Appendix A:
Traffic Counts

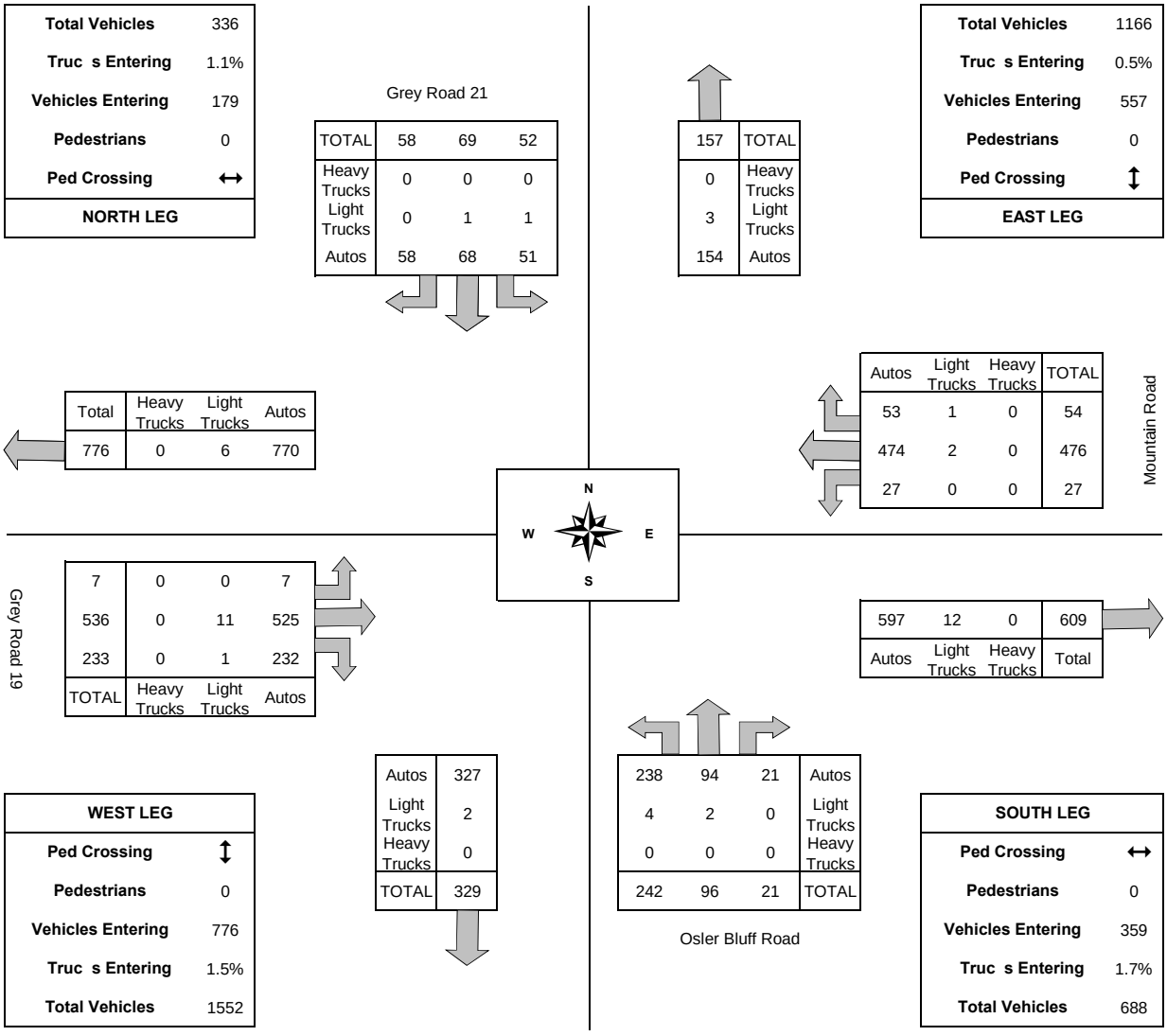
C.C.Tatham & Associates Ltd.
Consulting Engineers

INTERSECTION COUNT
FRIDAY PEAK HOUR

GENERAL INFORMATION

Surveyor Name	John Jardine	**Jurisdiction/Date**	Town of the Blue Mountains	January 28 2011
Weather Conditions	-2, snowing	**Major Street**	Grey Rd 19/Mountain Rd	E-W
Project Name	Georgian Gate	**Minor Street**	Grey Rd 21/Osler Bluff Rd	N-S
Project Number	107067	**Intersection Control**	traffic signal	

Additional Comments



16:00 to **1 :00**

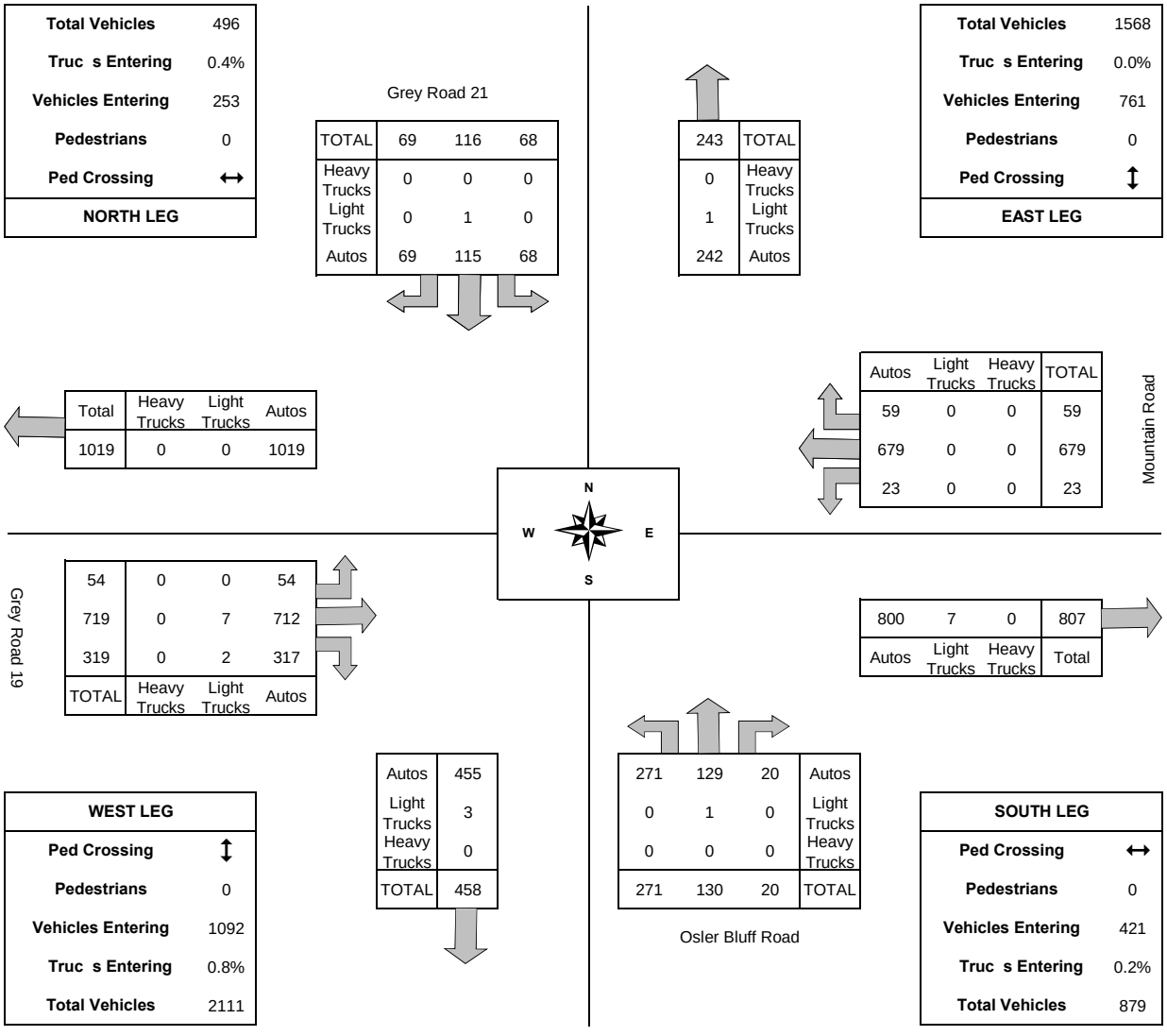
C.C.Tatham & Associates Ltd.
Consulting Engineers

INTERSECTION COUNT
SATURDAY PEAK HOUR

GENERAL INFORMATION

Surveyor Name	John Jardine	**Jurisdiction/Date**	Town of the Blue Mountains	January 29 2011
Weather Conditions	-2, snowing	**Major Street**	Grey Rd 19/Mountain Rd	E-W
Project Name	Georgian Gate	**Minor Street**	Grey Rd 21/Osler Bluff Rd	N-S
Project Number	107067	**Intersection Control**	traffic signal	

Additional Comments



16:15 to **1 :15**

C.C.Tatham & Associates Ltd.
Consulting Engineers

INTERSECTION COUNT
FRIDAY PEAK HOUR

GENERAL INFORMATION

Surveyor Name	Sheldon Hancock/Nick Schreiner	**Jurisdiction/Date**	Town of the Blue Mountains	Fri Feb 28/14
Weather Conditions	-10	**Major Street**	Grey Rd 19/Mountain Rd	E-W
Project Name	Windfall Medium Density	**Minor Street**	Grey Rd 21/Osler Bluff Rd	N-S
Project Number	113129	**Intersection Control**	traffic signal	

Additional Comments

Total Vehicles	293
% Trucks Entering	1.4%
Vehicles Entering	148
Pedestrians	0
Ped Crossing	↔
NORTH LEG	

Grey Road 21

TOTAL	19	76	53
Heavy Trucks	0	0	0
Light Trucks	1	1	0
Autos	18	75	53

Total Vehicles	868
% Trucks Entering	0.0%
Vehicles Entering	372
Pedestrians	0
Ped Crossing	↕
EAST LEG	

145	TOTAL
0	Heavy Trucks
0	Light Trucks
145	Autos

Total	Heavy Trucks	Light Trucks	Autos
439	0	1	438

Autos	Light Trucks	Heavy Trucks	TOTAL
52	0	0	52
302	0	0	302
18	0	0	18

Mountain Road

N
W E
S

Grey Road 19

27	0	0	27
427	0	10	417
169	0	4	165
TOTAL	Heavy Trucks	Light Trucks	Autos

486	10	0	496
Autos	Light Trucks	Heavy Trucks	Total

Autos	258
Light Trucks	5
Heavy Trucks	0
TOTAL	263

118	66	16	Autos
0	0	0	Light Trucks
0	0	0	Heavy Trucks
118	66	16	TOTAL

Osler Bluff Road

WEST LEG	
Ped Crossing	↕
Pedestrians	0
Vehicles Entering	623
% Trucks Entering	2.2%
Total Vehicles	1062

SOUTH LEG	
Ped Crossing	↔
Pedestrians	0
Vehicles Entering	200
% Trucks Entering	0.0%
Total Vehicles	463

Fri Feb 28/14 **16:30** to **17:30**

C.C.Tatham & Associates Ltd.
Consulting Engineers

INTERSECTION COUNT
SATURDAY PEAK HOUR

GENERAL INFORMATION

Surveyor Name	Sheldon Hancock/Nick Schreiner	**Jurisdiction/Date**	Town of the Blue Mountains	Sat Mar 1/14
Weather Conditions	-10	**Major Street**	Grey Rd 19/Mountain Rd	E-W
Project Name	Windfall Medium Density	**Minor Street**	Grey Rd 21/Osler Bluff Rd	N-S
Project Number	113129	**Intersection Control**	traffic signal	

Additional Comments

NORTH LEG	
Total Vehicles	484
% Trucks Entering	0.4%
Vehicles Entering	259
Pedestrians	0
Ped Crossing	↔

Grey Road 21

TOTAL	36	183	40
Heavy Trucks	0	0	0
Light Trucks	0	0	1
Autos	36	183	39

225	TOTAL
2	Heavy Trucks
1	Light Trucks
222	Autos

EAST LEG	
Total Vehicles	946
% Trucks Entering	0.6%
Vehicles Entering	464
Pedestrians	0
Ped Crossing	↕

Total	Heavy Trucks	Light Trucks	Autos
573	0	0	573

Autos	Light Trucks	Heavy Trucks	TOTAL
34	1	2	37
364	0	0	364
63	0	0	63

Mountain Road

N
W E
S

Grey Road 19

46	0	0	46
399	0	5	394
156	0	1	155
TOTAL	Heavy Trucks	Light Trucks	Autos

476	6	0	482
Autos	Light Trucks	Heavy Trucks	Total

Autos	401
Light Trucks	1
Heavy Trucks	0
TOTAL	402

173	142	43	Autos
0	0	0	Light Trucks
0	0	0	Heavy Trucks
173	142	43	TOTAL

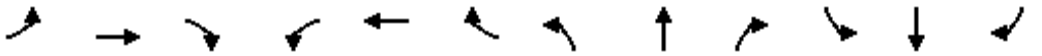
Osler Bluff Road

WEST LEG	
Ped Crossing	↕
Pedestrians	0
Vehicles Entering	601
% Trucks Entering	1.0%
Total Vehicles	1174

SOUTH LEG	
Ped Crossing	↔
Pedestrians	0
Vehicles Entering	358
% Trucks Entering	0.0%
Total Vehicles	760

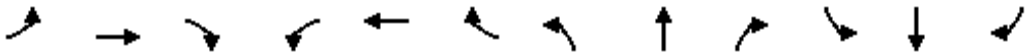
Sat Mar 1/14 **16:00** to **17:00**

Appendix B:
Existing Traffic Operations



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	536	233	27	476	57	242	96	21	52	69	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		3.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.99		1.00	0.97		1.00	0.93	
Flt Protected		1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1862	1583		1833		1770	1813		1770	1736	
Flt Permitted		0.99	1.00		0.84		0.57	1.00		0.68	1.00	
Satd. Flow (perm)		1848	1583		1546		1054	1813		1263	1736	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	7	564	245	28	501	60	255	101	22	55	73	61
RTOR Reduction (vph)	0	0	147	0	7	0	0	12	0	0	46	0
Lane Group Flow (vph)	0	571	98	0	582	0	255	111	0	55	88	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		25.3	25.3		25.3		26.1	26.1		16.1	16.1	
Effective Green, g (s)		25.3	25.3		25.3		26.1	26.1		16.1	16.1	
Actuated g/C Ratio		0.40	0.40		0.40		0.41	0.41		0.25	0.25	
Clearance Time (s)		6.0	6.0		6.0		3.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		737	631		616		512	746		320	440	
v/s Ratio Prot							c0.05	0.06			0.05	
v/s Ratio Perm		0.31	0.06		c0.38		c0.15			0.04		
v/c Ratio		0.77	0.15		0.95		0.50	0.15		0.17	0.20	
Uniform Delay, d1		16.6	12.2		18.4		12.9	11.7		18.4	18.6	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.1	0.1		23.4		0.8	0.4		1.2	1.0	
Delay (s)		21.7	12.3		41.8		13.7	12.1		19.6	19.6	
Level of Service		C	B		D		B	B		B	B	
Approach Delay (s)		18.9			41.8			13.2			19.6	
Approach LOS		B			D			B			B	

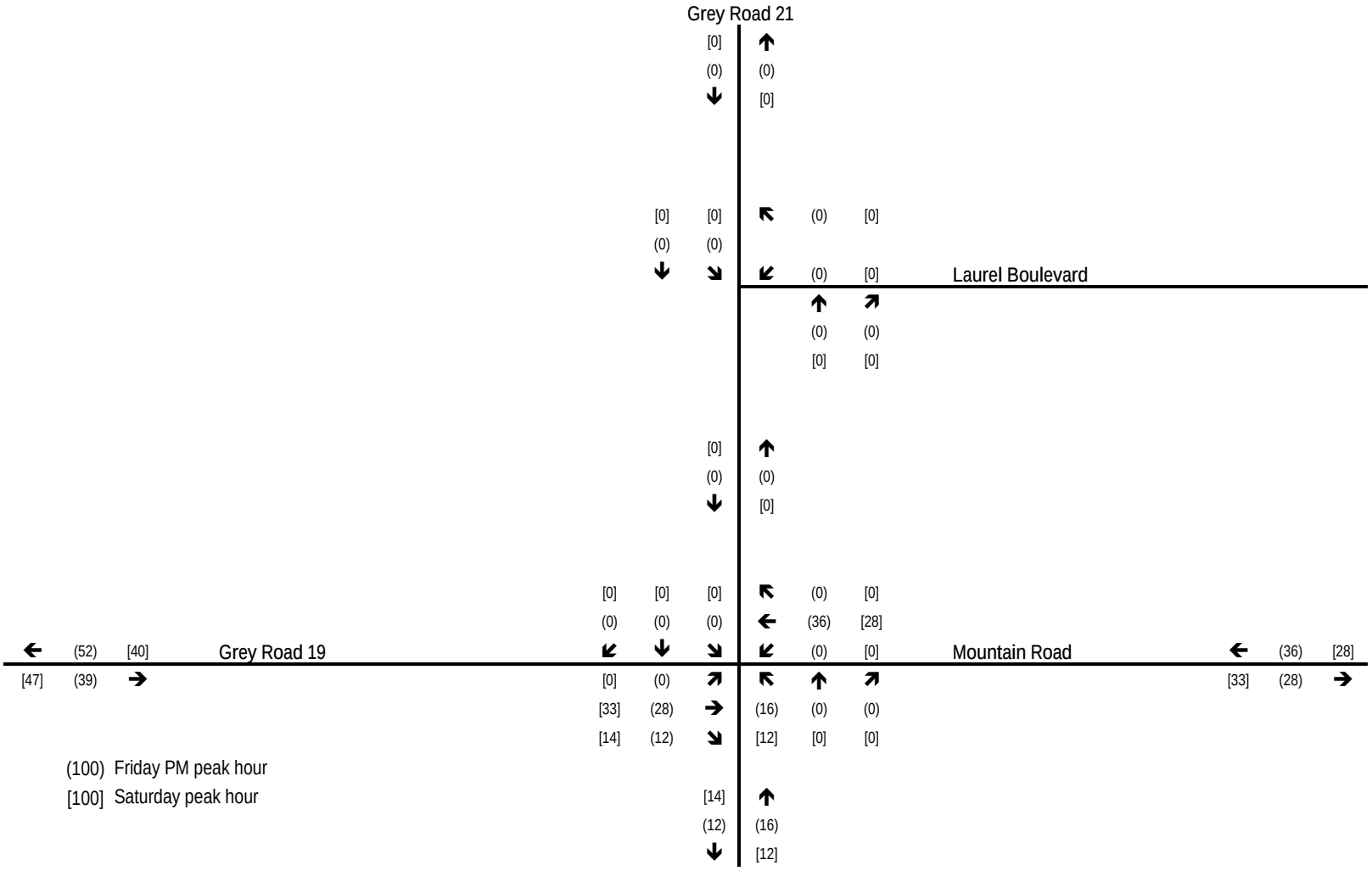
Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	63.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	54	719	319	23	679	59	271	130	20	68	116	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.99		1.00	0.98		1.00	0.94	
Flt Protected		1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1856	1583		1841		1770	1826		1770	1758	
Flt Permitted		0.91	1.00		0.79		0.50	1.00		0.66	1.00	
Satd. Flow (perm)		1688	1583		1456		935	1826		1223	1758	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	57	757	336	24	715	62	285	137	21	72	122	73
RTOR Reduction (vph)	0	0	141	0	4	0	0	7	0	0	27	0
Lane Group Flow (vph)	0	814	195	0	797	0	285	151	0	72	168	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		42.0	42.0		42.0		26.0	26.0		16.0	16.0	
Effective Green, g (s)		42.0	42.0		42.0		26.0	26.0		16.0	16.0	
Actuated g/C Ratio		0.52	0.52		0.52		0.32	0.32		0.20	0.20	
Clearance Time (s)		6.0	6.0		6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		886	831		764		387	593		244	351	
v/s Ratio Prot							c0.07	0.08			c0.10	
v/s Ratio Perm		0.48	0.12		c0.55		0.17			0.06		
v/c Ratio		0.92	0.24		1.04		0.74	0.26		0.30	0.48	
Uniform Delay, d1		17.4	10.3		19.0		22.7	19.9		27.2	28.3	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		14.2	0.1		44.4		7.1	1.0		3.1	4.6	
Delay (s)		31.6	10.4		63.4		29.9	20.9		30.3	32.9	
Level of Service		C	B		E		C	C		C	C	
Approach Delay (s)		25.4			63.4			26.7			32.2	
Approach LOS		C			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	37.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Appendix C:
Development Traffic Volumes



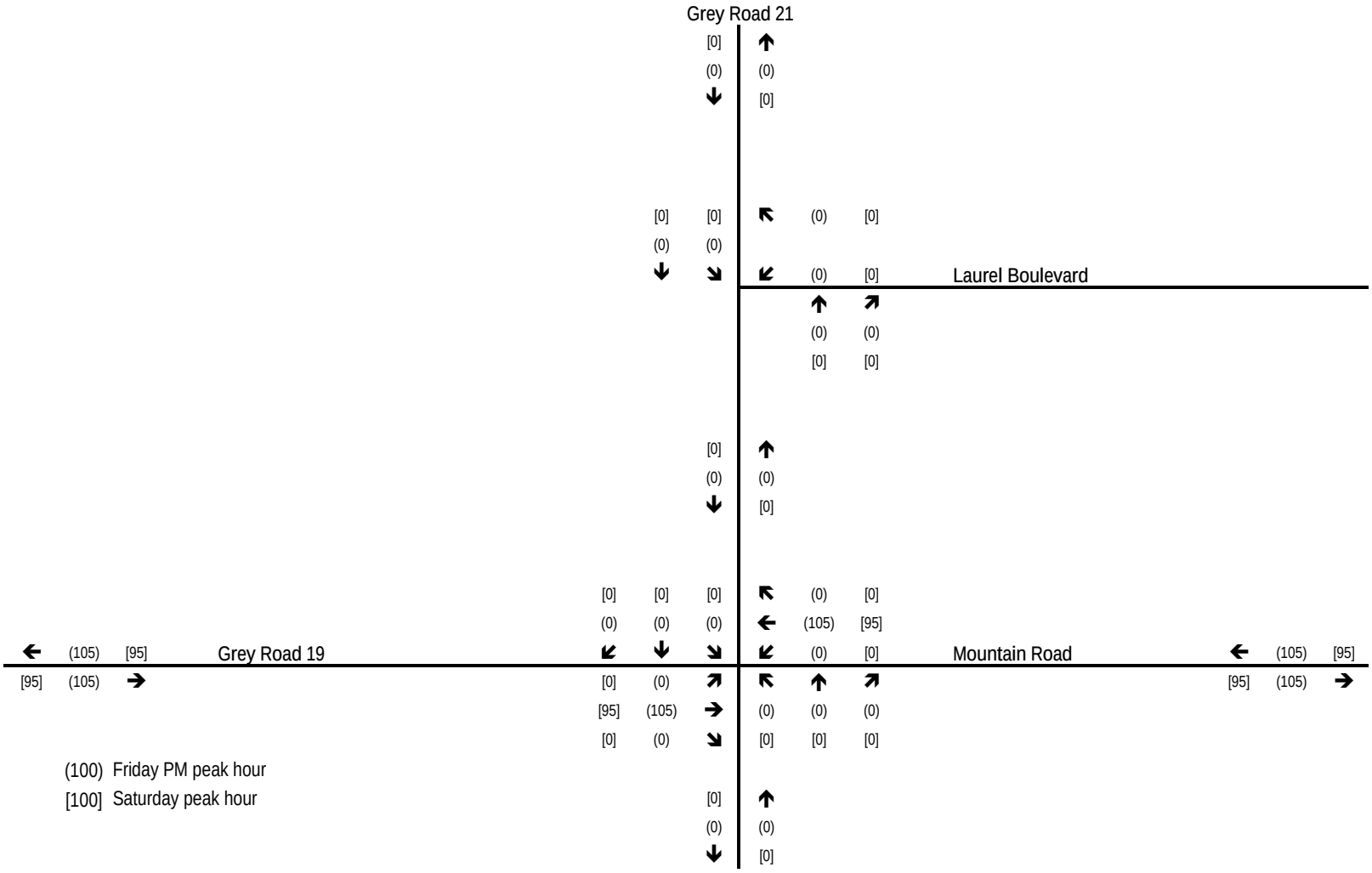
(100) Friday PM peak hour

[100] Saturday peak hour

C.C. Tatham & Associates Ltd.
Consulting Engineers

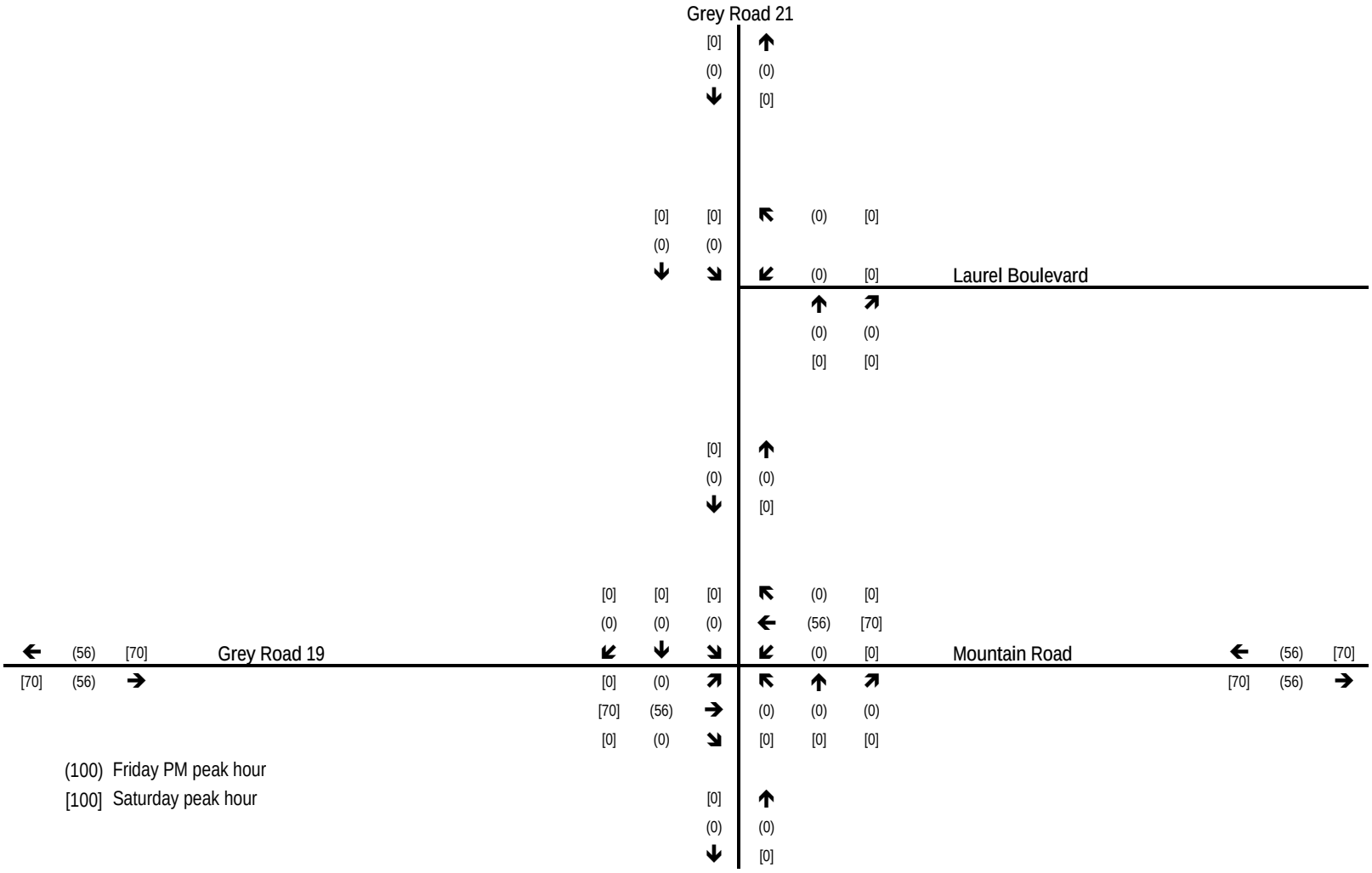
Grey Road 19 & 21 Intersection Improvements

Second Nature



(100) Friday PM peak hour

[100] Saturday peak hour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Laurel Boulevard
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Mountain Road
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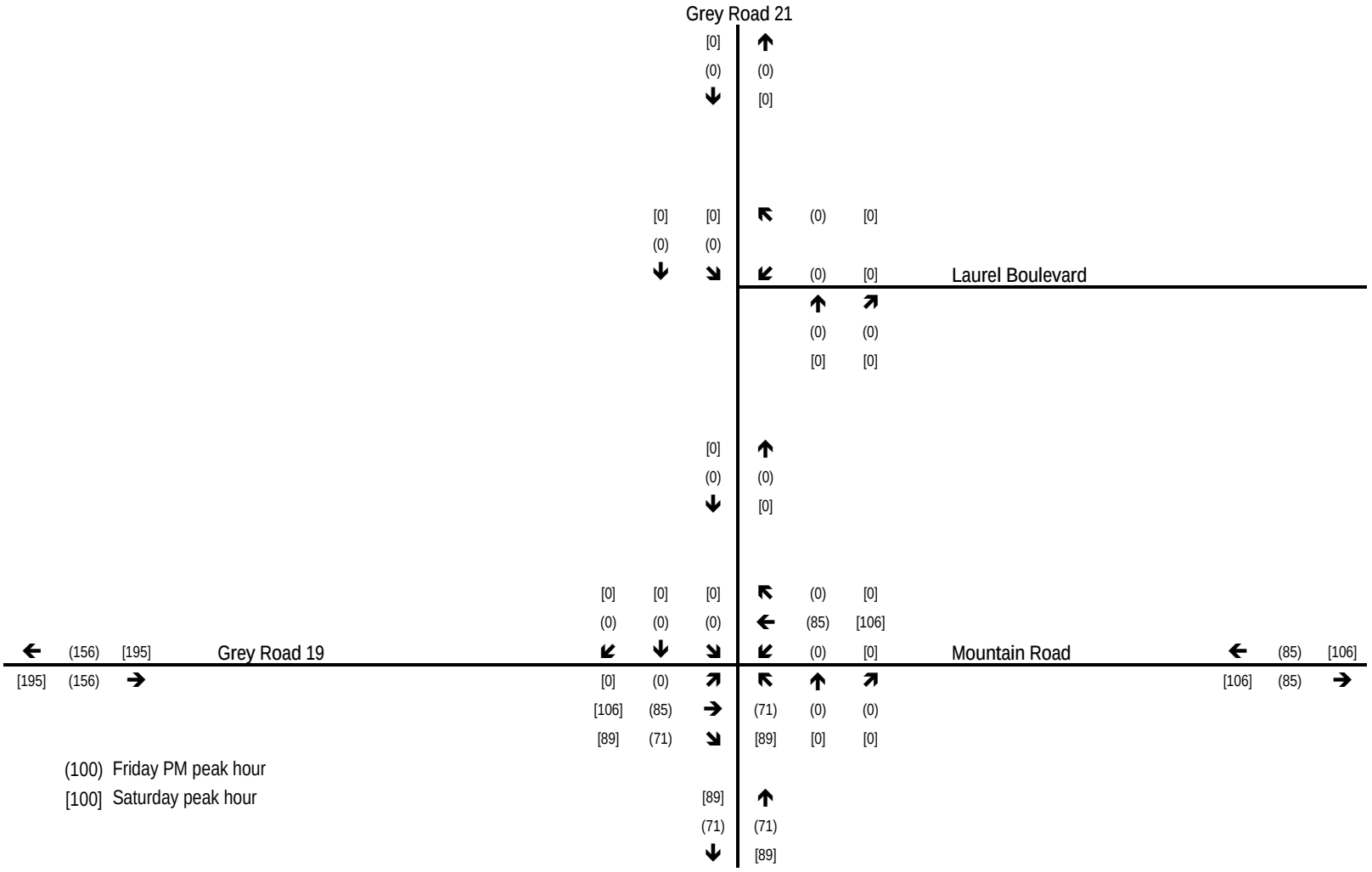

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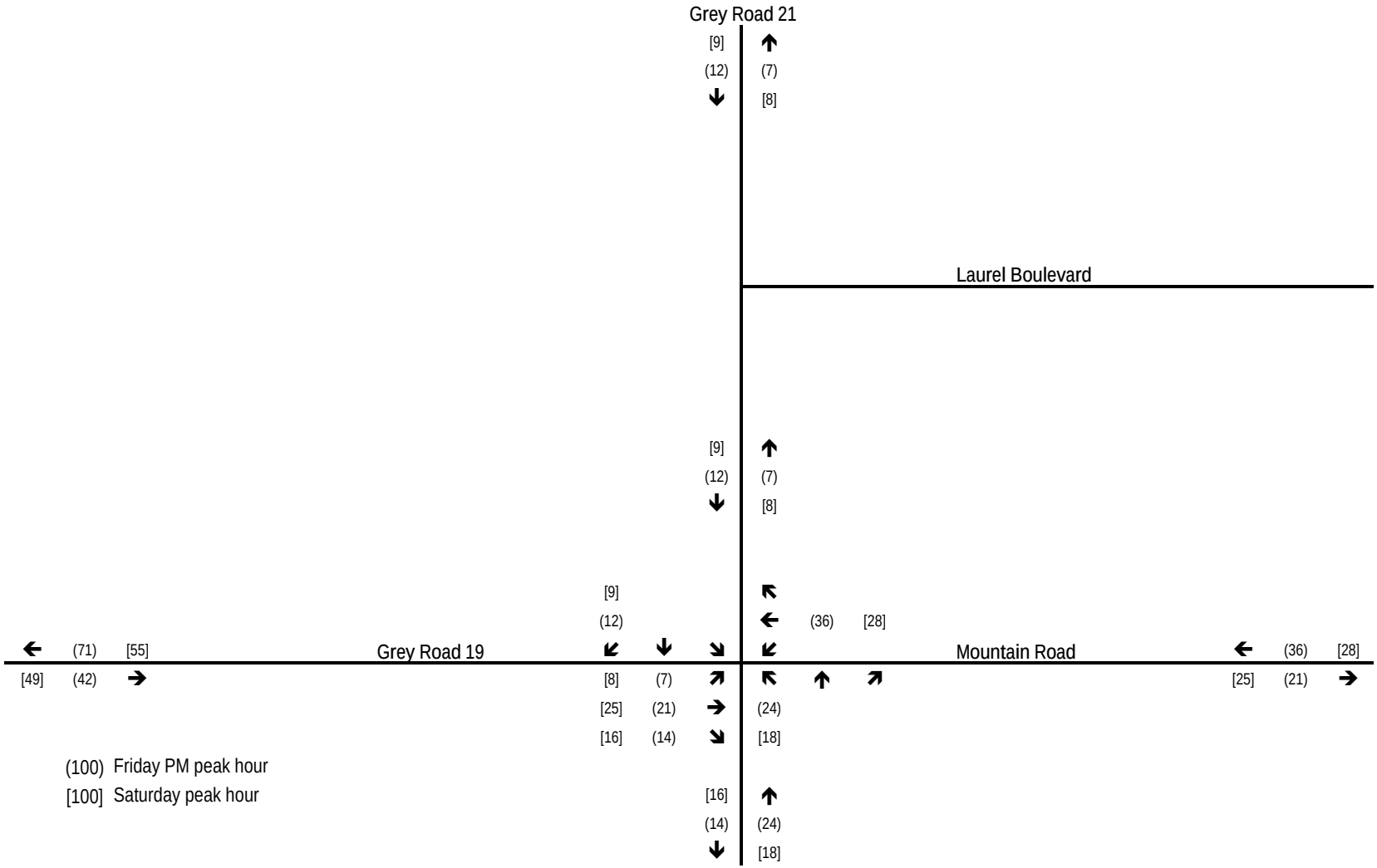
Grey Road 19 & 21 Intersection Improvements

BMR Orchards



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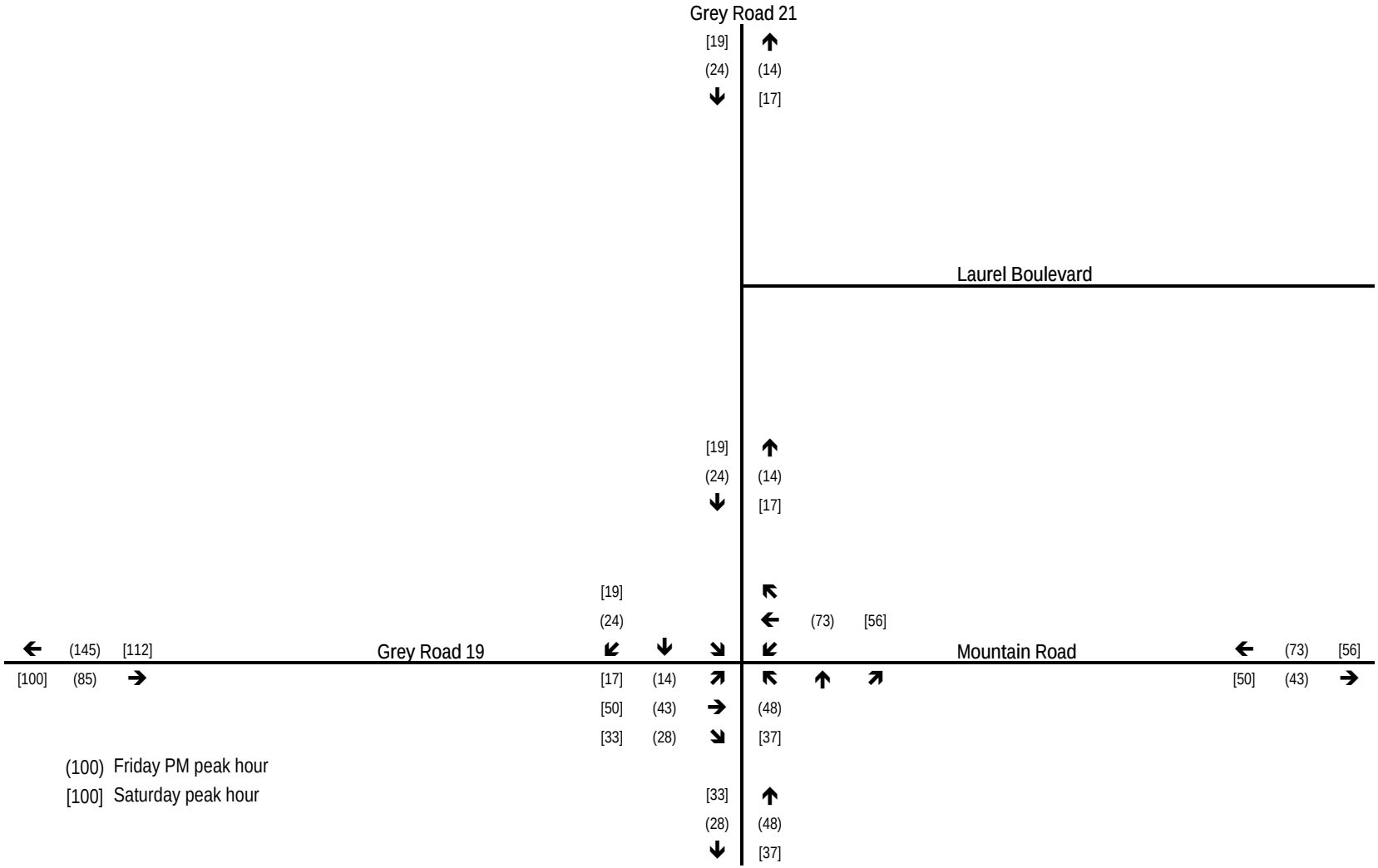
Grey Road 19 & 21 Intersection Improvements

Windfall 2019 (Phases 1 to 2)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[17]
(14)
Laurel Boulevard
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(24)
[17]
(14)
[19]
(24)
(73)
[56]
(145)
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Grey Road 19
Mountain Road
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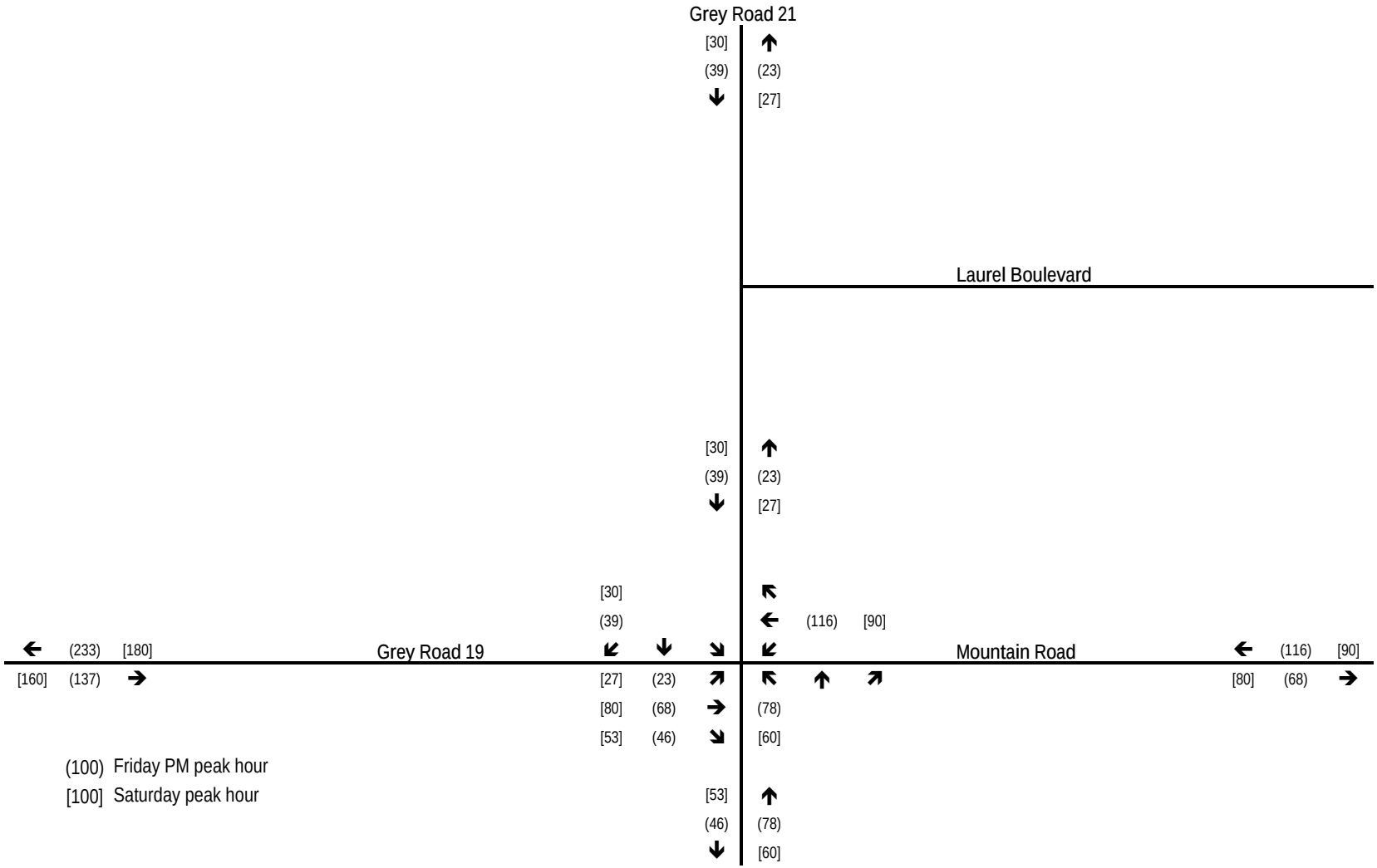

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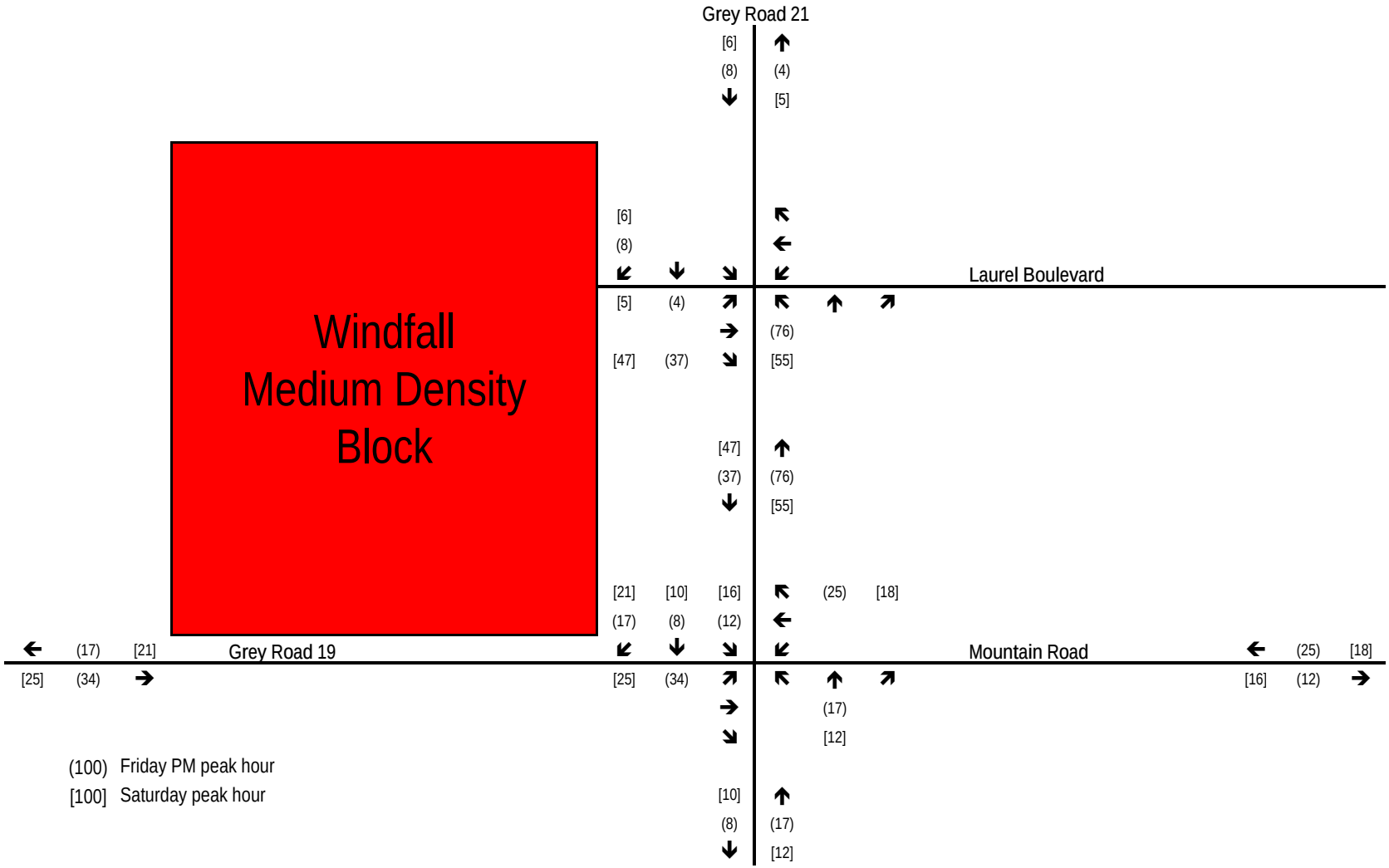
Grey Road 19 & 21 Intersection Improvements

Windfall 2029 (Phases 1 to 6)



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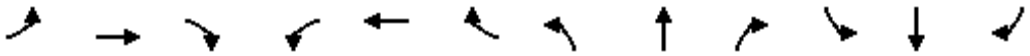
Grey Road 19 & 21 Intersection Improvements

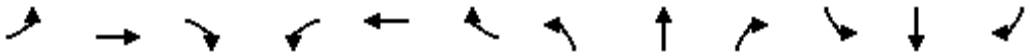
Windfall Medium Density (Phase 7)

Appendix D:
Future Traffic Operations - Signals



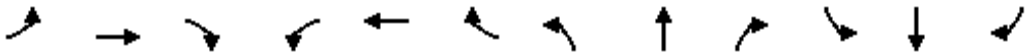
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	855	345	30	800	90	365	130	25	75	90	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.99		1.00	0.98		1.00	0.92	
Flt Protected		1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1857	1583		1835		1770	1818		1770	1719	
Flt Permitted		0.90	1.00		0.72		0.39	1.00		0.65	1.00	
Satd. Flow (perm)		1668	1583		1323		729	1818		1218	1719	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	58	900	363	32	842	95	384	137	26	79	95	100
RTOR Reduction (vph)	0	0	94	0	4	0	0	6	0	0	35	0
Lane Group Flow (vph)	0	958	269	0	965	0	384	157	0	79	160	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		69.0	69.0		69.0		29.0	29.0		17.0	17.0	
Effective Green, g (s)		69.0	69.0		69.0		29.0	29.0		17.0	17.0	
Actuated g/C Ratio		0.63	0.63		0.63		0.26	0.26		0.15	0.15	
Clearance Time (s)		6.0	6.0		6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		1046	992		829		286	479		188	265	
v/s Ratio Prot							c0.12	0.09			0.09	
v/s Ratio Perm		0.57	0.17		c0.73		0.23			0.06		
v/c Ratio		0.92	0.27		1.16		1.34	0.33		0.42	0.61	
Uniform Delay, d1		18.0	9.2		20.5		38.9	32.6		42.0	43.4	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		12.1	0.1		87.0		175.8	1.8		6.8	9.9	
Delay (s)		30.1	9.4		107.5		214.7	34.5		48.8	53.2	
Level of Service		C	A		F		F	C		D	D	
Approach Delay (s)		24.4			107.5			161.0			52.0	
Approach LOS		C			F			F			D	

Intersection Summary			
HCM 2000 Control Delay	76.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	116.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



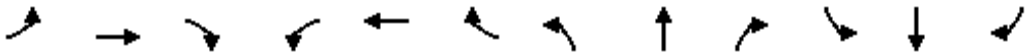
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	95	1080	465	30	1040	90	410	160	25	100	145	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.99		1.00	0.98		1.00	0.93	
Flt Protected		1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1855	1583		1841		1770	1825		1770	1739	
Flt Permitted		0.77	1.00		0.33		0.21	1.00		0.64	1.00	
Satd. Flow (perm)		1435	1583		609		392	1825		1184	1739	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	1137	489	32	1095	95	432	168	26	105	153	121
RTOR Reduction (vph)	0	0	90	0	2	0	0	4	0	0	24	0
Lane Group Flow (vph)	0	1237	399	0	1220	0	432	190	0	105	250	0
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		77.0	77.0		77.0		31.0	31.0		17.0	17.0	
Effective Green, g (s)		77.0	77.0		77.0		31.0	31.0		17.0	17.0	
Actuated g/C Ratio		0.64	0.64		0.64		0.26	0.26		0.14	0.14	
Clearance Time (s)		6.0	6.0		6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		920	1015		390		239	471		167	246	
v/s Ratio Prot							c0.18	0.10			c0.14	
v/s Ratio Perm		0.86	0.25		c2.00		0.29			0.09		
v/c Ratio		1.34	0.39		3.13		1.81	0.40		0.63	1.02	
Uniform Delay, d1		21.5	10.3		21.5		40.9	36.8		48.5	51.5	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		162.3	0.3		964.3		379.5	2.5		16.6	61.6	
Delay (s)		183.8	10.6		985.8		420.4	39.4		65.1	113.1	
Level of Service		F	B		F		F	D		E	F	
Approach Delay (s)		134.8			985.8			302.3			99.8	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	421.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	153.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	855	345	30	800	90	365	130	25	75	90	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3485		1770	1818		1770	1719	
Flt Permitted	0.21	1.00	1.00	0.21	1.00		0.57	1.00		0.65	1.00	
Satd. Flow (perm)	388	3539	1583	388	3485		1065	1818		1218	1719	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	58	900	363	32	842	95	384	137	26	79	95	100
RTOR Reduction (vph)	0	0	245	0	14	0	0	11	0	0	63	0
Lane Group Flow (vph)	58	900	118	32	923	0	384	152	0	79	132	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	19.2	19.2	19.2	19.2	19.2		28.0	28.0		18.0	18.0	
Effective Green, g (s)	19.2	19.2	19.2	19.2	19.2		28.0	28.0		18.0	18.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32		0.47	0.47		0.30	0.30	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	125	1147	513	125	1130		598	859		370	522	
v/s Ratio Prot		0.25			c0.26		c0.09	0.08			0.08	
v/s Ratio Perm	0.15		0.07	0.08			0.22			0.06		
v/c Ratio	0.46	0.78	0.23	0.26	0.82		0.64	0.18		0.21	0.25	
Uniform Delay, d1	15.9	18.1	14.6	14.7	18.4		10.7	9.0		15.3	15.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	3.6	0.2	1.1	4.7		2.4	0.4		1.3	1.2	
Delay (s)	18.6	21.7	14.8	15.8	23.1		13.0	9.4		16.6	16.7	
Level of Service	B	C	B	B	C		B	A		B	B	
Approach Delay (s)		19.7			22.8			12.0			16.7	
Approach LOS		B			C			B			B	

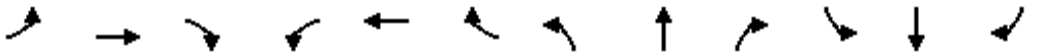
Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	59.2	Sum of lost time (s)	14.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	95	1080	465	30	1040	90	410	160	25	100	145	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3497		1770	1825		1770	1739	
Flt Permitted	0.16	1.00	1.00	0.16	1.00		0.45	1.00		0.64	1.00	
Satd. Flow (perm)	293	3539	1583	293	3497		839	1825		1184	1739	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	100	1137	489	32	1095	95	432	168	26	105	153	121
RTOR Reduction (vph)	0	0	296	0	10	0	0	9	0	0	42	0
Lane Group Flow (vph)	100	1137	193	32	1180	0	432	185	0	105	232	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	25.4	25.4	25.4	25.4	25.4		27.0	27.0		17.0	17.0	
Effective Green, g (s)	25.4	25.4	25.4	25.4	25.4		27.0	27.0		17.0	17.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39		0.42	0.42		0.26	0.26	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	115	1395	624	115	1379		467	765		312	459	
v/s Ratio Prot		0.32			0.34		c0.11	0.10			0.13	
v/s Ratio Perm	c0.34		0.12	0.11			0.27			0.09		
v/c Ratio	0.87	0.82	0.31	0.28	0.86		0.93	0.24		0.34	0.51	
Uniform Delay, d1	18.0	17.4	13.4	13.3	17.8		16.5	12.1		19.1	20.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	45.6	3.8	0.3	1.3	5.4		24.2	0.8		2.9	3.9	
Delay (s)	63.6	21.2	13.7	14.6	23.2		40.7	12.8		22.0	24.1	
Level of Service	E	C	B	B	C		D	B		C	C	
Approach Delay (s)		21.5			23.0			32.0			23.5	
Approach LOS		C			C			C			C	

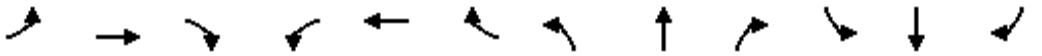
Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	14.0
Intersection Capacity Utilization	92.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



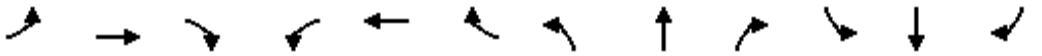
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	945	385	35	905	100	420	140	30	80	95	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	6.0	6.0	6.0	6.0		2.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3487		1770	1813		1770	1863	1583
Flt Permitted	0.19	1.00	1.00	0.24	1.00		0.62	1.00		0.64	1.00	1.00
Satd. Flow (perm)	348	3539	1583	439	3487		1151	1813		1200	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	995	405	37	953	105	442	147	32	84	100	126
RTOR Reduction (vph)	0	0	243	0	12	0	0	11	0	0	0	93
Lane Group Flow (vph)	63	995	162	37	1046	0	442	168	0	84	100	33
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	25.7	25.7	25.7	19.4	19.4		26.6	18.8		22.4	16.6	16.6
Effective Green, g (s)	25.7	25.7	25.7	19.4	19.4		26.6	18.8		22.4	16.6	16.6
Actuated g/C Ratio	0.40	0.40	0.40	0.30	0.30		0.41	0.29		0.35	0.26	0.26
Clearance Time (s)	2.0	6.0	6.0	6.0	6.0		2.0	6.0		2.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	234	1414	632	132	1052		553	530		469	480	408
v/s Ratio Prot	0.02	c0.28			c0.30		c0.10	0.09		0.02	0.05	
v/s Ratio Perm	0.09		0.10	0.08			0.23			0.05		0.02
v/c Ratio	0.27	0.70	0.26	0.28	0.99		0.80	0.32		0.18	0.21	0.08
Uniform Delay, d1	14.1	16.1	12.9	17.1	22.4		15.7	17.7		14.3	18.7	18.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	1.6	0.2	1.2	26.2		7.9	1.6		0.2	1.0	0.4
Delay (s)	14.7	17.7	13.1	18.3	48.6		23.6	19.3		14.5	19.7	18.4
Level of Service	B	B	B	B	D		C	B		B	B	B
Approach Delay (s)		16.3			47.6			22.4			17.8	
Approach LOS		B			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	64.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



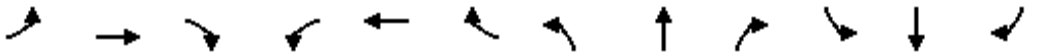
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	1200	515	30	1160	95	460	175	25	105	160	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	6.0	6.0	6.0	6.0		2.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3499		1770	1828		1770	1863	1583
Flt Permitted	0.11	1.00	1.00	0.15	1.00		0.52	1.00		0.63	1.00	1.00
Satd. Flow (perm)	201	3539	1583	282	3499		977	1828		1167	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	121	1263	542	32	1221	100	484	184	26	111	168	132
RTOR Reduction (vph)	0	0	249	0	7	0	0	6	0	0	0	108
Lane Group Flow (vph)	121	1263	293	32	1314	0	484	204	0	111	168	24
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	44.6	44.6	44.6	35.0	35.0		33.4	25.1		22.7	16.4	16.4
Effective Green, g (s)	44.6	44.6	44.6	35.0	35.0		33.4	25.1		22.7	16.4	16.4
Actuated g/C Ratio	0.50	0.50	0.50	0.39	0.39		0.37	0.28		0.25	0.18	0.18
Clearance Time (s)	2.0	6.0	6.0	6.0	6.0		2.0	6.0		2.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	232	1753	784	109	1360		494	509		336	339	288
v/s Ratio Prot	0.04	c0.36			c0.38		c0.16	0.11		0.02	0.09	
v/s Ratio Perm	0.21		0.18	0.11			0.20			0.06		0.02
v/c Ratio	0.52	0.72	0.37	0.29	0.97		0.98	0.40		0.33	0.50	0.08
Uniform Delay, d1	18.1	17.8	14.1	19.0	26.9		26.2	26.3		26.8	33.1	30.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.1	1.5	0.3	1.5	16.8		34.8	2.3		0.6	5.1	0.6
Delay (s)	20.2	19.3	14.4	20.5	43.8		61.0	28.7		27.4	38.2	31.1
Level of Service	C	B	B	C	D		E	C		C	D	C
Approach Delay (s)		18.0			43.2			51.2			33.0	
Approach LOS		B			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	1055	445	40	1025	105	485	150	30	85	105	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	6.0	6.0	6.0	6.0	6.0	2.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1816		1770	1863	1583
Flt Permitted	0.16	1.00	1.00	0.18	1.00	1.00	0.62	1.00		0.64	1.00	1.00
Satd. Flow (perm)	292	3539	1583	341	3539	1583	1146	1816		1188	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	1111	468	42	1079	111	511	158	32	89	111	147
RTOR Reduction (vph)	0	0	270	0	0	76	0	9	0	0	0	112
Lane Group Flow (vph)	74	1111	198	42	1079	35	511	181	0	89	111	35
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	31.2	31.2	31.2	23.5	23.5	23.5	30.5	22.6		23.4	17.5	17.5
Effective Green, g (s)	31.2	31.2	31.2	23.5	23.5	23.5	30.5	22.6		23.4	17.5	17.5
Actuated g/C Ratio	0.42	0.42	0.42	0.32	0.32	0.32	0.41	0.31		0.32	0.24	0.24
Clearance Time (s)	2.0	6.0	6.0	6.0	6.0	6.0	2.0	6.0		2.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	237	1498	670	108	1128	504	567	556		423	442	375
v/s Ratio Prot	0.02	c0.31			c0.30		c0.13	0.10		0.02	0.06	
v/s Ratio Perm	0.11		0.13	0.12		0.02	0.24			0.05		0.02
v/c Ratio	0.31	0.74	0.30	0.39	0.96	0.07	0.90	0.33		0.21	0.25	0.09
Uniform Delay, d1	15.4	17.9	14.0	19.5	24.6	17.5	19.0	19.7		18.1	22.8	21.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	2.0	0.2	2.3	17.2	0.1	17.5	1.6		0.2	1.4	0.5
Delay (s)	16.2	19.9	14.3	21.8	41.8	17.5	36.5	21.2		18.3	24.1	22.4
Level of Service	B	B	B	C	D	B	D	C		B	C	C
Approach Delay (s)		18.1			38.9			32.4			21.9	
Approach LOS		B			D			C			C	

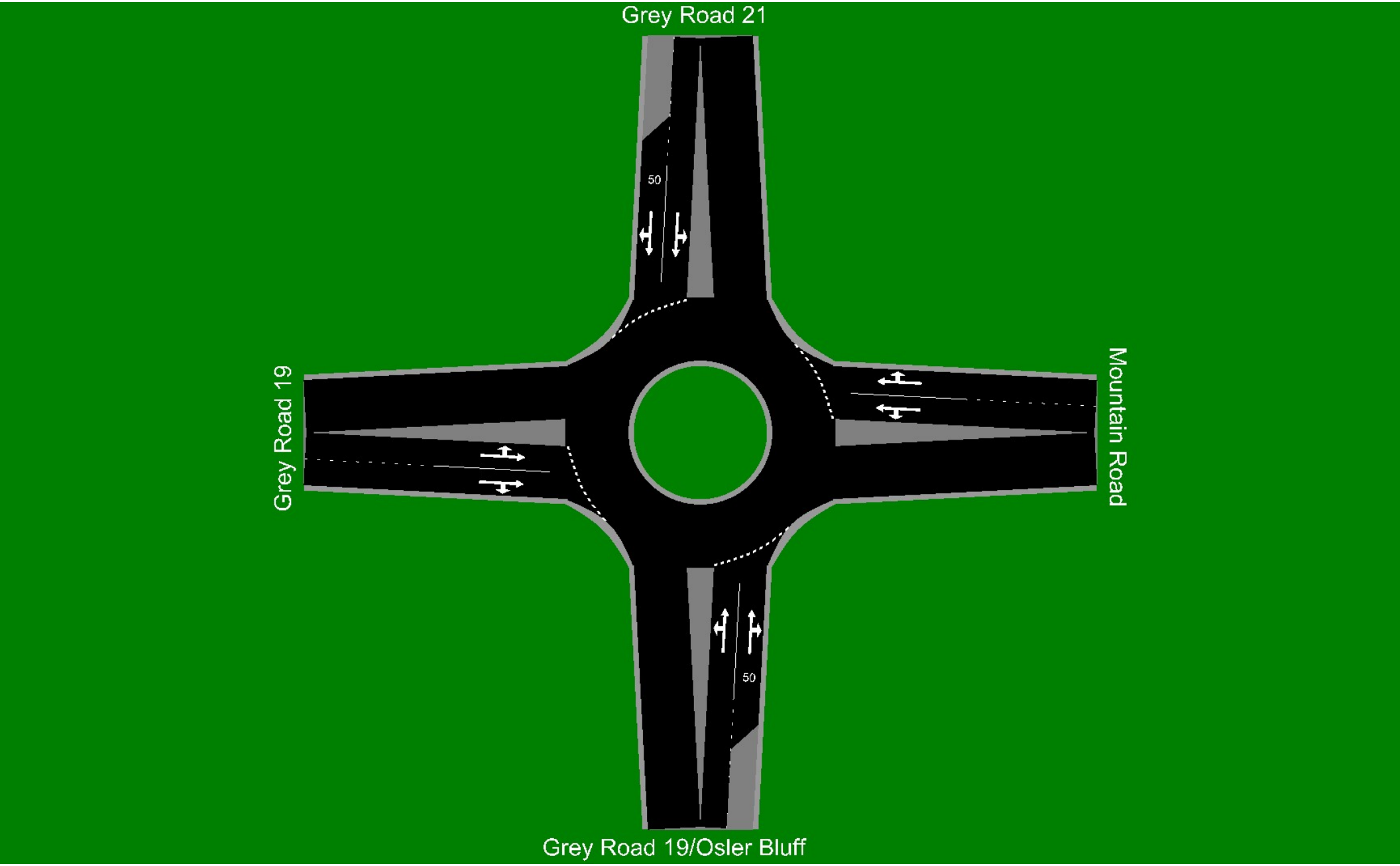
Intersection Summary			
HCM 2000 Control Delay	27.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	73.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	1340	580	35	1295	100	525	190	30	115	175	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	6.0	6.0	6.0	6.0	6.0	2.0	6.0		2.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1824		1770	1863	1583
Flt Permitted	0.08	1.00	1.00	0.09	1.00	1.00	0.36	1.00		0.61	1.00	1.00
Satd. Flow (perm)	147	3539	1583	159	3539	1583	676	1824		1144	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	137	1411	611	37	1363	105	553	200	32	121	184	158
RTOR Reduction (vph)	0	0	187	0	0	49	0	5	0	0	0	128
Lane Group Flow (vph)	137	1411	424	37	1363	56	553	227	0	121	184	30
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	58.8	58.8	58.8	48.8	48.8	48.8	49.0	39.2		23.8	16.0	16.0
Effective Green, g (s)	58.8	58.8	58.8	48.8	48.8	48.8	49.0	39.2		23.8	16.0	16.0
Actuated g/C Ratio	0.49	0.49	0.49	0.41	0.41	0.41	0.41	0.33		0.20	0.13	0.13
Clearance Time (s)	2.0	6.0	6.0	6.0	6.0	6.0	2.0	6.0		2.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	180	1737	776	64	1441	644	559	596		268	248	211
v/s Ratio Prot	0.05	c0.40			c0.39		c0.26	0.12		0.03	c0.10	
v/s Ratio Perm	0.32		0.27	0.23		0.04	0.15			0.06		0.02
v/c Ratio	0.76	0.81	0.55	0.58	0.95	0.09	0.99	0.38		0.45	0.74	0.14
Uniform Delay, d1	25.9	25.8	21.2	27.5	34.2	21.8	31.2	31.0		41.3	49.9	45.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	17.1	3.0	0.8	12.0	12.9	0.1	34.9	1.8		1.2	18.1	1.4
Delay (s)	43.0	28.8	22.0	39.6	47.1	21.9	66.1	32.8		42.5	68.0	47.2
Level of Service	D	C	C	D	D	C	E	C		D	E	D
Approach Delay (s)		27.8			45.2			56.3			54.2	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	40.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	119.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Appendix E:
Future Traffic Operations - Roundabout


