

**APPENDIX A:**  
**PROJECT NOTICES AND CIRCULATION**

CIRCULATION LIST: AGENCIES  
BRIDGE No. 0011 (PAISLEY): SCHEDULE B EA

AGENCY		CONTACT INFORMATION	ADDRESS	INFORMATION SENT												COMMENTS/RESPONSE RECEIVED (DESCRIPTION)	
				DATE SENT or RECEIVED	VIA			DOCUMENT							DESCRIPTION		
					E-mail	Mail	Phone	Notice (Initiation)	Project File (May 2018)	Notice (Update)	Project File (Jan 2019)	Notice of Completion	Other				
MUNICIPAL AGENCIES																	
County of Bruce	Contact	Tessa Fortier	County of Bruce	17-May-18	S				X	X							
		Planning and Development	Planning and Development	8-Jan-19	S						X	X					
	Telephone	(226) 909-1601 (Ext. 2)	1243 McKenzie Road														
	E-mail	<a href="mailto:tfortier@brucecounty.on.ca">tfortier@brucecounty.on.ca</a>	Port Elgin, ON N0H 2C6														
	Contact																
County of Bruce	Contact	Kerri Meier	County of Bruce	17-May-18	S				X	X							
		Environmental Coordinator	Walkerton Administration Centre	11-Jun-18	S									X			Request fo comment regarding poor visibility on Bruce Road 1
	Telephone	(519) 881-2400 (Ext. 307)	30 Park St., P.O. Box 398	18-Jun-18	R									X			Response
	E-mail	<a href="mailto:kmeier@brucecounty.on.ca">kmeier@brucecounty.on.ca</a>	Walkerton, ON N0G 2V0	8-Jan-19	S						X	X					
	Contact																
County of Bruce	Contact	Miguel Pelletier	County of Bruce	26-Sep-18		S								X			Re. Bridge 11- County Roads 3 and 1: Proposed exchange of jurisdiction
		Director of Transportation	Walkerton Administration Centre														
	Telephone	(519) 881-2400 (Ext. 307)	30 Park St., P.O. Box 398	21-Nov-18	R									X			Response
	E-mail	<a href="mailto:mpelletier@brucecounty.on.ca">mpelletier@brucecounty.on.ca</a>	Walkerton, ON N0G 2V0	8-Jan-19	S						X	X					
	Contact																
Municipality of Arran Elderslie	Contact	Scott McLeod	Municipaility of Arran-Elderslie	8-Jan-19	S						X	X					
		Public Works Manager	P.O. Box 70														
	Telephone	(519) 363-3039 (Ext. 115)	1925 Bruce Road #10														
	Fax	(519) 363-9337	Chesley, ON N0G 1L0														
	E-mail	<a href="mailto:works@arran-elderslie.ca">works@arran-elderslie.ca</a>															
Municipality of Brockton	Contact	John Strader	Municipaility of Brockton	17-May-18	S				X	X							
		Roads Superintendent	100 Scott Street, Box 68	8-Jan-19	S						X	X					
	Telephone	(519) 881-2223 (Ext. 125)	Walkerton, ON N0G 2V0														
	Fax	(519) 881-2991															
	E-mail	<a href="mailto:jstrader@brockton.ca">jstrader@brockton.ca</a>															
Saugeen Valley Conservation Authority (SVCA)	Contact	Alyssa Gowing and Shaun Anthony	Saugeen Conservation	17-May-18	S				X	X							
		Manager, Env. Planning and Regulations	1078 Bruce Road 12	8-Jan-19	S						X	X					Gary Senior retired in August 2018. Shaun Anthony took his position.
	Telephone	(519) 367-3040 (Ext. 224/239)	P.O. Box 150														M. Gallant no longer at SVCA. Replacement is A. Gowing.
	Fax	(519) 367-3041	Formosa, ON N0G 1W0														
	E-mail	<a href="mailto:a.gowing@svca.on.ca">a.gowing@svca.on.ca</a>															
Grey-Bruce Health Unit	Contact	Bev Middleton	Grey Bruce Health Unit	17-May-18	S				X	X							
		Public Health Inspector	101-17th Street East, 3rd Floor	8-Jan-19	S						X	X					
	Telephone	(519)376-9420	Owen Sound, ON N4K 0A5														
	Fax	(519)376-5043															
	E-mail	<a href="mailto:publichealth@publichealthgreybruce.on.ca">publichealth@publichealthgreybruce.on.ca</a>															

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BRIDGE No. 0011 (PAISLEY): SCHEDULE B EA

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PROVINCIAL AGENCIES																	
Ministry of the Environment, Conservation and Parks Owen Sound Area Office	Contact	Ian Mitchell, P.Eng.	MECP	17-May-18	S				X	X							Services Grey, Bruce and Huron County
		District Engineer	Owen Sound Area Office	8-Jan-19	S						X	X					
	Telephone	(519) 371-6191	101 17th Street East, 3rd Floor														
	Fax	(519) 371-2905	Owen Sound, ON N4K0A5														
	E-mail	<a href="mailto:ian.mitchell@ontario.ca">ian.mitchell@ontario.ca</a>															
Ministry of the Environment, Conservation and Parks Southwestern Region	Contact	Anneleis Eckert	MECP	17-May-18	S				X	X							Acknowledgement of Receipt of Notice of Commencement Project specific contact is Anneleis Eckert and First Nations consultation requirements.
		Regional Environmental Planner	Regional EA Coordinator	28-May-18		R								X			
	Telephone	(519) 873-5115	733 Exeter Road	8-Jan-19	S					X	X						
	Fax	(519) 873-5020	London, ON N6E 1L3														
	E-mail	<a href="mailto:eanotification.swregion@ontario.ca">eanotification.swregion@ontario.ca</a>															
	E-mail	<a href="mailto:anneleis.eckert@ontario.ca">anneleis.eckert@ontario.ca</a>															
Ministry of the Environment, Conservation and Parks Environmental Assessment and Approvals Branch	Contact	Director	MECP	17-May-18	S				X	X							
	Telephone	(416) 314-7288	Environmental Approvals Branch														
	Fax	(416) 314-8452	135 St, Clair Ave W, 1st Floor														
	E-mail	<a href="mailto:EAASIBgen@ontario.ca">EAASIBgen@ontario.ca</a>	Toronto, ON M4V 1P5														
Ministry of Natural Resources and Forestry	Contact	Ken Mott, District Planner	Ministry on Natural Resources and Forestry	8-Jan-19	S					X	X						Services Grey and Bruce County
	Telephone	(705) 725-7546	Midhurst District	18-Jan-19	R									X			Craig Todd was intially notified. Requested that contact be changed to Ken Mott in January 18, 2019 email.
		(705) 725-7584	2284 Nursery Road	22-Jan-19	R										X		Some SAR identified, GMBP response providing SAR existing list.
	E-mail	<a href="mailto:ken.mott@ontario.ca">ken.mott@ontario.ca</a>	Midhurst, ON L9X 1N8	23-Jan-19	S										X		MNRF confirmed that no additional SAR information was available.
Ministry of Transportation	Contact	Steve Hood	1450 7th Avenue East	8-Jan-19	S						X	X					
		Technical Services Supervisor	Owen Sound, ON N4K 2Z1														
	Telephone	(519) 372-4036															
	E-mail	<a href="mailto:steve.hood@ontario.ca">steve.hood@ontario.ca</a>															
Ministry of Agriculture, Food and Rural Affairs Regional Economic Development Branch (Grey/Bruce)	Contact	Cheryl Brine	1450 7th Ave E	8-Jan-19	S					X	X						
		Agriculture and Rural Development Advisor	Owen Sound, ON N4K 2Z1														
	Telephone	(519) 371-4717															
	E-mail	<a href="mailto:cheryl.brine@ontario.ca">cheryl.brine@ontario.ca</a>															
Ministry of Tourism, Culture and Sport Culture Division  Heritage Program Unit	Contact	Karla Barboza, Team Lead - Heritage (Acting)	MTCS														Response to request for project status update.  Request for telephone meeting Discuss need for comments from Municipal Heritage Committee Brockton Municipal Heritage Committee comments provided to MTCS Call to discuss outstanding issues/comments Summary of MTCS Comments Addendum/HIA sent to MTCS for review Confirmation from MTCS that comments were adequately addressed
	Telephone	(416) 314-7120	401 Bay Street	17-Dec-18	S									X			
	Fax		Toronto, ON M7A 0A7	8-Jan-19	S					X	X						
	E-mail	<a href="mailto:karla.barboza@ontario.ca">karla.barboza@ontario.ca</a>		13-Feb-19	R									X			
	Contact	Katherine Kirzati		14-Feb-19			R							X			
	E-mail	<a href="mailto:katherine.kirzati@ontario.ca">katherine.kirzati@ontario.ca</a>		8-Apr-19	S									X			
				12-Apr-19			R							X			
				15-Apr-19	R									X			
				1-May-19	S									X			
				8-May-19	R									X			

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FEDERAL AGENCIES																	
Environment and Climate Change Canada	Contact	Environmental Assessment Coordinator	Environment and Climate Change Canada	17-May-18	S			X	X								
	Telephone	(416) 739-4734	Ontario Region	8-Jan-19	S					X	X						
	Fax	(416) 739-4776	4905 Dufferin Street														
	E-mail	<a href="mailto:ec.ecoactionon.ec@canada.ca">ec.ecoactionon.ec@canada.ca</a>	Toronto, Ontario M3H 5T4														
Indigenous and Northern Affairs Canada	Contact	Environmental Assessment Coordinator	Indigenous and Northern Affairs	17-May-18	S			X	X								
	Telephone	(416)973-4004	Ontario Region	8-Jan-19	S					X	X						
	Fax	(416) 954-6201	25 St Clair Ave East, 8th Floor														
	E-mail	<a href="mailto:InfoPubs@aadnc-aandc.gc.ca">InfoPubs@aadnc-aandc.gc.ca</a>	Toronto, Ontario M4T 1M2														
FIRST NATIONS AND METIS - Consultations (Mail) Completed by Municipality of Brockton																	
Historic Saugeen Metis	Contact	Archie Indoe (President)	204 High Street	17-May-18	S	S		X	X								
		George Govier (Consultation Coordinator)	Box 1492	18-May-18	R								X				
	Telephone	(519) 483-4000	Southampton, ON N0H 2L0	8-Jan-19	S	S				X	X						Acknowledgement of Receipt. No objection or opposition to the proposed bridge works.
	Contact	Chris Hachey															
	E-mail	<a href="mailto:saugeenmetisadmin@bmts.com">saugeenmetisadmin@bmts.com</a>															
Saugeen First Nation	Contact	Lester Anoquot (Chief)	Saugeen First Nation	17-May-18	S	S		X	X								
		Cheree Urscheler (Band Administrator)	Saugeen Band Office	8-Jan-19	S	S				X	X						
	Telephone	(800) 680-0744	6493 Highway 21, R.R.#1														
	Fax	(519) 797-2978	Southampton, ON N0H 2L0														
	E-mail (updated)	<a href="mailto:lester.anoguot@saugeen.org">lester.anoguot@saugeen.org</a>															
Metis Nation of Ontario (MNO) Great Lakes Metis Council Owen Sound Office	Contact	James Wagar	Metis Nation of Ontario	17-May-18	S	S		X	X								
		Consultation Assessment Coordinator	Owen Sound Office	8-Jan-19	S	S				X	X						
	Telephone	(519) 370-0435	380-9th Street East														
	E-mail	<a href="mailto:jamesw@metisnation.org">jamesw@metisnation.org</a>	Owen Sound, ON N4K 1P1														
	E-mail	<a href="mailto:joannem@metisnation.ca">joannem@metisnation.ca</a>															
	E-mail	<a href="mailto:consultations@metisnation.org">consultations@metisnation.org</a>															
Saugeen Ojibway Nation Environmental Office	Contact	Doran Ritchie	Saugeen Ojibway Nation	17-May-18	S	S		X	X								
		Infrastructure Planning Coordinator	Environment Office	8-Jan-19	S	S				X	X						
	Telephone	(519) 534-5507 (ext. 226)	25 Maadookii Road														
	Fax	(519) 534-5525	Neyaashiinigmiing, Ont.														
	E-mail	<a href="mailto:d.ritchie@saugeenojibwaynation.ca">d.ritchie@saugeenojibwaynation.ca</a>	N0H 2T0														
Chippewas of Nawash Unceded First Nation	Contact	Chief Gregory Nadjiwon	Chippewas of Nawash Unceded FN	17-May-18	S	S		X	X								
	Telephone	(519) 534-1689	#135 Lakeshore Blvd.	8-Jan-19	S	S				X	X						
	Fax	(519) 534-2130	Neyaashiinigmiing, Ont.														
	E-mail	<a href="mailto:chiefsdesk@nawash.ca">chiefsdesk@nawash.ca</a>	R.R.5 Wiarton, ON N0H 2T0														
	E-mail	<a href="mailto:cnadministrator@nawash.ca">cnadministrator@nawash.ca</a>															



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UTILITIES																
Bell Access Network	Contact	Nicolas Kellar	Bell Access Network	17-May-18	S			X	X							
	Telephone	(519) 371-5450	870-4th Avenue East	8-Jan-19	S					X	X					
	Fax	(519) 376-3563	Owen Sound, ON													
	E-mail	<a href="mailto:nicholas.kellar@bell.ca">nicholas.kellar@bell.ca</a>	N4K 2N7													
Bruce Telecom (BMTS)	Contact	Head Office	BMTS - Tiverton - Head Office	17-May-18	S			X	X							
	Telephone	(519) 368-2000	3145 Highway 21	8-Jan-19	S					X	X					
	Fax		P.O. Box 80													
	E-mail	<a href="mailto:admin@brucetelecom.com">admin@brucetelecom.com</a>	Tiverton, ON N0G 2T0													
Union Gas Limited	Contact	Kevin Schimus	Union Gas	17-May-18	S			X	X							
	Telephone	(519) 377-0214	603 Krumpf Drive	17-May-18	R								X		Union Gas does not have any infrastructure in the area. Can be removed from project distrubution list.	
	Fax	(519) 376-2591	P.O. Box 340													
	E-mail	<a href="mailto:kschimus@uniongas.com">kschimus@uniongas.com</a>	Waterloo, ON N2J 4A4													
Hydro One Networks Inc.	Contact	Ken Aarup	Hydro One Networks Inc.	17-May-18	S			X	X							
	Telephone	(888) 664-9376	45 Sargeant Drive, Box 6700	8-Jan-19	S					X	X					
	Fax	(905) 944-3251	Barrie, ON													
	E-mail	<a href="mailto:Zone5PlanningDept@HydroOne.com">Zone5PlanningDept@HydroOne.com</a>	L4N 4V9													
	cc.	<a href="mailto:kenneth.aarup@hydroone.com">kenneth.aarup@hydroone.com</a>														
Rogers Cable	Contact	Tony Dominguez	Rogers Cable	17-May-18	S			X	X							
	Telephone	(705) 737-4660 ext. 6923	1 Sperling Drive	8-Jan-19	S					X	X					
	Fax	(705) 737-3840	Barrie, ON L4M 6B8													
	E-mail	<a href="mailto:Tony.Dominguez@rci.rogers.com">Tony.Dominguez@rci.rogers.com</a>														
EMERGENCY RESPONSE																
Bruce County Paramedic Services	Contact	County notification as outlined above.														
Walkerton and Elmwood Fire Departments Municipality of Brockton	Contact	Michael Murphy	Walkerton Fire Department													
	Telephone	(519) 881-0642	510 Napier Street	16-Jan-19	S					X	X					
	Fax	(519) 881-1877	P.O. Box 68													
	E-mail	<a href="mailto:mmurphy@brockton.ca">mmurphy@brockton.ca</a>	Walkerton, ON N0G 2V0													
Paisley and Area Fire Department Municipality of Arran-Elderslie	Contact	Rob Bonderud	C/O Municipality of Arran-Elderslie													
	Telephone	(519) 353-5340	P.O. Box 70	16-Jan-19	S					X	X					
	Fax	(519) 353-5597	Chesley, ON N0G 1L0													
	E-mail	<a href="mailto:paisleyfire@arran-elderslie.ca">paisleyfire@arran-elderslie.ca</a>														
Hanover Fire Department	Contact	Jeff Dentinger	Hanover Fire Department													
	Telephone	(519) 364-2780 (Ext. 1239)	341 10th Street	16-Jan-19	S					X	X					
	Fax		Hanover, ON N4N 1P5													
	E-mail	<a href="mailto:firechief@hanover.ca">firechief@hanover.ca</a>														

**CIRCULATION LIST: PROPERTIES WITHIN A 2 KILOMETER RADIUS OF BRIDGE  
BRIDGE No. 0011 (PAISLEY): SCHEDULE B EA**

NUMBER	LOCATION (ADDRESS)	ROLL NUMBER	DATE SENT or RECEIVED to/by OWNER	INFORMATION SENT								
				VIA			DOCUMENT					
				E-mail	Mail (Brockton)	Phone	Notice (Initiation)	Project File (MAY 2018)	Notice (Update)	Project File (Jan 2019)	Notice of Completion	Other
1	352 CONCESSION 20	410431000328600	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
2	CON A PT LOT 45 PT LOT 46	410431000328400	17-May-18		X		X	X				
	RP 3R6052 PART 1		8-Jan-19		X				X	X		
3	CON A PT LOT 45 PT LOT 46	410431000328420	17-May-18		X		X	X				
	RP3R6052 PART 2 & 3 ROW TO TOWNLINE		8-Jan-19		X				X	X		
4	1798 GREENOCK-ELDERSLIE	410338000100100	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
5	1826 GREENOCK-ELDERSLIE	410338000100200	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
6	1826 GREENOCK-ELDERSLIE	410338000100200	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
7	1848 GREENOCK-ELDERSLIE	410338000100300	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
8	1858 GREENOCK-ELDERSLIE	410338000100310	17-May-18		X		X	X				
			8-Jan-19		X				X	X		

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9	ELDERSLIE CON A PT LOT 4	410338000100400	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
10	ELDERSLIE CON A LOT 5 CON B PT LOT 5	410338000100500	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
11	3021 BRUCE ROAD 3	410338000100600	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
12	3064 BRUCE ROAD 3	410338000100700	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
13	3067 BRUCE ROAD 3	410338000100800	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
14	3119 BRUCE ROAD 3	410338000100900	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
15	209 CANROBERT ST	410338000101100	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
16	235 CANROBERT ST	410338000101101	17-May-18		X		X	X				
			8-Jan-19		X				X	X		

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17	CON A PT LOT 10	410338000101102	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
18	3206 BRUCE ROAD 3	410338000101200	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
19	CON B S PT LOT 2	410338000105300	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
20	CON B N PT LOT 2	410338000105400	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
21	CON B PT LOT 3	410338000105500	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
22	2939 BRUCE ROAD 3	410338000105700	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
23	89 CONCESSION 2A ELDERSLIE	410338000105800	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
24	126 CONCESSION 2A ELDERSLIE	410338000106000	17-May-18		X		X	X				
			8-Jan-19		X				X	X		

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25	154 CONCESSION 2A ELDERSLIE	410338000106001	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
26	3118 BRUCE ROAD 3	410338000106100	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
27	3098 BRUCE ROAD 3	410338000106101	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
28	3144 BRUCE ROAD 3	410338000106400	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
29	ELDERSLIE CONS A AND B PT LOT 9	410338000106500	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
30	3162 BRUCE ROAD 3	410338000106501	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
31	FORMER RWY LAND & ROW	410338000423400	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
32	19 BASELINE NORTH	410431000318900	17-May-18		X		X	X				
			8-Jan-19		X				X	X		

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33	CONCESSION 18	410431000319100	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
34	1048 CONCESSION 18	410431000319200	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
35	4220 BRUCE ROAD 1	410431000320800	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
36	CON 19 PT LOT 1	410431000320900	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
37	4182 BRUCE ROAD 1	410431000321000	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
38	4146 BRUCE RD 1	410431000321100	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
39	4166 BRUCE ROAD 1	410431000321101	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
40	4146 BRUCE ROAD 1	410431000321110	17-May-18		X		X	X				
			8-Jan-19		X				X	X		

**CIRCULATION LIST: PROPERTIES WITHIN A 2 KILOMETER RADIUS OF BRIDGE  
BRIDGE No. 0011 (PAISLEY): SCHEDULE B EA**

NUMBER	LOCATION (ADDRESS)	ROLL NUMBER	INFORMATION SENT									
			DATE SENT or RECEIVED to/by OWNER	VIA			DOCUMENT					
				E-mail	Mail (Brockton)	Phone	Notice (Initiation)	Project File (MAY 2018)	Notice (Update)	Project File (Jan 2019)	Notice of Completion	Other
41	CON 19 PT LOT 4	410431000321200	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
42	4108 BRUCE ROAD 1	410431000321210	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
43	CON 20 S PT LOT 1	410431000322100	17-May-18		X		X	X				
	RP 3R4788 PART 1		8-Jan-19		X				X	X		
44	4237 BRUCE ROAD 1	410431000322200	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
45	4341 BRUCE ROAD 1	410431000322300	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
46	4189 BRUCE ROAD 1	410431000322500	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
47	4107 BRUCE ROAD 1	410431000322600	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
48	GREENOCK CON 20 PT LOT 4	410431000322700	17-May-18		X		X	X				
	RP 3R8814 PART 1		8-Jan-19		X				X	X		

**CIRCULATION LIST: PROPERTIES WITHIN A 2 KILOMETER RADIUS OF BRIDGE  
BRIDGE No. 0011 (PAISLEY): SCHEDULE B EA**

NUMBER	LOCATION (ADDRESS)	ROLL NUMBER	INFORMATION SENT									
			DATE SENT or RECEIVED to/by OWNER	VIA			DOCUMENT					
				E-mail	Mail (Brockton)	Phone	Notice (Initiation)	Project File (MAY 2018)	Notice (Update)	Project File (Jan 2019)	Notice of Completion	Other
49	CON 21 PT LOT 1	410431000323700	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
50	CON 21 LOT 2 TO 3	410431000323900	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
51	930 CONCESSION 18	410431000327900	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
52	1835 GREENOCK-ELDERSLIE	410431000328100	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
53	94 BASELINE NORTH	410431000328200	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
54	1845 GREENOCK-ELDERSLIE	410431000328201	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
55	289 CONCESSION 20	410431000328300	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
56	1859 GREENOCK-ELDERSLIE	410431000328310	17-May-18		X		X	X				
			8-Jan-19		X				X	X		



**CIRCULATION LIST: PROPERTIES WITHIN A 2 KILOMETER RADIUS OF BRIDGE  
BRIDGE No. 0011 (PAISLEY): SCHEDULE B EA**

NUMBER	LOCATION (ADDRESS)	ROLL NUMBER	INFORMATION SENT									
			DATE SENT or RECEIVED to/by OWNER	VIA			DOCUMENT					
				E-mail	Mail (Brockton)	Phone	Notice (Initiation)	Project File (MAY 2018)	Notice (Update)	Project File (Jan 2019)	Notice of Completion	Other
57	4316 BRUCE ROAD 1	410431000328700	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
58	4358 BRUCE ROAD 1	410431000328900	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
59	4400 BRUCE ROAD 1	410431000329000	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
60	4442 BRUCE ROAD 1	410431000329100	17-May-18		X		X	X				
			8-Jan-19		X				X	X		
61	4575 BRUCE ROAD 1	410431000330000	17-May-18		X		X	X				
			8-Jan-19		X				X	X		



**SCHEDULE 'B' – MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT  
PHASE 2 – FIRST MANDATORY PUBLIC CONTACT  
GREENOCK BRIDGE NO. 0011 (CONCESSION 20, BROCKTON)  
NOTICE OF PROJECT INITIATION**

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The Municipality of Brockton is advancing project specific planning to address the deteriorated condition of Bridge No. 11 (Greenock) south of Paisley, on Concession 20 between Baseline North and Greenock Elderslie Road, just east of Bruce Road 1, as shown on the Study Area Map below. The Municipality has identified various deficiencies with the Bridge, including severe section loss at the floor beams and stringers, and severe corrosion throughout.

The project is being planned under Schedule 'B' of the Municipal Class Environmental Assessment.

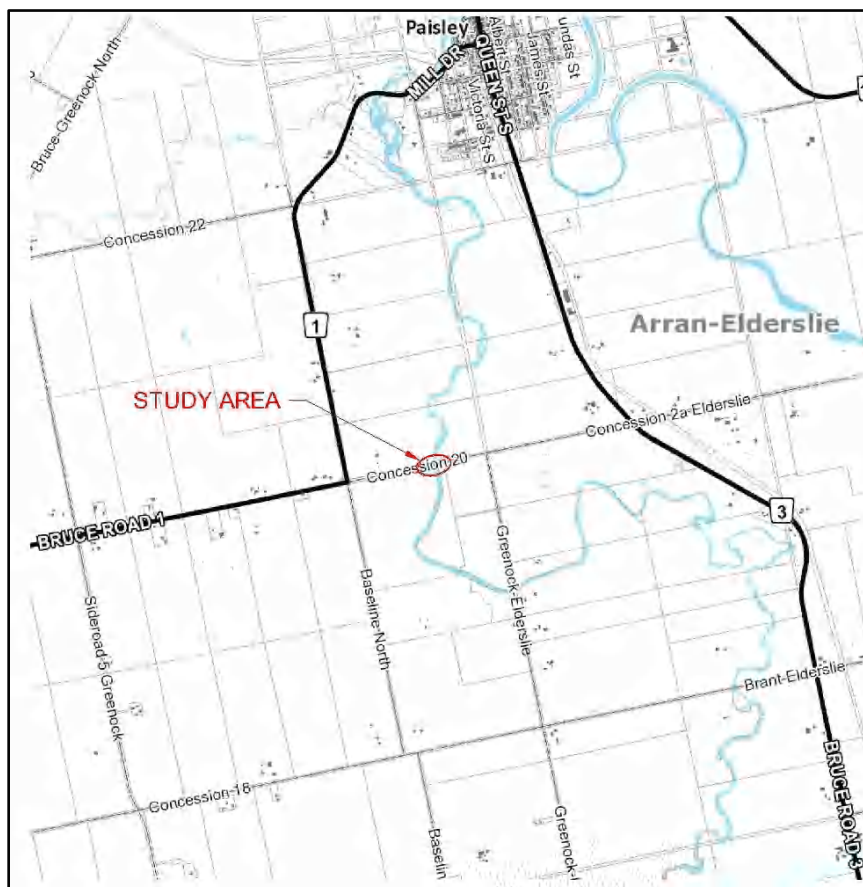
Alternative solutions that are being considered for the bridge include:

- i) Do Nothing,
- ii) Repair Existing Structure,
- iii) Replace Existing Structure,
- iv) Remove Existing Structure.

A Public Information Centre (PIC) will be held at the Cargill Community Centre (999 Greenock/Brant Townline) on **June 4, 2018 from 6:00 PM to 7:00 PM.**

Public input and comments are invited for incorporation into the planning and design of this project, and will be received until June 22, 2018. Subject to the identification of a Preferred Solution, comments received, and the receipt of necessary approvals, the Municipality intends to proceed with the planning, design, and construction of this project to be completed by late 2019.

**STUDY AREA MAP**



The Project File is posted on the Municipality's website at the address below.

For further information on this project, or on the planning process being followed, please contact either of the following:

Municipality of Brockton  
Mr. John Strader CRS-I  
100 Scott Street, Box 68  
Walkerton, ON N0G 2V0  
Email: [jstrader@brockton.ca](mailto:jstrader@brockton.ca)  
Tel: 519-881-2223  
[www.brockton.ca](http://www.brockton.ca)

GM BluePlan Engineering Limited  
Mr. John Slocombe, P.Eng.  
1260-2<sup>nd</sup> Avenue East, Unit 1  
Owen Sound, ON N4K 2J3  
Email: [john.slocombe@gmblueplan.ca](mailto:john.slocombe@gmblueplan.ca)  
Tel: 519-376-1805  
[www.gmblueplan.ca](http://www.gmblueplan.ca)



## **CORPORATION OF THE MUNICIPALITY OF BROCKTON**

Municipal Office  
100 Scott Street, Box 68  
WALKERTON, Ontario NOG 2V0

May 11, 2018

Chippewas of Nawash Unceded First Nation  
R.R.#5  
Warton, ON N0H 2T0

Attention: Chief Gregory Nadjiwon

### **RE: Schedule 'B' Environmental Assessment – Bridge No. 11 Greenock**

The Municipality of Brockton intends to initiate a planning process to address the deteriorated Bridge No. 11 Greenock, where shown on the attached map.

We are providing Chippewas of Nawash Unceded First Nation with the attached Notice of Project Initiation for the Schedule 'B' Environmental Assessment (EA) that will be issued on May 17, 2018. A Stage 1 and 2 Archaeological Assessment was completed for the study area in July 2017.

The Schedule 'B' EA Project File, which includes all background technical reports, will be available on the Municipality of Brockton website and at the Municipal Office for viewing on May 17, 2018.

We will continue to provide updates as this project progresses. Please contact our office or our consultant, John Slocombe, P.Eng. of GM BluePlan Engineering Limited if you have any questions, comments, or require additional information.

Yours truly,

John Strader  
Roads Superintendent.

Encl.

cc: GM BluePlan Engineering: John Slocombe, P.Eng.



## **CORPORATION OF THE MUNICIPALITY OF BROCKTON**

Municipal Office  
100 Scott Street, Box 68  
WALKERTON, Ontario NOG 2VO

May 11, 2018

Great Lakes Metis Council  
380 9th Street East  
Owen Sound, ON N4K 1P1

Attention: Great Lakes Metis Council and Consultation Assessment Coordinator, James Wagar

**RE: Schedule 'B' Environmental Assessment – Bridge No. 11 Greenock**

The Municipality of Brockton intends to initiate a planning process to address the deteriorated Bridge No. 11 Greenock, where shown on the attached map.

