checkbox"/> Lmax factor |
| <input type="checkbox"/> Wilting Point | <input type="checkbox"/> Umax factor |
| <input type="checkbox"/> Rooting Depth | <input type="checkbox"/> CKI factor |
| <input type="checkbox"/> Fraction Imperviousness | <input type="checkbox"/> Sy |
| <input type="checkbox"/> CQOF | <input type="checkbox"/> GWLBF0 |
| <input type="checkbox"/> CKBF | <input type="checkbox"/> GWLBF1 |
| <input type="checkbox"/> CKIF | <input type="checkbox"/> CQlow |

CKlow
 CSNOW

T0

Response: we will provide these values in the Final report.

6. Appendix A – SWMHYMO model parameter details:

Please provide the full listing of SWMHYMO model parameters by sub-catchment (existing and future conditions), which ensures that the modeling is reproducible.

Response: we will provide these values in the Final report.

7. Appendix A – Dam operation details:

Please include the Christie Lake Dam operation details, as alluded to in the text.

Response: it is our recollection that HCA referred us to the Maclaren report for the operation details.

8. Flood Plain Mapping: Middle Spencer Creek:

It is suggested that the report clarify the information that has been used for flood plain mapping on Middle Spencer Creek, which contributes to constraints to development (hazard lands) within the Greenville RSA.

Response: we will add this statement.

9. Flood Plain Mapping: Greenville Unnamed Tributary:

Please provide the rationale for the use of the MIKE 11 NAM peak flow rates within the flood plain mapping, rather than the finer resolution SWMHYMO results. Traditionally, official flood plain mapping is based on peak flow rates under future land conditions which omits any flow attenuation due to SWM or hydraulic structures.

The provided assessment, based on existing land use conditions, may underestimate the constraints to development (hazard lands) in this area.

Please provide clarification as to the information used as constraints to development for the area within sub-catchment 8a.

Response: with respect to the first paragraph, a peak flow rate of 21.5 cms (based on the MIKE 11 model was used for floodplain mapping). As is shown in Table 6.1.2 the peak

flow rate from SWMHYMO for future uncontrolled conditions is 20.65 cms. Thus, the approach is consistent with that mentioned by HCA above.

10. Surface Water Impact Assessment – Imperviousness Under Future and Existing Conditions:

It is suggested that a table be provided of the estimated imperviousness % of each subcatchment under both existing and future conditions, to enhance the understanding of the development impacts with respect to overall imperviousness of the sub-catchment.

Response: we will provide these values in the Final report.

Groundwater Assessment/Water Budget

11. Section 4.4.7 Summary and Conclusions. In Item 5 of the water quantity main conclusions, it is indicated that Mid Spencer creek was moderately stressed with the PRMS model. Based on this finding, the alternatives for servicing being considered would not appear to address this stress as they apply primarily to the municipal well system and most residents are on private wells.

Response: The Environmental Assessment process is only intended to address infrastructure owned by the municipality. Thus only the municipal well was considered. In our conclusions, and throughout the report we state that, in order to protect private wells a number of measures need to be implemented. In summary these include:

- *Ensuring future development provides a water balance that does not diminish existing supplies*
- *Undertake a stewardship program for existing residents to increase water quantity to the ground*
- *Undertake stewardship measures to improve groundwater quality*

12. Section 4.4.4 Groundwater Quantity and the Water Balance (pg. 76) last paragraph mentions that if 20% of the developed lots are covered in impervious surfaces, the potential for groundwater recharge will be correspondingly lowered, unless infiltration targets are implemented. There is discussion within the report of use of LIDs and source controls to address this reduction in infiltration, but it is the opinion of staff that there needs to be more discussion in the report as to how implementation of LIDs may be facilitated (i.e. special zoning provisions, etc.).

Response: This item will be discussed further with City staff at a subsequent meeting.

13. Water Budget – Land Use Assumptions:

Please clarify that the stated 80% pervious and 20% impervious is based on the available land use data.

Response: the 80% pervious and 20% impervious has been used since the onset of the study and was based on delineation of representative areas.

14. Water Budget – Domestic Water Use:

The estimation has been based on 285 L / person / day, which was referenced to average daily use of water by urban residents according to Environment Canada 2005 data.

Is there literature to confirm that this estimate can also apply to rural residential areas on private groundwater wells? See comment 11 above.

Response: In our experience, water consumption in the Greensville RSA has more characteristics of urban rather than traditional rural settings, in that most houses have 2 bathrooms, clothes and dishwashers and habits seen in urban settings, such as car washing and watering of lawns and flower gardens. The figure of 285 L/person/day should be retained.

15. Water Budget - Groundwater Supply and Demand:

According to the information provided, the average annual demand (PTTW actual average withdrawal plus estimated domestic use) is significantly greater than the available annual groundwater supply (recharge plus inflows from upstream plus return from domestic use via septic systems). It is recommended that additional discussion on this matter be provided in the report.

Response: the PTTW's lie outside of the RSA boundary. The comparison between demand within the RSA and PTTW permitted/actual demand outside the RSA is meant to emphasize that private demand is a small fraction of permitted demand. During earlier discussions with City staff it was clearly noted that our study was not to make recommendations with respect to PTTW's and thus no further discussion was provided.

16. Groundwater Impact Assessment – Imperviousness Under Future Conditions:

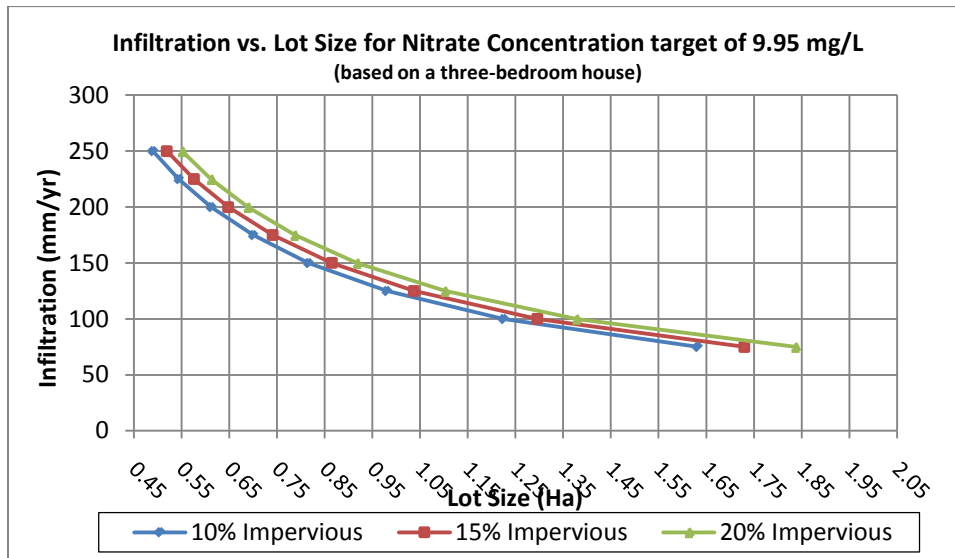
It is requested that the report text be enhanced to include rationale for the adopted 15% increase in imperviousness under proposed development conditions. The adopted imperviousness is inconsistent between the groundwater impact assessment (15% increase over existing condition imperviousness) and the water quality control assessment (50% imperviousness). Please provide the explanation for this difference.

Response: The 50% used in water quality control is an extremely conservative value which was set as areas will also require quantity control, thus the size and function of ponds will not be impacted by this number.

17. Recommended Groundwater Recharge Targets and Minimum Lot Size:

Please clarify the recommended proposed lot sizing. The report assesses the required groundwater recharge targets based on 1 acre (0.4 ha) lot sizes in Section 9.2.1.1 (Water Balance Targets), which is inconsistent with Figure 10.4.5.