Grey Road 21
50
Grey Road 19
Mountain Road
50
Grey Road 19/Osler Bluff

Movement Summary

Windfall Med Block - 2019 FRI TOTAL

Roundabout

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	Cap (veh/h)	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Eff. Stop Rate	Aver Speed (km/h)	Oper Cost ($/h)
Grey Road 19/Osler Bluff										
32	L	384	1180	0.465	9.0	LOS A	26	1.68	29.9	82
32	T	137	1180	0.465	9.0	LOS A	26	1.68	29.9	82
32	R	26	1180	0.465	9.0	LOS A	26	1.68	29.9	82
Approach		**549**	**1423**	**0.465**	**9.0**	**LOS A**	**26**	**1.68**	**29.9**	**82**
Mountain Road										
22	L	32	1913	0.507	3.7	LOS A	29	1.12	36.9	224
22	T	842	1913	0.507	3.7	LOS A	29	1.12	36.9	224
22	R	95	1913	0.507	3.7	LOS A	29	1.12	36.9	224
Approach		**969**	**1913**	**0.506**	**3.7**	**LOS A**	**29**	**1.12**	**36.9**	**224**
Grey Road 21										
42	L	79	1196	0.229	7.4	LOS A	10	1.47	36.3	94
42	T	95	1196	0.229	7.4	LOS A	10	1.47	36.3	94
42	R	100	1196	0.229	7.4	LOS A	10	1.47	36.3	94
Approach		**274**	**1196**	**0.229**	**7.4**	**LOS A**	**10**	**1.47**	**36.3**	**94**
Grey Road 19										
12	L	58	2828	0.467	1.1	LOS A	26	0.30	32.6	80
12	T	900	2828	0.467	1.1	LOS A	26	0.30	32.6	80
12	R	363	2828	0.467	1.1	LOS A	26	0.30	32.6	80
Approach		**1321**	**2828**	**0.467**	**1.1**	**LOS A**	**26**	**0.30**	**32.6**	**80**
All Vehicles		**3113**	**7361**	**0.507**	**3.9**	**LOS A**	**29**	**0.90**	**34.8**	**480**

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Movement Summary

Windfall Med Block - 2019 SAT TOTAL

Roundabout

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	Cap (veh/h)	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Eff. Stop Rate	Aver Speed (km/h)	Oper Cost ($/h)
Grey Road 19/Osler Bluff										
32	L	432	939	0.668	15.0	LOS B	47	2.19	25.6	109
32	T	168	939	0.668	15.0	LOS B	47	2.19	25.6	109
32	R	26	939	0.668	15.0	LOS B	47	2.19	25.6	109
Approach		**627**	**1110**	**0.668**	**15.0**	**LOS B**	**47**	**2.19**	**25.6**	**109**
Mountain Road										
22	L	32	1716	0.712	7.7	LOS A	59	1.84	34.7	304
22	T	1095	1716	0.712	7.7	LOS A	59	1.84	34.7	304
22	R	95	1716	0.712	7.7	LOS A	59	1.84	34.7	304
Approach		**1222**	**1716**	**0.712**	**7.7**	**LOS A**	**59**	**1.84**	**34.7**	**304**
Grey Road 21										
42	L	105	868	0.437	13.2	LOS B	21	1.93	33.9	139
42	T	153	868	0.437	13.2	LOS B	21	1.93	33.9	139
42	R	121	868	0.437	13.2	LOS B	21	1.93	33.9	139
Approach		**379**	**868**	**0.437**	**13.2**	**LOS B**	**21**	**1.93**	**33.9**	**139**
Grey Road 19										
12	L	100	2647	0.652	2.2	LOS A	46	0.62	30.4	111
12	T	1137	2647	0.652	2.2	LOS A	46	0.62	30.4	111
12	R	489	2647	0.652	2.2	LOS A	46	0.62	30.4	111
Approach		**1727**	**2647**	**0.652**	**2.2**	**LOS A**	**46**	**0.62**	**30.4**	**111**
All Vehicles		**3955**	**6341**	**0.712**	**7.0**	**LOS A**	**59**	**1.37**	**32.3**	**663**

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Movement Summary

Windfall Med Block - 2024 FRI TOTAL

Roundabout

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	Cap (veh/h)	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Eff. Stop Rate	Aver Speed (km/h)	Oper Cost ($/h)
Grey Road 19/Osler Bluff										
32	L	442	1093	0.568	10.8	LOS B	36	1.87	28.5	98
32	T	147	1093	0.568	10.8	LOS B	36	1.87	28.5	98
32	R	32	1093	0.568	10.8	LOS B	36	1.87	28.5	98
Approach		**621**	**1331**	**0.568**	**10.8**	**LOS B**	**36**	**1.87**	**28.5**	**98**
Mountain Road										
22	L	37	1793	0.611	5.5	LOS A	42	1.51	36.1	260
22	T	953	1793	0.611	5.5	LOS A	42	1.51	36.1	260
22	R	105	1793	0.611	5.5	LOS A	42	1.51	36.1	260
Approach		**1095**	**1793**	**0.611**	**5.5**	**LOS A**	**42**	**1.51**	**36.1**	**260**
Grey Road 21										
42	L	84	1002	0.311	9.3	LOS A	14	1.62	35.5	109
42	T	100	1002	0.311	9.3	LOS A	14	1.62	35.5	109
42	R	126	1002	0.311	9.3	LOS A	14	1.62	35.5	109
Approach		**312**	**1002**	**0.311**	**9.3**	**LOS A**	**14**	**1.62**	**35.5**	**109**
Grey Road 19										
12	L	63	2855	0.512	1.2	LOS A	30	0.34	32.1	89
12	T	995	2855	0.512	1.2	LOS A	30	0.34	32.1	89
12	R	405	2855	0.512	1.2	LOS A	30	0.34	32.1	89
Approach		**1463**	**2855**	**0.512**	**1.2**	**LOS A**	**30**	**0.34**	**32.1**	**89**
All Vehicles		**3491**	**6981**	**0.611**	**5.0**	**LOS A**	**42**	**1.09**	**34.0**	**556**

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Movement Summary

Windfall Med Block - 2024 SAT TOTAL

Roundabout

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	Cap (veh/h)	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Eff. Stop Rate	Aver Speed (km/h)	Oper Cost ($/h)
Grey Road 19/Osler Bluff										
32	L	484	787	0.886	29.4	LOS C	97	3.17	19.0	164
32	T	184	787	0.886	29.4	LOS C	97	3.17	19.0	164
32	R	26	787	0.886	29.4	LOS C	97	3.17	19.0	164
Approach		**697**	**934**	**0.886**	**29.4**	**LOS C**	**97**	**3.17**	**19.0**	**164**
Mountain Road										
22	L	32	1565	0.865	15.4	LOS B	104	2.67	30.6	384
22	T	1221	1565	0.865	15.4	LOS B	104	2.67	30.6	384
22	R	100	1565	0.865	15.4	LOS B	104	2.67	30.6	384
Approach		**1353**	**1565**	**0.865**	**15.4**	**LOS B**	**104**	**2.67**	**30.6**	**384**
Grey Road 21										
42	L	111	666	0.616	24.2	LOS C	34	2.45	30.1	168
42	T	168	666	0.616	24.2	LOS C	34	2.45	30.1	168
42	R	132	666	0.616	24.2	LOS C	34	2.45	30.1	168
Approach		**410**	**666**	**0.616**	**24.2**	**LOS C**	**34**	**2.45**	**30.1**	**168**
Grey Road 19										
12	L	121	2592	0.743	3.3	LOS A	65	1.01	29.4	127
12	T	1263	2592	0.743	3.3	LOS A	65	1.01	29.4	127
12	R	542	2592	0.743	3.3	LOS A	65	1.01	29.4	127
Approach		**1926**	**2592**	**0.743**	**3.3**	**LOS A**	**65**	**1.01**	**29.4**	**127**
All Vehicles		**4386**	**5756**	**0.886**	**13.2**	**LOS B**	**104**	**2.00**	**28.0**	**843**

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Movement Summary

Windfall Med Block - 2029 FRI TOTAL

Roundabout

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	Cap (veh/h)	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Eff. Stop Rate	Aver Speed (km/h)	Oper Cost ($/h)
Grey Road 19/Osler Bluff										
32	L	511	960	0.729	15.7	LOS B	59	2.29	25.2	125
32	T	158	960	0.729	15.7	LOS B	59	2.29	25.2	125
32	R	32	960	0.729	15.7	LOS B	59	2.29	25.2	125
Approach		**700**	**1186**	**0.729**	**15.7**	**LOS B**	**59**	**2.29**	**25.2**	**125**
Mountain Road										
22	L	42	1637	0.752	9.4	LOS A	67	2.04	33.7	316
22	T	1079	1637	0.752	9.4	LOS A	67	2.04	33.7	316
22	R	111	1637	0.752	9.4	LOS A	67	2.04	33.7	316
Approach		**1231**	**1637**	**0.752**	**9.4**	**LOS A**	**67**	**2.04**	**33.7**	**316**
Grey Road 21										
42	L	89	783	0.443	15.3	LOS B	22	2.00	33.1	130
42	T	111	783	0.443	15.3	LOS B	22	2.00	33.1	130
42	R	147	783	0.443	15.3	LOS B	22	2.00	33.1	130
Approach		**347**	**783**	**0.443**	**15.3**	**LOS B**	**22**	**2.00**	**33.1**	**130**
Grey Road 19										
12	L	74	2793	0.591	1.5	LOS A	37	0.41	31.3	103
12	T	1111	2793	0.591	1.5	LOS A	37	0.41	31.3	103
12	R	468	2793	0.591	1.5	LOS A	37	0.41	31.3	103
Approach		**1651**	**2793**	**0.591**	**1.5**	**LOS A**	**37**	**0.41**	**31.3**	**103**
All Vehicles		**3929**	**6399**	**0.752**	**7.7**	**LOS A**	**67**	**1.40**	**31.6**	**673**

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Movement Summary

Windfall Med Block - 2029 SAT TOTAL

Roundabout

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	Cap (veh/h)	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Eff. Stop Rate	Aver Speed (km/h)	Oper Cost ($/h)
Grey Road 19/Osler Bluff										
32	L	553	598	1.313	140.5	LOS F	412	8.10	6.4	529
32	T	200	598	1.313	140.5	LOS F	412	8.10	6.4	529
32	R	32	598	1.313	140.5	LOS F	412	8.10	6.4	529
Approach		**785**	**713**	**1.314**	**140.5**	**LOS F**	**412**	**8.10**	**6.4**	**529**
Mountain Road										
22	L	37	1583	0.951	24.4	LOS C	161	3.51	26.9	492
22	T	1363	1583	0.951	24.4	LOS C	161	3.51	26.9	492
22	R	105	1583	0.951	24.4	LOS C	161	3.51	26.9	492
Approach		**1505**	**1583**	**0.951**	**24.4**	**LOS C**	**161**	**3.51**	**26.9**	**492**
Grey Road 21										
42	L	121	589	0.788	38.7	LOS D	52	3.08	26.2	216
42	T	184	589	0.788	38.7	LOS D	52	3.08	26.2	216
42	R	158	589	0.788	38.7	LOS D	52	3.08	26.2	216
Approach		**464**	**589**	**0.788**	**38.7**	**LOS D**	**52**	**3.08**	**26.2**	**216**
Grey Road 19										
12	L	137	2518	0.857	6.2	LOS A	109	1.56	26.4	165
12	T	1411	2518	0.857	6.2	LOS A	109	1.56	26.4	165
12	R	611	2518	0.857	6.2	LOS A	109	1.56	26.4	165
Approach		**2157**	**2518**	**0.856**	**6.2**	**LOS A**	**109**	**1.56**	**26.4**	**165**
All Vehicles		**4911**	**5404**	**1.313**	**36.3**	**LOS D**	**412**	**3.34**	**18.7**	**1402**

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Appendix F:
Study Commencement

Grey County
595 9th Avenue E, Owen Sound, ON N4K 3E3
(519) 376-2205 www.grey.ca

County of Simcoe
1110 Highway 26, Midhurst, ON L0L 1X0
(705) 726-9300 www.simcoe.ca

Notice of Study Commencement

Grey Road 19 & Grey Road 21 Intersection Improvements

Municipal Class Environmental Assessment Study

Background

Grey County, in partnership with the County of Simcoe, is proposing to improve the intersection of Grey Road 19 (Simcoe Road 34) with Grey Road 21 and Mountain Road. As the intersection is located on the boundary of Grey and Simcoe Counties, a joint project is being undertaken. The Town of Collingwood, who have jurisdiction over Mountain Road, will also be participating in the study. The intersection improvements are required to improve public safety and traffic operations in consideration of increasing travel demands through the area (resulting from an increasing popularity of the area compounded with anticipated development growth). Possible improvements include the provision of additional turn lanes, additional through lanes in the east-west direction, upgraded traffic signal control (as opposed to the existing aerial installation) and improved intersection illumination. Consideration will also be given to the implementation of a 2-lane roundabout as opposed to traffic signal control.

Study Process

The Counties are proceeding with a Schedule B Municipal Class Environmental Assessment (EA) to consider the impacts associated with the proposed intersection improvements. The Class EA process will address the following:

- the existing traffic operations and conditions at the intersection;
- alternative solutions to implementing the intersection improvements;
- the location, extent and sensitivity of the existing environments within the area;
- the potential impacts of each alternative to the noted environments and possible mitigating measures;
- public and agency consultation and participation; and
- an assessment and evaluation of the alternatives culminating in a preferred solution.

Purpose of Notice

The purpose of this notice is to invite public/agency input and comment early in the study such that they can be incorporated into the planning and overall study design. Comments should be directed to the Counties and/or Consultant as noted below. A further opportunity for public input and comment will be provided at a Public Information Centre (open house) to be held in the upcoming months, during which time the various alternative solutions and assessment of each will be presented. Further details with respect to the Public Information Centre will be provided closer to the date.

This notice issued February 13, 2015.

Project Contacts

Owner
Grey County
595 9th Avenue East
Owen Sound, ON N4K 3E3

Owner
County of Simcoe
1110 Highway 26
Midhurst, ON L0L 1X0

Consultant
C.C. Tatham & Associates Ltd.
200 Sandford Fleming Dr. #200
Collingwood, ON L9Y 5A6

Michael Kelly, P.Eng
Director of Transportation Services
michael.kelly@grey.ca
(519) 376-2205 x1246

Paul Murphy, B.Sc., C.Tech
Engineering Technician II
paul.murphy@simcoe.ca
(705) 726-9300 x1371

Michael Cullip, P.Eng
Project Manager
mcullip@cctatham.com
(705) 444-2565 x265

Type	Company	Address1	Address2	City	PostalCode	Title	FirstName	LastName	JobTitle	Contact
Agency	Ministry of Agriculture, Food and Rural Affairs	Economic Development Division, Rural Community Development Branch	1 Stone Rd W. 3rd Floor	Guelph, ON	N1G 4Y2	Mr.	John	Turvey	Policy Advisor	519-826-3419
Agency	Ministry of Culture	Midhurst District Office	2284 Nursery Road	Midhurst, ON	L0L 1X0	Mr.	Greig	Stewart	Regional Advisor	705-739-6696
Agency	Ministry of Culture	Heritage Operations Unit	400 University Ave. 4th Floor	Toronto, ON	M7A 2R9	Mr.	Winston	Wong	Heritage Planner	416-314-7147
Agency	Ministry of the Environment & Climate Change	CEAA Branch	2 St. Clair Ave. W. 12th Floor	Toronto, ON	M4V 1L5	Mr.	Paul	Heeney	Supervisor, Project Review Unit	416-314-7210
Agency	Ministry of the Environment & Climate Change	Central Region Office	5775 Yonge Street 9th Floor	Toronto, ON	M2M 4J1	Ms.	Chunmei	Liu	EA Coordinator	416-326-4886
Agency	Ministry of the Environment & Climate Change	London Regional Office	733 Exeter Road	London, ON	N6E 1L3	Mr.	Bill	Armstrong	Environmental Planner	519-873-5013
Agency	Ministry of the Environment & Climate Change	Owen Sound District Office	101 17th Street East	Owen Sound, ON	N4K 0A5					519-371-2901
Agency	Ministry of Municipal Affairs and Housing	Central Region Office	777 Bay Street	Toronto, ON	M5G 2E5	Mr.	Darryl	Lyons	Senior Planner	416-585-6048
Agency	Ministry of Natural Resources & Forestry	Midhurst District	2284 Nursery Road	Midhurst, ON	L0L 1X0	Mr.	Mark	Shoreman	District Manager	705-725-7546
Agency	Ministry of Tourism, Culture & Sport	180 Dundas Street	9th Floor, Suite 502	Toronto, ON	M7A 2R9	Mr.	Tom	Sherzan	Manager, Regional Services Branch	
Agency	Ministry of Transportation	Central Region Planning & Design Section	1201 Wilson Avenue, Bldg. D, 4th Floor	Downsview, Ontario	M3M 1J8	Ms.	Heather	Glass	Sr Project Engineer	(416) 235-5521 heather.glass@mto.ca
Agency	Nottawasaga Valley Conservation Authority	John Hix Conservation Administration Centre	8195 Concession 8	Utopia, ON	L0M 1T0	Mr.	Glenn	Switzer	Director, Engineering & Technical Services	705-424-1479 ext. 225
Agency	Grey Sauble Conservation Authority	237897 Ingills Falls Road	R.R. #5	Owen Sound, ON	N4K 5N6	Mr.	Andrew	Sorensen	Planning Technician	519-376-3076

Type	Company	Address1	Address2	City	PostalCode	Title	FirstName	LastName	JobTitle	Contact
Agency	Niagara Escarpment Commission	99 King Street East	PO Box 308	Thornbury, ON	N0H 2P0	Mr.	Rick	Watt	Senior Planning Coordinator	519-599-3740 rick.watt@ontario.ca
Agency	Ministry of Aboriginal Affairs	Policy and Relations Branch	720 Bay Street, Fourth Floor	Toronto, ON	M5G 2K1	Mr.	Francois	Lachance	Senior Policy Advisor	416-326-4754
Agency (Federal)	Indian and Northern Affairs Canada	Environment and Natural Resources Department	25 St. Clair Ave. East, 8th Floor	Toronto, ON	M4T 1M2		Glenn	Gilbert	Manager	416-973-2131
Municipal	Ontario Provincial Police	Collingwood & Blue Mountains Detachment	201 Ontario Street	Collingwood, ON	L9Y 3Z5	Mr.	John	Trude		705-445-7024
Municipal	Town of The Blue Mountains	32 Mill Street	P.O. Box 310	Thornbury, ON	N0H 2P0	Mrs.	Corrina	Giles	Town Clerk	519-599-3131
Municipal	Town of Collingwood	97 Hurontario Street	P.O. Box 157	Collingwood, ON	L9Y 3Z5	Ms.	Sara	Almas	Town Clerk	705-445-1030
Municipal	Grey County	595 Ninth Avenue East	County Building	Owen Sound, ON	N4K 3E3	Ms.	Sharon	Vokes	Clerk	519-376-2205
Municipal	The County of Simcoe	Administration Centre	1110 Highway 26	Midhurst, ON	L0L 1X0		County Clerk			705-726-9300
School Board	Bluewater District School Board	351 1st Avenue North	PO Box 190	Chesley, ON	N0G 1L0	Mr.	Steve	Blake	Director of Education	519-363-2014
School Board	Bruce-Grey Catholic District School Board	799 16th Avenue		Hanover, ON	N4N 3A1					519-364-5820
School Board	Simcoe County District School Board		1170 Highway 26	Midhurst, ON	L0L 1X0	Mr.	Rick	Howse	Central Maintenance Supervisor	705-728-7570
School Board	Simcoe Muskoka Catholic District School Board	46 Alliance Blvd.		Barrie, ON	L4M 5K3		Jennifer	Sharpe	Planning Officer	705-722-3555
School Board	Student Transportation Consortium of Grey Bruce	799 16th Avenue		Hanover, ON	N4N 3A1	Ms.	Brenda	Campbell	Transportation Systems Administrator	519 364-0605
School Board	Simcoe County Student Transportation Consortium	566 Bryne Drive		Barrie, ON	L4N 9P6	Ms.	Bonnie	Branch	Transportation Officer	
Agency	Grey Bruce Health Unit	101 17th Street East		Owen Sound, ON	N4K 0A5					519-376-9420

Type	Company	Address1	Address2	City	PostalCode	Title	FirstName	LastName	JobTitle	Contact
Agency	Simcoe County District Health Unit	15 Sperling Drive		Barrie, ,ON	L4M 6K9	Mr.	Ted	Devine	Director, Health Protection Services	705-721-7520
Agency	ON Realty Corporation	1 Dundas Street West		Toronto, ON	M5G 2L5					
Utility	Bell Canada	136 Bayfield Street	Floor 2	Barrie, ON	L4M 3B1	Mrs.	Wendy	Lefebvre	Manager, Access Network	705-722-2467
Utility	Collus-Powerstream	43 Stewart Road	P.O. Box 189	Collingwood, ON	L9Y 3Z5	Mr.	Brian	Kennedy	Manager of Hydro Services	705-445-1800
Utility	Collingwood Public Utilities	43 Stewart Road	P.O. Box 189	Collingwood, ON	L9Y 3Z5	Mr.	Marcus	Firman	Chief Operating Officer	705-445-1800 ext 2246
Utility	Rogers Communications Inc.	1 Sperling Drive		Barrie, ON	L4M 6B8	Mr.	Tony	Dominguez	System Planner	705-737-4660 ext 6907 Tony.domnguez@rci.rogers.com
Utility	Hydro One	Subdivision Group	420 Welham Road	Barrie, ON	L4N 8Z2	Ms.	Heather	McTeer		1-866-272-3330
Utility	Hydro One Network	45 Sarjeant Drive	P.O. Box 6700	Barrie, ON	L4M 5N5		Business Customer Center			1-877-447-4412
Utility	ON Power Generation	700 University Avenue	H9F5	Toronto, ON	M5G 1X6	Ms.	Cara	Clairman	VP Sustainable Development	416-592-4921
Utility	Enbridge Gas Distribution Inc.	10 Churchill Drive		Barrie, ON	L4N 8Z5	Mr.	David	Smith	Sales Development Respresentative	705-739-5254
Utility	Union Gas	1590 8th St E		Owen Sound, ON	N4K 0A2	Mr.	Derrick	Cunningham		519-270-0305
First Nations Community	Chippewas of Georgina Island	R. R. #2	Box N-13	Sutton West, ON	LOE 1RO	Ms.	Donna	Big Canoe	Chief	705 437-1337
First Nations Community	Chippewas of Rama First Nation	5884 Rama Road	Suite 200	Rama, ON	L0K 1T0	Ms.	Sharon	Stinson Henry	Chief	
First Nations Community	Wahta Mohawk	P.O. Box 260	2664 Muskoka Road	Bala, ON	P0C 1A0		Blaine	Commandant	Chief	
First Nations Community	Moose Dear Point	3720 Twelve Mile Bay Road	P.O. Box 119	Mac Tier, ON	P0C 1H0		Barron	King	Chief	
First Nations Community	Wasauksing First Nation (Parry Island)	P.O. Box 250	1508 Lane "G" Geewadin Road	Parry Sound, ON	P2A 2X4		Alex	Zyganiuk	Community Consultation Coordinator	

Type	Company	Address1	Address2	City	PostalCode	Title	FirstName	LastName	JobTitle	Contact
First Nations Community	Coordinator for Williams Treaties First Nation	8 Creswick Court		Barrie, ON	L4M 2J7	Ms.	Karry	Sandy-McKenzie	Barrister & Solicitor	
First Nations Community	Beausoleil First Nation (Christian Island)	11 Ogema Miikaan	Christian Island	Cedar Point, ON	L0K 1R0		Roland	Monague	Chief	
First Nations Community	Georgian Bay Metis Council	355 Cranston Crescent	PO Box 4	Midland, ON	L4R 4K6	Mr.	David	Dusome	President	705-526-6335 daviddusome@rogers.com
First Nations Community	Metis Nation of Ontario - Head Office	500 Old St. Patrick Street	Unit D	Ottawa, ON	K1N 9G4					
Business	Blue Mountain Resorts	190 Gord Canning Drive		Blue Mountains, Ontario	L9Y 3Z2	Ms.	Lindsay	Ayers		705-445-0231
Business	Georgian International	85 Bayfield Street	Suite 500	Barrie, Ontario	L4M 3A7	Mr.	Bryan	Nykolation	Vice-President	705-730-5900 ext 2230 bryan@georgianinternational.com
Business	Mountainside Sports	774 Mountain Road		Collingwood, ON	L9Y 3Z2					705-444-2199
Business	Play it Again Sports	135 Hurontario Street		Collingwood, ON	L9Y 2L9	Ms.	Kathie	Ondercin		(705) 446-0633
Business	Tees Please	Blue Mountain Road		Collingwood, ON	L9Y 3Z2					705-445-5959
Business	Bill Brown Woodworking	743 Mountain Road		Collingwood, ON	L9Y 3Z2					705-445-4813
Business	Le Scandinave Spa	152 Grey Road 21	R.R. #3	Collingwood, ON	L9Y 3Z2	Mr.	Rob	Cederberg		705-443-8484 rob@ScandinaveBlue.com

Michael Cullip - FW: Grey Rd 19 & 21 intersection.

From: "Kelly,Michael" <Michael.Kelly@grey.ca>
To: "Michael Cullip (MCULLIP@cctatham.com)" <MCULLIP@cctatham.com>
Date: 2015-02-25 7:39 PM
Subject: FW: Grey Rd 19 & 21 intersection.

Michael Kelly
Director of Transportation Services
Phone: +1 519-372-0219 ext. 1246

Description: Grey County

From: Bob Mills [bob.mills@rogers.com]
Sent: February-23-15 2:14 PM
To: Kelly,Michael
Subject: Grey Rd 19 & 21 intersection.

Hello Michael and a 12 year homeowner on Slalom Gate Rd. so very familiar with this area. I am strongly in favor of a 2 lane roundabout. I realize you would need to expropriate the building on the SE corner to do this but believe that's best in the long run. Adding through lanes in the East / West direction would probably necessitate the same thing. Thanks.
Bob Mills
41 Slalom Gate Rd.
705 444 8470.

Michael Cullip - Grey Road 19 & Grey Road 21 Intersection Improvements

From: Gregory Morton <greg.morton@me.com>
To: <mcullip@cctatham.com>
Date: 2015-02-26 10:10 AM
Subject: Grey Road 19 & Grey Road 21 Intersection Improvements
CC: <paul.murphy@simcoe.ca>, <michael.kelly@grey.ca>

Michael Cullip,

I received the Class EA Notice of Study in the mail for the GR19/GR21 Intersection Improvements.

I offer the following input/questions:

1. Intersection improvements at the County Roads will affect the level of service of Holly Court, Laurel Boulevard, Evergreen Road/Slalom Gate Road, Slalom Gate Road, Trails End, and Mountview Court. The study should address these upstream/downstream intersections as well.

2. Round-a-bouts do not produce gaps in traffic like a signal light would. The study should speak to the change in service on all of the above listed intersections for each proposed intersection design.

3. Lighting. Recently the Town of Collingwood installed an additional streetlight at Slalom Gate Road and Mountain Road. I am opposed to this light as a solution to intersection definition concerns from residents. It is a redundant light as there is already lighting on Evergreen Road.

4. Better asphalt radius could be used to improve the Slalom Gate Road and Mountain Road intersection. I have photo-documented where many vehicles have dropped into the ditch on the southwest corner where the snow-plough tends to camouflages the true edge-of-shoulder.

5. Noise. Will the study address the increase in traffic noise? Will noise barriers be included in the scope.

I request that I am copied in any future correspondence on this topic.

Warm regards,

Gregory J. Morton, P.Eng.
11 Slalom Gate Rd
Collingwood, ON
L9Y 5B2

From: MOIRA MCINTYRE <mcintyremoira@rogers.com>
To: <michael.kelly@grey.ca>, <paul.murphy@simcoe.ca>
CC: <mcullip@cctatham.com>
Date: 3/6/2015 10:17 PM
Subject: Grey Road 19 & Grey Road 21 intersection

Good Evening Gentlemen;
I have been thinking about the traffic concerns in this intersection all day.
We already have had a failure of the roundabout that is up Mountain Road at the entrance to the Village at Blue Mountain as although this roundabout assists the traffic flow directly out the the Resort, the lights at Grey 19&21 stop that flowing traffic and I have personally seen this on several days in the last year. Your Assessment Study although valid is much too late- we already have a problem with traffic.
This problem will be exacerbated by the Windfall Development on Grey Road 19 of over 500 single family dwellings that is now in development. The proposed 242 condo unit development that Windfall is requesting an amendement to the Official Plan and a Zoning Amendment for at the next Committee of a Whole on March 16,2015 will just make everything worse. Once the Town agrees to this new condo development on the Northwest corner of Grey Road 19 and 21 - the same intersection that you are studying we will really be in trouble with traffic.
I understand that as a Collingwood resident we have little impact on what the Town of the Blue Mountains will do and therefore have come to you to assist us with this problem. Can you contact the Town of the Blue Mountains and ask them to put a hold on any new developments at this intersection until such time as the traffic issue has been studied, and decided. It seems imperative that we make the correct decision about traffic at this intersection for the safety of our citizens. Certainly additional homes funnelling into this intersection will not work.
Again, thank you for your time and hopefully you can resolve this problem.

Sincerely
Moira McIntyre

--- On Thu, 3/5/15, MOIRA MCINTYRE <mcintyremoira@rogers.com> wrote:

> From: MOIRA MCINTYRE <mcintyremoira@rogers.com>
> Subject: Grey Road 19 & Grey Road 21 intersection
> To: michael.kelly@grey.ca, paul.murphy@simcoe.ca
> Cc: mcullip@cctatham.com
> Date: Thursday, March 5, 2015, 8:53 PM
> Good Evening Gentlemen;
> I live at 17 Slalom Gate Rd. which is in the Mountain View
> Estates subdivision which borders this intersection. I
> have received your information leaflet in the mail and am
> very interested in what you are proposing to do at this
> intersection. I'm very concerned about the heavy
> traffic that I have seen of late especially coming down
> Mountain Road from Blue Mountain Resorts.
> I purchased this property almost 10 years ago as it was a
> quiet neighbourhood between the town of Collingwood and Blue
> Mountain. We ski, golf and work in the area and are
> very fond of our quiet serene neighbourhood where there is a
> mix of full time and recreational residents.
> A few weeks ago on the way home from a snowshoe outting at
> the top of the Mountain we were stopped dead on Mountain
> Road for several minutes in a line of traffic. Very
> concerning as we'd made a choice to live here so that we
> don't have to deal with traffic. When we got down to Osler

> Bluff Road there was no accident, of police cars holding up
> traffic and the lights were working. It was just
> traffic, leaving the Resort heading down Mountain
> Road. We could even enter the roundabout as there were
> too many cars from the other direction moving through and
> then once we did get around the roundabout - everything
> stopped- for several minutes.
> We are not development adverse but understand that
> there is a large condo development trying to get an Official
> Plan and Zoning By Law Amendment at the northwest corner of
> this same corner. We will find it difficult to have a 242
> condo 2,3 and 4 storey building adjacent to our lovely
> residential neighbourhood, but what about the increased
> demand on the roads?
> What are you suggesting to deal with this large number of
> people? Even if they are all recreational residents,
> 242x4 people per unit is 1000 people. This, plus the 500+
> new homes that are being built by the Windfall Development
> Group just up Mountain Road (another 2000 people) will
> certainly impact our traffic. This concerns me
> greatly. Even now, trying to get out of Slalom Gate Rd
> onto Mountain Road any time during a weekend is time
> consuming. I've waited up to 5 minutes to get a break
> in traffic.
> Public safety would deem that the Town of the Blue Mountains
> not allow a condo development at this intersection until and
> unless you can resolve the traffic congestion that is
> already occurring and there are only a handful of the
> Windfall Development homes (part of the 500+) that are
> currently finished and have people living in them.
> Please keep me informed. I look forward to hearing your
> assessment.
> Yours truly
> Moira McIntyre
> 17 Slalom Gate Rd.,
> 705 445 9955
>

Appendix G:
Alternative Solutions

LEGEND

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

NO.	REVISIONS	DATE	INITIAL

APPROVED

TOWN OF BLUE MOUNTAINS

INTERSECTION OPTION 1

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

SCALE: 1:1000 | JOB NO. 114258

DESIGN: SKR/MJC | CHECKED: MJC

DRAWN: TP | DATE: FEB/2015

DWG. **INT-1**

LEGEND

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

NO.	REVISIONS	DATE	INITIAL

APPROVED

TOWN OF BLUE MOUNTAINS

INTERSECTION OPTION 2

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

SCALE: 1:1000		JOB NO. 114258	
DESIGN: SKR/MJC	CHECKED: MJC	DWG.	**INT-2**
DRAWN: TP	DATE: FEB/2015		

LEGEND

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

NO.	REVISIONS	DATE	INITIAL

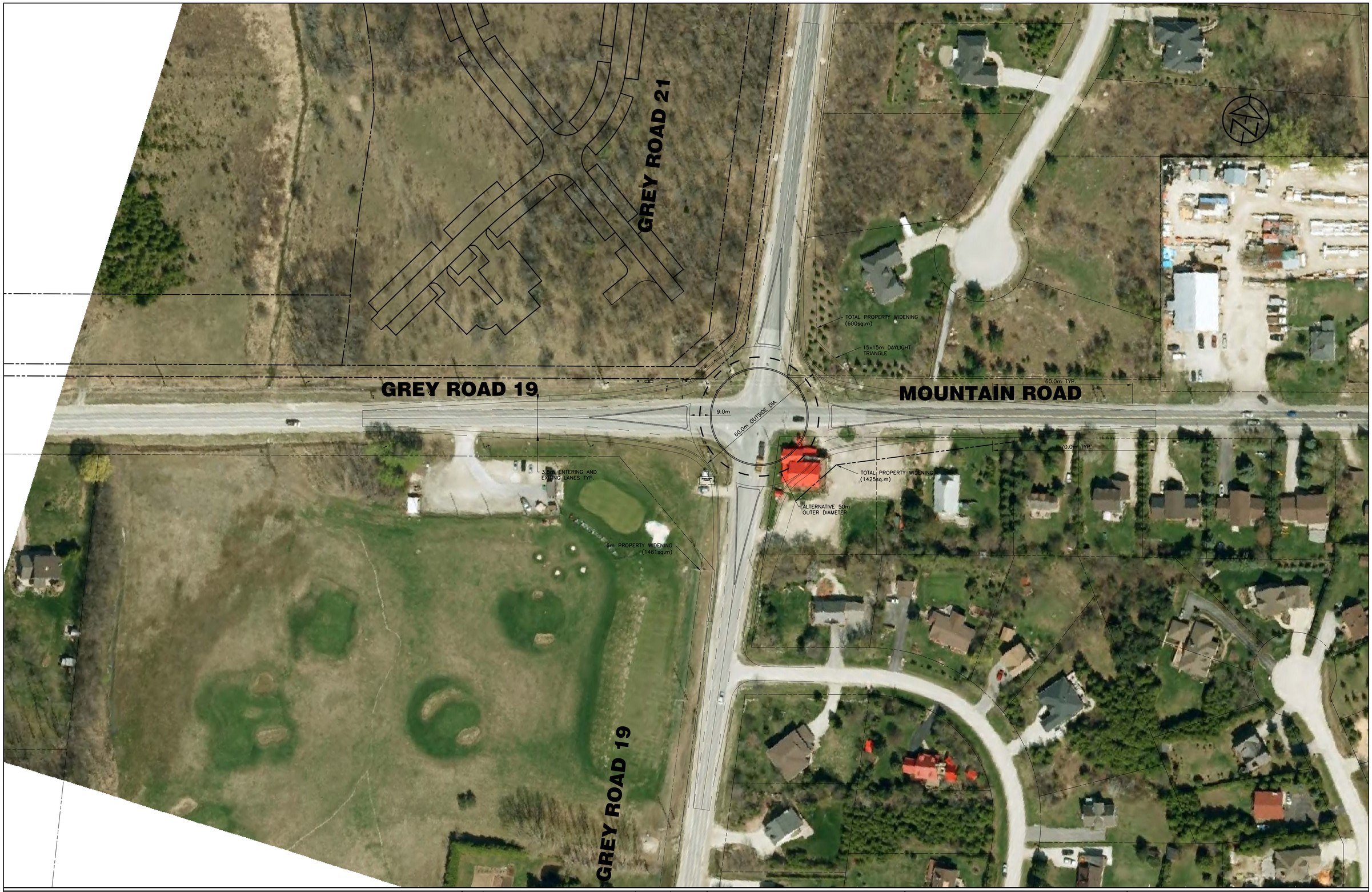
APPROVED

TOWN OF BLUE MOUNTAINS

INTERSECTION OPTION 3

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

SCALE: 1:1000 | JOB NO. 114258
DESIGN: SKR/MJC | CHECKED: MJC
DRAWN: TP | DATE: FEB/2015
DWG. **INT-3**



LEGEND

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

NO.	REVISIONS	DATE	INITIAL

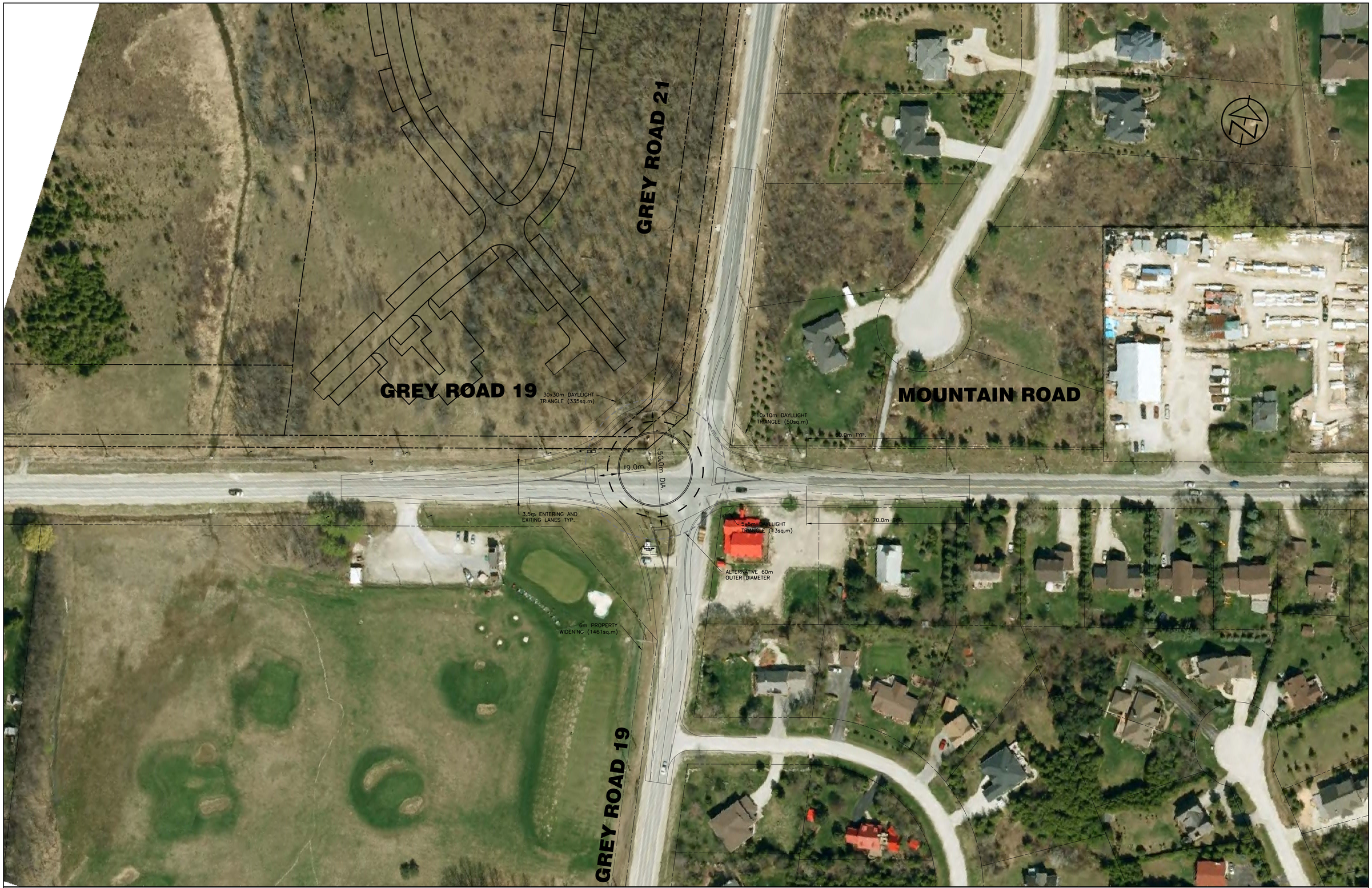
APPROVED

TOWN OF BLUE MOUNTAINS

ROUNDABOUT OPTION 1

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

SCALE: 1:1000		JOB NO. 114258	
DESIGN: SKR/MJC	CHECKED: MJC	DWG.	**RA-1**
DRAWN: TP	DATE: FEB/2015		



LEGEND

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

NO.	REVISIONS	DATE	INITIAL

APPROVED

TOWN OF BLUE MOUNTAINS

ROUNDABOUT OPTION 2

C.C.Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

SCALE: 1:1000		JOB NO. 114258	
DESIGN: SKR/MJC	CHECKED: MJC	DWG.	**RA-2**
DRAWN: TP	DATE: FEB/2015		

Appendix H:
Water Booster Station

BURIED FIBRE OPTIC CABLES
BURIED 750 TRUNK
EX. CONCRETE SLAB (CABLE)
EX. POST & WIRE FENCE
O. PED.
H.B.P.
BELL MH.
H.L.S.
S.I.B.
G.V.
U/GTV
P7
P6
P1
P2
P3
P4
P5
OSLER BLUFF ROAD
MOUNTAIN ROAD
GREY COUNTY ROAD No.19
H.ONE
CUS
H.B.F.
B. PED.
AERIAL FIBRE OPTIC CABLE
H.B.L.S.
SEE DWG. 100210-WM1RD TO WM4RD FOR ALIGNMENT OF WATERMAIN
SEE DWG. 100210-WM4-RD
G.B.M. APPROX. 855m WEST
B.P
30.0m
19.0m
H.P.
SIGNAL CONTROLLER
BRACE WIRE
Ex. 500mmø C.S.P.
350mmø WATERMAIN
17.7m
18.9m
45° ELBOW
STONE SOAK-AWAY PIT OVERFLOW DRAIN TO DITCH
6m-500mmø CSP
N.INV. 215.98
S.INV. 216.01
ACCESS HATCHES
BOOSTER PUMP CHAMBER (SEE DWGS. 100210-P3-1RD)
GRAVEL MAINTENANCE DRIVEWAY
3.0m
8.0m
20.6m
20.9m
HYDRO & BRACE WIRE
PROPOSED 350mmø WATERMAIN
Ex. 400mmø C.S.P.
M'BOX
EX. GRAVEL DWY.
EX. GRAVEL PARKING LOTS
EX. BUILDING
WELL
G.V. SERVICE
C.R.BOX
BOULDER

NOTES:
- LOCATION OF UTILITIES IS APPROXIMATE. CONTRACTOR TO OBTAIN UTILITY LOCATES AS REQUIRED PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION AGAINST DAMAGE.

PLOT 1=0.2

1m 1m 3m 5m 15m
2m 0 3m 5m 10m

LEGEND

- PROPERTY LINE
- H — OVERHEAD HYDRO WIRE
- HC — OVERHEAD HYDRO & COMMUNICATIONS CABLE
- UGC — U/G ROGERS CABLE
- UGG — U/G GAS (CONSUMERS, UNION)
- UGB — U/G BELL
- PROPOSED WATERMAIN
- x 216.85 PROPOSED FINAL GRADE

B.M.ELEV. 226.158
G.B.M. # 10 85 5003 - BRASS CAP EAST OF HYDRO TRANSFORMER STATION DRIVEWAY, ON SOUTH SIDE OF COUNTY ROAD No. 19

RECORD DRAWING

COMPILED BY:	D.S	DATE:	DEC. 2002
CHECKED BY:	D.S.	DATE:	DEC. 2002
DRAWN BY:	L.G.B.	DATE:	AUG. 2004
CHECKED BY:	D.B.E.	DATE:	SEPT. 2004

NO.	REVISIONS	DATE	INITIAL
	REVISED RECORD DRAWING	FEB. 2005	D.B.E.

RECORD DRAWING
NOTICE TO USERS

This Record Drawing may include information provided by others. Ainley & Associates Limited believes this information to be reliable but has not verified its accuracy and/or completeness and, accordingly, shall not be responsible for any errors or omissions which may result from its incorporation herein.

SCALE:	1:200
DESIGN:	B.L.
DRAWN:	D.E.
CHECKED:	I.N.
DATE:	SEPT. 2004

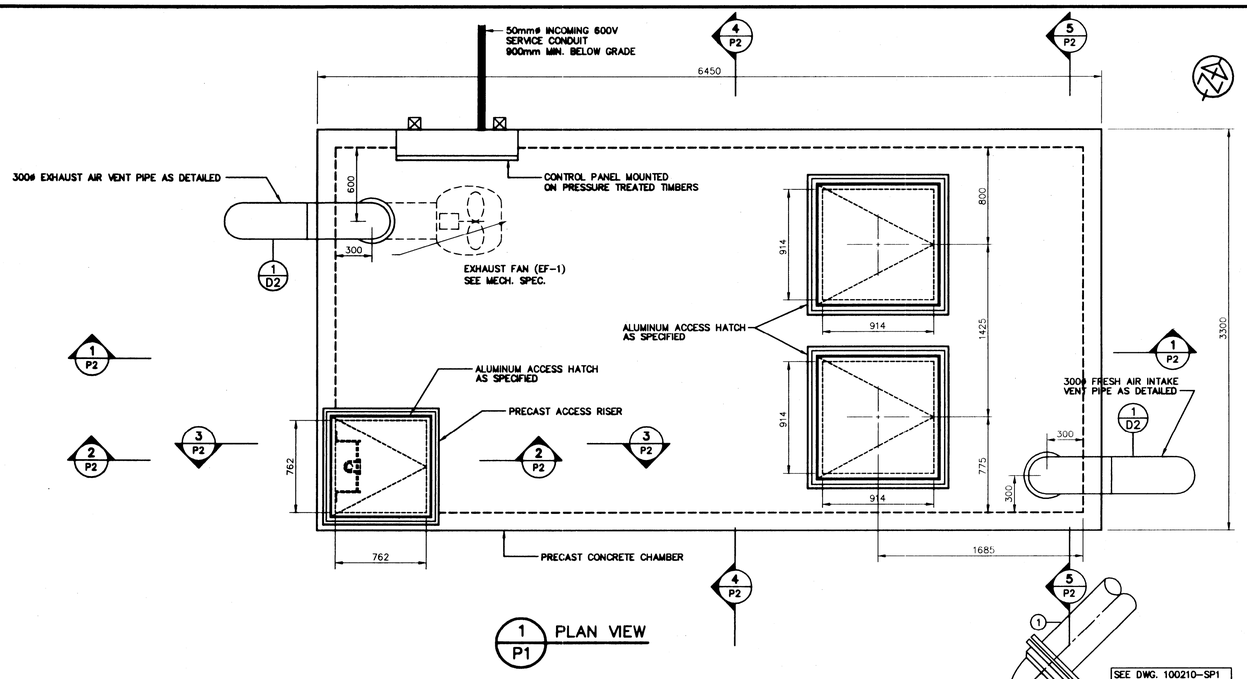
TOWN OF THE BLUE MOUNTAINS
COUNTY ROAD No.19
TRUNK WATERMAIN AND WATER BOOSTER PUMP STATION

SITE PLAN
WATER BOOSTER PUMP STATION

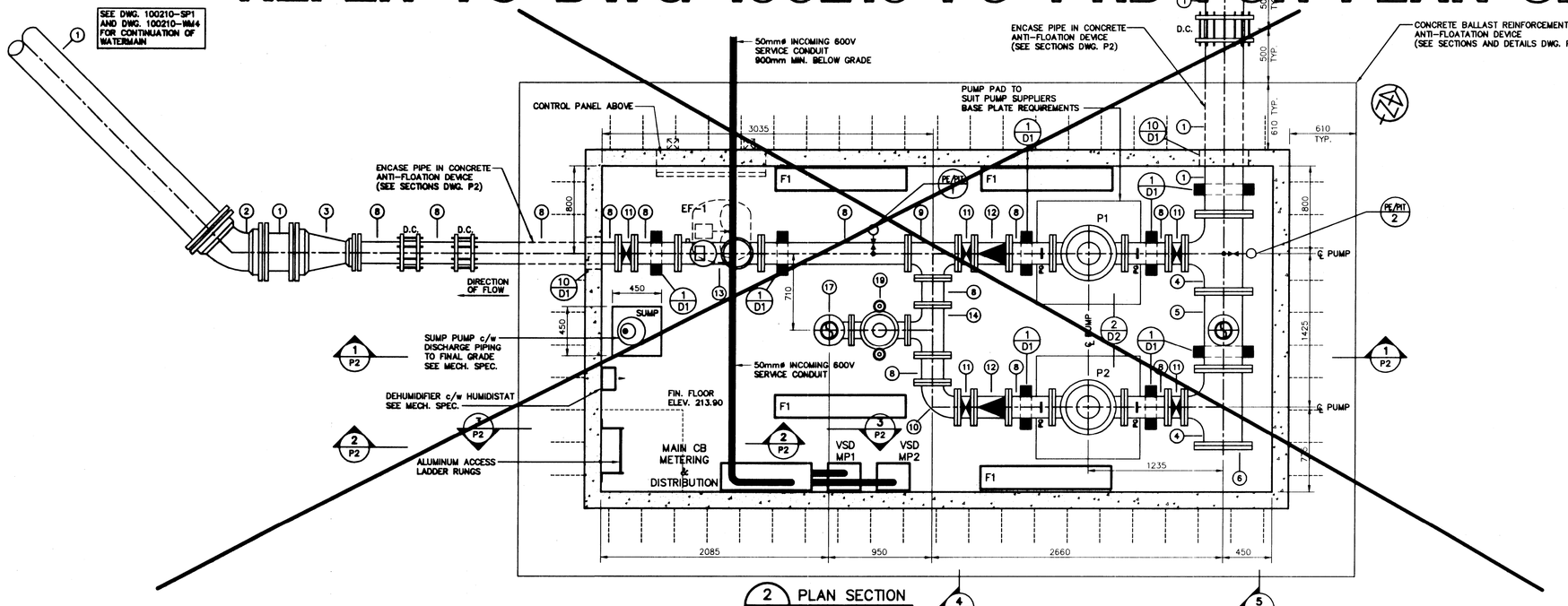
Ainley CONSULTING ENGINEERS PLANNERS

CONTRACT No. | DWG. 100210-SP1-RD

FITTING SCHEDULE	
No.	DESCRIPTION
1	350mmø D.I. PIPE
2	350mmø 45° M.J. ELBOW
3	350x200mmø M.J. REDUCER
4	350x350x200mmø REDUCING TEE
5	350x350x150mmø REDUCING TEE
6	350mmø BLIND FLANGE
7	
8	200mmø D.I. PIPE
9	200x200x200mmø TEE
10	200mmø 90° S.R. ELBOW
11	200mmø AWWA BUTTERFLY VALVE – CLOW STYLE 4500
12	200mmø SILENT CHECK VALVE – VALMATIC 1808 BN
13	200mmø FLOW METER FE/FIT-1
14	200x200x150mmø REDUCING TEE
15	
16	150mmø D.I. PIPE
17	150mmø 90° S.R. ELBOW
18	150mmø GATE VALVE
19	150mmø SURGE RELIEF VALVE – SINGER 106RPS-RR
20	200mmø FLANGED SPOOL PIECE SUITABLE TO REPLACE ITEM 13 – ADD. No.1



PLAN SECTION 2/P1 NOT APPLICABLE
REFER TO DWG 100210-P3-1-RD FOR PLAN SECTION



PLOT 1=25

0.25m 0.5m 1.5m
0 1.0m 2.0m

NOTES

1. ALL DIMENSION UNITS ARE MILLIMETRES AND ALL ELEVATION UNITS ARE METRES UNLESS OTHERWISE SPECIFIED.
2. ALL ABOVE GRADE JOINTS AND FITTINGS ARE FLANGED. ALL BELOW GRADE JOINTS AND FITTINGS ARE MECHANICAL.
3. USE UNI-FLANGE THRUST RESTRAINTS AT ALL MECHANICAL JOINTS AND FITTINGS UNLESS OTHERWISE SPECIFIED.
4. 'VC' INDICATES VICTAULIC COUPLING 'VFA' INDICATES VICTAULIC FLANGE ADAPTER

RECORD DRAWING

COMPILED	BY: D.S.	DATE:	DEC. 2002
CHECKED	BY: D.S.	DATE:	DEC. 2002
DRAWN	BY: L.G.B.	DATE:	AUG. 2004
CHECKED	BY: D.B.E.	DATE:	SEPT. 2004

NO.	REVISIONS	DATE	INITIAL
	REVISED RECORD DRAWING	FEB. 2005	D.B.E.

RECORD DRAWING

NOTICE TO USERS

This Record Drawing may include information provided by others. Ainley & Associates Limited believes this information to be reliable but has not verified its accuracy and/or completeness and, accordingly, shall not be responsible for any errors or omissions which may result from its incorporation herein.

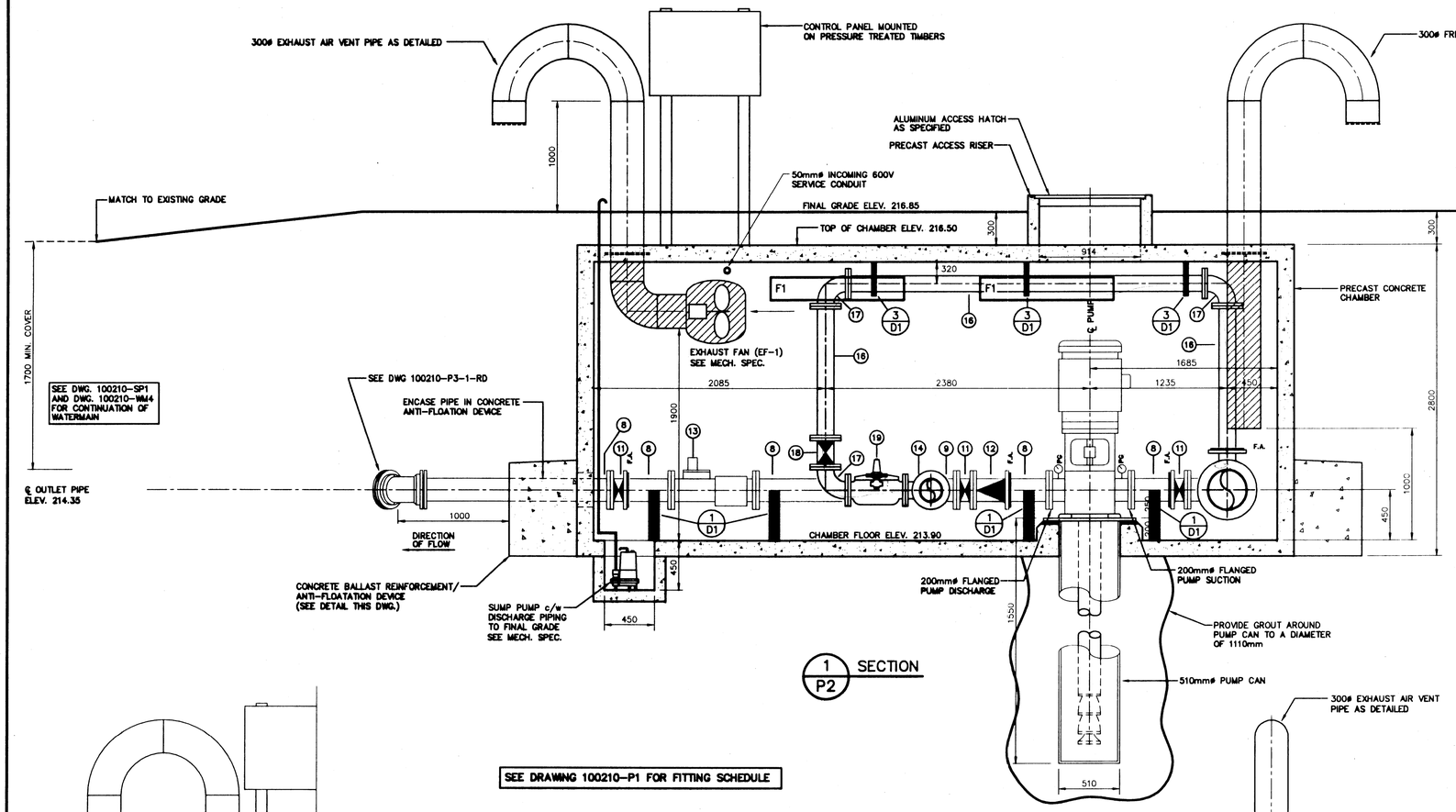
SCALE:	1:25
DESIGN:	B.L.
DRAWN:	P.C.S./D.E.
CHECKED:	I.N.
DATE:	SEPT. 2004

TOWN OF THE BLUE MOUNTAINS
COUNTY ROAD No.19
TRUNK WATERMAIN AND
WATER BOOSTER PUMP STATION

WATER BOOSTER PUMP STATION
PLANS

Ainley CONSULTING ENGINEERS PLANNERS

CONTRACT No. | DWG. 100210-P1-RD



PLOT 1=25

NOTES

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4. 'VC' INDICATES VICTAULIC COUPLING 'VFA' INDICATES VICTAULIC FLANGE ADAPTER

RECORD DRAWING

COMPILED BY: D.S.	DATE: DEC. 2002
CHECKED BY: D.S.	DATE: DEC. 2002
DRAWN BY: L.G.B.	DATE: AUG. 2004
CHECKED BY: D.B.E.	DATE: SEPT. 2004

NO.	REVISIONS	DATE	INITIAL
	REVISED RECORD DRAWING	FEB. 2005	D.B.E.

RECORD DRAWING

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SCALE:	1:25
DESIGN:	B.L.
DRAWN:	P.C.S./D.E.
CHECKED:	I.N.
DATE:	SEPT. 2004

TOWN OF THE BLUE MOUNTAINS
COUNTY ROAD No.19 TRUNK WATERMAIN AND WATER BOOSTER PUMP STATION

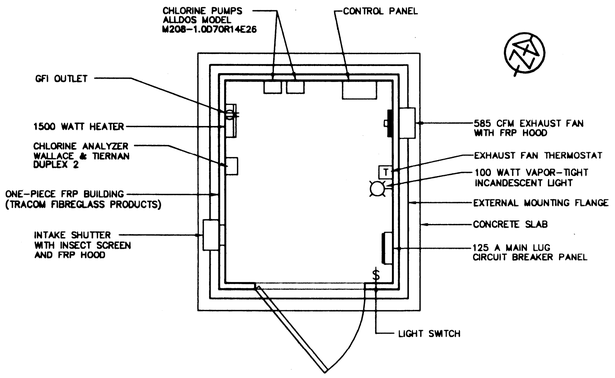
WATER BOOSTER PUMP STATION SECTIONS

Ainley CONSULTING ENGINEERS PLANNERS

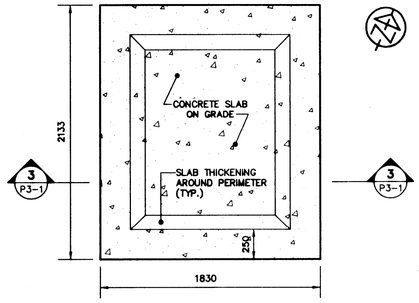
CONTRACT No. | DWG. 100210-P2-RD

FITTING SCHEDULE

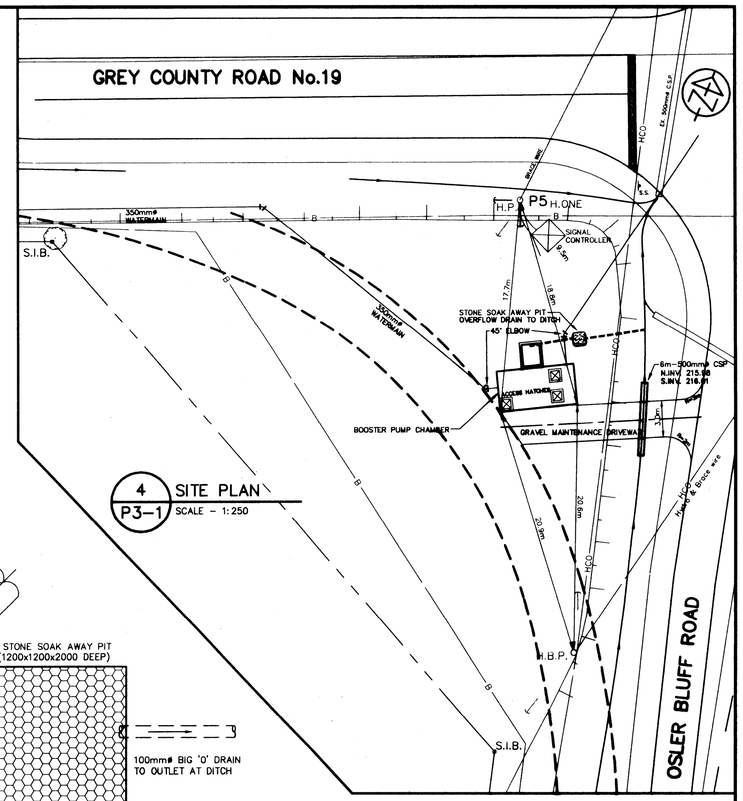
No.	DESCRIPTION
1	350mmø D.I. PIPE
2	350mmø 45° M.J. ELBOW
3	350x200mmø M.J. REDUCER
4	350x350x200mmø REDUCING TEE
5	350x350x150mmø REDUCING TEE
6	350mmø BLIND FLANGE
7	
8	200mmø D.I. PIPE
9	200x200x200mmø TEE
10	200mmø 90° S.R. ELBOW
11	200mmø AWWA BUTTERFLY VALVE – CLOW STYLE 4500
12	200mmø SILENT CHECK VALVE
13	200mmø FLOW METER FE/FIT-1
14	200x200x150mmø REDUCING TEE
15	
16	150mmø D.I. PIPE
17	150mmø 90° S.R. ELBOW
18	150mmø GATE VALVE
19	150mmø SURGE RELIEF VALVE
20	200mmø FLANGED SPOOL PIECE SUITABLE TO REPLACE ITEM 13 – ADD. No.1



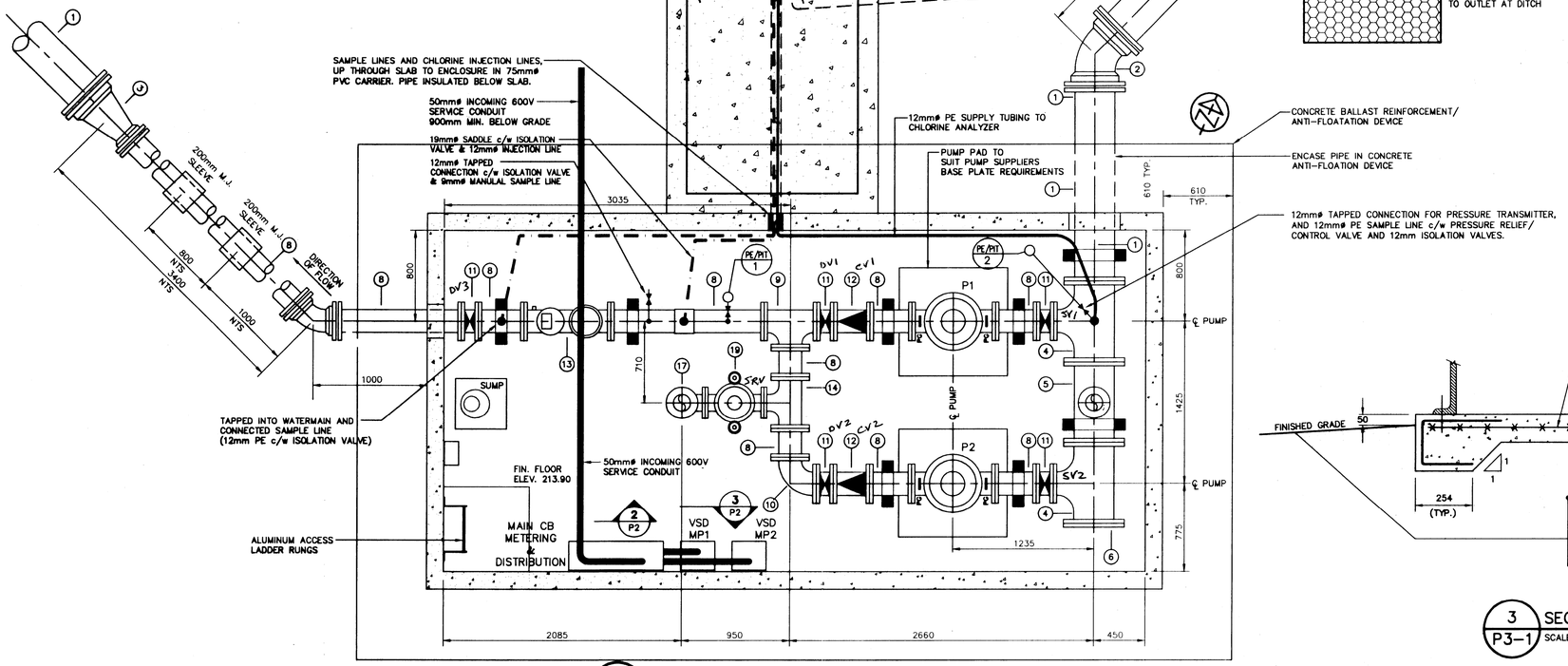
PLAN VIEW
SCALE – N.T.S.