We are providing Great Lakes Metis Council with the attached Notice of Project Initiation for the Schedule 'B' Environmental Assessment (EA) that will be issued on May 17, 2018. A Stage 1 and 2 Archaeological Assessment was completed for the study area in July 2017.

The Schedule 'B' EA Project File, which includes all background technical reports, will be available on the Municipality of Brockton website and at the Municipal Office for viewing on May 17, 2018.

We will continue to provide updates as this project progresses. Please contact our office or our consultant, John Slocombe, P.Eng. of GM BluePlan Engineering Limited if you have any questions, comments, or require additional information.

Yours truly,

John Strader  
Roads Superintendent.

Encl.

cc: GM BluePlan Engineering: John Slocombe, P.Eng.



## CORPORATION OF THE MUNICIPALITY OF BROCKTON

Municipal Office  
100 Scott Street, Box 68  
WALKERTON, Ontario NOG 2V0

May 11, 2018

Historic Saugeen Metis  
204 High Street, Box 1492  
Southampton, ON N0H 2L0

Attention: President, Archie Indoe and Consultation Coordinator, George Govier

**RE: Schedule 'B' Environmental Assessment – Bridge No. 11 Greenock**

The Municipality of Brockton intends to initiate a planning process to address the deteriorated Bridge No. 11 Greenock, where shown on the attached map.

We are providing Historic Saugeen Metis with the attached Notice of Project Initiation for the Schedule 'B' Environmental Assessment (EA) that will be issued on May 17, 2018. A Stage 1 and 2 Archaeological Assessment was completed for the study area in July 2017.

The Schedule 'B' EA Project File, which includes all background technical reports, will be available on the Municipality of Brockton website and at the Municipal Office for viewing on May 17, 2018.

We will continue to provide updates as this project progresses. Please contact our office or our consultant, John Slocombe, P.Eng. of GM BluePlan Engineering Limited if you have any questions, comments, or require additional information.

Yours truly,

John Strader  
Roads Superintendent.

Encl.

cc: GM BluePlan Engineering: John Slocombe, P.Eng.



## CORPORATION OF THE MUNICIPALITY OF BROCKTON

Municipal Office  
100 Scott Street, Box 68  
WALKERTON, Ontario NOG 2V0

May 11, 2018

Saugeen First Nation  
6493 Highway 21  
R.R.#1  
Southampton, ON N0H 2L0

Attention: Chief Lester Anoquot

**RE: Schedule 'B' Environmental Assessment – Bridge No. 11 Greenock**

The Municipality of Brockton intends to initiate a planning process to address the deteriorated Bridge No. 11 Greenock, where shown on the attached map.

We are providing Saugeen First Nation with the attached Notice of Project Initiation for the Schedule 'B' Environmental Assessment (EA) that will be issued on May 17, 2018. A Stage 1 and 2 Archaeological Assessment was completed for the study area in July 2017.

The Schedule 'B' EA Project File, which includes all background technical reports, will be available on the Municipality of Brockton website and at the Municipal Office for viewing on May 17, 2018.

We will continue to provide updates as this project progresses. Please contact our office or our consultant, John Slocombe, P.Eng. of GM BluePlan Engineering Limited if you have any questions, comments, or require additional information.

Yours truly,

John Strader  
Roads Superintendent.

Encl.

cc: GM BluePlan Engineering: John Slocombe, P.Eng.



## **CORPORATION OF THE MUNICIPALITY OF BROCKTON**

Municipal Office  
100 Scott Street, Box 68  
WALKERTON, Ontario NOG 2V0

May 11, 2018

Saugeen Ojibway Nation  
SON Environmental Office  
25 Maadookii Subdivision  
RR #5, Wiarton, ON N0H 2T0

Attention: Doran Ritchie

### **RE: Schedule 'B' Environmental Assessment – Bridge No. 11 Greenock**

The Municipality of Brockton intends to initiate a planning process to address the deteriorated Bridge No. 11 Greenock, where shown on the attached map.

We are providing Saugeen Ojibway Nation (SON) with the attached Notice of Project Initiation for the Schedule 'B' Environmental Assessment (EA) that will be issued on May 17, 2018. A Stage 1 and 2 Archaeological Assessment was completed for the study area in July 2017.

The Schedule 'B' EA Project File, which includes all background technical reports, will be available on the Municipality of Brockton website and at the Municipal Office for viewing on May 17, 2018.

We will continue to provide updates as this project progresses. Please contact our office or our consultant, John Slocombe, P.Eng. of GM BluePlan Engineering Limited if you have any questions, comments, or require additional information.

Yours truly,

John Strader  
Roads Superintendent.

Encl.

cc: GM BluePlan Engineering: John Slocombe, P.Eng.

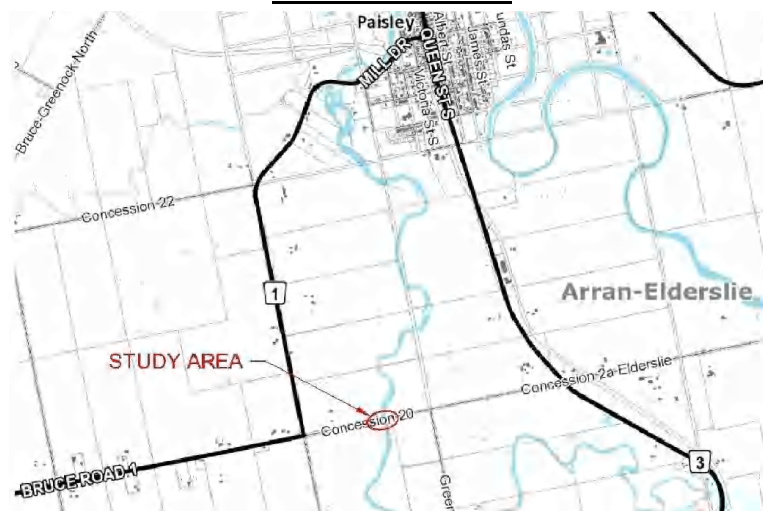


**MUNICIPALITY OF BROCKTON  
BRIDGE No.11 (GREENOCK): CONCESSION 20  
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT: SCHEDULE 'B'  
NOTICE OF PROJECT UPDATE (PHASE 2) AND  
INVITATION TO PUBLIC INFORMATION CENTRE (PIC No.2)**

The Municipality of Brockton is advancing project specific planning to address the deteriorated condition of Bridge No.11 (Greenock) south of Paisley, on Concession 20 between Baseline North and Greenock Elderslie Road, just east of Bruce Road 1, where shown on the Study Area Map below. The Municipality has identified various deficiencies with the bridge, including severe section loss at the floor beams and stringers, and severe corrosion throughout. At this time, the project is being planned under Schedule 'B' of the Municipal Class Environmental Assessment, as outlined in the Municipal Class Environmental Assessment Manual prepared by the Municipal Engineers Association (2015). Alternative solutions that are being considered for the bridge include the following:

- i. Do Nothing;
- ii. Repair Existing Structure;
- iii. Replace Existing Structure; and
- iv. Remove Existing Structure.

**STUDY AREA MAP**



The EA Process for Bridge No.11 was initiated in May 2018. This commenced the initial public consultation period which provided an opportunity to discuss the problem and/or opportunities specific to those potentially affected parties at an early stage. The initial Schedule 'B' Environmental Assessment Project File (May 2018) is currently available for viewing on the Municipality's website.

The Municipality is hosting a Public Information Session on January 22, 2019 that will include a presentation of the findings to Council. Further, the Schedule 'B' Project File (Version 2), which includes all background technical reports, has been updated and will be available on the Municipality of Brockton website and at the Municipal Office for viewing following the presentation to Council.

With the circulation of this Notice of Project Update and the updated Project File (which will be posted following the presentation), the public, agencies and first nations groups are invited to provide comments regarding the updated *Preliminary Recommended Solution*. Public input and comments are invited for incorporation into the continued planning of this project and will be received by GM BluePlan Engineering and/or the Municipality of Brockton until February 15, 2019. Contact information is provided below.

A Phase 2 Public Information Centre (PIC) is planned to be held:

**Date:** Tuesday January 22<sup>nd</sup>, 2019

**Time (Presentation):** 7:00 pm

**Location:** Bruce County Council Chambers (30 Park Street, Walkerton)

This Notice for the PIC is advertised in the Hanover Post and the Walkerton Herald-Times newspapers, and is also posted on the Municipality's website, where additional information is provided.

This Notice first issued on January 8, 2019

Mr. John Strader, CRS-I  
Municipality of Brockton  
100 Scott Street, Box 68  
Walkerton, ON N0G 2V0  
Tel: (519) 881-2223  
jstrader@brockton.ca  
www.brockton.ca

Mr. John Slocombe, P.Eng., Project Manager  
GM BluePlan Engineering Limited  
1260 - 2<sup>nd</sup> Avenue East, Unit 1  
Owen Sound, ON N4K 2J3  
Tel: (519) 376-1805  
john.slocombe@gmblueplan.ca  
www.gmblueplan.ca





Chippewas of Nawash Unceded First Nation  
R.R.#5 Wiarton, ON N0H 2T0

Attention: Chief Gregory Nadjiwon

**RE: Schedule 'B' Environmental Assessment – Bridge No. 11 Greenock**

The Municipality of Brockton is advancing project specific planning to address the deteriorated condition of Bridge No.11 (Greenock) south of Paisley, on Concession 20 between Baseline North and Greenock Elderslie Road, just east of Bruce Road 1, where shown on the attached map. At this time, the project is being planned under Schedule 'B' of the Municipal Class Environmental Assessment (EA), as outlined in the Municipal Class Environmental Assessment Manual prepared by the Municipal Engineers Association (2015).

We are providing Chippewas of Nawash Unceded First Nation with the attached Notice of Project Update for the Schedule 'B' EA, issued on January 8, 2019. A Stage 1 and 2 Archaeological Assessment was completed for the study area in July 2017 and a Cultural Heritage Evaluation Report and Preliminary Cultural Heritage Impact Assessment was completed in September 2018.

The Schedule 'B' EA Project File (Version 2), which includes all background technical reports, will be available on the Municipality of Brockton website and at the Municipal Office for viewing following the Public Information Session on January 22, 2019 that will include a presentation of the findings to Council.

We will continue to provide updates as this project progresses. Please contact our office or our consultant, John Slocombe, P.Eng. of GM BluePlan Engineering Limited if you have any questions, comments, or require additional information.

Yours truly,

John Strader  
Roads Superintendent.  
Municipality of Brockton  
cc: GM BluePlan Engineering: John Slocombe, P.Eng.



Saugeen Ojibway Nation  
SON Environmental Office  
25 Maadookii Subdivision  
RR #5, Wiarton, ON N0H 2T0

Attention: Doran Ritchie

**RE: Schedule 'B' Environmental Assessment – Bridge No. 11 Greenock**

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We are providing Saugeen Ojibway Nation (SON) with the attached Notice of Project Update for the Schedule 'B' EA, issued on January 8, 2019. A Stage 1 and 2 Archaeological Assessment was completed for the study area in July 2017 and a Cultural Heritage Evaluation Report and Preliminary Cultural Heritage Impact Assessment was completed in September 2018.

The Schedule 'B' EA Project File (Version 2), which includes all background technical reports, will be available on the Municipality of Brockton website and at the Municipal Office for viewing following the Public Information Session on January 22, 2019 that will include a presentation of the findings to Council.

We will continue to provide updates as this project progresses. Please contact our office or our consultant, John Slocombe, P.Eng. of GM BluePlan Engineering Limited if you have any questions, comments, or require additional information.

Yours truly,

John Strader  
Roads Superintendent.  
Municipality of Brockton  
cc: GM BluePlan Engineering: John Slocombe, P.Eng.



Historic Saugeen Metis  
204 High Street, Box 1492  
Southampton, ON N0H 2L0

Attention: President, Archie Indoe and Consultation Coordinator, George Govier

**RE: Schedule 'B' Environmental Assessment – Bridge No. 11 Greenock**

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We are providing Historic Saugeen Metis with the attached Notice of Project Update for the Schedule 'B' EA, issued on January 8, 2019. A Stage 1 and 2 Archaeological Assessment was completed for the study area in July 2017 and a Cultural Heritage Evaluation Report and Preliminary Cultural Heritage Impact Assessment was completed in September 2018.

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We will continue to provide updates as this project progresses. Please contact our office or our consultant, John Slocombe, P.Eng. of GM BluePlan Engineering Limited if you have any questions, comments, or require additional information.

Yours truly,

John Strader  
Roads Superintendent.  
Municipality of Brockton  
cc: GM BluePlan Engineering: John Slocombe, P.Eng.



Great Lakes Metis Council  
380 9th Street East  
Owen Sound, ON N4K 1P1

Attention: Great Lakes Metis Council and Consultation Assessment Coordinator, James Wagar

**RE: Schedule 'B' Environmental Assessment – Bridge No. 11 Greenock**

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We will continue to provide updates as this project progresses. Please contact our office or our consultant, John Slocombe, P.Eng. of GM BluePlan Engineering Limited if you have any questions, comments, or require additional information.

Yours truly,

John Strader  
Roads Superintendent.  
Municipality of Brockton  
cc: GM BluePlan Engineering: John Slocombe, P.Eng.



Saugeen First Nations  
6493 ON-21  
Southampton, ON  
N0H 2L0

Attention: Lester Anoquot

**RE: Schedule 'B' Environmental Assessment - Bridge No. 11 Greenock**

The Municipality of Brockton is advancing project specific planning to address the deteriorated condition of Bridge No.11 (Greenock) south of Paisley, on Concession 20 between Baseline North and Greenock Elderslie Road, just east of Bruce Road 1, where shown on the attached map. At this time, the project is being planned under Schedule 'B' of the Municipal Class Environmental Assessment (EA), as outlined in the Municipal Class Environmental Assessment Manual prepared by the Municipal Engineers Association (2015).

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The Schedule 'B' EA Project File (Version 2), which includes all background technical reports, will be available on the Municipality of Brockton website and at the Municipal Office for viewing following the Public Information Session on January 22, 2019 that will include a presentation of the findings to Council.

We will continue to provide updates as this project progresses. Please contact our office or our consultant, John Slocombe, P.Eng. of GM BluePlan Engineering Limited if you have any questions, comments, or require additional information.

Yours truly,

A handwritten signature in blue ink, appearing to read "John Strader", is written over a light blue horizontal line.

John Strader  
Roads Superintendent.  
Municipality of Brockton  
cc: GM BluePlan Engineering: John Slocombe, P.Eng.

**APPENDIX B:**  
**TECHNICAL ENVIRONMENT – SUPPORTING INFORMATION**

## BRIDGE INSPECTION REPORT

**Structure No.:** 0011  
**Location:** Lot 46/47, Concession "A", Greenock Survey  
**Date of Inspection:** November 24, 2009  
**Inspecting Engineer:** D. Cowan, P.Eng.  
**Estimated Safe Loading:** 7 tonnes (reduced from triple posting: 9, 12 and 18 tonnes)

### Structure Description:

<b>Structure:</b>	Steel pony truss	<b>Year Constructed:</b> 1920 (est.)
<b>No. Spans:</b> 1	<b>Width:</b> 4.5m	<b>Length:</b> 30.9m
<b>Approaches:</b>	Asphalt	
<b>Wearing Surface:</b>	Laminated 2x6 timber deck	

### Remarks:

- Bridge constructed by Hamilton Bridge Works (date not visible).
- Hazard marker signs on all four corners.
- The steel guiderail is damaged due to impact on the northwest, southwest, northeast corners and each side of the deck.
- The steel guiderail is no longer connected to one vertical web member on the south truss.
- The south truss appears to be slightly out of alignment, bowed outwards.
- Steel pony trusses and stringers are moderately rusted. Cross beams are deteriorating more rapidly due to corrosion. The west most single angle cross beam over the abutment has lost approximately 50% of cross sectional area due to corrosion.
- Bottom chord on east side of south truss has been permanently deformed by impact.
- Bottom chord on north truss is out of alignment.
- Four vertical web members on the south truss and two vertical web members on the north truss are damaged just above the deck and below the guard. The west most vertical web member on the south truss has snapped completely in half.
- Concrete facing of east abutment is breaking up. The facing in the southeast corner of abutment and ballast wall have severely deteriorated exposing reinforcing steel.
- 200 mm concrete facing has been added at east and west abutment. The concrete facing is spalling, cracking and delaminating on both sides.
- All truss bearing seats on east side are badly deteriorated with reinforcing steel exposed. A portion of the seat is exposed where concrete has spalled away.
- Concrete in northeast ballast walls has spalled.
- There is no rip-rap protection in front of the abutment walls. There are small amounts of scour damage on each abutment.

### Conclusions:

Generally the structure appears to be in overall poor condition. The south truss appears to be out of alignment, both bottom chords are out of alignment and numerous vertical web truss members are damaged or broken. These members are secondary members that are theoretically zero force members, so failure of these members does not automatically mean failure of the structure. Nonetheless, these members should be replaced or reinforced. The concrete facing is also badly deteriorating and may be becoming unstable.

It is recommended that a detailed structural evaluation of the bridge be completed within 6 months to determine the safe load capacity. It is our opinion that until repairs are completed the load capacity should be reduced to 7 tonnes from the current posting of 9, 12, and 18 tonnes.

### Recommendations:

1. Reduce safe load posting of bridge to 7 tonnes for all vehicles.
2. Complete a detailed structural investigation to determine extent of repairs required and a new safe load capacity.
3. Consider closing the bridge.
4. Replace vertical web member on south truss that has broken in half.
5. Install bearing blocks behind guiderail on deck or install curb along each side of deck to prevent vehicles from impacting the web members of the trusses.
6. New abutment seats are required at the east end and the east abutment is to be refaced. In the 2007 report, this work was recommended to be completed within one year.
7. Replace steel angle cross beam at east and west abutment.
8. Clean gravel off deck.
9. Clean bearing seats.

Per  
Gamsby and Mannerow Limited

  
D. Cowan, P.Eng.



FOR STRUCTURAL ONLY





**Plate 1** View of the structure from the west. Note that the south truss appears to be out of alignment.



**Plate 2** View of the structure from the north east.



**Plate 3** The approach guards are damaged due to impact (north west approach guard shown).



**Plate 4** Vertical web members are damaged at just above the deck (south east web member shown). The steel guard is not attached to the structure at this location.



**Plate 5** The west vertical web member is completely broken on the south truss.



**Plate 6** The south east abutment has severely spalled.



**Plate 7** The north west abutment is severely cracked and spalled at the bearing seat. Note also lots of cracking in the north abutment face, which is delaminating.



**Plate 8** The bottom chord cross tie over the west abutment has corroded and is losing area.



## BRIDGE INSPECTION REPORT

**Structure No.:** 0011  
**Location:** Lot 46/47, Concession "A", Greenock Survey  
**Date of Inspection:** July 3, 2014/September 30, 2014  
**Inspector:** Frank R. Palmay, P.Eng.  
**Estimated Safe Loading:** 7 tonnes (reduce from triple posting: 9, 12 and 18 tonnes)

### **Structure Description:**

<b>Structure:</b>	Steel pony truss	<b>Year Constructed:</b> 1920 (est.)
<b>No. Spans:</b> 1	<b>Width:</b> 4.5m	<b>Length:</b> 30.9m
<b>Approaches:</b>	Asphalt	
<b>Wearing Surface:</b>	Laminated 2x6 timber deck	

### **Remarks:**

- Bridge constructed by Hamilton Bridge Works (date not visible).
- Hazard marker signs on all four corners.
- The steel guiderail is damaged due to impact on the northwest, southwest, northeast corners and each side of the deck. Two posts on the southwest approach have severe damage.
- The steel guiderail is no longer connected to one vertical web member on the south truss.
- The south truss appears to be slightly out of alignment, bowed outwards.
- Steel pony trusses and stringers are moderately rusted. Floor beams are deteriorating more rapidly due to corrosion.
- The east and west most single angle floor beam over the abutment were replaced in 2014.
- Bottom chord on east side of south truss has been permanently deformed by impact.
- Bottom chord on north truss is out of alignment.
- All four corners of the bottom chord have been repaired in 2014.
- Five vertical web members on the south truss and three vertical web members on the north truss are which were previously noted to be damaged have been replaced
- The diagonal flat bar members which make up the lattice work on the trellises have been permanently deformed on all 6 trellises on the north truss.
- Concrete facing of east abutment is severely spalled and delaminated. The facing in the southeast corner of abutment and ballast wall have severely deteriorated exposing reinforcing steel.
- 200 mm concrete facing has been added at east and west abutment. The concrete facing is spalling, cracking and delaminating on both sides.
- All truss bearing seats on east side are badly deteriorated with reinforcing steel exposed. A portion of the seat is exposed where concrete has spalled away.
- Concrete in northeast ballast walls has spalled.
- There is severe spider cracking and delamination in the east abutment wall.
- There is no rip-rap protection in front of the abutment walls. There are small amounts of scour damage on each abutment.
- There is significant build-up of gravel and sand at either side of the deck.
- Note that when a regular pickup truck crosses the bridge the structure shakes.

**Conclusions:**

Generally the structure appears to be in overall poor condition. The south truss appears to be out of alignment, both bottom chords are out of alignment and numerous vertical web truss members are damaged or broken. These members are secondary members that are theoretically zero force members, so failure of these members does not automatically mean failure of the structure. Nonetheless, these members should be replaced or reinforced. The concrete facing is also badly deteriorating and may be becoming unstable.

It is recommended that a detailed structural evaluation of the bridge be completed to confirm the current posting.

**Recommendations:**

1. Consider closing the bridge or completing major rehabilitation within 3 years.
2. Reduce speed limit on structure to 30 km/hr to avoid additional impact to structure.
3. Complete a structural evaluation to confirm the current load posting.
4. Install bearing blocks behind guiderail on deck or install curb along each side of deck to prevent vehicles from impacting the web members of the trusses (within 2 years).
5. New abutment seats are required at the east end and the east abutment is to be refaced. This was recommended in our 2007 report.
6. Clean gravel off deck (1-3 years).
7. Clean bearing seats (1-3 years).

Per:  
GM BLUEPLAN ENGINEERING LIMITED

A handwritten signature in blue ink, appearing to read 'Frank R. Palmay'.

Frank R. Palmay, P.Eng.



**BRIDGE/CULVERT INSPECTION REPORT- 2014**  
**MUNICIPALITY OF BROCKTON**  
**GREENOCK SURVEY**

Structure No. 0011



**Photo P-1 - View of structure from west.**



**Photo P-2 - View of structure from southwest**

**BRIDGE/CULVERT INSPECTION REPORT- 2014**  
**MUNICIPALITY OF BROCKTON**  
**GREENOCK SURVEY**

Structure No. 0011



**Photo P-3 - View of soffit.**



**Photo P-4 - View of damaged truss lattice.**



**BRIDGE/CULVERT INSPECTION REPORT- 2014**  
**MUNICIPALITY OF BROCKTON**  
**GREENOCK SURVEY**

Structure No. 0011



**Photo P-5 - View of replaced bottom chord member.**



**Photo P-6- View of spalled abutment at truss bearing.**

**BRIDGE/CULVERT INSPECTION REPORT- 2014**  
**MUNICIPALITY OF BROCKTON**  
**GREENOCK SURVEY**

Structure No. 0011



**Photo P-7 - View of typical floor beam corrosion at bearing.**

## **BRIDGE INSPECTION REPORT**

**Structure No.:** 0011  
**Location:** Lot 46/47, Concession "A", Greenock Survey  
**Date of Inspection:** May 25, 2016/May 25, 2016  
**Inspector:** Frank R. Palmay, P.Eng.  
**Estimated Safe Loading:** 7 tonnes (reduce from triple posting: 9, 12 and 18 tonnes)

### **Structure Description:**

<b>Structure:</b>	Steel pony truss	<b>Year Constructed:</b>	1920 (est.)
<b>No. Spans:</b>	1	<b>Width:</b>	4.5m
		<b>Length:</b>	30.9m
<b>Approaches:</b>	Asphalt		
<b>Wearing Surface:</b>	Laminated 2x6 timber deck		

### **Remarks:**

- Hazard marker signs on all four corners.
- The steel guiderail is damaged due to impact on the northwest, southwest, northeast corners and each side of the deck. Two posts on the southwest approach have severe damage.
- The steel guiderail is no longer connected to one vertical web member on the south truss.
- The south truss appears to be out of alignment, bowed outwards.
- Steel pony trusses and stringers are moderately rusted. Floor beams are deteriorating more rapidly due to corrosion.
- Bottom chord on east side of south truss has been permanently deformed by impact.
- Bottom chord on north truss is out of alignment.
- Five vertical web members on the south truss and three vertical web members on the north truss are which were previously noted to be damaged have been replaced. One of the new members has been impacted and is permanently deformed
- The diagonal flat bar members which make up the lattice work on the trellises have been permanently deformed on all 6 trellises on the north truss.
- Concrete facing of east abutment is severely spalled and delaminated. The facing in the southeast corner of abutment and ballast wall have severely deteriorated exposing reinforcing steel.
- 200 mm concrete facing has been added at east and west abutment. The concrete facing is spalling, cracking and delaminating on both sides.
- All truss bearing seats on east side are badly deteriorated with reinforcing steel exposed. A portion of the seat is exposed where concrete has spalled away.
- Concrete in northeast ballast walls has spalled.
- There is severe spider cracking and delamination in the east abutment wall.
- There is no rip-rap protection in front of the abutment walls. There are small amounts of scour damage on each abutment.
- There is significant build-up of gravel and sand at either side of the deck.
- Note that when a regular pickup truck crosses the bridge the structure shakes.

**Conclusions:**

Generally the structure appears to be in overall poor condition. The south truss appears to be out of alignment, both bottom chords are out of alignment and numerous vertical web truss members are damaged or broken. These members are secondary members that are theoretically zero force members, so failure of these members does not automatically mean failure of the structure. Nonetheless, these members should be replaced or reinforced. The concrete facing is also badly deteriorating and may be becoming unstable.

It is recommended that a detailed structural evaluation of the bridge be completed to confirm the current posting.

**Recommendations:**

1. Complete a load posting evaluation immediately to determine if current posting is accurate
2. Consider closing the bridge or completing major rehabilitation within 1 year.
3. Reduce speed limit on structure to 30 km/hr to avoid additional impact to structure.
4. Install bearing blocks behind guiderail on deck or install curb along each side of deck to prevent vehicles from impacting the web members of the trusses (within 2 years).
5. New abutment seats are required at the east end and the east abutment is to be refaced. This was recommended in our 2007 report.
6. Clean gravel off deck (1-3 years).
7. Clean bearing seats (1-3 years).

**GM BLUEPLAN ENGINEERING LIMITED**

Per:

A handwritten signature in blue ink, appearing to read 'Frank R. Palmay'.

Frank R. Palmay, P.Eng.



**BRIDGE/CULVERT INSPECTION REPORT– 2016**  
**MUNICIPALITY OF BROCKTON**  
**GREENOCK SURVEY**

Structure No. 0011



**Photo 1** - View of structure from west.



**Photo 2** - View of structure from southeast



**BRIDGE/CULVERT INSPECTION REPORT– 2016  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

Structure No. 0011



**Photo 3** - View of soffit.



**Photo 4** - View of damaged truss lattice.

**BRIDGE/CULVERT INSPECTION REPORT– 2016  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

Structure No. 0011



**Photo 5** - View of typical wingwall/abutment condition.



**Photo 6**- View of spalled abutment at truss bearing.

**BRIDGE/CULVERT INSPECTION REPORT– 2016  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

**Structure No. 0011**



**Photo 7** - View of recently replaced web member with impact damage



## **BRIDGE REVIEW REPORT**

**Structure No.:** 0011  
**Location:** Lot 46/47, Concession "A", Greenock Survey  
**Date of Review:** May 29, 2018  
**Inspector:** Jesse Borges, EIT  
**Estimated Safe Loading:** 7 tonnes (reduce from triple posting: 9, 12 and 18 tonnes)

### **Structure Description:**

**Structure:** Steel pony truss **Year Constructed:** 1920 (est.)  
**No. Spans:** 1 **Width:** 4.5m **Length:** 30.9m  
**Approaches:** Asphalt  
**Wearing Surface:** Laminated 2x6 timber deck

### **Remarks:**

- Hazard marker signs on all four corners.
- The steel guiderail is damaged due to impact on the northwest, southwest, northeast corners and each side of the deck. Two posts on the southwest approach have severe damage.
- Laminated timber deck top is in good condition.
- The steel tube railing is bent in several locations and has extensive medium corrosion throughout. Railing is disconnected from vertical member at south truss.
- The east portion of south truss appears to be out of alignment, bowed inwards towards deck top. The top chord at southeast corner of bridge is pressing against deck top timber.
- Steel pony trusses have moderate corrosion.
- Stringers exhibiting severe corrosion and section loss over west bearing seat. Large perforations in web and significant section loss of the bottom flange.
- Severe corrosion with perforations noted in west most floor beam.
- Two bolt connections between stringers and floor beams are missing nuts and a bolt has sheared off at another connection.
- Bottom chord on east side of south truss has been permanently deformed by impact.
- Bottom chord on north truss is out of alignment.
- The interior vertical angle members of the trellises have been damaged at the south. Bottom of angles have been impacted and deformed permanently.
- The diagonal flat bar members which make up the lattice work on the trellises have been permanently deformed on all 6 trellises of the north truss.
- Concrete facing at east abutment is severely spalled and delaminated. The facing in the southeast corner of abutment and ballast wall have severely deteriorated exposing reinforcing steel.
- 200 mm concrete facing has been added at east and west abutment in past. The concrete facing is spalling, cracking and delaminating on both sides.
- All truss bearing seats on east side are badly deteriorated with reinforcing steel exposed. A portion of the seat is exposed where concrete has spalled away.
- Concrete in northeast ballast walls has spalled.
- There is severe spider cracking and delamination in the east abutment wall.
- There is no rip-rap protection in front of the abutment walls. There are small amounts of scour damage on each abutment.
- There is significant build-up of gravel and sand at either side of the deck.
- Previous report noted significant bridge vibrations when mid-size pickup truck travels over the bridge.