Response: The City of Hamilton requested that the infiltration shortfall be shown as cubic metres per one-acre (0.4 ha) area. The areas in Figure 10.4.5 represent calculated lot sizes (using general soil type and infiltration values in the Guidelines) to achieve sufficient nitrate dilution such that nitrate concentrations derived from septic systems fall below 10 mg/L at the property boundary.



18. Recommended Groundwater Recharge Targets:

Please provide supporting calculations of the calculated infiltration target of 1mm of additional infiltration for every precipitation event onto pervious areas, suggested in order to make up for the post-development infiltration shortfall.

Response:

18. To attain the requisite shortfall of 31.5 mm/year, we suggested over-infiltration of 1 mm for every precipitation event. The depth and frequency of precipitation events

are shown below, such that 1 mm per event would correspond to 42 mm for all events of 4mm or more.

Site 2 (Middle Spencer) Averages 2010-2013

Rainfall Average (mm)	2	6	10	14	18	22	26	36.7
Rainfall Range (mm)	1-4	4-8	8-12	12-16	16-20	20-24	24-28	28+
Average # Events	8.67	13.33	9.33	5.33	3.67	3.67	1.67	2.67

Erosion Hazard

19. Fluvial Geomorphology – Erosion Hazard:

Please provide details as to the erosion hazard information that has been used to establish the constraints to development (hazard lands) within the Greenville RSA as this is not explicitly stated in the report.

Response: Fluvial geomorphology assessments were completed to document existing channel conditions and restoration opportunities within the study area. General descriptions of fluvial processes and erosion conditions are provided in the fluvial geomorphology section of the report. Detailed erosion hazard and meander belt analyses are to be completed during the detailed design stage to confirm and refine the development constraints presented in the report.

20. Fluvial Geomorphology – Erosion Threshold analysis:

Please confirm that detailed erosion threshold analysis and critical discharge analysis will be undertaken at the Functional Design or Detailed Design stages.

Response: these analyses will be undertaken at the functional and detail design stages. The final report will be updated to include this statement.

Stormwater Management

21. Water Quality – Standard of Water Quality Treatment:

Enhanced (Level 1) standard of water quality treatment is the current standard for Middle Spencer Creek as established in the Hamilton Harbour Remedial Action Plan.

Response: The table will be updated to include Level 1 values.

22. Water Quality – Required Storage Volumes:

It is suggested that Table 9.2.1 be revised to be consistent with the traditional definition of active storage control. Generally, the active storage control volume does not include the Permanent Pool volume, and is defined by the greater of the individual volume required for 100 year flood control or erosion control or water quality extended detention. It is also suggested that the Table include the Total Pond volume, equal to the Permanent Pool plus 100 yr Flood Control volumes.

Response: this table will be revised based on discussions on October 9th.

23. Phase 1 Screening-Level Evaluation Matrix:

It would be appreciated if the report could provide additional supporting rationale for the screening level rankings.

Response: see comments for 24 below.

24. Detailed Assessment Matrix for Selecting the Preferred Alternative:

It may not be optimal to base the assessment on equal weightings for all the evaluation criteria. For instance, it may not be appropriate to give the same weight to aesthetics value as to water balance, flooding or erosion.

Response: This approach was used in SCUBE and has been vetted through City and Agency staff as well as the public.

Natural Heritage

25. Section 4.7.2.1.2 Fish Habitat. It may also be useful to incorporate the Department of Fisheries and Oceans definition of fish and fish habitat within this section, as they are the lead agency with regard to fisheries protection. HCA agrees with the fish habitat classification of watercourses with the Subwatershed Study Area.

Response: Agreed. The appropriate change will be made.

26. Section 4.7.2.1.3 Wetlands. Although the wetland features (1-8) are included as Core Areas in the NHS, it is important to confirm and map the features, as the majority will be protected under HCA regulation and will directly impact the extent of the constraints to development and buildable area. It is also important to confirm the features as it comes down to planning stage/detail design, as it is at this stage where the features will be identified, studied further and firm boundaries established.

Response: It will be recommended that wetland boundaries be staked by development proponents with coordination with the HCA at future planning stages.

27. Figure 4.7.4. HCA mapping shows local wetland # 9 with a much larger area and #10 is not shown on the map or discussed in the previous section. Wetland feature #5 does not have a boundary outline shown.

Response:

- Wetland 9 was assessed through ELC work completed in 2012 by NRSI (subcontract for Aquafor Beech). It should have been labelled as #8.
- There is no Wetland 10.
- The label for Wetland 5 (east of wetland 3) should have been deleted.

28. Figure 4.7.12. Zone C shows the revised NHS, a portion of the core areas identified are within sub-8a (5). See also see figure 4.8.2 RSA new development and constraints. HCA is concerned about the developable area remaining for sub-8a (5), as it has been highlighted as both linkage and core area and may not include erosion hazards as spoken to previously. The same could be said for sub-8a (4).

It may be prudent to revisit this parcel prior to finalizing the report to refine the developable area again, as it will pose an issue during future planning stages.

Response: Aquafor recognises that the presence of natural hazards and NHS result in some developable areas being land-locked. As discussed during the Oct 2015 meeting, it is not appropriate for a SWS to determine how developers can access land-locked pieces of developable land.

29. Section 4.7.2.1.6 Significant woodlands. Page 195 last paragraph indicates that additional woodland features identified within the RSA are considered significant. Since they satisfy the City of Hamilton criteria, these features should be incorporated in the NHS. Consider including a statement that the following woodlands are considered to be significant and will be included within the City of Hamilton NHS. Also in figure 4.7.11 revised Greensville NHS, the woodlands identified are shown as Core Areas. It is suggested that the figure include both Significant Woodland status and Core Area.

Response: Significant woodlands have been incorporated into the NHS as Core Areas. The text of the report can be updated to make this clear. To show each component of the NHS (e.g. significant woodland, significant wildlife habitat, etc.) on figure 4.7.11 would make the map unreadable as these features are many and often overlap. Readers will have to refer to individual figures (e.g. Figure 4.7.2.1.6) for a breakdown of the NHS components.

30. Table 6.1.1 Is it possible to indicate that the area outside of the identified constraints area is a preliminary assessment, considering the boundaries or VPZ have not been established at this time?

Response: Yes. The report shall be revised accordingly.

31. 7.2.8 Woodland Edge Management. Within the possible mitigation measures, item 8 indicates restricting grading activities to areas outside of a 3 meter buffer from the dripline of trees. Please note that grading activities are considered part of construction and therefore are restricted outside of the VPZ established for the woodlands (10-15m or greater).

Response: The recommendation shall be revised to state that grading shall only be allowed outside of the VPZ.

32. Figure 9.2.1 Storm Water Management. HCA understands the areas identified are considered preliminary and Aquafor Beech Ltd. mentions this in the report, but it should be noted that the preliminary SWM locations 7.1 and 1.2 encroach within the ESA and Significant Woodland areas. These facilities would need to be located outside of these features to ensure ecological function and services are not impacted.

Response: The SWMFs will be relocated outside of the NHS.

33. As Eastern Meadowlark and Barn Swallow were noted during all birding bird surveys during all years in multiple habitat units as noted in Table 4.6.23 (page 164), it is recommended that Table 4.7.3 (page 182) be updated to reflect that additional surveys for these species should be conducted at future planning stages.

Response: Agreed. The appropriate change will be made.

34. Please update this document to reflect that Hooded Warbler has been de-listed provincially and federally.

Response: The appropriate update will be made.