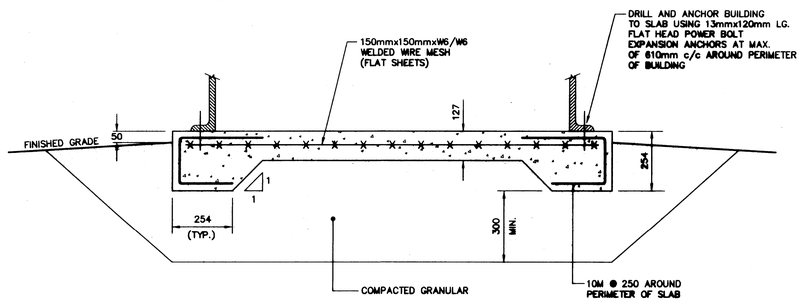
2 / P3-1 PLAN – SLAB



4 / P3-1 SITE PLAN
SCALE – 1:250



1 / P3-1 PLAN SECTION



3 / P3-1 SECTION – SLAB DETAIL
SCALE – N.T.S.

0 0.25m 0.5m 1.5m
0 1.0m 2.0m

PLOT 1=25

NOTES

1. ALL DIMENSION UNITS ARE MILLIMETRES AND ALL ELEVATION UNITS ARE METRES UNLESS OTHERWISE SPECIFIED.
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RECORD DRAWING

COMPILED	BY: D.S.	DATE:	DEC. 2002
CHECKED	BY: D.S.	DATE:	DEC. 2002
DRAWN	BY: L.G.B.	DATE:	AUG. 2004
CHECKED	BY: D.B.E.	DATE:	SEPT. 2004

NO.	REVISIONS	DATE	INITIAL
	REVISED RECORD DRAWINGS	FEB. 2005	D.B.E.

RECORD DRAWING

NOTICE TO USERS

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SCALE:	1:25
DESIGN:	B.L.
DRAWN:	P.C.S./D.E.
CHECKED:	M.W.A.
DATE:	SEPT. 2004

TOWN OF THE BLUE MOUNTAINS
COUNTY ROAD No.19
TRUNK WATERMAIN AND WATER BOOSTER PUMP STATION

WATER BOOSTER PUMP STATION CHLORINATION SYSTEM PLAN

Ainley CONSULTING ENGINEERS PLANNERS

CONTRACT No.

DWG. 100210-P3-1-RD

Appendix I:
Geotechnical Investigation

SPL Consultants Limited | ENGINEERING SOLUTIONS

March 10, 2014

SPL Project No.: 10001468

C.C. Tatham & Associates Ltd.
115 Sandford Fleming Road, #200
Collingwood, ON L9Y 5A6

Attention: **Mr. Michael Cullip, B.Eng. & Mgmt., M.Eng., P.Eng.**
Client Email: **mcullip@cctatham.com**

Re: **Geotechnical Investigation – Desktop Study**
Class Environmental Assessment for the Intersection Design of
Grey Road 21 & Grey Road 19, Town of Collingwood, ON

Dear Sir:

SPL Consultants Limited (SPL) was retained by C.C. Tatham & Associates Ltd to conduct a geotechnical investigation for a Class Environmental Assessment (EA) for the Intersection Design of Grey Road 21 & Grey Road 19 being conducted by Grey County. This letter report summarizes the results of the desktop study, which is the first stage of the geotechnical investigation.

1. INTRODUCTION

A geotechnical investigation will be completed as part of a Schedule B Class EA for the redesign of the intersection at Grey Road 19/Simcoe Road 34/Grey Road 21 and Mountain Road (Grey Roads 19 and 21 intersection). The intersection is under the jurisdiction of both Grey County and Simcoe County. It is our understanding that design options for the intersection are to be developed as part of the EA process and are to include the future widening of Grey Road 19 (south and west quadrants).

Reference Documents:

Information used to prepare this letter report was gathered from the following information:

- Ontario Division of Mines (ODM), Preliminary Map P.919, Geological Series, Quaternary Geology Collingwood – Nottawasaga Area, 1974;
- Ministry of Northern Development and Mines (MNDM), Collingwood Township, Grey County, Map 3 Bedrock Resources, 1991;
- Ministry of the Environment and Climate Change (MOECC) Water Well Records (WWR);
- Nottawasaga Valley Conservation Authority (NVCA), Interactive Map http://maps.simcoe.ca/NVCA/;
- TerraProbe Inc., Preliminary Geotechnical Investigation, Proposed Residential Subdivision, East Woodbridge Lands, Town of Blue Mountains, July 17, 2007;

- TerraProbe Inc., Preliminary Geotechnical Investigation, Proposed Residential Subdivision, Le Scandinave Spa Lands, Town of Blue Mountains, August 8, 2008; and,
- TerraProbe Inc., Summary of Final Groundwater Levels, Proposed Residential Development, Georgian Gate, The Blue Mountains, June 2, 2009.

The objective of the desktop study is to provide a review of existing information and to evaluate the regional geological and hydrogeological setting within the study area. Additional boreholes to verify the site-specific subsurface conditions will be required.

2. GEOLOGICAL AND HYDROGEOLOGICAL SETTING

The proposed project consists of the redesign of the Grey Roads 19 and 21 intersection in the Town of Collingwood.

2.1 Land Use and Surface Waters

The lands located adjacent to the Grey Roads 19 and 21 intersection include residential developments, commercial buildings, unoccupied and recreational space. The area northeast and south east of the intersection is comprised of the Evergreen Country Estates residential properties. The area northwest of the site is the proposed Georgian Gates residential development, which is currently forested, and the Le Scandinave Spa property. The area southwest of the intersection is comprised of a golf centre, driving range and a mini-putt facility.

The site is located in the Silver Creek Watershed. Two tributaries of the Silver Creek, one approximately 400 m north and another approximately 900 m south of the intersection, cross Grey Road 19 and flow in a north-easterly direction towards Georgian Bay.

The site is not within an area identified to be Wellhead Protection Area (WHPA), or a significant groundwater recharge area (SGRA) or an area that contains a highly vulnerable aquifer (HVA) as identified in the 2014 Updated Assessment Report: Nottawasaga Valley Source Protection Area, July 2014, and the NVCA's source water protection vulnerability mapping.

2.2 Regional Geology

The investigation area is located in the Simcoe Lowlands Physiographic Region (Chapman and Putnam, 1984) at the base of the Niagara Escarpment. Based on the information in the ODM Quaternary Geology map, the predominant native soils consist of sandy silt till. To the east of the site, the geology mapping indicates that there are stratified to sub-stratified deposits of gravel and sand, including minor till. Figure 2 illustrates the Surficial Geology in the area of the site.

Based on the MNDM Bedrock Map, the bedrock underlying the site consists of the Blue Mountain Formation of the upper Ordovician period which is a blue-grey shale. The bedrock is expected to be at depths of over 15 m below grade.

2.3 Site Stratigraphy

The interpretation of the subsurface stratigraphy in the area of the site is based on review of geological mapping, MOECC WWRs, and the TerraProbe geotechnical investigations for the Le Scandinave and Georgian Gates properties. Based on these, in general, the anticipated subsurface stratigraphy in the area of the site would consist of the following:

- **Topsoil**, up to 0.2 m thick;
- **Silty Sand to Sandy Silt Till**, with trace to some clay and pebbles, ranging in thickness to a depth of 0.2m to 8.2 m below grade. This formation is identified on the Le Scandinave and Georgian Gates property to the west and northwest of the intersection, as well as throughout the area in the WWRs (note that many of the WWRs indicate a 'clay' at surface, this 'clay' formation is interpreted to be consistent with the till formation identified in the geological mapping and the geotechnical investigation reports). Note that stratified layers of increased sand were encountered within the sandy silt till.
- **Upper Sand and Gravel**, ranging in thickness to depths of 2.4 to 16 m below grade. This sand and gravel unit was encountered, in a wet state, in BH 3 and BH 5 on the Le Scandinave property, as well as throughout the area in the WWRs. Three WWRs in the 300 m radius of the intersection are screened in this upper sand and gravel formation.
- **Clay Till**, ranging in thickness to depths of 5.5 to 19.2 m below ground. Multiple WWRs included this clay till formation underlying the upper sand and gravel
- **Lower Sand**, ranging in thickness to depths of 15 m to 20.7 m below ground. The majority of the WWRs in the 300 m radius of the intersection are screened in this sand unit.
- **Bedrock** was encountered in a couple of WWRs at depths of 24.4 m and 27.7 m below grade.

WWRs, 5739489, 5737448 and 5730414, south of Grey Road 21 in the eastern portion of the 300 m radius of the intersection, indicate that sand is present at surface. This is consistent with geological mapping of a stratified to sub-stratified deposits of gravel and sand, including minor till, east of the site.

2.4 Groundwater Conditions

Regional groundwater flow is expected to be easterly/north-easterly toward Georgian Bay. Shallow groundwater flow will be influenced by topography as well as the tributaries of the Silver Creek.

Based on the MOECC water well record review, 12 wells were identified in a 300 m radius of the site, with additional wells, not on record, expected to exist. The WWRs for all 12 of the locations indicate that the wells are used for domestic water supply.

Well depths range between 10.7 m to 65.7 m below ground, and the static water levels were reported varying from 0.6 m to 6.4 m below ground surface.

The locations of the MOECC WWRs are shown on Figure 1, and the records are included in Appendix A.

As mentioned in Section 1, Terraprobe completed a monthly groundwater monitoring program on the Le Scandinave and Georgian Gates residential development properties. While it is acknowledged that these properties are outside of the study area, the information from five of the BHs installed during these geotechnical investigations are being used to understand the conditions in the area. The locations of the selected boreholes/standpipe piezometers that were installed during the geotechnical investigations at the Le Scandinave (BH1, BH2, BH3 and BH5) and East Woodbridge Lands (BH1) geotechnical investigations are shown on Figure 1. The borehole logs for these locations are included in Appendix B. After the groundwater levels had stabilized in the standpipe piezometers, the groundwater levels were reported ranging from 0.9 m below ground to 0.5 m above ground level, with the high levels being measured in March of 2009.

3. SUMMARY

The geological and hydrogeological conditions in the area of the 19th and 21st intersection are expected to consist of sandy silt till ranging from 0.2 to 8.2 m below ground overlying an upper sand and gravel unit. This sand and gravel was encountered between 2.4 m to 16 m below ground and is a water bearing formation. Below the upper sand and gravel is a clay till extending up to 19.2 m, a lower sand unit encountered between 15 m to 20.7 m below ground, followed by bedrock. The upper sand and gravel unit is expected to be a source of groundwater and, depending on the construction design and area of the site, may require groundwater control during construction. Further assessment would be needed to determine groundwater seepage rates and volumes. A site specific geotechnical investigation should be conducted when the intersection design option has been determined by the EA process.

We trust that the information contained in this report is satisfactory. Should you have any questions, please do not hesitate to contact this office.

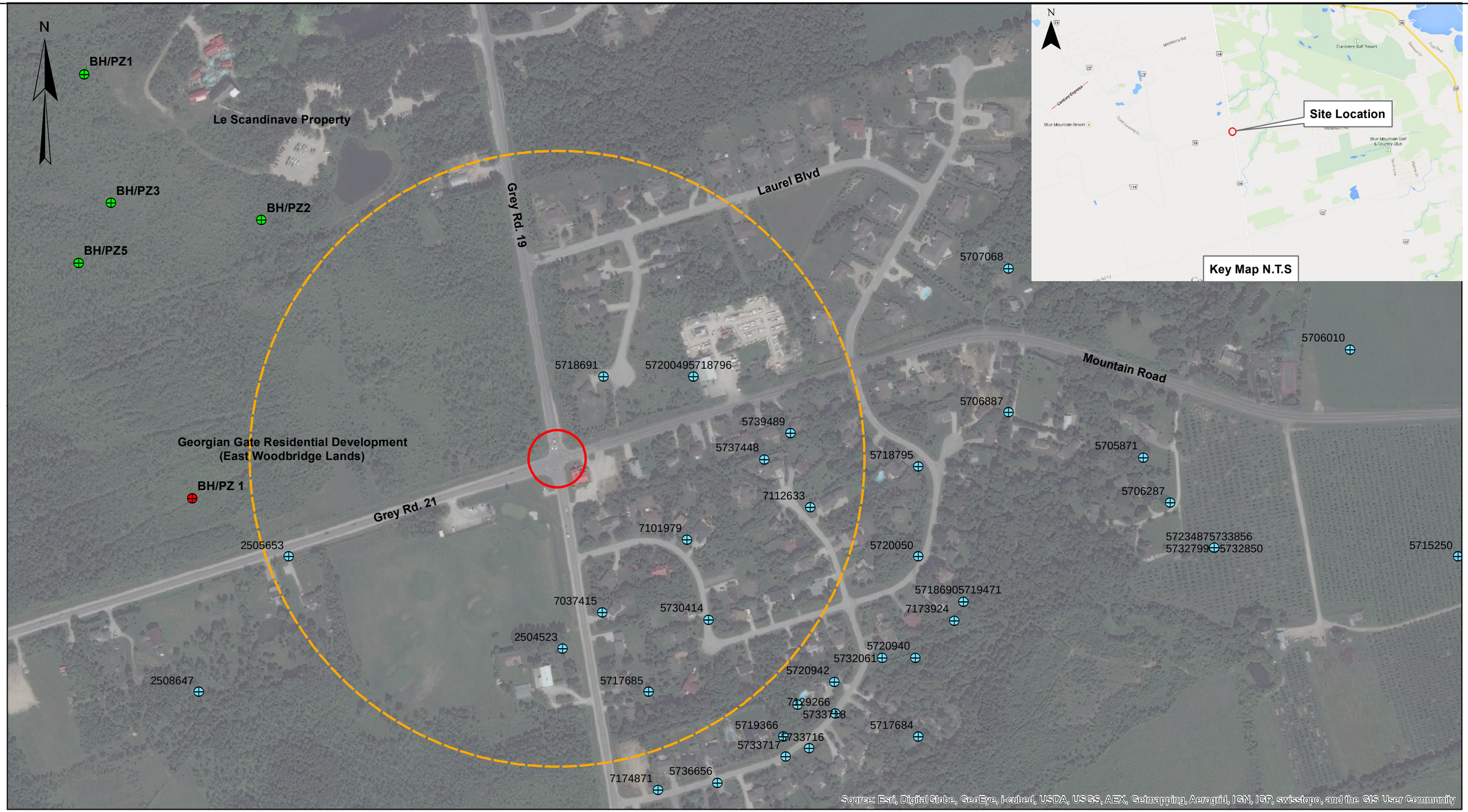
Yours truly,

SPL Consultants Limited

Gord Jarvis
Branch Manager, Collingwood

Kulbir Singh, P.Eng.
Geotechnical Engineer

FIGURES



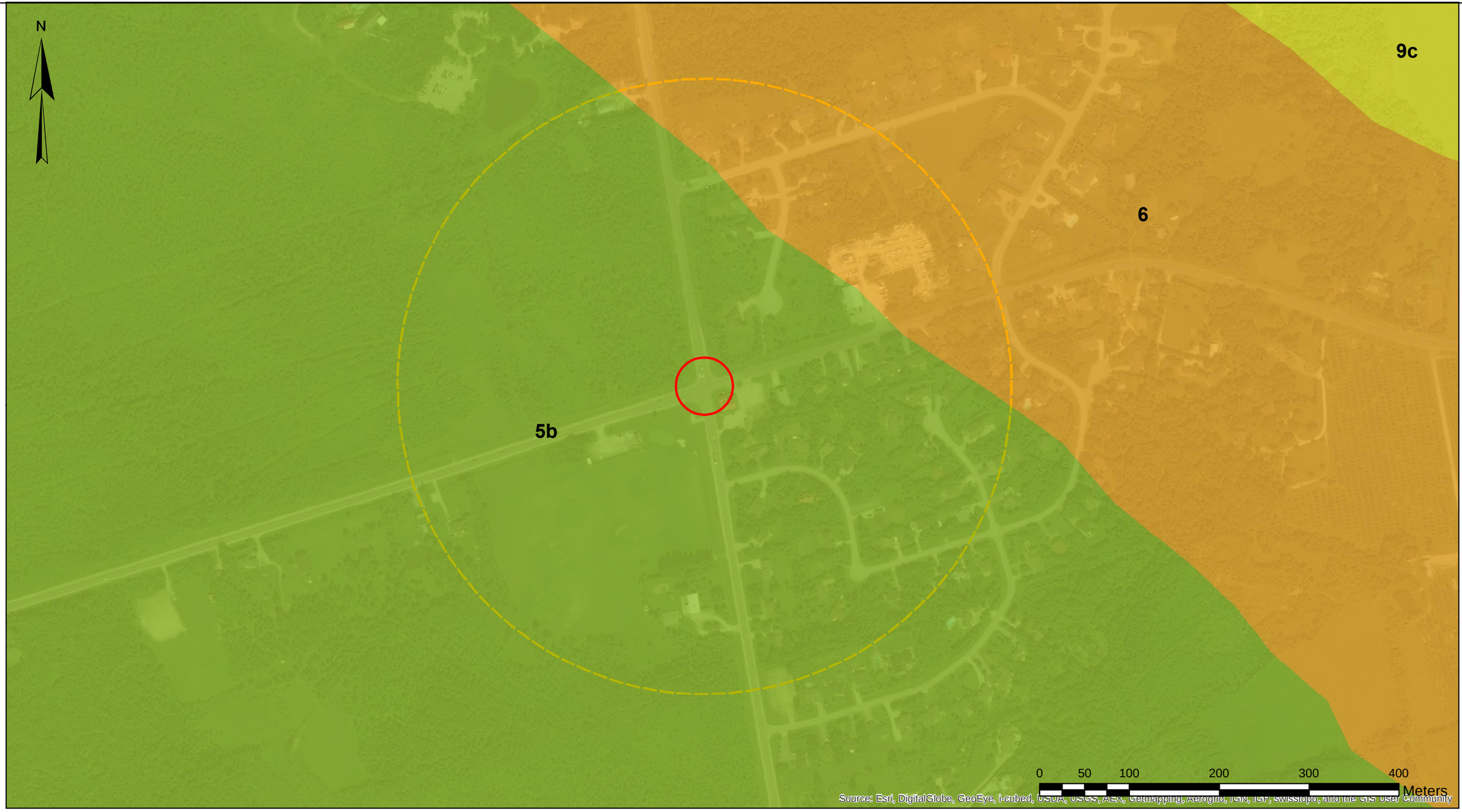
LEGEND:

- Site Location
- 300m Study Area
- MOECC Water Well Record
- East Woodbridge Lands Piezometer, Terraprobe, 2007
- Le Scandinave Spa Piezometer, Terraprobe, 2008

0 50 100 200 300 400 Meters

Source: Golden Horseshoe GIS Database 2002

Client: Empire Communities		Project No.: 10001468-300	Figure No: 1
Drawn: WB	Approved: GJ	Title: SITE LOCATION AND MOECC WATER WELL RECORDS	
Date: March 2015	Scale: As Shown	Project: DESKTOP STUDY GREY RD. 21 AND GREY RD. 19, COLLINGWOOD, ONTARIO	
Origional Size: Tabloid	Rev: 0	SPL Consultants Limited | ENGINEERING SOLUTIONS	



LEGEND:

- Site Location
- 300m Study Area
- 5b: Silty to sandy till (derived from stone-poor carbonate deposits)
- 6: Ice-contact stratified deposits; sand & gravel, minor silt, clay & till
- 9c: Coarse-textured glaciolacustrine deposits; sand, minor fine gravel

Source: Golden Horseshoe GIS Database 2002

Client: C.C. Tatham & Associates Ltd		Project No.: 10001468-300	Figure No: 2
Drawn: WB	Approved: GJ	Title: SURFICIAL GEOLOGY	
Date: March 2015	Scale: As Shown	Project: GEOTECHNICAL INVESTIGATION GREY RD. 21 AND GREY RD. 19, COLLINGWOOD, ONTARIO	
Origional Size: Tabloid	Rev: 0	SPL Consultants Limited | ENGINEERING SOLUTIONS	

APPENDIX A
MOECC Water Well Records

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 2504523 | MUNICIP. 2,5,00,3 | CON. CON | 10,1

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Grey	Collingwood Twp	1	015

OWNER (SURNAME FIRST) [redacted] | ADDRESS 2203 Collingwood | DATE COMPLETED DAY 13 MO [illegible] YR. 75

RC | ELEVATION | AC | BASIN CODE

21 | 2504523 17 | 556808 | 4826999 | 4 | 715 | 5 | 22 | MAY 22, 1975 | 70

LOG OF OVERBURDEN AND BEDROCK MATERIALS

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
	Topsoil.			0	1
Grey	clay.			1	18
	sand		Fine	18	30
	sand		Clean coarse	30	40

OWRC P.7

31 | 32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0030 ~~050~~	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 5/8 07	1 ☒ STEEL / 2 ☐ GALVANIZED / 3 ☐ CONCRETE / 4 ☐ OPEN HOLE	2.31	0	~~340~~ 0035
	1 ☒ STEEL / 2 ☐ GALVANIZED / 3 ☐ CONCRETE / 4 ☐ OPEN HOLE	Screen	34'6"	~~40~~ 0040
	1 ☐ STEEL / 2 ☐ GALVANIZED / 3 ☐ CONCRETE / 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
010 ~~slot~~	06.000 INCHES	5'6" FEET

MATERIAL AND TYPE: 5-S. 4 ~~blue~~ steel | DEPTH TO TOP OF SCREEN: 0035 ~~34'4"~~ FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER | PUMPING RATE: 0008 GPM | DURATION OF PUMPING: 03 HOURS 30 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
002 FEET	015 FEET		009 FEET	~~013~~ FEET	015 FEET	015 FEET

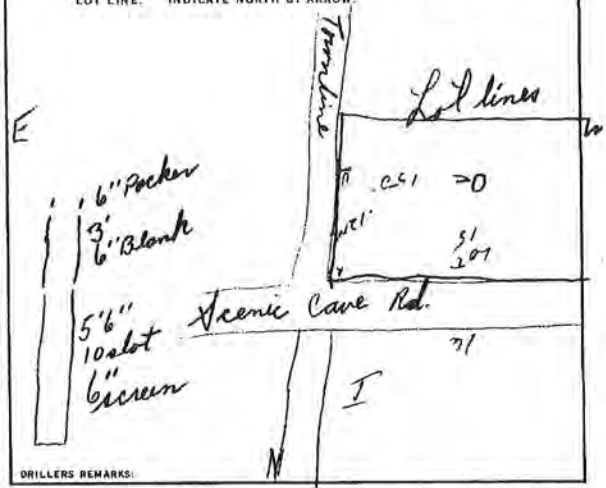
IF FLOWING GIVE RATE: GPM | PUMP INTAKE SET AT: FEET | WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☐ DEEP | RECOMMENDED PUMP SETTING: 030 FEET | RECOMMENDED PUMPING RATE: 0010 GPM

0.0036 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 01

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING

1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Jim Clarke Well Drilling | LICENCE NUMBER: 1565

ADDRESS: RR# 2 Meaford.

NAME OF DRILLER OR BORER: Bob. | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Jas A Clarke | SUBMISSION DATE: DAY ____ NO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 1565 | DATE RECEIVED: 14 03 74

DATE OF INSPECTION: 26. 9. 74 | INSPECTOR: J

REMARKS: P 2 WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 07-091

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

41 A/SW

Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 2505653 | PROVINCE 25003 | CON. CON | 01

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
GREY	CUTLINGWOOD	1	015

[redacted] INDIAN GROVE TORONTO | DATE COMPLETED DAY 11 MO 06 YR 76

UTM 27100 | FC 5 | ELEVATION 0729 | SC 5 | BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	TOP SOIL			0	1
GREY	CLAY	STONES		1	27
BLACK	SILT	SAND		27	35
GREY	CLAY			35	53
GREY	CLAY	SILT		53	63
BROWN	SAND			63	68

31 | 0001 1602 | 0027 2051 2 | 0035 8062 8 | 0063 2205 | 0063 2 10 3 0 6 | 0068 628

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0063 ~~64~~	1 ☑ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
06 ~~6 1/4~~	1 ☑ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE	188	0	063
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

SLOT NO.	DIAMETER INCHES	LENGTH FEET
008	06000	03

MATERIAL AND TYPE: STAINLESS STEEL

DEPTH TO TOP FEET: 0060 ~~64~~

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☑ PUMP 2 ~~☑ BAILER~~	0002 GPM	03 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☑ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
003 ~~5~~ FEET	018 FEET			030 FEET	022 FEET	FEET

IF FLOWING GIVE RATE: GPM

PUMP INTAKE SET AT: 61 FEET

WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP

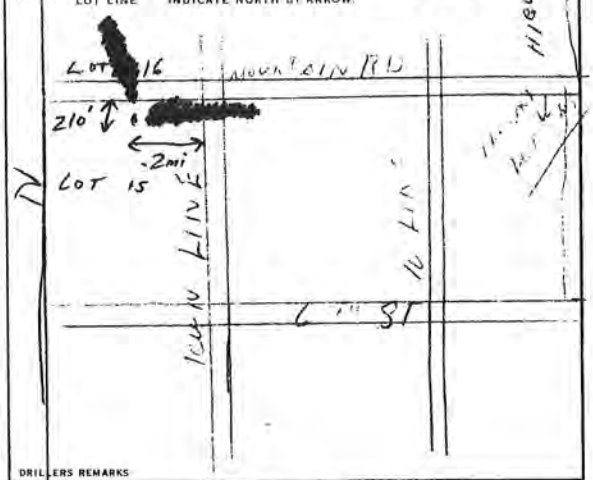
RECOMMENDED PUMP SETTING: 061 ~~61~~ FEET

RECOMMENDED PUMPING RATE: 0002 GPM

GPM / FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL

1 ☑ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE

01

1 ☑ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED; ☐ OTHER

METHOD OF DRILLING

1 ☑ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: DAWSON M SEWELL | LICENCE NUMBER: 4716

ADDRESS: RR1 DUNDALK

NAME OF DRILLER OR BORER: SAME | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: [signature] | SUBMISSION DATE: DAY ____ NO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR: 4716 | DATE RECEIVED: 30 06 26

DATE OF INSPECTION: July 4/77 | INSPECTOR:

REMARKS:

P.P.S.

W.R.

FORM 7 MOE 07-091

MINISTRY OF THE ENVIRONMENT COPY

4148

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

(11) 5717685 MUNICIP 5700B CON. C4N 12

COUNTY OR DISTRICT	TOWNSHIP BOROUGH CITY TOWN VILLAGE	CON BLOCK TRACT SURVEY ETC	LOT
[redacted]	[redacted]asaga	XII	045

[redacted] Donwood Dr., Toronto M4N 2G5 — DATE COMPLETED DAY 21 MO 05 YR 81

UTM 26,950 | RC 5 | ELEVATION 0700 | DC 5 | BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH FEET FROM	DEPTH FEET TO
	clay	gravel, cobbles, boulders		0	21
	coarse sand			21	27
	fine sand	gravel		27	35

total depth: 25 feet

(31) 0021 05 N 13 0027 10 0035 08 N

32

(41) WATER RECORD

WATER FOUND AT FEET	KIND OF WATER
0021 21-27	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

(51) CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH FEET FROM	DEPTH FEET TO
06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	0.188	+1	0020
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING SLOT NO.: 018 — DIAMETER: 06.000 INCHES — LENGTH: 05 FEET

MATERIAL AND TYPE: 18 slot (0.018") stainless steel wire wound

DEPTH TO TOP: 16.5 — packer 0017

(61) PLUGGING & SEALING RECORD

DEPTH SET AT FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)
10-13	18-17	
18-21	22-25	
26-29	30-33	

(71) PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER — PUMPING RATE: 0005 GPM — DURATION OF PUMPING: 02 HOURS 45 MINS

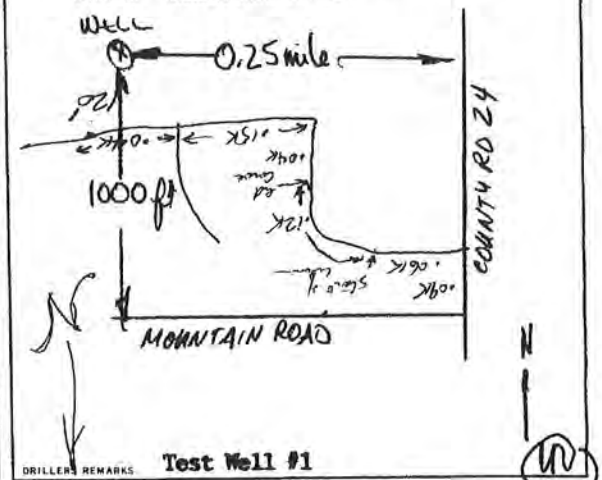
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY			
006	021	15 MINUTES 018	30 MINUTES 019	45 MINUTES	60 MINUTES 020
5.95 FEET	20.5 FEET	18.06 FEET	19.07 FEET	FEET	19.85 FEET

IF FLOWING GIVE RATE: GPM — PUMP INTAKE SET AT: FEET — WATER AT END OF TEST: 1 ☐ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☐ DEEP — RECOMMENDED PUMP SETTING: FEET — RECOMMENDED PUMPING RATE: GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW



DRILLER'S REMARKS: Test Well #1

FINAL STATUS OF WELL (56)	1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED
WATER USE (55-56) 01	1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED
METHOD OF DRILLING (57) 2	1 ☐ CABLE TOOL 2 ☒ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Snider Drilling Limited, — LICENCE NUMBER: 4816

ADDRESS: R.R.#1, (Craighurst), BARRIE, Ont. L4M 4Y8

NAME OF DRILLER OR BORER: Phillip Brown. — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Snider Drilling Limited. — SUBMISSION DATE: DAY ____ MO ____ YR. ____

OFFICE USE ONLY

DATA SOURCE (58): 1 — CONTRACTOR (59-62): 4816 — DATE RECEIVED: 031181

DATE OF INSPECTION: — INSPECTOR:

REMARKS:

Loc only 04/10/83 CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO 0506--4--77 FORM 7

7101979.

Ontario Ministry of the Environment

Well Tag No. (Place Sticker and/or Print Below) A 054200
A 054200.

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

First Name	Last Name	E-mail Address	☐ Well Constructed by Well Owner
	1588553 ONT. LTD.		

Mailing Address (Street Number/Name, RR)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
RR#1 COLLINGWOOD	COLLINGWOOD	ONT	L9Y3Y9	

Address of Well Location (Street Number/Name, RR)	Township	Lot	Concession
64 SLALOM GATE RD.	CLEARVIEW	64	12

County/District/Municipality	City/Town/Village	Province	Postal Code
SIMCOE	COLLINGWOOD	Ontario	L9Y3Y9

UTM Coordinates	Zone	Easting	Northing	GPS Unit Make	Model	Mode of Operation: ☐ Undifferentiated ☑ Averaged
NAD 83	17	559574	9273433	MAGELLAN		☐ Differentiated, specify

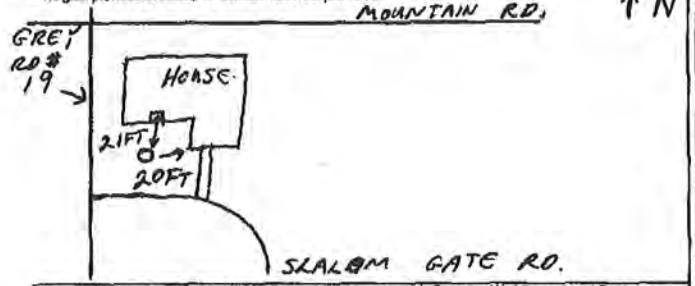
General Colour	Most Common Material	Other Materials	General Description	Depth (Metres) From	To
			SANDY CLAY	0	17.3
			SAND SILT.	17.3	17.98
			CLAY + SAND.	17.98	24.1
			SAND CLAY (HARD)	24.1	27.7
BLACK			SHALE	27.7	35.96
BROWN			SHALE	35.96	37.49
BROWN			LIMESTONE	37.49	38.4
WHITE			LIMESTONE.	38.4	53.34

Depth Set at (Metres) From	To	Type of Sealant Used (Material and Type)	Volume Placed (Cubic Metres)
0	8	BENSEAL	.4

☑ Cable Tool ☐ Diamond ☐ Public ☐ Commercial ☐ Not used
☐ Rotary (Conventional) ☐ Jetting ☑ Domestic ☐ Municipal ☐ Dewatering
☐ Rotary (Reverse) ☐ Driving ☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Rotary (Air) ☐ Digging ☐ Irrigation ☐ Cooling & Air Conditioning
☐ Air percussion ☐ Boring ☐ Industrial
☐ Other, specify ☐ Other, specify

☑ Water Supply ☐ Dewatering Well ☐ Observation and/or Monitoring Hole
☐ Replacement Well ☐ Abandoned, Insufficient Supply ☐ Alteration (Construction)
☐ Test Hole ☐ Abandoned, Poor Water Quality ☐ Other, specify
☐ Recharge Well ☐ Abandoned, other, specify

Please provide a map below showing:
- all property boundaries, and measurements sufficient to locate the well in relation to fixed points,
- an arrow indicating the North direction
- detailed drawings can be provided as attachments no larger than legal size (8.5" by 14")
- vidigital pictures of inside of well can also be provided



Date Well Completed (yyyy/mm/dd)	Was the well owner's information package delivered?	Date the Well Record and Package Delivered to Well Owner (yyyy/mm/dd)
2007/11/28	☐ Yes ☑ No	

Business Name of Well Contractor	Well Contractor's Licence No.
GEORGIAN BAY WELL DRILLING LTD.	6433

Business Address (Street No./Name, number, RR)	Municipality
RR#4	MEAFORD

Province	Postal Code	Business E-mail Address
ONT	N4L1W7	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	
5195381990	HODGKINSON	GEORGE

Well Technician's Licence No.	Signature of Technician	Date Submitted (yyyy/mm/dd)
7857	George Hodgkinson	2007/12/1

0506E (11/2006) **Ministry's Copy**

Check box if after test of well yield, water was: ☑ Clear and sand free ☐ Cloudy ☐ Cannot develop to sand-free state

If pumping discontinued, give reason:

Pumping test method: PUMP

Pump intake set at (Metres): 51.8

Pumping rate (Litres/min): 11.36

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (Metres): 32.29

Recommended pump type: ☐ Shallow ☑ Deep

Recommended pump depth: 51.8 Metres

Recommended pump rate (Litres/min): TO 11.36

If flowing give rate (Litres/min):

Draw Down Time (Min)	Draw Down Water Level (Metres)	Recovery Time (Min)	Recovery Water Level (Metres)
Static Level	5.37	Static Level	
1	6.6	1	31.85
2	7.38	2	31.44
3	8.06	3	31.26
4	8.7	4	31.1
5	9.12	5	30.96
10	11.59	10	30.46
15	14.21	15	30.11
20	16.7	20	29.78
25	19.01	25	29.44
30	21.22	30	29.11
40	25.15	40	28.96
50	28.47	50	27.81
60	32.29	60	27.19

Water found at Depth	Kind of Water
39.5 Metres ☐ Gas	☑ Fresh ☐ Salty ☑ Sulphur ☐ Minerals
Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

☐ Galvanized ☑ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete	☐ Galvanized ☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete	Diameter of the Hole (Centimetres): 15.23
		Depth of the Hole (Metres): 53.34
		Wall Thickness (Metres): .0048
☑ Open Hole		Inside Diameter of the Casing (Metres): .1681
Disinfected? ☑ Yes ☐ No		Depth of the Casing (Metres): 29.56

Audit No. Z [illegible]
Date Received (yyyy/mm/dd) FEB 13 2008
Remarks

Well [illegible] No.
Date of Inspection (yyyy/mm/dd)

Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☑ Imperial

W 7112655 (or Print Below)
A 062290
A062290

Well Record

Regulation 903 Ontario Water Resources Act

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	NATURAL PRESTIGE LOG HOMES		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No (inc. area code)
415099 10th LINE	RAVENNA	ONT	N0H2E0	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
44 TRAILS END	NOTTAWASAGA	45	12

County/District/Municipality	City/Town/Village	Province	Postal Code
SIMCOE COUNTY	COLLINGWOOD	Ontario	

UTM Coordinates Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	17	557094 4927379		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
BRN	CLAY			0	8
BRN	SAND			8	15
	CLAY	SAND		15	35
BRN	SAND			35	40
GREY	CLAY	STONES		40	50
BRN	SAND			50	57

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	30	Bentonite Grout	12 m³

Method of Construction

☐ Cable Tool ☐ Diamond
☑ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☑ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
6¼	STEEL	.188	+3½	52
5"	STEEL NIPPLE		51	54

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No	Depth (m/ft) From	To
5½	STAINLESS STEEL	14	54	57

Status of Well

☑ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	Kind of Water	Fresh	Untested
52	Gas Other, specify	☑	☐
	Gas Other, specify	☐	☐
	Gas Other, specify	☐	☐

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)

Results of Well Yield Testing

After test of well yield, water was
☑ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)
12 GPM

Duration of pumping
2 hrs + min

Final water level end of pumping (m/ft)
29'

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)
50'

Recommended pump rate (l/min / GPM)
10-12 GPM

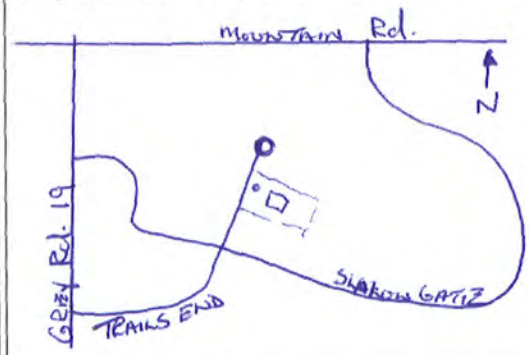
Well production (l/min / GPM)
20 GPM

Disinfected?
☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		16		29
1	1	21.5	1	24
2	2	24.5	2	20
3	3	26	3	19
4	4	26.5	4	18.5
5	5	27	5	18
10	10	28	10	16
15	15	28.5	15	16
20	20	28.5	20	16
25	25	↓	25	↓
30	30		30	
40	40		40	
50	50		50	
60	60		60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No
NEUMANN WELL DRILLING	7015

Business Address (Street Number/Name)	Municipality
RR#4	DUNDALK

Province	Postal Code	Business E-mail Address
ONT	N0C1B0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
5199233203	GILLIES TOM

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
1958		

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☑ Yes ☐ No	20080523	Audit No. Z 92944
	Date Work Completed: 20080523	Received

(506E 12/2007)

Ministry's Copy

7037415

Ontario — Ministry of the Environment

Well Record
Regulation 903 Ontario Water Resources Act

Well Tag Number (Plate number below): A021751
A021751

page ___ of ___

SE V

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

[redacted]

Address of Well Location (County/District/Municipality): 75911 Grey Rd. 21
Township: (Nottawasaga) Clearview
Lot: 12
Concession: 45
RR#/Street Number/Name
City/Town/Village
Site/Compartment/Block/Tract etc.

GPS Reading: NAD 83 | Zone 17 | Easting 556863 | Northing 4927262
Unit Make/Model: Magellan
Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To
	fill			0	.61
brown	sandy clay	stones		.61	3.35
grey	sandy clay			3.35	7.62
grey	clay	layers sand & gravel		7.62	14.00
	sand & gravel		Fine	14.00	15.54

Clay

Hole Diameter

Depth From	Depth To	Diameter Centimetres
0	15.54	15.87

Water Record

Water found at Metres	Kind of Water			
14.02	☒ Fresh	☐ Sulphur	☐ Gas	☐ Salty	☐ Minerals	☐ Other:
___ m	☐ Fresh	☐ Sulphur	☐ Gas	☐ Salty	☐ Minerals	☐ Other:
___ m	☐ Fresh	☐ Sulphur	☐ Gas	☐ Salty	☐ Minerals	☐ Other:

After test of well yield, water was
☒ Clear and sediment free
☐ Other, specify

Chlorinated ☒ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To
Casing				
15.87	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.477	0	14.33
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☒ Galvanized	Slot No.		
13.97		16	14.33	15.54
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

Pumping test method: pump
Pump intake set at - (metres): 15.24
Pumping rate - (litres/min): 22.15
Duration of pumping: 48 hrs + ___ min
Final water level end of pumping: 5.26 metres
Recommended pump type: ☐ Shallow ☒ Deep
Recommended pump depth: 15.24 metres
Recommended pump rate: 22.75 (litres/min)
If flowing give rate - (litres/min):
If pumping discontinued, give reason:

	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Static Level		2.44		
1	3.56		1	4.32
2	4.09		2	3.86
3	4.42		3	3.56
4	4.61		4	3.35
5	4.8		5	3.20
10	4.98		10	2.95
15	5.26		15	2.84
20	5.26		20	2.82
25	5.28		25	2.79
30	5.28		30	2.77
40	5.28		40	2.74
50	5.28		50	2.74
60	5.28		60	2.74

Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - Metres From	Depth set at - Metres To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	6.1	Benseal	

Method of Construction

☒ Cable Tool ☐ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

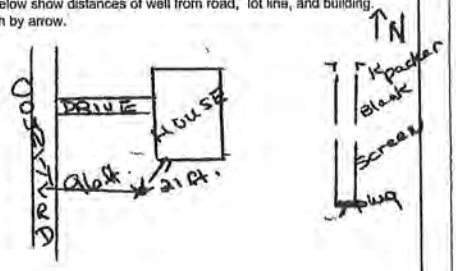
☒ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☒ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Well Contractor/Technician Information

Name of Well Contractor: JIM CLARKE WELL DRILLING LTD.
Well Contractor's Licence No.: 1565
Business Address (street name, number, city etc.): R. R. 2 Meaford, Ont. N4L 1W6
Name of Well Technician (last name, first name): Bob Scammell
Well Technician's Licence No.: T-3062
Signature of Technician/Contractor: X Jas A Clarke
Date Submitted: 2006 08 30

Audit No.: Z 41000
Date Well Completed: 2006 08 21
Was the well owner's information package delivered? ☒ Yes ☐ No
Date Delivered: 2006 08 17

Ministry Use Only

Data Source
Contractor: 1565
Date Received: DEC 01 2006
Date of Inspection
Remarks
Well Record Number

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☒ Well Owner's Copy ☐

Cette formule est disponible en français

Ontario — Ministry of the Environment

Well Tag Number (Place sticker and print number below): A009146

5739489

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN | CON | LOT

Well Owner's Information and Location of Well Information

[redacted]

SIMCOE | NORTH GWILLIMBURY

RR#/Street Number/Name | City/Town/Village | Site/Compartment/Block/Tract etc.

GPS Reading: NAD 83 | Zone 17 | Easting 557072 | Northing 4927461 | Unit Make/Model MERIDIAN | Mode of Operation: ☐ Undifferentiated ☑ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From (FEET)	Depth To (FEET)
BLACK	TOP SOIL			0	4
BROWN	GRAVEL	SAND		4	18
BROWN	CLAY	GRAVEL		18	56
GREY	CLAY	GRAVEL		56	80
BROWN	LIMESTONE			80	140
GREY	LIMESTONE			140	197

Hole Diameter

Depth From	Metres To	Diameter Centimetres
0	197	6"

Water Record

Water found at Metres	Kind of Water
110 FT	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas ☐ Other:
185 FT	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas ☐ Other:
___ m	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas ☐ Other:

After test of well yield, water was: ☑ Clear and sediment free ☐ Other, specify

Chlorinated ☑ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To (Metres)
Casing				
6"	☑ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.188	2'	82'
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
	☑ Open hole		82'	197'

Test of Well Yield

Pumping test method: Pump

	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres) 150	Static Level	21		
Pumping rate - (litres/min) 36 P.M.	1	24	1	119
Duration of pumping ___ hrs + ___ min	2		2	
Final water level end of pumping ___ metres	3	29	3	109
Recommended pump type: ☐ Shallow ☑ Deep	4		4	
Recommended pump depth 170 FT metres	5	38	5	106
Recommended pump rate 36 P.M. (litres/min)	10		10	
If flowing give rate - (litres/min)	15	51	15	92
If pumping discontinued, give reason.	20		20	
	25	60	25	84
	30		30	
	40	80	40	65
	50	91	50	
	60	123	60	60

Plugging and Sealing Record

☑ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	82	GROUT	

Method of Construction

☐ Cable Tool ☑ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

☑ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☑ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: HIGHLAND WATER WELLS | Well Contractor's Licence No.: 2576

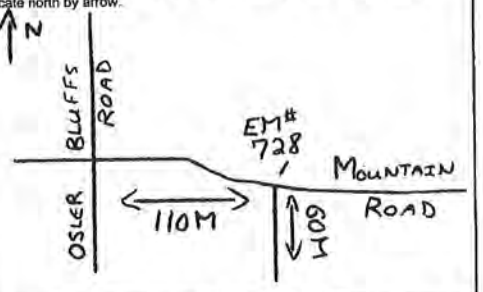
Business Address (street name, number, city etc.): BOX 141 DURHAM ONT N0G 1R0

Name of Well Technician (last name, first name): GRAHAM JEFF | Well Technician's Licence No.: 12107

Signature of Technician/Contractor: X [signature] | Date Submitted: 2005 01 13

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 25114 | Date Well Completed: 2005 01 10

Was the well owner's information package delivered? ☐ Yes ☐ No | Date Delivered

Ministry Use Only

Data Source | Contractor: 2576

Date Received: JAN 19 2005 | Date of Inspection

Remarks: Airlift @ 25' | Well Record Number

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☐ Well Owner's Copy ☐

Cette formule est disponible en français

Ontario Ministry of the Environment

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 — 5737448 — Municipality 5 7 6 0 3 — Con.

County or District: Simcoe
Township/Borough/City/Town/Village: Collingwood
Con block tract survey, etc.: Survey PLS1-M
Lot: 45
Address: #10 Trails End
Date completed: 27 day 11 month 02 year

Northing | RC | Elevation | RC | Basin Code | ii | iii | iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
			Brwn Sand	0	16
			Grey Sand Clay & Stone	16	42
			Brwn Sand Clay Stone	42	45
			Grey Sand Clay Stone	45	52
			Grey Sand Gravel mix	52	60

41 WATER RECORD

Water found at - feet	Kind of water
52	1 ☒ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
60	1 ☒ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
6"	1 ☒ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	.188	+2	52
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

Sizes of opening (Slot No.): 25 / 18 — Diameter: 6 inches — Length: 4 feet 3
Material and type: Stainless Steel
Depth at top of screen: 52 feet

61 PLUGGING & SEALING RECORD

☐ Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
0	25	Bensea

71 PUMPING TEST

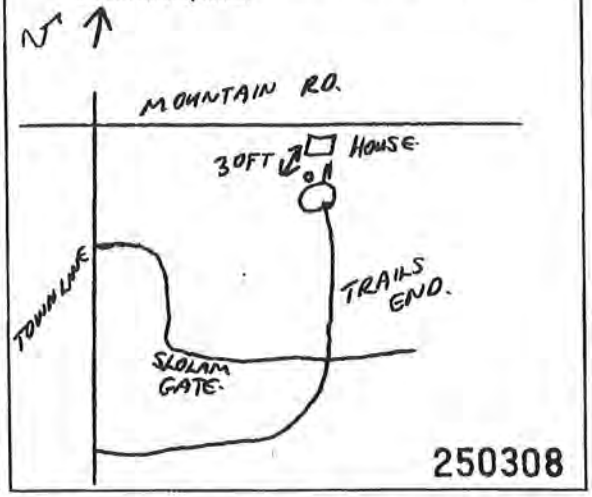
Pumping test method: 1 ☐ Pump 2 ☒ Bailer
Pumping rate: 5.5 GPM
Duration of pumping: 60 Hours ___ Mins

Static level	Water level end of pumping	Water levels during: 1 ☒ Pumping 2 ☒ Recovery 15 minutes	30 minutes	45 minutes	60 minutes
6 feet	45 feet	28 feet	34 feet	45 feet	45 feet

If flowing give rate: ___ GPM
Pump intake set at: 49 feet
Water at end of test: ☒ Clear ☐ Cloudy
Recommended pump type: ☐ Shallow ☒ Deep
Recommended pump setting: 49 feet
Recommended pump rate: TO 4 GPM

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



250308

FINAL STATUS OF WELL

1 ☒ Water supply 2 ☐ Observation well 3 ☐ Test hole 4 ☐ Recharge well 5 ☐ Abandoned, insufficient supply 6 ☐ Abandoned, poor quality 7 ☐ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE

1 ☒ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☐ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not use 10 ☐ Other

METHOD OF CONSTRUCTION

1 ☒ Cable tool 2 ☐ Rotary (conventional) 3 ☐ Rotary (reverse) 4 ☐ Rotary (air) 5 ☐ Air percussion 6 ☐ Boring 7 ☐ Diamond 8 ☐ Jetting 9 ☐ Driving 10 ☐ Digging 11 ☐ Other

Name of Well Contractor: Georgian Bay Well Drilling — Well Contractor's Licence No.: 6433
Address: RR4 Meaford ONT
Name of Well Technician: J. Saarine — Well Technician's Licence No.: T2896
Signature of Technician/Contractor: [signature] — Submission date: day 25 mo 11 yr 02

MINISTRY USE ONLY

Data source — Contractor: 6433 — Date received: DEC 31 2002
Date of inspection — Inspector
Remarks: CSS.ES2

0506 (07/00) Front Form 9

2 - MINISTRY OF THE ENVIRONMENT COPY

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 5730414 — MUNICIP. 5,7,0,0,8 — CON. CON. 1 1/2

COUNTY OR DISTRICT: [redacted]
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: NOTTAWASAGA
CON. BLOCK, TRACT, SURVEY, ETC.: CON. 12
LOT: 41
DATE COMPLETED: DAY 03 MO 11 YR 93
[redacted] COLLINGWOOD, ONT
BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	SAND	GRAVEL		0	39
GREY	HARDPAN			39	62
GREY	SAND	LIMESTONE BOULDERS	COARSE	62	72

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
62	1 ☒ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH FEET FROM	DEPTH FEET TO
6 1/4	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	+1'8"	686"
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE/SLOT NO. OF OPENING	DIAMETER	LENGTH
10	6 INCHES	3 FEET

MATERIAL AND TYPE: STAINLESS STEEL
DEPTH TO TOP OF SCREEN: 65'6" FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
4	10	BENSEAL

71 PUMPING TEST

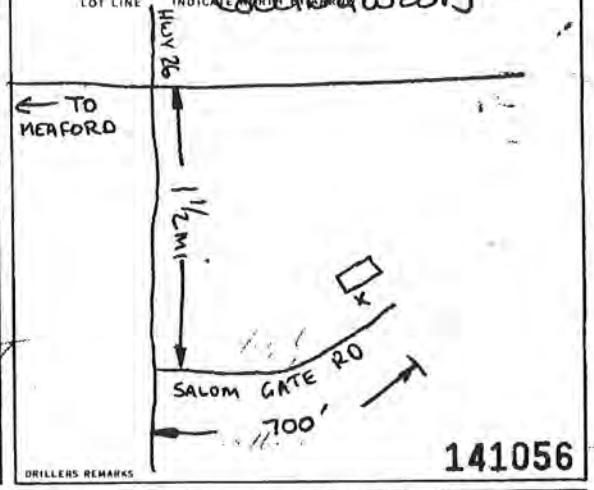
PUMPING TEST METHOD: 1 ☐ PUMP 2 ☐ BAILER — AIR
PUMPING RATE: 20.0 GPM
DURATION OF PUMPING: 2 HOURS 0 MINS
WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY

STATIC LEVEL	WATER LEVEL END OF PUMPING	IS MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
38 FEET	72 FEET	38 FEET	39 FEET	38 FEET	38 FEET

IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 70 FEET
RECOMMENDED PUMPING RATE: 20.0 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: 141056

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☒ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: HOWELL DRILLING
WELL CONTRACTOR'S LICENCE NUMBER: 2652
ADDRESS: BOX 368 COLDWATER ONT
NAME OF WELL TECHNICIAN: KIM HOWELL
WELL TECHNICIAN'S LICENCE NUMBER: T1057
SIGNATURE OF TECHNICIAN/CONTRACTOR: Kim Howell
SUBMISSION DATE: DAY 04 MO 11 YR 93

OFFICE USE ONLY

DATA SOURCE
CONTRACTOR: 2652
DATE RECEIVED: DEC 17 1993
DATE OF INSPECTION
INSPECTOR
REMARKS: CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/88) FORM 9

NO2C 41A/8W

NE ✓

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 5718691 MUNICIP 57008 CON CON 112

COUNTY OR DISTRICT: [redacted]

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: NOTTAWASAGA ...LLINGWOOD

CON, BLOCK, TRACT, SURVEY, ETC: ~~CON 12~~ XII — LOT 045

...ot 10 Collingwood

DATE COMPLETED: DAY 21 MO 09 YR 83

27300 5 ELEVATION 0700 5 BASIN CODE 2I

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH FEET FROM	TO
BLACK	TOP SOIL			0	1
GREY	CLAY	SAND STONES		1	12
BROWN	CLAY	SAND		12	35
BLACK	GRAVEL	STONES SAND		35	41
GREY	CLAY			41	42

JAN 07 1987

Mountain Rd S/S.
Plan 246 Sublot 6/7
51R-12384 part 2 RPlan 516 pt 46.

31 0001802 0012205 2812 0035605 12 0041811 1228 0041205

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0035 / 35-41	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH FEET FROM	TO
06 / 6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	+18	0035 / 37½
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.) 020 — DIAMETER 0 000 INCHES — LENGTH 03 FEET

MATERIAL AND TYPE: STAINLESS ST. — DEPTH TO TOP OF SCREEN 0035 FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
		K PACKER 35½

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER — PUMPING RATE 0015 GPM — DURATION OF PUMPING 02 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY — 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
008 FEET	014 FEET	008 FEET	FEET	FEET	FEET

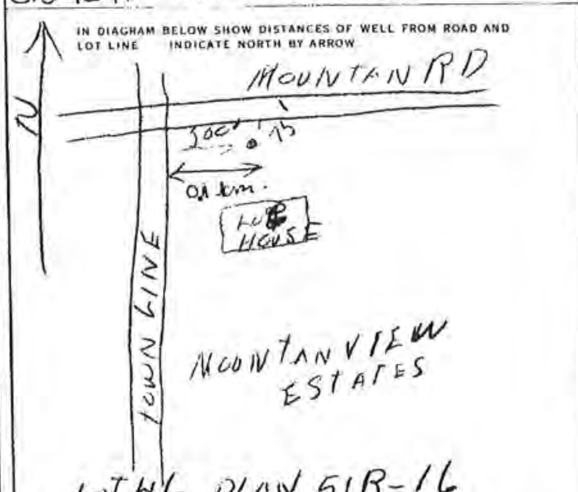
IF FLOWING GIVE RATE: GPM — PUMP INTAKE SET AT 35 FEET — WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☒ SHALLOW ☐ DEEP — RECOMMENDED PUMP SETTING 035 FEET — RECOMMENDED PUMPING RATE 0015 GPM

LOCATION OF WELL

012 129

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



LOT 46 PLAN 51R-16

DRILLERS REMARKS

FINAL STATUS OF WELL: 1 — 1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE: 01 — 1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING: 1 — 1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: DAWSON M SEWELL — LICENCE NUMBER 4716

ADDRESS: RR1 DUNTROON

NAME OF DRILLER OR BORER: CHARLES LOWE — LICENCE NUMBER

SIGNATURE OF CONTRACTOR: Dawson McSewell — SUBMISSION DATE DAY ___ MO ___ YR ___

OFFICE USE ONLY

DATA SOURCE 1 — CONTRACTOR 4716 — DATE RECEIVED 03 10 83

DATE OF INSPECTION — INSPECTOR

REMARKS: loc only, 12/85 PK

CSS.ES

FORM NO. 0506-4-77 FORM 7

MINISTRY OF THE ENVIRONMENT COPY

E 35

41 A/8W

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

NE ✓

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

(11) 5718796 MUNICIP 57008 CON CON 12

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC.	LOT
Simcoe	Nottawasaga	XII Plan 33	045

[redacted] 45 Codrington St Barrie — DATE COMPLETED: DAY 14 MO 11 YR 83

UTM 127300 5 0700 5 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BLACK	TOP SOIL			0	1
BROWN	CLAY	SAND, STONES, BOULDERS		1	18
BROWN	SAND	SILT, CLAY		18	22
GREY	CLAY	SAND	COMPACTED	22	50
GREY	SAND	SILT		50	53
GREY	SAND			53	56

Mountain Rd S/S (now Fumo, V&T)
Plan 246 sublot 11 pt 12
51R-516 part 42

(31) 0001892 | 0018605128/12 | 0022628062/05 | 0050205128/60 | 0053128062 | 0054128

(32)

(41) WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0053	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
53-56	
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

(51) CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH FEET FROM	DEPTH FEET TO
06	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	185	+1	0053
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
020	06000	03

MATERIAL AND TYPE: STAINLESS STEEL — DEPTH TO TOP OF SCREEN: 0053 FEET

(61) PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
53	56	IC - PACKER

(71) PUMPING TEST

PUMPING TEST METHOD: 1 ☑ PUMP 2 ☐ BAILER
PUMPING RATE: 0010 GPM
DURATION OF PUMPING: 02 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING
012 FEET	033 FEET

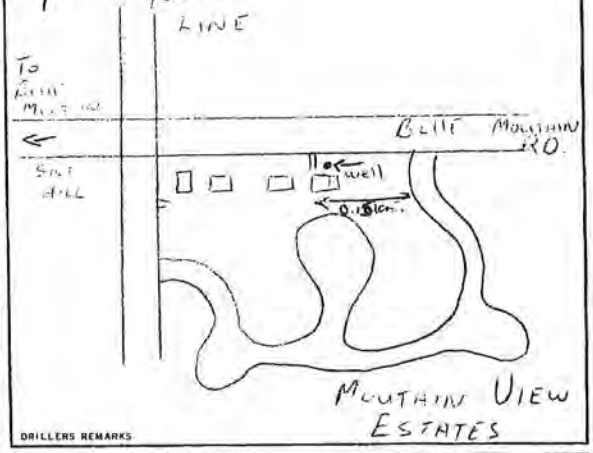
WATER LEVELS DURING: 1 ☐ PUMPING 2 ☑ RECOVERY

0 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
17½ FEET	FEET	FEET	FEET

IF FLOWING GIVE RATE: GPM
PUMP INTAKE SET AT: 54 FEET
WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP
RECOMMENDED PUMP SETTING: 052 FEET
RECOMMENDED PUMPING RATE: 0010 GPM

(012 129 (04)) LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW



DRILLERS REMARKS

FINAL STATUS OF WELL 1: 1 ☑ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE 01: 1 ☑ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; ☐ OTHER; 9 ☐ NOT USED

METHOD OF DRILLING 1: 1 ☑ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: DAWSON SEWELL — LICENCE NUMBER: 4716
ADDRESS: RR#1 DUNTROON
NAME OF DRILLER OR BORER: Chevis Lowe — LICENCE NUMBER:
SIGNATURE OF CONTRACTOR: Dawson M Sewell — SUBMISSION DATE: DAY MO YR

OFFICE USE ONLY

DATA SOURCE: 1 — CONTRACTOR: 4716 — DATE RECEIVED: 01 12 83
DATE OF INSPECTION: — INSPECTOR:
REMARKS: loc only 12/85 PIC

CSS.ES

FORM NO. 0506—4—77 FORM 7

MINISTRY OF THE ENVIRONMENT COPY

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

5720049 (11) MUNICIP 57008 CON CON 11 2

COUNTY OR DISTRICT: [redacted]
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: NORTH ONSAGA
CON 12 BLOCK, TRACT, SURVEY, ETC. PLAN XII
LOT 045 046
DATE COMPLETED: DAY 16 MO 07 YR 85
ADDRESS OF WELL: [redacted] BOX 364 STROUD RR#1
UTM: NG 27300 EC 5 ELEVATION 0700 EC 5 BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
	FILL	STONES		0	2
GREY	CLAY	GRAVEL	HARD	2	35
	GRAVEL	SAND, SILT		35	43
GREY	CLAY	SAND		43	51
BROWN	SAND			51	54

Mountain Rd 3/5
Plan 246 subLot 11, 12
51R-516 part 42.

JAN 08 1987

(31) 0002 01 12 | 0035 20 51 17 3 | 0043 11 28 06 | 0051 20 52 8 | 0054 16 28
(32)

(41) WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0054	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

(51) CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	+1½	51
04				

SCREEN

SIZE (SLOT NO.)	DIAMETER	LENGTH
020	05.000 INCHES	03 FEET

MATERIAL AND TYPE: JOHNSON STAINLESS STEEL
DEPTH TO TOP OF SCREEN: 0050 FEET

(61) PLUGGING & SEALING RECORD

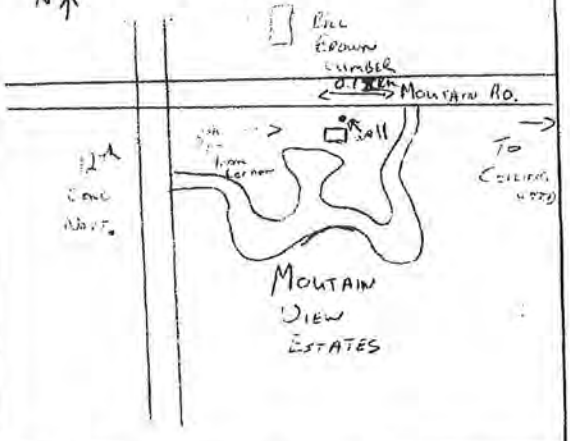
DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

(71) PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE: 0006 GPM
DURATION OF PUMPING: 01 HOURS 10 MINS
STATIC LEVEL: 011 FEET
WATER LEVEL END OF PUMPING: 044 FEET
WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY
15 MINUTES: FEET
30 MINUTES: FEET
45 MINUTES: FEET
60 MINUTES: 014 FEET
IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: 52 FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 050 FEET
RECOMMENDED PUMPING RATE: 0005 GPM

012 09 04 LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW



DRILLERS REMARKS

FINAL STATUS OF WELL 1
1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 01
1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED ☐ OTHER

METHOD OF DRILLING 1
1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: LOWE'S WELL DRILLING LTD. LICENCE NUMBER: 3429
ADDRESS: RR# 4 STAYNER LOM 1S0
NAME OF DRILLER OR BORER: CHARLIE LOWE LICENCE NUMBER:
SIGNATURE OF CONTRACTOR: [signature] SUBMISSION DATE: DAY ____ MO ____ YR ____

OFFICE USE ONLY

DATA SOURCE 1 CONTRACTOR 3429 DATE RECEIVED 06 08 85
DATE OF INSPECTION INSPECTOR
REMARKS: location 12/85 PK

CSS.ES

FORM NO. 0506—4—77 FORM 7

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APPENDIX B
Borehole Logs from TerraProbe's Preliminary Geotechnical Investigations at

- East Woodbridge Lands (2007)
- Le Scandinave Spa Lands (2008)

Terraprobe

LOG OF BOREHOLE 1

PROJECT: East Woodbridge Lands
LOCATION: The Town of the Blue Mountains, Ontario
CLIENT: Georgian International Land Corp.
DATE: 25 June 2007
EQUIPMENT: D-50 Crawler-Mounted, Solid Stem Augers
ELEVATION DATUM: n/a
FILE: 3-07-3076

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES
	Ground Surface				
0.0	150mm TOPSOIL				
0.2	SANDY SILT trace clay, trace gravel, compact to dense, brown / grey, moist to wet (GLACIAL TILL)		1	SS	4
			2	SS	26
			3	SS	44
			4	SS	36
			5	SS	40
	---- grey, wet		6	SS	30
5.0	End of Borehole				

ELEVATION SCALE

PENETRATION RESISTANCE PLOT
20 40 60 80 100
SHEAR STRENGTH kPa
○ UNCONFINED + FIELD VANE
● POCKET PEN. × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

ORGANIC VAPOUR (ppm)

STANDPIPE INSTALLATION OR REMARKS

NOTES:
Borehole was open and water level noted at 4.6m upon completion of drilling. Water level in piezometer at 1.6m on July 10, 2007.

Terraprobe

LOG OF BOREHOLE ..1..