**Conclusions:**

Generally, the structure appears to be in overall poor condition. The south truss appears to be out of alignment, both bottom chords are out of alignment and numerous vertical web truss members are damaged or broken. These members are secondary members that are theoretically zero force members, so failure of these members does not automatically mean failure of the structure. Nonetheless, these members should be replaced or reinforced. The concrete facing is also badly deteriorating and may be becoming unstable.

Considering the overall condition of the structure, we are recommending that the bridge be closed or replaced within 1 year. It is our opinion that performing any major repairs to the structure would only delay the structures closure/replacement and would not be financially beneficial to the Township. In the meantime, a structural evaluation should be completed immediately to determine if the current load posting is accurate.

The Municipality of Brockton is currently completing a Municipal Class Environmental Assessment (Schedule 'B') on the structure to determine the impacts to the surrounding environment and public if the following solutions are implemented:

- a) Do Nothing,
- b) Repair Existing Structure,
- c) Replace existing Structure,
- d) Remove Existing Structure.

**Recommendations:**

1. Complete a load posting evaluation immediately to determine if current posting is accurate.
2. Consider closing the bridge or completing major rehabilitation within 1 year.
3. Reduce speed limit on structure to 30 km/hr to avoid additional impact to structure.
4. Install bearing blocks behind guiderail on deck or install curb along each side of deck to prevent vehicles from impacting the web members of the trusses (within 2 years).
5. New abutment seats are required at the east end and the east abutment is to be refaced. This was recommended in our 2007 report.

GM BLUEPLAN ENGINEERING LIMITED

Per:

A handwritten signature in black ink, appearing to read 'J. Borges', is written over a horizontal line.

Jesse Borges, E.I.T.

**BRIDGE/CULVERT REVIEW REPORT– 2018  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

Structure No. 0011



**Photo 1** - View of structure from west.



**Photo 2** - View of structure from southwest.

**BRIDGE/CULVERT REVIEW REPORT– 2018  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

Structure No. 0011



**Photo 3** - View of damaged vertical truss support at south.



**Photo 4** - View of damaged truss lattice at north.



**BRIDGE/CULVERT REVIEW REPORT– 2018  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

**Structure No. 0011**



**Photo 5** - View of top chord at south pressing against deck top.



**Photo 6**- View of soffit.

**BRIDGE/CULVERT REVIEW REPORT– 2018  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

Structure No. 0011



**Photo 7** - View of severely corroded stringer end at west.



**Photo 8** - View of sheared bolt floor beam to stringer connection.

**BRIDGE/CULVERT REVIEW REPORT– 2018  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

Structure No. 0011



**Photo 9** - View of severe corrosion with perforations at east floor beam.



**Photo 10** - View of severe scaling and spalling at east abutment.



**BRIDGE/CULVERT REVIEW REPORT– 2018  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

**Structure No. 0011**



**Photo 11 - View of severe spalling with vertical cracks at northeast wingwall.**



**Photo 12 - View of concrete spalling at west bearing seat.**



Prepared By:



## Structure No. 0011 Rehabilitation Options

The Municipality of Brockton

**GMBP File: 212328**

**April, 2017**



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## **APPENDICES**

**APPENDIX A: BRIDGE LOCATION**

**APPENDIX B: 2016 GMBP BRIDGE REVIEW REPORT EXCERPT**

**APPENDIX C: SITE PHOTOGRAPHS**

**APPENDIX D: CONSTRUCTION OPTION COST ESTIMATES**

**APPENDIX E: STATEMENT OF LIMITATIONS**

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**THE MUNICIPALITY OF BROCKTON**  
**STRUCTURE NO. 0011 REHABILITATION OPTIONS**  
**APRIL, 2017**  
**GMBP FILE: 212328**

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GM BluePlan Engineering Limited (GMBP) was retained by the Municipality of Brockton in accordance with the Scope of Work submitted on September 15, 2016. The assignment relates to the rehabilitation of Structure No. 0011, located at Lot 45/46 Concession Road 20, in the former Township of Greenock. Our staff has attended the structure and prior to completing preliminary design for the rehabilitation we want to consider various design alternatives for this structure. Based on our ongoing conversations with the Roads Superintendent, Mr. John Strader, we understand that four (4) rehabilitation options are to be considered. The options being considered are complete replacement, partial rehabilitation of concrete works and lower steel members only, partial rehabilitation of concrete work and all truss members, and "do nothing" (which will result in closing the bridge in the near term).

## **1. BRIDGE OBSERVATIONS**

The subject bridge is located on Concession 20, west of Greenock Elderslie Road (Lot 46/47 Concession A of the Greenock Survey) and crosses the Teeswater River (refer to Appendix "A" for map showing its location). The structure is a steel pony truss bridge with steel floor beams and stringers supporting a wooden deck. The structure is supported by cast in place concrete abutments and wingwalls with an overall span of 30.9m. Based on our observations, the wingwall and abutment on the east side of the bridge have been previously repaired.

### **1.1 2016 Bridge Inspection Report**

In the spring of 2016, GM BluePlan Engineering Limited conducted a review of the bridges and culverts in the former Township of Greenock. The subject bridge, identified in the report as Structure No. 0011 was noted to have several deficiencies. An excerpt of this report regarding the condition of Structure No. 0011 has been Included as Appendix "B". Based on the identified deficiencies, it was recommended that the following work be carried out:

- Complete a load posting evaluation immediately to determine if the current posting is accurate.
- Consider closing the bridge or completing major rehabilitation within 1 year.
- Reduce speed limit on structure to 30 km/hr to reduce additional impact loading on structure.
- Install bearing blocks behind guiderail on deck or install curb along each side of the deck to prevent vehicles from impacting the web member of the trusses (within 2 years).
- New abutment seals are required at the east end and the east abutment is to be refaced.
- Clean gravel off deck (1-3 years).
- Clean bearing seats (1-3 years).

## 1.2 Remedial Works Completed to Date

It is our understanding that remedial works have been performed on the bridge in the past. These works included the replacement of four (4) sections of the bottom chords of the trusses. The replaced sections were 4.35m long and are located at all four corners of the bridge. The cross angle section connecting these bottom chords were also replaced. In review of previous files and observations made at the bridge, it was determined that several vertical truss members were replaced due to damages caused by impact. It should be noted that the replacement of these vertical members and the sections of the bottom chord were completed in 2014.

Based on the condition of the east and west concrete abutments, it appears that the eastern abutment has at one point been resurfaced. It should be noted however, that the year in which this work was completed is unknown.

## 1.3 Field Review

In order to complete a load evaluation, members of our staff attended the subject structure to take detailed measurements of structural elements. Our staff reviewed the pony truss elements, floor beams, stringers, abutments wingwalls, and bearing pads.

## 1.4 Identified Deficiencies

Between our 2016 Bridge Report and our detailed inspection we have identified several deficient items throughout the structure. Our findings have been summarized below.

### 1.4.1 Steel Pony Truss

During our 2016 bridge review, it was noted that the south truss appears to have bowed outwards. The bottom chord of the east side of the south truss has been permanently deformed and the bottom chord on the north side is also out of alignment. One of the vertical members was noted to have been damaged as well as all of the lattice members which make up the six northern trellises.

The steel truss members which have been damaged or are misaligned cannot be repaired as they are permanently deformed. Due to the current condition of the trusses we recommend that the majority of the members be replaced.

### 1.4.2 Steel Floor Beams

Moderate corrosion was noted on the steel floor beams during our 2016 bridge review. If the floor beams are to be reused, the corrosion should be removed by abrasive blasting and the protective coating reinstalled.

### 1.4.3 Steel Stringer Beams

The steel stringers were also noted to have moderate corrosion at the time of our 2016 Bridge Review. Upon further inspection it was noted that the stringers are severely deteriorated at each of the abutments. At the eastern abutment the stringers have deteriorated to a point of complete section loss of the web. Photos of this deterioration have been included in this report as Appendix "C". The steel stringers at the abutments have deteriorated beyond a point of repair and will require replacement. If the interior stringers are to be reused the corrosion should be removed by abrasive blasting and have the protective coating reinstalled.

### 1.4.4 Concrete Abutments

The cast in place concrete abutments are believed to be the original bridge abutments and are estimated to have been constructed in or around 1920. Previously, the abutments have been repaired by capping them with 8" of new concrete. Unfortunately, no record of when this work was completed is available.

The 8" thick facing on the east and west abutments is spalled and delaminated. The facing has deteriorated in the southeast corner exposing the existing abutments as well as the corroded reinforcing steel in the facing. Cracking was noted throughout the concrete facing on both abutments.

Minor scour was also noted along the base of the abutments at each end of the structure. It was noted that there is little to no rip rap stone to protect the abutments from erosion.

Based on our review, the abutments are in need of significant repairs or complete replacement. Repairs would include chipping and patching of all deteriorated areas as well as abrasive blasting of the exposed corroding steel.

#### **1.4.5 Concrete Ballast Walls**

The concrete ballast walls are in similar condition to the concrete abutments. Spalling was noted on the northeast and southeast ballast walls.

Based on our review, the ballast walls are also in need of significant repairs or complete replacement. Repairs would include chipping and patching of all deteriorated areas as well as abrasive blasting of the exposed corroding steel.

#### **1.4.6 Bearing Seat**

The bearing seats on both abutments have severe deterioration with exposed reinforcing steel. Based on our review, the bearing seats are in need of significant repairs or complete replacement. Repairs would include chipping and patching of all deteriorated areas as well as abrasive blasting of the exposed corroding steel.

#### **1.4.7 Steel Guiderails**

The steel guiderail appears to have been damaged due to an impact on the northwest, southwest, and northeast corners as well as each side of the deck. Two posts on the southwest approach have severe damages as well. The guiderail is no longer connected to one of the vertical web members on the south truss. The damaged steel guiderail should be completely replaced and brought up to current standards.

#### **1.4.8 Heavy Vegetation**

Heavy vegetation was observed on the eastern embankments. This vegetation can accelerate the deterioration of the structure if allowed to mature adjacent to the structure by way of harbouring moisture. We recommend, the vegetation be removed and that armour stone be installed adjacent to each of the structure's wingwalls.

## **2. DISCUSSION**

Based on the observations detailed above it is clear that remedial works of the steel truss structure are required if the bridge is to remain in use. Should only the elements of the steel truss structure be replaced, the bridge could remain in use but would have to continue to have a load posting. The reason for this, is that if the truss members are not reinforced or replaced they will not have adequate capacity to support the loading that would be applied if the triple posting of the bridge were to be removed. Based on the damage observed in the truss members detailed above it can be said that they will require replacement within the next 10 years. Similarly based on the condition of the concrete abutments and wingwalls of the structure it can be said the significant remedial works or replacement of the concrete portions of the structure will be required within the next 20 years.



### 3. REHABILITATION OPTIONS

Based on our understanding, the Municipality would like to consider several options regarding the rehabilitation of Structure No. 0011. We have generated four (4) rehabilitation options with varying levels of repairs and corresponding costs. Each option is discussed in further detail below and a summary of the estimated current and future costs is also provided.

#### 3.1 Option “A” – Complete Replacement

The goal of this option would be to completely replace the existing structure and all of its elements with a structure of similar geometry, which meets the Canadian Highway Bridge Design Code. The new structure would be of similar construction and would not be widened to allow for two lanes and the appropriate curbs and guiderails.

The Ministry of Tourism, Culture and Sport (MCTS) has an interest in projects related to structures over 40 years old, as there is potential for cultural heritage resources within the project area. Before proceeding with any work, a cultural and heritage evaluation report (CHER) would first have to be completed to establish whether the bridge has significant cultural or heritage value. A qualified person will have to undertake the CHER, in accordance with the MCTS requirements. If the property is determined to be of cultural heritage value, a heritage impact assessment (HIA) will then have to be completed. For the purposes of assessing this option, we have assumed that the CHER will find that no cultural heritage value exists.

The reason for the bridge remaining of similar width and basic structural system would be to reduce the effort required to complete the Environmental Assessment (EA).

If the road or hydraulic capacity of the bridge is not altered, then a Schedule ‘A’ Municipal Class EA will be required (the Schedule ‘A’ process is much less onerous than the Schedule ‘B’ process). It should be noted that the bridge design can be altered, should the Municipality wish to increase the capacity of the subject bridge, but the added cost and delays for completing a Schedule ‘B’ Municipal Class EA would be incurred. The steel truss would be supported by new cast in place concrete abutments and footings with new cast in place concrete wingwalls. The deck would be replaced with a thin slab concrete deck with an asphalt wearing surface.

This option would allow the Municipality to remove all load postings and is assumed to have a service life of 75 years.

#### 3.2 Option “B” – Replace Steel Elements Only

This rehabilitation option would include the replacement of the steel pony trusses, floor beams and stringers. The wood deck would be replaced with a concrete deck. The concrete elements such as the abutments and wingwalls would be reused to reduce the construction costs during this rehabilitation. The concrete abutments, ballast walls and wingwalls would be chipped and patched to extend their useful life cycle as much as possible.

As noted above, the MCTS has an interest in projects related to structures over 40 years old, as there is potential for cultural heritage resources within the project area. A qualified person will have to undertake a CHER to establish whether the bridge has significant cultural or heritage value. Assuming that no cultural heritage value exists, this work can then proceed.

Based on the existing condition of the abutments we expect that this option would extend the useful life cycle of the structure by approximately 20 years. After which, major repairs or replacement of the abutments would be required. Load postings could initially be increased to allow for emergency vehicles; however, diligent monitoring of existing foundations would be required for the first 5 years to determine if the existing foundations are adequate to support the applied loads.

### 3.3 Option “C” – Replace Only the Deck Supporting Members

This construction option is intended to address only the critical items to keep the structure functioning at the current level of service. The steel floor beams, stringers and deck would be removed or repaired as needed while all other elements remained in place. Based on our calculations, the removed wood deck would have to be replaced using similar wood construction as the additional weight that would be added by the use of a concrete wearing surface would overload the existing trusses.

Since this work is relatively minor in nature and relates to normal maintenance activities, this work is considered to be subject to a Schedule ‘A+’ Municipal Class EA. Schedule ‘A+’ activities are pre-approved, and require the Municipality to advise the public prior to proceeding.

Based on the existing conditions, we estimate that this would extend the useful life cycle of the structure by approximately 10 years. The load postings would have to remain in place, as the structural capacity of the steel trusses have been reduced due to the damages to the truss members and therefore, even with the replacement of the deck members, the existing trusses will limit the bridges capacity.

### 3.4 Option “D” – Do Nothing

Upon review of the Bridge Infrastructure Master Plan issued by B.M. Ross and Associates Limited in April, 2013, it was noted that all options recommend the rehabilitation of Structure No. 0011. Based on our review, the removal of the structure may pose very little impact, as the structure is paralleled by County Road 1 and Bruce Road 3. Currently, the bridge has a triple load posting of 9/12/18 tonnes which limits its economic value and its usefulness as a route for emergency vehicles. Of the four proposed options above, only Option “A” – complete replacement, will address the restrictions on the current structure.

## 4. ESTIMATED COSTS

In order to allow the Municipality to make informed financial decisions we have generated cost estimates for Options A, B, C and D. The cost estimates below have been calculated in terms of current values and net present value (NPV). See Table 1 below for a summary of the costs estimates found in Appendix “D” for cost estimates of each option based on current constructions cost.

The “Do Nothing” option will result in the closure of the bridge to vehicular traffic, likely within a couple of years. According to the MEA document, retirement of existing roads or related facilities is a Schedule A+ activity. However, if the structure is removed, since it is over 40 years old, its cultural heritage value would have to be determined by a qualified individual. If it is found to have such value, a Schedule ‘B’ Municipal Class EA would be required. Otherwise a Schedule A+ would suffice.

Our cost estimate, provided in Appendix “D” includes costs relating to demolition and the CHER study, with the assumption that no heritage value exists.

**Table 1: Cost Estimates Based on Current Construction Costs**

Rehabilitation Options	All Cost In 2017 Dollars			
	Costs Incurred in 2017	Costs Incurred in 2027	Costs Incurred in 2037	Total Cost of Works
Option "A" Complete Replacement	\$1,013,870	\$0	\$0	<b>\$1,013,870</b>
Option "B" Replace all Steel Components	\$896,770	\$439,950	\$0	<b>\$1,309,720</b>
Option "C" Replace Deck Steel Only	\$602,520	\$425,500	\$439,950	<b>\$1,467,970</b>
Option "D" Do Nothing				

The general philosophy used in considering the net present value of each alternative is that there is a trade-off between incurring large upfront expenditures (such as full replacement) and expending smaller, more frequent amounts (such as rehabilitation). Therefore, we have attempted to quantify these amounts in terms of net present value, to provide some sort of rational comparison.

The life span of municipal infrastructure depends on a number of factors. The Canadian Highway Bridge Design Code (CHBDC) requires bridges to be designed for a 75 year service life. Therefore for the purposes of evaluation, we have assumed that a new structure would have a 75 year life cycle and have no value at the end of this expected life. However Option A and B delay the construction of a new structure. Therefore for the purpose of our 75 year study Options A and B will have a remaining value at the end of the study period. This value has been subtracted from the net present value to allow for a fair comparison of costs.

In terms of financial estimations, the annual inflation rate over the 75 year study period has been estimated at 3% in order to determine future costs. We have considered a range of values for cost of capital, between 3% and 9%. Construction costs have been estimated using the results of recent tenders of similar construction.

The following methods were used in calculating both future worth and present worth values:

The future worth of the rehabilitation procedures was estimated using the formula:

Future Worth =  $(1 + F)^n \times \text{Present Cost}$ , where n = number of years and F = inflation rate

The present worth of future rehabilitation procedures was calculated using the formula:

$$\text{Present Worth} = \frac{\text{Future Worth}}{(1 + i)^n}$$

Where "n" = number of years and "i" = interest rate (cost of borrowing).



The cost of each alternative was tabulated over the 75 year service period to consider the capital outlays at various times, and to account for interest costs for each year.

In order to further refine the life cycle cost analysis, we considered a few different possibilities for interest costs. Although interest rates have been relatively low for a number of years, over the long term they may trend higher. Table 1 summarizes the various results, with inflation assumed to be constant at 3%.

**Table 2: Comparison of Various Interest Rates**

Interest Rate (Cost of Borrowing)	Net Present Value			
	Option "A" Complete Replacement	Option "B" Replace all Steel Components	Option "C" Replace Deck Steel Only	Option "D" Do Nothing
3%	<b>\$1,013,870</b>	\$1,323,469	\$1,442,763	
4%	<b>\$2,092,622</b>	\$2,576,880	\$2,744,416	
5%	<b>\$4,289,314</b>	\$5,022,718	\$5,221,053	
6%	<b>\$8,732,334</b>	\$9,793,414	\$9,931,275	
7%	<b>\$17,659,311</b>	\$19,088,513	\$18,882,636	
8%	<b>\$35,479,058</b>	\$37,167,322	\$35,875,205	
9%	\$70,823,562	\$72,249,327	<b>\$68,086,366</b>	

Note: Figures in bold indicate the lowest NPV for a given interest rate.

If the Municipality wishes to keep the bridge, Option "A" appears to be the best option for the majority of the likely interest rates. If the cost of borrowing is above 9.0% then Option "C" becomes the most cost efficient option based on NPV due to the long delay in the majority of estimated work. Below 9.0% Option "A" becomes the most valuable solution based on NPV.

If the Municipality can accommodate closing the bridge permanently, this is clearly the least costly alternative.

## 5. CONCLUSION

If the Municipality evaluates these options based solely on the long term financial considerations we recommend that the Municipality select Option "D" (close the bridge permanently).

If the Municipality wishes to maintain this river crossing, and permanent closure is not a viable option, then we recommend that the Municipality select Option "A". The proposed construction would address all of the structural issues with the bridge, as well as provide the Municipality with the least costly alternative over the long run.

All of which is respectfully submitted,

GM BLUE PLAN ENGINEERING LIMITED,  
Per:



Travis Denley, E.I.T.



## **APPENDIX A: BRIDGE LOCATION**



**APPENDIX B:**  
**2016 GMBP BRIDGE REVIEW REPORT EXCERPT**

# BRIDGE INSPECTION REPORT

<b><u>Structure No.:</u></b>	0011
<b><u>Location:</u></b>	Lot 46/47, Concession "A", Greenock Survey
<b><u>Date of Inspection:</u></b>	May 25, 2016/May 25, 2016
<b><u>Inspector:</u></b>	Frank R. Palmay, P.Eng.
<b><u>Estimated Safe Loading:</u></b>	7 tonnes (reduce from triple posting: 9, 12 and 18 tonnes)

### Structure Description:

<b>Structure:</b>	Steel pony truss	<b>Year Constructed:</b>	1920 (est.)
<b>No. Spans:</b>	1	<b>Width:</b>	4.5m
<b>Approaches:</b>	Asphalt	<b>Length:</b>	30.9m
<b>Wearing Surface:</b>	Laminated 2x6 timber deck		

**Remarks:**

- Hazard marker signs on all four corners.
- The steel guiderail is damaged due to impact on the northwest, southwest, northeast corners and each side of the deck. Two posts on the southwest approach have severe damage.
- The steel guiderail is no longer connected to one vertical web member on the south truss.
- The south truss appears to be out of alignment, bowed outwards.
- Steel pony trusses and stringers are moderately rusted. Floor beams are deteriorating more rapidly due to corrosion.
- Bottom chord on east side of south truss has been permanently deformed by impact.
- Bottom chord on north truss is out of alignment.
- Five vertical web members on the south truss and three vertical web members on the north truss are which were previously noted to be damaged have been replaced. One of the new members has been impacted and is permanently deformed
- The diagonal flat bar members which make up the lattice work on the trellises have been permanently deformed on all 6 trellises on the north truss.
- Concrete facing of east abutment is severely spalled and delaminated. The facing in the southeast corner of abutment and ballast wall have severely deteriorated exposing reinforcing steel.
- 200 mm concrete facing has been added at east and west abutment. The concrete facing is spalling, cracking and delaminating on both sides.
- All truss bearing seats on east side are badly deteriorated with reinforcing steel exposed. A portion of the seat is exposed where concrete has spalled away.
- Concrete in northeast ballast walls has spalled.
- There is severe spider cracking and delamination in the east abutment wall.
- There is no rip-rap protection in front of the abutment walls. There are small amounts of scour damage on each abutment.
- There is significant build-up of gravel and sand at either side of the deck.
- Note that when a regular pickup truck crosses the bridge the structure shakes.

**Conclusions:**

Generally the structure appears to be in overall poor condition. The south truss appears to be out of alignment, both bottom chords are out of alignment and numerous vertical web truss members are damaged or broken. These members are secondary members that are theoretically zero force members, so failure of these members does not automatically mean failure of the structure. Nonetheless, these members should be replaced or reinforced. The concrete facing is also badly deteriorating and may be becoming unstable.

It is recommended that a detailed structural evaluation of the bridge be completed to confirm the current posting.

**Recommendations:**

1. Complete a load posting evaluation immediately to determine if current posting is accurate
2. Consider closing the bridge or completing major rehabilitation within 1 year.
3. Reduce speed limit on structure to 30 km/hr to avoid additional impact to structure.
4. Install bearing blocks behind guiderail on deck or install curb along each side of deck to prevent vehicles from impacting the web members of the trusses (within 2 years).
5. New abutment seats are required at the east end and the east abutment is to be refaced. This was recommended in our 2007 report.
6. Clean gravel off deck (1-3 years).
7. Clean bearing seats (1-3 years).

**GM BLUEPLAN ENGINEERING LIMITED**

Per:



Frank R. Palmay, P.Eng.





## **APPENDIX C: SITE PHOTOGRAPHS**

**STRUCTURE NO. 0011 REHABILITATION OPTIONS– 2017  
MUNICIPALITY OF BROCKTON  
GREENOCK**

Structure No. 0011



**Photo 1** - View of structure from west.



**Photo 2** - View of structure from southeast

**STRUCTURE NO. 0011 REHABILITATION OPTIONS– 2017**  
**MUNICIPALITY OF BROCKTON**  
**GREENOCK**

Structure No. 0011



**Photo 3** - View of underside of bridge.



**Photo 4** - View of damaged truss lattice.

**STRUCTURE NO. 0011 REHABILITATION OPTIONS– 2017**  
**MUNICIPALITY OF BROCKTON**  
**GREENOCK**

Structure No. 0011



**Photo 5** - View of deteriorated steel stringer.



**Photo 6** - View of deteriorated steel stringer and west bearing seat.

**STRUCTURE NO. 0011 REHABILITATION OPTIONS– 2017  
MUNICIPALITY OF BROCKTON  
GREENOCK**

Structure No. 0011



**Photo 7** - View damaged steel plate at southeast corner of truss.



**Photo 8** - View of steel floor beams



**STRUCTURE NO. 0011 REHABILITATION OPTIONS– 2017**  
**MUNICIPALITY OF BROCKTON**  
**GREENOCK**

Structure No. 0011



**Photo 9** - View of cracking and deterioration on east abutment.



**Photo 10**- View of spalled concrete on east wing wall

**STRUCTURE NO. 0011 REHABILITATION OPTIONS– 2017  
MUNICIPALITY OF BROCKTON  
GREENOCK**

Structure No. 0011



**Photo 11** - View of deterioration on west abutment.



**Photo 12-** View of exposed steel on east abutment



**APPENDIX D:**  
**CONSTRUCTION OPTION COST ESTIMATES**

**Project No. 212328**

**PRELIMINARY COST ESTIMATE  
GREENOCK BRIDGE 0011  
MUNICIPALITY OF BROCKTON  
FULL STRUCTURE REPLACEMENT  
OPTION "A"**

Item No.	Description	Qty.	Unit of Measure	Unit Price	Total Price
1	Bonding, Insurance, Mobilization and Demobilization	100%	L.S.	\$ 50,000.00	\$ 50,000.00
2	Environmental Protection	100%	L.S.	\$ 20,000.00	\$ 20,000.00
3	Temporary Signage & Traffic Control	100%	L.S.	\$ 10,000.00	\$ 10,000.00
4	Removal and Disposal of Existing Structure	100%	L.S.	\$ 45,000.00	\$ 45,000.00
5	Supply and Installation of Peastone Cofferdams	300	m <sup>2</sup>	\$ 200.00	\$ 60,000.00
6	Excavation and Disposal of Granulars and Backfill	100%	L.S.	\$ 35,000.00	\$ 35,000.00
7	Dewatering	100%	L.S.	\$ 25,000.00	\$ 25,000.00
8	Supply and Place Concrete for Mudslabs	10	m <sup>3</sup>	\$ 400.00	\$ 4,000.00
9	Supply and Install Concrete Footings	125	m <sup>3</sup>	\$ 400.00	\$ 50,000.00
10	Supply and Install Concrete Wingwall and Abutments	45	m <sup>3</sup>	\$ 900.00	\$ 40,500.00
11	Provide and Install Pre-Eng Steel Bridge	100%	L.S.	\$ 400,000.00	\$ 400,000.00
12	Supply and Install Reinforced Concrete Deck	40	m <sup>3</sup>	\$ 1,500.00	\$ 60,000.00
13	Supply and Place Granulars	200	tonne	\$ 30.00	\$ 6,000.00
14	Supply and Install Guide Rail System Approaches	240	m	\$ 125.00	\$ 30,000.00
15	Supply and Install Guide Rail End Treatment	4	each	\$ 2,800.00	\$ 11,200.00
16	Site Restoration	100%	L.S.	\$ 15,000.00	\$ 15,000.00
<b>ESTIMATED TOTAL CONSTRUCTION COST</b>					<b>\$ 861,700.00</b>
<b>CONTINGENCY ALLOWANCE (10%)</b>					<b>\$ 86,170.00</b>
<b>CULTURAL AND HERITAGE EVALUATION REPORT</b>					<b>\$ 6,000.00</b>
<b>ENGINEERING AND CONTRACT ADMINISTRATION</b>					<b>\$ 60,000.00</b>
<b>PROJECT TOTAL</b>					<b>\$ 1,013,870.00</b>

**Project No. 212328**

**PRELIMINARY COST ESTIMATE  
GREENOCK BRIDGE 0011  
MUNICIPALITY OF BROCKTON  
REPLACEMENT OF STEEL MEMBERS  
REHAB CAST-IN-PLACE CONCRETE STRUCTURE  
OPTION "B"**