35. HCA would recommend that the document be amended to remove the recommendation of trails with a VPZ as stated on page 345 of the Subwatershed Study. HCA recommends all trails be outside of vegetation protection zones.

Response: Trails in VPZs have been discussed with the City of Hamilton. According to the City's OP, any use allowed within Core areas (e.g. trails) are allowed in VPZs, subject to an EIS.

36. Table 10.4.2. The HCA should be added to the list of approval agencies for development or site alteration in ESAs, as this designation would overlap with the majority of wetlands, especially PSWs.

Response: Agreed. The appropriate update will be made.

Conservation Halton

Mid-Spencer/Greenville Rural Settlement Area Subwatershed Study, Draft Final Report dated June 17, 2015 – scoped review of hydrogeology and source protection data

Comment Record

Reference (Pg. #, Fig. #)	Comment
General comment – report format	The randomness of the information presented (maps, figures and tables from different reports) makes the report very confusing. Some of the presented information from referenced reports is outdated or incorrect. Considering that the report is supposed to be a conceptual model, it must be easily understood.
General comment – study area	Although, the scale of this project is explained in Section 1.2 as two distinct study areas: the Greenville Rural Area and Mid-Spencer Creek Subwatershed, it seems that they are used interchangeably at times.
General comment - spelling/grammar	It was noticed that “Greenville” is incorrectly spelled as “Greenville” on many figures. The report should be reviewed and edited for missing words, incorrect grammar, tense, plural words, etc. For example, MOE should be MOECC, MNR should be MNRF, Page 1 2 nd paragraph 3 rd line has a missing word ...area are currently... , etc.
Page 10 and 239 – Figure 2.1.1	The figure’s water balance is not consistent with the water balance for the area and that reported on by Aquafor Beech in the report. Evapotranspiration is low and should not be used as typical for this region.

Reference (Pg. #, Fig. #)	Comment
Maps – quarry delineation	The mapping, such as 4.3.3 a and b do not accurately delineate the quarries in the study area and should be correct for a better, more accurate interpretation of their effect on drainage patterns within the watershed.
Page 44	1 st paragraph - The Middle Spencer Creek subwatershed covers 18% of the total Spencer Creek watershed, not 30% as reported. Bullets – it would be appropriate to include the Tier 3 study reports for water sustainability as part of this list.
Page 45 Fig.4.4.1	This figure is not appropriate for the title it has. The figure shows the physiography for the entire Hamilton CA jurisdiction. If a figure is taken from a source protection report it should be properly referenced in the text or redrawn using OGS mapping. The reference for the current figure is “taken from the Assessment Report for the Hamilton Region Source Protection Area, January 2012”. Figure 4.5.3 also shows the physiography of the study area and we question the need for figure 4.4.1. The mapping should be revised to show the quarries.
Pages 47, 48 Figures 4.4.2 and 4.4.3	Again, the quarries should be shown on the mapping and the geology revised. With the new understanding of stratigraphy in the Hamilton area we are surprised to see the use of Amabel Formation and the incorrect use of Lockport Formation. Lockport is a group not a formation and although this is an Earthfx figure it should be corrected.
Page 49, last paragraph	According to our records (Hamilton SPA Assessment Report) there are 37 residences and 144 people relying on Greenville municipal water. Please confirm the numbers used.

Reference (Pg. #, Fig. # Etc.)	Comments
Page 49, last paragraph	Figures 4.4.4 and 4.4.5 should identify the Greensville municipal well and Briencrest communal well locations to set context.
Page 60	Only macro karst features are discussed. Micro karst along the escarpment edge and in the Greensville RSA should also be discussed.
Pages 61 to 64	The geologic units in the text, figures and table are not consistent. The differences should be discussed and since OGS has recently mapped many boreholes in the Hamilton area, their mapping should be used to discuss the geologic conditions of the Greensville area.
Page 65, 1 st paragraph	Support for the following statement is required - "The uppermost weathered 5 metres of bedrock constitutes an aquifer, whether it is Guelph or Eramosa." The preceding sentence indicated that the Eramosa is a regional aquitard. Why is it now an aquifer? And why 5 metres?
Pages 66 and 67, Figures 4.4.14 and 4.4.15	<p>Figures 4.4.14 and 4.4.15 do not represent the actual groundwater flow conditions in the RSA area and they should be revised, as follows:</p> <ul style="list-style-type: none"> • The Lafarge processing area had overburden removed hence cannot have overburden groundwater contours through it. • The Lafarge processing area ground surface is at around 230 - 236 masl elevation. The bedrock groundwater contours on Figure 4.4.15 are some 10 m above the ground surface. • The Lafarge North and South pits and the Dufferin Flamborough pit have not been considered in the groundwater contour mapping, nor have the physiographic features.

Reference (Pg. #, Fig. # Etc.)	Comments
	<ul style="list-style-type: none"> Based on our experience in the area the proposed water level maps lack the required detail to represent the actual groundwater conditions, especially for the RSA study area, i.e. Niagara Escarpment, physiography, bedrock valleys, etc.
Section 4.4.2	Groundwater flow is discussed based on water levels from 11 monitoring wells in overburden and bedrock. This is an insufficient dataset to properly characterize the groundwater conditions in multiple aquifer systems for an area as large as the Greensville RSA.
Section 4.4.2	On Page 56 it is argued that the water levels in nested wells showed a consistent downward gradient from overburden to bedrock, which according to the authors indicates that the aquifers are connected, and on page 65 it is argued that there is little difference between the gradients in overburden and bedrock wells, which again confirms the aquifers are connected. The interpretation and conclusions have to be consistent to be defensible. Also, what should be discussed is the interface aquifer as discussed by Brunton in his recent reports and shown on Figure 4.4.12.
Page 69, last paragraph	Please clarify the text that water level data are available to October 2010 and are included in Table 4.4.5. What was monitored until September 2013? This should be discussed.
Section 4.4.4, Table 4.4.7 and the following discussion	Was the Lafarge quarry location and function considered in the estimates of the lateral flows? Also, the discussion about 14% of available annual groundwater use by the Greensville residents should consider net available groundwater i.e: a net lateral groundwater flow (in and out of the RSA) should be calculated and used. Water returned through septic systems should also be accounted for in the estimate of the total groundwater recharge. Alternatively, a discussion why it is appropriate to use only recharge and groundwater flow into the subwatershed as available groundwater should be provided.

Reference (Pg. #, Fig. # Etc.)	Comments
	Page 71, 5 th paragraph – “groundwater flows downhill into...” should be “groundwater flowing laterally into...”
Page 72, Table 4.4.6	I could not find any support for the use of 6% for infiltration. Please add it based on existing conditions. Also, on page 73, assumptions were made regarding the areas of perviousness and imperviousness. These values should not be assumed, they should be measured using GIS for existing conditions and proposed conditions. These are important considerations for development of the subwatershed. The Tier 3 study estimated stream leakage values, which could be used to enhance the water budget calculation.
Section 4.4.4, page 74, second paragraph	First sentence: “Permits to Take Water (PTTW) from groundwater sources have been controversial, particularly when residential wells run dry.” should be deleted as it is just a subjective opinion. MOECC has the jurisdiction over the PTTW program and tools in place to deal with negative impacts.
Section 4.4.4, page 74	It should be clarified why the permitted water taking discussion states that the actual water taking is unknown for the permitted takings, and then it is followed by Table 4.4.8 showing average withdrawals between 2007 and 2012. The permitted water taking data is available from the MOECC WRS database.
Section 4.4.4, page 74, Table 4.4.8	The summaries of water takings in Table 4.4.8 and data presented on Figure 4.4.17 should consider: <ul style="list-style-type: none"> • The percentage of groundwater vs surface water takings for the reported quarry takings • Water handling at Lafarge quarry. There is only one discharge point out of the entire quarry (via processing area). Pumping from the north and south quarries is internal to their operations