PROJECT NAME: Le Scandinave Spa Site
PROJECT No.: 3-08-4081
CLIENT: Georgian Gate Ltd.
BORING DATE: July 14, 2008
LOCATION: Town of Blue Mountains, Ontario
ELEVATION DATUM: Geodetic

BORING METHOD: CME55 Crawler-mounted Drill Rig / Solid Stem Augers

DEPTH SCALE IN METRES	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	"N" VALUE	PENETRATION RESISTANCE PLOT (20 40 60 80) / SHEAR STRENGTH kPa (not.V - +, rem.V - ⊕; 20 40 60 80)	WATER CONTENT (%) (10 20 30)	INSTALLATION INFORMATION
0	GROUND SURFACE		215.9						
	150mm - TOPSOIL		0.0						
	Brown to Grey; Compact to Very Dense; Moist to Wet			1	SS	8	x		
1	SAND & SILT, to SILTY SAND, trace to some gravel, trace clay, TILL, with sandy seams below 4.5m, with occassional cobbles/boulders			2	SS	31	x		
2				3	SS	43	x		1.6m
				4	SS	50/150mm			
3				5	SS	52	x		
4									4.0m
									4.7m
5	Wet			6	SS	50/100mm			
6									
				7	SS	50/150mm			
	End of Borehole		209.3 6.6						
7									
8									
9									

Bentonite Seal

1. Borehole remained open upon completion of drilling.
2. Water level noted at 4.0m during drilling.
3. Water level on July 15, 2008 measured at 4.7m (elev. 211.2m).
4. Water level on July 21, 2008 measured at 1.6m (elev. 214.3m).

Terraprobe

LOG OF BOREHOLE ..2..

PROJECT NAME: Le Scandinave Spa Site

PROJECT No.: 3-08-4081

CLIENT: Georgian Gate Ltd.

BORING DATE: July 14, 2008

LOCATION: Town of Blue Mountains, Ontario

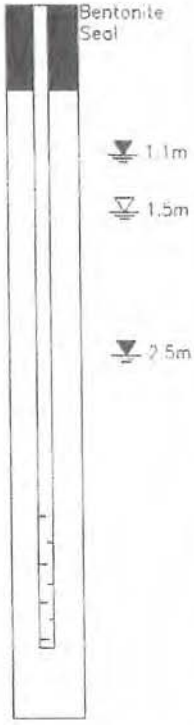
ELEVATION DATUM: Geodetic

BORING METHOD: CME55 Crawler-mounted Drill Rig / Solid Stem Augers

DEPTH SCALE IN METRES

SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	"N" VALUE	PENETRATION RESISTANCE PLOT (20 40 60 80) / SHEAR STRENGTH kPa (nat.V – +, rem.V – ⊕, 20 40 60 80)	WATER CONTENT (%) (10 20 30)
GROUND SURFACE		215.3					
75mm – TOPSOIL		0.0					
Brown to Grey; Compact to Very Dense; Moist to Wet			1	SS	11	x	o
SAND & SILT, to SILTY SAND, trace to some gravel, trace clay, TILL, with wet sandy seams below 1.6m, with occassional cobbles/boulders			2	SS	38	x	o
			3	SS	50	x	o
			4	SS	50/100mm		o
			5	SS	50/50mm		o
			6	SS	50/25mm		o
		210.3					
End of Borehole		5.0					

INSTALLATION INFORMATION



1. Borehole remained open upon completion of drilling.
2. Water level noted at 1.5m during drilling.
3. Water level on July 15, 2008 measured at 2.5m (elev. 212.8m).
4. Water level on July 21, 2008 measured at 1.1m (elev. 214.2m).

Terraprobe

LOG OF BOREHOLE ..3..

PROJECT NAME: Le Scandinave Spa Site

PROJECT No.: 3-08-4081

CLIENT: Georgian Gate Ltd.

BORING DATE: July 14, 2008

LOCATION: Town of Blue Mountains, Ontario

ELEVATION DATUM: Geodetic

BORING METHOD: CME55 Crawler-mounted Drill Rig / Solid Stem Augers

DEPTH SCALE IN METRES

DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	"N" VALUE
GROUND SURFACE		216.0			
125mm – TOPSOIL		0.0			
Brown to Grey; Compact to Very Dense; Moist to Wet			1	SS	6
SAND & SILT, to SILTY SAND, trace to some gravel, trace clay, TILL, with occassional cobbles/boulders			2	SS	50/75mm
			3	SS	69
			4	SS	85
			5	SS	39
		212.0			
Grey; Very Dense; Wet		4.0			
SAND & GRAVEL, some silt			6	SS	50/100mm
		211.0			
End of Borehole		5.0			

PENETRATION RESISTANCE PLOT

20 40 60 80

SHEAR STRENGTH kPa

not V - + Q - ●

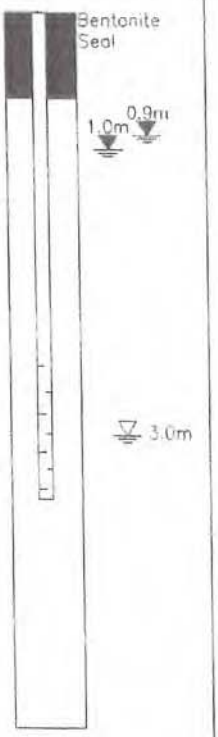
rem.V - ⊕ U - ○

20 40 60 80

WATER CONTENT (%)

10 20 30

INSTALLATION INFORMATION



1. Borehole remained open upon completion of drilling.

2. Water level noted at 3.0m during drilling.

3. Water level on July 15, 2008 measured at 1.0m (elev. 215.0m).

4. Water level on July 21, 2008 measured at 0.9m (elev. 215.1m).

Appendix J:
Natural Environment Study

Environmental Impact Study

Class EA Grey Road 19 and

Grey Road 21, County of Grey, Ontario

Prepared for:
C.C. Tatham & Associates Ltd.

Prepared by:
Azimuth Environmental
Consulting, Inc.

June 2015

AEC 14-400

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Environmental Assessments & Approvals

June 12, 2015 AEC 14-400

C.C. Tatham & Associates Ltd.
115 Sandford Fleming Drive
Collingwood, Ontario
L9Y 5A6

Attention: Michael Cullip, Manager Transportation & Municipal Engirneering

Re: **Environmental Impact Study - Class EA Grey Road 19 and Grey Road 21, County of Grey, Ontario**

Dear Mr. Cullip:

As requested Azimuth Environmental Consulting Inc. (Azimuth) has completed an Environmental Impact Study (EIS) to satisfy the requirements of a Schedule 'B' Class EA for the above mentioned intersection. The results of our studies indicate that proposed improvements to the intersection will not impact habitat of SAR or significant natural heritage functions identified within the 2014 Provincial Policy Statement (PPS): Woodland Amphibian Breeding Habitat and Fish habitat. Therefore, the proposed development is consistent with Sections 2.1.5 d, 2.1.6, 2.1.7 and 2.1.8 of the PPS and requires no registry or permitting submissions under Ontario's *Endangered Species Act, 2007*. We recommend that a request for review under the fisheries protection provisions of the *Fisheries Act* is made to DFO for any work completed below the high water mark in Silver Creek and any roadside ditches connecting to Silver Creek.

Yours truly,

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Kate Ellis, B. Sc.
Aquatic Ecologist

85 Bayfield Street, Suite 400, Barrie, Ontario L4M 3A7
telephone: (705) 721-8451 • fax: (705) 721-8926 • info@azimuthenvironmental.com • www.azimuthenvironmental.com

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1.0 INTRODUCTION

Azimuth Environmental Consulting Inc. (Azimuth) was retained by C.C. Tatham & Associates Ltd. (CCT) to prepare an Environmental Impact Study (EIS) for the Grey Road 19 and Grey Road 21 intersection, Town of The Blue Mountains, Grey County.

2.0 STUDY METHODS

A considerable amount of background information for the site was obtained from a two studies that were recently completed for adjacent properties (i.e. Georgian Gate :Lands (Azimuth 2009) and the Windfall Medium Density Block (MDB) (Azimuth 2009)).

In order to complete the EIS report, the following tasks and studies were completed:

- Obtained background natural heritage information from the Ministry of Natural Resources and Forestry (MNRF) through the Natural Heritage Information Centre (NHIC) and Midhurst District and from NVCA (Watershed Report data) (Appendix A);
- Conducted a Butternut reconnaissance survey on March 11, 2015;
- Conducted a single field visits to observe and monitor the flows and fish habitat characteristics of the watercourses and drainage features found within the site limits on March 11, 2015; and
- Reviewed the proposed design options established for the improvements to the intersection provide by CCT on March 11, 2015 (Appendix B).

3.0 EXISTING CONDITION

3.1 Land Use

The lands adjacent to the intersection are mostly developed, with the exception of the land to the northwest. It is our understanding that the lands to the northwest will be developed into a medium density block (Windfall Project). Northwest of the intersection there is successional woodland cover and cultural meadow habitat suggesting a previous farm use. The lands are no longer used for agriculture. A tributary of Silver Creek flows through the adjacent lands to the west and crosses under Grey Road 19, 200m west of the intersection. Northeast of the intersection there are estate residential developments associated with Laurel Blvd. Southeast of the intersection there are estate residential developments associated with Slalom Gate and a commercial development in the form of a ski shop. Lands to the southwest contain commercial development in the form of a golf driving range.

3.2 Topography, Soils, Geology/Hydrogeology

The following information is a summary of the detailed descriptions of site-conditions provided in the Georgian Gate EIS (Azimuth 2009).

3.2.1 Topography

Topography for the Georgian Gate lands is smooth to moderately sloping, with surface elevations for the site ranging in the vicinity of 227 masl to 207 masl. In general, the lands slope in a northeasterly direction towards Georgian Bay.

3.2.2 Soils and Bedrock Geology

The stratigraphic descriptions provided in MOE well records within 1 km of the site identify the overburden as a moderately thick layer (6m to 10 m) of gravely clay deposited over bedrock. On-site borehole logs indicate an overburden thickness in excess of five metres (Terraprobe 2007, 2008).

The underlying local bedrock geology is composed generally of limestone, dolostone, and shale from the Middle Ordovician period (from 472 to 461 million years ago). The upper bedrock formation in the area is listed to consist of mainly shale from the Whitby Formation.

3.2.3 Hydrogeology

As noted by Terraprobe (2008) "… boreholes" [on the Spa lands] "encountered 75 to 150 mm of topsoil underlain by a compact to very dense native sandy silt to silty sand glacial till …". Terraprobe goes on to state "… the very dense glacial till soils limited the advancement of the boreholes with conventional drilling equipment due to their density …". Terraprobe (2007) indicated that they would expect the ground water table to "… fluctuate seasonally with higher level anticipated during wetter seasons / years. It is anticipated that the water levels reflect perched conditions above the dense / hard soils rather than the true ground water table". The boreholes drilled on the Georgian Gate lands were equally dense. Toward the west the sediments possessed an even higher clay content.

The inability to infiltrate significant waters is consistent with the site conceptual model findings. Waters are perched within this ground water system and there would be no meaningful vertical percolation into the deeper sediments. The till materials retain a residual soil moisture, but there no significant ground water movement barring the upper desiccate zone, if present. It is speculated at depth a basal granular unit would convey ground water laterally toward Georgian Bay, subject to the local undulations in this contact surface.

3.3 Vegetation

Lands to the northwest of the intersection (Windfall MDB lands) contain successional vegetation cover and fencerow vegetation typical of abandoned farmland. As per Table 1, most of the site contains Mineral Cultural Woodland containing Green Ash, White Elm and hawthorn. Further west Mineral Cultural Meadow occurs adjacent to the watercourse and associated Reed-canary Grass Mineral Meadow Marsh. The meadow habitat is in the process of converting to Cultural Woodland.

Table 2 provides a listing of vascular plant species observed in the vegetation communities to the northwest of the intersection as well as those observed within the adjacent Meadow Marsh community associated with the adjacent watercourse. None of the species is considered a Species at Risk (SAR) in Ontario (i.e., not designated Endangered, Threatened or Special Concern under Ontario's Endangered Species Act, 2007) and none is considered provincially rare (i.e., no assigned an SRANK of 1, 2 or 3).

All species are common in the area. We were unable to find any Butternut trees, saplings or seedlings (Endangered) within the study area.

3.4 Wildlife

The results of calling amphibian surveys completed in 2014 confirmed that the lands to the northwest of the intersection (MBD lands) provide no amphibian breeding habitat consistent with its lack of standing water, however, breeding amphibian habitat is found within the wetland habitat located approximately 200 m west of the study area.

Table 3 reports the bird species observed within and adjacent to the MDB. None of the birds is a SAR and none is considered provincially rare. No area-sensitive forest or grassland breeding bird species were observed within or adjacent to the lands to southwest during studies completed in 2014 by Azimuth (Azimuth 2014).

The following mammals were observed on the Georgian Gate lands northwest of the intesection (direct observation and/or interpretation of sign): Raccoon (*Procyon lotor*, SRANK 5); Porcupine (*Erethizion dorsatum*, SRANK 5), Coyote (*Canis latrans*, SRANK 5), Eastern Chipmunk (*Tamias striatus*, SRANK 5), Red Squirrel (*Tamiasciurus hudsonicus*, SRANK 5), Grey Squirrel (*Sciurus carolinensis*, S5), Eastern Cottontail (*Sylvilagus floridanus*, SRANK 5), Beaver (*Castor canadensis*, SRANK 5) and White-tailed Deer (*Odocoileus virginianus*, SRANK 5). None of these species is a SAR or considered provincially rare. The Georgian Gate lands do not function as deer

yard/winter concentration area for White-tailed Deer as per the results of the Georgian Gate EIS (Azimuth 2009).

3.5 Aquatic Habitat

As per the findings of the Georgian Gate EIS (Azimuth 2009), the tributary of Silver Creek where it crosses Grey Road 19 is considered cool/warm water fish habitat. Silver Creek flows under Grey Road 19 through a 1500 mm round corrugated steel pipe (CSP) that is 28m in length. This culvert appears to be in good repair, it is at grade and it is not a barrier for fish migration as observed. On March 11, 2015 the culvert was full of ice and snow; water temperature was recorded to be 1°C. Approximately 300m downstream of Grey Road 19 there is a beaver dam. Downstream (east of) the berm/beaver dam, fish habitat should be considered direct cold water habitat that hosts spawning and rearing conditions for migratory Salmonid species originating from Georgian Bay.

The roadside ditches on Grey Road 19, west of Grey Road 21, drain towards the tributary of Silver Creek (Figure 2). These roadside ditches have straight (constructed) banks that are vegetated by grasses that are regularly mowed. On March 11 these roadside ditches were for largely filled with melting snow resulting in trickling flow and some pooling water. An additional site visit was conducted on June 11, 2015, following a storm event, to confirm the presence of fish habitat within the ditches. At the time of the June field assessment, the north ditch was dry, however, the ditch exhibited evidence of confined flow. There was standing water present in the south ditch, from the entrance driveway to the Silver Creek culvert inlet. These roadside ditches likely flow for a very short time of the year during the spring snow melt and during large rainfall events. Fish are able to access these only during high flow. These roadside ditches provide seasonal direct fish (or contributing) fish habitat.

4.0 PROPOSED DEVELOPMENT

Five options for improvements to the intersection were received on March 6, 2015 from CCT (Appendix B). Three of the five options require widening of the intersection and widening the approach to the intersection to add turning lanes. Two options involve construction of a roundabout would require widening the intersection and widening the approach lanes as well.

5.0 IMPACT ASSESSMENT

As outlined in Section 3 the lands adjacent to the intersection contain the following natural heritage constraints to development in the form of Wetland/Woodland

Amphibian Breeding Habitat and Fish Habitat. In the following sections we evaluate the potential for impact.

5.1 Wetland/Woodland Amphibian Breeding Habitat

As shown on Figure 2, there is a relatively large area of wetland and upland habitat located on lands to the northwest of the intersection that function as amphibian breeding habitat. Areas of swamp wetland, woodland and meadow habitat surrounding the breeding ponds provides upland habitat for use by woodland amphibians outside of the breeding season to satisfy their life history requirements.

Widening of Grey Road 19 300m west of the intersection (if required) will cause a small encroachment into the narrow linear wetland feature that borders Silver Creek north of Grey Road 19. The impacted area is small compared to the overall size of this wetland and the area retained and protected is large enough and provides sufficient habitat diversity to maintain breeding populations.

5.2 Aquatic Habitat

As shown on Figure 2 there is a tributary of Silver Creek that crosses Grey Road 21 in the western portion of the study area. In addition there are roadside ditches along the north and south ROW of Grey Road 19 that are connected to the Silver Creek tributary which provide seasonal direct fish habitat. When working in proximity to fish habitat appropriate mitigative measures should be implemented (see Section 6) to avoid serious harm to fish habitat.

Any work below high water in fish habitat has the potential to cause serious harm to fish habitat and could contravene the fisheries act. Based on our review of plans submitted by CCT on March 6, 2015, we have identified two activities that involve work below the high water mark these are. 1) Relocation of roadside ditches, and 2) Extension of the culvert under Grey Road 19 at Silver Creek (if required). Both are discussed in further detail below.

5.2.1 Relocating Roadside Ditches

Relocating roadside ditches is required to allow for widening of the intersection and construction of turning lanes. These roadside ditches connect to nearby waterbody that contains fish (Silver Creek) and are therefore not except from DFO review based on the guidelines posted on the DFO website. A submission for review to DFO for this work will be required. Based on the extent of the relocations as well as the limited quality of the seasonal fish habitat provided by the roadside ditches we expect this work can be

completed without causing serious harm to fish or fish habitat provided any guidance received from DFO and mitigation all measures discussed in Section 6 are implemented.

5.2.2 Culvert Extension

Extension of the culvert that conveys the Silver Creek Tributary under Grey Road 21 may be required. Note that the length of the existing culvert is 28m which appears to be adequate to accommodate widening of the road in this location. If the culvert is extended it will create a footprint below high water mark. Although the potential for serious harm is small this type of work is not exempt from DFO review based on the guidelines posted on the DFO website and a submission will be required to DFO. Based on the limited size of the culvert extension, and limited functions provided by the cool/warm water habitat present at the culvert we expect this work can be completed without causing serious harm to fish or fish habitat provided any guidance received from DFO and all mitigation measures discussed in Section 6 are implemented.

6.0 RECOMMENDATIONS

- If possible, conduct vegetation clearing/tree cutting outside of the migratory bird breeding season (generally taken to occur between May 1st and July 31st) to reduce the risk of impacting actively nesting birds.
- A request to DFO for review under the fisheries protection provisions of the *Fisheries Act* should be made for any work completed below the high water mark in Silver Creek and any roadside ditches connecting to Silver Creek.
- If possible any work below high water should be completed outside of the restricted activity timing windows for the protection of spawning Rainbow Trout and Pacific Salmon and developing eggs and fry which is September 15 to June 15 (to be confirmed by MNRF).
- Any work below the high water mark should be completed in isolation of flowing water.
- Any water discharged as the result of dewatering that might be required to install services should be treated in such a way that only clear, silt free water is discharged to local watercourses or into wetland habitat.
- Prior to any site dewatering fish are to be safely removed and relocated downstream with the use of a backpack electro-fisher, to be operated by a qualified crew. For this work, a License to Collect Fish for Scientific Purposes is required from the MNRF prior the completion of fish sampling.
- A sediment and erosion control plan will be prepared by the engineering team. Controls include such measures as flow control structures (i.e. check dams) for sediment control, staging to minimize the duration of exposure of unstable soils, coir logs for silt control, sodding/seeding of exposed areas in a timely fashion for

erosion control, sediment traps, and silt fence where required for sediment control.

- Any areas in proximity to fish habitat disturbed during construction will be re-vegetated with native trees and shrubs combined with a native seed mix.
- Construction vehicle maintenance and re-fueling should occur in a "marshalling location" that is established well away from watercourse and wetland features to prevent the spill of fuel or other deleterious substances into these aquatic habitats

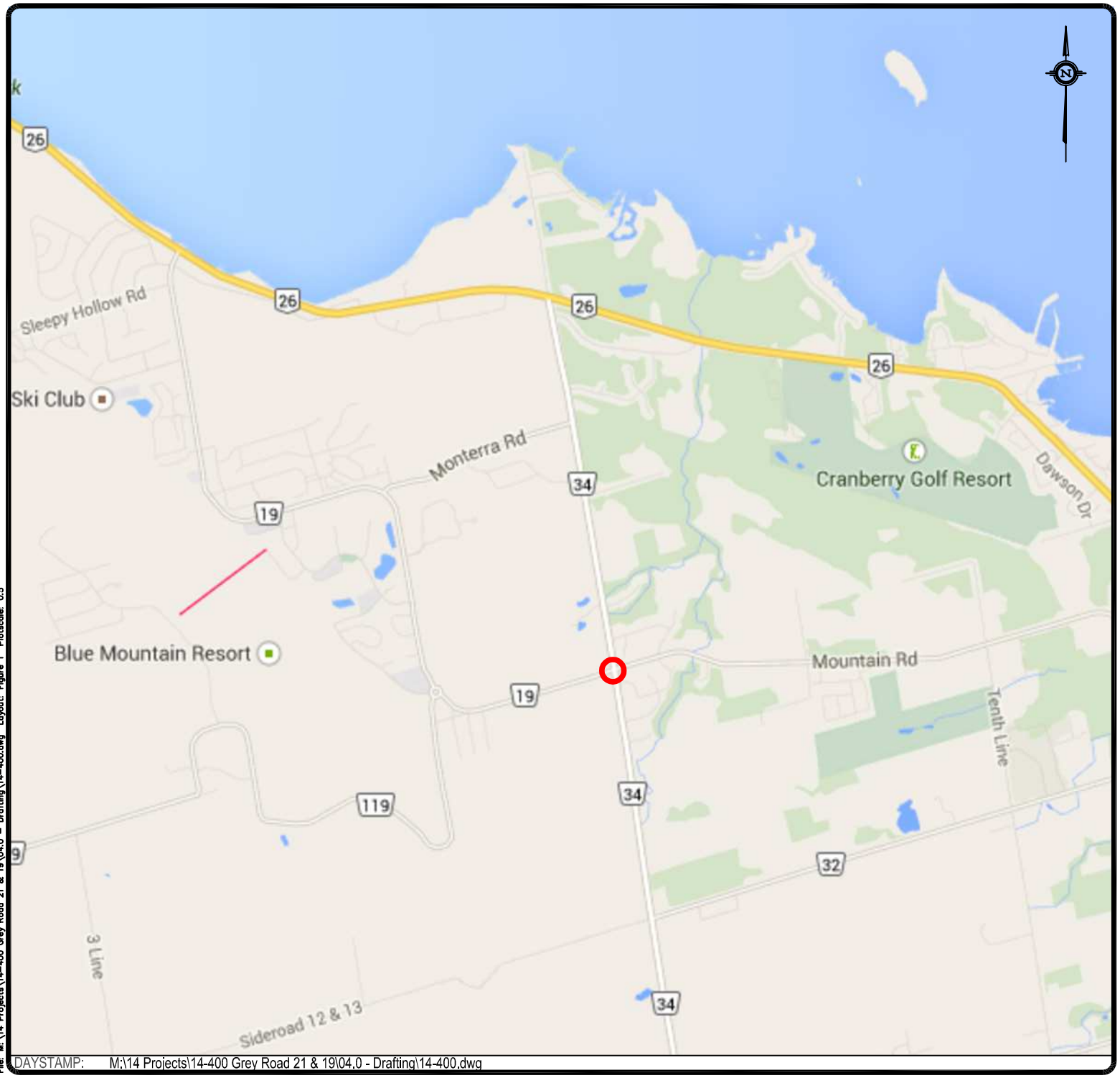
7.0 CONCLUSIONS

The results of our studies indicate that proposed improvements to the intersection will not impact habitat of SAR or significant natural heritage functions identified within the 2014 Provincial Policy Statement (PPS): Woodland Amphibian Breeding Habitat and Fish habitat. Therefore, the proposed development is consistent with Sections 2.1.5 d, 2.1.6, 2.1.7 and 2.1.8 of the PPS and requires no registry or permitting submissions under Ontario's *Endangered Species Act, 2007*. We recommend that a request for review should is made to DFO for any work completed below the high water mark in Silver Creek and any roadside ditches connecting to Silver Creek.

8.0 REFERENCES

Azimuth 2009. Environmental Impact Study, Georgian Gate Lands, Part 16, Concession 1, Town of the Blue Mountains, Grey County.

Azimuth 2014. Environmental Impacts Study Update - Windfall, Medium Density Block (MDB).



LEGEND:

Approx. Study Area

600m 0 1200m

HORIZONTAL SCALE 1: 40,000

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

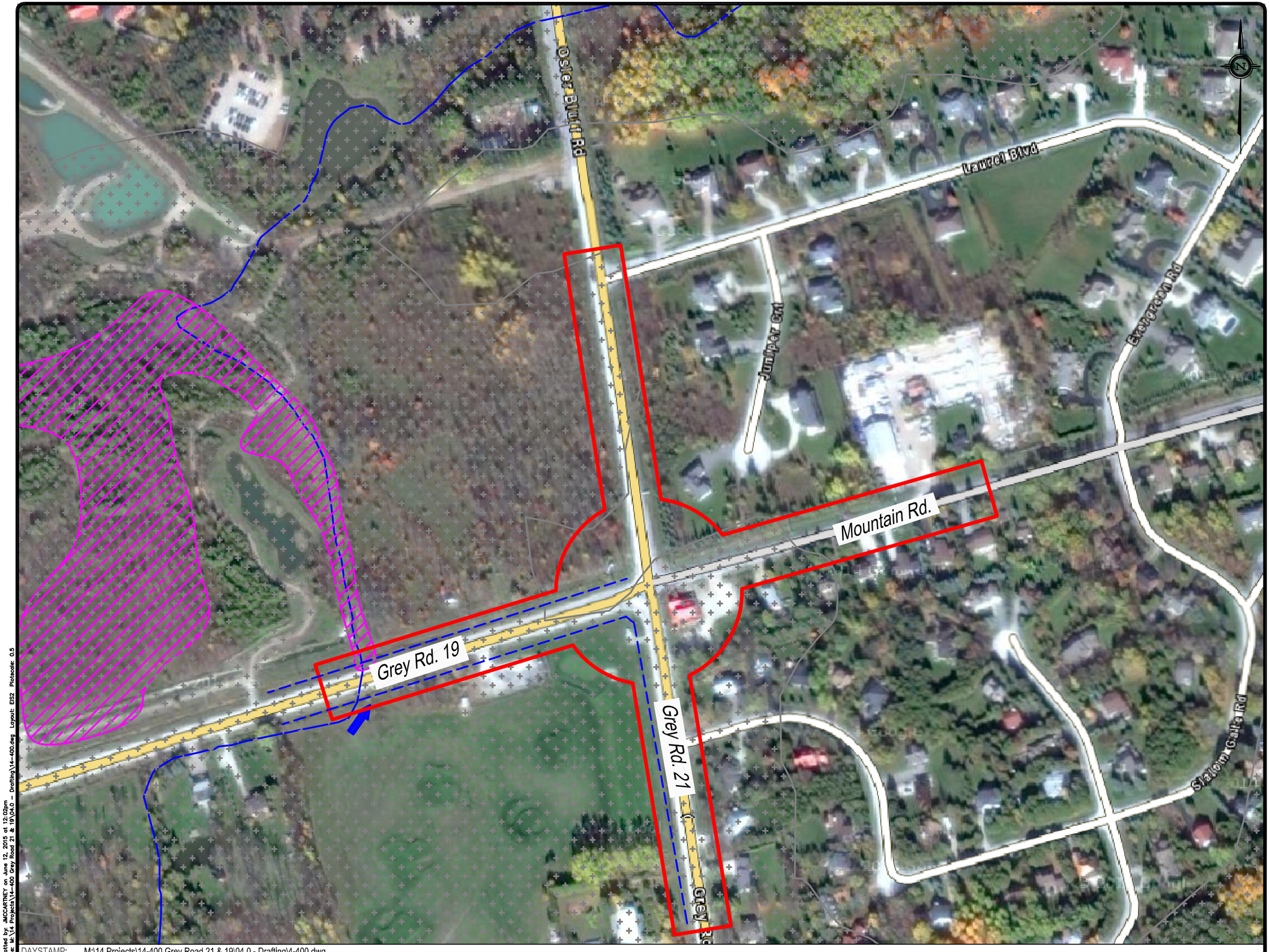
Study Area Location

Grey Rd.19 & 21,
Collingwood, ON

DATE ISSUED: *February 2015*	Figure No.
CREATED BY: *JLM*	1
PROJECT NO.: *14-400*	
REFERENCE: *Google Maps*	

DAYSTAMP: M:\14 Projects\14-400 Grey Road 21 & 19\04.0 - Drafting\14-400.dwg

Plotted by: JMCCARTNEY on February 5, 2015 at 4:24pm
File: M:\14 Projects\14-400 Grey Road 21 & 19\04.0 - Drafting\14-400.dwg Layout: Figure 1 Plotscale: 0.5



LEGEND:

- *Approx. Study Area*
- *Tributary of Silver Creek*
- *Flow Direction*
- *Wetland*
- *NVCA Regulated Area*
- *Contributing Fish Habitat (Roadside Ditch)*

25m 0 75m

HORIZONTAL SCALE 1:2,500

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Environmental Features

Grey Road 21 & 19
Collingwood, ON

DATE ISSUED:	*February 2015*	Figure No.
CREATED BY:	*JLM*	2
PROJECT NO.:	*14-400*	
REFERENCE:	*First Base Solutions*	

DAYSTAMP: M:\14 Projects\14-400 Grey Road 21 & 19\04.0 - Drafting\4-400.dwg

Plotted by: JMCCARTNEY on June 12, 2015 at 12:02pm
File: M:\14 Projects\14-400 Grey Road 21 & 19\04.0 - Drafting\14-400.dwg Layout: EIS2 Plotscale: 0.5

Table 1. Ecological Land Classification System (ELC), Plant Community Description, Windfall Medium Density Block.

		Species Composition		
ELC Code[1]	**ECL Name**	**Canopy/Subcanopy**	**Understory**	**Ground Layer**
CUW1b	Mineral Cultural Woodland Ecosite	Ash, Apple, White Elm	Ash, Hawthorn	Grasses, Virginia Strawberry, Dandelion, Poison Ivy, Field Daisy, Common St. John's wort, Wild Carrot
CUW1e	Mineral Cultural Woodland Ecosite	Ash, Apple, White Elm	Ash, Hawthorn	Grasses, Virginia Strawberry, Dandelion, Poison Ivy, Field Daisy, Common St. John's wort, Wild Carrot
CUM1a	Mineral Cultural Meadow Ecosite	NA	Ash, Apple, Hawthorn	Grasses, Dandelion, Field Daisy, Clover, Chickweed, Vetch, Common St. John's wort, Wild Carrot, Field Horsetail
MAM2-2	Reed-canary Grass Mineral Meadow Marsh Type	NA	NA	Reed Canary Grass, Sedges

[1] Ecological Land Classification polygon, See Table 2 for plant species composition and Figure 2 for location

Table 3. Bird List, Windfall Medium Density Block.

			Conservation Rank[1]		
FAMILY	**SCIENTIFIC NAME**	**ENGLISH COMMON NAME**	**SRANK**	**GRANK**	**SARO STATUS**
Anatidae	*Anas platyrhynchos*	Mallard	S5	G5	
Ardeidae	*Butorides virescens*	Green Heron	S4	G5	
Bombycillidae	*Bombycilla cedrorum*	Cedar Waxwing	S5	G5	
Columbidae	*Zenaida macroura*	Mourning Dove	S5	G5	
Corvidae	*Cyanocitta cristata*	Blue Jay	S5	G5	
Emberizidae	*Melospiza melodia*	Song Sparrow	S5	G5	
Emberizidae	*Spizella pusilla*	Field Sparrow	S4	G5	
Emberizidae	*Zonotrichia albicollis*	White-throated Sparrow	S5	G5	
Fringillidae	*Carduelis tristis*	American Goldfinch	S5	G5	
Icteridae	*Agelaius phoeniceus*	Red-winged Blackbird	S4	G5	
Icteridae	*Molothrus ater*	Brown-headed Cowbird	S4	G5	
Mimidae	*Dumetella carolinensis*	Gray Catbird	S4	G5	
Paridae	*Poecile atricapillus*	Black-capped Chickadee	S5	G5	
Parulidae	*Geothlypis trichas*	Common Yellowthroat	S5	G5	
Parulidae	*Oreothlypis ruficapilla*	Nashville Warbler	S5	G5	
Parulidae	*Setophaga petechia*	Yellow Warbler	S5	G5	
Scolopacidae	*Scolopax minor*	American Woodcock	S4	G5	
Troglodytidae	*Troglodytes aedon*	House Wren	S5	G5	
Turdidae	*Turdus migratorius*	American Robin	S5	G5	
Tyrannidae	*Empidonax alnorum*	Alder Flycatcher	S5	G5	
Tyrannidae	*Myiarchus crinitus*	Great Crested Flycatcher	S4	G5	
Tyrannidae	*Tyrannus tyrannus*	Eastern Kingbird	S4	G5	

[1]Conservation Rank from MNR, NHIC - 2014 list

Table 2. Plant List, Windfall Medium Density Block.

			Vegetation Community[1]						
			Woodland		Meadow	Marsh	Conservation Rank[2]		
Family	Species Name	Common Name	CUW1a	CUW1e	CUM1a	MAM2-2	GRANK	SRANK	SARO Stautus
ACERACEAE	*Acer negundo*	Manitoba Maple		X			G5	S5	
ALISMATACEAE	*Alisma triviale*	Northern Water-plantain			X	X	G5	S5	
ANACARDIACEAE	*Toxicodendron radicans*	Poison Ivy	X	X			G5	S5	
APIACEAE	*Daucus carota*	Wild Carrot	X	X	X		GNR	SNA	
APOCYNACEAE	*Apocynum cannabinum*	Hemp Dogbane		X			G5	S5	
ASCLEPIADACEAE	*Asclepias syriaca*	Common Milkweed		X			G5	S5	
ASTERACEAE	*Achillea millefolium*	Common Yarrow	X	X			G5	SNA	
ASTERACEAE	*Centaurea jacea*	Brown Knapweed	X	X	X		GNR	SNA	
ASTERACEAE	*Centaurea nigra*	Black Knapweed		X			GNR	SNA	
ASTERACEAE	*Cichorium intybus*	Chicory		X			GNR	SNA	
ASTERACEAE	*Cirsium arvense*	Canada Thistle	X	X	X		GNR	SNA	
ASTERACEAE	*Cirsium vulgare*	Bull Thistle			X		GNR	SNA	
ASTERACEAE	*Erigeron annuus*	Annual Fleabane	X	X			G5	S5	
ASTERACEAE	*Erigeron hyssopifolius*	Daisy Fleabane	X				G5	S5	
ASTERACEAE	*Euthamia graminifolia*	Grass-leaved Goldenrod		X	X	X	G5	S5	
ASTERACEAE	*Inula helenium*	Elecampane Flower	X	X			GNR	SNA	
ASTERACEAE	*Leucanthemum vulgare*	Oxeye Daisy	X	X			GNR	SNA	
ASTERACEAE	*Solidago altissima*	Eastern Late Goldenrod	X		X		GNR	S5	
ASTERACEAE	*Solidago caesia*	Blue-stemmed Goldenrod		X			G5	S5	
ASTERACEAE	*Solidago canadensis*	Canada Goldenrod	X	X	X		G5	S5	
ASTERACEAE	*Solidago gigantea*	Smooth Goldenrod		X			G5	S5	
ASTERACEAE	*Solidago juncea*	Early Goldenrod	X				G5	S5	
ASTERACEAE	*Solidago nemoralis*	Gray-stemmed Goldenrod		X	X		G5	S5	
ASTERACEAE	*Solidago rugosa*	Northern Rough-leafed Goldenrod			X		G5	S5	
ASTERACEAE	*Symphyotrichum cordifolium*	Heart-leaved Aster		X			G5	S5	
ASTERACEAE	*Symphyotrichum lanceolatum*	Panicled Aster	X	X	X		G5	S5	
ASTERACEAE	*Symphyotrichum lateriflorum*	Starved Aster	X	X	X		G5	S5	
ASTERACEAE	*Symphyotrichum novae-angliae*	New England Aster	X	X	X		G5	S5	
ASTERACEAE	*Symphyotrichum pilosum var. pringlei*	Pringle's Aster		X			G5T5	S4	
ASTERACEAE	*Symphyotrichum urophyllum*	Arrow-leaved Aster	X				G4	S4	
ASTERACEAE	*Taraxacum officinale*	Brown-seed Dandelion	X	X			G5	SNA	
ASTERACEAE	*Tragopogon pratensis*	Meadow Goat's-beard	X				GNR	SNA	
CAPRIFOLIACEAE	*Viburnum lentago*	Nannyberry		X			G5	S5	
CAPRIFOLIACEAE	*Viburnum opulus ssp. trilobum*	Highbush Cranberry	X	X	X		GNR	S5	
CARYOPHYLLACEAE	*Cerastium fontanum*	Common Mouse-ear Chickweed	X				GNR	SNA	
CLUSIACEAE	*Hypericum perforatum*	Common St. John's-wort	X	X	X	X	GNR	SNA	

			Vegetation Community[1]						
			Woodland		Meadow	Marsh	Conservation Rank[2]		
Family	Species Name	Common Name	CUW1a	CUW1e	CUM1a	MAM2-2	GRANK	SRANK	SARO Stautus
CORNACEAE	*Cornus alternifolia*	Alternate-leaf Dogwood		X			G5	S5	
CORNACEAE	*Cornus stolonifera*	Red-osier Dogwood	X	X	X	X	G5	S5	
CRASSULACEAE	*Penthorum sedoides*	Ditch-stonecrop				X	G5	S5	
CUPRESSACEAE	*Thuja occidentalis*	Eastern White Cedar	X	X		X	G5	S5	
CYPERACEAE	*Carex bebbii*	Bebb's Sedge	X	X	X	X	G5	S5	
CYPERACEAE	*Carex blanda*	Woodland Sedge		X			G5?	S5	
CYPERACEAE	*Carex brevior*	Fescue Sedge			X		G5?	S4S5	
CYPERACEAE	*Carex comosa*	Bristly Sedge			X	X	G5	S5	
CYPERACEAE	*Carex gracillima*	Graceful Sedge		X			G5	S5	
CYPERACEAE	*Carex granularis*	Meadow Sedge			X		G5	S5	
CYPERACEAE	*Carex hystericina*	Porcupine Sedge			X		G5	S5	
CYPERACEAE	*Carex laxiflora*	Loose-flowered Sedge	X				G5	S5	
CYPERACEAE	*Carex lupulina*	Hop Sedge		X		X	G5	S5	
CYPERACEAE	*Carex radiata*	Stellate Sedge	X				G4	S4	
CYPERACEAE	*Carex spicata*	Spiked Sedge	X	X	X		G?	SNA	
CYPERACEAE	*Carex stipata*	Awl-fruited Sedge		X	X	X	G5	S5	
CYPERACEAE	*Carex vulpinoidea*	Fox Sedge	X		X	X	G5	S5	
CYPERACEAE	*Eleocharis palustris*	Creeping Spike-rush				X	G5?	S5	
CYPERACEAE	*Schoenoplectus tabernaemontani*	Soft-stem Bulrush				X	G5	S5	
CYPERACEAE	*Scirpus atrovirens*	Dark-green Bulrush	X		X	X	G5?	S5	
CYPERACEAE	*Scirpus cyperinus*	Cottongrass Bulrush			X		G5	S5	
ELAEAGNACEAE	*Shepherdia canadensis*	Canada Buffalo-berry			X		G5	S5	
EQUISETACEAE	*Equisetum arvense*	Field Horsetail		X			G5	S5	
EQUISETACEAE	*Equisetum pratense*	Meadow Horsetail				X	G5	S5	
FABACEAE	*Lotus corniculatus*	Garden Bird's-foot Trefoil	X				GNR	SNA	
FABACEAE	*Medicago lupulina*	Black Medic	X		X		GNR	SNA	
FABACEAE	*Melilotus alba*	White Sweet Clover	X	X	X		G5	SNA	
FABACEAE	*Robinia pseudo-acacia*	Black Locust	X				G5	SNA	
FABACEAE	*Securigera varia*	Common Crown-vetch			X		GNR	SNA	
FABACEAE	*Trifolium hybridum*	Alsike Clover			X	X	GNR	SNA	
FABACEAE	*Trifolium pratense*	Red Clover	X		X		GNR	SNA	
FABACEAE	*Vicia cracca*	Tufted Vetch	X	X	X	X	GNR	SNA	
FAGACEAE	*Quercus rubra*	Northern Red Oak	X				G5	S5	
GENTIANACEAE	*Centaurium erythraea*	Common Centaury				X	GNR	SNA	
GERANIACEAE	*Geranium robertianum*	Herb-robert	X				G5	S5	
GROSSULARIACEAE	*Ribes lacustre*	Bristly Black Currant	X		X		G5	S5	
GROSSULARIACEAE	*Ribes triste*	Swamp Red Currant		X			G5	S5	
JUNCACEAE	*Juncus articulatis*	Jointed Rush			X		G5	S5	

			Vegetation Community[1]						
			Woodland		Meadow	Marsh	Conservation Rank[2]		
Family	Species Name	Common Name	CUW1a	CUW1e	CUM1a	MAM2-2	GRANK	SRANK	SARO Stautus
JUNCACEAE	*Juncus canadensis*	Canada Rush			X		G5	S5	
JUNCACEAE	*Juncus compressus*	Flattened Rush		X	X		G5	SNA	
JUNCACEAE	*Juncus tenuis*	Path Rush		X	X		G5	S5	
LAMIACEAE	*Leonurus cardiaca*	Common Motherwort					GNR	SNA	
LAMIACEAE	*Lycopus americanus*	American Water-horehound		X	X	X	G5	S5	
LAMIACEAE	*Mentha arvensis*	Field Mint	X	X	X		G5	S5	
LAMIACEAE	*Mentha spicata*	Spearmint	X		X	X	GNR	SNA	
LAMIACEAE	*Mentha x piperita*	Hybrid Mint				X	GNA	SNA	
LAMIACEAE	*Prunella vulgaris*	Self-heal	X	X		X	G5	S5	
LILIACEAE	*Asparagus officinalis*	Garden Asparagus		X			G5?	SNA	
OLEACEAE	*Fraxinus americana*	White Ash	X	X	X		G5	S4	
OLEACEAE	*Fraxinus pennsylvanica*	Green Ash	X	X		X	G5	S4	
ONAGRACEAE	*Circaea canadensis*	Broadleaf Enchanter's Nightshade	X				G5	S5	
ORCHIDACEAE	*Epipactis helleborine*	Eastern Helleborine	X	X			GNR	SNA	
PINACEAE	*Pinus sylvestris*	Scotch Pine	X	X			GNR	SNA	
PLANTAGINACEAE	*Plantago lanceolata*	English Plantain	X	X		X	G5	SNA	
PLANTAGINACEAE	*Plantago major*	Common Plantain	X			X	G5	S5	
POACEAE	*Agrostis gigantea*	Redtop			X		G4G5	SNA	
POACEAE	*Bromus inermis*	Awnless Brome					G5T	SNA	
POACEAE	*Calamagrostis canadensis*	Bluejoint Reedgrass				X	G5	S5	
POACEAE	*Dactylis glomerata*	Orchard Grass	X	X	X		GNR	SNA	
POACEAE	*Elymus repens*	Creeping Wild-rye	X				GNR	SNA	
POACEAE	*Festuca rubra*	Red Fescue	X				G5	SNA	
POACEAE	*Glyceria canadensis*	Canada Manna-grass				X	G5	S4S5	
POACEAE	*Glyceria striata*	Fowl Manna-grass		X	X	X	G5	S5	
POACEAE	*Leersia oryzoides*	Rice Cutgrass			X	X	G5	S5	
POACEAE	*Phalaris arundinacea*	Reed Canary Grass	X	X	X	X	G5	S5	
POACEAE	*Phleum pratense*	Common Timothy	X	X	X		GNR	SNA	
POACEAE	*Poa annua*	Annual Bluegrass	X	X			GNR	SNA	
POACEAE	*Poa compressa*	Canada Bluegrass		X			GNR	SNA	
POACEAE	*Poa palustris*	Fowl Bluegrass				X	G5	S5	
POACEAE	*Poa pratensis*	Kentucky Bluegrass	X				G5	S5	
POACEAE	*Poa saltuensis*	Drooping Bluegrass	X				G5	S4	
POACEAE	*Schedonorus pratensis*	Meadow Fescue				X	G5	SNA	
POLYGONACEAE	*Polygonum amphibium*	Water Smartweed				X	G5	S5	
POLYGONACEAE	*Rumex crispus*	Curly Dock	X	X	X	X	GNR	SNA	
PRIMULACEAE	*Lysimachia ciliata*	Fringed Loosestrife				X	G5	S5	
PRIMULACEAE	*Lysimachia thyrsiflora*	Water Loosestrife				X	G5	S5	

			Vegetation Community[1]						
			Woodland		Meadow	Marsh	Conservation Rank[2]		
Family	Species Name	Common Name	CUW1a	CUW1e	CUM1a	MAM2-2	GRANK	SRANK	SARO Stautus
RANUNCULACEAE	*Anemone canadensis*	Canada Anemone			X		G5	S5	
RANUNCULACEAE	*Anemone virginiana*	Virginia Anemone		X			G5	S5	
RANUNCULACEAE	*Ranunculus acris*	Tall Buttercup	X	X			G5	SNA	
RANUNCULACEAE	*Ranunculus flabellaris*	Yellow Water Buttercup			X	X	G5	S4?	
RHAMNACEAE	*Rhamnus cathartica*	Common Buckthorn	X	X	X		GNR	SNA	
ROSACEAE	*Agrimonia gryposepala*	Hooked Groovebur	X	X			G5	S5	
ROSACEAE	*Amelanchier laevis*	Smooth Serviceberry			X		G4G5Q	S5	
ROSACEAE	*Crataegus macrosperma*	Big-fruit Hawthorn	X		X		G5	S5	
ROSACEAE	*Crataegus punctata*	Dotted Hawthorn	X	X	X		G5	S5	
ROSACEAE	*Fragaria virginiana*	Wild Strawberry	X	X			G5	S5	
ROSACEAE	*Geum canadense*	White Avens	X				G5	S5	
ROSACEAE	*Malus pumila*	Common Apple	X	X	X		G5	SNA	
ROSACEAE	*Potentilla recta*	Sulphur Cinquefoil	X	X			GNR	SNA	
ROSACEAE	*Prunus virginiana*	Choke Cherry		X			G5	S5	
ROSACEAE	*Rosa acicularis*	Prickly Rose	X				G5	S5	
ROSACEAE	*Rosa blanda*	Smooth Rose		X			G5	S5	
ROSACEAE	*Rosa rubiginosa*	A Rose	X				GNR	SNA	
ROSACEAE	*Rubus occidentalis*	Black Raspberry	X				G5	S5	
RUBIACEAE	*Galium palustre*	Marsh Bedstraw			X	X	G5	S5	
SALICACEAE	*Populus balsamifera*	Balsam Poplar		X	X		G5	S5	
SALICACEAE	*Populus tremuloides*	Trembling Aspen		X	X		G5	S5	
SALICACEAE	*Salix alba var. alba*	White Willow		X			G5	SNA	
SALICACEAE	*Salix amygdaloides*	Peach-leaved Willow		X			G5	S5	
SALICACEAE	*Salix petiolaris*	Meadow Willow		X			G5	S5	
SCROPHULARIACEAE	*Mimulus ringens*	Square-stem Monkeyflower			X	X	G5	S5	
SCROPHULARIACEAE	*Verbascum thapsus*	Common Mullein			X		GNR	SNA	
TILIACEAE	*Tilia americana*	American Basswood		X	X		G5	S5	
TYPHACEAE	*Typha angustifolia*	Narrow-leaved Cattail			X		G5	SNA	
ULMACEAE	*Ulmus americana*	American Elm	X	X		X	G5?	S5	
VITACEAE	*Parthenocissus quinquefolia*	Virginia Creeper	X	X		X	G5	S4?	
VITACEAE	*Vitis riparia*	Riverbank Grape	X	X	X		G5	S5	

[1] Ecological Land Classification polygon, See Table 1 for community description and Figure 2 for location

[2] Conservation Rank - From Ministry of Natural Resources, Natural Heritage Information Centre (2014 list)

APPENDICES

Appendix A: Agency Correspondence and Background Information
Appendix B: Development Options
Appendix C: Photographic Record of the Site

APPENDIX A

Agency Correspondence and Background Information

AZIMUTH ENVIRONMENTAL CONSULTING, INC.
Environmental Assessments & Approvals

February 18, 2015 AEC 14-400

Ministry of Natural Resources
Midhurst District
2284 Nursery Road
Midhurst, Ontario
L0L 1X0

Attention: Suzanne Robinson, Species at Risk Biologist

RE: DRAFT Species at Risk Information Request for Class EA Grey Road 21 & Grey Road 19, County of Grey, ON.

Dear Ms. Robinson:

Azimuth was retained by C.C. Tatham & Associates Ltd. to conduct a Natural Heritage Study in support of the Class EA for proposed intersection improvements at Grey Road 21 and Grey Road 19. The figure attached shows the study area and environmental features.

The site is west of the Town of Collingwood along the border of the County of Grey and the County of Simcoe. The site is in an area designated 'settlement' and 'recreational resort area' by the County of Simcoe and County of Grey Official plans respectively. The site is outside of areas affected by development control regulations by the Town of Blue Mountains official plan which identifies the site as 'Escarpment Recreational'. The Town of Collingwood official plan identifies this area as 'Rural Residential'. Part of the study area is regulated by NVCA.

There are no Provincially Significant Wetlands (PSW) or Areas of Natural and Scientific Interest (ANSI) within or within 1km of the study area. There is an unevaluated wetland in the Northwest quadrant of the study area. A tributary of Silver Creek crosses Grey Road 19. Table 1 reports the bird species observed within and adjacent to the intersection. None of the birds is currently protected or considered rare provincially or Nationally. No area-sensitive forest or grassland breeding bird species were observed

within or adjacent to the intersection. Parts of the study area are treed. Other land use includes commercial lots, residential lots and municipal roads. Other species to be considered during our study include American Ginseng and Butternut which are known to occur in Simcoe County.

The purpose of this letter is to request additional information regarding Species at Risk and sensitive areas associated with the Study Area, aside from those identified above and to request any background information from you that may be relevant to our study.

Thank you very much for your assistance in this matter. If you have any questions regarding this project please do not hesitate to contact us.

Yours truly,

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

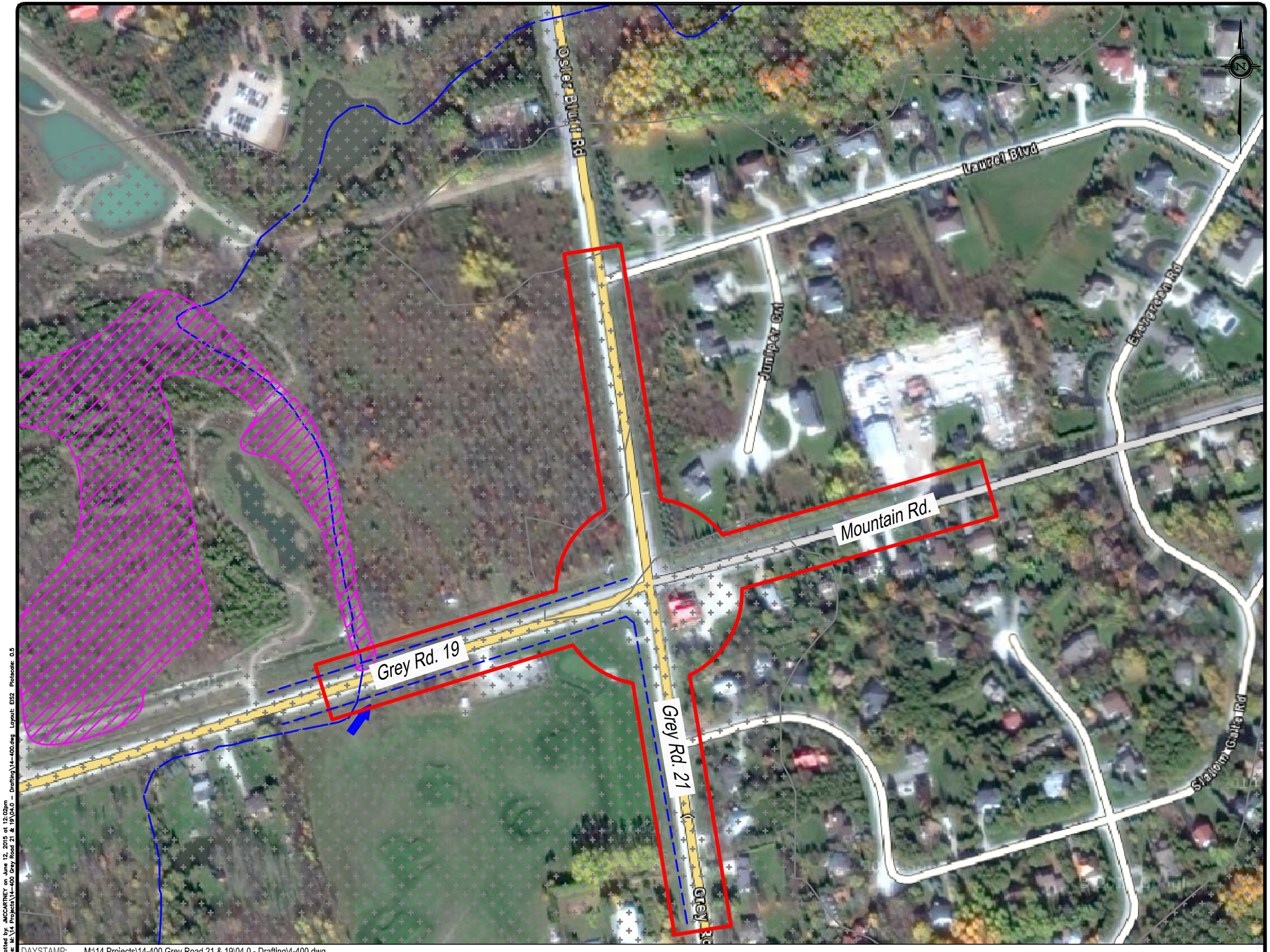
T.C. den Haas, M.Sc.
Aquatic Ecologist

TCD

Attachments:

- Figure 2 Environmental Features;
- Table 1 Bird Species

c.c. Dave Featherstone NVCA



LEGEND:

- *Approx. Study Area*
- *Tributary of Silver Creek*
- *Flow Direction*
- *Wetland*
- *NVCA Regulated Area*
- *Contributing Fish Habitat (Roadside Ditch)*

25m 0 75m

HORIZONTAL SCALE 1:2,500

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Environmental Features

Grey Road 21 & 19
Collingwood, ON

DATE ISSUED:	*February 2015*	Figure No.
CREATED BY:	*JLM*	2
PROJECT NO.:	*14-400*	
REFERENCE:	*First Base Solutions*	

DAYSTAMP: M:\14 Projects\14-400 Grey Road 21 & 19\04.0 - Drafting\4-400.dwg

Plotted by: JMCCARTNEY on June 12, 2015 at 12:02pm
File: M:\14 Projects\14-400 Grey Road 21 & 19\04.0 - Drafting\14-400.dwg Layout: EIS2 Plotscale: 0.5

Table 1. Bird List, Intersection Grey Road 21 and Grey Road 19.

			Conservation Rank[1]		
FAMILY	**SCIENTIFIC NAME**	**ENGLISH COMMON NAME**	**SRANK**	**GRANK**	**SARO STATUS**
Anatidae	*Anas platyrhynchos*	Mallard	S5	G5	
Ardeidae	*Butorides virescens*	Green Heron	S4	G5	
Bombycillidae	*Bombycilla cedrorum*	Cedar Waxwing	S5	G5	
Columbidae	*Zenaida macroura*	Mourning Dove	S5	G5	
Corvidae	*Cyanocitta cristata*	Blue Jay	S5	G5	
Emberizidae	*Melospiza melodia*	Song Sparrow	S5	G5	
Emberizidae	*Spizella pusilla*	Field Sparrow	S4	G5	
Emberizidae	*Zonotrichia albicollis*	White-throated Sparrow	S5	G5	
Fringillidae	*Carduelis tristis*	American Goldfinch	S5	G5	
Icteridae	*Agelaius phoeniceus*	Red-winged Blackbird	S4	G5	
Icteridae	*Molothrus ater*	Brown-headed Cowbird	S4	G5	
Mimidae	*Dumetella carolinensis*	Gray Catbird	S4	G5	
Paridae	*Poecile atricapillus*	Black-capped Chickadee	S5	G5	
Parulidae	*Geothlypis trichas*	Common Yellowthroat	S5	G5	
Parulidae	*Oreothlypis ruficapilla*	Nashville Warbler	S5	G5	
Parulidae	*Setophaga petechia*	Yellow Warbler	S5	G5	
Scolopacidae	*Scolopax minor*	American Woodcock	S4	G5	
Troglodytidae	*Troglodytes aedon*	House Wren	S5	G5	
Turdidae	*Turdus migratorius*	American Robin	S5	G5	
Tyrannidae	*Empidonax alnorum*	Alder Flycatcher	S5	G5	
Tyrannidae	*Myiarchus crinitus*	Great Crested Flycatcher	S4	G5	
Tyrannidae	*Tyrannus tyrannus*	Eastern Kingbird	S4	G5	

[1]Conservation Rank from MNR, NHIC - 2014 list

Taco Den Haas

From: Robinson, Suzanne (MNRF) [suzanne.robinson@ontario.ca]
Sent: March-09-15 12:59 PM
To: Taco Den Haas
Cc: Dave Featherstone
Subject: RE: Species at Risk Information Request for Class EA Grey Road 21 & Grey Road 19, County of Grey, ON.

Hi Taco

At this time, there are no other reports of species at risk that are relevant to this location. The species at risk information is based on the best available information to date, please keep in mind that other species may be present on the landscape.

For a complete list of species at risk in Ontario, please review the information at the following link:

http://www.ontario.ca/environment-and-energy/species-risk

Should an observation of a species at risk or rare species occur, please report the information to the to the Midhurst District MNRF office.

Regards,

Suzanne Robinson
Management Biologist
Midhurst District

From: Dave Featherstone [mailto:dfeatherstone@nvca.on.ca]
Sent: February-19-15 1:13 PM
To: Taco Den Haas; Robinson, Suzanne (MNRF)
Subject: RE: Species at Risk Information Request for Class EA Grey Road 21 & Grey Road 19, County of Grey, ON.

Good afternoon, Taco! Jim Broadfoot will have some fairly recent info from the Windfall development property in the northwest quadrant of the study area. Not SAR but…the Silver Creek tributary is considered coldwater (migratory rainbow trout) and there is a linear wetland system along it downstream of the Le Scandinave pond.

Best regards,

David Featherstone, B.Sc.
Manager, Watershed Monitoring Program
Nottawasaga Valley Conservation Authority
8195 Concession Line 8
Utopia, Ontario
L0M 1T0
(705) 424-1479 Ext. 242
dfeatherstone@nvca.on.ca

From: Taco Den Haas [mailto:TDenHaas@Azimuthenvironmental.Com]
Sent: Wednesday, February 18, 2015 4:06 PM
To: Robinson, Suzanne (MNR) (suzanne.robinson@ontario.ca)
Cc: Dave Featherstone; Michael Cullip
Subject: Species at Risk Information Request for Class EA Grey Road 21 & Grey Road 19, County of Grey, ON.

Dear Ms. Robinson:
Azimuth was retained by C.C. Tatham & Associates Ltd. to conduct a Natural Heritage Study in support of the Class EA for proposed intersection improvements at Grey Road 21 and Grey Road 19. At this time we would like to request any additional information MNR may have for the site in regards to species at risk. Please find our request letter attached. Thank you very much for your assistance in this matter and if you have any questions regarding this project please do not hesitate to contact me.
Regards,

Taco den Haas
Aquatic Ecologist

Azimuth Environmental Consulting, Inc.
85 Bayfield Street, Suite 400
Barrie, ON L4M 3A7
office (705) 721-8451 x 220
cell (705) 331-6677

Providing services in ecology, environmental engineering & hydrogeology

APPENDIX B

Development Options

LEGEND

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

NO.	REVISIONS	DATE	INITIAL

APPROVED

TOWN OF BLUE MOUNTAINS

INTERSECTION OPTION 1

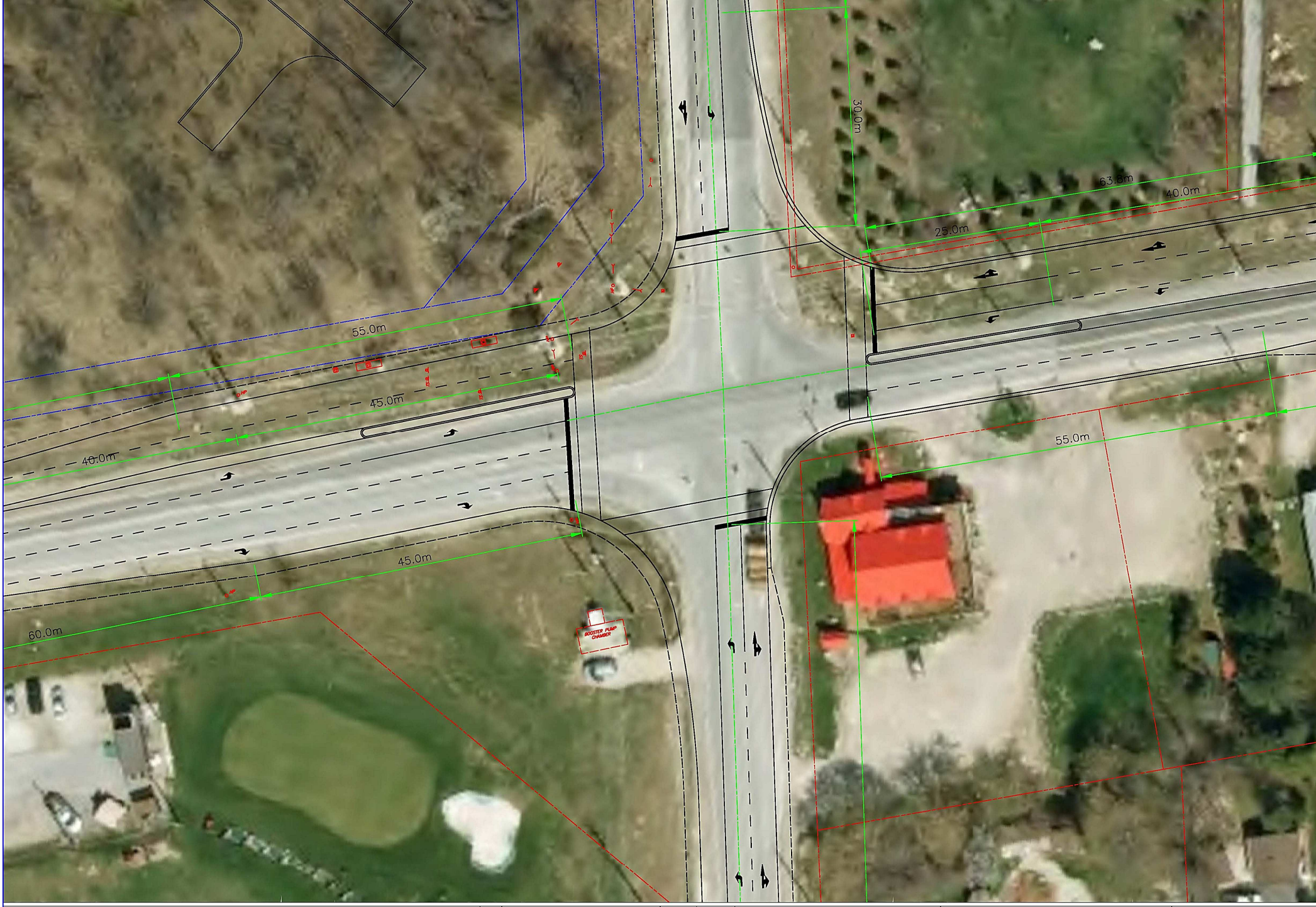
C.C.Tatham & Consulting Engineers

Collingwood Bracebr

SCALE: 1:1000

DESIGN: SKR/MJC | CHECKED: MJC

DRAWN: TP | DATE: FEB/2015



LEGEND

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

NO.	REVISIONS	DATE	INITIAL

APPROVED

TOWN OF BLUE MOUNTAINS

INTERSECTION OPTION 2

C.C. Tatham & Consulting Engineers

Collingwood Bracebr

SCALE: 1:1000

DESIGN: SKR/MJC | CHECKED: MJC

DRAWN: TP | DATE: FEB/2015

LEGEND

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

NO.	REVISIONS	DATE	INITIAL

APPROVED

TOWN OF BLUE MOUNTAINS

INTERSECTION OPTION 3

C.C.Tatham & Associates
Consulting Engineers
Collingwood Bracebr

SCALE: 1:1000	
DESIGN: SKR/MJC	CHECKED: MJC
DRAWN: TP	DATE: FEB/2015


9.0m
60.0m OUTSIDE DIA.
3.5m ENTERING AND
EXITING LANES TYP.
ALTERNATIVE 50m
OUTER DIAMETER
BOOSTER PUMP
CHAMBER


60.0m TYP.
50.0m DIA.
9.0m
3.5m ENTERING AND
EXITING LANES TYP.
BOOSTER PUMP
CHAMBER
ALTERNATIVE 60m
OUTER DIAMETER

APPENDIX C

Photographic Record of the Site

North side of Grey Road 19 east of Grey Rd 21 facing West.
Date: March 11, 2015

North Side of Grey Road 19 east of Grey Rd 21 facing west.
Date: March 11, 2015

South side of Grey Road 19 east of Grey Rd 21 facing east. Snow melting in roadside ditch with trickle water and pooled water.
Date: March 11, 2015

South side of Grey Road 19 east of Grey Rd 21 facing west.
Date: March 11, 2015

East side of Grey Road 21 south of Grey Rd 19 facing south.
Date: March 11, 2015

East side of Grey Road 21 south of Grey Rd 19 facing north.
Date: March 11, 2015

West side of Grey Road 21 south of Grey Rd 19 facing south.
Date: March 11, 2015

West side of Grey Road 21 south of Grey Rd 19 facing north.
Date: March 11, 2015

South side of Grey Road 19 west of Grey Rd 21 east. Melting snow in roadside ditch and flooding of the field south of the road. Date: March 11, 2015

South side of Grey Road 19 west of Grey Rd 21 facing East. Roadside ditch with snow. Date: March 11, 2015

North side of Grey Road 19 facing West. Roadside ditch with melting snow. Standing water observed in the ditch.
Date: March 11, 2015

North side of Grey Road 19 facing east. Roadside ditch with melting snow. Some flooding of the land adjacent to the field.
Date: March 11, 2015

West side of Grey Road 21 facing north. Date: March 11, 2015

West side of Grey Road 21 facing south. Date: March 11, 2015

East side of Grey Road 21 facing north. Date: March 11, 2015

East side of Grey Road 21 facing south. Date: March 11, 2015

North ditch of Grey Road 19, West of Grey Road 21, facing west.
Date: June 11, 2015

Silver Creek Culvert outlet on the north side of Grey Road 19.
Date: June 11, 2015

Silver Creek Culvert inlet on the south side of Grey Road 19. Date: June 11, 2015

Standing water in the though ditch of Grey Road 19, west of Grey Road 21, looking southeast. Date: June 11, 2015

South ditch of Grey Road 19, looking downstream (west) of the entrance culvert.. Date: June 11, 2015

South ditch of Grey Road 19, looking upstream (east) from entrance culvert, towards Grey Road 21. Date: June 11, 2015

Appendix K:
Archaeological Assessment

ARCHEOWORKS INC.