Item No.	Description	Qty.	Unit of Measure	Unit Price	Total Price
<b>Anticipated 2017 Cost</b>					
1	Bonding, Insurance, Mobilization and Demobilization	100%	L.S.	\$ 50,000.00	\$ 50,000.00
2	Environmental Protection	100%	L.S.	\$ 20,000.00	\$ 20,000.00
3	Temporary Signage & Traffic Control	100%	L.S.	\$ 10,000.00	\$ 10,000.00
4	Removal and Disposal Existing Super Structure	100%	L.S.	\$ 25,000.00	\$ 25,000.00
5	Supply and Installation of Peastone Cofferdams	300	m <sup>2</sup>	\$ 200.00	\$ 60,000.00
6	Dewatering	100%	L.S.	\$ 25,000.00	\$ 25,000.00
7	Excavation and grading for structure and approaches	100%	L.S.	\$ 10,000.00	\$ 10,000.00
8	Chip and patch and partial re-facing of concrete abutments	25	m <sup>2</sup>	\$ 1,500.00	\$ 37,500.00
9	Provide and Install Pre-Eng Steel Bridge	100%	L.S.	\$ 400,000.00	\$ 400,000.00
10	Supply and Install Reinforced Concrete Deck	40	m <sup>3</sup>	\$ 1,500.00	\$ 60,000.00
11	Supply and Place Granulars	50	tonne	\$ 30.00	\$ 1,500.00
12	Supply and Install Guide Rail System Approaches	240	m	\$ 125.00	\$ 30,000.00
13	Supply and Install Guide Rail end treatment	4	each	\$ 2,800.00	\$ 11,200.00
13	Site Restoration	100%	L.S.	\$ 15,000.00	\$ 15,000.00
<b>ESTIMATED TOTAL CONSTRUCTION COST</b>					<b>\$ 755,200.00</b>
CONTINGENCY ALLOWANCE (10%)					\$ 75,520.00
CULTURAL AND HERITAGE EVALUATION REPORT					\$ 6,000.00
ENGINEERING AND CONTRACT ADMINISTRATION					\$ 60,000.00
<b>PROJECT TOTAL</b>					<b>\$ 896,720.00</b>

**Project No. 212328**

**PRELIMINARY COST ESTIMATE  
GREENOCK BRIDGE 0011  
MUNICIPALITY OF BROCKTON  
REPLACEMENT OF STEEL MEMBERS  
REHAB CAST-IN-PLACE CONCRETE STRUCTURE  
OPTION "B"**

<b>Anticipated 2037 Cost (In 2017 Dollars)</b>					
1	Bonding, Insurance, Mobilization and Demobilization	100%	L.S.	\$ 50,000.00	\$ 50,000.00
2	Environmental Protection	100%	L.S.	\$ 20,000.00	\$ 20,000.00
3	Temporary Signage & Traffic Control	100%	L.S.	\$ 10,000.00	\$ 10,000.00
4	Removal and Disposal of Existing Structure	100%	L.S.	\$ 45,000.00	\$ 45,000.00
5	Supply and Installation of Peastone Cofferdams	300	m <sup>2</sup>	\$ 200.00	\$ 60,000.00
6	Excavation and Disposal of Granulars and Backfill	100%	L.S.	\$ 35,000.00	\$ 35,000.00
7	Dewatering	100%	L.S.	\$ 25,000.00	\$ 25,000.00
8	Supply and Place Concrete for Mudslabs	10	m <sup>3</sup>	\$ 400.00	\$ 4,000.00
9	Supply and Install Concrete Footings	125	m <sup>3</sup>	\$ 400.00	\$ 50,000.00
10	Supply and Install Concrete Wingwall and Abutments	45	m <sup>3</sup>	\$ 900.00	\$ 40,500.00
11	Site Restoration	100%	L.S.	\$ 15,000.00	\$ 15,000.00
<b>ESTIMATED TOTAL CONSTRUCTION COST</b>					<b>\$ 354,500.00</b>
CONTINGENCY ALLOWANCE (10%)					\$ 35,450.00
ENGINEERING AND CONTRACT ADMINISTRATION					\$ 50,000.00
<b>PROJECT TOTAL</b>					<b>\$ 439,950.00</b>

**Project No. 212328**

**PRELIMINARY COST ESTIMATE  
GREENOCK BRIDGE 0011  
MUNICIPALITY OF BROCKTON  
REPLACEMENT OF STEEL STRINGERS AND FLOOR BEAMS  
REHAB CAST-IN-PLACE CONCRETE STRUCTURE  
OPTION "C"**

Item No.	Description	Qty.	Unit of Measure	Unit Price	Total Price
<b>Anticipated 2017 Cost</b>					
1	Bonding, Insurance, Mobilization and Demobilization	100%	L.S.	\$ 50,000.00	\$ 50,000.00
2	Environmental Protection	100%	L.S.	\$ 20,000.00	\$ 20,000.00
3	Temporary Signage & Traffic Control	100%	L.S.	\$ 10,000.00	\$ 10,000.00
4	Removal and Disposal of Existing Structure	100%	L.S.	\$ 25,000.00	\$ 25,000.00
5	Supply and Installation of Peastone Cofferdams	300	m <sup>2</sup>	\$ 200.00	\$ 60,000.00
6	Excavation and Grading for Structure and Approaches	100%	L.S.	\$ 8,000.00	\$ 8,000.00
7	Dewatering	100%	L.S.	\$ 25,000.00	\$ 25,000.00
8	Chip and patch and partial re-facing of concrete abutments	25	m <sup>2</sup>	\$ 1,500.00	\$ 37,500.00
9	Provide and Install Steel Stringers and Cross Beams	100%	L.S.	\$ 200,000.00	\$ 200,000.00
10	Supply and Place Granulars	50	tonne	\$ 30.00	\$ 1,500.00
11	Supply and Install Guide Rail System Approaches	240	m	\$ 125.00	\$ 30,000.00
12	Supply and Install Guide Rail End Treatment	4	each	\$ 2,800.00	\$ 11,200.00
13	Site Restoration	100%	L.S.	\$ 15,000.00	\$ 15,000.00
<b>ESTIMATED TOTAL CONSTRUCTION COST</b>					<b>\$ 493,200.00</b>
CONTINGENCY ALLOWANCE (10%)					\$ 49,320.00
ENGINEERING AND CONTRACT ADMINISTRATION					\$ 60,000.00
<b>PROJECT TOTAL</b>					<b>\$ 602,520.00</b>

**Project No. 212328**

**PRELIMINARY COST ESTIMATE  
GREENOCK BRIDGE 0011  
MUNICIPALITY OF BROCKTON  
REPLACEMENT OF STEEL STRINGERS AND FLOOR BEAMS  
REHAB CAST-IN-PLACE CONCRETE STRUCTURE  
OPTION "C"**

Item No.	Description	Qty.	Unit of Measure	Unit Price	Total Price
<b>Anticipated 2027 Cost (In 2017 Dollars)</b>					
1	Bonding, Insurance, Mobilization and Demobilization	100%	L.S.	\$ 50,000.00	\$ 50,000.00
2	Environmental Protection	100%	L.S.	\$ 20,000.00	\$ 20,000.00
3	Temporary Signage & Traffic Control	100%	L.S.	\$ 10,000.00	\$ 10,000.00
4	Removal and Disposal of Existing Structure	100%	L.S.	\$ 25,000.00	\$ 25,000.00
5	Dewatering	100%	L.S.	\$ 25,000.00	\$ 25,000.00
6	Provide and Install Steel Trusses	100%	L.S.	\$ 200,000.00	\$ 200,000.00
7	Site Restoration	100%	L.S.	\$ 15,000.00	\$ 15,000.00
<b>ESTIMATED TOTAL CONSTRUCTION COST</b>					<b>\$ 345,000.00</b>
CONTINGENCY ALLOWANCE (10%)					\$ 34,500.00
CULTURAL AND HERITAGE EVALUATION REPORT					\$ 6,000.00
ENGINEERING AND CONTRACT ADMINISTRATION					\$ 40,000.00
<b>PROJECT TOTAL</b>					<b>\$ 425,500.00</b>

**Project No. 212328**

**PRELIMINARY COST ESTIMATE  
GREENOCK BRIDGE 0011  
MUNICIPALITY OF BROCKTON  
REPLACEMENT OF STEEL STRINGERS AND FLOOR BEAMS  
REHAB CAST-IN-PLACE CONCRETE STRUCTURE  
OPTION "C"**

Item No.	Description	Qty.	Unit of Measure	Unit Price	Total Price
<b>Anticipated 2037 Cost (In 2017 Dollars)</b>					
1	Bonding, Insurance, Mobilization and Demobilization	100%	L.S.	\$ 50,000.00	\$ 50,000.00
2	Environmental Protection	100%	L.S.	\$ 20,000.00	\$ 20,000.00
3	Temporary Signage & Traffic Control	100%	L.S.	\$ 10,000.00	\$ 10,000.00
4	Removal and Disposal of Existing Structure	100%	L.S.	\$ 45,000.00	\$ 45,000.00
5	Supply and Installation of Peastone Cofferdams	300	m <sup>2</sup>	\$ 200.00	\$ 60,000.00
6	Excavation and Disposal of Granulars and Backfill	100%	L.S.	\$ 35,000.00	\$ 35,000.00
7	Dewatering	100%	L.S.	\$ 25,000.00	\$ 25,000.00
8	Supply and Place Concrete for Mudslabs	10	m <sup>3</sup>	\$ 400.00	\$ 4,000.00
9	Supply and Install Concrete Footings	125	m <sup>3</sup>	\$ 400.00	\$ 50,000.00
10	Supply and Install Concrete Wingwall and Abutments	45	m <sup>3</sup>	\$ 900.00	\$ 40,500.00
11	Site Restoration	100%	L.S.	\$ 15,000.00	\$ 15,000.00
<b>ESTIMATED TOTAL CONSTRUCTION COST</b>					<b>\$ 354,500.00</b>
<b>CONTINGENCY ALLOWANCE (10%)</b>					<b>\$ 35,450.00</b>
<b>ENGINEERING AND CONTRACT ADMINISTRATION</b>					<b>\$ 50,000.00</b>
<b>PROJECT TOTAL</b>					<b>\$ 439,950.00</b>



## **APPENDIX E: STATEMENT OF LIMITATIONS**

## **STATEMENT OF LIMITATIONS**

This report is intended exclusively for the Client(s) named in the report. The material in it reflects our best judgment in light of the information reviewed by GM BluePlan Engineering Limited at the time of preparation. Unless otherwise agreed in writing by GM BluePlan Engineering Limited, this report shall not be used to imply warranty as to the fitness of the property for a particular purpose. This report is not a certification of compliance with past or present regulations. No portion of this report may be used as a separate entity, it is written to be read in its entirety.

Only the specific information identified has been reviewed. The consultant is not obligated to identify mistakes or insufficiencies in the information obtained from the various sources or to verify the accuracy of the information. The Consultant may use such specific information obtained in performing its services and is entitled to rely upon the accuracy and completeness thereof.

This assessment does not wholly eliminate uncertainty regarding the potential for existing or future costs, hazards or losses in connection with a property. No physical or destructive testing and no design calculations have been performed unless specifically recorded. Conditions existing but not recorded were not apparent given the level of study undertaken. We can perform further investigation on items of concern if so required.



**CHUNG & VANDER DOELEN**  
ENGINEERING LTD.

**GEOTECHNICAL INVESTIGATION  
BROCKTON BRIDGE 11 REPLACEMENT  
CONCESSION ROAD 20  
MUNICIPALITY OF BROCKTON**

**Submitted to:**

Municipality of Brockton  
100 Scott Street  
Walkerton, Ontario  
N0G 2V0

**Attention:**

Mr. John Strader

**FILE NO / G17465 / September 19, 2017**



**CHUNG & VANDER DOELEN  
ENGINEERING LTD.**

311 VICTORIA STREET NORTH  
KITCHENER / ONTARIO / N2H 5E1  
519-742-8979

September 19, 2017  
**FILE NO.:** G17465

Municipality of Brockton  
100 Scott Street  
Walkerton, Ontario  
N0G 2V0

Attention: Mr. John Strader

**Re: GEOTECHNICAL INVESTIGATION  
BROCKTON BRIDGE 11 REPLACEMENT  
CONCESSION ROAD 20  
MUNICIPALITY OF BROCKTON**

We take pleasure in enclosing one copy of our Geotechnical Investigation Report carried out at the above-referenced site. Soil samples will be retained for a period of three (3) months and will thereafter be disposed of unless we are otherwise instructed.

If you have any questions or clarifications are required, please contact the undersigned at your convenience.

We thank you for giving us this opportunity to be of service to you.

Yours truly,  
**CHUNG & VANDER DOELEN ENGINEERING LTD.**

Robert Vander Doelen, P. Eng.  
Senior Engineer

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## **1.0 INTRODUCTION**

CHUNG & VANDER DOELEN ENGINEERING LTD. (CVD) has been retained by the Municipality of Brockton to conduct a geotechnical investigation for the proposed replacement of Bridge 11 located on Concession Road 20 crossing the Teeswater River south of the village of Paisley.

It is understood that the existing bridge will be reconstructed to improve the crossing. The proposed bridge will be single-span, 31 m long and may be widened to two lanes. It is anticipated that the finished grade of the replacement bridge deck will be close to that of the existing bridge. It is anticipated that footing foundations can be used to support the replacement bridge, however, driven H-piles could be chosen as a foundation alternative.

The purpose of the investigation was to determine the subsurface conditions at the site and, based on the findings, make geotechnical recommendations for the design and construction of the foundation elements of the proposed replacement bridge.

## **2.0 FIELD WORK**

Two (2) boreholes, one at each abutment, were drilled and sampled to depths of 8.5 and 10.7 m below existing grades in order to investigate the subsurface conditions. The boreholes were advanced to strata suitable for supporting a pile foundation and the locations are shown on Drawing No. 1, appended.

The field work for this project was completed on August 8, 2017 under the supervision of a member of our engineering team who logged the boreholes in the field, effected the subsurface sampling and monitored the groundwater conditions. The site underground utilities were located prior to commencement of the field drilling program.

The borehole was advanced to the sampling depth using a power auger drilling rig equipped with continuous flight hollow stem augers and standard soil sampling equipment. Standard penetration tests (SPTs) in accordance with ASTM Specification D 1586-99 were carried out at frequent intervals of depth, and the results are shown on the Borehole Logs as Penetration Resistance or "N"-values. The compactness condition or consistency of the soil strata has been inferred from these test results.

Samples obtained from the insitu tests were examined in the field and subsequently taken to our laboratory for detailed description and moisture content determination.





The locations of the boreholes were established in the field by CVD. Ground surface elevations at the boreholes were surveyed by this office and are referenced to a temporary benchmark (TBM) established as:

TBM: Top of existing east bridge abutment on south side of roadway

Elevation: 100.00 m (assumed)

### **3.0 EXISTING CONDITION**

The existing bridge spans the Teeswater River and is 31± m long. The approach on the east side of the bridge is generally flat while the approach on the west side of the bridge is significantly sloped.

### **4.0 SUBSURFACE CONDITIONS**

The subsurface conditions encountered at the boreholes are detailed on the Borehole Log Sheets, Enclosures 1 and 2 of this report. The following notes are intended to amplify and comment on the subsurface data.

The stratigraphic boundaries shown on the borehole logs are inferred from non-continuous sampling and, therefore, represent transitions between soil types rather than exact planes of geologic change.

#### **4.1 Pavement**

Asphalt measuring 50 mm thick underlain by 300 mm thick granular base was contacted at both boreholes. 50 mm of Granular "A" overlies the asphalt at Borehole 2.

#### **4.2 Fill**

The surficial pavement layer was underlain by dark brown to brown sand and silt fill with a trace of gravel and occasional cobbles, organics and clayey pockets which extended to depths of 3.6 and 2.9 m below existing grades, respectively, at Boreholes 1 and 2.



Standard penetration testing in the fill yielded “N”-values between 5 and 8 blows per 300 mm, indicating a loose compactness condition. Natural moisture contents were measured between 9 and 27%, the higher values being indicative of organics.

#### 4.3 Organics

The fill was underlain by black organics with some wood fragments which extended to depths of 4.1 and 3.5 m below existing grades, respectively, at Boreholes 1 and 2. The organics were in a compressed condition.

#### 4.4 Sand and Silt Till

The organics at Borehole 1 was underlain by grey sand and silt till with some gravel and cobbles and a trace of clay which extended to a depth of 6.1 m below existing grade.

Standard penetration testing yielded “N”-values between 22 and 49 blows per 300 mm, indicating a compact to dense compactness condition. A natural moisture content of 12% was measured, indicating a moist moisture condition.

#### 4.5 Clayey Silt Till

The organics at Borehole 2 was underlain by grey clayey silt till with a trace of gravel and sand which extended to a depth of 6.0 m below existing grade.

Standard penetration testing yielded “N”-values of 29 and greater than 100 blows per 300 mm, indicating a hard consistency. Natural moisture contents of 11 and 12% were measured, indicating a damp moisture condition.

#### 4.6 Bedrock

The till at Boreholes 1 and 2 were underlain by brown weathered carbonate bedrock which extended to depths of 9.2 and at least 8.5 m below existing grade at Boreholes 2 and 1, respectively. The carbonate bedrock at Borehole 2 was further underlain by weathered red shale which extended to a depth of at least 10.7 m below existing grade.



The bedrock layers were penetrated to 2.4 and 4.7 m depths by the 82 mm ID hollow stem augers before being terminated at their respective depths of 8.5 and 10.7 m below existing grades due to auger refusal.

The bedrock is described as being comprised of brown aphanatic dolostone with minor shaley dolomite of the Bass Island Formation of Upper Silurian age according to the "Paleozoic Geology of Southern Ontario" document (Ontario Ministry of Northern Development and Mines, 1972).

#### **4.7 Groundwater Condition**

Groundwater conditions were monitored during advancement of borehole augering and immediately following withdrawal of the drilling augers at each borehole location.

Water levels were measured at depths of 4.0 and 4.8 m below existing grades at Boreholes 1 and 2, respectively. It is expected that the water level at Borehole 2 would rise to 4± m depth given sufficient time to stabilize. The groundwater levels are expected to stabilize near the surface water level of the river.

It is noted that the groundwater table will fluctuate seasonally and in response to major weather events.



## 5.0 DISCUSSION AND RECOMMENDATIONS

It is understood that the existing bridge will be reconstructed to improve the crossing. The proposed bridge will be single-span, 31 m long and may be widened to two lanes. It is anticipated that the finished grade of the replacement bridge deck will be close to that of the existing bridge. It is anticipated that footing foundations can be used to support the replacement bridge, however, driven H-piles could be chosen as a foundation alternative.

### 5.1 Footing Foundations

Conventional strip and spread footing foundations can be used to support the proposed bridge. Footings cast on competent native dense sand and silt till or hard clayey silt till can be designed using a Geotechnical Reaction at SLS of 360 kPa. The SLS value given above is based on a maximum settlement of 25 mm under the footing foundations. The Factored Geotechnical Resistance at ULS is 600 kPa.

The following table summarizes the highest founding level and elevation for the footing at each borehole location:

Borehole No.	Existing Ground Elevation (m)	Highest Founding Depth (m)	Highest Founding Elevation (m)
1	99.63	4.53	95.1
2	99.32	4.22	95.1

These soil bearing pressures can be achieved provided that the founding subgrade is undisturbed during construction. The majority of the settlements will take place during construction and the first loading cycle of the building.

Under inclined loading conditions, the bearing resistance at ULS should be reduced in accordance with Clause 6.10.4 of CAN/CSA-S6-14.



It is recommended that a lean concrete mat be placed over approved footing subgrade in wet or saturated areas to prevent further disturbance to the bearing soils resulting from construction activities.

It is recommended that the footing excavations be inspected by the geotechnical engineer to ensure adequate soil bearing and proper subgrade preparation.

## 5.2 Pile Foundations

Pile foundations would be required for an integral abutment bridge design. Typically, H-Piles are driven to practical refusal to achieve full axial capacity. The bedrock encountered at the site would provide practical refusal required to achieve full axial capacity.

The replacement bridge should be designed to withstand the appropriate traffic loadings (CL-625-ONT), temporary construction loads and critical loading effects during construction.

To achieve the necessary flexibility for an integral abutment design, the top 3 m of each pile below the abutment stem should be surrounded by two concentric CSPs, generally as illustrated in Figure 6 of the MTO Report SO-96-01 "Integral Abutment Bridges".

It is recommended that steel H-piles be driven to/into the underlying bedrock to support the bridge. It is envisaged that the piles will meet practical refusal after being driven through the overburden soils into the bedrock and can be considered to be essentially end-bearing in the bedrock. Consequently, the pile tip elevation will be close to 93.0± m.

The following axial resistances are recommended for HP 310x110 steel pile:

Factored Axial Resistance at ULS	= 1,700 kN
Axial Resistance at SLS	= 1,200 kN

The Serviceability condition is based on the premise that the maximum total settlement will not exceed 25 mm.

The pile spacing should be at least 3 times the pile diameter. For closer spacing, a slight reduction in the quoted pile capacity is required due to group effects. CVD can provide further assistance if required.





The following table summarizes the estimated pile tip elevations:

Borehole	Ground Surface Elevation (m)	Estimated Pile Tip Elevation (m)	Length of Pile (m)
1	99.63	6.33	93.30
2	99.32	6.22	93.10

Although not encountered during the advancement of the boreholes, it is possible that boulders could be present in overburden soil deposits lying above the bedrock.

### 5.3 Pile Resistance to Lateral Loads

To provide the required flexibility in the piles, the top 3 m of each pile below the abutment stem should be surrounded by a 600 mm diameter CSP as specified by the integral abutment design procedure in MTO Report SO-96-01 "integral Abutment Bridges". The space between the pile and the pre-drilled oversize hole should be backfilled with sand after the pile is driven. The lateral resistance may be assumed to have a value of  $k_s = 1,200 \text{ kPa/m}$ .

Since the pile length is expected to be in the order of 3 m, all of the lateral resistance will be generated in the sand filled CSP. If the lateral pile capacity is not sufficient to support the lateral loading, battered piles can be employed.

The values for  $k_s$  must be reduced based on the closeness of the piles and the direction of the applied lateral loading. The reduction factors are listed in the following table.

Pile Spacing Perpendicular to Direction of Loading		Pile Spacing in Direction of Loading	
centerline to centerline distance between Piles	reduction factor (multiply $k_s$ by factor)	centerline to centerline distance between Piles	reduction factor (multiply $k_s$ by factor)
4 D and more	1	8 D and more	1
3.5 D	0.69	6 D	0.7
2.5 D	0.63	4 D	0.4
2.0 D	0.5	3 D and less	0.25





## 5.4 Pile Driving

The piles should be provided with driving shoes in accordance with OPSD 3301.00.

In accordance with MTO standard practice, the piles should be driven to pre-determined elevations as recommended in the previous section, after which driving should be controlled by the Hiley formula. An ultimate capacity of 3400 kN (2 times the factored axial resistance at ULS) can be used.

In accordance with the above criterion, we recommend that the piles should be driven to about 1 m above the quoted design elevations and driving should then be monitored and controlled by employing the Hiley Dynamic Pile Driving Formula in accordance with MTO Standards SS 103-10 or SS 103-11. If the driven pile encounters refusal above the recommended elevations, the geotechnical engineer should be notified immediately.

The pile driving should be carried out using a hammer capable of delivering energy of at least 40 kJ but not exceeding 60 kJ.

During the driving process, piles, which have already been driven, should be monitored to determine if they are heaving due to the effects of driving adjacent piles. If this phenomenon occurs, the affected piles should be re-driven.

It is recommended that not less than 15% of the piles and at least three (3) piles at each foundation element be re-struck one to two days after initial installation as a precaution against relaxation. If relaxation is deemed to have occurred, then all piles in that foundation element should be re-struck.

It is possible that the piles may be driven several meters above or below the estimated tip elevations. This aspect should be taken into consideration when ordering piles.

The base of the pile caps should be provided with a minimum 1.2 m of earth cover for frost protection purposes.

Groundwater levels should be maintained by a dewatering system to 600 mm below the underside of pile caps to protect the base from disturbance.



## 5.5 Earthquake Consideration

In accordance with the Canadian Highway Bridge Design Code (CAN/CSA-S6-14), the proposed bridge structure should be designed to resist seismic loading.

Based on the soils and bedrock condition encountered at the boreholes, the site can be classified as a Site Class C (very dense soil and soft rock) as per Section 4.4.3.2, Site Properties.

## 5.6 Lateral Earth Pressure

The lateral earth pressures acting on the bridge abutments will depend on the type and method of placement of the backfill materials and on the subsequent lateral movement of the structure. The lateral earth pressures to be used in the design should be computed in accordance with Section 6.12 of CAN/CSA-S6-14.

The granular backfill should conform to OPSS Form 1010 for either Granular "A" or "B" Type I. To maintain free-draining characteristics in granular fill materials, the maximum percentage passing the No. 200 sieve (75 mm) should be limited to 5%. The excavated material is not considered suitable as granular backfill. Free-draining granular material specified above should be imported.

The backfill should be placed in accordance with OPSS 501. Any slopes should be benched as per OPSD 208.010 prior to backfill placement. A perforated sub-drain must be installed behind the walls with a positive outlet to maintain the granular fill in a drained condition. Alternatively, weep holes can be used to effect drainage.

The lateral earth pressure,  $P_h$ , may be computed using the equivalent fluid pressures presented in Clause 6.12.2.3 of CAN/CSA-S6-14.

Alternatively, the following equation based on unfactored earth pressure distributions can be used. The factored resistance can be calculated by using a factor of 0.8.

$$P_h = K (\gamma h + q)$$

Where:

K	=	earth pressure coefficient, use value from table below
$\gamma$	=	unit weight of soil = 21.2 kN/m <sup>3</sup> for Granular "B" Type I
		= 22.8 kN/m <sup>3</sup> for Granular "A"
h	=	depth below top of wall, m
q	=	surcharge pressure, of 0.8 m of fill as per Clause 6.12.5, CAN/CSA-S6-14



Wall Type	Earth Pressure Coefficient (K)	
	Granular "A" ( $\phi = 35^\circ$ )	Granular "B" Type I ( $\phi = 30^\circ$ )
Restrained Wall ( $K_o$ )	0.43	0.50
Unrestrained Wall ( $K_a$ )	0.27	0.33

The submerged unit weight of the backfill should be used for any submerged portion of the granular backfill when calculating the lateral earth pressure.

The above parameters are based on a horizontal back slope (not exceeding  $5^\circ$ ) behind the abutment walls. If concrete approach slabs are not provided, an additional load equivalent to 800 mm of fill should be superimposed on the wall loading to account for traffic surcharge loading.

A compaction surcharge equal to 12 kPa should be included in the lateral earth pressures for the structural design of the abutment and retaining walls in accordance with Clause 6.12.3 of CAN/CSA-S6-14. Vibratory equipment for use behind abutments and wing walls should be restricted in size as per current MTO practices.

## 5.7 Construction and Groundwater Control

Excavation for this project will involve the removal of the existing bridge structure and excavation for the abutment footings or pile cap founding level. Excavations to 4 to 5 m deep below the existing road surface are potentially expected if footing foundations are utilized. Excavations to depths of 5 m should not present any special difficulties using heavy excavation equipment. Groundwater control can be achieved with temporary stream diversion and pumping from filtered sumps. Perimeter intercept ditching is recommended to collect seepage water from the cut slope face.

To improve the stability of the base of the excavation and thus the operation, a 300 mm thick 50 mm clear crushed stone or recycled concrete can be used to cover the base of the excavation.

All excavations must be carried out in compliance with the requirements of the current Occupational Health and Safety Act (OHSA). For this purpose, the upper fill materials, compressed organics and the upper stratum of the native till soils are generally classified as Type 3 soils and excavations should be cut to no steeper than 1H : 1V throughout.

Proper groundwater control must be maintained throughout the construction of the foundation and abutment walls and during backfilling. Where saturated granular deposits are exposed, the cut slopes may have to be temporarily flattened to 2H : 1V during excavation until the groundwater bleeds out.



## **5.8 Embankment Widening**

Preparation for approach embankment widening is to include removal of surficial topsoil, loose sand and silt fill, buried organics and any other deleterious materials prior to placing competent fill materials. Embankment construction should use imported granular materials. Embankments constructed using these materials and/or approved imported suitable soils can be safely constructed with side slopes of not steeper than 2.5 H : 1V.

Backfill adjacent to the abutments should be carried out in conformance with OPSD 3501.00, and the fill should be placed in accordance with OPSS 501. Local steepening of the embankment slope adjacent to the abutment to 1.5H : 1V is feasible, provided that the slope surface is protected with rip-rap.

The fill placement should begin at the toe of the embankment, in levelled lifts and each lift compacted to at least 98% SPMDD. The new embankment fill should be benched into the existing embankment as per OPSD 208.010.

The exposed subgrade should be inspected and approved by the geotechnical engineer. The approved subgrade should then be proof-rolled using a heavy compactor, as directed by the engineer. No unusual dewatering is anticipated during stripping and preparation of the subgrade to receive the embankment fills unless the excavation is carried out in wet weather conditions. Where necessary, gravity drainage and pumping from open filtered sumps should suffice.

Measures should be incorporated into the design and staging to ensure that the slope surfaces are protected from surface erosion. Proper erosion control measures should be implemented both during construction of the embankment fills and permanently. Erosion control during construction should be carried out by installing silt fences. Properly designed erosion control blankets could also be placed on any new embankments after completion of fill placement. A vegetative cover should be established as soon as practical upon completion of fill placement to minimize the chances of surface erosion.

Revetments such as a rip-rap blanket should be provided at the toe of the slope to prevent erosion/scour by surface water. The design of the rip-rap blanket should be carried out cognizant of the stream hydraulics.





## 6.0 CLOSURE

The Limitations of Report, as quoted in Appendix "A", is an integral part of this report.

We trust that the information presented in this report is complete within our terms of reference. If there are any further questions concerning this report, please do not hesitate to contact our office.

Yours truly,  
**CHUNG & VANDER DOELEN ENGINEERING LTD.**



Robert Vander Doelen, P. Eng.  
Senior Engineer



Eric Y. Chung, M. Eng., P. Eng.  
Principal Engineer



# **APPENDIX “A”**

## **LIMITATIONS OF REPORT**





# APPENDIX "A"

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## LIMITATIONS OF REPORT

The conclusions and recommendations given in this report are based on information determined at the testhole locations. Subsurface and groundwater conditions between and beyond the testholes may differ from those encountered at the testhole locations, and conditions may become apparent during construction which could not be detected or anticipated at the time of the site investigation. It is recommended practice that the Soils Engineer be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered in the testholes.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of testholes may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusion as to how the subsurface conditions may affect their work.