Reference (Pg. #, Fig. # Etc.)	Comments
Page 81, Table 4.4.12	A switch has been made from infiltration to recharge with no discussion of the difference between the two and how recharge was calculated.
Page 81, 2 nd paragraph	We don't believe that the study completed is not detailed enough to make this statement and this has not been proven. This will be a very political statement so must be defensible if it is to remain. The statement should be removed or additional analysis undertaken to prove that this is a true statement. Were local groundwater flow patterns considered, the depth of wells, etc.?
Page 81, 4 th paragraph	Reference is made to the Tier 2 study and is incorrectly cited. The correct reference is "Halton-Hamilton Source Protection Staff, 2010"
Page 82, 2 nd paragraph	<p>It appears that the author is confusing the water budget studies with the delineation of the water quality wellhead protection area for the Greensville well. The first sentence of the 2nd paragraph is incorrect to state "The study entailed a WHPA around the". The water quantity and water quality studies are independent. Earthfx delineated the water quantity WHPAs in 2015 and Earthfx delineated the water quality WHPA in 2010, as referenced. The water quantity WHPAs – WHPA Q1 and Q2 and a discussion of what they represent should be included in this report.</p> <p>Also, the statement that Figure 4.4.23 shows contributions from agricultural nitrate sources is not correct. This figure only shows livestock density. Nitrates also enter the study area from managed lands – manure spreading, fertilizers, NASM, etc. Please revise the statement.</p>

Reference (Pg. #, Fig. # Etc.)	Comments
Page 82, Section 4.4.6	Third paragraph is confusing. It starts with an explanation of backward particle tracking to delineate wellhead protection areas and closes the paragraph describing higher vulnerability areas within the WHPA, while WHPA vulnerability is not discussed until the next paragraph. The Lafarge Processing Area is incorrectly identified as the Lafarge South Quarry.
Pages 87 and 88	<p>The bullet points summarize water quantity and quality and the lead in phrase should be revised accordingly.</p> <p>Point 1 – the calculations made in this study are not detailed enough to draw definite conclusions. Assumptions are made about many things including the 85% return of septic water to the ground. Also the 12% recorded here was 14% on page 73.</p> <p>Point 2 – See our comment above regarding this conclusion – it is not substantiated and should be removed.</p> <p>Point 4 – This report looked at precipitation between 2008 and 2011 not since 2008. Also the conclusion is based on an arbitrary value of 6% infiltration that is not supported.</p> <p>Point 5 - The summary is not clear and should be re-written.</p> <p>Point 6, 2nd line – should be rewritten to – “...Hamilton, which included the Greensville RSA.” The point should be re-written. It mixes up who the study was done for with what it was intended to do.</p> <p>Point 8 – “...although the number of wells...” and “..the Ontario Drinking Water Quality Standard...”</p> <p>Point 11 – reference should be to Halton-Hamilton Source Protection Staff, 2010</p>
Page 245, Section 6.2	<p>It is difficult to review this section since we question the assumptions and calculations made in this report and have not reviewed the Earthfx modelling report.</p> <p>Page 251, last paragraph – the quarries pump out a mixture of direct precipitation, surface water runoff and groundwater.</p>
Page 306, Section 9.2.2	<p>It is difficult to review this section since we question the assumptions and calculations made. A few points are:</p> <p>Table 9.2.3 Water Demand – Existing as a % of all groundwater recharge was reported at 12% on page 87 (first conclusion)</p> <p>Table 9.2.3 Water Demand – Build-out as % of recharge: does not account for increase in imperviousness</p> <p>4th paragraph - 31.5 mm annually should be 15% not 115% of 210 mm</p> <p>What LIDs mitigate the impact of nitrates and how?</p>

Reference (Pg. #, Fig. # Etc.)	Comments

Mid-Spencer/Greenville Rural Settlement Area Subwatershed Study, Draft Final Report dated June 17, 2015 – scoped review of hydrogeology and source protection data

Comment Record

Reference (Pg. #, Fig. #)	Comment
General comment – report format	<p>The randomness of the information presented (maps, figures and tables from different reports) makes the report very confusing. Some of the presented information from referenced reports is outdated or incorrect. Considering that the report is supposed to be a conceptual model, it must be easily understood.</p> <p>The purpose of the geology/hydrogeology sections is to set a defensible conceptual overview as one component of a subwatershed study and a groundwater management plan. The information summarized, and referred to, recent studies by reputable organizations that are neither outdated nor incorrect. The process for presenting the information was developed with City staff who were aware of the overall process including the Source Protection program.</p>
General comment – study area	<p>Although, the scale of this project is explained in Section 1.2 as two distinct study areas: the Greenville Rural Area and Mid-Spencer Creek Subwatershed, it seems that they are used interchangeably at times.</p> <p>The city provided direction to restrict our work to the RSA, stating that the complementary studies by EarthFx would deal with other issues. Both the large subwatershed and the small RSA were treated as separate entities.</p>
General comment - spelling/grammar	<p>It was noticed that “Greenville” is incorrectly spelled as “Greenville” on many figures. The report should be reviewed and edited for missing words, incorrect grammar, tense, plural words, etc. For example, MOE should be MOECC, MNR should be MNRF, Page 1 2nd paragraph 3rd line has a missing word ...area <i>are</i> currently... , etc.</p>

Reference (Pg. #, Fig. #)	Comment
Page 10 and 239 – Figure 2.1.1	<p>The figure's water balance is not consistent with the water balance for the area and that reported on by Aquafor Beech in the report. Evapotranspiration is low and should not be used as typical for this region.</p> <p>The Aquafor Beech water balance is based on accepted practice and is consistent with Earthfx reports and Environment Canada, particularly with respect to ET.</p>
Maps – quarry delineation	<p>The mapping, such as 4.3.3 a and b do not accurately delineate the quarries in the study area and should be correct for a better, more accurate interpretation of their effect on drainage patterns within the watershed.</p> <p>This is not relevant to the purpose of the study. The quarry PTTW and pumping have been noted. The quarry water is pumped to the adjacent Logie's Creed Subwatershed.</p>
Page 44	<p>1st paragraph - The Middle Spencer Creek subwatershed covers 18% of the total Spencer Creek watershed, not 30% as reported.</p> <p>Bullets – it would be appropriate to include the Tier 3 study reports for water sustainability as part of this list.</p> <p>The Tier 3 report was appropriately referenced.</p>
Page 45 Fig.4.4.1	<p>This figure is not appropriate for the title it has. The figure shows the physiography for the entire Hamilton CA jurisdiction. If a figure is taken from a source protection report it should be properly referenced in the text or redrawn using OGS mapping. The reference for the current figure is "taken from the Assessment Report for the Hamilton Region Source Protection Area, January 2012".</p> <p>Figure 4.5.3 also shows the physiography of the study area and we question the need for figure 4.4.1. The mapping should be revised to show the quarries.</p> <p>The figure provides the regional context and was properly referenced to the Source Protection Office. Permission was obtained to use Assessment Report figures in our report.</p>
Pages 47, 48 Figures 4.4.2 and 4.4.3	<p>Again, the quarries should be shown on the mapping and the geology revised.</p> <p>With the new understanding of stratigraphy in the Hamilton area we are surprised to see the use of Amabel Formation and the incorrect use of Lockport Formation. Lockport is a group not a formation and although this is an Earthfx figure it should be corrected.</p> <p>The stratigraphy is consistent with published data and was used in complementary EarthFx studies. The "Lockport Formation" was historically divided into three "Members". Recently the OGS is re-defining it as a "Group" with up to four "Formations." No correction required.</p>