Stage 1 Archaeological Assessment: Detailed Design for Proposed Improvements to the Intersection of Grey Road 19/Osler Bluff Road and Grey Road 21/Mountain Road Within Part of Lots 45 and 46, Concession 12 and Lots 15 and 16, Concession 1 In the Geographic Townships of Nottawasaga and Collingwood Historical Counties of Simcoe and Grey Now in the Towns of Collingwood and Blue Mountains Counties of Simcoe and Grey Ontario

Project #: 235-GR1343-14
Licensee (#): Alvina Tam (P1016)
PIF#: P1016-0066-2015

Original Report

March 4th, 2015

Presented to:
C.C. Tatham Associates
115 Sandford Fleming Drive, Suite 200
Collingwood, Ontario
L9Y 5A6
T: 705.444.2565
F: 705.444.2327

Prepared by:
Archeoworks Inc.
16715-12 Yonge Street, Suite 1029
Newmarket, Ontario
L3X 1X4
T: 416.676.5597
F: 416.676.5810

EXECUTIVE SUMMARY

Archeoworks Inc. was retained by *C.C. Tatham Associates* to conduct a Stage 1 Archaeological Assessment (AA) as part of the detailed design for proposed improvements to the intersection of Grey Road 19/Osler Bluff Road) and Grey Road 21/Mountain Road. The study area is located within part of Lots 15 and 16, Concession 1 in the Geographic Township of Collingwood, historical County of Grey, now in the Town of Blue Mountains, County of Grey; and part of Lots 45 and 46, Concession 12, in the Geographic Township of Nottawasaga, historical County of Simcoe, now in the Town of Collingwood, County of Simcoe, Ontario.

The Stage 1 AA identified elevated potential for the recovery of Aboriginal and Euro-Canadian archaeological remains within undisturbed portions of the study area due to its close proximity (within 100 metres) to historic transportation routes and being partially within the hamlet of Kirkville.

The study area is situated in a mainly rural setting at the boundary of Grey and Simcoe Counties and comprises the intersection of Grey Road 19/ Osler Bluff Road and Grey Road 21/Mountain Road. Disturbances consisting of an existing commercial structure, paved roads, gravel parking area, gravel shoulder, roadside ditching, and hydro utilities were identified. Potentially undisturbed areas with archaeological potential include (but are not limited to) includes the slightly treed and overgrown area located beyond the existing ROW within the northeast corner, the wooded areas along the northwestern limit, and the manicured grassed area along the southwestern limit of the study area.

The following recommendations are presented:

1. As per *Section 1.4.1, Standard 1* of the *2011 S&G,* areas that exhibit disturbed conditions need to be confirmed through an on-site property inspection during a Stage 2 AA.

2. All identified areas which contain archaeological potential must be subjected to a Stage 2 AA. Given the narrow width of these areas at less than 10 metres and being situated amidst a wooded area and utilities where infrastructure may be damaged, ploughing in advance of pedestrian archaeological survey will not be possible. As such, these areas must be subjected to a Stage 2 shovel test pit archaeological survey at five-metre intervals in accordance with *Section 2.1.2* of the *2011 S&G*.

3. Should construction activities associated with this development extend beyond the assessed limits of the study corridor; further archaeological investigation will be required to assess the archaeological potential of these lands.

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PROJECT PERSONNEL

Project Director ..... Alvina Tam - MTCS licence P1016

Report Preparation ..... Alvina Tam - MTCS licence P1016

Report Review ..... Nimal Nithiyanantham – MTCS licence P390
Kim Slocki – MTCS licence P029
Jessica Marr - MTCS licence P334

Historical Research ..... Lee Templeton – MTCS licence R454

Graphics ..... Alvina Tam - MTCS licence P1016
Lee Templeton – MTCS licence R454

1.0 PROJECT CONTEXT

1.1 Objective

The objectives of a Stage 1 Archaeological Assessment (AA), as outlined by the 2011 *Standards and Guidelines for Consultant Archaeologists* (‘*2011 S&G’*) published by the *Ministry of Tourism, Culture, and Sport* (*MTCS*) (2011), are as follows:

- To provide information about the property’s geography, history, previous archaeological fieldwork and current land condition;
- To evaluate in detail the property’s archaeological potential, which will support recommendations for Stage 2 survey for all or parts of the property; and
- To recommend appropriate strategies for Stage 2 survey.

1.2 Development Context

Archeoworks Inc. was retained by *C.C. Tatham Associates* to conduct a Stage 1 AA as part of the detailed design for proposed improvements to the intersection of Grey Road 19/Osler Bluff Road) and Grey Road 21/Mountain Road. These infrastructure improvements will improve public safety and traffic operations, as the area has seen increased travel demands. Design improvements will consider the provision of additional turn lanes; additional east-west direction lanes; upgraded traffic signal control or a two-lane roundabout; and improved illumination. Five alignments have been proposed, each outlined as follows:

1. QL-1: Four Lane Concept
2. FL-1: Five Lane Concept – Northerly Shift
3. FL-2: Five Lane Concept – Southerly Shift
4. RC-3: Roundabout Concept – North-West Location
5. RC-5: Roundabout Concept – South-East Location

Collectively, these five alignments will be referred to as the “study area”. Each will be discussed in further detail within **Section 2.0 – Analysis and Conclusions**.

The study area is located within part of Lots 15 and 16, Concession 1 in the Geographic Township of Collingwood, historical County of Grey, now in the Town of Blue Mountains, County of Grey; and part of Lots 45 and 46, Concession 12, in the Geographic Township of Nottawasaga, historical County of Simcoe, now in the Town of Collingwood, County of Simcoe,

Ontario (***see Appendix A – Maps 1-5***). Currently, an archaeological master plan is not available for either of the Counties of Simcoe and Grey[1].

This study is being undertaken as a Schedule B Municipal Class Environmental Assessment (Class EA). This Stage 1 AA was conducted through the Class EA process under the project direction of Ms. Alvina Tam, under the archaeological consultant licence number P1016, in accordance with the *Ontario Heritage Act* (2009). Permission to investigate the study area was granted by *C.C. Tatham Associates* on February 6th, 2015.

1.3 Historical Context

The *2011 S&G* considers areas of early Euro-Canadian settlement, including places of early military pioneer or pioneer settlement (e.g., pioneer homesteads, isolated cabins, and farmstead complexes), early wharf or dock complexes, and pioneer churches and early cemeteries, as having archaeological potential. There may be commemorative markers of their history, such as local, provincial, or federal monuments or heritage parks. Early historical transportation routes (trails, passes, roads, railways, portage routes), properties listed in a municipal register or designated under the *Ontario Heritage Act* or a federal, provincial, or municipal historic landmark or site, and properties that local histories or informants have identified with possible archaeological sites, historical events, activities, or occupations are also considered to have archaeological potential.

To establish the archaeological and historical significance of the study area, *Archeoworks Inc*. conducted a comprehensive review of the Aboriginal and Euro-Canadian settlement history, the designated and listed heritage properties and commemorative markers, and consulted with available historical mapping. Furthermore, an examination of the registered archaeological sites, previous archaeological assessments within close proximity to its limits, and review of the physiography of the overall area and its correlation to locating archaeological remains was performed.

The results of this background research are documented below and summarized in **Appendix B – Summary of Background Research.**

1.3.1 Pre-Contact Period

1.3.1.1 The Paleoindian Period (ca. 11,500 to 7,500 B.C.)

Prior to the ice age in North America, the Niagara Escarpment formed within Ontario. The region in which the study area is situated was first inhabited after the final retreat of the North American Laurentide ice sheet approximately 15,000 years ago (or 13,000 B.C.) (Stewart, 2013, p.24). Massive amounts of glacial meltwater expanded against the retreating ice boundary in

[1] The Grey County Official Plan indicates that the undertaking of an archaeological master plan is projected to commence in 2017 (Grey County, 2013).

the north, flooding Huron and Georgian Bay and occupying much of the Simcoe lowlands (Stewart, 2013, p.25). Eventually, the water within these basins coalesced to form glacial Lake Algonquin and "covered parts or all of Lake Huron, Lake Superior, and Erie basins, which included Lake Simcoe and Lake Couchiching" (Frim, 2002, p.xi; Karrow and Warner, 1990, p.15). The shoreline extended around the Lake Simcoe basin, the base of Bruce Peninsula and southwest to Kincardine (Karrow and Warner, 1990, p.15). The lessening ice load created isostatic rebound and caused abandoned shorelines to tilt northward towards the ice centre. Water began to accumulate along the southern shorelines, forming the main glacial strandline of Lake Algonquin which extended around the southern shore of Lake Simcoe (Karrow and Warner, 1990, p.15). This strandline is marked by a number of erosional and depositional features including high bluffs, off-shore bars, and limestone scarps where wave erosion cut into the bedrock (Storck, 1982, p.9). At this time, the study area was likely under Lake Algonquin.

The continuing retreat of the glaciers between 10,500 and 10,000 B.P. (ca. 8500-8000 B.C.) and glacial uplift uncovered a series of lower outlets near the North Bay, Ontario and water flooded the Ottawa River. The level of Lake Algonquin rapidly fell to form a series of short-lived post-Algonquin lakes located in the Georgian Bay and Lake Huron Basins which "exposed about half the present lake floor areas as dry land" (Karrow and Warner, 1990, p.17; Larson and Schaetzl, 2001, p.532; Jackson et al., 2000, p.419). These low-water lakes exposed as much as 12,000 to 14,000 kilometres of lake plain along the Ontario side of modern Lake Huron (Jackson, 2004, p.38). Streams and stream valleys extended throughout the flat, newly-exposed lake plain which opened large tracts of land available for flora and fauna to colonize (Karrow, 2004, p. 8; Karrow and Warner, 1990, p. 17). Along the ancient shoreline and the beaches of Lake Algonquin, there is definite evidence of human occupations corresponding to the Late Paleoindian period of Southern Ontario (Karrow and Warner, 1990, p.15).

Generally, Paleoindians are thought to have been small groups of nomadic hunter-gatherers who depended on naturally available foodstuff such as game or wild plants (Ellis and Deller, 1990, p.38). For much of the year, Paleoindians "hunted in small family groups; these would periodically gather into a larger grouping or bands during a favourable period in their hunting cycle, such as the annual caribou migration" (Wright, 1994, p.25).

Paleoindian sites are extraordinarily rare and consist of "stone tools clustered in an area of less than 200-300 metres" (Ellis, 2013, p.35). These sites appear to have been campsites used during travel episodes and can be found on well-drained soils in elevated situations, which would have provided a more comfortable location in which to camp and view the surrounding territory (Ellis and Deller, 1990, p.50). Traditionally, Paleoindian sites have been located primarily along abandoned glacial lake strandlines or beaches. However, this view is biased as these are areas in which archaeologists have searched for sites, due to current understanding of the region's geological history (Ellis and Deller, 1990, p.50; Ellis, 2013, p.37). In areas where attention has been paid to non-strandline areas and to older strandlines, sites are much less concentrated and more ephemeral (Ellis and Deller, 1990, p.51).

Artifact assemblages from this period are characterized by fluted and lanceolate stone points, scrapers, and small projectile points produced from specific chert types (Ellis and Deller, 1990). Paleoindians favoured Collingwood chert from Beaver Valley, which has been found throughout Ontario and as far as Michigan (Flynn, 1999, p.9). Distinctive dart heads were used to kill game, and knives for butchering and other tasks (Wright, 1994, p.24). These items were created and transported over great distances while following migratory animals within a massive territory.

1.3.1.2 The Archaic Period (ca. 7,800 to 500 B.C.)

As the climate steadily warmed, deciduous trees slowly began to permeate throughout Southern Ontario, creating mixed deciduous and coniferous forests (Karrow and Warner, 1990, p.30). The "Archaic peoples are the direct descendants of Paleoindian ancestors" having adapted to meet new environmental and social conditions (Ellis, 2013, p.41; Wright, 1994, p.25). The Archaic period is divided chronologically and cultural groups are divided geographically and sequentially. Archaic Aboriginals lived in "hunter-gatherer bands whose social and economic organization was probably characterized by openness and flexibility" (Ellis et al., 1990, p.123). This fluidity created 'traditions' and 'phases' which encompass large groups of Archaic Aboriginals (Ellis et al., 1990, p.123).

Few Archaic sites have faunal and floral preservation and lithic scatters are often the most common Archaic Aboriginal site type (Ellis et al., 1990, p. 123). House structures have "left no trace" due to the high acidic content of Ontario soils (Wright, 1994, p.27). Burial/grave goods and ritual items appear, although very rarely. By the Late Archaic, multiple individuals were buried together suggesting semi-permanent communities were in existence (Ellis, 2013, p.46). Ceremonial and decorative items also appear on Archaic Aboriginal sites through widespread trade networks, such as conch shells from the Atlantic coast and galena from New York (Ellis, 2013, p.41). Through trade with the northern Archaic Aboriginals situated around Lake Superior, native copper was initially utilized to make hooks and knives but gradually became used for decorative and ritual items (Ellis, 2013, p.42).

During the Archaic period, stone points were reformed from fluted and lanceolate points to stone points with notched bases to be attached to a wooden shaft (Ellis, 2013, p.41). The artifact assemblages from this period are characterized by a reliance on a wide range of raw lithic materials in order to make stone artifacts, the presence of stone tools shaped by grinding and polishing, and an increase in the use of polished stone axes and adzes as wood-working tools (Ellis et al., 1990, p. 65; Wright, 1994, p.26). Ground-stone tools were also produced from hard stones and reformed into tools and throwing weapons (Ellis, 2013, p.41). The bow and arrow was first used during the Archaic period (Ellis, 2013, p.42).

As isostatic uplift continued, drainage through the North Bay outlet was closed off and elevated water in the Huron Basin to higher than modern levels (Jackson et al., 2000, p.419). This high water phase is known as the "Nipissing Phase, occurring approximately 5000 B.P. (3000 B.C.), which inundated large areas probably previously occupied by humans" (Karrow and Warner, 1990, p. 21). It is generally believed that during the Nipissing Phase, water levels reached those of Lake Algonquin, thus creating one contiguous lake in the Lake Superior, Lake Michigan, and

Lake Huron basins (Jackson et al., 2000, p.419). Gradually, the Nipissing Phase water levels retreated to their present heights, draining down the St. Clair River and thus creating a series of little beaches due to the falling lake levels (Council of the Township of Collingwood, 1979, p.37).

1.3.1.3. The Early Woodland Period (ca. 800 B.C. to 0 B.C.)

Early Woodland cultures evolved out of the Late Archaic period (Ferris and Spence, 1995, p. 89; Spence et al., 1990, p.168). The Early Woodland period is divided into two complexes: the Meadowood complex and the Middlesex complex. The Middlesex complex appears to be restricted to Eastern Ontario, particularly along the St. Lawrence River while Meadowood materials depict a broader extent of occupation in southwestern Ontario (Spence et al., 1990, p.134, 141). The distinguishing characteristic of the Early Woodland period is the introduction of pottery (ceramics). The earliest forms were coil-formed, "thick, friable and often under fired, and must have been only limited to utility usage" (Ferris and Spence, 1995, p.89; Williamson, 2013, p.48).

Cache Blades, a formal chipped stone technology, and side-notched Meadowood points, were commonly employed tools often recycled into a number of other tool forms such as end scrapers (Spence et al., 1990, p.128; Ferris and Spence, 1995, p.93). These tools were primarily formed from Onondaga chert (Spence et al., 1990, p.128). Meadowood sites have produced a distinctive material culture that functioned in both domestic and ritual spheres (Ferris and Spence, 1995, p.90; Spence et al., 1990, p. 128). This allows correlations to be made between habitations and mortuary sites, creating a well-rounded view of Meadowood culture (Ferris and Spence, 1995, p.90; Spence et al., 1990, p. 128). However, their settlement-subsistence system is poorly understood as only a "few settlement types have been adequately investigated, and not all of these are from the same physiographic regions" (Ferris and Spence, 1995, p.93; Spence et al., 1990, p. 136). Generally, Meadowood sites are in association with the Point Peninsula and Saugeen complexes, which "then eventually changed or were absorbed into the Point Peninsula complex" (Wright, 1994, pp. 29-30).

1.3.1.4 The Middle Woodland Period (ca. 200 B.C. to A.D. 900)

During the Middle Woodland period, three primary cultural complexes developed in Southern Ontario. The Couture complex was located in the southwestern-most part of Ontario (Spence et al., 1990, p.143). The Point Peninsula complex was "distributed throughout south-central and eastern Southern Ontario, the southern margins of the Canadian Shield, the St. Lawrence River down river to Quebec City, most of southeastern Quebec, along the Richelieu River into Lake Champlain" (Spence et al., 1990, p.157; Wright, 1999, p.633). The Saugeen complex occupied "southwestern Southern Ontario from the Bruce Peninsula on Georgian Bay to the north shore of Lake Erie to the west of Toronto" (Wright, 1999, p.629; Wright, 1994, p.30). The Saugeen complex was also present along the Nottawasaga, Thames and Grand Rivers, however "sites along the Grand River have been variously assigned to Saugeen, Point Peninsula and independent complexes" (Spence et al., 1990, p.148).

The Saugeen and Point Peninsula cultures appear to have shared Southern Ontario but the borders between these three cultural complexes are not well defined, and many academics

believe that the Niagara Escarpment formed a frontier between the Saugeen complex and the Point Peninsula complex (Spence et al., 1990, p.143; Wright, 1999, p.629; Ferris and Spence, 1995, p.98). Consequently, the dynamics of hunter-gatherer societies shifted territorial boundaries resulting in regional clusters throughout southwestern Southern Ontario that have been variously assigned to Saugeen, Point Peninsula, or independent complexes (Spence et al., 1990, p.148; Wright, 1999, p.649). Saugeen material culture is best known from the east shore of Lake Huron (Spence et al., 1990, p.148).

Middle Woodland pottery share a preference for stamped, scallop-edged, or tooth-like decoration, but each cultural complex had distinct pottery forms, such as globular pots, finishes, and zones of decoration (Williamson, 2014, p.49; Ferris and Spence, 1995, p. 97; Spence et al., 1990, p.143). Major changes in settlement-subsistence systems occurred during the Middle Woodland period, particularly the introduction of large 'house' structures and substantial middens associated with these structures (Spence et al., 1990, p.167; Ferris and Spence, 1995, p. 99). The larger sites likely indicate a prolonged period of macroband settlement and a more consistent return to the same site, rather than an increase in band size (Spence et al., 1990, p. 168). Environmental constraints in different parts of Southern Ontario all produced a common implication of increased sedentism caused by the intensified exploitation of local resources (Ferris and Spence, 1995, p. 100). Burial offerings became more ornate and encompassed many material mediums, including antler, whetstones, copper, and pan pipes (Ferris and Spence, 1995, p. 99). Burial sites during this time were set away from occupation sites and remains were buried at time of death; secondary burials were not common (Ferris and Spence, 1995, p. 101). Small numbers of burial mounds are present, particularly around Rice Lake, and both exotic and utilitarian items were left as grave goods (Williamson, 2013, p.51; Ferris and Spence, 1995, p.102).

1.3.1.5 The Late Woodland Period (ca. 900 B.C. to A.D. 1600)

Multiple sub-stages and complexes have been assigned to the Late Woodland Period (A.D. 900-1600), which are divided spatially and chronologically and eventually progressed into the historic Contact period groups of the Late Ontario Iroquois stage (Fox, 1990a; Williamson, 1990; Dodd et al., 1990; Warrick, 2000). Although several migration theories have been suggested explaining the Iroquoian origins, an "available date from southern Ontario strongly suggests continuity (*in situ*) from the Middle-Late Woodland Transitional Princess Point complex and Late Woodland cultural groups" (Ferris and Spence, 1995, p. 105; Smith, 1990, p.283).

During the Late Ontario Iroquoian stage, the Iroquoian-speaking linguistic groups developed. Prior to European Contact, neighbouring Iroquois-speaking communities united to form several confederacies known as the Huron (Huron-Wendat), Neutral (called Attiewandaron by the Wendat), Petun (Tionnontaté or Khionontateronon) in Ontario, and the Five Nations of the Iroquois (Haudenosaunee) of upper New York State (Birch, 2010, p.31; Warrick, 2013, p.71). These groups are located primarily in south and central Ontario. Each group was distinct but shared a similar pattern of life already established by the 16th century (Trigger, 1994, p.42). Iroquoian village size began to gradually enlarge as horticulture took on a more central importance in subsistence patterns, particularly the farming of maize, squash, and beans,

supplemented by fishing, hunting, and gathering. House structures were initially oval and gradually became longhouses. Villages were later fortified (Williamson, 1990; Dodd et al., 1990).

The geographic distribution of pre-contact Ontario Iroquoian sites describes two major groups east and west of the Niagara Escarpment: the ancestral Attiewandaron to the west, and the ancestral Huron-Wendat and to the east (Warrick, 2000, p. 446). Recently, it has been theorized that ancestral Tionnontaté groups had arrived in the area between the Nottawasaga River, the Niagara Escarpment and Georgian Bay via the Grand, Pine and Nottawasaga Rivers from ancestral Attiewandaron country and are derived from the pre-contact Attiewandaron community (Garrad, 2014, pp. 1, 147-148). However, their origins are still questioned due to a lack of comparative studies between Tionnontaté and Attiewandaron material culture (Garrad, 2014, p.153). The territory along the Blue Mountains of the Niagara Escarpment may have been known to the ancestral Tionnontaté and ancestral Attiewandaron. The Tionnontaté arrived in the area as early as A.D. 1580 and were not an *in situ* development (Garrad, 2014, p.147).

1.3.2 Contact Period (ca. A.D. 1600 to 1650)

The Tionnontaté or Khionontateronon were called the 'Petun,' a term of Brazilian origin meaning tobacco, by the French after Samuel de Champlain observed the Tionnontaté cultivating and trading tobacco. In 1615-1616, Samuel de Champlain, along with Father Joseph Le Caron, a Recollet priest, had arrived in Tionnontaté territory and found eight occupied villages and two villages under construction. Limited ethno-historical information is available regarding the size of the Tionnontaté population, however inferences from pre-epidemic Huron-Wendat data suggests the Tionnontaté population may have exceeded 8,000 individuals. Jesuit missionaries, who attempted to establish the Mission of the Apostles to the Petun, recognized the existence of two different groups within the Tionnontaté territory: the Nation of the Wolves and the Nation of the Deer (Garrad and Heidenreich, 1978, pp. 394-396).

The Odawa (also referred to as the 'Ottawa'), an Algonquin-speaking cultural group known to Samuel de Champlain as the *Cheveux relevés* or "standing hairs," were located along the western limits of the Niagara Escarpment within the Bruce Peninsula on Manitoulin Island, (Fox, 1990b, p.457; Feest and Feest, 1978, p.772). The Odawa were located immediately west of the Tionnontaté and shared the resources of the Niagara Escarpment. Samuel de Champlain encountered the Odawa on the south shores of Lake Huron after a snowshoe tour west from the Huron-Wendat villages. The location of this settlement is believed to be situated near Craigleith, although this location has been debated (Fox, 1990b, p.458).

Ethnohistoric information identifies the Odawa as being relatively small in population, seasonally mobile, and settled primarily around rivers and creeks. Substantial Odawa settlements include longhouses that reflect intensified interactions with Iroquoian groups, such as the Tionnontaté. A variety of ceramic wares and exotic lithics found on Odawa sites reflect long distance travel and trade connections. The Tionnontaté and the Odawa shared the resources of the Niagara Escarpment and shared villages, particularly in the vicinity of the Scenic Caves below the Standing Rock "Ekarenniondi." This village was later relocated near to

Craigleith which became the principal village of the Tionnontaté (Fox, 1990b, p.473; Flynn, 1999, p.10).

Prior to the Jesuit missionaries, several Recollet priests traveled through Tionnontaté territory en route to Attiewandaron territory, following the Nottawasaga River, the Pine River to the source of the Irvine River into the Grand River, and into the banks of Lake Erie (Bricker, 1934, p.58; Garrad, 2014, p.148). Scant reference of the Tionnontaté were made by French fur-traders suggesting they believed the Tionnontaté were similar in language, dress, and religious beliefs to tribes within the Huron-Wendat Confederacy (Garrad and Heidenreich, 1978, p.395; Garrad, 2014, pp.167-177, 490). However, it is now believed that the Tionnontaté were "mainly or entirely Attiewandaron who had moved to a new location to enhance their trading position" (Garrad, 2014, p.490). Additionally, the Tionnontaté acted as middle-men for trade of European goods between the Odawa and the Attiewandaron along the Niagara River (Garrad and Heidenreich, 1978, p.396).

During the 1630s, Jesuit missionaries attempted to convert the entire Huron-Wendat Confederacy to Christianity as the initial phase of a missionary endeavour to convert all native people in Southern Ontario (Trigger, 1994, p.51). The Jesuits attempted to set up missionaries amongst the Tionnontaté, but were unsuccessful due to fears of the spread of disease (Garrad, 2014, p.215). By 1640, post-epidemic population numbers of the Tionnontaté population dropped to 3,375 individuals, a reduction of 60% of their entire population (Garrad, 2014, p.473). That same year, a village of the Tionnontaté was destroyed by the Haudenosaunee, renewing the Huron-Tionnontaté military and defence alliance (Garrad and Heidenreich, 1978, p.396).

By 1645, having grown dependent on European goods and with their territory no longer yielding enough animal pelts, the Haudenosaunee became increasingly aggressive towards the Huron-Wendat Confederacy (Trigger, 1994, p.53). Armed with Dutch guns and ammunition, the Haudenosaunee engaged in warfare with the Huron-Wendat Confederacy and brutally attacked and destroyed several Huron-Wendat villages (Trigger, 1994, p.53). To prevent the revival of Huron-Wendat settlements, the Haudenosaunee attacked and destroyed the villages of the Huron-Wendat's allies, the Tionnontaté (Trigger, 1994, p.56). In 1650, what remained of the Tionnontaté migrated through Attiewandaron territory prior to resettlement in America (Garrad, 2014, pp.501-505). The former territory occupied by the Tionnontaté likely remained largely unoccupied for several decades. After the Huron-Wendat dispersal, the Odawa migrated to the northwest across Manitoulin Island.

1.3.3 Post Contact Period (ca. A.D. 1650 – 1800)

Although their homeland was located south of the lower Great Lakes, the Haudenosaunee controlled most of Southern Ontario after the 1660s, occupying at "least half a dozen villages along the north shore of Lake Ontario and into the interior" (Schmalz, 1991, p.17; Williamson, 2013, p.60). The Haudenosaunee established "settlements at strategic locations along the trade routes inland from the north shore of Lake Ontario. Their settlements were on canoe-and-portage routes that linked Lake Ontario to Georgian Bay and the upper Great Lakes"

(Williamson, 2013, p.60). The Haudenosaunee used this territory within Southern Ontario to hunt game and obtain furs for exclusive trade with the Dutch and English (Coyne, 1895, p.20). The Township of Collingwood and the Township of Nottawasaga were largely abandoned and used as seasonal hunting ground (Flynn, 1999, p.11).

At this time, several Algonquin-speaking linguistic and cultural groups within the Anishinaabeg Nation began to challenge the Haudenosaunee dominance in the Lake Huron and Georgian Bay region (Johnston, 2004, pp.9-10; Gibson, 2006, p.36). Before contact with the Europeans, the Ojibwa territorial homeland was situated inland from the north shore of Lake Huron (MNCFN, ND, p.3). The English referred to the Algonquin-speaking linguistic and cultural groups that settled in the area bounded by Lakes Ontario, Erie, and Huron as Chippewas or Ojibwas (Smith, 2002, p.107). In 1640, the Jesuit fathers had recorded the name "*oumisagai*, or Mississaugas, as the name of an Algonquin band near the Mississagi River on the northwestern shore of Lake Huron. The French, and later English, applied this same designation to all Algonquian[-speaking groups] settling on the north shore of Lake Ontario" (Smith, 2002, p. 107; Smith, 2013, pp.19-20).

After a major smallpox epidemic in 1662, the capture of New Netherland by the English in 1664 curtailing access to guns and powder, and a series of successful attacks against the Haudenosaunee by groups within the Anishinaabeg Nation from 1653 to 1662, the Haudenosaunee dominance in the region began to fail (Warrick, 2008, p.242; Schmalz, 1991, p.20). Prior to 1680, the Ojibwa had begun to settle just north of the evacuated Huron-Wendat territory and with the English entering the fur-trading market, the Ojibwa began to expand further into Southern Ontario (Gibson, 2006, p. 36; Schmalz, 1991, p.18). By the 1690s, Haudenosaunee settlements along the northern shores of Lake Ontario were abandoned (Williamson, 2013, p.60). By 1701, after a series of successful battles on the Bruce Peninsula, at the mouth of the Humber River and along Burlington Bay, the Haudenosaunee were defeated and expelled from Ontario (Gibson, 2006, p. 37; Schmalz, 1991, p.27; Coyne, 1895, p.28). After these battles, the Ojibwa replaced the Haudenosaunee in Southern Ontario and the Odawa and other groups within the Anishinaabeg Nation resumed regular hunting, trapping and collecting maple sap along the Beaver River and along the Lake Huron shoreline (Schmalz, 1991, p.29; Council of the Township of Collingwood, 1979, p.29).

In 1701, representatives of several bands within the Anishinaabeg Nation and the Haudenosaunee assembled in Montreal to participate in Great Peace negotiations, sponsored by the French (Johnston, 2004, p.10; Trigger, 2004, p.58). The Mississaugas were granted sole possession of the territory to the north of Lake Ontario and Lake Erie, while the Haudenosaunee or Six Nations as the British referred to them with the inclusion of the Tuscarora group, gained territory along the Grand River (Hathaway, 1930, p.433; Tooker, 1978, p.428). The Great Peace Treaty of Montreal brought peace between the Iroquoian Confederacy with the French, allowing the Odawa and the Ojibwa to travel safely to Albany to trade their furs (McArthur et al., 2013, p.23). The Townships of Collingwood and Nottawasaga continued to function primarily as hunting grounds until after the Seven Years War (Flynn, 1999, p.11).

The Seven Years War brought proxy-warfare between the French and British in North America. In 1763, the Royal Proclamation declared the Seven Years War over, giving the British control of New France and created a western boundary for British colonization. The British did not earn the respect of many groups within the Anishinaabeg Nation, as the British did not honour fair trade nor recognize their occupancy of the land as the French had. The Pontiac Uprising, also known as the Beaver Wars, began that same year (Johnston, 2004, pp.13-14). After numerous attacks on the British, the Pontiac Uprising was over in 1766, when a peace agreement was concluded with Sir William Johnson, the Superintendent of Indian Affairs, which depended mostly on the integrity of the British (Schmalz, 1991, p.81). The fur-trade continued throughout Southern Ontario until the beginning of British colonization.

1.3.4 Euro-Canadian Settlement Period (A.D. 1800 to present)

By 1793, Lieutenant-Governor John Graves Simcoe had arrived at the entrance of Penetanguishene Bay and sought to establish a fort in the easily defensible natural harbour should the Americans provoke an attack from the south (Pencen Museum, 2013). This site would also act as a depot of inter-lake commerce (Belden, 1881, p.4). In 1798, William Claus, Superintendent of Indian Affairs, bargained on behalf of the British Government for a tract of land adjacent to the harbour of Penetanguishene, and purchased the tip of the peninsula for cloth, blankets and kettles valued at £101 of Quebec currency (Surtees, 1994, p. 109; Hunter, 1909a, p.12). Settlement around Fort Penetanguishene continued slowly until the War of 1812.

After the War of 1812, a second wave of settlers arrived in Upper Canada. Between 1815 and 1824, the non-Aboriginal population doubled as a result of heavy immigration from Britain (Surtees, 1994, p. 112). In 1818, William Claus assembled an Ojibwa council and “asked for over a million hectares to the west and south of Lake Simcoe” (Surtees, 1994, p. 115; Hunter, 1909a, p.14). At this council, William Claus advised settlement would take several years and the Aboriginals residing in the area would still be able to occupy the area while receiving annual clothing and the usual presents distributed by the King (Surtees, 1994, p. 116). The government agreed to pay an annuity of £1200 currency in goods (Surtees, 1994, p.116; Hunter, 1909a, p. 15). This tract included 1,592,000 acres of land and the majority of the County of Simcoe and the County of Grey; this transaction is known as the Lake Simcoe-Nottawasaga Treaty (Hunter, 1909a, p.15; Surtees, 1994, p.103).

The Township of Collingwood consisted of 69,500 acres and was originally named Alta Township (Belden, 1880, p.11; Marsh, 1931, p.38). The Township of Alta was renamed Township of Collingwood after Lord Collingwood, a commanding officer who served under Admiral Lord Nelson in the Battle of Trafalgar against Napoleon in 1805 (Flynn, 1999, p.13). The Township of Collingwood was the first township surveyed in Grey County and was completed by Charles Rankin in 1833 (Marsh, 1931, p.39). The first grants provided to private individuals in The Township of Collingwood were given to children of United Empire Loyalist and as pensions to retiring military personnel (Flynn, 1999, p. 14). After completing the survey of the Township of Collingwood, Charles Rankin constructed a log cabin along the lakeshore (March, 1931, p. 41). The first settler in the Township of Collingwood was Richard McGuire. Much of the township was subjected to land speculators (Council of the Township of Collingwood, 1979,

p.41). Subsequent settlers to arrive in the Township were primarily Irish and Highland Scotch immigrants who settled along the St. Vincent trail fronting the Lake Huron shoreline (Belden, 1880, p.11; Council of the Township of Collingwood, 1979, p.45).

From 1846 to 1850, Old Mill Road had been established and became the principal route for settlers arriving in the Township of Collingwood (Council of the Township of Collingwood, 1979, p.45). Municipal records were limited prior to 1854 and over the next two decades, the township grew. By Confederation in 1867, the township was well established (Flynn, 1999, p.14; Council of the Township of Collingwood, 1979, p.52).

It would be another 20 years from the treaty before the Township of Nottawasaga was surveyed. Thomas Kelly, a government surveyor, began the official survey in 1832, and was completed by Charles Rankin in 1833 (Hunter, 1909a, p.41; Belden, 1881, p. 15). Shortly afterwards, a few settlers arrived in the Township after having purchased land. The Township contains several rivers and streams, which navigate a chain of hills, and drain into Georgian Bay, producing deep clefts or canyons (Belden, 1881, p.15). The earliest settlers to arrive in the Township of Nottawasaga were of considerably mixed nationalities, however they were “ready to sink considerations of race, and, with mutual dependence and help, to form a community of united interests in the new land” (Belden, 1881, p. 15). By 1842, a total of 420 individuals lived in Nottawasaga Township, and were principally of Scottish descent (Smith, 1846, p. 132). 18,850 acres were owned, but only 1,539 were under cultivation (Smith, 1846, p.132).

During the mid-19th century, there was a significant increase in immigrants from the British Isles into Upper Canada, placing a great demand on all available land. By 1850, the number of individuals within the Township increased to 1,411 (Smith, 1851, p.63). In 1855, the Northern Railway was extended from Aurora to Collingwood, allowing the township to prosper economically due to the rich cedar reserves available in the Township (Historical Canada, 2014; Smith, 1846, p.132). The Township continued to develop with the construction of the Hamilton and North Western Railway (ca. 1881) which began in Hamilton and extended to Collingwood (Cooper, 2001). Better roadways were established throughout the remainder of the century as early settlers focused on the lumber trade, agriculture, and animal husbandry within rural Ontario (Hunter, 1909a, pp. 323-330).

As settlement continued throughout both the Township of Collingwood and the Township of Nottawasaga, small communities began to cluster around major roadways, resources, and small industries. Mair Mills, located at the intersection of Grey Road 21/Mountain Road and Grey Road 19/Osler Bluff Road, was originally known as Kirkwood, named after Robert Kirk who operated a saw and flour mill at Silver Creek. The hamlet had a post office which used Kirkwood as a location designator, although this post office did not stay open continually. After the passing of Robert Kirk, his son-in-law John Mair re-opened the post office, and operated the flour mill for several years (Williams, 1906, p.221).

1.3.5 Past Land Use

The study area encompasses part of Lots 15 and 16, Concession 1 in the Geographic Township of Collingwood, historical County of Grey now in the Town of Blue Mountains, County of Grey; and part of Lots 45 and 46, Concession 12, in the Geographic Township of Nottawasaga, historical County of Simcoe, now in the Town of Collingwood, County of Simcoe, Ontario.

To further assess the study area's potential for the recovery of historic pre-1900 remains, several documents, namely the 1880 *Grey Supplement in the Illustrated Historical Atlas of the Dominion of Canada* and the 1881 *Simcoe Supplement in the Illustrated Historical Atlas of the Dominion of Canada* were reviewed in order to gain an understanding of the land use history (***see Map 6***). The study area is located in unassigned lots and partially within the hamlet of Kirkville. It should be kept in mind, however, that not all historic features within the Township of Collingwood and the Township of Nottawasaga may have been depicted as the Grey and Simcoe Supplement in the Illustrated Atlas required a paid subscription from the residents in the County of Simcoe (Benson, N.D., p.4).

In addition, the study area encompasses historic settlement roads: present-day Grey Road 21/Mountain Road and Grey Road 19/Osler Bluff Road, which were originally laid out during the surveys of the Township of Collingwood and the Township of Nottawasaga. In Southern Ontario, the *2011 S&G* considers undisturbed lands within 300 metres of early Euro-Canadian settlements and 100 metres of early historic transportation routes (e.g., trails, passes, roads, railways, portage routes) to be of elevated archaeological potential (per *Section 1.4.1, Standard 1.c and 1.d*). Therefore, based on close proximity to both historic Euro-Canadian settlements and historic transportation routes, there is elevated potential for the location of Euro-Canadian archaeological resources (pre-1900) within undisturbed portions of the study area which lie within 300 metres and 100 metres of these features, respectively.

1.3.6 Present Land Use

The primary present land use of the study area can be categorized as transportation/rural.

1.4 Archaeological Context

1.4.1 Designated and Listed Cultural Heritage Resources

Consultation of the Ontario Heritage Properties Database which records heritage resources that have been designated for their provincial cultural value or interest under the *Ontario Heritage Act* (*O.Reg. 10/06)*, confirmed the absence of a provincially designated heritage property within and near (within 300 metres) of the study area[2].

[2] **Clarification:** As of 2005, the Ontario Heritage Properties Database is no longer being updated. The Ministry of Tourism, Culture and Sport is currently updating a new system which will provide much greater detail to users and will become publicly accessible in the future. (http://www.hpd.mcl.gov.on.ca)

To determine if any designated or listed heritage properties are located within or near (within 300 metres of) the study area that falls within the Town of Blue Mountains, the Town of Blue Mountain's Planning Department was contacted and confirmed no designated or listed heritage properties are located within or in close proximity to (within 300 metres of) the study area (Templeton, 2015a).

To determine if any designated or listed heritage properties are located within or within 300 metres of the study area that falls within the Town of Collingwood, the Town of Collingwood's Clerk's Department was contacted and confirmed no designated or listed heritage properties are located within or in close proximity to (within 300 metres of) the study area (Templeton, 2015b).

According to *Section 1.3.1* of the 2011 *S&G,* undisturbed lands within 300 metres of properties listed in a municipal register or designated under the *Ontario Heritage Act* or a federal, provincial, or municipal historic landmark or site, are considered to have elevated archaeological potential. Therefore, based on the absence of both designated and listed heritage properties within and in close proximity to the study area (as per *Section 1.4.1, Standard 1.c*.); this feature does not further elevate archaeological potential within undisturbed portions of the study area.

1.4.2 Heritage Conservation Districts

A Heritage Conservation District (HCD) includes areas that have been protected under Part V of the *Ontario Heritage Act*. An HCD can be found in both urban and rural environments and may include residential, commercial, and industrial areas, rural landscapes or entire villages or hamlets with features or land patterns that contribute to a cohesive sense of time or place and contribute to an understanding and appreciation of the cultural identity of a local community, region, province, or nation. An HCD may comprise an area with a group or complex of buildings, or large area with many buildings and properties and often extends beyond its built heritage, structures, streets, landscape and other physical and spatial elements, to include important vistas and views between and towards buildings and spaces within the district (MTCS, 2006, p.5). An HCD area contains valuable cultural heritage and must be taken into consideration during municipal planning to ensure that they are conserved.

According to *Section 1.3.1* of the 2011 *S&G*, undisturbed lands within 300 metres of heritage resources listed on a municipal register or designated under the Ontario Heritage Act, or a federal, provincial, or municipal historic landmark or site, are considered to have elevated archaeological potential. To determine if the study area is located within or near (within 300 metres of) an HCD, the Town of Blue Mountain's Planning Department was contacted and confirmed that the portion of the study area that located within the Town of Blue Mountain is not located within or near an HCD (Templeton, 2015a).

Additionally, the Town of Collingwood's Clerk's Department was contacted and confirmed that the portion of the study area within the Town of Collingwood is not located within or in close proximity to (within 300 metres of) an HCD (Templeton, 2015b). Therefore, based on the

absence of an HCD within or in close proximity to (within 300 metres of) the study area (as per *Section 1.4.1, Standard 1.c*.), this feature does not further elevate archaeological potential within undisturbed portions of the study area.

1.4.3 Commemorative Plaques or Monuments

According to *Section 1.3.1* of the *2011 S&G*, undisturbed lands within 300 metres of Aboriginal and Euro-Canadian settlements where commemorative markers of their history, such as local, provincial, or federal monuments, cairns or plaques, or heritage parks, are considered to have elevated archaeological potential. To determine if any historical plaques are present, the Ontario Historical Plaques inventory, which contains a catalogue of federal Historic Sites and Monuments Board of Canada plaques, the provincial Ontario Heritage Trust plaques, plaques identified by various historical societies, and other published plaques located in Ontario were reviewed. This review confirmed the absence of commemorative plaques within and in close proximity to (within 300 metres of) the study area. Therefore, based on the absence of commemorative markers within or in close proximity (within 300 metres of) the study area (per *Section 1.4.1, Standard 1.c*), this feature does further elevate archaeological potential within the study area.

1.4.4 Registered Archaeological Sites

In order to provide a summary of registered or known archaeological sites within a minimum one kilometre distance from the study area limits, as per *Section 1.1, Standard 1* and *Section 7.5.8, Standard 1* of the *2011 S&G*, the *Ontario Archaeological Sites Database* (OASD) maintained by the *MTCS* was consulted (MTCS, 2015). Every archaeological site is registered according to the Borden System, which is a numbering system used throughout Canada to track archaeological sites and their artifacts. The study area is located within Borden block BcHb.

According to the *MTCS* (2015), no archaeological sites have been registered within one-kilometre of the study area. Therefore, based on the absence of registered archaeological sites within or in close proximity (within 300 metres of) the study area (per *Section 1.4.1, Standard 1.c*), this feature does further elevate archaeological potential within the study area. It must be noted, however, that the paucity of archaeological sites in proximity to the study area is not necessarily reflective of the scale of previous habitation, but more likely a lack of detailed archaeological surveys within the immediate area.

Despite the absence of archaeological resources in relation to the study area, it is useful to provide the cultural history of occupation in Southern Ontario provided in **Table 1**. This data provides an understanding of the potential cultural activity that may have occurred within the study area (Ferris, 2013, p.13).

Table 1: History of Occupation in Southern Ontario

Period	Archaeological Culture	Date Range	Attributes
PALEO-INDIAN			
Early	Gainey, Barnes, Crowfield	>11500-8500 BC	Big game hunters. Fluted projectile points

Period	Archaeological Culture	Date Range	Attributes
Late	Holcombe, Hi-Lo, Lanceolate	8500-7500 BC	Small nomadic hunter-gatherer bands. Lanceolate projectile points
ARCHAIC			
Early	Side-notched, corner notched, bifurcate-base	7800-6000 BC	Small nomadic hunter-gatherer bands; first notched and stemmed points, and ground stone celts.
Middle	Otter Creek, Brewerton	6000-2000 BC	Transition to territorial settlements
Late	Narrow, Broad and Small Points Normanskill, Lamoka, Genesee, Adder Orchard etc.	2500-500 BC	More numerous territorial hunter-gatherer bands; increasing use of exotic materials and artistic items for grave offerings; regional trade networks
WOODLAND			
Early	Meadowood, Middlesex	800BC-0BC	Introduction of pottery, burial ceremonialism; panregional trade networks
Middle	Point Peninsula, Saugeen, Jack's Reef Corner Notched	200 BC-AD 900	Cultural and ideological influences from Ohio Valley complex societies; incipient horticulture
Late	Algonquian, Iroquoian, Western Basin	AD 900-1250	Transition to village life and agriculture
	Algonquian, Iroquoian, Western Basin	AD 1250-1400	Establishment of large palisaded villages
	Algonquian, Iroquoian	AD 1400-1600	Tribal differentiation and warfare
HISTORIC			
Early	Huron, Neutral, Petun, Odawa, Ojibwa, Five Nations Iroquois	AD 1600 – 1650	Tribal displacements
Late	Six Nations Iroquois, Ojibwa, Mississauga	AD 1650 – 1800s	Migrations and resettlement
	Euro-Canadian	AD 1780 - present	European immigrant settlements

1.4.5 Previous Archaeological Assessments

In order to further establish the archaeological context of the study area, reports documenting previous archaeological fieldwork carried out within the limits of, or immediately adjacent to (i.e., within 50 metres) the study area were consulted. The *MTCS* (2015) identified one report documenting fieldwork within 50 metres of the study area:

1. Stage 1-2 Archaeological Assessment of Proposed Residential Developments, Part of Lot 16, Concession 1, Geographic Township of Collingwood, Town of Blue Mountains, Grey County (AMICK Consultants Ltd., 2008).

In an attempt to adhere to *Section 7.5.8, Standard 4* of the *2011 S&G*, the *MTCS* at archaeologicalregister@ontario.ca was contacted on March 3rd, 2015 in order to obtain a copy of the report listed above (Templeton, 2015c). A copy had not yet been received at the time of report completion.

1.4.6 Physical Features

An investigation of the study area's physical features was conducted to aid in the development of an argument for archaeological potential based on the environmental conditions of the study area. Environmental factors such as close proximity to water, soil type, and nature of the terrain, for example, can be used as predictors to determine where human occupation may have occurred in the past.

The study area is situated within the Simcoe Lowlands physiographic region of Southern Ontario. These lowlands were flooded by glacial Lake Algonquin and are bordered by shore cliffs, beaches and boulder terraces, and are floored by sand, silt, and clay. East of the Holland marsh, the plains are level, underlain by deposits of sand and silt. Drumlinized till has also been observed in the region. The lands south of Lake Simcoe have substantial swamp or wet sand areas, making it a poorer farming district than the Nottawasaga basin to the west (Chapman & Putnam, 1984).

The native soil type of the study area is Kemble silty clay, a Brown Forest/Grey Brown Podzolic/Intergrade soil that is characterized as fine-textured and derived from limestone till. Its topography is smooth, very gently sloping to smooth, gently sloping and slightly stony (Ontario Agricultural College, 1959; Ontario Agricultural College, 1981).

In terms of archaeological potential, potable water is a highly important resource necessary for any extended human occupation or settlement. As water sources have remained relatively stable in Southern Ontario since post-glacial times, proximity to water can be regarded as a useful index for the evaluation of archaeological site potential. Indeed, distance from water has been one of the most commonly used variables for predictive modeling of site location. A watershed is an area drained by a river and its tributaries. As surface water collects and joins a collective water body, it picks up nutrients, sediment and pollutants, which may altogether, affect ecological processes along the way. Hydrological features such as primary water sources (i.e. lakes, rivers, creeks, streams) and secondary water sources (i.e. intermittent streams and creeks, springs, marshes, swamps) would have helped supply plant and food resources to the surrounding area and are indicators of archaeological potential (per *Section 1.3.1* of the *2011 S&G*).

The study area is situated within the Grey Sauble conservation authority. As the study area is not located within 300 metres of either a primary or a secondary water source, this feature does not further elevate archaeological potential within undisturbed portions of the study area (as per *Section 1.4.1., Standard 1.c*.).

1.4.7 Current Land Conditions

The study area is situated in a mainly rural setting at the boundary of Grey and Simcoe Counties and comprises the intersection of Grey Road 19/ Osler Bluff Road and Grey Road 21/Mountain Road. A commercial business (*Mountain Side Sports*) is situated at the immediate southeast corner of the intersection. A driving range is also situated at the southwest corner of the

intersection. The topography within the study area is generally level, measuring approximately 215 metres above sea level.

1.4.8 Date(s) of Review

Given the presence of snow cover, a desktop review of field conditions was undertaken using historical aerial photography and current satellite imagery obtained through the Google Earth application on March 3rd, 2015.

1.5 Confirmation of Archaeological Potential

Based on the information gathered from background research documented in the preceding sections, potential for the recovery of archaeological resources within any undisturbed portions of the study area limits has been established. Features contributing to archaeological potential are summarized in **Appendix B**.

2.0 ANALYSIS AND CONCLUSIONS

In combination with data gathered from background research (***see Sections 1.3 and 1.4***); an evaluation of archaeological potential was performed.

2.1 Historical Imagery

A detailed review of aerial photographs taken in 1954 to 1978 (***see Maps 7-9***) and satellite imagery taken from 2007 (***see Map 10***), reveals that the study area has undergone few changes during this period of time. In 1954, the surrounding area was undeveloped. The southeast corner of the study area appears to have encompassed a structure (***see Map 7***). A closer view of the structure can be seen in 1966. To the east of this structure is a driveway, leading to a building which lies to the south of the study area limits. A small structure is also partially situated within the northwest corner limit of the study area (***see Map 8***).

In 1978, the structure in the northwest corner of the study area was razed. Furthermore, the area immediately surrounding the building in the southeast corner of was graded and cleared of some vegetation (***see Map 9***). By 2007, the northwest corner of the study area was overgrown, and the areas to the east and south of the structure within the southeast corner were completely cleared and became gravel parking areas. A utility construction was also installed in the southwest corner of the study area. The study area also partially encompasses an adjacent driving range (***see Map 10***). The study area has remained relatively unchanged since this time.

2.2 QL-1

QL-1 was evaluated for extensive disturbances that have removed archaeological potential. Disturbances consisting of existing paved roads, gravel shoulder, roadside ditching, and utilities were identified (***see Map 11; Images 1-3, 6***). However, in accordance with *Section 1.4.1* of the *2011 S&G*, which requires that both an on-site visual inspection and background research be conducted in order to exempt any area from further Stage 2 survey, it is recommended that the aforementioned areas of low or uncertain archaeological potential due to disturbances only be considered as *likely* not requiring Stage 2 test pit or pedestrian survey. A Stage 2 visual survey is still required to provide on-site confirmation and documentation of the actual condition and exact extent of the disturbances.

Portions of QL-1 that do not exhibit extensive disturbance are considered to have archaeological potential. These areas include the slightly treed and overgrown area located beyond the existing ROW within the northeast corner of the study area and the wooded areas along the northwest corner of the intersection (***see Map 11; Images 2-3, 6***). Given the narrow width of these areas at less than 10 metres and being situated amidst a wooded area and utilities where infrastructure may be damaged, ploughing in advance of pedestrian archaeological survey will not be possible. Therefore, if selected as the preferred alignment, these areas will need to be subjected to a Stage 2 AA employing a test pit archaeological survey at five metre intervals, in accordance with *Section 2.1.2* of the *2011 S&G*.

2.3 FL-1

FL-1 was evaluated for extensive disturbances that have removed archaeological potential. Disturbances consisting of existing paved roads, gravel shoulder, roadside ditching, and utilities were identified (***see Map 12; Images 1-4, 6***). However, in accordance with *Section 1.4.1* of the *2011 S&G*, which requires that both an on-site visual inspection and background research be conducted in order to exempt any area from further Stage 2 survey, it is recommended that the aforementioned areas of low or uncertain archaeological potential due to disturbances only be considered as *likely* not requiring Stage 2 test pit or pedestrian survey. A Stage 2 visual survey is still required to provide on-site confirmation and documentation of the actual condition and exact extent of the disturbances.

Portions of FL-1 that do not exhibit extensive disturbance are considered to have archaeological potential. These areas include the slightly treed and overgrown area located beyond the existing ROW within the northeast corner of the study area and the wooded areas along the northwest corner of the intersection (**see Map 8; Images 2-4, 6**). Given the narrow width of these areas at less than 10 metres and being situated amidst a wooded area and utilities where infrastructure may be damaged, ploughing in advance of pedestrian archaeological survey will not be possible. Therefore, if selected as the preferred alignment, these areas will need to be subjected to a Stage 2 AA employing a test pit archaeological survey at five metre intervals, in accordance with *Section 2.1.2* of the *2011 S&G*.

2.4 FL-2

FL-2 was evaluated for extensive disturbances that have removed archaeological potential. Disturbances consisting of existing paved roads, gravel shoulder, roadside ditching, and utilities were identified (***see Map 13; Images 1-3, 5-6***). However, in accordance with *Section 1.4.1* of the *2011 S&G*, which requires that both an on-site visual inspection and background research be conducted in order to exempt any area from further Stage 2 survey, it is recommended that the aforementioned areas of low or uncertain archaeological potential due to disturbances only be considered as *likely* not requiring Stage 2 test pit or pedestrian survey. A Stage 2 visual survey is still required to provide on-site confirmation and documentation of the actual condition and exact extent of the disturbances.

Portions of FL-2 that do not exhibit extensive disturbance are considered to have archaeological potential. These areas include the slightly treed and overgrown area located beyond the existing ROW within the northeast corner of the study area and the wooded areas along the northwest corner of the intersection (***see Map 13; Images 2-3, 6***). Given the narrow width of these areas at less than 10 metres and being situated amidst a wooded area and utilities where infrastructure may be damaged, ploughing in advance of pedestrian archaeological survey will not be possible. Therefore, if selected as the preferred alignment, these areas will need to be subjected to a Stage 2 AA employing a test pit archaeological survey at five metre intervals, in accordance with *Section 2.1.2* of the *2011 S&G*.

2.5 RC-3

RC-3 was evaluated for extensive disturbances that have removed archaeological potential. Disturbances consisting of existing paved roads, gravel shoulder, roadside ditching, and utilities were identified (***see Map 14; Images 1-3, 6-7***). However, in accordance with *Section 1.4.1* of the *2011 S&G*, which requires that both an on-site visual inspection and background research be conducted in order to exempt any area from further Stage 2 survey, it is recommended that the aforementioned areas of low or uncertain archaeological potential due to disturbances only be considered as *likely* not requiring Stage 2 test pit or pedestrian survey. A Stage 2 visual survey is still required to provide on-site confirmation and documentation of the actual condition and exact extent of the disturbances.

Portions of RC-3 that do not exhibit extensive disturbance are considered to have archaeological potential. This includes the slightly treed and overgrown area located beyond the existing ROW within the northeast corner, the wooded areas along the northwest corner, and the manicured grassed area along the southwestern limit of the study area (***see Map 14; Images 2-3, 6-7***). Given the narrow width of these areas at less than 10 metres and being situated amidst a wooded area and utilities where infrastructure may be damaged, ploughing in advance of pedestrian archaeological survey will not be possible. Therefore, if selected as the preferred alignment, these areas will need to be subjected to a Stage 2 AA employing a test pit archaeological survey at five metre intervals, in accordance with *Section 2.1.2* of the *2011 S&G*.

2.6 RC-5

RC-5 was evaluated for extensive disturbances that have removed archaeological potential. Disturbances consisting of an existing commercial structure, paved roads, gravel parking area, gravel shoulder, roadside ditching, and utilities were identified (***see Map 15; Images 1-3, 6, 8***). However, in accordance with *Section 1.4.1* of the *2011 S&G*, which requires that both an on-site visual inspection and background research be conducted in order to exempt any area from further Stage 2 survey, it is recommended that the aforementioned areas of low or uncertain archaeological potential due to disturbances only be considered as *likely* not requiring Stage 2 test pit or pedestrian survey. A Stage 2 visual survey is still required to provide on-site confirmation and documentation of the actual condition and exact extent of the disturbances.

Portions of RC-5 that do not exhibit extensive disturbance are considered to have archaeological potential. These areas include the slightly treed and overgrown area located beyond the existing ROW within the northeast corner of the study area and the wooded areas along the northwest corner of the intersection (***see Map 15; Images 2-3, 6***). Given the narrow width of these areas at less than 10 metres and being situated amidst a wooded area and utilities where infrastructure may be damaged, ploughing in advance of pedestrian archaeological survey will not be possible. Therefore, if selected as the preferred alignment, these areas will need to be subjected to a Stage 2 AA employing a test pit archaeological survey at five metre intervals, in accordance with *Section 2.1.2* of the *2011 S&G*.

3.0 RECOMMENDATIONS

The following recommendations are presented:

1. As per *Section 1.4.1, Standard 1* of the *2011 S&G,* areas that exhibit disturbed conditions, marked in **Maps 11-15**, need to be confirmed through an on-site property inspection during a Stage 2 AA.

2. All identified areas which contain archaeological potential must be subjected to a Stage 2 AA, illustrated in **Maps 11-15**. Given the narrow width of these areas at less than 10 metres and being situated amidst a wooded area and utilities where infrastructure may be damaged, ploughing in advance of pedestrian archaeological survey will not be possible. As such, these areas must be subjected to a Stage 2 shovel test pit archaeological survey at five-metre intervals in accordance with *Section 2.1.2* of the *2011 S&G*.

3. Should construction activities associated with this development extend beyond the assessed limits of the study corridor; further archaeological investigation will be required to assess the archaeological potential of these lands.

4.0 ADVICE ON COMPLIANCE WITH LEGISLATION

1. This report is submitted to the MTCS as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the MTCS, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

2. It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act*.

3. Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the *Ontario Heritage Act*.

4. The *Cemeteries Act*, R.S.O. 1990 c. C.4 and the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the *Ministry of Consumer Services*.

5. No excavation activities shall take place within the study area prior to the *MTCS* (Archaeology Program Unit) confirming in writing that all archaeological licensing and technical review requirements have been satisfied.

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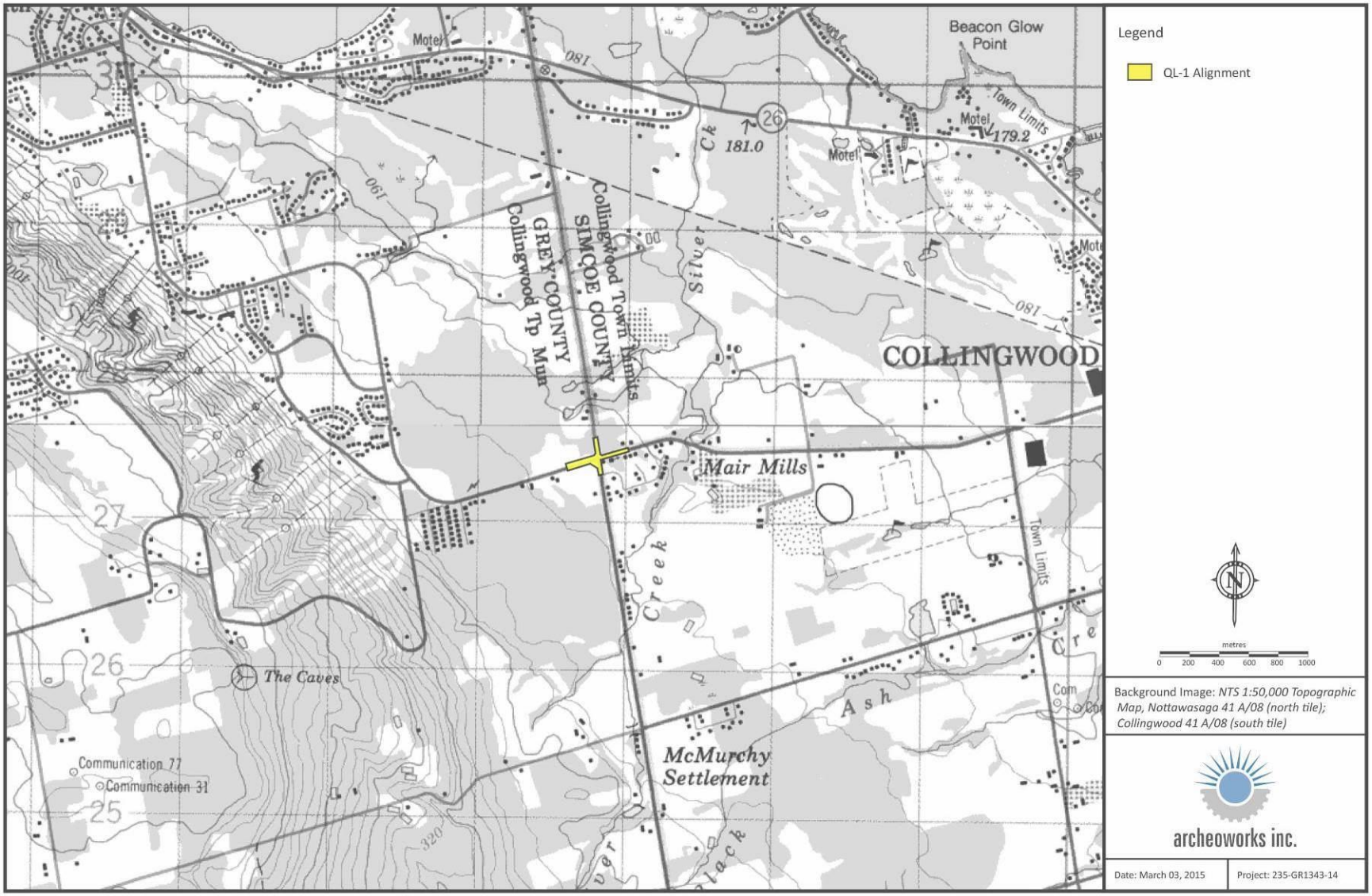
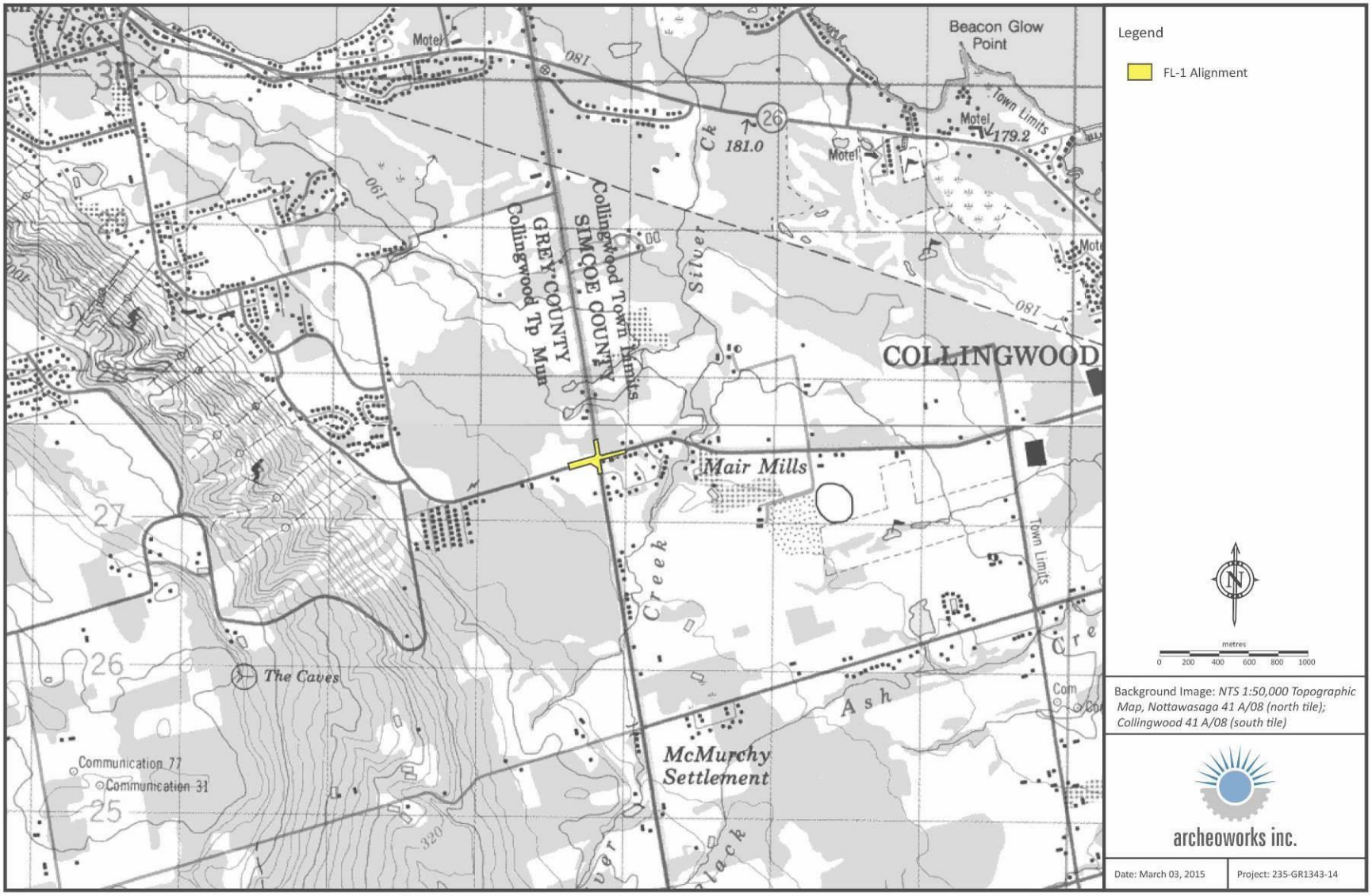
Wright, J.V. (1999). *A History of the Native People of Canada: Volume II (1,000B.C. – A.D. 500)*. Hull, Quebec: Museum of Civilization.