The benchmark and elevations mentioned in this report were obtained strictly for use in the geotechnical design of the project and by this office only, and should not be used by any other parties for any other purposes.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. CHUNG & VANDER DOELEN ENGINEERING LIMITED accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This report does not reflect the environmental issues or concerns unless otherwise stated in the report. The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known, we recommend that we be retained during the final design stage to verify that the design is consistent with our recommendations, and that assumptions made in our analysis are valid.



# ENCLOSURES



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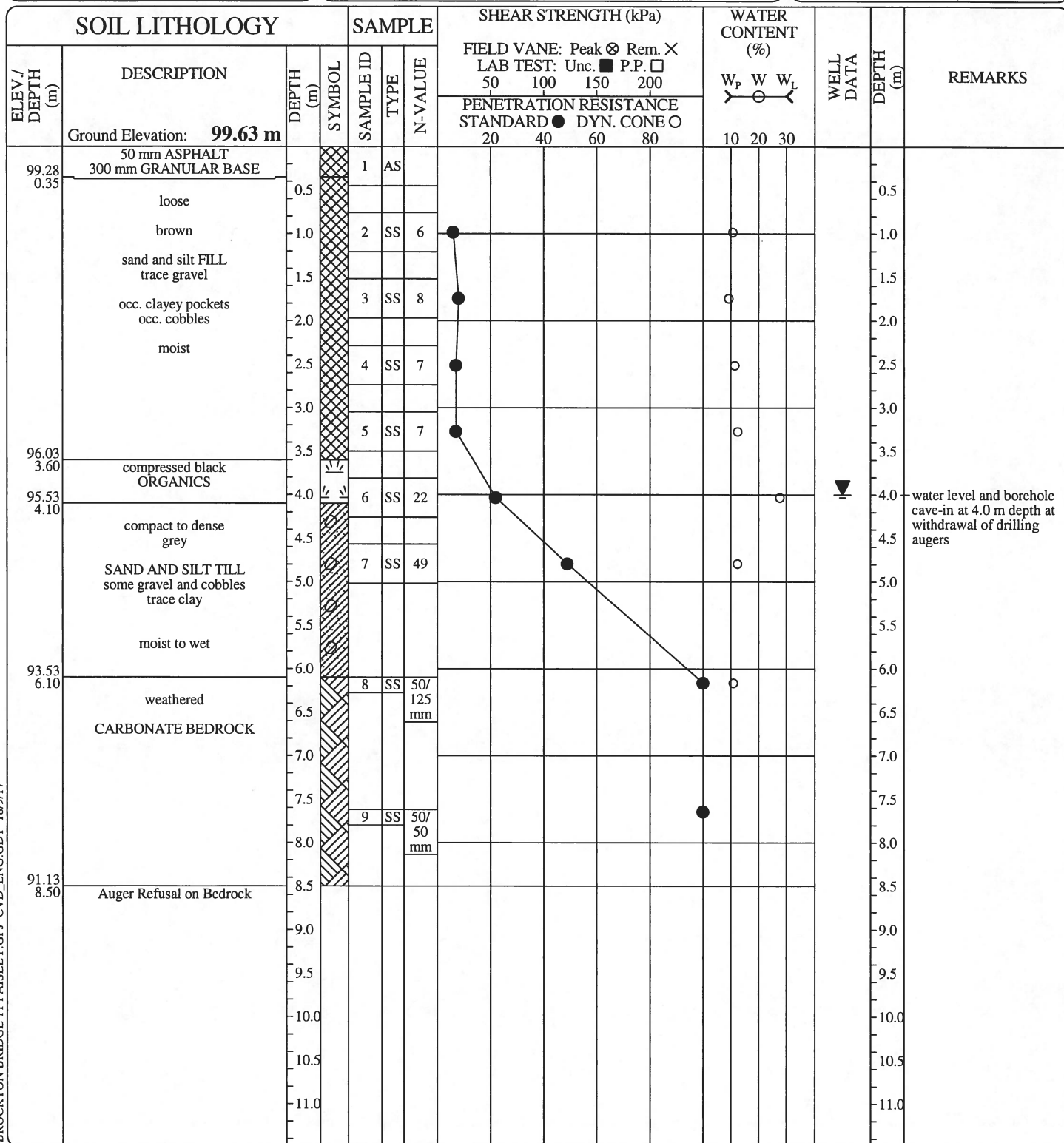
BOREHOLE No. 1



Client: **Municipality of Brockton**  
Project: **Brockton Bridge 11 Replacement**  
Location: **Concession Road 20, Brockton (Paisley)**

EQUIPMENT DATA

Machine: **Diedrich D50T**  
Method: **Hollow Stem Auger**  
Size: **82 mm I.D.**  
Date: **Aug 08 / 17 TO Aug 08 / 17**



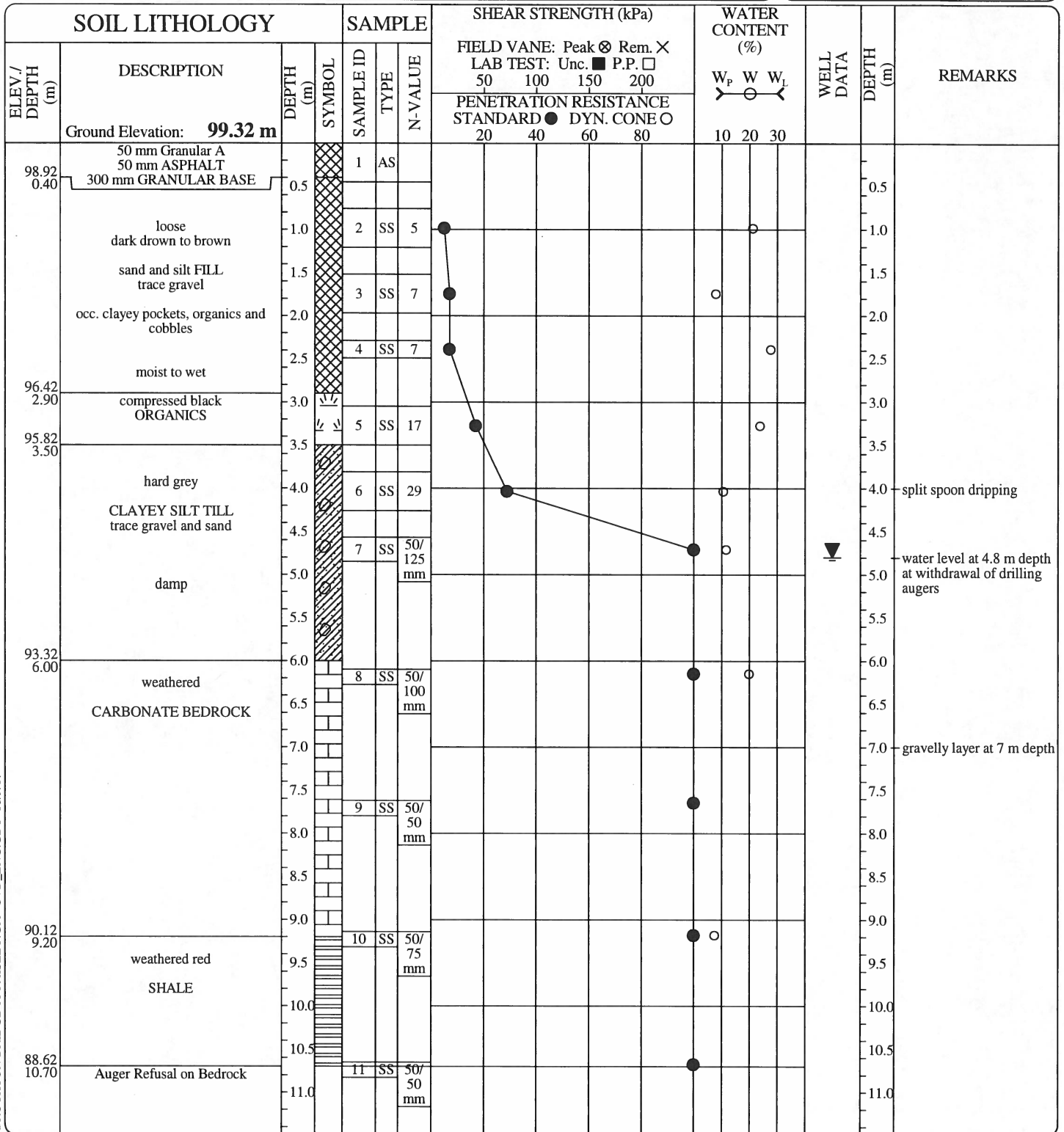
PROJECT MANAGER: **RVD**

**CHUNG & VANDER DOELEN  
ENGINEERING LTD.**

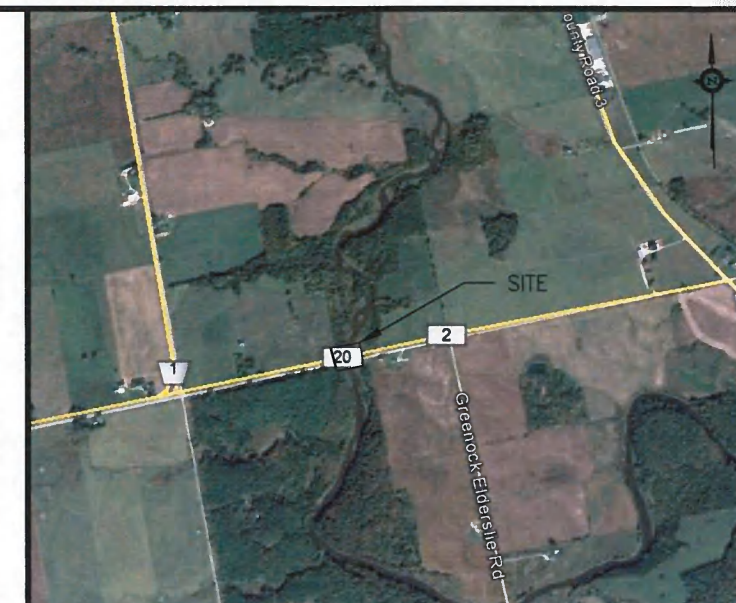
311 Victoria Street North  
Kitchener, Ontario N2H 5E1  
ph. (519) 742-8979, fx. (519) 742-7739

Client: **Municipality of Brockton**Project: **Brockton Bridge 11 Replacement**Location: **Concession Road 20, Brockton (Paisley)**

## EQUIPMENT DATA


Machine: **Diedrich D50T**Method: **Hollow Stem Auger**Size: **82 mm I.D.**Date: **Aug 08 / 17 TO Aug 08 / 17**PROJECT MANAGER: **RVD****CHUNG & VANDER DOELEN  
ENGINEERING LTD.**311 Victoria Street North  
Kitchener, Ontario N2H 5E1  
ph. (519) 742-8979, fx. (519) 742-7739






KEY PLAN SOURCE: Google Earth

**LEGEND**

 TBM: Top of existing east bridge abutment on south side of roadway  
Elevation : 100.00 m (Assumed)

 Borehole Location

BOREHOLE LOCATION PLAN

Brockton Bridge 11  
Replacement

Concession Road 20  
Paisley, Ontario

 **CHUNG & VANDER DOELEN**  
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311 VICTORIA STREET NORTH  
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Drawn By: JV	Date: September, 2017	File No.: G17465
Checked By: RVD	Scale: 1:300	Drawing No.: 1



## D.7 – STRUCTURES AND CLEARANCES

### D.7.1 – INTRODUCTION

The material contained in this section is intended to assist the road designer when designing cross sections where bridge structures, retaining walls or other structures are required. The section gives direction in setting structure dimensions of an operational nature or structural dimensions that influence geometric design of horizontal alignment, vertical alignment and cross sections. For additional detailed information and structural dimensions, reference should be made to the current edition of the Ontario Highway Bridge Design Code.

### D.7.2 – BRIDGE TYPES

A bridge is a structure having a span of 3 m or more which either forms a part of a highway or passes over or under the highway.

A bridge should be designed to suit the geometric requirements of the road, however, in designing the geometric features of a road the impact of the geometry on structural design should be taken into account.

Modern bridges are constructed of wood, reinforced concrete, prestressed concrete, or steel. The approximate range of spans over which general structure types have been found to be suitable is given in Table D.7-1.

Bridges in common use are generally slab, voided slab, beam and truss bridges. The many structural configurations available make it difficult to set general guidelines for estimating structure depth; however, in setting preliminary grade line at a grade separation structure, the following rules of thumb may be used for the total thickness of girder and deck (otherwise known as the structure depth):

- for railway structures use 11% of the total span,
- for highway bridges use 7% of the total span.

Bridge structures for grade separations and most water crossings should conform in alignment, profile and cross section to the natural lines of the approaches.

Bridges spanning roadways should be of deck type construction rather than truss as they have a pleasing appearance and can be more easily widened later. Overhead bridges may have a single or double opening for the two roadways and may have either open or closed abutments (see Figure D.7-1).

Bridges with open abutments are preferable to closed abutments as they provide better visibility. Where the clearances are minimal, guide rail protection must be considered.

Closed abutments are adaptable to narrow rights-of-way but should be provided with independently supported guide rail protection placed a minimum of 1.0 m from the face of the guide rail to the wall or pier.

Table D.7-1

### SPAN LENGTHS FOR BRIDGE STRUCTURES

Type	Material	Span Range m
Slab	Reinforced Concrete	3-15
	Prestressed Concrete	3-30
Voided Slab	Prestressed Concrete	30-70
Beam	Wood	3-6
	Prestressed Concrete	10-55
	Steel	10-160
Truss	Steel	90-550
Arch Rib	Concrete	90-330
	Steel	120-370
Arch Truss	Steel	240-520
Cable Stayed	Prestressed Concrete	90-400
	Steel	90-400
Segmental	Prestressed Concrete	50-230
Suspension	Steel	300-1500

It is desirable that the full shoulder width be carried across bridges in order to eliminate the hazard of the offsets at the ends of the bridge and to provide a refuge for disabled vehicles. However, this is not always practical and shoulder widths should be modified as stated in Section D.7.3.2.

For long bridges, particularly long-span bridges where costs are high, some shoulder width restriction is necessary. The effect of the restriction is compensated to some extent by the tendency of drivers to be more alert and to become accustomed to the reduced clearance.

Bailey Bridges and Acrow Panel Bridges are modular steel panel bridges which can be quickly assembled and erected. They are used for detours, temporary crossings and for emergency applications.

### D.7.3 – CROSS SECTION DIMENSIONS

#### D.7.3.1 – Deck Width and Traffic Lanes

The number and width of through lanes and auxiliary lanes should be the same on the bridge deck as on the approach roadway.

In general, the minimum acceptable bridge cross section is 8.5 m. Provision of single-lane bridges may be permitted on very low-volume roadways in which the minimum width between curbs, railings or curb and railing should not be less than 5.0 m.

#### D.7.3.2 – Bridge Deck Shoulder Widths

For a bridge where the approach roadway is provided with continuous barrier walls or curbs, and



**ROAD ALLOWANCE:**

Means a surveyed allowance of land for roadway purposes. A road allowance can be either “opened” with an existing road surface or “unopened” in which case no travelled surface is provided.

In this document, “existing road allowance” means an existing opened road allowance with an existing road surface, or road right-of-way. It does not include an unopened or shore road allowance.

**ROAD CAPACITY:**

Means capacity defined in terms of travelled lanes and does not differentiate between various lane widths to accommodate differing volumes of traffic. (2)

**ROAD WIDENING:**

Means increasing the number of lanes of an existing road and may include the widening of the right-of-way but does not include localized operational improvements.

**ROADS:****Arterial Roads:**

Means roads which move moderate to high traffic volumes over moderate distances within a municipality between principal areas of traffic generation and which gather traffic from collector roads and local roads and move it to the Provincial highway system; arterial roads are generally designed for medium speed, have capacity for 2 - 6 lanes, may be divided, with limited or controlled direct access from adjacent developments and with on-street parking discouraged.

**Collector Roads:**

Means roads which move low to moderate traffic volumes within specific areas of a municipality and collect local traffic for distribution to the arterial or Provincial highway system; collector roads are generally designed for medium speed, have capacity for 2 - 4 lanes, are usually undivided, with direct access from adjacent development permitted but usually controlled, and with controlled on-street parking usually permitted.

**Local Roads:**

Means roads which provide for low volumes of traffic and access to private properties; local roads are designed for low speeds, have capacity for 2 undivided lanes of traffic; through traffic is discouraged and parking is usually permitted though often controlled.

**SAME PURPOSE, USE,  
CAPACITY AND LOCATION:**

See Operation.

**SAME PURPOSE, USE AND  
LOCATION (TRANSIT  
PROJECTS):**

See Section D.1.3.1.

Table D.A-2

## GEOMETRIC DESIGN STANDARDS FOR SECONDARY HIGHWAYS

DESIGN ELEMENTS DESIGN YEAR TRAFFIC VOLUME		DESIGN SPEED	MINIMUM CURVES (m)			MINIMUM STOPPING SIGHT DIST.	MAX. GRADE	WIDTH (m)	
			HORIZ.	VERTICAL					
AADT	DHV	km/h	Radius	K - Crest	K - Sag	m	%	Lane	Shoulder
Greater than 1000	Greater than 150	100	420	70	45	185	6 - 8	3.50	2.00
		90	340	50	40	160	6 - 8	3.25	2.00
		80	250	35	30	135	6 - 8	3.25	2.00
		70	190	25	25	110	6 - 12	3.00	1.00
		60	130	15	18	85	6 - 12	3.00	1.00
1000 to 400	150 to 60	80	250	35	30	135	6 - 8	3.25 *	1.00
		70	190	25	25	110	6 - 12	3.00	1.00
		60	130	15	18	85	6 - 12	3.00	1.00
Less than 400	Less than 60	80	250	35	30	135	8	3.25 *	1.00 **
		70	190	25	25	110	12	3.00	1.00 **
		60	130	15	18	85	12	3.00	1.00 **
		50	90	8	12	65	12	2.75	1.00 **

Lane width may be increased by 0.25 m to a maximum of 3.5 m if warranted by type, size and volume of truck traffic.

\* A 3.0 m lane width may be acceptable where the type, size and volume of trucks are not significant.

\*\* 0.5 m shoulders will be permitted where there is no foreseeable possibility of the road being paved within a 20-year period. A minimum of 1.0 m shoulder must be used where guide rail is installed.

## Notes:

- Design Year should reflect the anticipated life span of the proposed improvement. Design Year is normally 10 years beyond the Program Year for resurfacing and reconstruction projects, and 20 years beyond for new construction projects.
- Use DHV if available for selection of design standards.
- Desirable Maximum Design Speed is 80 km/h.
- Minimum Horizontal Curve Radius based on maximum superelevation of 0.06 m/m.
- Minimum Vertical Curve Standards based on stopping sight distance.
- Lower value in maximum grade range is desirable maximum. Higher value is acceptable maximum.
- Minimum desirable shoulder width for:
  - pavement support    - 1.0 m gravel shoulder
  - 0.5 m paved shoulder
  - disabled vehicle       - 2.0 m shoulder
- Desirable Shoulder Rounding - 0.5 m.

**A.5.7 DESIGN SPEED SELECTION**

Many factors influence and constrain the selection of the appropriate design speed for a given highway facility, which include:

- traffic conditions, such as volumes, composition and trip length
- character of terrain
- socio-economic-political characteristics of the area, i.e. population density and land development and travel habits of the local residents
- environmental quality and aesthetics
- economics

Application of these criteria applies only to the selection of a specific design speed within the logical range of values pertinent to the classification type selected. The ranges for each classification are illustrated in Table A5-2.

Traffic volumes are instrumental in the selection of the appropriate classification from the eight basic types, as well as in the selection of road cross-sectional features and intersection/interchange design which affect the capacity and level of service.

The effects of terrain types, socio-economic characteristics, environment and economics are not immediately obvious.

The typical driver can recognize or sense a logical operating speed for a given highway based on knowledge of the system, appraisal of the ruggedness of the terrain, and the extent, density and size of development. Based on this judgement, the driver will adjust speed to be consistent with the conditions expected to be encountered. The driver's initial response is to react to the anticipated situation rather than to the actual situation. In most instances, the two are similar enough that no problems are created. When the initial response is incorrect, operation and safety may be severely affected.

Design speed should be chosen to be consistent with the speed a driver is likely to expect. Where a difficult condition is obvious, drivers are more inclined to accept lower speed operation than where there is no apparent reason for it.

Other things being equal, it follows that a highway in level or rolling terrain justifies a higher design speed than one in mountainous terrain, and a highway located in a rural environment calls for a higher design speed than one situated in an urban area.

A highway carrying a large volume of traffic may justify a higher design speed than a less important facility in similar topography, particularly where the savings in vehicle operation and other operating costs are sufficient to offset the increased costs of right-of-way and construction. A low design speed, however, should not automatically be assumed for a secondary highway where the topography is such that drivers are likely to travel at high speeds. Drivers do not adjust their speeds to the importance of the highway but to its physical limitations and the traffic thereon.

When the appropriate highway classification division is selected from Table A5-1, the design speed can be chosen from the range of values in Table A5-2.

When designing a substantial length of highway, it is desirable, although it may not be feasible, to assume a constant design speed. Changes in terrain and other physical controls may dictate a change in design speed on certain sections. Each section, however, should be of relatively long length, compatible with the general terrain or development through which the highway passes. The justification for introducing a reduced design speed should be obvious to the driver. Moreover, the introduction of a lower or higher design speed should not be effected abruptly but over sufficient distance to permit drivers to change speed gradually before reaching the section of highway with the different design speed.

Differences in design speed from one segment to another should not be more than 20 km/h. Even so, drivers may not perceive the slower condition ahead, for which they should be warned well in advance. A transition section allowing for speed reductions, as from 100 to 90 to 80 km/h should be provided. Thus, the changing condition should comprise extra long (anticipatory) sight distances, speed-zone signs, curve speed signs, and so on.

Design speed should be greater than or equal to the legal posted speed.

Generally the desirable practice of selecting the design speed for new construction and reconstruction is

- 20 km/h greater than the proposed legal speed, unless circumstances warrant a reduction.

A design speed equal to the maximum posted speed is accepted where warranted by such factors as low traffic volumes, rugged terrain and economic considerations. This practice would be more appropriate for minor collector and local roads. A design speed equal to the legal posted speed is the normal practice for Secondary Highways.

Where a highway section warrants only resurfacing to remove pavement structure deficiencies, the general practice is to limit construction costs by removing only



critical deficiencies as identified by the accident and maintenance records. The existing alignment is generally retained. In these situations the proposed and the existing design speeds should be the same.

Commonly used design speeds are:

- 120 km/h for freeways
- 110 km/h for major arterials carrying long distance traffic, and all four-lane divided and undivided highways
- 100 km/h for all other arterials and collectors
- 80 km/h for local roads and secondary highways.

Horizontal and vertical alignment geometry should be consistent with the selected design speed. In practice, because of numerous constraints often encountered, minimum acceptable values for alignment standards are recognized and used.

Minimum acceptable standards are based on the allowable reduction in the design speed of isolated curves from the overall design speed of the highway.

The reduction should preferably be no greater than 10 km/h and never greater than 20 km/h.

Where higher than average accident rates can be attributed to geometric design deficiencies, corrective measures should be considered. Isolated deficiencies should be improved if signing alone proves to be ineffective and costs are acceptable.

Where a minor secondary highway has a generally substandard alignment and advisory and warning signs have proven ineffective, consider:

- where no improvements are warranted - reducing the legal posted speed to be consistent with the overall highway design speed; or
- where improvements are warranted - selecting a design speed and corresponding legal posted speed commensurate with the topography and with a realistic balance between improvement costs and user benefits.

The implications of employing substandard curvature are more fully explained in Chapter C - ALIGNMENT.

Design speeds have been established in 10 km/h increments, ranging from 40 km/h for local roads, to a maximum of 120 km/h for design of freeways. Maximum and minimum design speeds have been established for each major classification of highway. The resulting functional classification system is presented in Table A5-2.



## 1.4 RISK ACCEPTANCE

The alternative to removing, replacing or shielding hazards is to accept some risk. The risk acceptance alternate is usually the best choice when the cost of other acceptable alternates outweigh the potential benefits of reduced accident severity. Although other criteria might indicate a need for corrective action, if funds for safety improvements are limited, it will be a prudent alternative to accept the risk at low priority locations so available funds can be concentrated where they will achieve the greatest safety return. This alternative increases in acceptability when there is a long record showing little or no run-off-the-road impacts, and where there is a low possibility of future accidents. On the other hand, risk acceptance may be unacceptable in the event of a clear accident pattern or if future accidents appear likely.

The suitability of the risk acceptance alternative is a function of accident history and the possibility of future accidents. The accident history should consider multiple years of run-off-the-road impacts with the hazard in question. Unfortunately, we do not have a fully satisfactory basis to evaluate the possibility of future accidents. In the final analysis, this judgement must be made on the basis of personal knowledge and professional assessment of the hazard, roadway, site and traffic conditions.

If it is decided not to follow policy but to accept risk, approval of the Design Criteria Committee is required. Reasons for risk acceptance must be documented in the project file.