Reference (Pg. #, Fig. #)	Comment
Page 49, last paragraph	<p>According to our records (Hamilton SPA Assessment Report) there are 37 residences and 144 people relying on Greensville municipal water. Please confirm the numbers used.</p> <p>The information used was provided by the City of Hamilton and has been updated.</p>

Reference (Pg. #, Fig. # Etc.)	Comments
Page 49, last paragraph	<p>Figures 4.4.4 and 4.4.5 should identify the Greensville municipal well and Briencrest communal well locations to set context.</p> <p>All wells were shown in the figures to illustrate the density of wells used. The Greensville Municipal Well and Briencrest wells are identified in Figure 4.4.8.</p>
Page 60	<p>Only macro karst features are discussed. Micro karst along the escarpment edge and in the Greensville RSA should also be discussed.</p> <p>The existence and effects of microkarst is not a significant control of the hydrogeology of the RSA.</p>
Pages 61 to 64	<p>The geologic units in the text, figures and table are not consistent. The differences should be discussed and since OGS has recently mapped many boreholes in the Hamilton area, their mapping should be used to discuss the geologic conditions of the Greensville area.</p> <p>The objective of the geology and hydrogeology sections is to set present-day and future implementation of groundwater quantity and quality management, consistent with the terms of reference. The objective was not a state-of-the-art geological synthesis. Frank Brunton's work is properly acknowledged. The OGS hydrogeological monitoring network of 12 wells (established in 2011) extends from Guelph in the south to Warton in the north. In the future, these data will be used for a hydrogeologic characterization work of South Central Ontario.</p>

Reference (Pg. #, Fig. # Etc.)	Comments
Page 65, 1 st paragraph	<p>Support for the following statement is required - "The uppermost weathered 5 metres of bedrock constitutes an aquifer, whether it is Guelph or Eramosa." The preceding sentence indicated that the Eramosa is a regional aquitard. Why is it now an aquifer? And why 5 metres?</p> <p>The uppermost 3-5 metres of weathered and fractured bedrock always serves as a potential aquifer (example: the Contact Zone Aquifer throughout SE Ontario). The 5-metre figure is appropriate and was also used by Earthfx. The Eramosa Formation is a <u>Regional</u> aquitard but also a local aquifer: numerous bedrock wells in the Greensville RSA are cased in the upper Eramosa.</p>
Pages 66 and 67, Figures 4.4.14 and 4.4.15	<p>Figures 4.4.14 and 4.4.15 do not represent the actual groundwater flow conditions in the RSA area and they should be revised, as follows:</p> <ul style="list-style-type: none"> • The Lafarge processing area had overburden removed hence cannot have overburden groundwater contours through it. • The Lafarge processing area ground surface is at around 230 - 236 masl elevation. The bedrock groundwater contours on Figure 4.4.15 are some 10 m above the ground surface. • The Lafarge North and South pits and the Dufferin Flamborough pit have not been considered in the groundwater contour mapping, nor have the physiographic features. • Based on our experience in the area the proposed water level maps lack the required detail to represent the actual groundwater conditions, especially for the RSA study area, i.e. Niagara Escarpment, physiography, bedrock valleys, etc. <p>The contours were derived from the entire water well record (spanning more than 60 years (and extrapolated to cover the RSA). The contours provide a defensible and representative regional groundwater flow pattern. This is sufficiently detailed for the goals of the study. No revisions are necessary.</p>
Section 4.4.2	<p>Groundwater flow is discussed based on water levels from 11 monitoring wells in overburden and bedrock. This is an insufficient dataset to properly characterize the groundwater conditions in multiple aquifer systems for an area as large as the Greensville RSA.</p> <p>Our proposal was limited to these 11 wells which were (of necessity) drilled on public lands. The work program was discussed with the HCA and City staff. Again, the level of detail is appropriate to the goal of the study.</p>

Reference (Pg. #, Fig. # Etc.)	Comments
Section 4.4.2	<p>On Page 56 it is argued that the water levels in nested wells showed a consistent downward gradient from overburden to bedrock, which according to the authors indicates that the aquifers are connected, and on page 65 it is argued that there is little difference between the gradients in overburden and bedrock wells, which again confirms the aquifers are connected. The interpretation and conclusions have to be consistent to be defensible. Also, what should be discussed is the interface aquifer as discussed by Brunton in his recent reports and shown on Figure 4.4.12.</p> <p>The gradients are small, seasonally neutral, but consistently downward.</p>
Page 69, last paragraph	<p>Please clarify the text that water level data are available to October 2010 and are included in Table 4.4.5. What was monitored until September 2013? This should be discussed.</p> <p>The 2013 data were collected by the City of Hamilton and do not have water levels.</p>
Section 4.4.4, Table 4.4.7 and the following discussion	<p>Was the Lafarge quarry location and function considered in the estimates of the lateral flows? Also, the discussion about 14% of available annual groundwater use by the Greensville residents should consider net available groundwater i.e: a net lateral groundwater flow (in and out of the RSA) should be calculated and used. Water returned through septic systems should also be accounted for in the estimate of the total groundwater recharge. Alternatively, a discussion why it is appropriate to use only recharge and groundwater flow into the subwatershed as available groundwater should be provided.</p> <p>The lateral flows into, and through, and out of the quarries were discussed in detail in the EarthFx Tier 3 report and are not repeated here, as quarry water is pumped into the adjacent Logie's Creek Subwatershed. The groundwater inflows through the RSA were grossly estimated by Darcy's Law using slope, aquifer thickness, width and estimated hydraulic conductivity. The number used for groundwater recharge from streams is small and consistent with the GSFLOW model in the Tier 3 study. This level of detail is appropriate to derive the water balance.</p> <p>Page 71, 5th paragraph – "groundwater flows downhill into..." should be "groundwater flowing laterally into..."</p> <p>Non-technical readers understand that water flows downhill.</p>

Reference (Pg. #, Fig. # Etc.)	Comments
Page 72, Table 4.4.6	<p>I could not find any support for the use of 6% for infiltration. Please add it based on existing conditions. Also, on page 73, assumptions were made regarding the areas of perviousness and imperviousness. These values should not be assumed, they should be measured using GIS for existing conditions and proposed conditions. These are important considerations for development of the subwatershed. The Tier 3 study estimated stream leakage values, which could be used to enhance the water budget calculation.</p> <p>The figure is 60%, not 6%. It is an estimate based on topography and soils. The pervious/impervious are defensible estimates that are appropriate for the hydrogeologic objective of the study, which is to preserve groundwater recharge and develop best practices for stormwater management.</p>
Section 4.4.4, page 74, second paragraph	<p>First sentence: "Permits to Take Water (PTTW) from groundwater sources have been controversial, particularly when residential wells run dry." should be deleted as it is just a subjective opinion. MOECC has the jurisdiction over the PTTW program and tools in place to deal with negative impacts.</p> <p>Agreed; however this "subjective opinion" was raised by the residents during public meetings and will not be edited out.</p>
Section 4.4.4, page 74	<p>It should be clarified why the permitted water taking discussion states that the actual water taking is unknown for the permitted takings, and then it is followed by Table 4.4.8 showing average withdrawals between 2007 and 2012. The permitted water taking data is available from the MOECC WRS database.</p> <p>We have both permitted and actual withdrawals under PTTWs.</p>
Section 4.4.4, page 74, Table 4.4.8	<p>The summaries of water takings in Table 4.4.8 and data presented on Figure 4.4.17 should consider:</p> <ul style="list-style-type: none"> • The percentage of groundwater vs surface water takings for the reported quarry takings • Water handling at Lafarge quarry. There is only one discharge point out of the entire quarry (via processing area). Pumping from the north and south quarries is internal to their operations <p>These breakdowns are discussed in the Tier 3 study and do not change anything. Water handling (surface and groundwater) from the North to South Quarry to the Processing Area is discharged to the Logie's Creek Subwatershed.</p>