APPENDICES

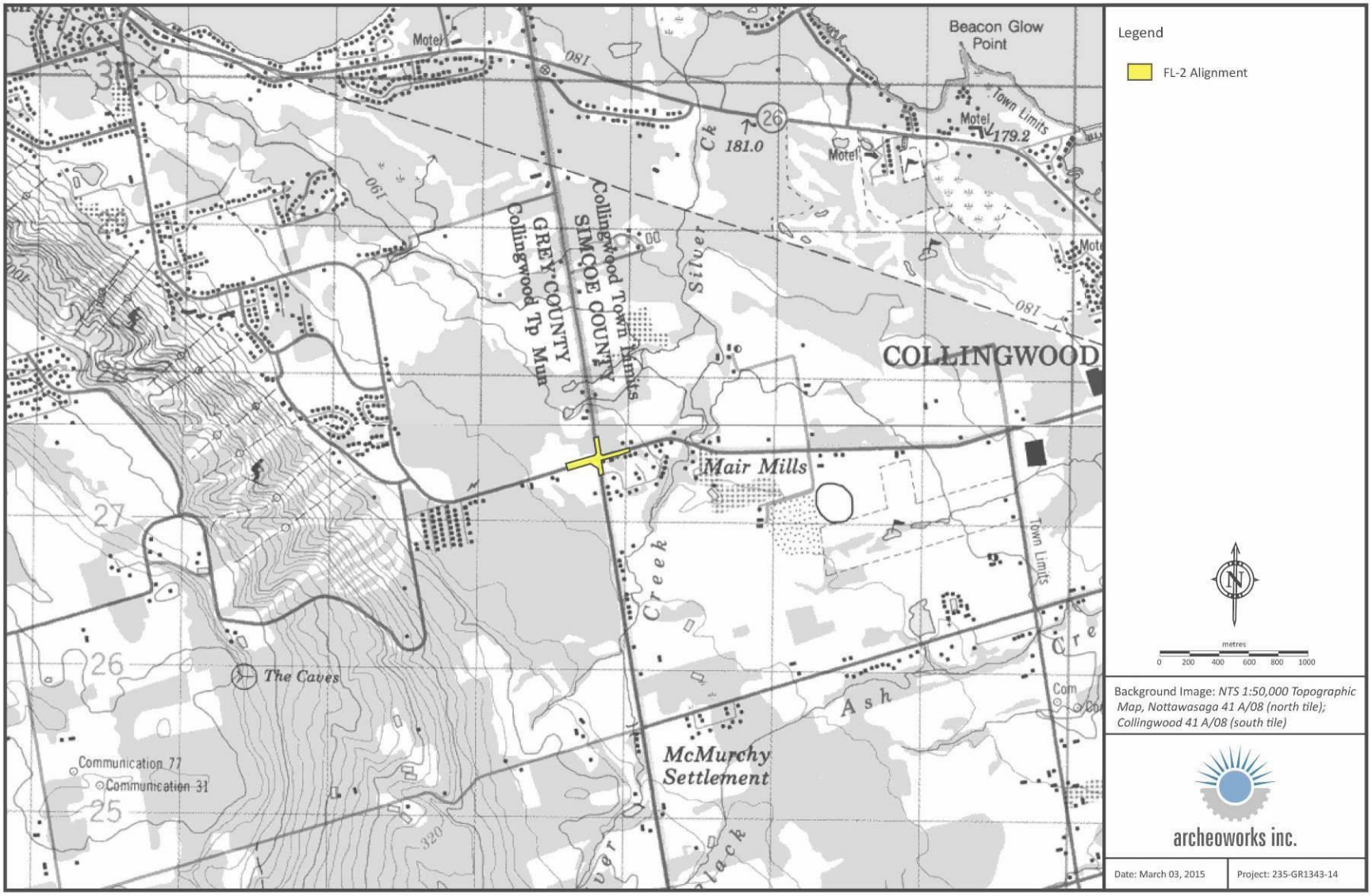
APPENDIX A: MAPS



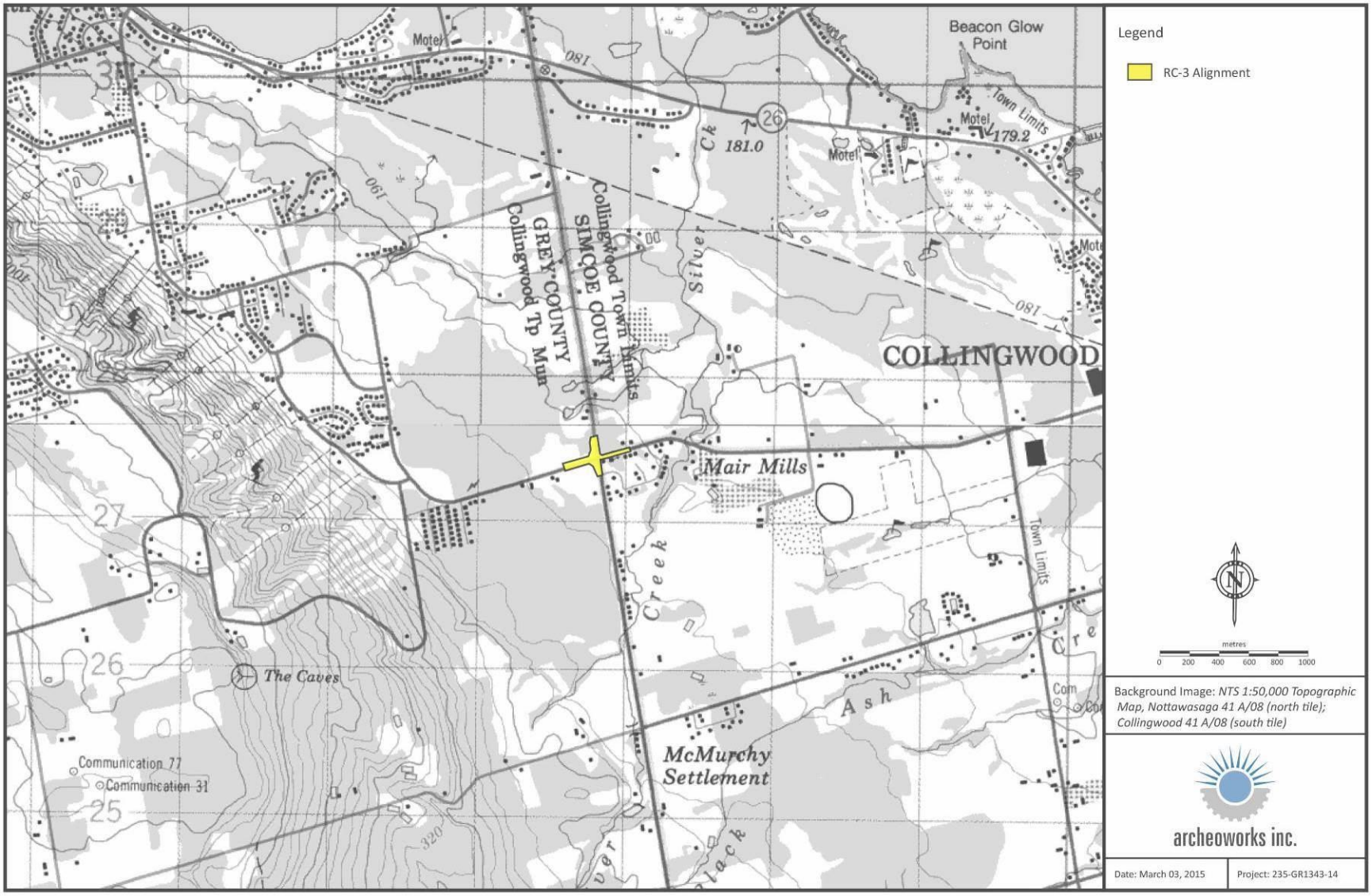
MAP 1 National Topographical System Map (Natural Resources Canada, 1998) identifying the QL-1 Alignment.



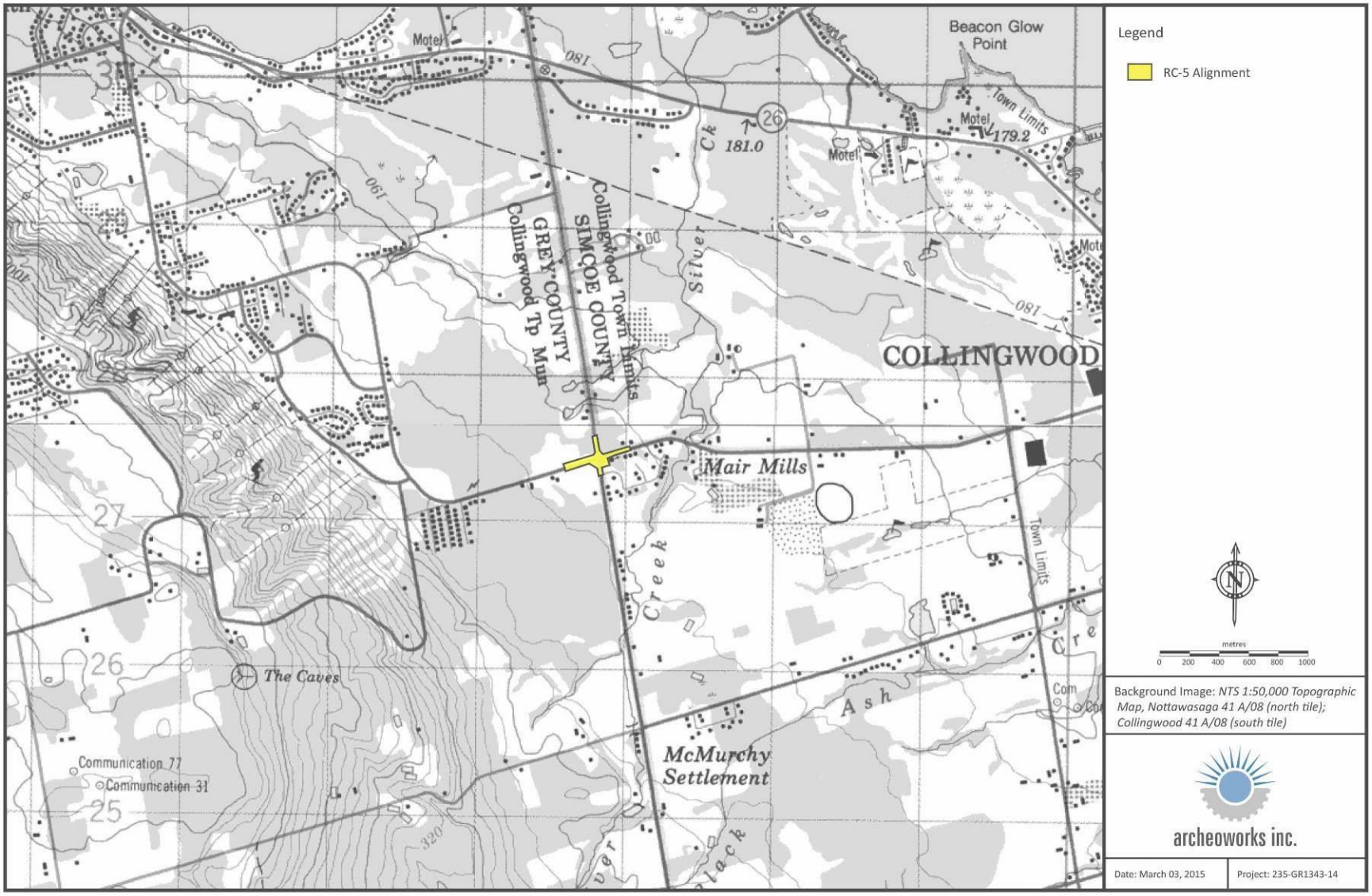
MAP 2 National Topographical System Map (Natural Resources Canada, 1998) identifying the FL-1 Alignment.



MAP 3 National Topographical System Map (Natural Resources Canada, 1998) identifying the FL-2 Alignment.

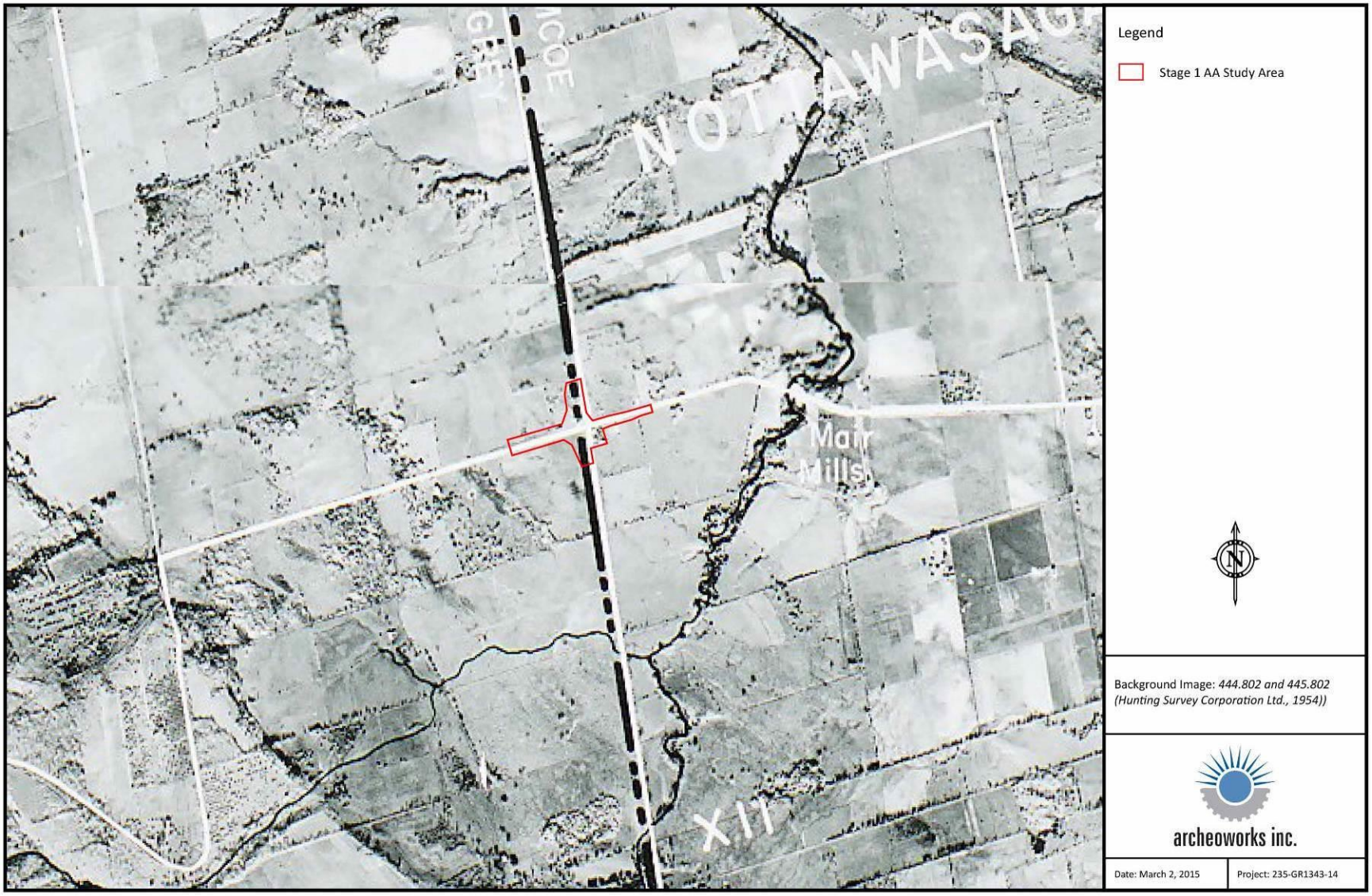


MAP 4 National Topographical System Map (Natural Resources Canada, 1998) identifying the RC-3 Alignment



MAP 5 National Topographical System Map (Natural Resources Canada, 1998) identifying the RC-5 Alignment.

MAP 6 Stage 1 AA study area within the Grey Supplement in the Illustrated Atlas of the Dominion of Canada (H. Belden & Co., 1880) and the Simcoe Supplement in the Illustrated Atlas of the Dominion of Canada (H. Belden & Co., 1881).



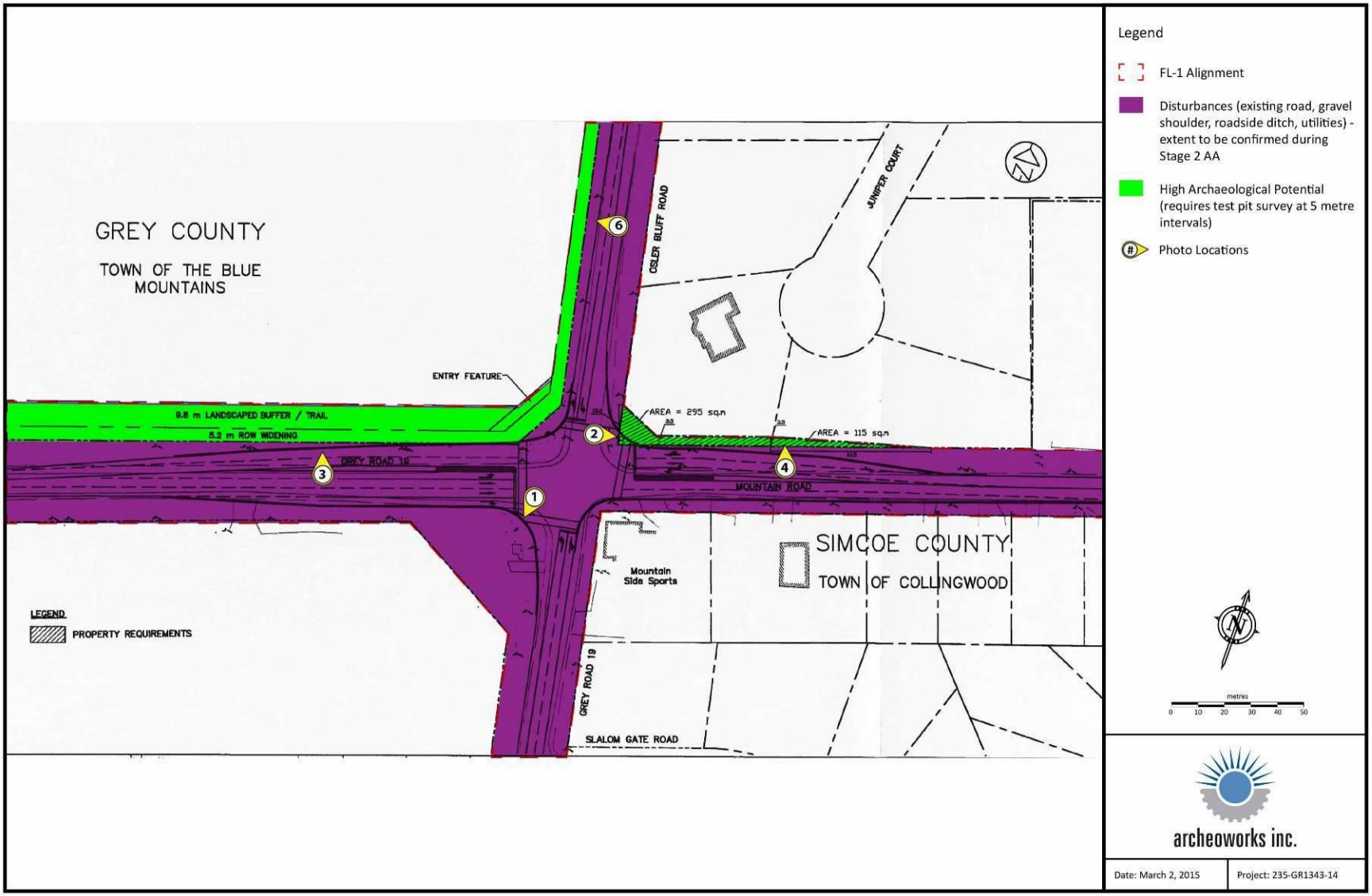
MAP 7 Stage 1 AA study area within a 1954 aerial photograph (Hunting Survey Corporation Ltd., 1954)

MAP 8 Stage 1 AA study area within a 1966 aerial photograph (Simcoe and Grey County Forest Resource Inventory Aerial Photographic Print, 1966).

MAP 9 Stage 1 AA study area within a 1978 aerial photograph (Simcoe and Grey County Forest Resource Inventory Aerial Photographic Print, 1978).

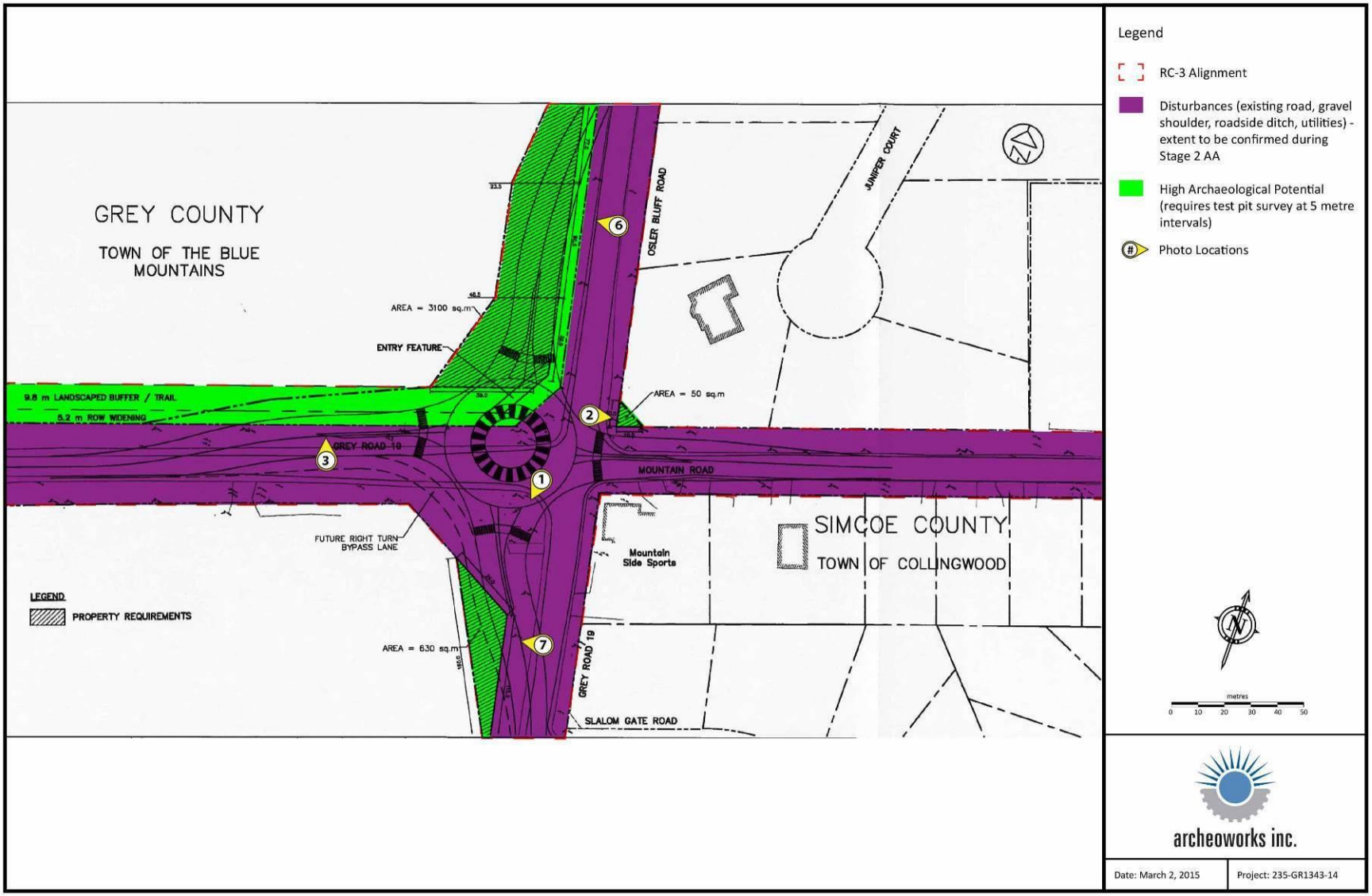
MAP 10 Stage 1 AA study area within a 2007 satellite image (Google Earth, 2015)

MAP 11 Stage 1 AA results of the QL-1 Alignment with photo locations indicated.

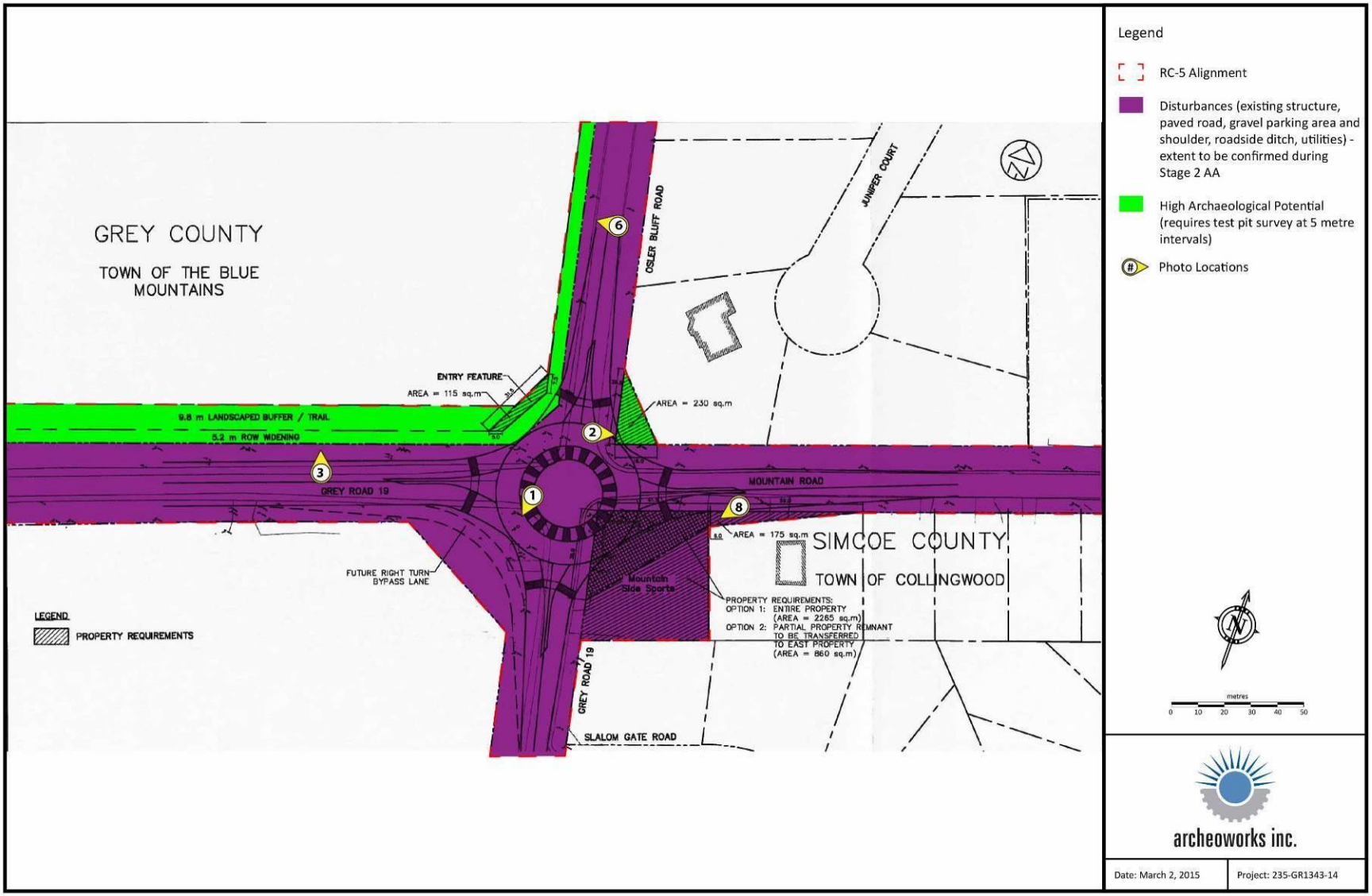


MAP 12 Stage 1 AA results of the FL-1 Alignment with photo locations indicated.

MAP 13 Stage 1 AA results of the FL-2 Alignment with photo locations indicated.



MAP 14 Stage 1 AA results of the RC-3 Alignment with photo locations indicated.



MAP 15 Stage 1 AA results of the RC-5 Alignment with photo locations indicated.

APPENDIX B: SUMMARY OF BACKGROUND RESEARCH

Feature of Archaeological Potential		Yes	No	Unknown	Comment
1	Known archaeological sites within 300 m?		X		If Yes, potential confirmed
Physical Features		**Yes**	**No**	**Unknown**	**Comment**
2	Is there water on or near the property?		X		If Yes, potential confirmed
2a	Presence of primary water source within 300 metres of the study area (lakes, rivers, streams, creeks)		X		If Yes, potential confirmed
2b	Presence of secondary water source within 300 metres of the study area (intermittent creeks and streams, springs, marshes, swamps)		X		If Yes, potential confirmed
2c	Features indicating past presence of water source within 300 metres (former shorelines, relic water channels, beach ridges)		X		If Yes, potential confirmed
2d	Accessible or inaccessible shoreline (high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh)		X		If Yes, potential confirmed
3	Elevated topography (knolls, drumlins, eskers, plateaus, etc.)		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
4	Pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
5	Distinctive land formations (mounds, caverns, waterfalls, peninsulas, etc.)		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
Cultural Features		**Yes**	**No**	**Unknown**	**Comment**
6	Is there a known burial site or cemetery that is registered with the Cemeteries Regulation Unit on or directly adjacent to the property?		X		If Yes, potential confirmed
7	Associated with food or scarce resource harvest areas (traditional fishing locations, food extraction areas, raw material outcrops, etc.)		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
8	Indications of early Euro-Canadian settlement (monuments, cemeteries, structures, etc.) within 300 metres	X			If Yes to two or more of 3-5 or 7-10, potential confirmed
9	Associated with historic transportation route (historic road, trail, portage, rail corridor, etc.) within 100 metres of the property	X			If Yes to two or more of 3-5 or 7-10, potential confirmed
Property-specific Information		**Yes**	**No**	**Unknown**	**Comment**
10	Contains property designated under the Ontario Heritage Act		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
11	Local knowledge (aboriginal communities, heritage organizations, municipal heritage committees, etc.)		X		If Yes, potential confirmed
12	Recent ground disturbance, not including agricultural cultivation (post-1960, extensive and deep land alterations)	X – Parts of the study area			If Yes, low archaeological potential is determined

APPENDIX C: IMAGES

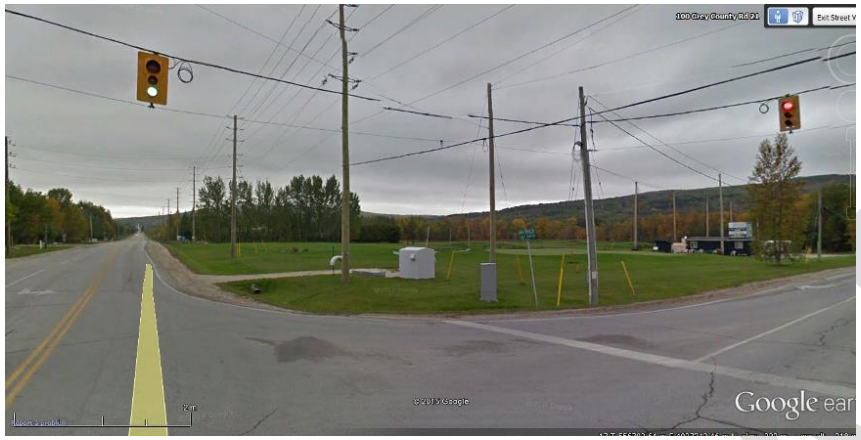


IMAGE 1: View of disturbances associated with paved roadway and utilities (Google Earth, 2015a).

IMAGE 2: View of disturbances associated with paved roadway, gravel shoulder, and utilities. In addition, view of slightly treed area with archaeological potential (Google Earth, 2015a).

IMAGE 3: View of disturbances associated with paved roadway, gravel shoulder, and utilities. In addition, view of treed area with archaeological potential (Google Earth, 2015a).

IMAGE 4: View of disturbances associated with gravel shoulder and utilities. In addition, view of slightly treed area with archaeological potential (Google Earth, 2015a).

IMAGE 5: View of disturbances associated with paved roadway and driveway, gravel shoulder, roadside ditch, and utilities (Google Earth, 2015a).

IMAGE 6: View of disturbances associated with gravel shoulder and utilities. In addition, view of slightly treed area with archaeological potential (Google Earth, 2015a).

IMAGE 7: View of disturbances associated with gravel shoulder. In addition, view of manicured grassed area with archaeological potential (Google Earth, 2015a).

IMAGE 8: View of disturbances associated with paved roadway, utilities, existing structure, and gravel parking area/driveway (Google Earth, 2015a).

APPENDIX D: INVENTORY OF DOCUMENTARY AND MATERIAL RECORD

Project Information:				
Project Number:		235-GR1343-14		
Licensee:		Alvina Tam (P1016)		
MTCS PIF:		P1016-0066-2015		
Document/ Material			**Location**	**Comments**
1.	Research/ Analysis/ Reporting Material	Digital files stored in: /2014/235-GR1343-14 - Grey Road 19-21 Intersection Improvements Class EA/Stage 1	Archeoworks Inc., 16715-12 Yonge Street, Suite 1029, Newmarket, ON, Canada, L3X 1X4	Stored on Archeoworks network servers
2.	Digital Images	Eight (8) digital images	Archeoworks Inc., 16715-12 Yonge Street, Suite 1029, Newmarket, ON, Canada, L3X 1X4	Stored on Archeoworks network servers

Under Section 6 of Regulation 881 of the *Ontario Heritage Act*, *Archeoworks Inc*. will, "keep in safekeeping all objects of archaeological significance that are found under the authority of the licence and all field records that are made in the course of the work authorized by the licence, except where the objects and records are donated to Her Majesty the Queen in right of Ontario or are directed to be deposited in a public institution under subsection 66 (1) of the Act."

Appendix L:
Public Information Centre

Grey County
595 9th Avenue E, Owen Sound, ON N4K 3E3
(519) 376-2205 www.grey.ca

County of Simcoe
1110 Highway 26, Midhurst, ON L0L 1X0
(705) 726-9300 www.simcoe.ca

Notice of Public Information Centre

Grey Road 19 & Grey Road 21 Intersection Improvements

Municipal Class Environmental Assessment Study

Background

Grey County, in partnership with the County of Simcoe, is proposing to improve the intersection of Grey Road 19 (Simcoe Road 34) with Grey Road 21 and Mountain Road. As the intersection is located on the boundary of Grey and Simcoe Counties, a joint project is being undertaken. The Town of Collingwood, who have jurisdiction over Mountain Road, will also be participating in the study. The intersection improvements are required to improve public safety and traffic operations in consideration of increasing travel demands through the area (resulting from an increasing popularity of the area compounded with anticipated development growth). Possible improvements include the provision of additional turn lanes, additional through lanes in the east-west direction, upgraded traffic signal control (as opposed to the existing aerial installation) and improved intersection illumination. Consideration will also be given to the implementation of a 2-lane roundabout as opposed to traffic signal control.

Study Process

The Counties are proceeding with a Schedule B Municipal Class Environmental Assessment (EA) to consider the impacts associated with the proposed intersection improvements. The Class EA process will address the following:

- the existing traffic operations and conditions at the intersection;
- alternative solutions to implementing the intersection improvements;
- the location, extent and sensitivity of the existing environments within the area;
- the potential impacts of each alternative to the noted environments and possible mitigating measures;
- public and agency consultation and participation; and
- an assessment and evaluation of the alternatives culminating in a preferred solution.

Purpose of Notice

The purpose of this notice is to invite public/agency input via a Public Information Centre (PIC) to be held on Saturday, March 14, 2015 at the Town of Collingwood Public Library, Community Rooms B and C (3rd Floor). There will be formal presentation at 1:00 PM, followed by a general open house from 1:30 to 4:00 PM. Should you be unable to attend, please feel free to submit your comments in writing to the Counties and/or Consultant as noted below. Following completion of the PIC, and in consideration of concerns raised through agency reviews and public comment, the preferred solution will be identified and appropriately documented in the Class EA report.

This notice issued February 27, 2015.

Project Contacts

Owner
Grey County
595 9th Avenue East
Owen Sound, ON N4K 3E3

Michael Kelly, P.Eng
Director of Transportation Services
michael.kelly@grey.ca
(519) 376-2205 x1246

Owner
County of Simcoe
1110 Highway 26
Midhurst, ON L0L 1X0

Paul Murphy, B.Sc., C.Tech
Engineering Technician II
paul.murphy@simcoe.ca
(705) 726-9300 x1371

Consultant
C.C. Tatham & Associates Ltd.
200 Sandford Fleming Dr. #200
Collingwood, ON L9Y 5A6

Michael Cullip, P.Eng
Project Manager
mcullip@cctatham.com
(705) 444-2565 x265

Type	Company	Address1	Address2	City	PostalCode	Title	FirstName	LastName	JobTitle	Contact
Agency	Ministry of Agriculture, Food and Rural Affairs	Economic Development Division, Rural Community Development Branch	1 Stone Rd W. 3rd Floor	Guelph, ON	N1G 4Y2	Mr.	John	Turvey	Policy Advisor	519-826-3419
Agency	Ministry of Culture	Midhurst District Office	2284 Nursery Road	Midhurst, ON	L0L 1X0	Mr.	Greig	Stewart	Regional Advisor	705-739-6696
Agency	Ministry of Culture	Heritage Operations Unit	400 University Ave. 4th Floor	Toronto, ON	M7A 2R9	Mr.	Winston	Wong	Heritage Planner	416-314-7147
Agency	Ministry of the Environment & Climate Change	CEAA Branch	2 St. Clair Ave. W. 12th Floor	Toronto, ON	M4V 1L5	Mr.	Paul	Heeney	Supervisor, Project Review Unit	416-314-7210
Agency	Ministry of the Environment & Climate Change	Central Region Office	5775 Yonge Street 9th Floor	Toronto, ON	M2M 4J1	Ms.	Chunmei	Liu	EA Coordinator	416-326-4886
Agency	Ministry of the Environment & Climate Change	London Regional Office	733 Exeter Road	London, ON	N6E 1L3	Mr.	Bill	Armstrong	Environmental Planner	519-873-5013
Agency	Ministry of the Environment & Climate Change	Owen Sound District Office	101 17th Street East	Owen Sound, ON	N4K 0A5					519-371-2901
Agency	Ministry of Municipal Affairs and Housing	Central Region Office	777 Bay Street	Toronto, ON	M5G 2E5	Mr.	Darryl	Lyons	Senior Planner	416-585-6048
Agency	Ministry of Natural Resources & Forestry	Midhurst District	2284 Nursery Road	Midhurst, ON	L0L 1X0	Mr.	Mark	Shoreman	District Manager	705-725-7546
Agency	Ministry of Tourism, Culture & Sport	180 Dundas Street	9th Floor, Suite 502	Toronto, ON	M7A 2R9	Mr.	Tom	Sherzan	Manager, Regional Services Branch	
Agency	Ministry of Transportation	Central Region Planning & Design Section	1201 Wilson Avenue, Bldg. D, 4th Floor	Downsview, Ontario	M3M 1J8	Ms.	Heather	Glass	Sr Project Engineer	(416) 235-5521 heather.glass@mto.ca
Agency	Nottawasaga Valley Conservation Authority	John Hix Conservation Administration Centre	8195 Concession 8	Utopia, ON	L0M 1T0	Mr.	Glenn	Switzer	Director, Engineering & Technical Services	705-424-1479 ext. 225
Agency	Grey Sauble Conservation Authority	237897 Ingills Falls Road	R.R. #5	Owen Sound, ON	N4K 5N6	Mr.	Andrew	Sorensen	Planning Technician	519-376-3076

Type	Company	Address1	Address2	City	PostalCode	Title	FirstName	LastName	JobTitle	Contact
Agency	Niagara Escarpment Commission	99 King Street East	PO Box 308	Thornbury, ON	N0H 2P0	Mr.	Rick	Watt	Senior Planning Coordinator	519-599-3740 rick.watt@ontario.ca
Agency	Ministry of Aboriginal Affairs	Policy and Relations Branch	720 Bay Street, Fourth Floor	Toronto, ON	M5G 2K1	Mr.	Francois	Lachance	Senior Policy Advisor	416-326-4754
Agency (Federal)	Indian and Northern Affairs Canada	Environment and Natural Resources Department	25 St. Clair Ave. East, 8th Floor	Toronto, ON	M4T 1M2		Glenn	Gilbert	Manager	416-973-2131
Municipal	Ontario Provincial Police	Collingwood & Blue Mountains Detachment	201 Ontario Street	Collingwood, ON	L9Y 3Z5	Mr.	John	Trude		705-445-7024
Municipal	Town of The Blue Mountains	32 Mill Street	P.O. Box 310	Thornbury, ON	N0H 2P0	Mrs.	Corrina	Giles	Town Clerk	519-599-3131
Municipal	Town of Collingwood	97 Hurontario Street	P.O. Box 157	Collingwood, ON	L9Y 3Z5	Ms.	Sara	Almas	Town Clerk	705-445-1030
Municipal	Grey County	595 Ninth Avenue East	County Building	Owen Sound, ON	N4K 3E3	Ms.	Sharon	Vokes	Clerk	519-376-2205
Municipal	The County of Simcoe	Administration Centre	1110 Highway 26	Midhurst, ON	L0L 1X0		County Clerk			705-726-9300
School Board	Bluewater District School Board	351 1st Avenue North	PO Box 190	Chesley, ON	N0G 1L0	Mr.	Steve	Blake	Director of Education	519-363-2014
School Board	Bruce-Grey Catholic District School Board	799 16th Avenue		Hanover, ON	N4N 3A1					519-364-5820
School Board	Simcoe County District School Board		1170 Highway 26	Midhurst, ON	L0L 1X0	Mr.	Rick	Howse	Central Maintenance Supervisor	705-728-7570
School Board	Simcoe Muskoka Catholic District School Board	46 Alliance Blvd.		Barrie, ON	L4M 5K3		Jennifer	Sharpe	Planning Officer	705-722-3555
School Board	Student Transportation Consortium of Grey Bruce	799 16th Avenue		Hanover, ON	N4N 3A1	Ms.	Brenda	Campbell	Transportation Systems Administrator	519 364-0605
School Board	Simcoe County Student Transportation Consortium	566 Bryne Drive		Barrie, ON	L4N 9P6	Ms.	Bonnie	Branch	Transportation Officer	
Agency	Grey Bruce Health Unit	101 17th Street East		Owen Sound, ON	N4K 0A5					519-376-9420

Type	Company	Address1	Address2	City	PostalCode	Title	FirstName	LastName	JobTitle	Contact
Agency	Simcoe County District Health Unit	15 Sperling Drive		Barrie, ,ON	L4M 6K9	Mr.	Ted	Devine	Director, Health Protection Services	705-721-7520
Utility	Bell Canada	136 Bayfield Street	Floor 2	Barrie, ON	L4M 3B1	Mrs.	Wendy	Lefebvre	Manager, Access Network	705-722-2467
Utility	Collus-Powerstream	43 Stewart Road	P.O. Box 189	Collingwood, ON	L9Y 3Z5	Mr.	Brian	Kennedy	Manager of Hydro Services	705-445-1800
Utility	Collingwood Public Utilities	43 Stewart Road	P.O. Box 189	Collingwood, ON	L9Y 3Z5	Mr.	Marcus	Firman	Chief Operating Officer	705-445-1800 ext 2246
Utility	Rogers Communications Inc.	1 Sperling Drive		Barrie, ON	L4M 6B8	Mr.	Tony	Dominguez	System Planner	705-737-4660 ext 6907 Tony.domnguez@rci.rogers.com
Utility	Hydro One	Subdivision Group	420 Welham Road	Barrie, ON	L4N 8Z2	Ms.	Heather	McTeer		1-866-272-3330
Utility	Hydro One Network	45 Sarjeant Drive	P.O. Box 6700	Barrie, ON	L4M 5N5		Business Customer Center			1-877-447-4412
Utility	ON Power Generation	700 University Avenue	H9F5	Toronto, ON	M5G 1X6	Ms.	Cara	Clairman	VP Sustainable Development	416-592-4921
Utility	Enbridge Gas Distribution Inc.	10 Churchill Drive		Barrie, ON	L4N 8Z5	Mr.	David	Smith	Sales Development Respresentative	705-739-5254
Utility	Union Gas	1590 8th St E		Owen Sound, ON	N4K 0A2	Mr.	Derrick	Cunningham		519-270-0305
First Nations Community	Chippewas of Georgina Island	R. R. #2	Box N-13	Sutton West, ON	LOE 1RO	Ms.	Donna	Big Canoe	Chief	705 437-1337
First Nations Community	Chippewas of Rama First Nation	5884 Rama Road	Suite 200	Rama, ON	L0K 1T0	Ms.	Sharon	Stinson Henry	Chief	
First Nations Community	Wahta Mohawk	P.O. Box 260	2664 Muskoka Road	Bala, ON	P0C 1A0		Blaine	Commandant	Chief	
First Nations Community	Moose Dear Point	3720 Twelve Mile Bay Road	P.O. Box 119	Mac Tier, ON	P0C 1H0		Barron	King	Chief	
First Nations Community	Wasauksing First Nation (Parry Island)	P.O. Box 250	1508 Lane "G" Geewadin Road	Parry Sound, ON	P2A 2X4		Alex	Zyganiuk	Community Consultation Coordinator	
First Nations Community	Coordinator for Williams Treaties First Nation	8 Creswick Court		Barrie, ON	L4M 2J7	Ms.	Karry	Sandy-McKenzie	Barrister & Solicitor	

Type	Company	Address1	Address2	City	PostalCode	Title	FirstName	LastName	JobTitle	Contact
First Nations Community	Beausoleil First Nation (Christian Island)	11 Ogema Miikaan	Christian Island	Cedar Point, ON	L0K 1R0		Roland	Monague	Chief	
First Nations Community	Georgian Bay Metis Council	355 Cranston Crescent	PO Box 4	Midland, ON	L4R 4K6	Mr.	David	Dusome	President	705-526-6335 daviddusome@rogers.com
First Nations Community	Metis Nation of Ontario - Head Office	500 Old St. Patrick Street	Unit D	Ottawa, ON	K1N 9G4					
Business	Blue Mountain Resorts	190 Gord Canning Drive		Blue Mountains, Ontario	L9Y 3Z2	Ms.	Lindsay	Ayers		705-445-0231
Business	Georgian International	85 Bayfield Street	Suite 500	Barrie, Ontario	L4M 3A7	Mr.	Bryan	Nykolation	Vice-President	705-730-5900 ext 2230 bryan@georgianinternational.com
Business	Mountainside Sports	774 Mountain Road		Collingwood, ON	L9Y 3Z2					705-444-2199
Business	Play it Again Sports	135 Hurontario Street		Collingwood, ON	L9Y 2L9	Ms.	Kathie	Ondercin		(705) 446-0633
Business	Tees Please	Blue Mountain Road		Collingwood, ON	L9Y 3Z2					705-445-5959
Business	Bill Brown Woodworking	743 Mountain Road		Collingwood, ON	L9Y 3Z2					705-445-4813
Business	Le Scandinave Spa	152 Grey Road 21	R.R. #3	Collingwood, ON	L9Y 3Z2	Mr.	Rob	Cederberg		705-443-8484 rob@ScandinaveBlue.com

February 26, 2015 update

- remove Infrastructure Ontario (formerly Ontario Realty Corp) as per IO letter received February 25, 2015

Grey County

COUNTY OF SIMCOE
For the Greater Good

C.C. Tatham & Associates Ltd.
Consulting Engineers

Grey Road 19 & Grey Road 21 Intersection Improvements

March 14, 2015

Public Information Centre

Welcome

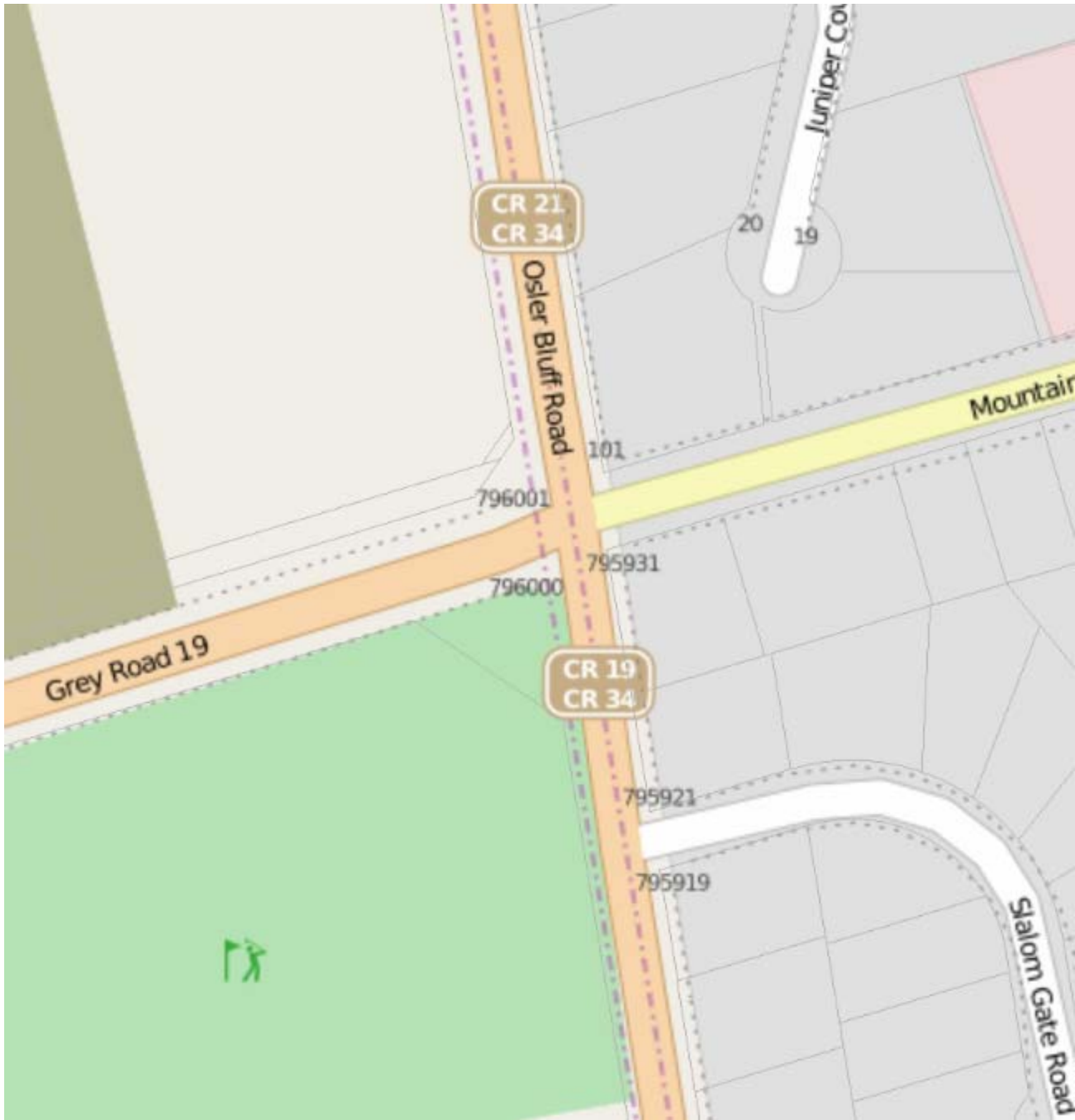
- This Public Information Centre will:
  - establish channels of communication with public & stakeholders
  - detail the study area, study purpose & objective
  - present the need & justification for the study and issues to be resolved
  - identify alternative solutions & potential environmental impacts
  - identify a recommended solution for public review
  - seek input & comments for consideration in the selection of the final preferred solution

- Public & Stakeholders:
  - sign the registry
  - review the presentation material
  - ask questions of the Counties or Consultant
  - submit a comment sheet & indicate whether or not you want to be kept informed of the process

Study Objective & Purpose

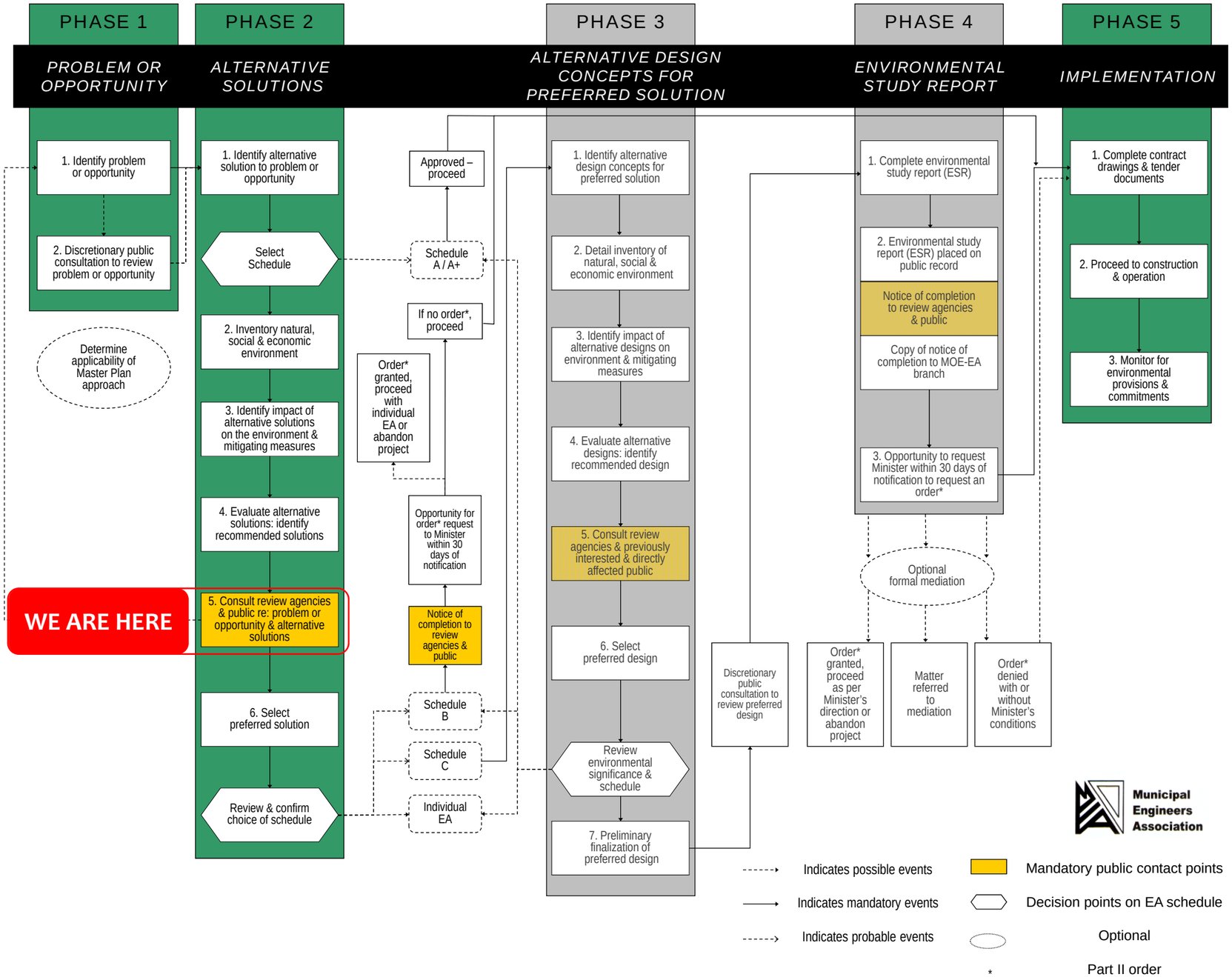
- The **OBJECTIVE** of the study:
  - to improve traffic operations & public safety at the intersection of Grey Road 19 & Grey Road 21

- The **PURPOSE** of the study:
  - develop alternative solutions to improve traffic operations
  - identify the location, extent & sensitivity of affected environments
  - assess the alternatives given potential environmental impacts
  - identify the preferred solution & measures to mitigate adverse impacts
  - satisfy the Class EA requirements



Study Process

- The Counties are proceeding with a Schedule B Class Environmental Assessment
- Phases 1, 2 & 5 of the Class EA process
- Opportunities for public input
  - notices
  - public information centre
  - 30-day review of final report



Existing Conditions

- Mountain Road looking **WEST**

Configuration: 1 WB shared left-through-right lane
Constraints: location of Mountainside Sports, utility poles & services

- Grey Road 19 looking **EAST**

Configuration: 1 EB shared left-through & 1 EB right lane
Constraints: location of water booster station, utility poles & services

- Grey Road 19 looking **NORTH**

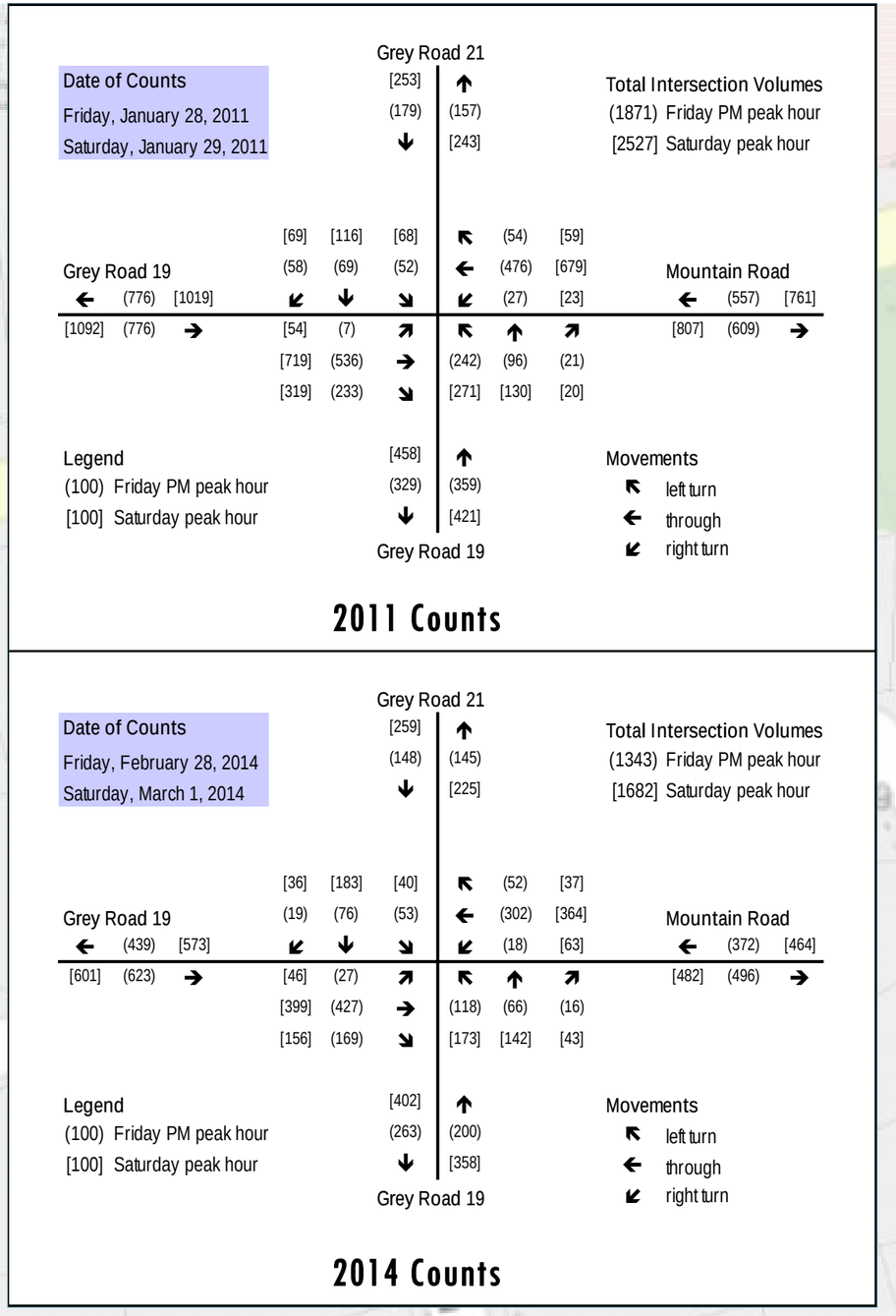
Configuration: 1 NB left & 1 NB through-right lane
Constraints: location of Mountainside Sports & water booster station

- Grey Road 19 looking **SOUTH**

Configuration: 1 SB left & 1 NB through-right lane
Constraints: location of natural gas regulator, utility poles & services

Existing Traffic Volumes

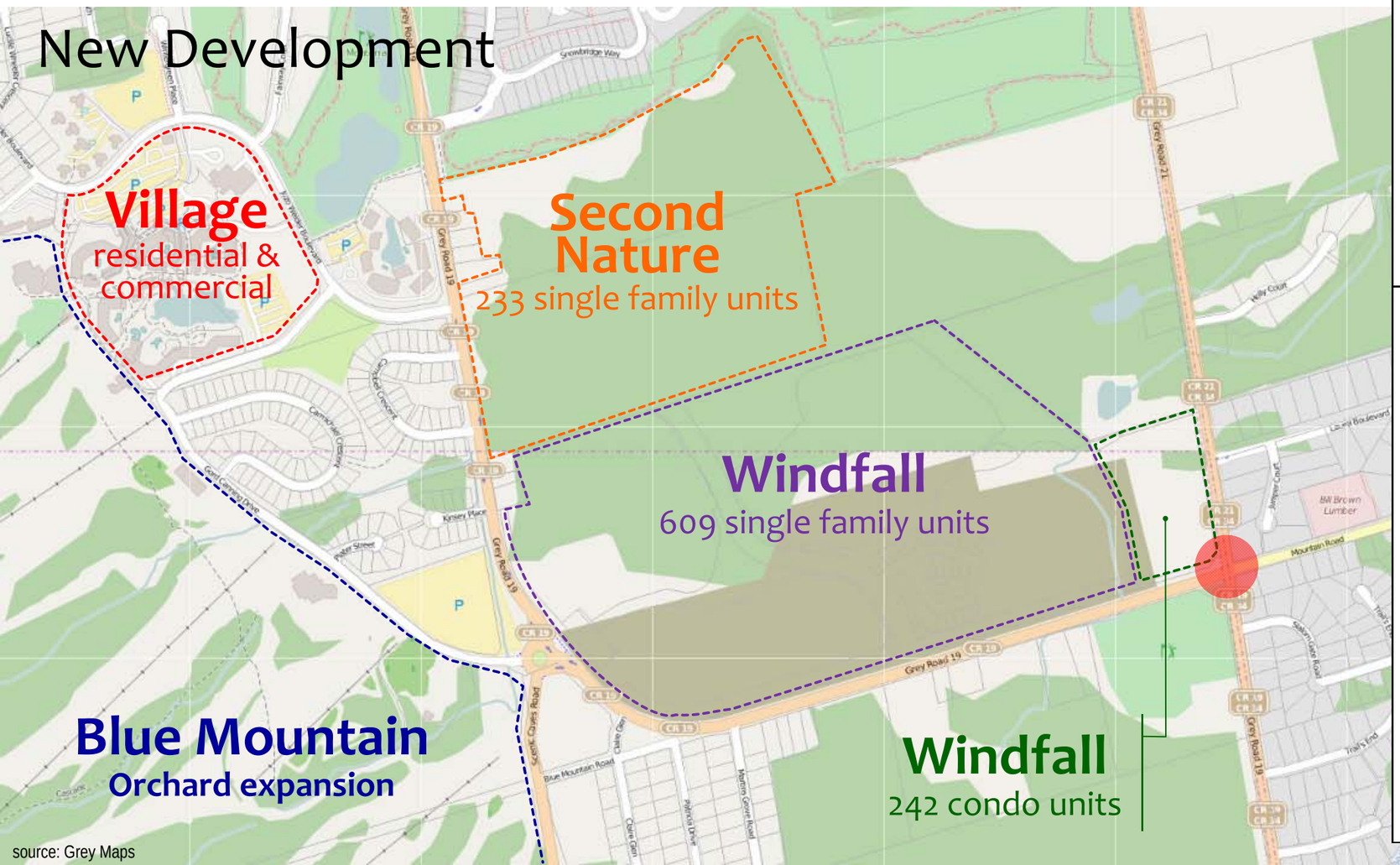
- Traffic counts were completed on typical winter weekends to consider winter peak hours (Friday & Saturday 4-6PM)
- 2011 volumes were 40-50% greater than 2014 volumes and thus the 2011 counts were used as the basis for this study
- The intersection operates acceptably with average delays of 25 to 65 seconds
- There are some isolated periods of increased delays & congestion during peak ski periods

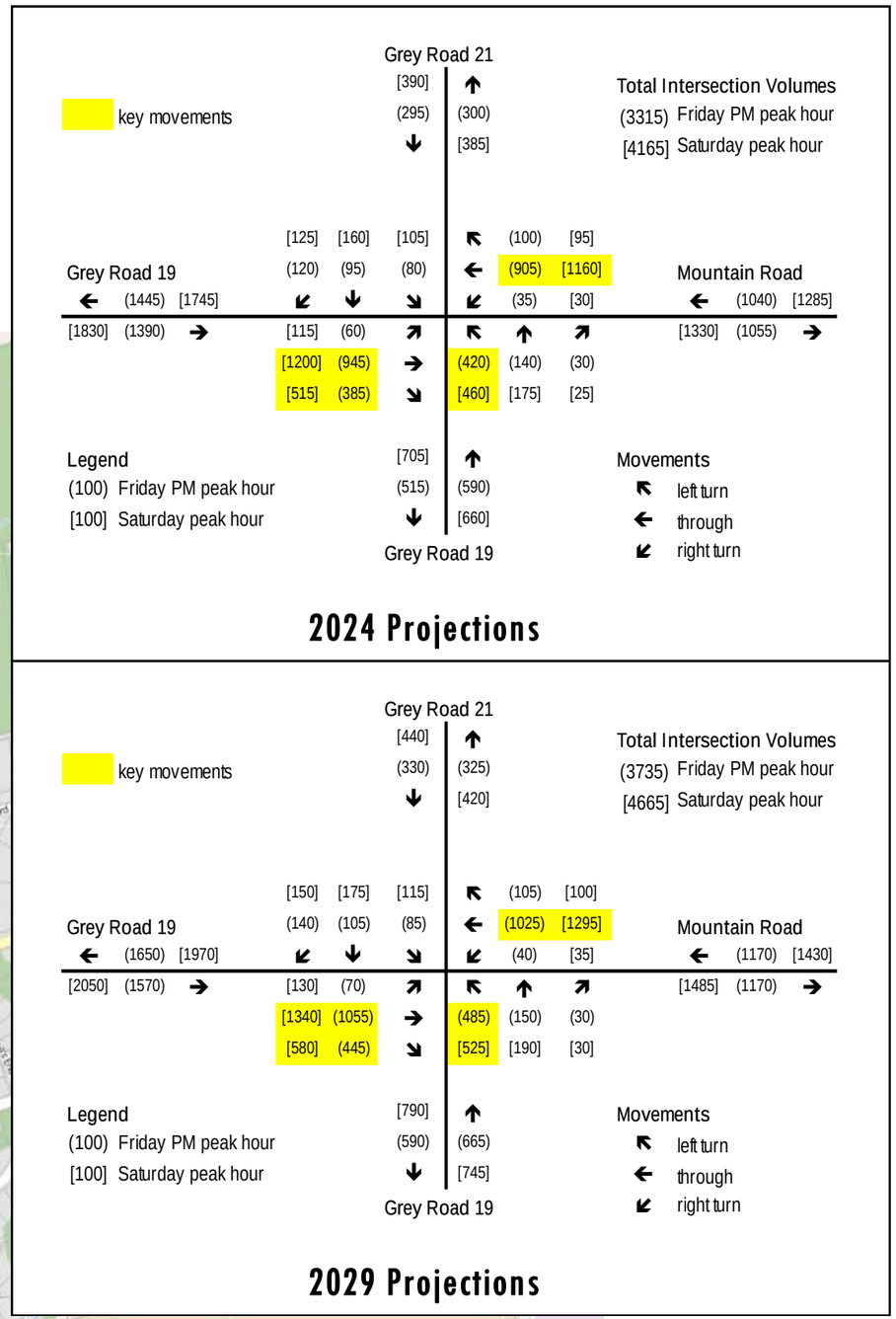


source: Grey Maps

Future Traffic Volumes

- Future volumes have been established considering growth in the overall areas, in addition to growth from new development





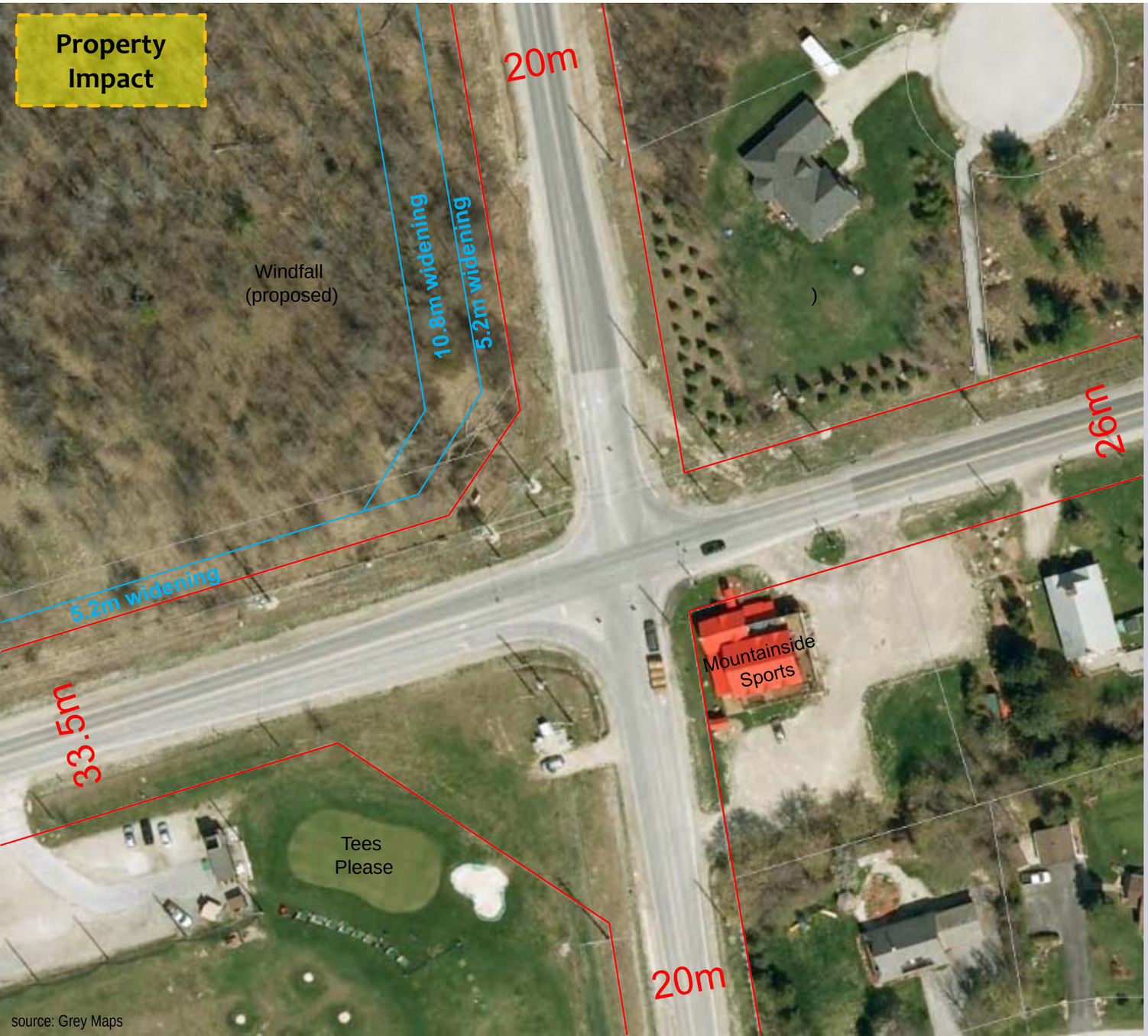
Problem Statement & Alternatives

- The **PROBLEM STATEMENT,** which is the basis for the study is:
  - Improvements are **NEEDED** to accommodate existing & future travel demands through the area (resulting from an increasing popularity of the area compounded with anticipated development growth).