**PRELIMINARY COST ESTIMATE**  
**GREENOCK BRIDGE 0011**  
**MUNICIPALITY OF BROCKTON**  
**ALTERNATIVE 2 - OPTION 1**  
**REPLACE STEEL ELEMENTS**

Item No.	Description	Qty.	Unit of Measure	Unit Price	Total Price
<b>Anticipated 2018 Cost</b>					
1	Bonding, Insurance, Mobilization and Demobilization	100%	L.S.	\$ 35,000.00	\$ 35,000.00
2	Environmental Protection	100%	L.S.	\$ 5,000.00	\$ 5,000.00
3	Temporary Signage & Traffic Control	100%	L.S.	\$ 5,000.00	\$ 5,000.00
4	Removal and Disposal Existing Superstructure	100%	L.S.	\$ 40,000.00	\$ 40,000.00
5	Chip and patch and partial re-facing of concrete abutments	25	m <sup>2</sup>	\$ 1,500.00	\$ 37,500.00
6	Provide and Install Pre-Eng Steel Bridge	100%	L.S.	\$ 400,000.00	\$ 400,000.00
7	Supply and Install Reinforced Concrete Deck	40	m <sup>3</sup>	\$ 1,500.00	\$ 60,000.00
8	Supply and Place Granulars on Approaches	50	tonne	\$ 30.00	\$ 1,500.00
9	Supply and Install Guide Rail System Approaches	240	m	\$ 130.00	\$ 31,200.00
10	Supply and Install Guide Rail end treatment	4	each	\$ 4,200.00	\$ 16,800.00
11	Supply and Place Asphalt on Approaches	27	tonne	\$ 200.00	\$ 5,400.00
12	Site Restoration	100%	L.S.	\$ 5,000.00	\$ 5,000.00
<b>ESTIMATED TOTAL CONSTRUCTION COST</b>					<b>\$ 642,400.00</b>
CONTINGENCY ALLOWANCE (10%)					\$ 64,240.00
ENGINEERING AND CONTRACT ADMINISTRATION					\$ 64,300.00
<b>PROJECT TOTAL</b>					<b>\$ 770,940.00</b>



**PRELIMINARY COST ESTIMATE**  
**GREENOCK BRIDGE 0011**  
**MUNICIPALITY OF BROCKTON**  
**ALTERNATIVE 2 - OPTION 1**  
**REPLACE STEEL ELEMENTS**

Anticipated 2038 Cost (In 2018 Dollars)					
1	Bonding, Insurance, Mobilization and Demobilization	100%	L.S.	\$ 20,000.00	\$ 20,000.00
2	Environmental Protection	100%	L.S.	\$ 20,000.00	\$ 20,000.00
3	Temporary Signage & Traffic Control	100%	L.S.	\$ 5,000.00	\$ 5,000.00
4	Removal and Disposal of Existing Foundations	100%	L.S.	\$ 45,000.00	\$ 45,000.00
5	Supply and Installation of Peastone Cofferdams	300	m <sup>2</sup>	\$ 200.00	\$ 60,000.00
6	Excavation and Disposal of Granulars and Backfill	100%	L.S.	\$ 35,000.00	\$ 35,000.00
7	Dewatering	100%	L.S.	\$ 25,000.00	\$ 25,000.00
8	Supply and Place Concrete for Mudslabs	10	m <sup>3</sup>	\$ 400.00	\$ 4,000.00
9	Supply and Install Concrete Footings	50	m <sup>3</sup>	\$ 500.00	\$ 25,000.00
10	Supply and Install Concrete Wingwall and Abutments	45	m <sup>3</sup>	\$ 1,000.00	\$ 45,000.00
11	Supply and Place Asphalt on Approaches	27	tonne	\$ 200.00	\$ 5,400.00
12	Site Restoration	100%	L.S.	\$ 15,000.00	\$ 15,000.00
<b>ESTIMATED TOTAL CONSTRUCTION COST</b>					<b>\$ 304,400.00</b>
CONTINGENCY ALLOWANCE (10%)					\$ 30,440.00
ENGINEERING AND CONTRACT ADMINISTRATION					\$ 30,500.00
<b>PROJECT TOTAL</b>					<b>\$ 365,340.00</b>

**PRELIMINARY COST ESTIMATE**  
**GREENOCK BRIDGE 0011**  
**MUNICIPALITY OF BROCKTON**  
**ALTERNATIVE 2 - OPTION 2**  
**REPLACE DECK SUPPORTING ELEMENTS**

Item No.	Description	Qty.	Unit of Measure	Unit Price	Total Price
<b>Anticipated 2018 Cost</b>					
1	Bonding, Insurance, Mobilization and Demobilization	100%	L.S.	\$ 20,000.00	\$ 20,000.00
2	Environmental Protection	100%	L.S.	\$ 5,000.00	\$ 5,000.00
3	Temporary Signage & Traffic Control	100%	L.S.	\$ 5,000.00	\$ 5,000.00
4	Removal and Disposal of Existing Structure	100%	L.S.	\$ 25,000.00	\$ 25,000.00
5	Chip and patch and partial re-facing of concrete abutments	25	m <sup>2</sup>	\$ 1,500.00	\$ 37,500.00
6	Provide and Install Steel Stringers and Cross Beams	100%	L.S.	\$ 150,000.00	\$ 150,000.00
7	Supply and Place Granulars	50	tonne	\$ 30.00	\$ 1,500.00
8	Supply and Install Guide Rail System Approaches	240	m	\$ 130.00	\$ 31,200.00
9	Supply and Install Guide Rail End Treatment	4	each	\$ 4,200.00	\$ 16,800.00
10	Supply and Place Asphalt on Approaches	27	tonne	\$ 200.00	\$ 5,400.00
11	Site Restoration	100%	L.S.	\$ 5,000.00	\$ 5,000.00
<b>ESTIMATED TOTAL CONSTRUCTION COST</b>					<b>\$ 302,400.00</b>
CONTINGENCY ALLOWANCE (10%)					\$ 30,240.00
ENGINEERING AND CONTRACT ADMINISTRATION					\$ 30,300.00
<b>PROJECT TOTAL</b>					<b>\$ 362,940.00</b>

**PRELIMINARY COST ESTIMATE**  
**GREENOCK BRIDGE 0011**  
**MUNICIPALITY OF BROCKTON**  
**ALTERNATIVE 2 - OPTION 2**  
**REPLACE DECK SUPPORTING ELEMENTS**

Item No.	Description	Qty.	Unit of Measure	Unit Price	Total Price
<b>Anticipated 2028 Cost (In 2018 Dollars)</b>					
1	Bonding, Insurance, Mobilization and Demobilization	100%	L.S.	\$ 20,000.00	\$ 20,000.00
2	Environmental Protection	100%	L.S.	\$ 5,000.00	\$ 5,000.00
3	Temporary Signage & Traffic Control	100%	L.S.	\$ 5,000.00	\$ 5,000.00
4	Removal and Disposal of Existing Structure	100%	L.S.	\$ 25,000.00	\$ 25,000.00
5	Provide and Install Steel Trusses	100%	L.S.	\$ 200,000.00	\$ 200,000.00
6	Site Restoration	100%	L.S.	\$ 5,000.00	\$ 5,000.00
<b>ESTIMATED TOTAL CONSTRUCTION COST</b>					<b>\$ 260,000.00</b>
CONTINGENCY ALLOWANCE (10%)					\$ 26,000.00
ENGINEERING AND CONTRACT ADMINISTRATION					\$ 26,000.00
<b>PROJECT TOTAL</b>					<b>\$ 312,000.00</b>

**PRELIMINARY COST ESTIMATE**  
**GREENOCK BRIDGE 0011**  
**MUNICIPALITY OF BROCKTON**  
**ALTERNATIVE 2 - OPTION 2**  
**REPLACE DECK SUPPORTING ELEMENTS**

Item No.	Description	Qty.	Unit of Measure	Unit Price	Total Price
<b>Anticipated 2038 Cost (In 2018 Dollars)</b>					
1	Bonding, Insurance, Mobilization and Demobilization	100%	L.S.	\$ 20,000.00	\$ 20,000.00
2	Environmental Protection	100%	L.S.	\$ 20,000.00	\$ 20,000.00
3	Temporary Signage & Traffic Control	100%	L.S.	\$ 5,000.00	\$ 5,000.00
4	Removal and Disposal of Existing Structure	100%	L.S.	\$ 45,000.00	\$ 45,000.00
5	Supply and Installation of Peastone Cofferdams	300	m <sup>2</sup>	\$ 200.00	\$ 60,000.00
6	Excavation and Disposal of Granulars and Backfill	100%	L.S.	\$ 35,000.00	\$ 35,000.00
7	Dewatering	100%	L.S.	\$ 25,000.00	\$ 25,000.00
8	Supply and Place Concrete for Mudslabs	10	m <sup>3</sup>	\$ 400.00	\$ 4,000.00
9	Supply and Install Concrete Footings	50	m <sup>3</sup>	\$ 500.00	\$ 25,000.00
10	Supply and Install Concrete Wingwall and Abutments	45	m <sup>3</sup>	\$ 1,000.00	\$ 45,000.00
	Supply and Place Asphalt on Approaches	27	tonne	\$ 200.00	\$ 5,400.00
11	Site Restoration	100%	L.S.	\$ 15,000.00	\$ 15,000.00
<b>ESTIMATED TOTAL CONSTRUCTION COST</b>					<b>\$ 304,400.00</b>
CONTINGENCY ALLOWANCE (10%)					\$ 30,440.00
ENGINEERING AND CONTRACT ADMINISTRATION					\$ 30,500.00
<b>PROJECT TOTAL</b>					<b>\$ 365,340.00</b>

**PRELIMINARY COST ESTIMATE**  
**GREENOCK BRIDGE 0011**  
**MUNICIPALITY OF BROCKTON**  
**ALTERNATIVE 3 - OPTION 1**  
**SINGLE SPAN, SINGLE LANE REPLACEMENT**

Item No.	Description	Qty.	Unit of Measure	Unit Price	Total Price
<b>Anticipated 2018 Cost</b>					
1	Bonding, Insurance, Mobilization and Demobilization	100%	L.S.	\$ 45,000.00	\$ 45,000.00
2	Environmental Protection	100%	L.S.	\$ 20,000.00	\$ 20,000.00
3	Temporary Signage & Traffic Control	100%	L.S.	\$ 5,000.00	\$ 5,000.00
4	Removal and Disposal of Existing Structure	100%	L.S.	\$ 60,000.00	\$ 60,000.00
5	Supply and Installation of Peastone Cofferdams	300	m <sup>2</sup>	\$ 200.00	\$ 60,000.00
6	Dewatering	100%	L.S.	\$ 25,000.00	\$ 25,000.00
7	Supply and Place Concrete for Mudslabs	10	m <sup>3</sup>	\$ 400.00	\$ 4,000.00
8	Supply and Install Concrete Footings	50	m <sup>3</sup>	\$ 500.00	\$ 25,000.00
9	Supply and Install Concrete Wingwall and Abutments	45	m <sup>3</sup>	\$ 1,000.00	\$ 45,000.00
10	Provide and Install Pre-Eng Steel Bridge	100%	L.S.	\$ 400,000.00	\$ 400,000.00
11	Supply and Install Reinforced Concrete Deck	40	m <sup>3</sup>	\$ 1,500.00	\$ 60,000.00
12	Supply and Place Granulars	200	tonne	\$ 30.00	\$ 6,000.00
13	Supply and Install Guide Rail System Approaches	240	m	\$ 130.00	\$ 31,200.00
14	Supply and Install Guide Rail End Treatment	4	each	\$ 4,200.00	\$ 16,800.00
15	Supply and Place Asphalt on Approaches	27	tonne	\$ 200.00	\$ 5,400.00
16	Site Restoration	100%	L.S.	\$ 15,000.00	\$ 15,000.00
<b>ESTIMATED TOTAL CONSTRUCTION COST</b>					<b>\$ 823,400.00</b>
CONTINGENCY ALLOWANCE (10%)					\$ 82,340.00
ENGINEERING AND CONTRACT ADMINISTRATION					\$ 82,400.00
<b>PROJECT TOTAL</b>					<b>\$ 988,140.00</b>



**PRELIMINARY COST ESTIMATE  
GREENOCK BRIDGE 0011  
MUNICIPALITY OF BROCKTON  
ALTERNATIVE 3 - OPTION 2  
SINGLE SPAN, TWO LANE**

Item No.	Description	Qty.	Unit of Measure	Unit Price	Total Price
<b>Anticipated 2018 Cost</b>					
1	Bonding, Insurance, Mobilization and Demobilization	100%	L.S.	\$ 50,000.00	\$ 50,000.00
2	Environmental Protection	100%	L.S.	\$ 20,000.00	\$ 20,000.00
3	Temporary Signage & Traffic Control	100%	L.S.	\$ 5,000.00	\$ 5,000.00
4	Removal and Disposal of Existing Structure	100%	L.S.	\$ 60,000.00	\$ 60,000.00
5	Supply and Installation of Peastone Cofferdams	300	m <sup>2</sup>	\$ 200.00	\$ 60,000.00
6	Excavation and Disposal of Granulars and Backfill	100%	L.S.	\$ 35,000.00	\$ 35,000.00
7	Dewatering	100%	L.S.	\$ 25,000.00	\$ 25,000.00
8	Supply and place precast girders	5	each	\$ 32,000.00	\$ 160,000.00
9	Supply and Place Concrete for Mudslabs	20	m <sup>3</sup>	\$ 400.00	\$ 8,000.00
10	Supply and Install Concrete Footings	75	m <sup>3</sup>	\$ 500.00	\$ 37,500.00
11	Supply and Install Concrete Wingwall and Abutments	70	m <sup>3</sup>	\$ 1,000.00	\$ 70,000.00
12	Supply and Install Reinforced Concrete Deck	75	m <sup>3</sup>	\$ 2,000.00	\$ 150,000.00
13	Supply and Install Deck Curbs	10	m <sup>3</sup>	\$ 1,000.00	\$ 10,000.00
14	Supply and Install Approach Slabs	15	m <sup>3</sup>	\$ 1,000.00	\$ 15,000.00
15	Supply and Install Expansion Joints	16	m	\$ 1,000.00	\$ 16,000.00
16	Elastomeric bearing pads	10	each	\$ 1,000.00	\$ 10,000.00
17	Supply and install deck drains	4	each	\$ 1,200.00	\$ 4,800.00
18	Deck Railing	60	m	\$ 1,000.00	\$ 60,000.00
19	Deck waterproofing	250	m <sup>2</sup>	\$ 65.00	\$ 16,250.00
20	Supply and Place Asphalt Wearing Surface	40	tonne	\$ 200.00	\$ 8,000.00
21	Supply and Install Guide Rail System Approaches	240	m	\$ 130.00	\$ 31,200.00
22	Supply and Install Guide Rail End Treatment	4	each	\$ 4,200.00	\$ 16,800.00
23	Site Restoration	100%	L.S.	\$ 15,000.00	\$ 15,000.00
<b>ESTIMATED TOTAL CONSTRUCTION COST</b>					<b>\$ 883,550.00</b>
CONTINGENCY ALLOWANCE (10%)					\$ 88,400.00
ENGINEERING AND CONTRACT ADMINISTRATION					\$ 88,400.00
<b>PROJECT TOTAL</b>					<b>\$ 1,060,350.00</b>

**APPENDIX C:**  
**NATURAL ENVIRONMENT – SUPPORTING INFORMATION**

# Bridge No. 0011 (Greenock) EA Municipality of Brockton

Bruce County, Ontario

Scoped Environmental Impact Study

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Prepared for:

The Municipality of Brockton

Project Number:

AA17-120A

Date:

January 15, 2018

**ABOUD & ASSOCIATES INC.**  
Consulting Arborists • Ecologists • Landscape Architects

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## **1.0 Introduction**

The Municipality of Brockton is undertaking a Class Environmental Assessment (EA) in order to determine the best course of action for the repair, replacement or removal of Bridge No. 0011 located adjacent Lot 46/47, Concession A crossing the Teeswater River along Concession 20. Aboud & Associates (AA) has been retained as part of a project team with GM BluePlan to complete the Class EA. This EIS has been completed as part of the Class EA process to characterize and document natural heritage features within the study area, assess impacts, and to propose reasonable measures to mitigate potential impacts to natural heritage features.

### **1.1 Project Background & Rationale**

Bridge No. 0011 is an aging bridge located directly south of the Village of Paisley, within the former Township of Greenock. This bridge forms part of Concession Road 20 and crosses the Teeswater River approximately 3.4 km south of its confluence with the Saugeen River in Paisley.

The bridge falls within the Saugeen Valley Conservation Authority (SVCA) screening limit, and is designated as Environmental Protection/Hazard lands as defined by the Bruce County Official Plan (2013) Schedule A. The subject bridge is also designated as Environmental Protection lands in the Walkerton Community Official Plan (2013) and the Municipality of Brockton Zoning By-law (2013-06).

While Council has already passed a resolution for bridge replacement with a similar single lane bridge, this EIS will also evaluate the potential for a larger two-way bridge.

### **1.2 Existing Land Use and Study Area**

The study area includes Bridge No. 0011 as well as adjacent lands up to 120 metres surrounding the bridge (Figure 1). Due to property access restriction all studies were conducted from Concession Road 20.

## 1.3 Existing Regulations

### 1.3.1 Provincial Policy Statement

The *Provincial Policy Statement* ([PPS] OMMHA 2014) provides policy direction on matters of provincial interest related to land use planning and development.

In regards to **Natural Heritage Protection** the PPS (2014) states that:

*“Natural features and areas shall be protected for the long term.”*

And that:

*“The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features.”*

Under the PPS, development and site alteration are not permitted in:

- a) significant wetlands;
- b) significant woodlands;
- c) significant valleylands;
- d) significant wildlife habitat;
- e) significant areas of natural and scientific interest; and
- f) coastal wetlands,

*unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.*

The PPS (2014) also states that:

- *“Development and site alteration is not permitted in fish habitat, habitat of endangered species and threatened species except in accordance with provincial and federal requirements.*
- *Development and site alteration is not permitted on adjacent lands to the natural heritage features and areas identified above, unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.*
- *Development and site alteration is restricted in or near sensitive surface water features and sensitive ground water features in order to protect the hydrologic functions of the feature. Mitigation and/or alternative development approaches may be required in order to protect, improve or restore sensitive surface water features, sensitive ground water features, and their hydrologic functions.”*

Under *Section 1.6.8.5*, these significant resources shall be given consideration in the planning of significant transportation infrastructure.

The proposed Bridge No. 0011 is considered infrastructure and therefore is not prohibited on lands containing significant resources. However, natural features must be documented and considered when selecting a preferred option.

### **1.3.2 Endangered Species Act, 2007**

The provincial Endangered Species Act, 2007 (ESA) provides protection to species designated as Threatened or Endangered on the Species at Risk in Ontario list (MNR 2015a). The habitat of Species at Risk is also generally protected under the ESA. Protected habitat is habitat identified as essential for life processes including breeding, rearing, feeding, hibernation, and migration.

The ESA (Subsection 9(1)) states that:

*“No person shall,*

- (a) kill, harm, harass, capture or take a living member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species;*
- (b) possess, transport, collect, buy, sell, lease, trade or offer to buy, sell, lease or trade,*
  - (i) a living or dead member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species,*
  - (ii) any part of a living or dead member of a species referred to in subclause (i),*
  - (iii) anything derived from a living or dead member of a species referred to in subclause (i); or*
- (c) sell, lease, trade or offer to sell, lease or trade anything that the person represents to be a thing described in subclause (b) (i), (ii) or (iii).”*

Clause 10(1)(a) of the ESA also states that:

*“No person shall damage or destroy the habitat of a species that is listed on the Species at Risk in Ontario list as an endangered or threatened species.”*

An authorization or permit between the proponent and the Minister of Natural Resources and Forestry is required to authorize activities that would otherwise be prohibited by subsection 9(1) and 10(1) of the ESA.

### **1.3.3 Fisheries Act, 1985**

Teeswater River, a fish-bearing water, is within the study area. This area and the fish within are protected under the Fisheries Act, 1985. The Fisheries Act, 1985 provides protection for the sustainability and ongoing productivity of Canada's recreational, commercial and Aboriginal fisheries.

Section 35 (1) of the Fisheries Act States that:

*“No person shall carry on any work, undertake activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or fish that support such a fishery”*

The Fisheries Act, 1985 requires that projects and activities avoid causing serious harm to fish and fish habitat unless authorized to do so by the Department of Fisheries and Oceans Canada (DFO). This applies to work conducted in or near waterbodies that support recreational, commercial and Aboriginal fisheries. Within the context of bridges, any proposed actions that could impact fish or fish habitat would need to be assessed for compliance with the Fisheries Act, 1985. If it is determined that proposed actions will cause serious harm to fish, which cannot be mitigated for, then a Fisheries Act Authorization would be required.

#### **1.3.4 Saugeen Valley Conservation Authority**

The proposed bridge replacement is located entirely within the jurisdiction and Screening Limits of the Saugeen Valley Conservation Authority, and is adjacent to unevaluated wetlands, both north and south of the study area.

Section 3.7.2.3 of the Environmental Planning and Regulations Policies Manual (2017) states all wetlands and their associated areas of interference are regulated under the *Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Regulation*. Any development or interference within wetlands or development in areas of interference requires permission from SVCA.

An EIS to assess the hydrologic impact may be required if the submitted plans do not demonstrate the following:

- Disturbance to natural vegetation communities contributing to the hydrologic function of the wetland are avoided;
- Overall existing drainage patterns for the lot will be maintained;
- Disturbed area and soil compaction is minimized;
- Development is located above the high water table;
- All sewage disposal systems are located a minimum of 15 metres from the wetland and a minimum of 0.9 metres above the water table;
- Impervious areas are minimized;
- Best management practices are used to:
  - Maintain water balance;
  - Control sediment and erosion;
  - Maintain as much of the wetland buffer as possible;

Section 4.15.1 of the manual states watercourse crossings may be permitted if it has been demonstrated to the satisfaction of the SVCA that the interference is acceptable on the natural features and hydrologic and ecological functions of the watercourse. At a minimum, plans

should demonstrate the following based on the morphological characteristics of the watercourse:

- i. Culverts have an open bottom where feasible and where it is not feasible, culverts are appropriately embedded into the watercourse;
- ii. Crossing location, width and alignment should be compatible with stream morphology which typically requires location of the crossing on a straight and shallow/riffle reach of the watercourse with the crossing situated at right angles to the watercourse;
- iii. The crossing is sized and located such that there is no increase in upstream or downstream erosion or flooding;
- iv. The design should consider fish and wildlife passage;
- v. Have regard for upstream and downstream effects when installing/replacing a culvert.

### **1.3.5 Municipality of Brockton Zoning By-law (2013-06)**

The study area is zoned as Environmental Protection under the Municipality of Brockton Zoning By-law (2013-06). Section 24.3 states notwithstanding any other provisions and definitions of this By-law, all buildings and structures shall be prohibited in an 'Environmental Protection (EP)' zone except for the following:

- i. Those necessary for flood and/or erosion control purposes in accordance with Section 24.3
- ii. Unenclosed picnic shelters
- iii. Washroom facilities associated with a Public Park or Conservation Area
- iv. Buildings essential for public services
- v. Boat launching and docking

Section 3.1.1 states that "Nothing contained in this By-law shall prevent the Corporation . . . or Commission from: installing a . . . road or street; any required accessory service buildings or other use for the purposes of the public service subject to compliance with the provisions prescribed for the zone in which it is to be located and subject to there being no outdoor storage of goods, materials or equipment in any yard and provided that the location of any accessory building conforms to all yard, lot coverage and height provisions of the Zone in which it is located"

### **1.3.6 Walkerton Community Official Plan (2013)**

The study area is designated as Environmental Protection under the Walkerton Community Official Plan (2013). Section 3.9.3 states that certain buildings and structures that must be located within the Environmental Protection zone by the nature of their use, such as for flood or erosion control, are permitted. Certain buildings and structures that must be located within the Environmental Protection zone by the nature of their use, are permitted.

Section 3.9.4 states replacement of existing buildings or structures damaged by natural causes may be permitted if the hazard risk does not increase from the original condition and provided



such replacement does not increase the height, size, volume, or change the use. Extensions or enlargements may be subject to the requirements of Section 3.9.6.

Section 3.9.6 states an Environmental Impact Study (EIS) is required for new development proposed within the Environmental Protection zone.

### **1.3.7 County of Bruce Official Plan (2013)**

According to the County of Bruce Official Plan (2013) Schedule 'A', the study area is within lands designated as Environmental Protection/Hazard.

The County of Bruce OP Section 5.8.3 indicates that Hazard Land Areas include areas of Provincially Significant Wetlands and Environmental Hazard Areas such as flood and erosion susceptibility areas, hazard lands, steep slopes or other physical conditions which are severe enough to cause property damage or potential loss of life in the lands were to be developed.

Section 5.8.4 states that buildings and structures are generally not permitted in Hazard Land Areas. Only those uses which do not impair ecological processes and the environmental features so identified will be permitted.

Section 4.3.3 states that in order to achieve County objectives for the protection of the natural environment, development proponents shall be required to prepare an EIS for any proposal that is:

- i. In, or within 120 metres of, a provincially significant wetland;
- ii. In, or within 60 metres of, a locally significant wetland;
- iii. In, or within 120 metres of, the habitat of threatened or endangered species;
- iv. In, or within, 120 metres of, a significant woodland, significant valleyland, significant wildlife habitat, deer wintering areas;
- v. In, or within, 120 metres of, fish habitat
- vi. Within the '100 Metre Buffer Zone' or '2 Year Time of Travel (WHPA-B) for Wellhead Protection Areas or within an 'Intake Protection Zone 1 (IPZ-1)' or 'Intake Protection Zone 2 (IPZ-2)' for Intake Protection Zones;
- vii. Within known areas of karst topography
- viii. In, or within, 50 metres of Areas of Natural and Scientific Interest (ANSI) Earth Science

Section 5.8.5 states that the replacement or rebuilding of an existing building destroyed by natural means beyond the control of the owner may be permitted provided it does not exceed the size or volume of the original building, and it is located at the same site, unless an environmentally more acceptable site is available and acceptable to the owner which will not aggravate the existing hazardous situation, and is for substantially the same use, subject to the approval of the local municipality and the appropriate approval authorities.

## **1.4 Terms of Reference**

Based on the above regulations and policies (Section 1.3) and communication with regulatory authorities, an EIS is required for the construction of the proposed bridge, as there may be the potential for negative impacts to the natural heritage system. As mentioned in Section 1.1, this EIS has been completed to assess several alternatives including a larger two-lane structure.

A proposed Terms of Reference (ToR) for the EIS was developed and submitted to the Municipality of Brockton, the County of Bruce and the SVCA on July 11, 2017. Comments regarding the proposed ToR were received from the SVCA on September 11, 2017.

Based on comments received from the SVCA, the SVCA will have no objection to the proposed project if the replacement bridge will not change the constriction of the river flow at the location. If the bridge design conforms with existing parameters of the existing bridge, and the hydrology will not be altered, SVCA staff will not require a Hydrologic Assessment for review. Additionally, SVCA staff will not require an EIS for review for this replacement. If the plans for the bridge change from what is existing or further restrict flow, an Engineered Hydrology Report will need to be provided for SVCA. The Terms of Reference and comments are provided in *Appendix 1*.

## **2.0 Methods**

### **2.1 Background Review**

A background information review was conducted of both biological and physical features within the vicinity of the study area. The following resources were consulted as part of this review:

1. Ministry of Natural Resources and Forestry (MNRF), Midhurst District (accessed: 2017)
2. Natural Heritage Information Centre (NHIC) database (accessed: 2017)
3. Ontario Reptile and Amphibian Atlas Interactive map (Ontario Nature 2017)
4. Ontario Mammal Atlas (1994)
5. Atlas of the Breeding Birds of Ontario, 2001-2005
6. Saugeen Valley Conservation Authority Regulation Mapping (accessed 2017)

### **2.2 Trees & Vegetation**

#### **2.2.1 Ecological Land Classification**

Ecological Land Classification (ELC) field investigations were completed on July 28, 2017. Detailed survey dates and weather information are provided in *Appendix 8*. Due to not having permission to access the private properties within the study area, all ELC surveys were conducted from the roadside. Surveys were completed by qualified ecologist, Shannon Ferguson, OMNRF Certified in Ecological Land Classification. Vegetation communities within the study area were characterized and delineated through field investigation, following the Ecological Land Classification (ELC) system for Southern Ontario 1st approximation; community codes generally follow the 2nd approximation (Lee, et al., 1998, 2008). Boundaries of ELC communities were mapped using aerial images and field observations (*Figure 1*). Digitized ELC data sheets are provided in *Appendix 3*.

Identified ELC communities were cross-referenced with the NHIC Ontario Plant Community List (NHIC 2015) to determine the presence of rare plant communities (S3-S1). The Subnational, or Provincial, Ranks (S-Rank) are assigned by the Ontario Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre (NHIC) in order to help assign protection priorities.

#### **2.2.2 Botanical Inventory**

Concurrent with ELC evaluations, the subject lands were inventoried as best as possible from the roadside in order to provide a comprehensive one season botanical inventory. Detailed survey dates and weather information are provided in *Appendix 8*.

Identified vascular plant species were compared to provincial and federal SAR lists (COSSARO, SARA) provincial ranks (NHIC 2015), and global ranks, in order to assess federal, provincial, regional and local conservation status of each species. English colloquial names and scientific

binomials of plant species generally follow the Database of Vascular Plants of Canada (VASCAN) (VASCAN 2015).

Identification of environmentally sensitive plant species was completed based on the assignment of a coefficient of conservatism value (CC) for each native species (Oldham, et al., 1995). The value of CC, ranging from 0 (low) to 10 (high), is based on a species' tolerance of disturbance and fidelity to specific natural habitat parameters. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters. These species may be more sensitive to environmental changes (Mortarello et. al., 2010).

A list of all identified plant species is provided in *Appendix 4*. The list provides botanical name, common name, provincial rarity rank (S-Rank), global rarity rank (G-Rank), provincial SAR status, federal SAR status, coefficient of conservatism (CC) and coefficient of wetness (CW). Plant species that could only be identified to genus were not assigned the above information.

## **2.3 Wildlife**

### **2.3.1 Incidental Wildlife Observations**

Incidental observations of insects, mammals and reptiles were recorded during all field visits. Detailed survey dates and weather information are provided in *Appendix 8*.

### **2.3.2 Fish Records**

Background fish dot records for the Teeswater River were requested through a Request for Information submitted to the MNRF Midhurst District on July 7, 2017. The MNRF response can be found in *Appendix 2*.

## **2.4 Significant Wildlife Habitat**

With guidance from the *Significant Wildlife Habitat Technical Guide* (2000) and the *SWH EcoRegion Criterion Schedule 6E* (2015b), the study area and adjacent lands were considered for the presence of Significant Wildlife Habitat (e.g. specialized habitats for wildlife, habitat for species of conservation concern). Detailed survey dates and weather information are provided in *Appendix 8*. An assessment of the study area for all SWH is provided in *Appendix 6*.

## **2.5 SAR Habitat Assessment**

A thorough review of background documents was conducted to compile a master list of all Species at Risk, and species with conservation designation that may occur in the study area. A review of the site, along with habitat requirements for each species was conducted; the site was then evaluated for potential habitat using Ecological Land Classification, guidance from MNRF documents, and on-site knowledge acquired through field surveys. Detailed survey dates and weather information are provided in *Appendix 8*. An assessment of the study area for candidate habitat for SAR is provided in *Appendix 7*.

### 3.0 Existing Conditions

Information that characterizes the existing conditions of the study area came from several sources, including but not limited to, background review of existing documents, public information sources, and field reconnaissance.

#### 3.1 Background Review

##### 3.1.1 Natural Heritage Information Centre - Species at Risk

Preliminary investigation through the Natural Heritage Information Centre (NHIC) identified one provincial Species at Risk (SAR) under the ESA recorded within approximately 2km of the study area. This species and its habitat requirements are summarized in *Table 1*.

Table 1. NHIC Species at Risk Records

Scientific Name	Common Name	(COSEWIC) Status <sup>1</sup>	(SARO) Status <sup>2</sup>	Last Observed (NHIC)	S-Rank <sup>3</sup>	Habitat Requirements
<i>Villosa iris</i>	Rainbow	SC	END	--	S2S3	Most abundant in well-oxygenated reaches of small to medium-sized rivers, but is also found in inland lakes. Typically found in or near riffles and along edges of emergent vegetation in moderate to strong current. It occupies mixtures of cobble, gravel, sand and occasionally mud or boulder. (COSEWIC, 2015)

<sup>1</sup> COSEWIC – Committee on the status of endangered wildlife in Canada

<sup>2</sup> SARO – Species at Risk Act Ontario

<sup>3</sup> S-Rank – Denotes the conservation status of a species at the provincial level

SH: Possibly Extirpated, S1: Critically Imperiled, S2: Imperiled, S3: Vulnerable

##### 3.1.2 Ministry of Natural Resources and Forestry

A request for information was sent to the MNRF on July 7, 2017, to inquire whether any further Species at Risk may occur in the study area. A response was provided on July 19, 2017, and is provided in *Appendix 2*. No additional SAR occurrence records were provided.

##### 3.1.3 Ontario Breeding Bird Atlas

A list of birds determined to be breeding (Possible, Probable or Confirmed) in the 10km x 10km square containing the study area during the 2001-2005 Ontario Breeding Bird Atlas (Cadman et. al. 2007) was compiled. This list includes 114 species; ten are considered Species at Risk under the ESA. No habitat for Species at Risk birds was present in the study area. A review of species at risk identified through background resources and their habitat requirements are discussed in *Appendix 7*. The findings of this review are presented in *Appendix 5*.