Reference (Pg. #, Fig. # Etc.)	Comments
Page 81, Table 4.4.12	<p>A switch has been made from infiltration to recharge with no discussion of the difference between the two and how recharge was calculated.</p> <p>These terms are equivalent in terms of surface water infiltrating through soil and recharging aquifers.</p>
Page 81, 2 nd paragraph	<p>We don't believe that the study completed is not detailed enough to make this statement and this has not been proven. This will be a very political statement so must be defensible if it is to remain. The statement should be removed or additional analysis undertaken to prove that this is a true statement. Were local groundwater flow patterns considered, the depth of wells, etc.?</p> <p>The statement that "1 out of every 6 litres of groundwater within the RSA could come from someone else's septic system" remains a valid working hypothesis and will not be removed.</p>
Page 81, 4 th paragraph	<p>Reference is made to the Tier 2 study and is incorrectly cited. The correct reference is "Halton-Hamilton Source Protection Staff, 2010"</p>
Page 82, 2 nd paragraph	<p>It appears that the author is confusing the water budget studies with the delineation of the water quality wellhead protection area for the Greensville well. The first sentence of the 2nd paragraph is incorrect to state "The study entailed a WHPA around the". The water quantity and water quality studies are independent. Earthfx delineated the water quantity WHPAs in 2015 and Earthfx delineated the water quality WHPA in 2010, as referenced. The water quantity WHPAs – WHPA Q1 and Q2 and a discussion of what they represent should be included in this report.</p> <p>Reference is made to the Tier 3 study by EarthFx in 2015, which was published after the June 17 draft. WHPA Q1 is defined as "<i>...being the combined area that is the cone of influence of the well and the whole of the cones of influence of all other wells that intersect that area, whereas the Q2 "...being the [WHPA-Q1] area and any area where a future reduction in recharge would significantly impact that area."</i> The consequences with regard to Greensville RSA are implicit in the EarthFx times-of-travel of groundwater from point of recharge to water wells, discussed in Section 6 of our report.</p> <p>Also, the statement that Figure 4.4.23 shows contributions from agricultural nitrate sources is not correct. This figure only shows livestock density. Nitrates also enter the study area from managed lands – manure spreading, fertilizers, NASM, etc. Please revise the statement.</p>

Reference (Pg. #, Fig. # Etc.)	Comments
	<p>One major source of nitrate contribution (and bacteria) are exemplified by one figure of livestock density. More detail is available in the referenced Assessment Report.</p>
<p>Page 82, Section 4.4.6</p>	<p>Third paragraph is confusing. It starts with an explanation of backward particle tracking to delineate wellhead protection areas and closes the paragraph describing higher vulnerability areas within the WHPA, while WHPA vulnerability is not discussed until the next paragraph. The Lafarge Processing Area is incorrectly identified as the Lafarge South Quarry.</p> <p>The 3rd paragraph explains the procedure to arrive at the WHPA.</p>
<p>Pages 87 and 88</p>	<p>The bullet points summarize water quantity and quality and the lead in phrase should be revised accordingly.</p> <p>Point 1 – the calculations made in this study are not detailed enough to draw definite conclusions. Assumptions are made about many things including the 85% return of septic water to the ground. Also the 12% recorded here was 14% on page 73.</p> <p>Point 2 – See our comment above regarding this conclusion – it is not substantiated and should be removed.</p> <p>Point 4 – This report looked at precipitation between 2008 and 2011 not since 2008. Also the conclusion is based on an arbitrary value of 6% infiltration that is not supported.</p> <p>Point 5 - The summary is not clear and should be re-written.</p> <p>Point 6, 2nd line – should be rewritten to – “...Hamilton, which included the Greenville RSA.” The point should be re-written. It mixes up who the study was done for with what it was intended to do.</p> <p>Point 8 – “...although the number of wells...” and “..the Ontario Drinking Water Quality Standard...”</p> <p>Point 11 – reference should be to Halton-Hamilton Source Protection Staff, 2010</p> <p>No changes to the conclusions. The assumptions (e.g. 85% of water is returned is to the soil) excludes such activities as hosing down driveways, washing cars etc.).</p>

Reference (Pg. #, Fig. # Etc.)	Comments
Page 245, Section 6.2	<p>It is difficult to review this section since we question the assumptions and calculations made in this report and have not reviewed the Earthfx modelling report.</p> <p>Page 251, last paragraph – the quarries pump out a mixture of direct precipitation, surface water runoff and groundwater.</p> <p>We stand by our assumptions and calculations.</p>
Page 306, Section 9.2.2	<p>It is difficult to review this section since we question the assumptions and calculations made. A few points are:</p> <p>Table 9.2.3 Water Demand – Existing as a % of all groundwater recharge was reported at 12% on page 87 (first conclusion)</p> <p>Table 9.2.3 Water Demand – Build-out as % of recharge: does not account for increase in imperviousness</p> <p>4th paragraph - 31.5 mm annually should be 15% not 115% of 210 mm</p> <p>What LIDs mitigate the impact of nitrates and how?</p> <p>The shortfall of recharge at residential build-out under private services is estimated to be 600 square metres or 15% of a 4,000 square metre lot.</p> <p>Nitrate is a conservative species (like chloride) that can only be removed from the water cycle by plant roots. LIDs that promote vegetative uptake of nitrogen improve water quality.</p>

Niagara Escarpment Commission

Mid-Spencer/Greensville Rural Settlement Area Subwatershed Study

DRAFT FINAL REPORT - June 17, 2015

Comment Record – Niagara Escarpment Commission

Reference	Comments
Executive Summary	Include a schedule from the Niagara Escarpment Plan showing the Plan designations and Greensville Minor Urban Centre boundaries
Study Area p.1	Should reference the Niagara Escarpment as a feature in the study area
Figure 4.6.6	It would be informative to show the potential new development areas and the Species at Risk on the same map to flag potential conflicts. NEP policy, Part 2.8 prohibits development in the habitat of endangered species.
P. 185	In the commentary on Jefferson Salamander, there is no conclusion indicating what next steps, management action is recommended as there is in the description for other species. Has the habitat of this endangered species been included in the NHS? (PPS 2014 Part. 2.1.7)
P. 188	Update reference to PPS 2014 as it relates to fish habitat.
P. 222	The citation for the NEP policies should be Niagara Escarpment Plan 2005 (not Niagara Escarpment Commission). “Natural Area” should be “Escarpment Natural Area”, “Rural Area” should be “Escarpment Rural Area”. Policies should be listed from most to least restrictive. It would be appropriate to cite the Objectives for each designation (rather than paraphrasing). Since the list of permitted uses is not a complete list, the text should say “including but not limited to”. If it would be helpful, NEC staff can provide an appropriate synopsis of the relevant policies for inclusion in the document.
P. 260	Aggregate extraction is included in the list of “management actions”. A management action relating to aggregate extraction could be to consider how to work with the quarries to promote progressive rehabilitation and appropriate after uses that would be supportive of the restoration of the natural environment.
P. 268	Reference should be made to PPS 2014 not 2005.
P. 269	There may be alternatives that are impacted by the Niagara Escarpment Planning and Development Act

	and so this could be mentioned here.
p. 340	As portions of the Greenville Minor Urban Centre are within Development Control, it is appropriate to note that approvals might be necessary from the NEC.