- The **ALTERNATIVE SOLUTIONS** have been prepared to:
  - demonstrate the range of possible solutions that can be implemented to address the problem statement
  - consider the future travel demands through the intersection to 2029 & beyond
  - consider alternative forms of traffic control (namely traffic signal vs roundabout)

- The study includes consideration for maintaining the status quo (referred to as the Do Nothing solution)

Alt Solution: Do Nothing

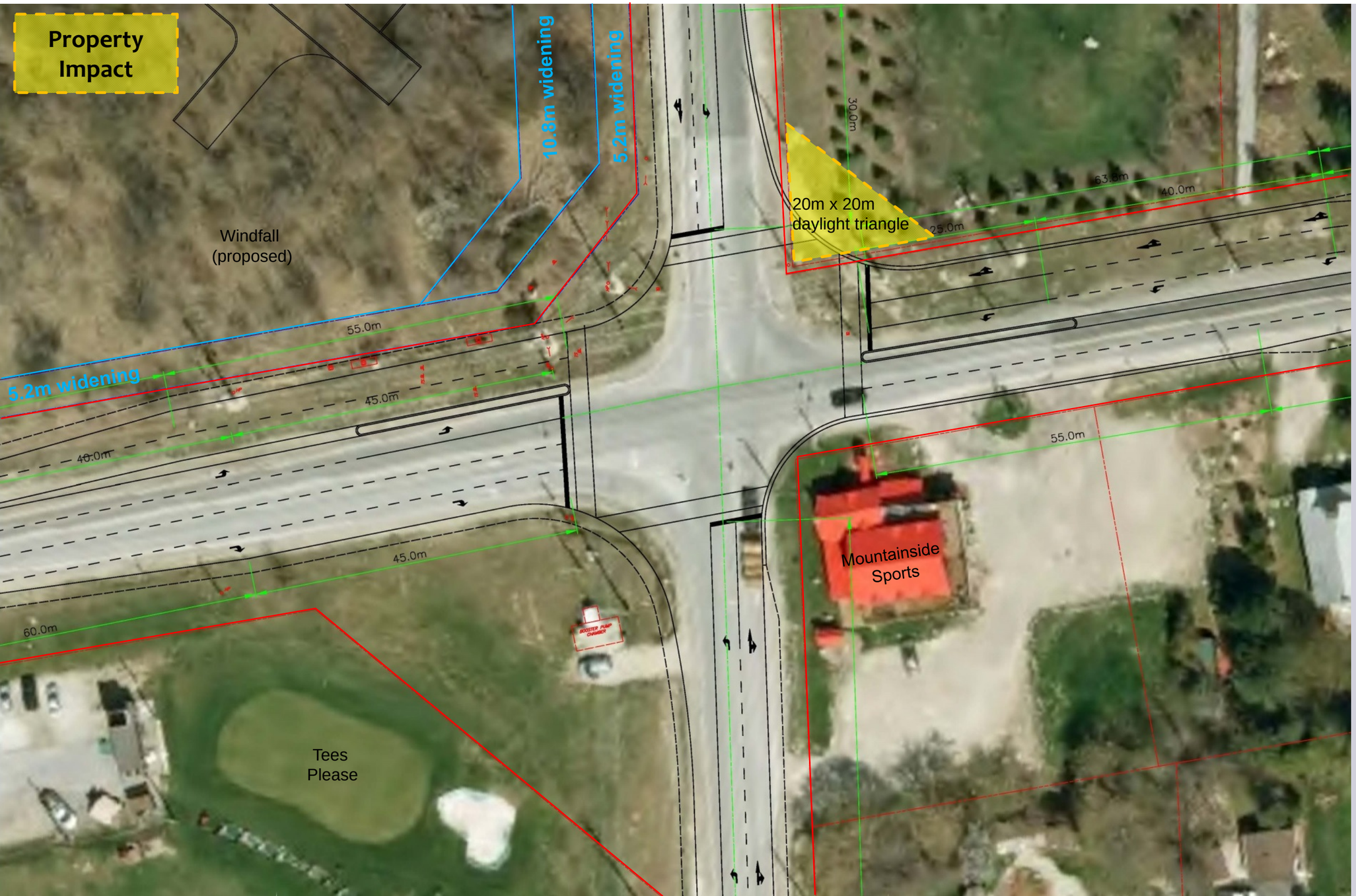


- existing intersection configuration is maintained
- as traffic volumes increase with growth in the area, the intersection will not provide adequate traffic operations
- this will result in high delays, increased congestion & unacceptable operations
- potential for traffic back-ups to the roundabout at Blue Mountain
- **NOT** a feasible option

Alt Solution: Intersection 1

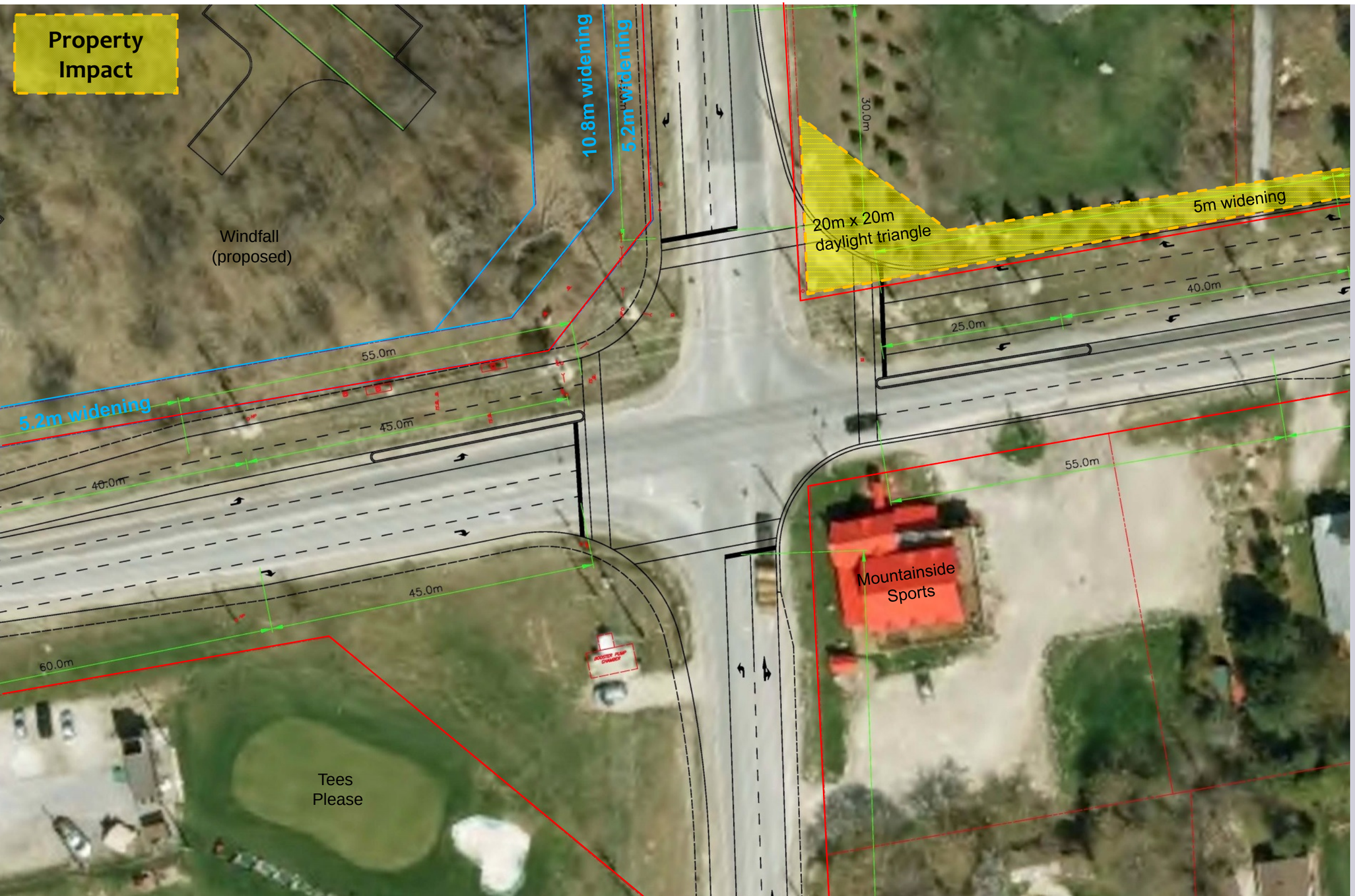
- add 2nd E-W through lane
- maintain N & S approaches
- avoids Mountainside Sports
- avoids water booster station
- impacts NE corner

Alt Solution: Intersection 2



- add 2nd E-W through lane
- add E-W left turn lanes
- maintain N & S approaches
- avoids Mountainside Sports
- avoids water booster station
- impacts NE corner

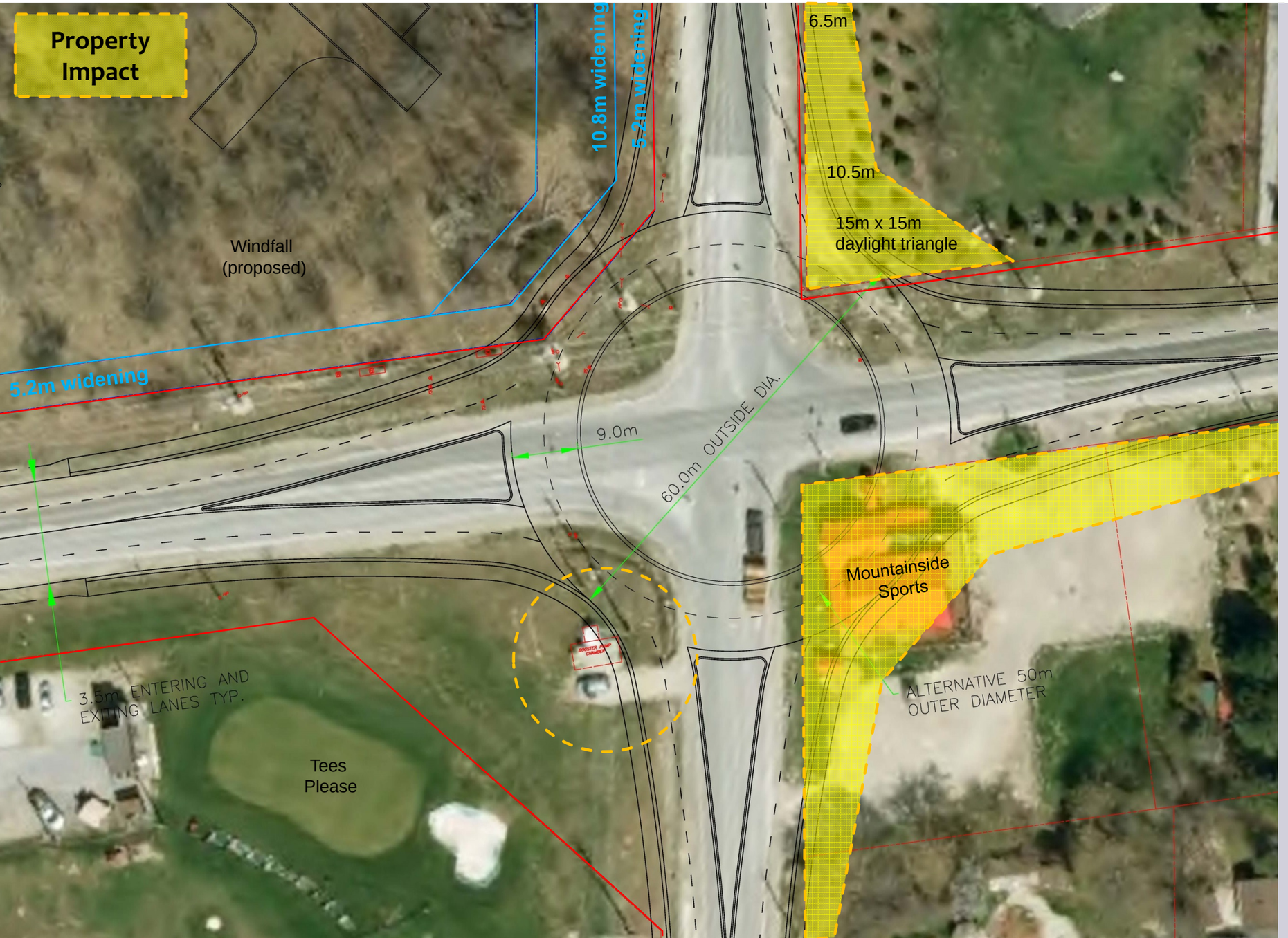
Alt Solution: Intersection 3



- add 2nd E-W through lane
- add E-W left turn lanes
- add WB & SB right lanes

- avoids Mountainside Sports
- avoids water booster station
- impacts NE corner

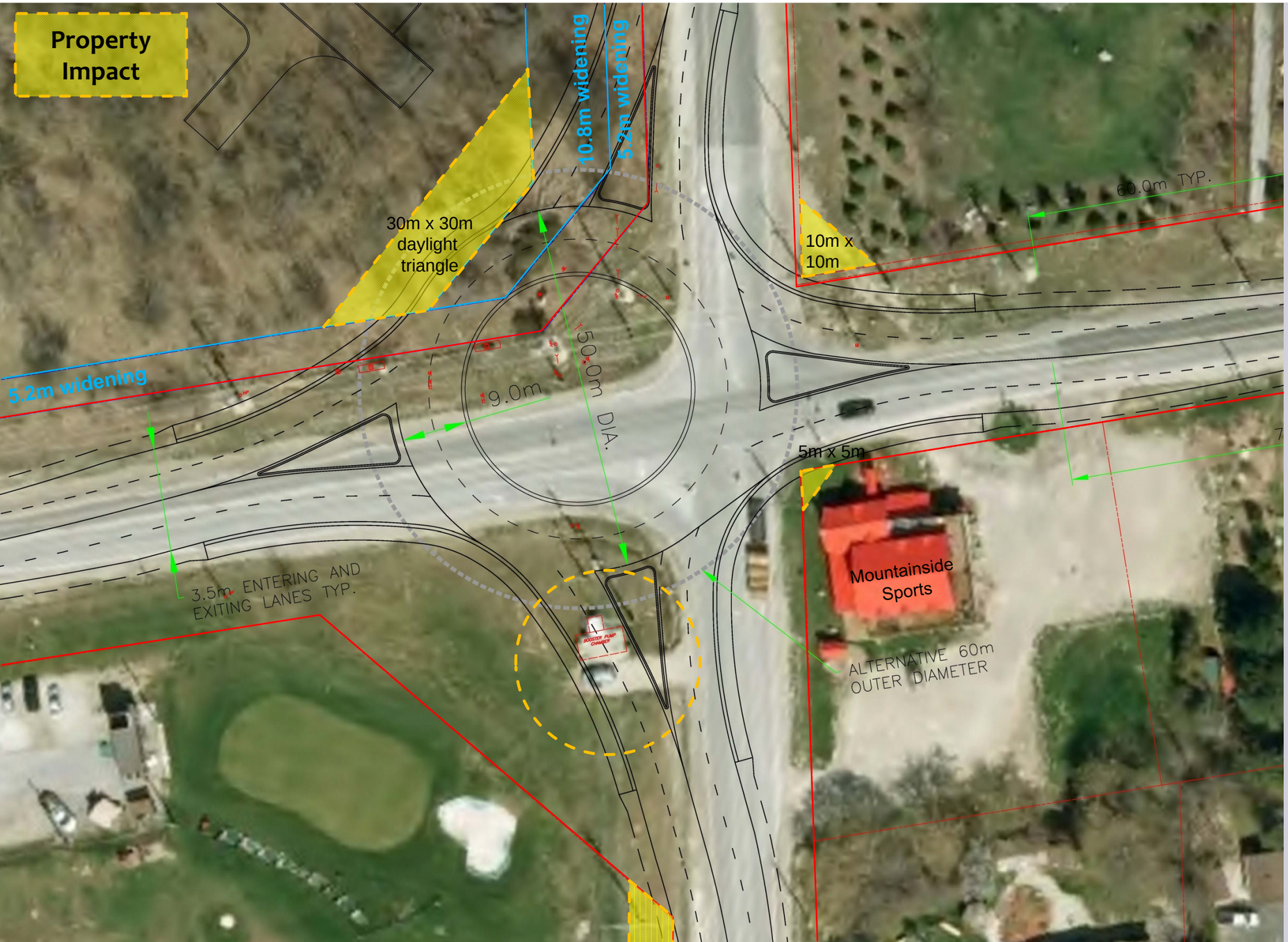
Alt Solution: Roundabout 1



- 2 lane roundabout + 2 lane entries/exits
- 42m inside island
- 9m circulatory road
- 60m outside island

- impacts Mountainside Sports
- impacts water booster station
- impacts NE corner

Alt Solution: Roundabout 2



- 2 lane roundabout + 2 lane entries/exits
- 32m inside island
- 9m circulatory road
- 50m outside island (reduced size)

- no impacts to Mountainside Sports
- impacts water booster station
- impacts NE corner
- impacts NW corner

Environment Inventories

- The **ENVIRONMENTS** considered include:
  - physical environment (traffic operations & utilities)
  - natural environment (aquatics, wildlife, vegetation & sensitive areas)
  - social environment (residents, development & noise)
  - cultural/heritage environment (archaeology, built heritage & First Nations)
  - economic environment (construction & property costs)

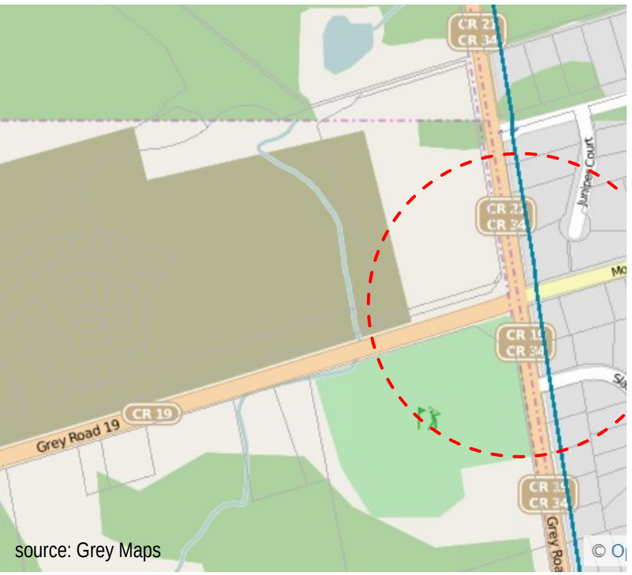
Physical Environment

	Traffic Operations	Utilities
Do Nothing	As the future volume will exceed the intersection capacity, poor traffic operations, increased delays and longer traffic queues will result.	No impacts to existing utilities.
Intersection 1	Additional E-W through lanes will improve traffic operations. Can accommodate 2019 traffic projections, beyond which further improvements will be necessary (add E-W lefts). With improvements, intersection will operate at 75% capacity in 2019.	Impacts to 8-10 utility poles (relocation required). No impacts to water booster station in SW corner or gas regulator station in NW corner.
Intersection 2	Additional E-W through lanes & left turn lanes will improve traffic operations. Can accommodate 2024 traffic projections, beyond which further improvements will be necessary (add SB right). With improvements, intersection will operate at 86% capacity in 2024.	Impacts to 18-20 utility poles, underground telephone and watermain on Grey Road 19. No impacts to water booster station in SW corner or gas regulator station in NW corner.
Intersection 3	Additional E-W through lanes & left turn lanes will improve traffic operations. Can accommodate 2029 traffic projections, beyond which further improvements will be necessary (add WB right). With improvements, intersection will operate at 91% capacity in 2029.	Impacts to 23-25 utility poles, underground telephone, gas & watermain, and gas regulator station in NW corner. No impacts to water booster station in SW corner.
Roundabout 1	2-lane roundabout (42m island + circulatory lanes = 60m outside diameter) with 2 entry and 2 exit lanes on each approach. Acceptable operations will be provided with exception of 2029 Saturday peak, when projected volumes will exceed the roundabout capacity (NB approach will be 32% over capacity). Roundabout provides traffic operations, safety and environmental benefits over a signalized intersection.	Impacts to 21-23 utility poles, underground telephone and gas in the area of the roundabout, water booster station in SW corner and gas regulator station in NW corner.
Roundabout 2	Same as Roundabout 1 except 32m island. 2029 Saturday peak operations will be affected by reduced roundabout size (NB approach will be 48% over capacity). Roundabout provides traffic operations, safety and environmental benefits over a signalized intersection.	Impacts to 18-20 utility poles (relocation required), underground telephone and gas in the area of the roundabout, water booster station in SW corner and gas regulator station in NW corner.

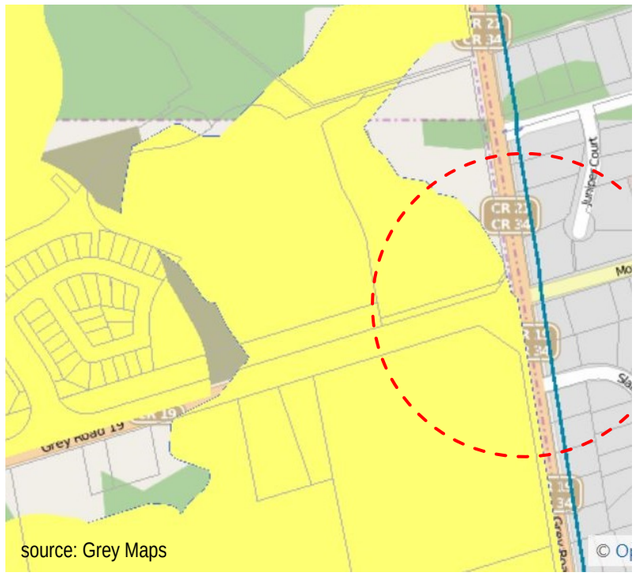
- Roundabouts are generally preferred to signalized intersections given improved safety and traffic operations, and reduced environmental impacts. In this case, the roundabouts have longer-term traffic issues (volume > capacity) and impact the water booster and gas regulator stations.

Natural Environment

Watercourses

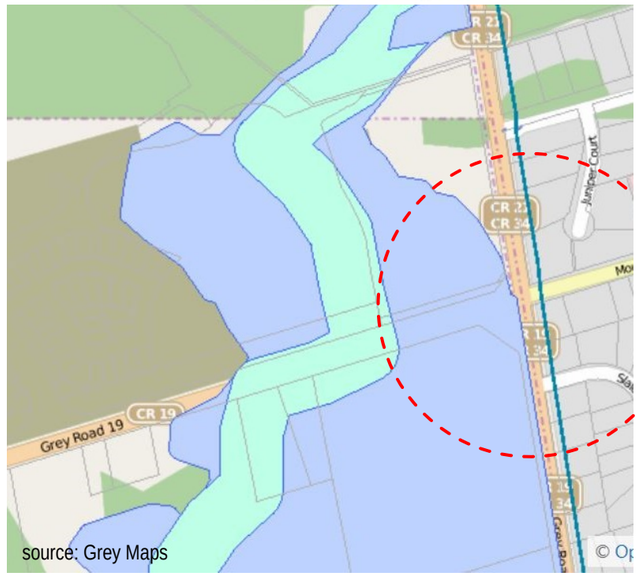


NVCA Regulated Areas

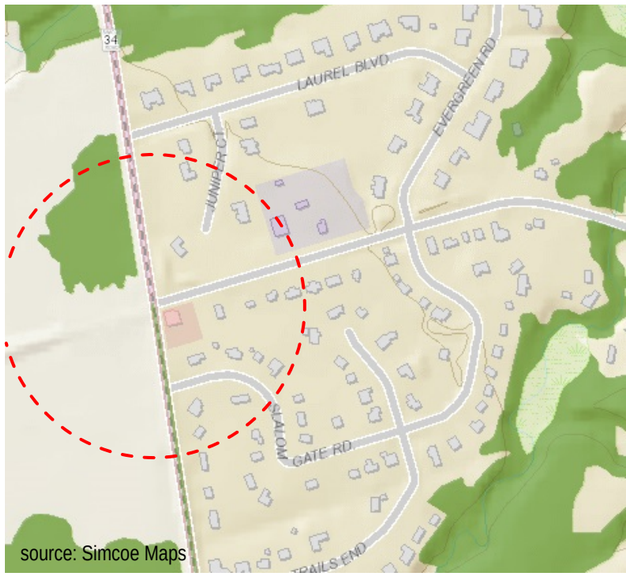


Meanders

NVCA Floodplain



Forest Area/Woodland



- Natural Environment review undertaken by Azimuth Environmental
  - no major issues/impacts/constraints have been identified
  - the surrounding areas are primarily developed or to be developed
  - the west side of the intersection is within the floodplain area (and hence NVCA regulated area) & thus will need an NVCA permit

- Greatest possible impacts with Roundabout 2, other options have similar and minimal impacts.
- All options are considered feasible.

Social & Cultural/Heritage Environments

	North-West Corner	North-East Corner	South-West Corner	South-East Corner	Cultural/Heritage
Do Nothing	No property impacts.	No property impacts.	No property impacts.	No property impacts.	No potential impacts
Intersection 1	No property impacts, widenings have been obtained from Windfall on both Grey Road 19 & 21.	15m x 15m daylight triangle required (112 sq.m).	6m widening along Grey Road 19 (1432 sq.m).	No property impacts.	The Stage 1 Archeological Assessment identified elevated potential for the recovery of Aboriginal and Euro-Canadian archaeological remains within undisturbed portions of the study area due to its close proximity (within 100 metres) to historic transportation routes and being partially within the hamlet of Kirkville. Undisturbed areas include (but are not limited to) the slightly treed and overgrown area located beyond the existing ROW within the NE corner, the wooded areas along the NW limit, and the grassed area along the SW limit of the study area. All identified areas which contain archaeological potential must be subjected to a Stage 2 Archaeological Assessment.
Intersection 2	No property impacts, widenings have been obtained from Windfall on both Grey Road 19 & 21.	20m x 20m daylight triangle required (198 sq.m).	6m widening along Grey Road 19 (1432 sq.m).	No property impacts.	
Intersection 3	No property impacts, widenings have been obtained from Windfall on both Grey Road 19 & 21.	20m x 20m daylight triangle required + 5m widening along Mountain Road (992 sq.m).	6m widening along Grey Road 19 (1432 sq.m).	No property impacts.	
Roundabout 1	No property impacts, widenings have been obtained from Windfall on both Grey Road 19 & 21.	15m x 15m daylight triangle required + minor widening along Grey Road 21 (600 sq.m).	6m widening along Grey Road 19 (1461 sq.m).	To acquire Mountainside Sports property + minor widening along Mountain Road + minor widening along Grey Road 10 (1425 sq.m.)	
Roundabout 2	30m x 30m daylight triangle required (335 sq.m).	10m x 10m daylight triangle required (50 sq.m).	6m widening along Grey Road 19 (1461 sq.m).	5m x 5m daylight triangle required (13 sq.m).	

- Greatest property impacts with Roundabout 1 given location of Mountainside Sports.
- Intersection 1 & 2 have least impacts of improvements.

Economic Environment

	Construction Costs	Maintenance Costs	Property Costs
Do Nothing	No additional construction costs.	No additional maintenance costs.	No additional property costs.
Intersection 1	Least costly of all alternatives to construct.	No increase in maintenance costs over existing conditions (typically $5000 per year for traffic signals).	Minimal property costs.
Intersection 2	Increased costs over Intersection 1.	No increase in maintenance costs over existing conditions (typically $5000 per year for traffic signals).	Minimal property costs.
Intersection 3	Increased costs over Intersection 1 and Intersection 2 (estimated construction cost of $1M).	No increase in maintenance costs over existing conditions (typically $5000 per year for traffic signals).	Slighter greater property costs as compared to Intersection 1 and Intersection 2.
Roundabout 1	Comparable cost to Intersection 3 and Roundabout 2 ($1M). Additional costs to relocate water booster station and gas regulator station ($0.75M to $1.0M estimated).	Roundabout maintenance is cheaper than traffic signal maintenance ($2000 vs $5000 per year).	Greatest property costs (Mountainside Sports property estimated at $1M- $1.25M).
Roundabout 2	Comparable cost to Intersection 3 and Roundabout 1 ($1M). Additional costs to relocate water booster station and gas regulator station ($0.75M to $1.0M estimated).	Roundabout maintenance is cheaper than traffic signal maintenance ($2000 vs $5000 per year).	Minimal property costs. Property at Windfall can be acquired through Site Plan Approval.

- The cost to construct a signalized intersection and roundabout are comparable. However, in considering the costs associated with relocating the water booster station and acquiring the Mountainside Sports property, the roundabout alternatives are 2x to 3x greater than signals.

Recommended Alternative

- Do Nothing does not address future traffic operations.
- Intersection 1 does not provide sufficient road capacity (no E-W left turn lanes).
- While roundabouts are preferred to traffic signals from a traffic & safety perspective, Roundabout 1 & 2 result in impacts/additional costs to the water booster station and/or Mountainside Sports (+ $1M to $2M to the project cost).

- Intersection 2 is the recommended solution (with ability to upgrade to Intersection 3 as warranted by traffic volumes).

Next Steps

- To **FINALIZE** the study, the project team will:
  - review all comments received
  - identify a preferred alternative
  - prepare a Class EA report for review
  - prepare a Notice of Study Completion for circulation (public has 30 days to review)
  - proceed to design & implementation

- Before you leave:
  - Have all your questions been answered?
  - Have you signed the registry to be informed of the study completion?
  - Have you completed a comment sheet?

Grey County
595 9th Avenue East
Owen Sound, ON N4K 3E3
Michael Kelly, P.Eng
Director of Transportation Services
michael.kelly@grey.ca
(519) 376-2205 x1246

County of Simcoe
1110 Highway 26
Midhurst, ON L0L 1X0
Paul Murphy, B.Sc., C.Tech
Engineering Technician II
paul.murphy@simcoe.ca
(705) 726-9300 x1371

C.C. Tatham & Associates Ltd.
200 Sandford Fleming Dr. #200
Collingwood, ON L9Y 5A6
Michael Cullip, P.Eng
Project Manager
mcullip@cctatham.com
(705) 444-2565 x265

Grey Road 19 & Grey Road 21 Intersection Improvements
Municipal Class Environmental Assessment Study
Public Information Centre – March 14, 2015

SIGN-IN SHEET (please print)

NAME	STREET ADDRESS	TOWN/CITY	POSTAL CODE	AFFILIATION	EMAIL
Joe Public	123 Your Street	Your Town	A1B 2C3	resident / business	joe@home.com
Norman Wingrove	10 Lockhart Rd.	Collingwood	L9Y 4B5	Blue Mountain Watershed Trust	norman.wingrove@watershedtrust.ca
Steve UrBancic	—	C'wood	—	—	surbancic@cctatham.com
Jenet&Jerry Hogarth	10 Evergreen CR	C'wood	L9Y 5A8		ljhogarth@rogers.com
Helen MacCachern	65 Slalom Gate Rd	Collingwood	L9Y 5B1		herald@bmts.com.
BLUE MOUNTAIN RESORT LINDSAY AYERS	108 JOZO WEIDER BLVD	BLUE MOUNTAINS	L9Y 3Z2	BLUE MOUNTAIN RESORT	layers@bluemountain.ca
SUSAN WAYNE	163 GREY RD 21	COLLINGWOOD		Resident	Susan@WayneGodfreyDesign.com please send copy of study
FRED BAUER	795906 Grad Rd. 19	Blue Mountains	L9Y 0P6	Resident	jbh.hume@hotmail.com
TIM FRYER	75 Georgian Manor Dr.	C'WOOD	L9Y 3Z1	TOWN COUNCILOR	tfryer@collingwood.ca
GREG MORTON	11 SLALOM GATE RD	C WOOD	L9Y 5B2	Resident / Business	greg.morton@me.com *PDFs email
Peter KINAL	33 St. Clair Ave	C-wood		Retired	Trinity.broker@AOL.com.
Nancy LeMay	185 Osler Bluff Rd	"		resident	bunnyrabbitgirl@hotmail.com

Grey Road 19 & Grey Road 21 Intersection Improvements
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NAME	STREET ADDRESS	TOWN/CITY	POSTAL CODE	AFFILIATION	EMAIL
Joe Public	123 Your Street	Your Town	A1B 2C3	resident / business	joe@home.com
MARIE MCCREADY	680 MOUNTAIN RD	COLLINGWOOD	L9Y 5G3	RESIDENT	MEELLIS@ROGERS.COM
GARRY & JEN BECKETT	68 SLALOM GATE	"	L9Y 5B1	RESIDENT	gjbeckett@outlook.com
JIM ROBINSON	680 MOUNTAIN RD	"	L9Y 5G3	RESIDENT	PAYSTAK4@ROGERS.COM
ALVARO Petten	795901 Grey Rd 19	"	L9Y 3Y9	Resident	apetten@HOTMAIL.COM
FRANK VAN DE WATER	795905 Grey Rd 19	"	99 OTTER CRESC TORONTO M5N 2W9	PART-TIME RESIDENT	fvandewater@rogers.com
PAUL GATT	39 TRAILS END	"	L9Y 5B2	RESIDENT	paul.gatt@ROGERS.COM PLEASE SEND PRESENTATION.

March 13, 2015

Attention: Michael Cullip
Project Manager
C.C. Tatham & Assoc.
200 Sanford Fleming Dr. #200
Collingwood, Ontario
L9Y 5A6

Re: Grey Rd. #19 & Grey Road #21 Intersection Improvements

Hello Michael,

I wanted to advise you in writing that we will be unable to attend the Public Information meeting in Collingwood on March 14, 2015.

As the property owners at 774 Mountain Road (DBA Mountainside Sports) we have a major interest in how these improvements will impact our property and business. It is regrettable that we are unable to attend this session, but know that you will keep us informed of any developments including a timeline for completion of this study and the improvements.

Thank you,

Kathie and Dale Ondercin

227 Maple Street
Collingwood, ON
L9Y 3N1

c.c. Michael Kelly
Paul Murphy

From: MOIRA MCINTYRE <mcintyremoira@rogers.com>
To: <michael.kelly@grey.ca>, <paul.murphy@simcoe.ca>, <mcullip@cctatham.com>
CC: Denise Tateyama <denise.tateyama@pacemarketing.ca>
Date: 3/14/2015 8:18 AM
Subject: Grey Road 19 & Grey Road 21 intersection

Gentlemen;
I understand there is a public meeting this afternoon at the Collingwood library which I just found out about through a neighbour this morning. Sad, that you didn't bother to notify me although I did get the initial notification regarding your study and have written you 3-three separate emails to which I have had no reply.
Unfortunately I'm in a business strategic retreat today and can't attend your meeting, so I ask that you deal with my request that I now have made several times through email as follows:

1. I support a roundabout solution to the traffic problem at this intersection rather than a light solution as it would be in keeping with the roundabout up the road and allow the traffic to move through in a passive way.
2. The condo development at the northwest corner of this intersection should be put on hold by the Town of the Blue Mountains and County of Simcoe until such time as the traffic solution is made and implemented.

Please add my comments to your public meeting notes and have them read to the public that attend.
Sincerely
Moira McIntyre
17 Slalom Gate Rd.,
Collingwood, Ontario

--- On Fri, 3/6/15, MOIRA MCINTYRE <mcintyremoira@rogers.com> wrote:

> From: MOIRA MCINTYRE <mcintyremoira@rogers.com>
> Subject: Grey Road 19 & Grey Road 21 intersection
> To: michael.kelly@grey.ca, paul.murphy@simcoe.ca
> Cc: mcullip@cctatham.com
> Date: Friday, March 6, 2015, 11:17 PM
> Good Evening Gentlemen;
> I have been thinking about the traffic concerns in this
> intersection all day.
> We already have had a failure of the roundabout that is up
> Mountain Road at the entrance
> to the Village at Blue Mountain as although this roundabout
> assists the traffic flow directly out the the Resort, the
> lights at Grey 19&21 stop that flowing traffic and I
> have personally seen this on
> several days in the last year. Your Assessment Study
> although valid is much too late- we already
> have a problem with traffic.
> This problem will be exacerbated by the Windfall Development
> on Grey Road 19 of
> over 500 single family dwellings that is now in development.
> The proposed 242 condo unit development that Windfall is
> requesting an amendement to the Official Plan and a Zoning
> Amendment for at the next Committee of a Whole on March
> 16,2015 will just make everything worse. Once the Town
> agrees to this new condo development on the Northwest corner
> of Grey Road 19 and 21 - the same intersection that you are
> studying we will really be in trouble with traffic.

> I understand that as a Collingwood resident we have little
> impact on what
> the Town of the Blue Mountains will do and therefore have
> come to you to assist us with this problem. Can you
> contact the Town of the Blue Mountains
> and ask them to put a hold on any new developments at this
> intersection until such time as
> the traffic issue has been studied, and decided. It
> seems imperative that we make the correct decision about
> traffic at this intersection for the safety of our
> citizens. Certainly additional homes
> funnelling into this intersection will not work.
> Again, thank you for your time and hopefully you can resolve
> this problem.
>
> Sincerely
> Moira McIntyre
>
> --- On Thu, 3/5/15, MOIRA MCINTYRE <mcintyremoira@rogers.com>
> wrote:
>
> > From: MOIRA MCINTYRE <mcintyremoira@rogers.com>
> > Subject: Grey Road 19 & Grey Road 21 intersection
> > To: michael.kelly@grey.ca,
> paul.murphy@simcoe.ca
> > Cc: mcullip@cctatham.com
> > Date: Thursday, March 5, 2015, 8:53 PM
> > Good Evening Gentlemen;
> > I live at 17 Slalom Gate Rd. which is in the Mountain
> View
> > Estates subdivision which borders this intersection.
> I
> > have received your information leaflet in the mail and
> am
> > very interested in what you are proposing to do at
> this
> > intersection. I'm very concerned about the heavy
> > traffic that I have seen of late especially coming
> down
> > Mountain Road from Blue Mountain Resorts.
> > I purchased this property almost 10 years ago as it was
> a
> > quiet neighbourhood between the town of Collingwood and
> Blue
> > Mountain. We ski, golf and work in the area and are
> > very fond of our quiet serene neighbourhood where there
> is a
> > mix of full time and recreational residents.
> > A few weeks ago on the way home from a snowshoe outting
> at
> > the top of the Mountain we were stopped dead on
> Mountain
> > Road for several minutes in a line of traffic. Very
> > concerning as we'd made a choice to live here so that
> we
> > don't have to deal with traffic. When we got down to

> Osler
> > Bluff Road there was no accident, of police cars
> holding up
> > traffic and the lights were working. It was just
> > traffic, leaving the Resort heading down Mountain
> > Road. We could even enter the roundabout as there
> were
> > too many cars from the other direction moving through
> and
> > then once we did get around the roundabout -
> everything
> > stopped- for several minutes.
> > We are not development adverse but understand that
> > there is a large condo development trying to get an
> Official
> > Plan and Zoning By Law Amendment at the northwest
> corner of
> > this same corner. We will find it difficult to have a
> 242
> > condo 2,3 and 4 storey building adjacent to our lovely
> > residential neighbourhood, but what about the
> increased
> > demand on the roads?
> > What are you suggesting to deal with this large number
> of
> > people? Even if they are all recreational residents,
> > 242x4 people per unit is 1000 people. This, plus the
> 500+
> > new homes that are being built by the Windfall
> Development
> > Group just up Mountain Road (another 2000 people) will
> > certainly impact our traffic. This concerns me
> > greatly. Even now, trying to get out of Slalom Gate
> Rd
> > onto Mountain Road any time during a weekend is time
> > consuming. I've waited up to 5 minutes to get a
> break
> > in traffic.
> > Public safety would deem that the Town of the Blue
> Mountains
> > not allow a condo development at this intersection
> until and
> > unless you can resolve the traffic congestion that is
> > already occurring and there are only a handful of the
> > Windfall Development homes (part of the 500+) that are
> > currently finished and have people living in them.
> > Please keep me informed. I look forward to hearing
> your
> > assessment.
> > Yours truly
> > Moira McIntyre
> > 17 Slalom Gate Rd.,
> > 705 445 9955
> >

From: Paul Gatt <paul_gatt@icloud.com>
To: "mcullip@cctatham.com" <mcullip@cctatham.com>
Date: 3/15/2015 8:43 AM
Subject: Grey Road 19 & 21

Hi Michael,

I missed the first part of your presentation yesterday at the library. Can you please forward the presentation slides?

I was very surprised with the current #1 choice being a traffic light with turn lanes. I was expecting a traffic circle given the current circle just to the West on 19.

The quoted traffic flow numbers do not match with observed flows from a local resident. This is the first year I have not been able to exit Slalom Gate onto 19 North, due to a sold line of stopped cars backing up 20 to 30 cars to the South. This was on most weekends.

Not sure when you did your counts but there is much more traffic this year even compared to last year.

I would like to read the whole presentation in detail and comment on the whole presentation.

Regards, Paul Gatt, P.Eng.
39 Trails End, Collingwood
705-293-0199

Grey Road 19 & Grey Road 21 Intersection Improvements
Municipal Class Environmental Assessment Study
Public Information Centre – March 14, 2015

Grey County

COUNTY OF SIMCOE

COMMENT SHEET (please print)

1. Please check the category that best describes your interest in the study:

☒ Town of Collingwood resident ☐ Town of The Blue Mountains Resident ☐ Area Business Owner ☐ Other

2. With expected growth, seasonal traffic demands and future developments in the area, traffic volumes through the subject intersection will increase and some level of congestion will occur, particularly if no improvements to the intersection are undertaken.

Do you agree with the recommended transportation improvement strategies to address future travel needs? Why?

I agree with the recommended traffic improvement strategy ie Intersection 2. There is a need for improved traffic flow at this busy intersection when we consider the 1,000+ new residential units planned / being built in the area, plus future expansion at The Village at Blue

While the best solution would be a roundabout, as a taxpayer, we cannot justify spending the extra 1-2 million at this time.

Name	Norman Wingrove, CPA, CMA
Address	10 Lockhart Road Collingwood ON L9Y 4B5

Thank you for your input. Please submit at the PIC or mail/email/fax by **March 28, 2015** to:

Michael Cullip, C.C. Tatham & Associates Ltd., 115 Sandford Fleming Drive, Suite 200
Collingwood, ON L9Y 5A6
mcullip@cctatham.com
tel: (705) 444-2565 fax: (705) 444-2327

The information on this comment sheet is collected under the authority of the Environmental Assessment Act and will become public information. All comments will be included in the Class Environmental Assessment documentation to be made public at the conclusion of this project. Please check the space below if you wish your comments to be made anonymously.

☐ Please withhold my name and address from publication

Michael Cullip - Re: 114258 - Grey Road 19 / 21 - presentation material

From: Paul Gatt <paul_gatt@icloud.com>
To: Michael Cullip <MCULLIP@cctatham.com>
Date: 2015-03-18 7:29 PM
Subject: Re: 114258 - Grey Road 19 / 21 - presentation material
CC: "jvelick@collingwood.ca" <jvelick@collingwood.ca>, "michael.kelly@grey.c...

Good Day Michael,

Thank you for the presentation material!

First I am most pleased that this problematic intersection is being addressed prior to the pending development. Also very nice to see that both Grey and Simcoe are working together to develop a solution.

My first comment is on the measured and projected traffic flows.

The traffic at this intersection is very dependent on:

A- the weather (a significant percentage of the flow is heading for Blue Mountain and that is largely impacted by the weather).

B- the traffic patterns are totally different in the am and the pm

Therefore only doing traffic flows in the pm on 2 days in each of 2011 and 2014 can hardly be used to indicate even current traffic patterns and for sure not for projected flows. Given that a major problem with this intersection is related to left hand turns and the morning rush to the hill was not even looked at I question your results.

Here is a summary of the historic weather for each of these 2 days:

Weather Friday, Jan 28, 2011, min -8, max 0
Saturday, Jan 29, 2011, min -12, max -6

Friday, Feb 28, 2014, min -22, max -12
Saturday Mar 1, 2014, Min -13, max -13
Plus the wind on Thursday evening hit 67km

Thinking the weather may have influenced the number of skiers and cars at the hill.

Also as a local living at 39 Trails End, this is the first year I have not been able to exit Slalom Gate to go North on 19(Osler Bluff Rd) due to the very long line of backed up cars South on 19 waiting to turn left almost every winter weekend. Unless the weather was ugly in which case, no backup.

So I question the validity of your traffic flows both in volume and in directions.

Nice that this study is being done prior to the Windfall development project on the North West corner of this intersection. However I feel the initial cost is not factoring in your future restrictions for improving this intersection. If you under design this intersection now because of a slight additional developmental cost you will not have a second chance to correct it.

With the ever increasing flow North on 19 toward this intersection in general and especially on winter weekend mornings and much of this flow turns left following 19. In the future I expect more traffic also to flow North on 21 as more traffic bypasses Collingwood (26, Popular, 19, 21 to 26).

In general I feel the traffic study is totally inaccurate and misleading. Your preferred option is very short sighted especially given your future restricted options.

Paul Gatt P.Eng.
39 Trails End, Collingwood

On Mar 17, 2015, at 3:43 PM, Michael Cullip <MCULLIP@cctatham.com> wrote:

> Thank you for submitting comments regarding intersection improvements at the intersection of Grey Road 19 & 21. For your information, I have attached a copy of the presentation that was provided at the Public Information Centre on March 14, 2015 (the presentation closely mirrors the boards that were on display). It includes the recommended improvement solution as based on the engineering assessment completed to date. Following consideration for all public comments, we will identify the preferred solution for implementation.
>
> The larger scale drawings pertaining to each of the 5 options are unfortunately too large to transmit via email (28meg) but can be downloaded via the following link:
>
> https://dl.dropboxusercontent.com/u/15127028/Grey%20Road%2019%20%26%2021%20Options.pdf
>
> I have also attached for your use, as required, the comment sheet. Please

provide any additional comments by March 28, 2015. Any comments submitted to date have been received and will be considered in selecting the preferred improvement option. All comments received will form part of the final report.

A further notice will be circulated once the study is complete, and the final report is available for public review, at which time you will have 30 days to review and provide further comment as required.

Should you have any questions, please don't hesitate to contact me or either of the County contacts (details for which are provided in the slides).

Thanks for your interest and participation to date.

Michael Cullip, B.Eng. & Mgmt., M.Eng. P.Eng
Director, Manager - Transportation & Municipal Engineering

C.C. Tatham & Associates Ltd.
tel: (705) 444-2565 x265
cell: (705) 888-3289
mcullip@cctatham.com
www.cctatham.com

<Grey Road 19 & 21 - PIC slides.pdf>

<Grey Road 19 & 21 - comment sheet.pdf>

Michael Cullip - FW: Website Request: GR19-GR21 EA

From: "Patterson,Tanya" <Tanya.Patterson@grey.ca>
To: "'mcullip@cctatham.com'" <mcullip@cctatham.com>
Date: 2015-04-30 9:46 AM
Subject: FW: Website Request: GR19-GR21 EA

Good morning Michael,

Please see the email request below.

Thank you,
Tanya Patterson
Administrative Assistant
Phone: +1 519-372-0219 ext. 1283

Description: Grey County

From: gwgcooper@gmail.com [gwgcooper@gmail.com]
Sent: April-30-15 9:11 AM
To: Hamer, Klarika; Patterson,Tanya
Subject: Website Request: GR19-GR21 EA

Name: Gerry Cooper, PEng
Email: gwgcooper@gmail.com
Phone: 705-835-6742

Please register me for the EA study underway for the intersection of GR19 and GR21. I note the involvement of Simcoe County in this project. Simcoe County also has an EA study underway for Horseshoe Valley Road (CR-22) improvements and roundabouts are an alternative solutions under consideration. I would appreciate any responses made to the public input made at the March 14, 2015 PIC.

Michael Cullip - Comment re Grey Rd 19 & Grey Rd 21 Intersection Improvements

From: "Bill Abbotts" <bill_abbotts@hotmail.com>
To: <mcullip@cctatham.com>
Date: 2015-05-01 7:39 AM
Subject: Comment re Grey Rd 19 & Grey Rd 21 Intersection Improvements
CC: <directoripw@thebluemountains.ca>

Hello

I attended a Blue Mountains council meeting Thurs April 30 where Mike Kelley gave a presentation regarding Grey Rd 19 & Grey Rd 21 Intersection Improvements. Adding lanes to Mountain Road into Collingwood could just move the traffic congestion to a 2 lane road and the intersection where Mountain Road joins with Hwy 26. The route Grey Rd 19 South to 6th Street then across the 10th Line to Poplar SR then east to the Hwy 26 bypass needs to be considered. It is signed and used as a route around Collingwood by myself and many others now.

I believe a modified Option 2 Roundabout is the best solution for this intersection. This allows for the best traffic flow, and if moved slightly west & north on the existing diagram impacts the least amount of properties. It allows for a real gateway to The Blue Mountains, Grey County, and Blue Mountain Resorts.

Please keep me informed as this project proceeds.

Thankyou & Cheers

Bill Abbotts

Phone - 519 599-6457
Cell - 705 444-4067
Email - Bill_Abbotts@hotmail.com

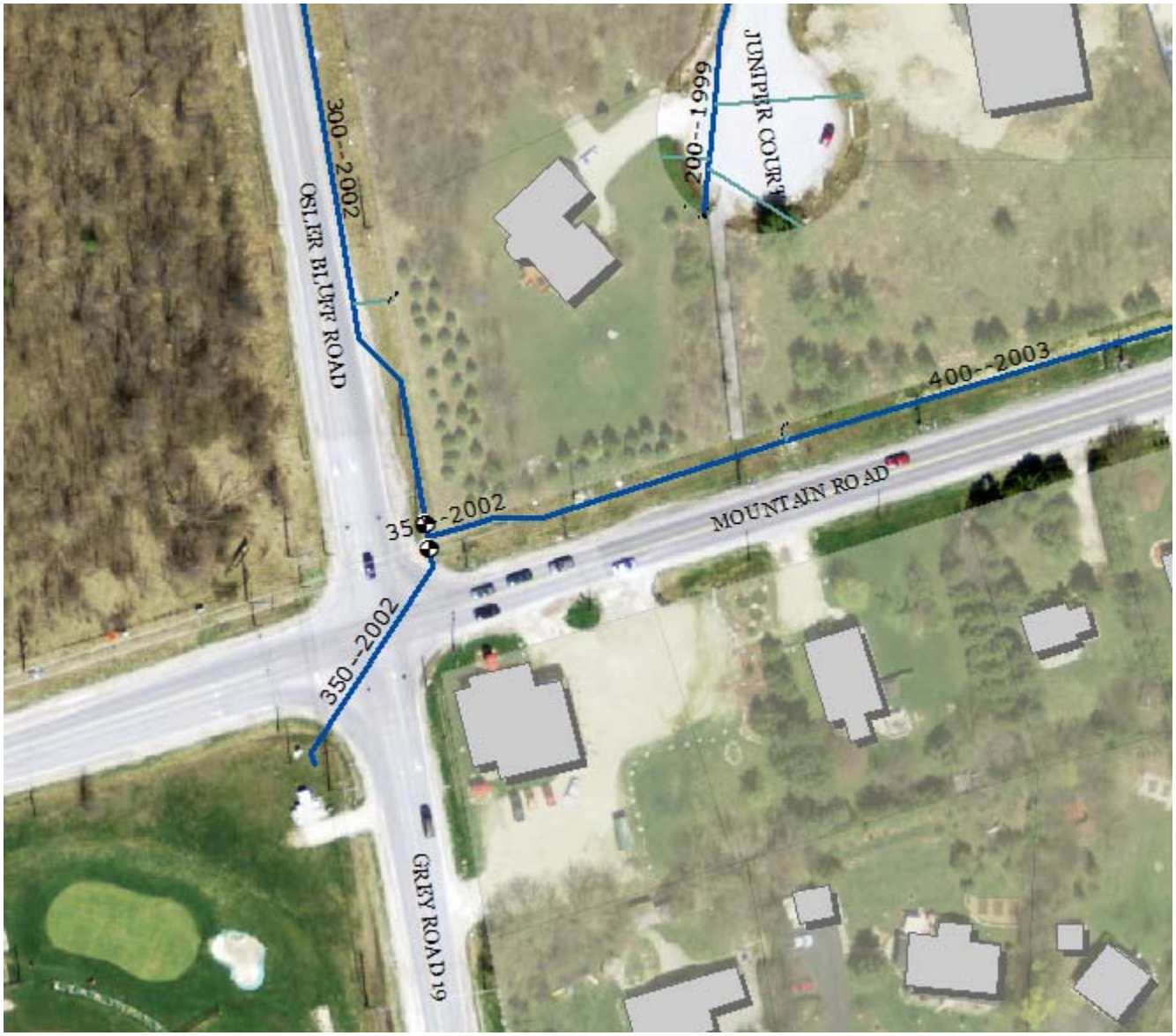
Michael Cullip - Grey Road 19 and Grey Road 21 Intersection Improvements

From: Peggy Slama <pslama@collus.com>
To: Michael Cullip <MCULLIP@cctatham.com>, "'michael.kelly@grey.ca'" <michae...
Date: 2015-04-10 8:39 AM
Subject: Grey Road 19 and Grey Road 21 Intersection Improvements
CC: Karla Findlay <kfindlay@collus.com>, Dana Doyle <ddoyle@collus.com>, Joh...

Collingwood Public Utilities would like to provide the following preliminary comments through the Municipal Class Environmental Assessment process.

Please find attached a snapshot from our GIS system of our buried water infrastructure at the intersection. The figure shows the sizes of our transmission main in the area. This transmission main is the only water source for a subdivision east of the intersection. Therefore, the preservation of the watermain integrity is important and must be maintained during construction. The 350mm diameter line crossing the intersection is connected to the Town of the Blue Mountains in ground reservoir.
With respect to road structure or features at the intersection, it is preferred that access to the watermain is considered during design. We must be able to access any part of the main, for instance to address an emergency break, which could occur at any point along the line. We must have easy access to the valves at the road surface.

Please keep Collingwood Public Utilities informed of all future notices regarding this study. My contact information is listed below.



Peggy Slama, P.Eng.
Collingwood Public Utilities
Manager, Water Services
43 Stewart Road,
Collingwood, ON L9Y 4M7
705-445-1800 ext. 2224
705-446-5316 (cell)
705-445-0791 (fax)
pslama@collus.com

Please consider the environment before printing this e-mail.

Michael Cullip - Grey Road 19 & Grey Road 21 Intersection Improvements - The Blue Mountain Comments

From: Reg Russwurm <rrusswurm@thebluemountains.ca>
To: "Michael Cullip (mcullip@cctatham.com)" <mcullip@cctatham.com>
Date: 2015-05-05 4:30 PM
Subject: Grey Road 19 & Grey Road 21 Intersection Improvements - The Blue Mountain Comments
CC: "Michael Kelly (michael.kelly@grey.ca)" <michael.kelly@grey.ca>

Michael C.,

Below is the Council resolution passed in response to the presentation made by Michael K to Town of The Blue Mountain's Council on April 30.

I would wish to discuss with the project team the challenges with constructing a roundabout at this intersection and possible solutions.

- Reg

B.1 Grey Road 19 & Grey Road 21 Intersection Improvements

Presented by: Michael Kelly, Director of Transportation Services, Grey County

Moved by: John McKean Seconded by: Michael Seguin

THAT with respect to the Grey Road 19 and Grey Road 21 Intersection Improvements, the preferred solution for Council of the Town of The Blue Mountains is a roundabout in this location, Carried.

From: Reg Russwurm <rrusswurm@thebluemountains.ca>
To: "Kelly,Michael" <Michael.Kelly@grey.ca>, "Michael Cullip(mcullip@cctatha...
Date: 5/6/2015 12:53 PM
Subject: RE: Grey Road 19 & Grey Road 21 Intersection Improvements - The Blue Mountain Comments

Michael,

The key themes were around gate way feature ("sense of arrival") and concern that traffic signals will not function as well as a roundabout. I provided no opinion either way.

I think we should dig into the cost premium a little more. I think you mentioned $750k or so to move the PS. That sounds high to me especially since we can salvage much of the equipment. There may be options to relocate the PS to an alternate location within an above ground building.

- Reg

-----Original Message-----
From: Kelly,Michael [mailto:Michael.Kelly@grey.ca]
Sent: May-05-15 6:51 PM
To: Reg Russwurm; Michael Cullip (mcullip@cctatham.com)
Subject: Re: Grey Road 19 & Grey Road 21 Intersection Improvements - The Blue Mountain Comments

Reg: Any rational, especially when there is $2M cost difference?

MJK

Sent from my BlackBerry 10 smartphone on the Bell network.
From: Reg Russwurm
Sent: Tuesday, May 5, 2015 4:29 PM
To: Michael Cullip (mcullip@cctatham.com)
Cc: Kelly,Michael
Subject: Grey Road 19 & Grey Road 21 Intersection Improvements - The Blue Mountain Comments

Michael C.,

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From: Reg Russwurm <rrusswurm@thebluemountains.ca>
To: "Kelly,Michael" <Michael.Kelly@grey.ca>, "Michael Cullip(mcullip@cctatha...
Date: 5/7/2015 8:35 AM
Subject: RE: Grey Road 19 & Grey Road 21 Intersection Improvements - The Blue Mountain Comments

Michael,

I have a figure of $250k or so in my head as going a long way to moving the PS.

I can picture a slab on grade with perhaps a pre-fab building. Since the PS can be out of service for a period of time with some planning, we can re-use the mechanical equipment and maybe some of the electrical and chemical as well. The PS was originally planned for 8000 m3/day. The Town has recently re-negotiated the Water Purchase Agreement with Collingwood to a firm capacity of 1250 m3/day with the abilities to go to 4000 m3/day only because the current pumps are capable of moving that much water. There's reason to feel that the Town could downsize the PS to 1250m3/day which could cut down on capital and operating costs as well.