### 3.1.4 Ontario Reptile and Amphibian Atlas

Review of the Ontario Reptile and Amphibian Atlas identified 11 species that are known to occur within the 10km x 10km square containing the study area. This list includes one Species at Risk under the ESA and SARA, respectively; Common Snapping Turtle (*Chelydra serpentina*) are listed as Special Concern provincially and federally and Milksnake (*Thamnophis sauritus*) is listed as Special Concern federally. Confirmed nesting or overwintering habitat was not identified on the subject parcel for any of these species, although overwintering habitat may be present within other areas of the Teeswater River for Common Snapping Turtle. The findings of this review are presented in *Appendix 5*.

### 3.1.5 Atlas of the Mammals of Ontario

Review of the Atlas of the Mammals of Ontario (1994) identified 14 species that are known to occur within approximately 10km of the study area. This list includes one Species at Risk under the ESA; Little Brown Myotis (*Myotis lucifugus*) are listed as Endangered provincially and federally. Potential maternity habitat was not identified in the study area for this species. A review of all Species at Risk identified in the background review and their habitat requirements are discussed in *Appendix 7*. The findings of this review are presented in *Appendix 5*.

## 3.2 Trees & Vegetation

### 3.2.1 Ecological Land Classification

A one season ELC evaluation was completed on July 28, 2017, by Aboud & Associates. Ten ELC polygons, consisting of nine unique ELC communities, were identified and mapped in the study area (*Figure 1*). The community polygons identified during the ELC surveys are summarized in *Table 2*. Digitized field forms are provided in *Appendix 3*. Comparison with the NHIC Rare Plant Communities confirmed that none of the ELC communities identified within the study area are listed as provincially rare plant communities (S1 – S3).

Table 2. Ecological Land Classification Communities

ELC Code <sup>1</sup>	Vegetation Type	Summary Description
<b>Meadow Marsh (MAMM)</b>		
MAMM 1-2	Cattail Graminoid Mineral Meadow Marsh	This community is located south of the subject bridge along the east edge of the Teeswater River within the study area. The community contains no canopy, but is sparsely populated by Eastern White Cedar ( <i>Thuja occidentalis</i> ) in the sub-canopy. The understorey contains species including Staghorn Sumac ( <i>Rhus typhina</i> ) and Hemlock Water-parsnip ( <i>Sium suave</i> ), while the ground layer is dominated by Broad-leaved Cattail ( <i>Typha latifolia</i> ) with abundant Reed Canary-grass ( <i>Phalaris arundinacea</i> ) accompanied by occasional Spotted Joe Pye Weed ( <i>Eutrochium maculatum</i> var. <i>maculatum</i> ) and a species of Goldenrod ( <i>Solidago</i> sp.).
MAMM 1-3	Reed Canary-grass Graminoid Mineral Meadow Marsh	This community is located both north and south of the subject bridge along the west edge of the Teeswater River within the study area. There is no vegetation in the canopy or sub-canopy, however the understorey contains sporadic Manitoba Maple ( <i>Acer negundo</i> ) specimens, with the ground layer dominated by Reed Canary-grass, Spotted Joe Pye Weed, a species of Goldenrod and Riverbank Grape ( <i>Vitis riparia</i> ).



Table 2. Ecological Land Classification Communities

ELC Code <sup>1</sup>	Vegetation Type	Summary Description
<b>Mixed Forest (FOMM)</b>		
FOMM 2	Dry- Fresh White Pine- Hardwood Mixed Forest	This mixed forest community occurs south-west of the subject bridge along the slope adjacent to the Cattail Graminoid Meadow Marsh. The canopy is comprised of Eastern White Pine ( <i>Pinus strobus</i> ) and Large-tooth Aspen ( <i>Populus grandidentata</i> ) with the sub-canopy including Eastern White Pine, Eastern White Cedar, White Elm ( <i>Ulmus americana</i> ) and Manitoba Maple. The understorey is similar to the sub-canopy with a mixture of Eastern White Cedar, Eastern White Pine, White Elm and Sugar Maple ( <i>Acer saccharum</i> ). The ground layer consists of Canada Goldenrod ( <i>Solidago canadensis</i> var. <i>canadensis</i> ), Summer Grape ( <i>Vitis aestivalis</i> ), Eastern Late Goldenrod ( <i>Solidago altissima</i> ssp. <i>altissima</i> ) and Wild Carrot ( <i>Daucus carota</i> ).
FOMM 10	Fresh- Moist Spruce/Fir- Hardwood Mixed Forest	This community is located south of the subject bridge east of the Teeswater River, adjacent to the agricultural field. The canopy is primarily White Spruce ( <i>Picea glauca</i> ) with White Elm associates, while the sub-canopy is a combination of Apple sp. ( <i>Malus</i> sp.) and White Elm. The understorey contains Common Buckthorn ( <i>Rhamnus cathartica</i> ), Summer Grape and Manitoba Maple with the ground layer including Canada Goldenrod, Fuller's Teasel ( <i>Dipsacus fullonum</i> ) and Reed Canary-grass.
<b>Deciduous Woodland (WOD)</b>		
WODM 5	Fresh- Moist Deciduous Woodland	This community is located immediately north-east of the subject bridge and is adjacent to Concession 20. The canopy consists of Crack Willow ( <i>Salix x fragilis</i> ) and Black Walnut ( <i>Juglans nigra</i> ) with the sub-canopy composed of Black Walnut and American Basswood ( <i>Tilia americana</i> ). The understorey consists of Manitoba Maple and Green Ash ( <i>Fraxinus pennsylvanica</i> ) with the ground layer being comprised of Reed Canary-grass, Spotted Joe Pye Weed, Canada Goldenrod and Riverbank Grape.
<b>Deciduous Forest (FOD)</b>		
FODM 4	Dry- Fresh Upland Deciduous Forest	This community occurs in the north-west corner of the study area adjacent to the agricultural field. The canopy and sub-canopy are primarily Black Walnut with Eastern White Cedar associates in the sub-canopy. The understorey is a mixture of Eastern White Cedar, Green Ash and Common Buckthorn and the ground layer contains Canada Goldenrod, Common Dandelion ( <i>Taraxacum officinale</i> ), Summer Grape and Reed Canary-grass.
<b>Coniferous Forest (FOC)</b>		
FOCM 4	Fresh- Moist White Cedar Coniferous Forest	This community occurs along the west slope adjacent to the Teeswater River, north of the subject bridge. The canopy and sub-canopy are dominated by Eastern White Cedar with small American Basswood specimens in the sub-canopy as well as the understorey. The ground layer is composed of Reed Canary-grass, Sensitive Fern ( <i>Onoclea sensibilis</i> ), Spotted Jewelweed ( <i>Impatiens capensis</i> ) and Summer Grape.
<b>Open Agriculture (OAG)</b>		
OAGM1	Annual Row Crops	This agricultural community is located in the south-east corner of the study area, between a residential dwelling and the Spruce/Fir-hardwood Mixed Forest.
OAGM4	Open Pasture	This pasture-dominated community is located in the north-west corner of the study area adjacent to the White Cedar Coniferous Forest.

ELC Codes generally follows the ELC Second Approximation (Lee 2008)

### 3.2.2 Botanical Inventory

A detailed botanical field inventory of the study area was completed and 33 species of vascular plants were identified. All identified plant species are listed in *Appendix 4*. A further 1 species

were identified only to the level of genus and have not been designated as native or non-native or included in the overall species count.

Of the 33 species identified, 23 species (70%) are native and 10 species (30%) are exotic or cultivars.

### 3.2.2.1 Species at Risk, Regional and Local Significance

No vegetation communities listed above are considered rare in the province.

Most of the native species are ranked S5 (secure in Ontario) or SNA (S-Rank not applicable) with three species, Green Ash (*Fraxinus pennsylvanica*), Black Walnut (*Juglans nigra*), Summer Grape (*Vitis aestivalis*) ranking S4 (apparently secure in Ontario), and one species is ranked S4?, Virginia Creeper (*Parthenocissus quinquefolia*), indicating uncertainty in its ranking.

None of the species observed in the study area had a co-efficient of conservatism of 9 or 10. This indicates the presence of species with moderate to high tolerance for environmental ranges, which may be less impacted by minor site alteration or environmental disturbance.

## 3.3 Wildlife

### 3.3.1 Incidental Wildlife Observations

All Incidental wildlife observations made outside formal field surveys are presented in *Table 4*. All observations were of single individuals unless otherwise stated. Species with conservation designation are identified on *Figure 1*.

Table 3. Incidental Species Observations

Common Name	Scientific Name	Taxa	Date	Location/Notes
American Crow	<i>Corvus brachyrhynchos</i>	Bird	July 28, 2017	Observed during ELC/botanical survey
Common Yellowthroat	<i>Geothlypis trichas</i>	Bird	July 28, 2017	Observed during ELC/Botanical survey
White-throated Sparrow	<i>Zonotrichia albicollis</i>	Bird	July 28, 2017	Observed during ELC/Botanical survey
Northern Cardinal	<i>Cardinalis cardinalis</i>	Bird	July 28, 2017	Observed during ELC/Botanical survey
Mallard	<i>Anas platyrhynchos</i>	Bird	July 28, 2017	Observed during ELC/Botanical survey
Blue Jay	<i>Cyanocitta cristata</i>	Bird	July 28, 2017	Observed during ELC/Botanical survey
Gray Catbird	<i>Dumetella carolinensis</i>	Bird	July 28, 2017	Observed during ELC/Botanical survey
Red Squirrel	<i>Sciurus vulgaris</i>	Mammal	July 28, 2017	Observed during ELC/Botanical survey

#### 3.3.1.1 Species Listed under the Endangered Species Act

No federally or provincially listed species were identified within the study area through background research, provided data, or field observations. Potential habitat for Barn Swallow

does exist on the underside of the bridge. Investigations of the underside of the bridge for Barn Swallow nests took place on July 28, 2017. No Barn Swallow nests were detected at this time.

### **3.4 Fish Records**

MNRF Midhurst District (Kathy Dodge) provided fish dot information within the Request for Information response received on August 19, 2017. It was indicated that there is only one sampling location approximately 1.9km from the subject bridge. Species found at that site include: Iowa Darter, Johnny Darter, Blackside Darter, Rainbow Darter, Yellow Bullhead, Hornyhead Chub, Central Mudminnow, Common Shiner, Stonecat, Rock Bass, Pumpkinseed, Creek Chub, Small-mouth Bass, White Sucker and Longnose Dace. MNRF considers the Teeswater River to be a cool/warm water system in this area, with known population of Smallmouth Bass and Northern Pike.

### **3.5 Significant Wildlife Habitat**

With guidance from the *Significant Wildlife Habitat Technical Guide* (2000) and the SWH EcoRegion Criteria Schedule 6E (2015), we have determined that Significant Wildlife Habitat (SWH) is not present within the proposed study area. Assessment criteria and results are provided in *Appendix 6*.

### **3.6 SAR Habitat Assessment**

An assessment of all Species at Risk, and species with conservation designation, that have the potential to occur in the study area based on lists provided by the MNRF (2015c), Breeding Bird Atlas, Ontario Reptile and Amphibian Atlas, Mammal Atlas and the NHIC was completed. Species assessed include all species with Provincial SARO status, Federal SARA status, or an S-Rank of S1-S3. A description of habitat requirements, field studies conducted, and results are provided in *Appendix 7*.

## **4.0 Impact Analysis, Mitigation and Restoration**

### **4.1 Analysis and Comparison of Bridge Alternatives**

The proposed repair or replacement of the subject bridge along Concession 20 crossing the Teeswater River has been assessed for impact to the Natural Heritage System. The bridge is proposed to be repaired or reconstructed in the same location as the existing bridge, comprising four proposed alternatives. Subject to future detailed design, repair or replacement is anticipated to have minor to no impacts on the water course and natural features compared to current conditions.

An analysis of each bridge alternative is provided in *Table 4*. Monitoring and mitigation of residual effects are also proposed. A detailed description of all potential impacts and mitigation guidelines are provided in *Table 5*.

Table 4. Comparison and rating of impacts of natural heritage by alternative

Factor/Criteria	Alternative 1- Do Nothing	Alternative 2- Rehabilitation of the existing bridge	Alternative 3A- Replacement of new bridge structure	Alternative 3B- Install new two-way Bridge	Alternative 4- Remove existing Bridge
<i>Trees</i>	0 trees will be affected	Impacts to be determined at detailed design	Impacts to be determined at detailed design	Impacts to be determined at detailed design	Some existing trees may require removal.
<i>Aquatic habitat and Fish Passage</i>	No impact to floodlines, channel process or fish movement potential.	No impact to river flow, channel processes or fish movement potential, provided the bridge location remains in situ	No impact to river flow, channel processes or fish movement potential, provided the bridge location remains in situ	Impacts to be determined at detailed design.	No impact to floodlines, channel process or fish movement potential
<i>Vegetation</i>	Vegetation will not be removed. No restoration or invasive species management will occur	Some naturalized vegetation is anticipated to require removal for access to the existing bridge structure	Some naturalized vegetation is anticipated to require removal for removal of existing structure. Removal of old bridge and installation of new bridge may impact a larger vegetated area.	Some naturalized vegetation is anticipated to require removal. Removal of bridge and installation of wider bridge structure will impact a larger vegetated area	Some naturalized vegetation is anticipated to require removal.
<i>Significant Wildlife Habitat</i>	No impacts to SWH	No impacts to the river corridor, or adjacent riparian area are anticipated, no impacts to SWH are expected.	No impacts to the river corridor, or adjacent riparian area are anticipated, no impacts to SWH are expected	Possible impacts to the river corridor may occur. Impacts to be determined at detailed design.	No impacts to the river corridor, or adjacent riparian area are anticipated, no impacts to SWH are expected.
<i>Species at Risk</i>	No immediate impacts to SAR birds are anticipated	No impacts to SAR are anticipated outside of the breeding bird window. May provide nesting habitat for SAR birds, should they occur	No impacts to SAR are anticipated outside of the breeding bird window. May provide nesting habitat for SAR birds, should they occur	No impacts to SAR are anticipated outside of the breeding bird window. May provide nesting habitat for SAR birds, should they occur	No impacts to SAR are anticipated outside of the breeding bird window. Will cause elimination of a potential future location for Barn Swallow nesting.
<i>Wildlife &amp; Wildlife Habitat</i>	No impacts to wildlife & wildlife habitat. No improvements to degraded habitat.	No impacts to wildlife & wildlife habitat are anticipated. Restoration recommendations will provide improvements to degraded habitat	No impacts to wildlife & wildlife habitat are anticipated. Restoration recommendations will provide improvements to degraded habitat.	Larger area may be altered however no impacts to wildlife & wildlife habitat are anticipated. Restoration recommendations will provide improvements to degraded habitat.	No impacts to wildlife & wildlife habitat. No improvements to degraded habitat.
Ranking	1	2	4	5	3

## 4.2 Generalized Impact Assessment and Mitigation

The repair, reconstruction or removal of the bridge structure will result in impacts to the existing natural features. An assessment of the impacts (potential and actual) and mitigation measures are provided in *Table 5*. See *Appendix 9* for descriptions of criteria, impact ratings and analysis.

Table 5. Impact Assessment and Mitigation

PHASE	ACTIVITY	POTENTIAL IMPACTS	DURATION OF IMPACT	REVERSIBILITY	GEOGRAPHIC LEVEL OF INFLUENCE	FREQUENCY	ECOLOGICAL SITE CONTEXT	LIKELIHOOD OF OCCURRING	CUMULATIVE EFFECTS?	POTENTIAL IMPACT RATING <sup>1</sup>	MITIGATION RECOMMENDATIONS / COMMENTS	FINAL <sup>2</sup> IMPACT RATING	MONITORING / FOLLOW-UP RECOMMENDATION
Site Preparation and servicing	Vegetation Removal – clearing & grubbing <i>upland areas</i>	<ul style="list-style-type: none"> <li>Loss of vegetation and wildlife habitat</li> <li>Loss of rare plant species of communities</li> </ul>	ST	R	SA	O	PD	H	Y	Minor	<ul style="list-style-type: none"> <li>avoidance of significant wildlife habitat</li> <li>Implicate design to avoid or minimize loss of vegetation and edge habitat</li> <li>Revegetate areas with native species after site preparation</li> <li>Establish and maintain buffers around significant features, habitats of significant species, including rare plants</li> </ul>	None	<ul style="list-style-type: none"> <li>Monitor for successful establishment of native plant communities</li> </ul>



PHASE	ACTIVITY	POTENTIAL IMPACTS	DURATION OF IMPACT	REVERSIBILITY	GEOGRAPHIC LEVEL OF INFLUENCE	FREQUENCY	ECOLOGICAL SITE CONTEXT	LIKELIHOOD OF OCCURRING	CUMULATIVE EFFECTS?	POTENTIAL IMPACT RATING <sup>1</sup>	MITIGATION RECOMMENDATIONS / COMMENTS	FINAL <sup>2</sup> IMPACT RATING	MONITORING / FOLLOW-UP RECOMMENDATION
		<ul style="list-style-type: none"> <li>Disturbance of fish and wildlife species</li> </ul>	ST	R	SA	O	PD	M	Y	Minor	<ul style="list-style-type: none"> <li>avoid removal or destruction of animal movement corridors</li> <li>Time activities to avoid wildlife disturbance during important life stages</li> </ul>	Minor - None	
		<ul style="list-style-type: none"> <li>Impacts to Nesting Birds Protected under the Migratory Bird Convention Act</li> </ul>	ST	P	AA	O	PD	H	Y	Minor	<ul style="list-style-type: none"> <li>Conduct a bird nest survey to determine locations of active nests prior to construction works including installation of Erosion Sediment Control (ESC) fence and any site clearing.</li> <li>Create nest protection zones where active bird nests are found and monitor (as needed, e.g. weekly) until inactive.</li> </ul>	Minor - None	
	Vegetation removal – Clearing &	<ul style="list-style-type: none"> <li>Loss of shade, resulting in increased water temperatures</li> </ul>	LT	R	SA	O	PD	M	Y	Moderate – Minor	<ul style="list-style-type: none"> <li>Maintain or restore riparian vegetation where possible</li> </ul>	Minor	

PHASE	ACTIVITY	POTENTIAL IMPACTS	DURATION OF IMPACT	REVERSIBILITY	GEOGRAPHIC LEVEL OF INFLUENCE	FREQUENCY	ECOLOGICAL SITE CONTEXT	LIKELIHOOD OF OCCURRING	CUMULATIVE EFFECTS?	POTENTIAL IMPACT RATING <sup>1</sup>	MITIGATION RECOMMENDATIONS / COMMENTS	FINAL <sup>2</sup> IMPACT RATING	MONITORING / FOLLOW-UP RECOMMENDATION
Site Preparation and servicing (cont.)	grubbing shoreline/ riparian areas	• Bank erosion and sedimentation during rainfall events	ST	R	SA	O	PD	M	Y	Minor	• Implement ESC plan • Stabilize banks where necessary, prior to construction	None	• Monitor ESC fence weekly, and after a major storm event for any breaks, and repair
		• Disturbance to riparian species	ST	R	SA	O	PD	H	N	Moderate – Minor	• Avoid vegetation removal on sensitive landforms	Minor	
		• Loss of fish spawning habitat • Changes in temperature regime for fish species	ST	R	SA	O	PD	M	Y	Moderate	• Maintain important wildlife areas	Minor – None	
	Vegetation removal – Clearing & grubbing Wetland Areas	• Increased erosion, sedimentation into wetland	ST	P	SA	O	PD	M	Y	Minor	• Develop & implement ESC plan	None	• Monitor ESC fence weekly, and after a major storm event for any breaks, and repair
	Grading	• Increased erosion, sedimentation and turbidity	ST	P	SA	O	PD	M	Y	Moderate	• Maintain or restore vegetative buffers	Minor – None	• Monitor ESC fence weekly, and after a major storm event for any breaks, and repair

PHASE	ACTIVITY	POTENTIAL IMPACTS	DURATION OF IMPACT	REVERSIBILITY	GEOGRAPHIC LEVEL OF INFLUENCE	FREQUENCY	ECOLOGICAL SITE CONTEXT	LIKELIHOOD OF OCCURRING	CUMULATIVE EFFECTS?	POTENTIAL IMPACT RATING <sup>1</sup>	MITIGATION RECOMMENDATIONS / COMMENTS	FINAL <sup>2</sup> IMPACT RATING	MONITORING / FOLLOW-UP RECOMMENDATION
	Grading	<ul style="list-style-type: none"> <li>Increase nutrient inputs and contaminants to waterbodies and wetlands</li> </ul>	ST	P	SA	O	PD	M	Y	Moderate	<ul style="list-style-type: none"> <li>Develop &amp; implement ESC plan</li> <li>Designate areas for equipment storage</li> </ul>	Minor – None	<ul style="list-style-type: none"> <li>Monitor ESC fence weekly, and after a major storm event for any breaks, and repair</li> </ul>
		<ul style="list-style-type: none"> <li>Increased soil compaction</li> </ul>	ST	P	SA	O	PD	H	N	Minor	<ul style="list-style-type: none"> <li>Control access and movement of equipment and people</li> </ul>	None	
		<ul style="list-style-type: none"> <li>Changes to drainage</li> <li>Changes to surface runoff</li> </ul>	ST	P	SA	O	PD	M	N	Minor	<ul style="list-style-type: none"> <li>Schedule grading to avoid high runoff volumes</li> <li>Minimize changes to land contours and natural drainage</li> <li>Maintain streams and timing, quantity of flows</li> </ul>	None	
		<ul style="list-style-type: none"> <li>Changes in soil moisture, tree cover and vegetation</li> </ul>	ST	R	SA	O	PD	M	N	Moderate	<ul style="list-style-type: none"> <li>Minimize the area and duration of soil exposure</li> </ul>	Minor	

PHASE	ACTIVITY	POTENTIAL IMPACTS	DURATION OF IMPACT	REVERSIBILITY	GEOGRAPHIC LEVEL OF INFLUENCE	FREQUENCY	ECOLOGICAL SITE CONTEXT	LIKELIHOOD OF OCCURRING	CUMULATIVE EFFECTS?	POTENTIAL IMPACT RATING <sup>1</sup>	MITIGATION RECOMMENDATIONS / COMMENTS	FINAL <sup>2</sup> IMPACT RATING	MONITORING / FOLLOW-UP RECOMMENDATION
Site Preparation and servicing (cont.)		<ul style="list-style-type: none"> <li>Disturbance to wildlife</li> <li>Alteration or destruction of wildlife Habitat</li> </ul>	ST	R	SA	O	PD	L	N	Minor	<ul style="list-style-type: none"> <li>Time activities to avoid sensitive periods (Breeding birds, fish spawning)</li> <li>Identify sensitive species prior to work and design grading to avoid disturbing sensitive species</li> <li>Conduct work outside timing windows of sensitive species</li> </ul>	Minor – None	
		<ul style="list-style-type: none"> <li>Wildlife Entering Construction Areas</li> </ul>	ST	R	SA	O	PD	L	N	Minor	<ul style="list-style-type: none"> <li>Develop &amp; implement ESC plan to exclude wildlife</li> </ul>	Minor - None	<ul style="list-style-type: none"> <li>Silt fence to be inspected weekly during site preparation</li> </ul>
Construction	Bridge Construction	<ul style="list-style-type: none"> <li>Increased erosion, sedimentation and turbidity</li> </ul>	ST	P	SA	O	PD	H	N	Moderate – Minor	<ul style="list-style-type: none"> <li>Maintain vegetated buffers</li> <li>Develop sediment and erosion control plan</li> </ul>	Minor – None	
		<ul style="list-style-type: none"> <li>Water contamination by oils, gasoline, grease and other materials</li> </ul>	ST	P	SA	O	PD	M	Y	Moderate – Minor	<ul style="list-style-type: none"> <li>Control water contamination through good housekeeping practices</li> </ul>	None	

PHASE	ACTIVITY	POTENTIAL IMPACTS	DURATION OF IMPACT	REVERSIBILITY	GEOGRAPHIC LEVEL OF INFLUENCE	FREQUENCY	ECOLOGICAL SITE CONTEXT	LIKELIHOOD OF OCCURRING	CUMULATIVE EFFECTS?	POTENTIAL IMPACT RATING <sup>1</sup>	MITIGATION RECOMMENDATIONS / COMMENTS	FINAL <sup>2</sup> IMPACT RATING	MONITORING / FOLLOW-UP RECOMMENDATION
Construction (cont.)		<ul style="list-style-type: none"> <li>Increased impervious surfaces causing, increased runoff, reduced infiltration and groundwater discharge</li> </ul>	ST	P	SA	O	PD	M	N	Minor	<ul style="list-style-type: none"> <li>Maintain or provide vegetative buffers</li> <li>Implement infiltration techniques</li> <li>Control quantity and quality of stormwater discharge</li> </ul>	None	
	Roads – Water Crossings	<ul style="list-style-type: none"> <li>Channel realignment</li> </ul>	ST	P	SA	O	PD	L	N	Minor	<ul style="list-style-type: none"> <li>Maintain existing stream channel if possible</li> <li>Realign using natural channel design</li> <li>Use bridges to span stream</li> <li>Minimize width of right of way</li> </ul>	None	
		<ul style="list-style-type: none"> <li>Increased erosion, sedimentation and turbidity</li> </ul>	ST	P	SA	O	PD	M	Y	Moderate – Minor	<ul style="list-style-type: none"> <li>Develop and implement sediment and erosion control plan</li> </ul>	Minor - None	
		<ul style="list-style-type: none"> <li>Loss of riparian vegetation</li> </ul>	ST	R	SA	O	PD	H	Y	Moderate	<ul style="list-style-type: none"> <li>Re-vegetate as soon as possible</li> </ul>	Minor - None	
		<ul style="list-style-type: none"> <li>Linkage interruption along watercourse</li> </ul>	ST	P	SA	O	PD	L	N	Minor	<ul style="list-style-type: none"> <li>Extend bridges beyond shoreline to allow land based wildlife passage</li> </ul>	Minor – None	

PHASE	ACTIVITY	POTENTIAL IMPACTS	DURATION OF IMPACT	REVERSIBILITY	GEOGRAPHIC LEVEL OF INFLUENCE	FREQUENCY	ECOLOGICAL SITE CONTEXT	LIKELIHOOD OF OCCURRING	CUMULATIVE EFFECTS?	POTENTIAL IMPACT RATING <sup>1</sup>	MITIGATION RECOMMENDATIONS / COMMENTS	FINAL <sup>2</sup> IMPACT RATING	MONITORING / FOLLOW-UP RECOMMENDATION
		<ul style="list-style-type: none"> <li>Pollutants from roads</li> </ul>	ST	P	SA	O	PD	M	Y	Moderate – Minor	<ul style="list-style-type: none"> <li>Collect and treat road run-off in stormwater management facilities</li> </ul>	None	



### **4.3 Hydrological Function and Changes to Watercourse**

A detailed hydrological study and analysis of the functions and anticipated changes to the watercourses have not been completed. However, it is expected that repair or reconstruction of Bridge No. 0011, in the same location as the existing bridge, would have little to no impact on the hydrology of the watercourse or flood risk. Installation of a wider two-way bridge structure may result in changing the existing or further restricting the flow of the river at this location. A hydrological study would be required to assess the impacts of the proposed bridge reconstruction if this proposal alternative was chosen.

## **5.0 Legislation and Policy Compliance**

### **5.1 Provincial Policy Statement**

The proposed bridge is considered essential transportation infrastructure and is therefore exempt from the constraints applied to development. The natural resources within the zone of impact from the proposed bridge must still be given consideration, and impacts minimized where possible. To fulfill the requirement under the PPS, natural features were inventoried and assessed for potential and actual impacts from the proposed bridge construction.

### **5.2 Fisheries Act, 1985**

In order to ensure compliance with the Fisheries Act, 1985), a DFO Self-Assessment or DFO Request for Review of the detailed design should be completed by a qualified biologist to ensure compliance under the Fisheries Act, 1985). If it is determined that proposed actions may cause serious harm to fish that cannot be mitigated for, then a Fisheries Act Authorization would be required.

### **5.3 Saugeen Valley Conservation Authority**

The proposed bridge is entirely within the screening limits and within the 30 metre area of interference for surrounding unevaluated wetlands. The proposed bridge meets SVCA policy, as it is considered Public Infrastructure. Public Infrastructure is permitted within watercourses subject to being approved through a satisfactory EA process and/or other studies deemed necessary by the SVCA and/or if the interference on the natural features and hydrologic and ecological functions of the watercourse has been deemed acceptable by the SVCA.

This area is already impacted by the existing bridge and new impacts to natural heritage features will be minor to none. Hydrological impacts to the watercourse and changes to flood capacity should be minimized through detailed design. Appropriate mitigation measures should be applied through design and construction planning and disturbed areas restored or enhanced where appropriate.

## **5.5 Municipality of Brockton Zoning By-law (2013-06)**

The study area is zoned as Environmental Protection within the Municipality of Brockton Zoning By-law. Based on the proposed structure being categorized as a service and utility, falling within Section 3.1 Permitted Uses in All Zones, the works are not contravening the Zoning By-law.

## **5.6 Walkerton Community Official Plan (2013)**

The proposed bridge is within lands designated as Environmental Protection within the Walkerton Community OP. An EIS is required for any new development within lands designed as Environmental Protection. Minimum EIS requirements per the Walkerton Community OP are as follows:

- A. Description of Existing Natural Environment
  - a. Site description and landscape context
  - b. Summary of development proposal
- B. Anticipated Environmental Effects
  - a. Characteristics of the features and functions affected by the proposal
  - b. Sensitivity assessment
  - c. Predicted effects
- C. Proposed Mitigation
  - a. Mitigation methods proposed
  - b. Mitigation methods selected
- D. Monitoring Plan

This EIS has addressed all of the requirements put forward by the Walkerton Community OP, and through background research combined with existing conditions documented through field studies, mitigation measures have been recommended to ensure that there will be no negative impacts to the surrounding natural features or their ecological functions. Therefore the proposed bridge does not contravene the Walkerton Community OP.