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23 March 2016

Ms. Nancy Mott, MCIP, RPP
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Niagara Escarpment Commission
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Dear Ms. Mott,

Subject: **Response to NEC comments on Mid-Spencer/Greenville RSA
Subwatershed Study DRAFT FINAL REPORT – June 17, 2015**

The Niagara Escarpment Commission (NEC) has reviewed and submitted comments on the *Draft Final Report: Mid-Spencer/Greenville Rural Settlement Area Subwatershed Study*, prepared for the City of Hamilton by Aquafor Beech Limited, dated 17 June 2015.

The comments received are listed below and a reply is also presented; confirmation of any changes to the Report is also included below with reference to the pages or sections that were modified:

1. Executive Summary - Include a schedule from the Niagara Escarpment Plan showing the Plan designations and Greenville Minor Urban Centre boundaries
Response (R) –Please see pg. 6 of the executive summary and Figure 1.2.2 of the report.
2. Study Area p.1 - Should reference the Niagara Escarpment as a feature in the study area
R – This addition is made (see last paragraph of Section 1.2).
3. Figure 4.6.6 - It would be informative to show the potential new development areas and the Species at Risk on the same map to flag potential conflicts. NEP policy, Part 2.8 prohibits development in the habitat of endangered species.
R – This figure is updated to include development areas.
4. On page 185 in the commentary on Jefferson Salamander, there is no conclusion indicating what next steps, management action is recommended as there is in the

description for other species. Has the habitat of this endangered species been included in the NHS? (PPS 2014 Part. 2.1.7)

R - Conservation Hamilton is currently monitoring for JESA and is collaborating with the MNR. To date, JESA has not been found in the pond. Please see pg. 187, Table 4.7.3 for further info.

In addition, Aquafor has discussed with HCA and the City how JESA should be addressed in the report. It was decided that potential JESA habitat was not going to be illustrated on maps nor mentioned in writing aside from the general statement in Table 4.7.3. The report requires a water balance to be completed for the pond HCA is monitoring (pgs. 258 and 354); the vernal pond and surrounding woodland are included within the NHS.

5. Page 188 - Update reference to PPS 2014 as it relates to fish habitat.

R – The definition in Section 4.7.2.1.2 was updated accordingly.

6. Page 222 - The citation for the NEP policies should be Niagara Escarpment Plan 2005 (not Niagara Escarpment Commission). "Natural Area" should be "Escarpment Natural Area", "Rural Area" should be "Escarpment Rural Area". Policies should be listed from most to least restrictive. It would be appropriate to cite the Objectives for each designation (rather than paraphrasing). Since the list of permitted uses is not a complete list, the text should say "including but not limited to". If it would be helpful, NEC staff can provide an appropriate synopsis of the relevant policies for inclusion in the document.

R - Thank you. Aquafor Beech Limited would appreciate a synopsis from the NEC for addition into the document. References to the ENA, ERA have been made (see pgs. 225-6).

7. Page 260 - Aggregate extraction is included in the list of "management actions". A management action relating to aggregate extraction could be to consider how to work with the quarries to promote progressive rehabilitation and appropriate after uses that would be supportive of the restoration of the natural environment.

R - The report is updated accordingly (pg. 268).

8. Page 268 - Reference should be made to PPS 2014 not 2005.

R - The entire report is updated accordingly.

9. Page 269 - There may be alternatives that are impacted by the Niagara Escarpment Planning and Development Act and so this could be mentioned here.

R - The report is updated accordingly (pg. 270).

10. Page 340 - As portions of the Greensville Minor Urban Centre are within Development Control, it is appropriate to note that approvals might be necessary from the NEC.

R - The report is updated accordingly (Tables 10.4.2 and 10.4.4).

Trusting that the information provided in this document is satisfactory in answering NEC's comments, please don't hesitate to contact if further information is required.

Regards,

A handwritten signature in blue ink, appearing to read "Marco Silverio". The signature is fluid and cursive, with a large initial "M" and a long, sweeping underline.

Marco Silverio, M.Sc.
Project Manager, Sustainable Initiatives
Hamilton Water, City of Hamilton

Ministry of Natural Resources and Forestry

August 28, 2015

Marco Silverio
PM-Source Protection Planning
Sustainable Initiatives
City of Hamilton | Public Works Department
77 James Street North, Suite 400
Hamilton, ON L8R 2K3

**Re: Mid-Spencer/Greensville Rural Settlement Area Subwatershed Study – June 17, 2015
Draft – City of Hamilton – MNR Comments August 2015**

Mr. Silverio,

The Ministry of Natural Resources and Forestry (MNR) Guelph District can confirm receipt of the final draft Mid-Spencer/Greensville Rural Settlement Area Subwatershed Study (“the Study”) prepared by Aquafor Beech Limited. The draft circulated for comment is dated June 17, 2015. MNR staff have had an opportunity to review the final draft and can offer the project team the following technical comments for consideration.

MNR Comments

- It has been noted by MNR staff that bat surveys were not undertaken as part of the biological field surveys for the subwatershed study. We also note that Table 4.6.23 and Table 4.7.3 indicate that Little Brown Bat (Endangered) was confirmed within the study area through the City of Hamilton Natural Areas Inventory (2014). It is recommended that the Study identify that bat surveys may be undertaken, as appropriate, at subsequent planning stages in accordance with MNR Guelph District’s bat survey protocol. This comment could be included in Table 4.7.3 (similar to the recommendation made for Butternut in Table 4.7.3).

In addition, there are SAR bats included on the municipal list that are “suspected to occur” in Hamilton. It is recommended that a review of the probability of these species occurring within the study area be undertaken. If it is suspected that these species may occur in the Greensville Rural Settlement Area (GRSA), it is recommended that they be included in Table 4.7.3.

- MNR staff note that the Guelph District’s SAR database shows a 2012 record within the subwatershed study area submitted by the Hamilton Conservation Authority for Whip-poor-will (Threatened). The Study does not appear to include this information (e.g. Table 4.6.23).
- According to MNR records, there are potential breeding ponds for Jefferson Salamander within the GRSA that were surveyed by Hamilton Conservation Authority (HCA) staff in 2013

(negative search results). In accordance with the Recovery Strategy for this species, a minimum of three years of negative searches is required to conclude the absence of breeding habitat. It is recommended that the project team for the Study confirm the number of years HCA staff surveyed for Jefferson Salamander within the GRSA and if additional work is required to confirm presence/absence of the species in support of the Study or during subsequent planning stages.

- MNRF staff have reviewed provincial wetland mapping (available online: <https://www.ontario.ca/environment-and-energy/make-natural-heritage-area-map>) as a comparison to the wetlands identified in Figure 4.7.4 of the Study. It appears that not all unevaluated wetlands have been identified in Figure 4.7.4. It is recommended that the project team consider including all unevaluated wetlands within the GRSA, in addition to nearby unevaluated and Provincially Significant Wetlands outside of the GRSA (e.g. the Hayes and Christie Wetland Complex to the west of the GRSA).

It is also recommended that the project team review the wetland numbering system used in Figure 4.7.4 of the Study for accuracy and completeness. For example, the Study identifies that there are eight discrete wetland areas (Wetlands 1-8). However, Figure 4.7.4 of the Study includes the number 9, excludes wetland number 8, and identifies two separate wetlands as number 5.