- Reg

-----Original Message-----
From: Kelly,Michael [mailto:Michael.Kelly@grey.ca]
Sent: May-07-15 7:02 AM
To: Reg Russwurm; Michael Cullip (mcullip@cctatham.com)
Subject: RE: Grey Road 19 & Grey Road 21 Intersection Improvements - The Blue Mountain Comments

Reg: What is the cost?

Michael Kelly
Director of Transportation Services
Phone: +1 519-372-0219 ext. 1246

-----Original Message-----
From: Reg Russwurm [mailto:rrusswurm@thebluemountains.ca]
Sent: May-06-15 12:53 PM
To: Kelly,Michael; Michael Cullip (mcullip@cctatham.com)
Subject: RE: Grey Road 19 & Grey Road 21 Intersection Improvements - The Blue Mountain Comments

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Appendix M:
Additional Traffic Volumes

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

A ternoon Pea Diagram

Speci ied Period
From: 15:00:00
To: 18:00:00

One Hour Pea
From: 15:30:00
To: 16:30:00

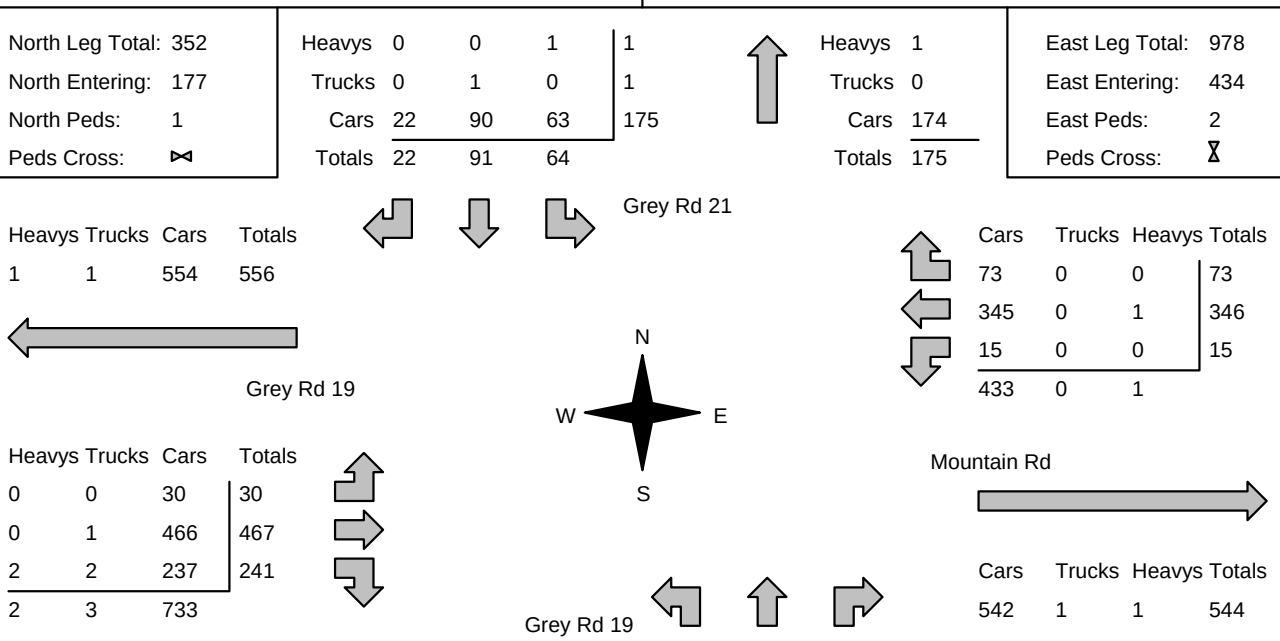
Municipality: Blue Mountain
Site : 1705600004
Intersection: Grey Rd 19 & Grey Rd 21
TFR File : 1
Count date: 17-Mar-17

Weather conditions:

Person counted:
Person prepared:
Person chec ed:

Signalized Intersection

Major Road: Grey Rd 19 runs W/E



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Total Count Diagram

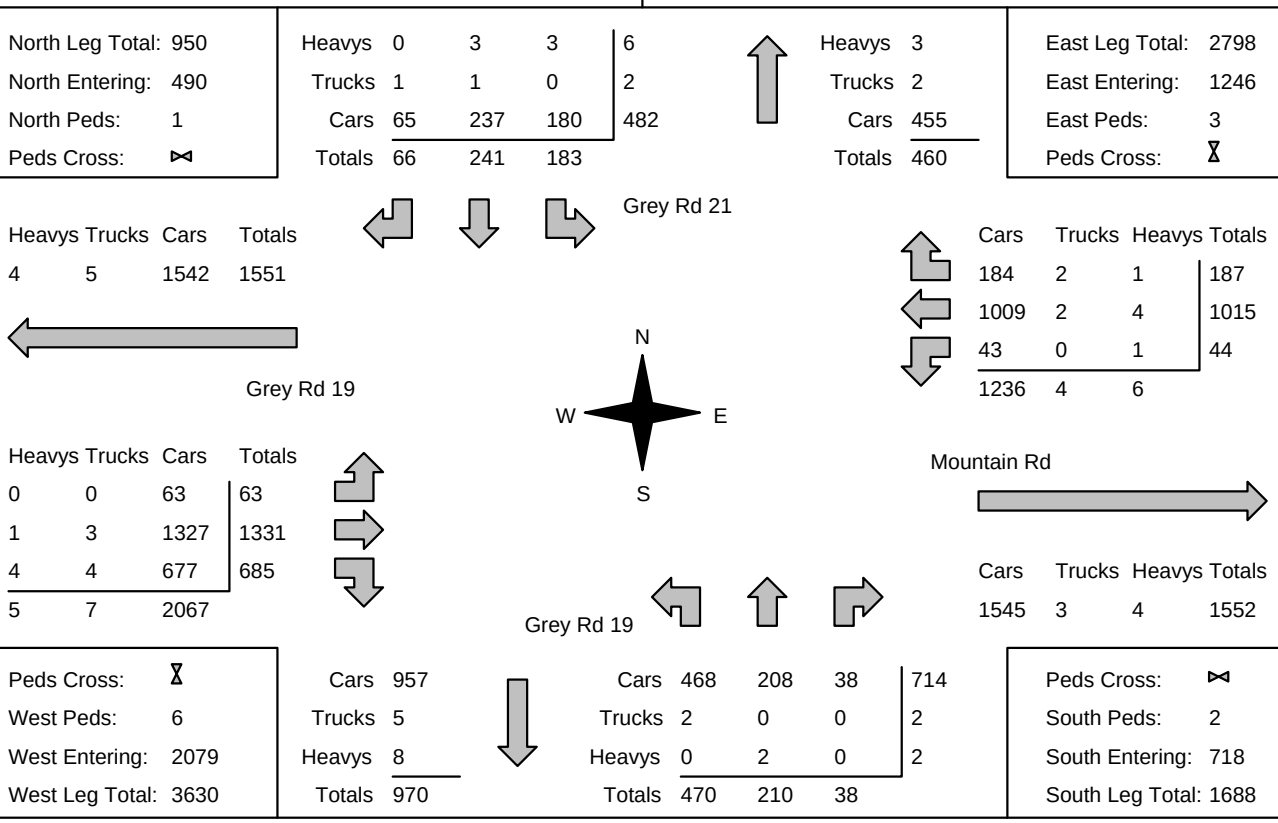
Municipality: Blue Mountain
Site : 1705600004
Intersection: Grey Rd 19 & Grey Rd 21
TFR File : 1
Count date: 17-Mar-17

Weather conditions:

Person counted:
Person prepared:
Person chec ed:

Signalized Intersection

Major Road: Grey Rd 19 runs W/E



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Tra ic Count Summary

Intersection: Grey Rd 19 & Grey Rd 21 | **Count Date:** 17-Mar-17 | **Municipality:** Blue Mountain

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
15:00:00	*0*	*0*	*0*	*0*	*0*
16:00:00	*78*	*72*	*27*	*177*	*1*
17:00:00	*61*	*92*	*15*	*168*	*0*
18:00:00	*44*	*77*	*24*	*145*	*0*
Totals:	183	241	66	490	1

North/South Total Approaches: 1208

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
15:00:00	*0*	*0*	*0*	*0*	*0*
16:00:00	*165*	*75*	*9*	*249*	*2*
17:00:00	*198*	*78*	*16*	*292*	*0*
18:00:00	*107*	*57*	*13*	*177*	*0*
S Totals:	470	210	38	718	2

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
15:00:00	*0*	*0*	*0*	*0*	*0*
16:00:00	*20*	*344*	*69*	*433*	*1*
17:00:00	*14*	*324*	*63*	*401*	*2*
18:00:00	*10*	*347*	*55*	*412*	*0*
Totals:	44	1015	187	1246	3

East/West Total Approaches: 3325

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
15:00:00	*0*	*0*	*0*	*0*	*0*
16:00:00	*28*	*450*	*230*	*708*	*0*
17:00:00	*20*	*487*	*246*	*753*	*0*
18:00:00	*15*	*394*	*209*	*618*	*6*
W Totals:	63	1331	685	2079	6

Calculated Values or Tra ic Crossing Major Street

Hours Ending:	*15:00*	*16:00*	*17:00*	*18:00*	*0:00*	*0:00*	*0:00*	*0:00*
Crossing Values:	*0*	*319*	*353*	*234*	*0*	*0*	*0*	*0*

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

A ternoon Pea Diagram

Speci ied Period
From: 15:00:00
To: 18:00:00

One Hour Pea
From: 15:15:00
To: 16:15:00

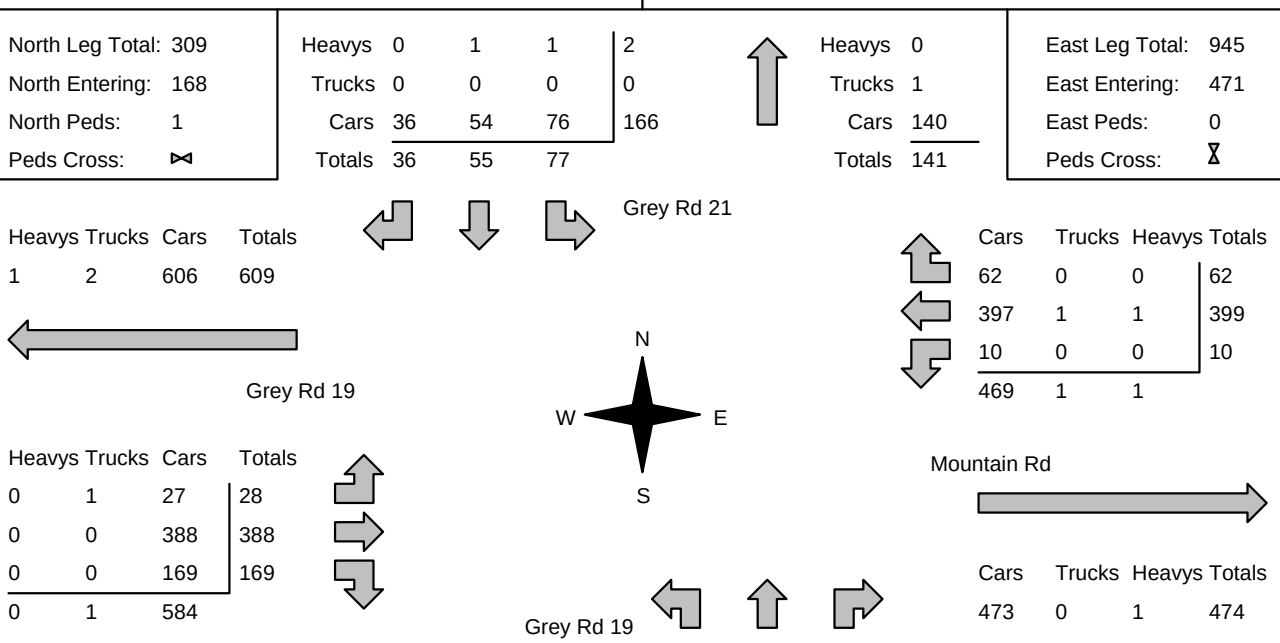
Municipality: Blue Mountain
Site : 1705600004
Intersection: Grey Rd 19 & Grey Rd 21
TFR File : 1
Count date: 18-Mar-17

Weather conditions:

Person counted:
Person prepared:
Person chec ed:

Signalized Intersection

Major Road: Grey Rd 19 runs W/E



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Total Count Diagram

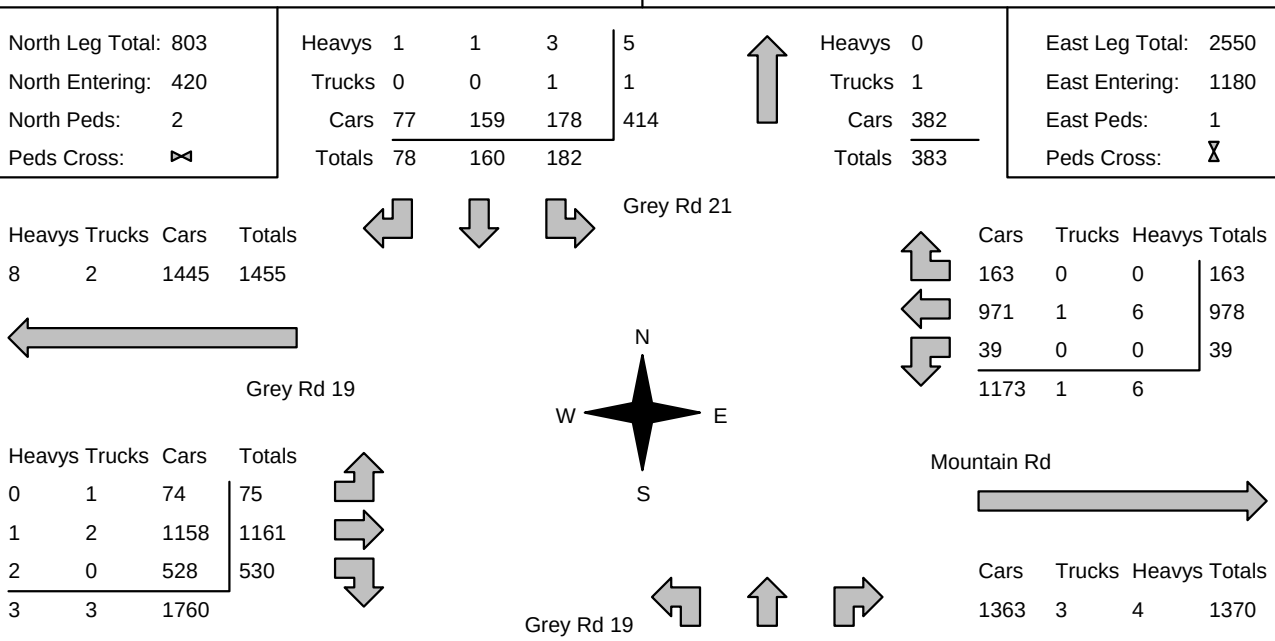
Municipality: Blue Mountain
Site : 1705600004
Intersection: Grey Rd 19 & Grey Rd 21
TFR File : 1
Count date: 18-Mar-17

Weather conditions:

Person counted:
Person prepared:
Person chec ed:

Signalized Intersection

Major Road: Grey Rd 19 runs W/E



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Tra ic Count Summary

Intersection: Grey Rd 19 & Grey Rd 21 | **Count Date:** 18-Mar-17 | **Municipality:** Blue Mountain

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
15:00:00	*0*	*0*	*0*	*0*	*0*
16:00:00	*77*	*49*	*31*	*157*	*1*
17:00:00	*62*	*55*	*34*	*151*	*1*
18:00:00	*43*	*56*	*13*	*112*	*0*
Totals:	182	160	78	420	2

North/South Total Approaches: 991

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
15:00:00	*0*	*0*	*0*	*0*	*0*
16:00:00	*169*	*51*	*12*	*232*	*0*
17:00:00	*135*	*48*	*9*	*192*	*0*
18:00:00	*95*	*46*	*6*	*147*	*0*
S Totals:	399	145	27	571	0

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
15:00:00	*0*	*0*	*0*	*0*	*0*
16:00:00	*15*	*388*	*62*	*465*	*0*
17:00:00	*14*	*316*	*59*	*389*	*1*
18:00:00	*10*	*274*	*42*	*326*	*0*
Totals:	39	978	163	1180	1

East/West Total Approaches: 2946

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
15:00:00	*0*	*0*	*0*	*0*	*0*
16:00:00	*25*	*388*	*164*	*577*	*0*
17:00:00	*34*	*398*	*184*	*616*	*1*
18:00:00	*16*	*375*	*182*	*573*	*2*
W Totals:	75	1161	530	1766	3

Calculated Values or Tra ic Crossing Major Street

Hours Ending:	*15:00*	*16:00*	*17:00*	*18:00*	*0:00*	*0:00*	*0:00*	*0:00*
Crossing Values:	*0*	*297*	*254*	*196*	*0*	*0*	*0*	*0*

C.C. Tatham & Associates Ltd.
Consulting Engineers

INTERSECTION COUNT
PM PEAK HOUR

GENERAL INFORMATION

Surveyor Name	Lucas McDonald	**Jurisdiction/Date**	Town of the Blue Mountains	Fri Aug 18, 2017
Weather Conditions	Raining and warm - 20 degrees	**Major Street**	Grey Rd 21/Osler Bluff Rd	N-S
Project Name	Grey Road 19/21 Class EA	**Minor Street**	Grey Rd 19/Mountain Rd	E-W
Project Number	114258	**Intersection Control**	traffic signal	

Additional Comments

Total Vehicles	467
Truc s Entering	2.7%
Vehicles Entering	185
Pedestrians	0
Ped Crossing	↔
NORTH LEG	

Grey Rd 21/Osler Bluff Rd

TOTAL	29	97	59
Heavy Trucks	0	1	1
Light Trucks	0	3	0
Autos	29	93	58

282	TOTAL
2	Heavy Trucks
2	Light Trucks
278	Autos

Total Vehicles	942
Truc s Entering	0.4%
Vehicles Entering	536
Pedestrians	0
Ped Crossing	↕
EAST LEG	

Total	Heavy Trucks	Light Trucks	Autos
592	1	2	589

Autos	Light Trucks	Heavy Trucks	TOTAL
129	1	1	131
366	0	0	366
39	0	0	39

Grey Rd 19/Mountain

N
W E
S

Grey Rd 19/Mountain

36	1	0	35
329	0	4	325
134	1	1	132
TOTAL	Heavy Trucks	Light Trucks	Autos

400	5	1	406
Autos	Light Trucks	Heavy Trucks	Total

Autos	264
Light Trucks	4
Heavy Trucks	2
TOTAL	270

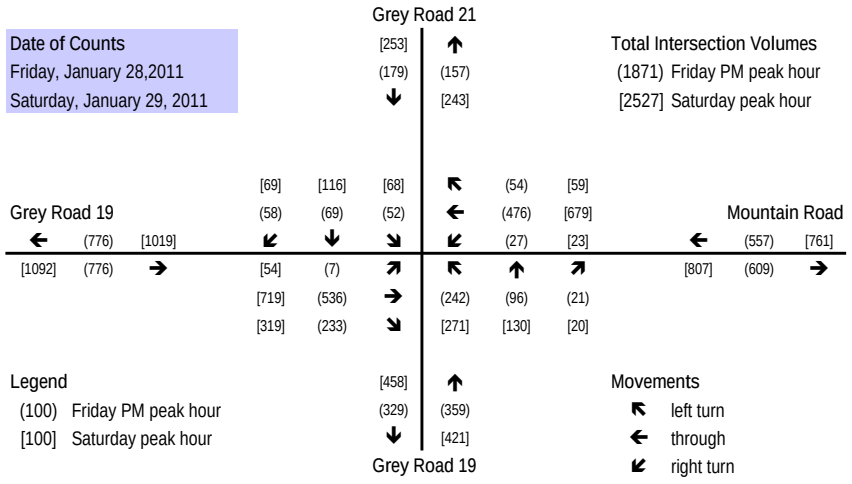
194	114	17	Autos
2	1	1	Light Trucks
1	0	0	Heavy Trucks
197	115	18	TOTAL

Grey Rd 21/Osler Bluff Rd

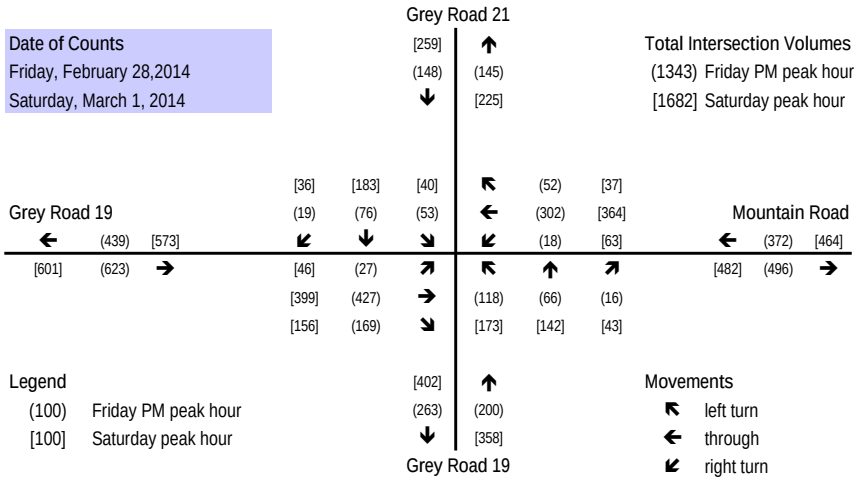
Ped Crossing	↕
Pedestrians	0
Vehicles Entering	499
Truc s Entering	1.4%
Total Vehicles	1091
WEST LEG	

Ped Crossing	↔
Pedestrians	0
Vehicles Entering	330
Truc s Entering	1.5%
Total Vehicles	600
SOUTH LEG	

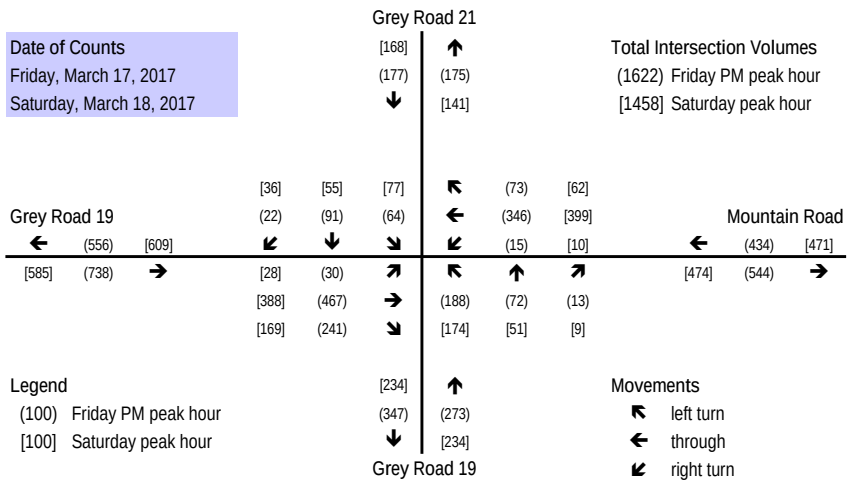
16:00 to **1 :00**



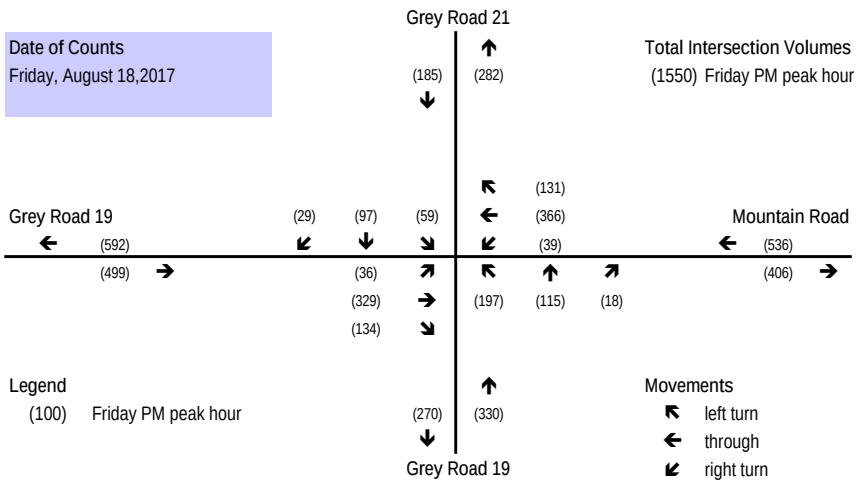
2011 Winter Counts



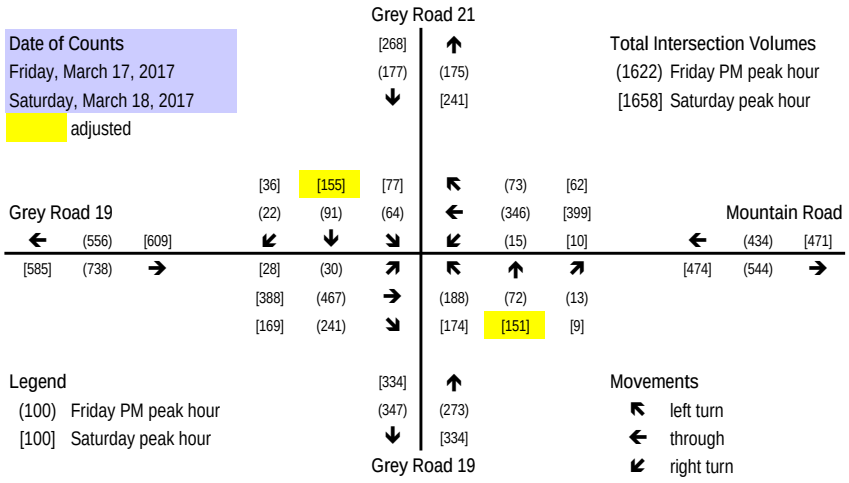
2014 Winter Counts



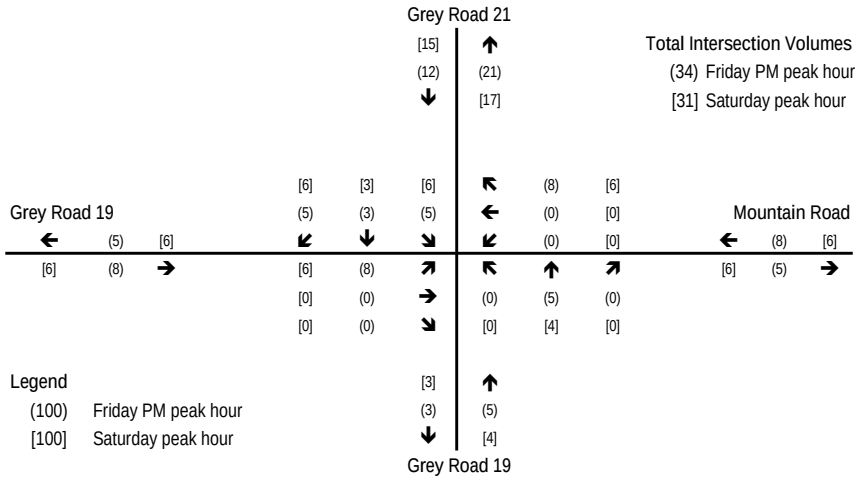
2017 Winter Counts



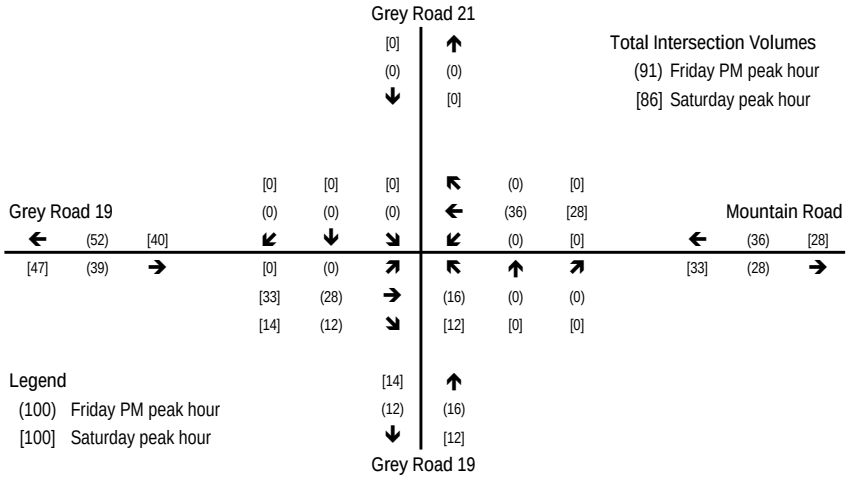
2017 Summer Counts



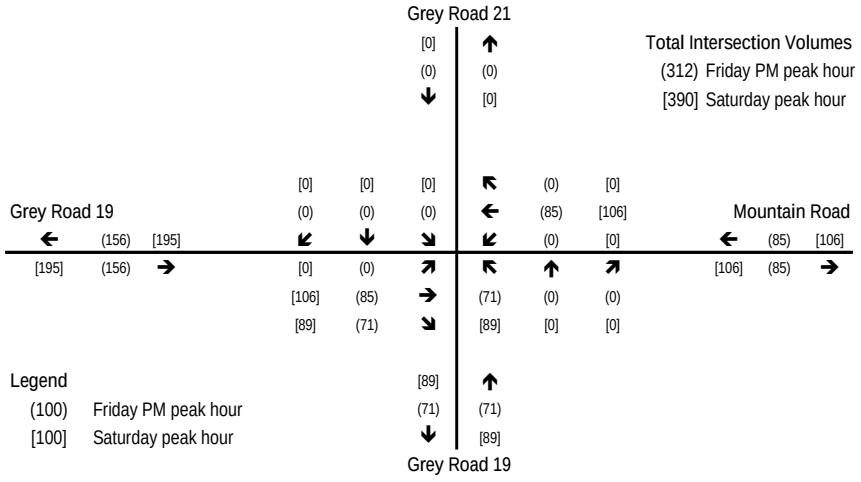
2017 Winter Counts Adjusted (Base Volumes)



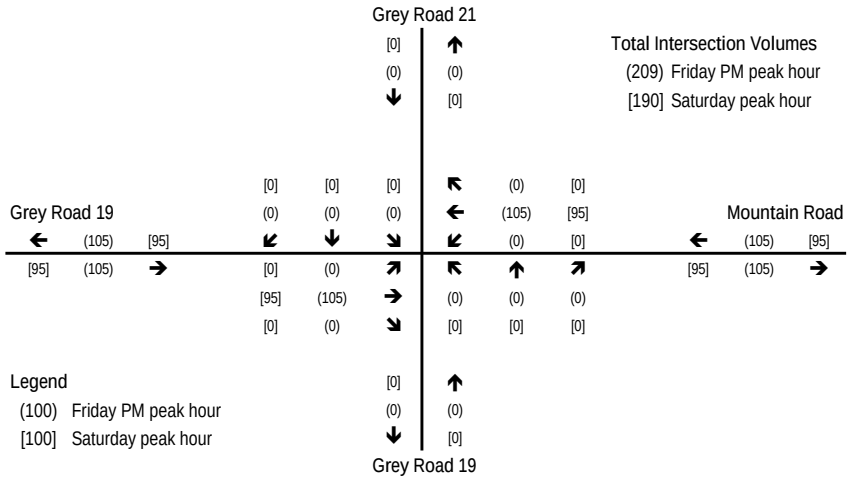
Monterra Phase 2



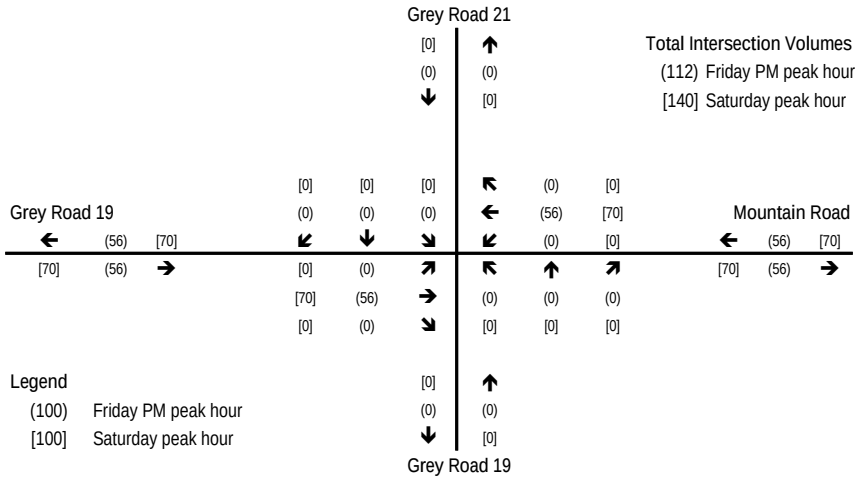
Second Nature



BMR Orchards

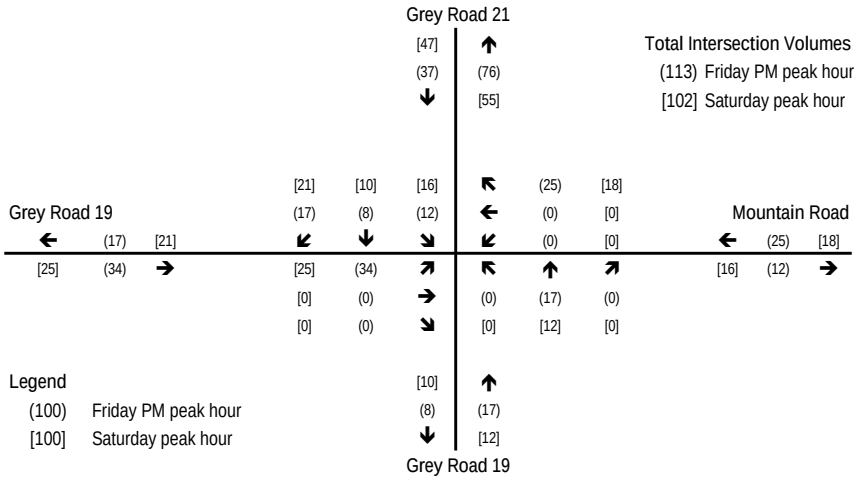


Intrawest Residential

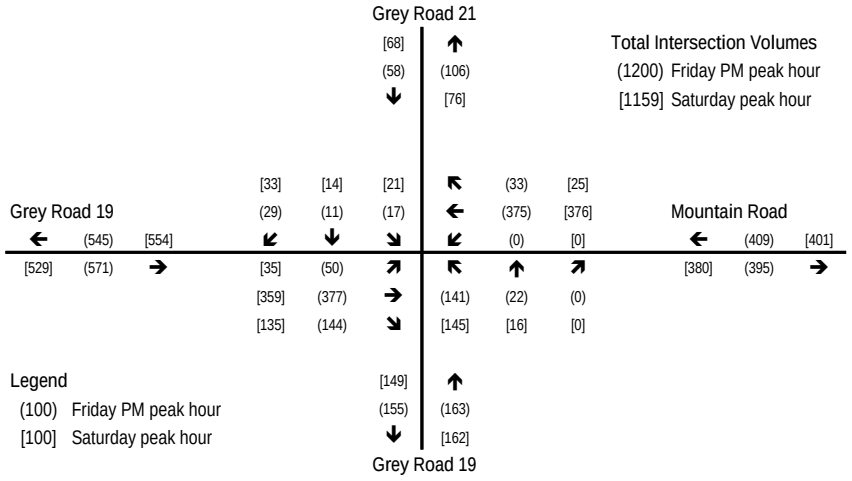


Intrawest Commercial

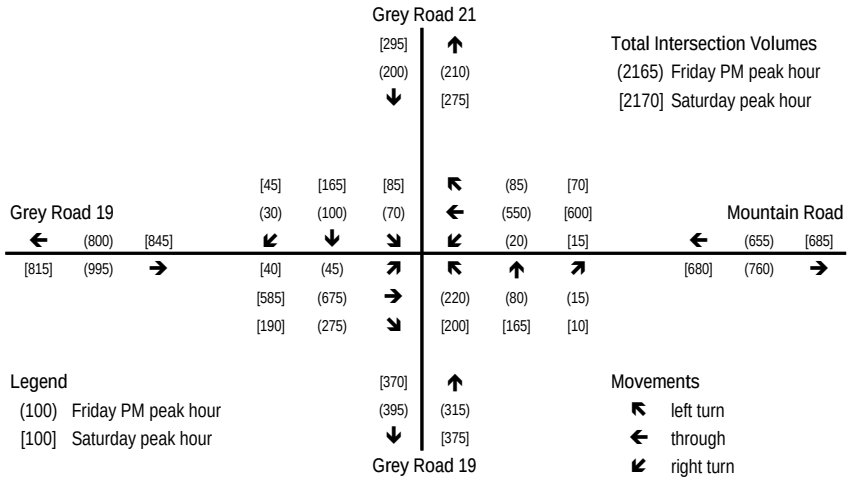
Remaining Windfall Phases 1 to 6



Mountain House (Windfall Medium Density)

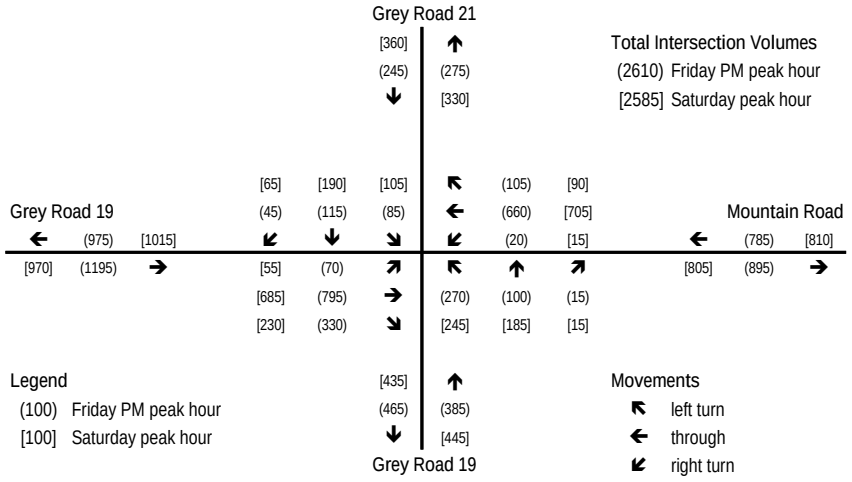


Total Development Traffic



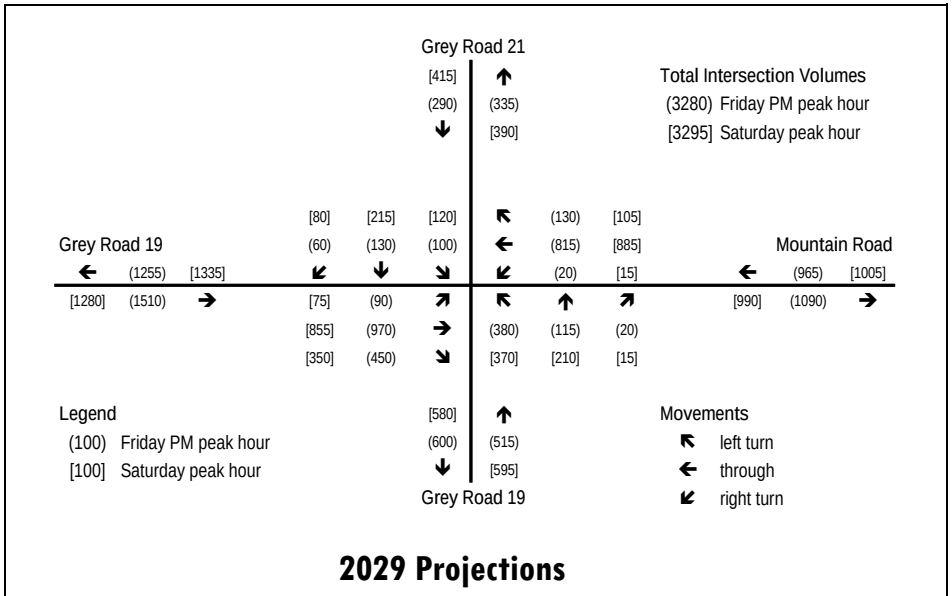
2019 Projections

2019	Total Traffic includes	
2017	traffic count	
2%	annual growth	1.04 factor
33%	Second Nature	
93%	Intrawest Residential	
92%	Intrawest Commercial	
0%	BMR Orchards	
26%	Remaining Windfall Phases 1 to 6	
25%	Mountain House (Windfall Medium Density)	
0%	Monterra Phase 2	
5	roundup to	



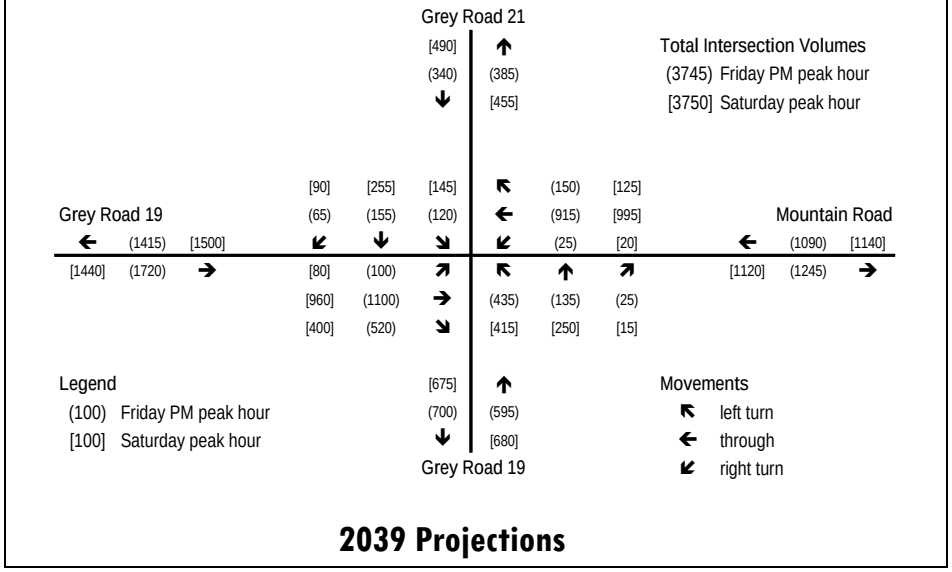
2024 Projections

2024	Total Traffic includes	
2017	traffic count	
2%	annual growth	1.15 factor
100%	Second Nature	
100%	Intrawest Residential	
100%	Intrawest Commercial	
0%	BMR Orchards	
67%	Remaining Windfall Phases 1 to 6	
50%	Mountain House (Windfall Medium Density)	
100%	Monterra Phase 2	
5	roundup to	



2029 Projections

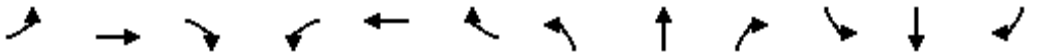
2029	Total Traffic includes	
2017	traffic count	
2%	annual growth	1.27 factor
100%	Second Nature	
100%	Intrawest Residential	
100%	Intrawest Commercial	
100%	BMR Orchards	
100%	Remaining Windfall Phases 1 to 6	
100%	Mountain House (Windfall Medium Density)	
100%	Monterra Phase 2	
5	roundup to	



2039 Projections

2039	Total Traffic includes	
2017	traffic count	
2%	annual growth	1.55 factor
100%	Second Nature	
100%	Intrawest Residential	
100%	Intrawest Commercial	
100%	BMR Orchards	
100%	Remaining Windfall Phases 1 to 6	
100%	Mountain House (Windfall Medium Density)	
100%	Monterra Phase 2	
5	roundup to	

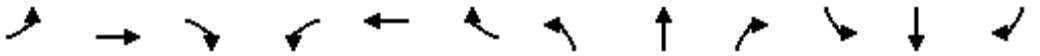
Appendix N:
Additional Future Traffic Operations



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	480	248	15	353	81	192	77	13	69	95	24
Future Volume (vph)	34	480	248	15	353	81	192	77	13	69	95	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.98		1.00	0.98		1.00	0.97	
Flt Protected		1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1857	1583		1814		1770	1822		1770	1807	
Flt Permitted		0.95	1.00		0.97		0.68	1.00		0.70	1.00	
Satd. Flow (perm)		1764	1583		1770		1261	1822		1295	1807	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	36	505	261	16	372	85	202	81	14	73	100	25
RTOR Reduction (vph)	0	0	155	0	16	0	0	9	0	0	14	0
Lane Group Flow (vph)	0	541	106	0	457	0	202	86	0	73	111	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		20.0	20.0		20.0		17.3	17.3		17.3	17.3	
Effective Green, g (s)		20.0	20.0		20.0		17.3	17.3		17.3	17.3	
Actuated g/C Ratio		0.41	0.41		0.41		0.35	0.35		0.35	0.35	
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		715	642		718		442	639		454	634	
v/s Ratio Prot								0.05			0.06	
v/s Ratio Perm		c0.31	0.07		0.26		c0.16			0.06		
v/c Ratio		0.76	0.16		0.64		0.46	0.13		0.16	0.18	
Uniform Delay, d1		12.6	9.3		11.7		12.4	10.9		11.0	11.1	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.6	0.1		1.9		3.4	0.4		0.8	0.6	
Delay (s)		17.1	9.5		13.6		15.7	11.3		11.8	11.7	
Level of Service		B	A		B		B	B		B	B	
Approach Delay (s)		14.6			13.6			14.3			11.7	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	49.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

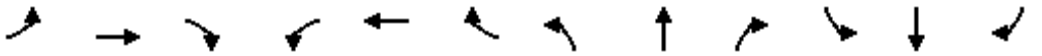
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	396	172	10	407	68	177	157	9	83	160	39
Future Volume (vph)	31	396	172	10	407	68	177	157	9	83	160	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.98		1.00	0.99		1.00	0.97	
Flt Protected		1.00	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1856	1583		1825		1770	1848		1770	1808	
Flt Permitted		0.94	1.00		0.99		0.63	1.00		0.65	1.00	
Satd. Flow (perm)		1760	1583		1802		1168	1848		1206	1808	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	33	417	181	11	428	72	186	165	9	87	168	41
RTOR Reduction (vph)	0	0	113	0	13	0	0	3	0	0	13	0
Lane Group Flow (vph)	0	450	68	0	498	0	186	171	0	87	196	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		18.0	18.0		18.0		18.2	18.2		18.2	18.2	
Effective Green, g (s)		18.0	18.0		18.0		18.2	18.2		18.2	18.2	
Actuated g/C Ratio		0.37	0.37		0.37		0.38	0.38		0.38	0.38	
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		657	591		672		441	697		455	682	
v/s Ratio Prot								0.09			0.11	
v/s Ratio Perm		0.26	0.04		c0.28		c0.16			0.07		
v/c Ratio		0.68	0.11		0.74		0.42	0.25		0.19	0.29	
Uniform Delay, d1		12.7	9.9		13.1		11.1	10.3		10.1	10.5	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		3.0	0.1		4.4		2.9	0.8		0.9	1.1	
Delay (s)		15.7	10.0		17.5		14.0	11.1		11.0	11.5	
Level of Service		B	A		B		B	B		B	B	
Approach Delay (s)		14.0			17.5			12.6			11.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	48.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

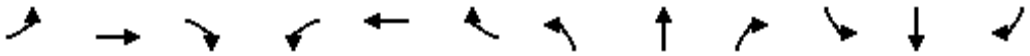
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	970	450	20	815	130	380	115	20	100	130	60
Future Volume (vph)	90	970	450	20	815	130	380	115	20	100	130	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3466		1770	1821		1770	1775	
Flt Permitted	0.19	1.00	1.00	0.19	1.00		0.56	1.00		0.67	1.00	
Satd. Flow (perm)	347	3539	1583	347	3466		1047	1821		1241	1775	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	1021	474	21	858	137	400	121	21	105	137	63
RTOR Reduction (vph)	0	0	303	0	22	0	0	10	0	0	28	0
Lane Group Flow (vph)	95	1021	171	21	973	0	400	132	0	105	172	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	21.5	21.5	21.5	21.5	21.5		26.0	26.0		16.0	16.0	
Effective Green, g (s)	21.5	21.5	21.5	21.5	21.5		26.0	26.0		16.0	16.0	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36		0.44	0.44		0.27	0.27	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	125	1278	572	125	1252		554	795		333	477	
v/s Ratio Prot		c0.29			0.28		c0.10	0.07			0.10	
v/s Ratio Perm	0.27		0.11	0.06			0.22			0.08		
v/c Ratio	0.76	0.80	0.30	0.17	0.78		0.72	0.17		0.32	0.36	
Uniform Delay, d1	16.7	17.1	13.6	12.9	16.9		12.6	10.2		17.4	17.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	23.4	3.6	0.3	0.6	3.1		4.6	0.4		2.5	2.1	
Delay (s)	40.1	20.6	13.9	13.6	20.0		17.2	10.6		19.8	19.7	
Level of Service	D	C	B	B	B		B	B		B	B	
Approach Delay (s)		19.8			19.8			15.5			19.8	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	59.5	Sum of lost time (s)	14.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

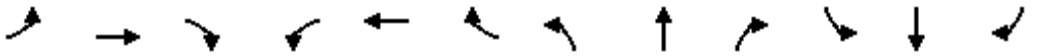
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	855	350	15	885	105	370	210	15	120	215	80
Future Volume (vph)	75	855	350	15	885	105	370	210	15	120	215	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3483		1770	1844		1770	1787	
Flt Permitted	0.20	1.00	1.00	0.20	1.00		0.43	1.00		0.61	1.00	
Satd. Flow (perm)	363	3539	1583	363	3483		794	1844		1139	1787	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	900	368	16	932	111	389	221	16	126	226	84
RTOR Reduction (vph)	0	0	241	0	15	0	0	4	0	0	22	0
Lane Group Flow (vph)	79	900	127	16	1028	0	389	233	0	126	288	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	20.5	20.5	20.5	20.5	20.5		27.0	27.0		17.0	17.0	
Effective Green, g (s)	20.5	20.5	20.5	20.5	20.5		27.0	27.0		17.0	17.0	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34		0.45	0.45		0.29	0.29	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	125	1219	545	125	1200		491	836		325	510	
v/s Ratio Prot		0.25			c0.30		c0.11	0.13			c0.16	
v/s Ratio Perm	0.22		0.08	0.04			0.25			0.11		
v/c Ratio	0.63	0.74	0.23	0.13	0.86		0.79	0.28		0.39	0.56	
Uniform Delay, d1	16.3	17.1	13.9	13.4	18.1		12.3	10.2		17.1	18.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.0	2.4	0.2	0.5	6.2		8.5	0.8		3.5	4.5	
Delay (s)	26.3	19.5	14.1	13.8	24.3		20.8	11.0		20.5	22.6	
Level of Service	C	B	B	B	C		C	B		C	C	
Approach Delay (s)		18.4			24.2			17.1			22.0	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	59.5	Sum of lost time (s)	14.0
Intersection Capacity Utilization	87.0%	ICU Level of Service	E
Analysis Period (min)	15		

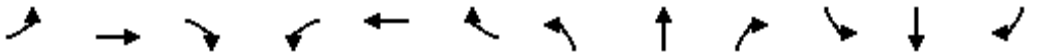
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	1100	520	25	915	150	435	135	25	120	155	65
Future Volume (vph)	100	1100	520	25	915	150	435	135	25	120	155	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3464		1770	1820		1770	1780	
Flt Permitted	0.15	1.00	1.00	0.15	1.00		0.50	1.00		0.65	1.00	
Satd. Flow (perm)	276	3539	1583	276	3464		940	1820		1212	1780	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1158	547	26	963	158	458	142	26	126	163	68
RTOR Reduction (vph)	0	0	320	0	20	0	0	10	0	0	23	0
Lane Group Flow (vph)	105	1158	227	26	1101	0	458	158	0	126	208	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	27.0	27.0	27.0	27.0	27.0		26.0	26.0		16.0	16.0	
Effective Green, g (s)	27.0	27.0	27.0	27.0	27.0		26.0	26.0		16.0	16.0	
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.42		0.40	0.40		0.25	0.25	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	114	1470	657	114	1438		478	728		298	438	
v/s Ratio Prot		0.33			0.32		c0.12	0.09			0.12	
v/s Ratio Perm	c0.38		0.14	0.09			0.27			0.10		
v/c Ratio	0.92	0.79	0.35	0.23	0.77		0.96	0.22		0.42	0.47	
Uniform Delay, d1	18.0	16.5	13.0	12.3	16.3		17.9	12.8		20.6	20.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	59.8	2.9	0.3	1.0	2.5		30.4	0.7		4.4	3.6	
Delay (s)	77.8	19.4	13.3	13.3	18.8		48.2	13.5		25.0	24.6	
Level of Service	E	B	B	B	B		D	B		C	C	
Approach Delay (s)		20.9			18.6			38.9			24.7	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	960	400	20	995	125	415	250	15	145	255	90
Future Volume (vph)	80	960	400	20	995	125	415	250	15	145	255	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		2.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3480		1770	1847		1770	1790	
Flt Permitted	0.16	1.00	1.00	0.16	1.00		0.29	1.00		0.59	1.00	
Satd. Flow (perm)	303	3539	1583	303	3480		534	1847		1096	1790	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	1011	421	21	1047	132	437	263	16	153	268	95
RTOR Reduction (vph)	0	0	263	0	15	0	0	3	0	0	20	0
Lane Group Flow (vph)	84	1011	158	21	1164	0	437	276	0	153	343	0
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	24.6	24.6	24.6	24.6	24.6		29.0	29.0		16.0	16.0	
Effective Green, g (s)	24.6	24.6	24.6	24.6	24.6		29.0	29.0		16.0	16.0	
Actuated g/C Ratio	0.38	0.38	0.38	0.38	0.38		0.44	0.44		0.24	0.24	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		2.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	113	1327	593	113	1305		443	816		267	436	
v/s Ratio Prot		0.29			c0.33		c0.17	0.15			c0.19	
v/s Ratio Perm	0.28		0.10	0.07			0.27			0.14		
v/c Ratio	0.74	0.76	0.27	0.19	0.89		0.99	0.34		0.57	0.79	
Uniform Delay, d1	17.8	17.9	14.2	13.8	19.3		15.3	12.0		21.8	23.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	22.9	2.6	0.2	0.8	8.0		38.8	1.1		8.7	13.4	
Delay (s)	40.7	20.6	14.5	14.6	27.3		54.1	13.1		30.5	36.6	
Level of Service	D	C	B	B	C		D	B		C	D	
Approach Delay (s)		20.0			27.1			38.1			34.8	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	65.6	Sum of lost time (s)	14.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement Summary

GR 19/21 - 2029 FRI TOTAL

Roundabout

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	Cap (veh/h)	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Eff. Stop Rate	Aver Speed (km/h)	Oper Cost ($/h)
Grey Road 19/Osler Bluff										
32	L	400	977	0.556	11.6	LOS B	34	1.91	27.9	88
32	T	121	977	0.556	11.6	LOS B	34	1.91	27.9	88
32	R	21	977	0.556	11.6	LOS B	34	1.91	27.9	88
Approach		**543**	**1218**	**0.556**	**11.6**	**LOS B**	**34**	**1.91**	**27.9**	**88**
Mountain Road										
22	L	21	1850	0.550	4.5	LOS A	35	1.33	36.6	236
22	T	858	1850	0.550	4.5	LOS A	35	1.33	36.6	236
22	R	137	1850	0.550	4.5	LOS A	35	1.33	36.6	236
Approach		**1017**	**1850**	**0.550**	**4.5**	**LOS A**	**35**	**1.33**	**36.6**	**236**
Grey Road 21										
42	L	105	988	0.309	8.2	LOS A	14	1.55	36.0	107
42	T	137	988	0.309	8.2	LOS A	14	1.55	36.0	107
42	R	63	988	0.309	8.2	LOS A	14	1.55	36.0	107
Approach		**305**	**1126**	**0.309**	**8.2**	**LOS A**	**14**	**1.55**	**36.0**	**107**
Grey Road 19										
12	L	95	2727	0.583	1.6	LOS A	35	0.44	31.2	100
12	T	1021	2727	0.583	1.6	LOS A	35	0.44	31.2	100
12	R	474	2727	0.583	1.6	LOS A	35	0.44	31.2	100
Approach		**1589**	**2727**	**0.583**	**1.6**	**LOS A**	**35**	**0.44**	**31.2**	**100**
All Vehicles		**3454**	**6920**	**0.583**	**4.6**	**LOS A**	**35**	**1.03**	**34.0**	**530**

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Movement Summary

GR 19/21 - 2029 SAT TOTAL

Roundabout

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	Cap (veh/h)	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Eff. Stop Rate	Aver Speed (km/h)	Oper Cost ($/h)
Grey Road 19/Osler Bluff										
32	L	389	1211	0.518	9.9	LOS A	29	1.80	29.0	95
32	T	221	1211	0.518	9.9	LOS A	29	1.80	29.0	95
32	R	16	1211	0.518	9.9	LOS A	29	1.80	29.0	95
Approach		**627**	**1330**	**0.518**	**9.9**	**LOS A**	**29**	**1.80**	**29.0**	**95**
Mountain Road										
22	L	16	1757	0.602	5.3	LOS A	39	1.51	36.2	249
22	T	932	1757	0.602	5.3	LOS A	39	1.51	36.2	249
22	R	111	1757	0.602	5.3	LOS A	39	1.51	36.2	249
Approach		**1058**	**1757**	**0.602**	**5.3**	**LOS A**	**39**	**1.51**	**36.2**	**249**
Grey Road 21										
42	L	126	876	0.501	10.2	LOS B	28	1.82	35.2	157
42	T	226	876	0.501	10.2	LOS B	28	1.82	35.2	157
42	R	84	876	0.501	10.2	LOS B	28	1.82	35.2	157
Approach		**439**	**1063**	**0.501**	**10.2**	**LOS B**	**28**	**1.82**	**35.2**	**157**
Grey Road 19										
12	L	79	2323	0.580	2.5	LOS A	36	0.74	30.2	87
12	T	900	2323	0.580	2.5	LOS A	36	0.74	30.2	87
12	R	368	2323	0.580	2.5	LOS A	36	0.74	30.2	87
Approach		**1347**	**2323**	**0.580**	**2.5**	**LOS A**	**36**	**0.74**	**30.2**	**87**
All Vehicles		**3471**	**6473**	**0.602**	**5.7**	**LOS A**	**39**	**1.30**	**33.8**	**588**

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Movement Summary

GR 19/21 - 2039 FRI TOTAL

Roundabout

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	Cap (veh/h)	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Eff. Stop Rate	Aver Speed (km/h)	Oper Cost ($/h)
Grey Road 19/Osler Bluff										
32	L	458	824	0.761	19.4	LOS B	63	2.50	23.2	122
32	T	142	824	0.761	19.4	LOS B	63	2.50	23.2	122
32	R	26	824	0.761	19.4	LOS B	63	2.50	23.2	122
Approach		**627**	**1019**	**0.761**	**19.4**	**LOS B**	**63**	**2.50**	**23.2**	**122**
Mountain Road										
22	L	26	1690	0.679	7.3	LOS A	53	1.76	34.9	283
22	T	963	1690	0.679	7.3	LOS A	53	1.76	34.9	283
22	R	158	1690	0.679	7.3	LOS A	53	1.76	34.9	283
Approach		**1148**	**1690**	**0.679**	**7.3**	**LOS A**	**53**	**1.76**	**34.9**	**283**
Grey Road 21										
42	L	126	846	0.423	11.4	LOS B	21	1.80	34.7	130
42	T	163	846	0.423	11.4	LOS B	21	1.80	34.7	130
42	R	68	846	0.423	11.4	LOS B	21	1.80	34.7	130
Approach		**358**	**942**	**0.423**	**11.4**	**LOS B**	**21**	**1.80**	**34.7**	**130**
Grey Road 19										
12	L	105	2579	0.702	2.9	LOS A	55	0.89	29.8	117
12	T	1158	2579	0.702	2.9	LOS A	55	0.89	29.8	117
12	R	547	2579	0.702	2.9	LOS A	55	0.89	29.8	117
Approach		**1810**	**2579**	**0.702**	**2.9**	**LOS A**	**55**	**0.89**	**29.8**	**117**
All Vehicles		**3943**	**6230**	**0.761**	**7.6**	**LOS A**	**63**	**1.48**	**31.7**	**651**

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Movement Summary

GR 19/21 - 2039 SAT TOTAL

Roundabout

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	Cap (veh/h)	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Eff. Stop Rate	Aver Speed (km/h)	Oper Cost ($/h)
Grey Road 19/Osler Bluff										
32	L	437	1074	0.667	14.4	LOS B	46	2.19	25.7	122
32	T	263	1074	0.667	14.4	LOS B	46	2.19	25.7	122
32	R	16	1074	0.667	14.4	LOS B	46	2.19	25.7	122
Approach		**716**	**1153**	**0.667**	**14.4**	**LOS B**	**46**	**2.19**	**25.7**	**122**
Mountain Road										
22	L	21	1609	0.746	8.9	LOS A	62	2.00	34.0	304
22	T	1047	1609	0.746	8.9	LOS A	62	2.00	34.0	304
22	R	132	1609	0.746	8.9	LOS A	62	2.00	34.0	304
Approach		**1201**	**1609**	**0.746**	**8.9**	**LOS A**	**62**	**2.00**	**34.0**	**304**
Grey Road 21										
42	L	153	742	0.695	18.1	LOS B	49	2.38	32.1	201
42	T	268	742	0.695	18.1	LOS B	49	2.38	32.1	201
42	R	95	742	0.695	18.1	LOS B	49	2.38	32.1	201
Approach		**516**	**889**	**0.695**	**18.1**	**LOS B**	**49**	**2.38**	**32.1**	**201**
Grey Road 19										
12	L	84	2163	0.701	4.5	LOS A	55	1.33	28.6	103
12	T	1011	2163	0.701	4.5	LOS A	55	1.33	28.6	103
12	R	421	2163	0.701	4.5	LOS A	55	1.33	28.6	103
Approach		**1516**	**2163**	**0.701**	**4.5**	**LOS A**	**55**	**1.33**	**28.6**	**103**
All Vehicles		**3949**	**5815**	**0.746**	**9.4**	**LOS A**	**62**	**1.82**	**31.3**	**730**

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Appendix O:
Study Completion

Grey County
595 9th Avenue E, Owen Sound, ON N4K 3E3
(519) 376-2205 www.grey.ca

County o Simcoe
1110 Highway 26, Midhurst, ON L0L 1X0
(705) 726-9300 www.simcoe.ca

Notice of Study Completion

Grey Road 19 & Grey Road 21 Intersection Improvements

Municipal Class Environmental Assessment Study

Background

Grey County, in partnership with the County of Simcoe, has undertaken a Municipal Class Environmental Assessment (Class EA) Study to assess options for improvements to the intersection of Grey Road 19 (Simcoe Road 34) with Grey Road 21 and Mountain Road. As the intersection is located on the boundary of Grey and Simcoe Counties, a joint project has been undertaken. The Town of Collingwood, who has jurisdiction over Mountain Road, has also participated in the study. The intersection improvements are required to improve public safety and traffic operations in consideration of increasing travel demands through the area (resulting from an increasing popularity of the area compounded with anticipated development growth).

Study Process

The Study was carried out in accordance with the planning and design process for a 'Schedule B' Class EA as outlined in the Municipal Engineers Association *Municipal Class Environmental Assessment* document (October 2000, amended 2007, 2011 & 2015). The Class EA process included defining the problem, developing alternative solutions to solve the problem, assessing potential impacts associated with the proposed solutions and identifying the preferred solution.

The Preferred Solution

Based on the assessment in relation to the physical, natural, cultural, social and economic environments, and in consideration of all stakeholder comments received, the preferred solution is as follows: construct a 2-lane roundabout with a 60 metre outside diameter, with each approach and departure leg having 2 lanes (flared at the roundabout). With respect to the location, the roundabout is to be located to the west and/or north of the intersection so as to avoid impacts to the Mountainside Sports commercial property. A roundabout has been selected as it provides improved traffic operations, improved motorist safety, an opportunity for a gateway feature to the area and is in keeping with other existing and/or planned roundabouts along the Grey Road 19 corridor.

Purpose of Notice

The purpose of this notice is to inform the public that the Phase 1 & 2 Report is on display for review at the locations noted below, for the period **January 28, 2019 to March 1, 2019.** The report is also posted on the respective websites. Interested persons are encouraged to review the report and provide written comments to Grey County and/or County of Simcoe (contacts noted below) within the review period.

Grey County
Administration Centre
595 9th Avenue East
Owen Sound, ON N4K 3E3
1 (800) 567-GREY
www.grey.ca

Pat Hoy, P.Eng.
Director of Transportation
pat.hoy@grey.ca

County o Simcoe
Administration Centre
1110 Highway 26
Midhurst, ON L9X 1N6
1 (866) 896-9300
www.simcoe.ca

Paul Murphy, B.Sc., C.Tech
Engineering Technician II
paul.murphy@simcoe.ca

Town o Collingwood
Town Hall
97 Hurontario Street
Collingwood, ON L9Y 3Z5
(705) 445-1030
www.collingwood.ca

Part II Order Request

If concerns arise regarding this project, which cannot be resolved in discussion with the Counties, you may request that the Minister of the Environment, Conservation & Parks make an order for the project to comply with Part II of the Environmental Assessment Act (a Part II Order), which addresses individual environmental assessments. Requests are to be submitted to the Minister, and copied to both Grey County and the County of Simcoe, before the end of the review period. If there is no request received by **March 1, 2019,** the project may proceed based on the identified preferred solution.

The Honourable Rod Phillips
Minister of the Environment, Conservation & Parks
minister.mecp@ontario.ca

77 Wellesley Street West
11th Floor, Ferguson Block
Toronto, ON M7A 2T5

This notice issued January 23, 2019