- A number of SAR records identified through the Study that are not included in the District's database and are currently not available through the NHIC data records (e.g. SAR shown on Figure 4.6.6). In order to assist the Ministry with screening projects in this area, it would be appreciated if the project team could provide these SAR records with their spatial coordinates to the Guelph District office.
- MNRF staff have identified that the Mid-Spencer Creek Subwatershed Boundary and GRSA are within the Greenbelt Plan Area. Based on Greenbelt Plan mapping, it appears that a small portion of the GRSA is designated Natural Heritage System, in addition to Protected Countryside and Niagara Escarpment Plan Area. These designations are also relevant to the broader Mid-Spencer Creek Subwatershed Boundary. MNRF staff recommend that a section regarding the Greenbelt Plan be included in the Provincial Context of Section 4.7. In addition, it is recommended that the project team consider including a reference to Greenbelt Plan policies that may be relevant to future development in the GRSA (such as Sections 3.2.2 Natural Heritage System Policies and 3.2.4 Key Hydrologic Features Policies).
- A number of definitions included in the Study that are referenced from the City of Hamilton's Official Plan are also definitions from the 2005 Provincial Policy Statement (PPS). MNRF staff recommend that the Study include a note identifying that these definitions may have been modified in the 2014 PPS. Alternatively, the Study could use definitions directly from the 2014 PPS.

Please contact the undersigned if you have questions or if clarification is required.

Regards,



Tara McKenna, District Planner
Ministry of Natural Resources and Forestry, Guelph District
1 Stone Road West
Guelph, ON, N1G 4Y2
Phone: (519) 826-4912

cc Dave Marriott, District Planner, MNRF
Ian Thornton, Resources Operations Supervisor, MNRF
Anne Marie Laurence, Management Biologist, MNRF
Lorraine Norminton, Partnership Specialist, MNRF



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23 March 2016

Ms. Tara McKenna
District Planner
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1 Stone Road West, Guelph, ON N1G 4Y2

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Email: Tara.McKenna@ontario.ca

Dear Ms. McKenna,

Subject: **Response to MNRF comments on Mid-Spencer/Greensville RSA
Subwatershed Study DRAFT FINAL REPORT – June 17, 2015**

The Ministry of Natural Resources and Forestry (MNRF) has reviewed and submitted comments on the *Draft Final Report: Mid-Spencer/Greensville Rural Settlement Area Subwatershed Study*, prepared for the City of Hamilton by Aquafor Beech Limited, dated 17 June 2015.

The comments received are listed below and a reply is also presented; confirmation of any changes to the Report is also included below with reference to the pages or sections that were modified:

1. It has been noted by MNRF staff that bat surveys were not undertaken as part of the biological field surveys for the subwatershed study. We also note that Table 4.6.23 and Table 4.7.3 indicate that Little Brown Bat (Endangered) was confirmed within the study area through the City of Hamilton Natural Areas Inventory (2014). It is recommended that the Study identify that bat surveys may be undertaken, as appropriate, at subsequent planning stages in accordance with MNRF Guelph District's bat survey protocol. This comment could be included in Table 4.7.3 (similar to the recommendation made for Butternut in Table 4.7.3).

Response (R) – The Final Report includes recommendations for bat surveys at future planning stages (Tables 4.7.3 and 10.4.4).

2. In addition, there are SAR bats included on the municipal list that are "suspected to occur" in Hamilton. It is recommended that a review of the probability of these species occurring within the study area be undertaken. If it is suspected that these species may occur in the Greensville Rural Settlement Area (GRSA), it is recommended that they be included in Table 4.7.3.

R – A screening review is included in the Report (Table 4.7.3).

3. MNRF staff note that the Guelph District's SAR database shows a 2012 record within the subwatershed study area submitted by the Hamilton Conservation Authority for Whip-poor-will (Threatened). The Study does not appear to include this information (e.g. Table 4.6.23).

R – Staff was unaware of this new species record at the time of writing. Aquafor has since contacted the HCA and included the observation in the report (Table 4.2.23). A single male was heard in the Donald Farm Complex ESA; this record does not affect the RSA or the boundaries of the NHS.

4. According to MNRF records, there are potential breeding ponds for Jefferson Salamander within the GRSA that were surveyed by Hamilton Conservation Authority (HCA) staff in 2013 (negative search results). In accordance with the Recovery Strategy for this species, a minimum of three years of negative searches is required to conclude the absence of breeding habitat. It is recommended that the project team for the Study confirm the number of years HCA staff surveyed for Jefferson Salamander within the GRSA and if additional work is required to confirm presence/absence of the species in support of the Study or during subsequent planning stages.

R - Aquafor contacted the Hamilton Conservation Authority for details. It is understood that the HCA will undertake further monitoring. As discussed with HCA and the City of Hamilton, the report will not make specific mention of JESA nor will it show the vernal pool as potential habitat. The report has included the need for an EIS to determine potential impacts to the pond (e.g. water balance) and surrounding forest at a future planning stage. Please see pgs 187, 258, and 354 of the report.

5. MNRF staff have reviewed provincial wetland mapping (available online: <https://www.ontario.ca/environment-and-energy/make-natural-heritage-area-map>) as a comparison to the wetlands identified in Figure 4.7.4 of the Study. It appears that not all unevaluated wetlands have been identified in Figure 4.7.4. It is recommended that the project team consider including all unevaluated wetlands within the GRSA, in addition to nearby unevaluated and Provincially Significant Wetlands outside of the GRSA (e.g. the Hayes and Christie Wetland Complex to the west of the GRSA).

R – The wetland map can be updated pending receipt of updated wetland mapping from the City of Hamilton. The revised map can show wetlands that were identified as part of this study as well as evaluated and unevaluated wetland layers from the City/MNRF. Please note that the wetland mapping available online is outdated; some wetlands on this map are no longer present on the landscape.

6. It is also recommended that the project team review the wetland numbering system used in Figure 4.7.4 of the Study for accuracy and completeness. For example, the Study identifies that there are eight discrete wetland areas (Wetlands 1-8). However, Figure 4.7.4 of the Study includes the number 9, excludes wetland number 8, and identifies two separate wetlands as number 5.

R - Wetland label #5 (nearest to wetland #3) should not have been included on the figure. Wetland #9 should have been labelled as #8.

7. A number of SAR records identified through the Study that are not included in the District's database and are currently not available through the NHIC data records (e.g. SAR shown on Figure 4.6.6). In order to assist the Ministry with screening projects in this area, it would be appreciated if the project team could provide these SAR records with their spatial coordinates to the Guelph District office.

R - SAR records will be sent to the City of Hamilton for dissemination.

8. MNRF staff have identified that the Mid-Spencer Creek Subwatershed Boundary and GRSA are within the Greenbelt Plan Area. Based on Greenbelt Plan mapping, it appears that a small portion of the GRSA is designated Natural Heritage System, in addition to Protected Countryside and Niagara Escarpment Plan Area. These designations are also relevant to the broader Mid-Spencer Creek Subwatershed Boundary. MNRF staff recommend that a section regarding the Greenbelt Plan be included in the Provincial Context of Section 4.7. In addition, it is recommended that the project team consider including a reference to Greenbelt Plan policies that may be relevant to future development in the GRSA (such as Sections 3.2.2 Natural Heritage System Policies and 3.2.4 Key Hydrologic Features Policies).

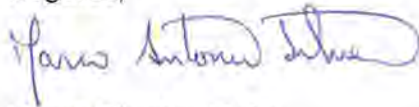
R - The appropriate updates are included in the report (Section 4.7, and pages 173, 192, 194, 214-218, 225-226, & 269).

9. A number of definitions included in the Study that are referenced from the City of Hamilton's Official Plan are also definitions from the 2005 Provincial Policy Statement (PPS). MNRF staff recommend that the Study include a note identifying that these definitions may have been modified in the 2014 PPS. Alternatively, the Study could use definitions directly from the 2014 PPS.

R – The entire report has been updated to include definitions from the 2014 PPS.

Trusting that the information provided in this document is satisfactory in answering MNRF's comments, please don't hesitate to contact if further information is required.

Regards,



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