## **5.7 County of Bruce Official Plan (2013)**

The study area is within Environmental Protection/Hazard Lands as designated by the County of Bruce OP.

Section 5.8.4 states that buildings and structures are generally not permitted in Hazard Area Lands. Only those uses which do not impair ecological processes and the environmental features so identified will be permitted.

Based on the findings of this EIS, the recommended mitigation prior, during and post-construction ensures that the establishment of the proposed bridge will not impair ecological processes or the environmental features and therefore will not contravene the County of Bruce OP.

## **6.0 Summary and Conclusions**

It is our opinion that through implementing the mitigation measures identified in *Table 5* and in *Section 4*, the proposed repair, replacement or removal of Bridge No. 0011 will result in no significant long-term negative impacts to natural heritage features identified within and adjacent to the proposed bridge locations. The natural features within the study area will be protected and enhanced through mitigation and restoration recommendations. This will result in long term positive effects on the natural heritage features within the study area. Below is a summary of the affected natural heritage features, constraints and impacts. Recommendations for associated mitigation and/or protection measures are identified in *Section 4*.

### **6.1 Biological Studies and Site Constraints**

1. Surveys were conducted for Ecological Land Classification and Vegetation Communities (ELC and Vascular Plant List), Significant Wildlife Habitat, Species at Risk Habitat Assessment.
2. No Species at Risk were detected in the study area.
3. No Significant Wildlife Habitat was identified within the study area.
4. The study area includes a warm/cool water fish habitat (Teeswater River).
5. The study area includes Environmental Protection/Hazard Lands.

### **6.2 Impact Assessment**

1. Impacts of each bridge alternative as well as generalized impacts from the construction of the bridge were assessed to determine their extent, and mitigation guidelines have been provided (*Table 5*).
2. Impacts primarily involve the removal of trees, naturalized weedy herbaceous vegetation communities, site grading, impact to fish habitat, and wildlife disturbance.
3. Trees close to the bridge location may require an assessment of stability for the retained trees and may include some selective tree removal and pruning.
4. There are opportunities in the study area for edge enhancement, restoration, invasive species management and compensation planting to mitigate and offset potential impacts.

### **6.3 Legislation and Policy Compliance**

1. The proposed repair, replacement or removal of Bridge No. 0011 is permitted in accordance with SVCA's *Environmental Planning and Regulations Policies Manual*. The proposed bridge meets SVCA Policy, as it is considered public infrastructure. The proposed bridge must minimize the interference on the natural feature and hydrologic and ecological functions of the watercourse. Through the mitigation measures recommended, the above conditions have been met. Therefore the proposed bridge structure complies with the SVCA's interference with watercourses policies.

## 7.0 Avoidance, Mitigation and Compensation Recommendations

The following recommendations are provided to ensure protection and maintenance of natural heritage features and function within and adjacent the proposed bridge. Through the implementation of the proposed mitigation, restoration, and compensation, no negative impacts are expected to the natural heritage system.

1. Prepare and implement an Erosion and Sediment Control Plan (ESC) as part of detailed design.
2. Install and monitor a silt and sediment control barrier
  - a) Silt fence to be inspected weekly during construction and following a storm event of 25mm of rainfall within 24 hours.
3. ESC measures to be kept in place until trail construction is completed and disturbed soils have been vegetated.
4. The area of construction disturbance shall be kept to a minimum.
5. Control access and movement of equipment and people.
6. Minimize the use of heavy equipment in sensitive areas.
7. Works are to be located as far away from natural feature boundaries as possible.
8. Equipment is to be limited to the construction allowance area and is not to encroach within the adjacent forested and wetland communities or watercourse.
9. Accumulated sediment and debris to be removed before silt fence is removed.
10. All disturbed areas will be re-vegetated or restored with site appropriate indigenous plants.
11. Implement a comprehensive restoration and compensation within the areas of impact associated with the construction of the bridge.
12. Time activities to avoid wildlife disturbance during critical life stages;
  - a) No in-water works are permitted from March 15 to July 15 (spring timing restrictions) and October 1 to May 31 (fall timing restrictions), as per DFO fisheries timing windows.
  - b) Avoid removal of trees and vegetation during the generalized breeding bird nesting period from April 1 to August 31. If removal of vegetation is to occur

during the general nesting period, a nest search should be carried out by a skilled and experienced Biologist.

- c) Installation of Barn Swallow exclusion measures (e.g netting) recommended prior to the beginning of the generalize breeding bird nesting period (April 1).
13. Compensate for trees removed at a 2:1 or 3:1 ratio
  14. Choose designs and materials that will minimize impacts
  15. Limit any cleaning solutions or paint used on the bridge and take appropriate precautions to avoid products entering the watercourse.



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OMNR Certified Ecological Land Classification  
OMNR Certified Wetland Evaluation

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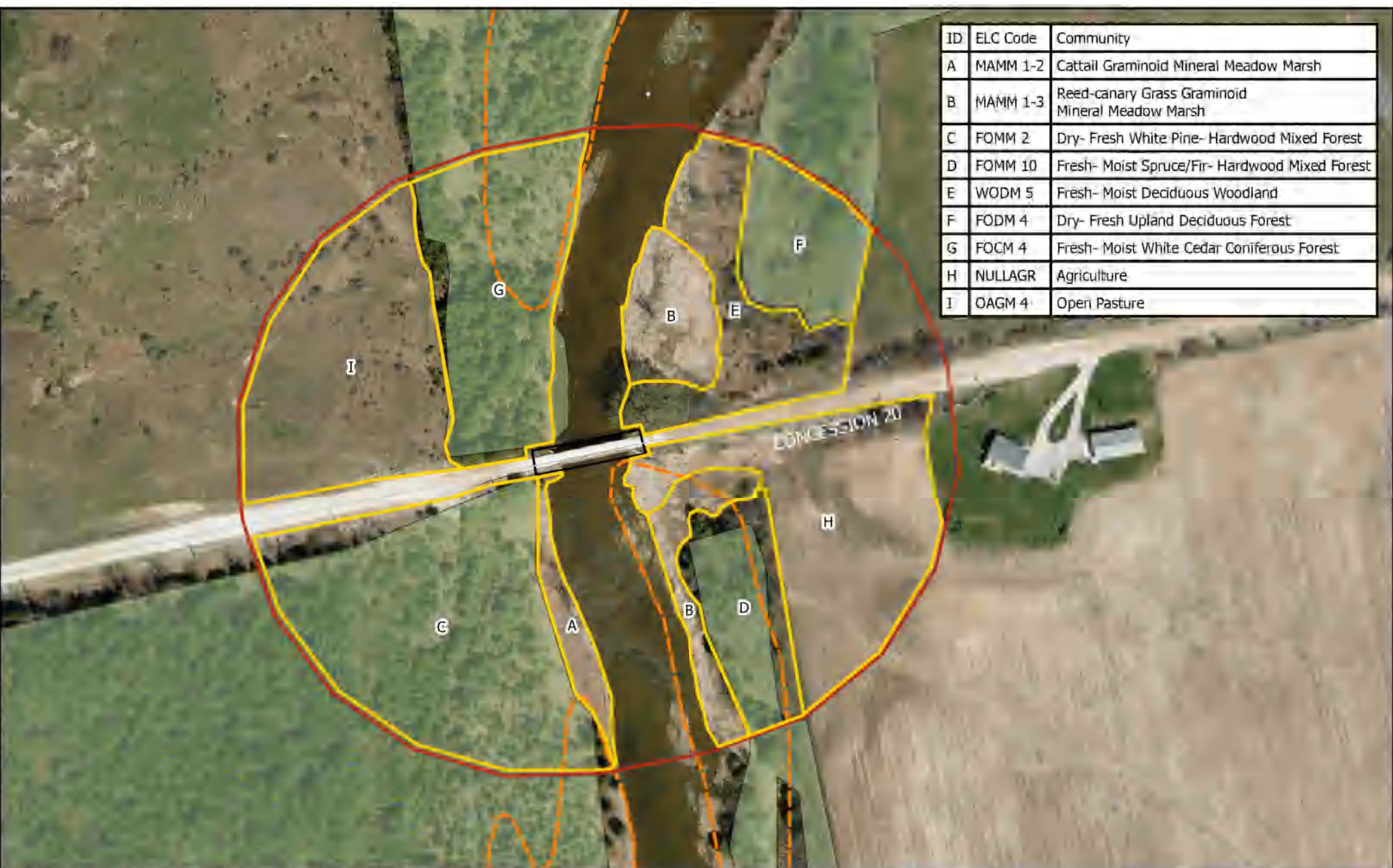
### **Agency Correspondence**

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**Figure 1**

ID	ELC Code	Community
A	MAMM 1-2	Cattail Graminoid Mineral Meadow Marsh
B	MAMM 1-3	Reed-canary Grass Graminoid Mineral Meadow Marsh
C	FOMM 2	Dry- Fresh White Pine- Hardwood Mixed Forest
D	FOMM 10	Fresh- Moist Spruce/Fir- Hardwood Mixed Forest
E	WODM 5	Fresh- Moist Deciduous Woodland
F	FODM 4	Dry- Fresh Upland Deciduous Forest
G	FOCM 4	Fresh- Moist White Cedar Coniferous Forest
H	NULLAGR	Agriculture
I	OAGM 4	Open Pasture



## LEGEND

- ECOLOGICAL LAND CLASSIFICATION (AA)
- STUDY AREA (120M)
- SUBJECT BRIDGE
- WOODLAND (MNR)
- UNEVALUATED WETLANDS (MNR)

Information Sources:  
 1. Orthophotography provided by First Base Solutions Accessed September 29, 2017.  
 2. Woodlands and wetlands provided by Land Information Ontario. Accessed July 5, 2017.  
 3. Ecological Land Classification provided by Aboud & Associates, July, 2017.

## EXISTING CONDITIONS

Project:

**BRIDGE NO. 0011  
(GREENOCK)**



Date: JANUARY 2018  
 Project: AA17-120A  
 Scale: 1 : 2000



**ABOUD & ASSOCIATES INC.**  
 Consulting Arborists • Ecologists • Landscape Designers  
 591 Woolwich Street, Guelph, Ontario, Canada N1H 3Y5  
 T: 519.822.8834 F: 519.822.8852 info@aboudinc.com www.aboudinc.com

Figure No:

**1**

## Appendix 1



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NATURALIZATION PLANS  
INTERPRETIVE DESIGN  
MONITORING  
CONTRACT ADMINISTRATION

ENVIRONMENTAL STUDIES  
SUBWATERSHED STUDIES  
ENVIRONMENTAL IMPACT  
STATEMENTS  
ECOLOGICAL LAND  
CLASSIFICATION  
WETLAND EVALUATION  
VEGETATION ASSESSMENT  
BOTANICAL INVENTORIES  
WILDLIFE SURVEYS  
MONITORING

LANDSCAPE ARCHITECTURE  
MASTER PLANNING  
RESIDENTIAL COMMUNITIES  
COMMERCIAL/INDUSTRIAL  
HEALTHCARE AND EDUCATION  
STREETSCAPES  
PARKS AND OPEN SPACES  
TRAIL SYSTEMS  
GREEN ROOFS  
CONTRACT ADMINISTRATION

EXPERT OPINION  
OMB TESTIMONY  
LEGAL PROCEEDINGS  
PEER REVIEW  
RESEARCH  
EDUCATION

July 11, 2017

Our Project No.: AA17-120A  
Sent by e-mail: G.Senior@svca.on.ca

Gary Senior  
Sr. Manager  
Flood Warning and Land Management  
Saugeen Valley Conservation Authority  
1078 Bruce Rd 12, Formosa ON N0G 1W0

**Re: Bridge No. 0011 (Greenock) EA, Municipality of Brockton, Bruce County**  
**Terms of Reference - Scoped Environmental Impact Study**

Dear Gary Senior:

This document outlines the Terms of Reference (ToR) of a Scoped Environmental Impact Study (EIS), for a class Environmental Assessment (EA) to determine the best course of action for the repair, replacement or removal of Bridge No. 011 (Greenock) located within Lot 46/47, Concession A crossing the Teeswater River along Concession 20. Please review the terms and circulate to SVCA staff for discussion and approval.

## BACKGROUND

It is anticipated that the existing bridge crossing the Teeswater River, directly south of the Village of Paisley will need to be replaced. The subject bridge forms part of Concession Road 20 and crosses the Teeswater River at a location that is an estimated 3.4km south of its confluence with the Saugeen River.

The proposed bridge is within the Saugeen Valley Conservation Authority screening limit, and is located within Environmental Protection/Hazard zoning as defined under the schedules of the Bruce County OP (2013), as well as Environmental Protection in the Walkerton Community Official Plan (2013) and the Municipality of Brockton Zoning By-law (2013-26).



In preparing the Terms of Reference, the following sources were reviewed for background information:

- Aerial photography of the subject site,
- Bruce County Official Plan (2013) and Schedules,
- Municipality of Brockton Zoning By-law (2013-26)
- Walkerton Community Official Plan (2013)
- Bruce County GIS mapping (Bruce County Maps, accessed July 5, 2017) of natural heritage features (e.g. wooded areas, MNR evaluated wetlands, watercourses)
- SVCA mapping (accessed July 5, 2017) of regulation limit
- SVCA Environmental Planning and Regulations Policies Manual, 2017. Accessed July 5, 2017
- Natural Heritage Information Center, Make-a-map, accessed June 23, 2017,
- Ontario Nature. Ontario Reptile and Amphibian Atlas: a citizen science project to map the distribution of Ontario's reptiles and amphibians. Accessed June 23, 2017.
- Ontario Mammal Atlas. Dobbyn, 1995. Accessed July 5, 2017
- Ontario Breeding Bird Atlas. Bird Studies Canada, 2007 Accessed July 5, 2017.
- Land Information Ontario, Woodland and Wetland Mapping, 2007.

## **STUDY AREA**

The study area is Bridge No. 0011 (Greenock) as well as adjacent lands up to 120 metres surrounding the bridge (Figure 1).

## **PLANNING CONTEXT**

### *Municipality of Brockton Zoning By-law (2013-26)*

The study area is zoned as Environmental Protection under the Municipality of Brockton Zoning By-law (2013-26). Section 24.3 states notwithstanding any other provisions and definitions of this By-law, all buildings and structures shall be prohibited in an 'Environmental Protection (EP)' zone except for the following:

- i. Those necessary for flood and/or erosion control purposes in accordance with Section 24.3
- ii. Unenclosed picnic shelters
- iii. Washroom facilities associated with a Public Park or Conservation Area
- iv. Buildings essential for public services
- v. Boat Launching and Docking

Section 3.5.1 states that nothing in this By-law shall prevent the strengthening to a safe condition of any building or structure or part of any such building or structure which does not

comply with the provisions of this By-law, provided such alteration or repair does not increase the height, habitable space, size, or change the use of such building or structure.

#### *Walkerton Community Official Plan*

The study area is designated as Environmental Protection under the Walkerton Community Official Plan (2013). Section 3.9.3 states that certain buildings and structures that must be located within the Environmental Protection designation by the nature of their use, such as for flood or erosion control, are permitted. Certain buildings and structures that must be located within the Environmental Protection designation by the nature of their use, are permitted.

Section 3.9.4 states replacement of existing buildings or structures damaged by natural causes may be permitted if the hazard risk does not increase from the original condition and provided such replacement does not increase the height, size, volume or change the use. Extensions or enlargements may be subject to the requirements of Section 3.9.6.

Section 3.9.6 states an Environmental Impact Study (EIS) is required for new development proposed within the Environmental Protection designation.

#### *County of Bruce Official Plan*

According to the County of Bruce Official Plan (2013) Schedule 'A', the study area is within lands designated as Environmental Protection/Hazard.

The County of Bruce OP Section 5.8.3 indicates that Hazard Land Areas include those areas of identified Provincially Significant Wetlands and Environmental Hazard Areas such as flood and erosion susceptibility areas, hazard lands, steep slopes or other physical conditions which are severe enough to cause property damage or potential loss of life if the lands were to be developed.

Section 5.8.4 states that buildings and structures are generally not permitted in Hazard Area Lands. Only those uses which do not impair ecological processes and the environmental features so identified will be permitted.

Section 4.3.3 states that in order to achieve County objectives for the protection of the natural environment, development proponents shall be required to prepare an EIS for any proposal that is:

- i. In, or within 120 metres of, a provincially significant wetland;
- ii. In, or within 60 metres of, a locally significant wetland
- iii. In, or within 120 metres of, the habitat of threatened or endangered species;
- iv. In, or within, 120 metres of, a significant woodland, significant valleyland, significant wildlife habitat, deer wintering areas;
- v. In, or within, 120 metres of, fish habitat

- vi. Within the '100 Metre Buffer Zone' or '2 Year Time of Travel (WHPA-B)' for Wellhead Protection Areas or within a 'Intake Protection Zone 1 (IPZ-1)' or 'Intake Protection Zone 2 (IPZ-2)' for Intake Protection Zones;
- vii. Within known areas of karst topography
- viii. In, or within, 50 metres of Areas of Natural and Scientific Interest (ANSI) Earth Science

Section 5.8.5 states that the replacement or rebuilding of an existing building destroyed by natural means beyond the control of the owner may be permitted providing it does not exceed the size or volume of the original building, is located at the same site, unless an environmentally more acceptable site is available and acceptable to the owner which will not aggravate the existing hazardous situation, and is for substantially the same use, subject to the approval of the local municipality and the appropriate approval authorities.

#### *Saugeen Valley Conservation Authority*

The proposed bridge replacement is entirely within the screening area and is adjacent to unevaluated wetlands, both north and south of the study area.

Section 3.7.2.3 of the Environmental Planning and Regulations Policies Manual (2017) states all wetlands and their associated areas of interference are regulated under the *Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Regulation*. Any *development* or *interference* within wetlands or development in areas of interference requires permission from the SVCA.

An EIS to assess the hydrologic impact may be required if the submitted plans do not demonstrate the following:

- Disturbance to natural vegetation communities contributing to the hydrologic function of the wetland are avoided
- Overall existing drainage patterns for the lot will be maintained
- Disturbed area and soil compaction is minimized
- Development is located above the high water table
- All sewage disposal systems are located a minimum of 15 metres from the wetland and a minimum of 0.9 metres above the water table
- Impervious areas are minimized
- Best management practices are used to:
  - Maintain water balance
  - Control sediment and erosion
  - Maintain as much of the wetland buffer as possible.

Section 4.15.1 Interference with Watercourses states watercourse crossings may be permitted if it has been demonstrated to the satisfaction of the SVCA that the interference is acceptable on the natural features and hydrologic and ecological functions of the watercourse. At a minimum, plans should demonstrate the following based on the morphological characteristics of the watercourse:

- i. Culverts have an open bottom where feasible and where it is not feasible, culverts are appropriately embedded into the watercourse;
- ii. Crossing location, width and alignment should be compatible with stream morphology which typically requires location of the crossing on a straight and shallow/riffle reach of the watercourse with the crossing situated at right angles to the watercourse;
- iii. The crossing is sized and located such that there is no increase in upstream or downstream erosion or flooding;
- iv. The design should consider fish and wildlife passage;
- v. Have regard for upstream and downstream effects when installing/replacing a culvert

## **BACKGROUND REVIEW**

Additional background natural heritage information related to the subject lands and adjacent lands identified the following information:

1. The Ontario Reptile and Amphibian Atlas shows within a 10 km square of the subject lands, the recent and historical presence of 11 species of reptiles and amphibians, including two species of Conservation Concern (Milksnake (SC) and Snapping Turtle (SC)).
2. The Natural Heritage Information Center indicates the presence of 1 species of Conservation Concern within the 1 km square covering the project location (Rainbow Mussel (THR provincially, END federally).
3. The Ontario Mammal Atlas indicates that one species of Conservation Concern, Little Brown Myotis (END), may occur within 10km of the study areas.
4. The Ontario Breeding Bird Atlas indicates the presence of 10 species of Conservation Concern within the 10km square covering the project location Common Nighthawk (SC), Red-headed Woodpecker (SC), Eastern Wood-pewee (SC), Bank Swallow (THR), Barn Swallow (THR), Wood Thrush (SC), Golden-winged Warbler (SC), Grasshopper Sparrow (SC), Bobolink (THR), Eastern Meadowlark (THR)

Based on a review of the background information and an ortho-photograph review of habitat present in the study area, it is unlikely that any Species at Risk identified in the literature review, with the exception of Rainbow Mussel, will occur within the proposed bridge or adjacent the study areas. As a result, detailed wildlife surveys are not recommended for reptiles or bats, unless candidate habitat is identified in the study area through a review of Significant Wildlife Habitat for the sites.

## **PROPOSED TERMS OF REFERENCE**

### **Scoped Environmental Impact Study**

To fulfill the requirements of this study, we will:

1. Complete an MNRF Request for Information and determine if any Species at Risk have been identified in the study area, and any studies required by the MNRF under the ESA (2007).
2. Conduct a screening of all background information and the site to determine the potential for the presence of Species at Risk (SAR).
3. Communication with DFO regarding the Rainbow Mussel Critical habitat, and any permit requirements at detailed design.
4. Field Studies:
  - a. Conduct one site visit to characterize vegetation communities using the ELC system (MNRF) and complete a 1 season botanical inventory.
  - b. Evaluate underside of bridge for evidence of Barn Swallow nesting
  - c. Wetland limit and assessment: Determine if vegetation communities on-site meet the criteria for wetland status (not a complete wetland evaluation), and pre-stake the boundary of the unevaluated wetland within the study area and coordinate with SVCA to field-verify the actual boundary of the wetland.
  - d. Investigate the study area for habitat that may support important life stages for Species at Risk identified during SAR site screening
  - e. Investigate the study area for the presence of significant wildlife habitat; and complete a site assessment for all potential SWH (eg. bat maternity habitat, raptor wintering areas, amphibian breeding habitat, turtle nesting, habitat for species of conservation concern) using the SWH Criteria schedules for Ecoregion 6E (2015)
  - f. Document all observations of incidental wildlife
5. Species of flora and fauna found during field study or previously recorded as significant locally/regionally, Species at Risk (Endangered Species Act, 2007; Species at Risk Act , 2002) will be reported
6. Record observations of incidental wildlife during all site visits
7. Communications with project team, SVCA, County and the Municipality as needed
8. Analyze findings and prepare a map that shows:
  - a. Identified natural heritage features, and functions, and landscape level features (e.g. linkages, forest interior habitat).
  - b. The proposed alternatives
  - c. ELC vegetation communities (one season botanical)
  - d. Location of the wetland boundary
  - e. Other noteworthy features as needed

- f. Locations of other natural heritage features from background literature searches (e.g. mammal atlas, herpetofaunal atlas, County's OP, Township Zoning By-law)
9. Provide policy rationale for expected impacts to natural heritage features (e.g. removal of trees and grading to accommodate development, requirements)
10. Design Review: Conduct an analysis of the design options and provide recommendations as they relate to natural heritage features
11. Prepare report with appendices and figures as needed of methodology, existing conditions, design alternatives/impacts and mitigation guidelines and recommendations

Please contact the undersigned should you require additional information of the above.

Yours truly,

**ABOUD & ASSOCIATES INC.**



Shannon Ferguson, B. Env., Eco. Rest. Cert  
Ecologist

cc. Andrea Nelson, Senior Hydrogeologist, GM BluePlan  
John Strader, Roads Superintendent, Municipality of Brockton  
Bruce Stickney, Manager of Land Use, Bruce County

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## LEGEND

- STUDY AREA
  WETLAND (UNEVALUATED)
  BRIDGE
  WOODLAND

Information Sources:

1. Orthophotography provided by First Base Solutions  
Accessed July 5, 2017.
2. Wooded Areas provided by Land Information Ontario.  
Accessed July 5, 2017.
3. Wetlands provided by Land Information Ontario  
Accessed July 5, 2017.

## STUDY AREA

Project:

**BRIDGE NO. 0011  
(GREENOCK)**



Date: JULY 2017

Project: AA17-120A

Scale: 1 : 2000



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Figure No:

**1**





1078 Bruce Road 12, P.O. Box 150, Formosa ON Canada N0G 1W0  
Tel 519-367-3040, Fax 519-367-3041, [publicinfo@svca.on.ca](mailto:publicinfo@svca.on.ca), [www.svca.on.ca](http://www.svca.on.ca)

SENT ELECTRONICALLY ONLY ([sferguson@aboudtng.com](mailto:sferguson@aboudtng.com))

September 11, 2017

Aboud and Associates Inc.  
190 Nicklin Road  
Guelph, Ontario  
N1H 7L5

ATTN: Shannon Ferguson, Ecologist

Dear Ms. Ferguson,

RE: Bridge No. 0011  
Concession 2A/Concession Road 20  
Lots 46-47, Concession A  
Geographic Township of Greenock  
Municipality of Brockton

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It is the understanding of the Saugeen Valley Conservation Authority (SVCA) that Aboud and Associates has been awarded a sub-consultant contract from GM Blue Plan to assess the agency requirements and provide a scoped Environmental Impact Study (EIS) for the bridge replacement at the above-mentioned location (along with the Riversdale Bridge No. 002 in the Geographic Township of Greenock). You have since provided Terms of Reference (ToR) for Bridge No. 0011 for SVCA review.

SVCA offers the following comments based on the information that was provided for the replacement of the pony truss bridge at the above noted location. These comments are based on our general examination of the site, existing file information and aerial photographs.

Please be advised that this bridge is subject to SVCA's Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (Ontario Regulation 169/06, as amended). This Regulation is in accordance with Section 28 of the *Conservation Authorities Act*, R.S.O. 1990, Chap. C. 27 and requires that a person obtain the written permission of the SVCA prior to any "development" in a Regulated Area or alteration to a wetland or watercourse.

"Development" and "Alteration"

Subsection 28 (25) of the Conservation Authorities Act defines development as:

*a) the construction, reconstruction, erection or placing of a building or structure of any kind,*



**Watershed Member Municipalities**

Municipality of Arran-Elderslie, Municipality of Brockton, Township of Chatsworth, Municipality of Grey Highlands,  
Town of Hanover, Township of Howick, Municipality of Morris-Turnberry, Municipality of South Bruce,  
Township of Huron-Kinloss, Municipality of Kincardine, Town of Minto, Township of Wellington North,  
Town of Saugeen Shores, Township of Southgate, Municipality of West Grey

- b) any change to a building or structure that would have the effect of altering the use or potential use of the building or structure, increasing the size of the building or structure or increasing the number of dwelling units in the building or structure;*
- c) site grading; or,*
- d) the temporary or permanent placing, dumping or removal of any material, originating on the site or elsewhere.*

According to Section 5 of Ontario Regulation 169/06, as amended, alteration generally includes the straightening, diverting or interference in any way with the existing channel of a river, creek, stream or watercourse, or the changing or interfering in any way with a wetland.

The SVCA has not received plans for the new bridge design and will require such plans to comment specifically, however SVCA staff understands that the bridge will be replaced with a similar single-lane structure with the same span between the abutments.

### **SVCA Policy Manual**

#### **Policy 4.15.1-1**

Public infrastructure is an activity approved through a satisfactory EA process and other studies deemed necessary by the SVCA.

If the replacement bridge will not change the constriction of the river flow at this location, the SVCA will have no objection to the proposed project. If the bridge design conforms with the existing parameters of the existing bridge, and the hydrology will not be altered, SVCA staff will not require a Hydrologic Assessment for review. Additionally, SVCA staff will not require an EIS for review for this replacement. If the plans for the bridge change from what is existing or further restrict flow, an Engineered Hydrology Report will need to be provided for SVCA review.

### **Department of Fisheries and Oceans**

In the past, Conservation Authorities served as the first point of contact and the local service provider for review of Section 35 of the previous version of the Fisheries Act, and had entered into agreements with Fisheries and Oceans Canada to facilitate this process. Changes to the Fisheries Act effective November 25, 2013, have resulted in the cancellation of these agreements. It is now the responsibility of the proponent to contact the Department of Fisheries and Oceans at 1-855-852-8320 or <http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html> to ensure their project addresses the Fisheries Act.

### **Limitation of SVCA Comments**

The SVCA has provided comments based on the information that is currently available. Should construction not proceed for some time, there is no guarantee the SVCA comments will remain unchanged indefinitely.

An application to Alter a Regulated Area and the related fee of \$715.00 (Standard Works Application Fee to Alter a Watercourse) should be included with the design plans when they are prepared. Thank you for your cooperation. Should you have any questions, please do not hesitate to contact Michelle Gallant of this office.

Sincerely,



Michelle Gallant  
Regulations Officer  
Saugeen Valley Conservation Authority

MG/

cc: Dan Gieruszak, Authority Member, SVCA (via e-mail)  
Andrea Nelson, M.SC. Senior Hydrogeologist (via e-mail)

## Appendix 2

## Shannon Ferguson

---

**From:** Dodge, Kathy (MNRF) <kathy.dodge@ontario.ca>  
**Sent:** July-19-17 1:41 PM  
**To:** Shannon Ferguson  
**Subject:** RE: 17-120A- MNRF Request for Information July 7, 2017

Hi Shannon-

I have reviewed your information request, and you have done a thorough search of available resources.

We do not have a lot to add.

Wetland mapping/evaluation- the wetland in the area of this bridge location is an unevaluated wetland. We do not have any information to provide.

Fish Dot information- We only have one sampling location approximately 1.9 km from the site. Species found include

Iowa darter, Johnny darter, Blackside darter, Rainbow darter, yellow bullhead, hornyhead chub, central mudminnow, common shiner, stonecat, rock bass, pumpkinseed, creek chub, smallmouth bass, white sucker, longnose dace

We consider the Teeswater River to be a cool/warm water system in this area, with known populations of smallmouth bass and northern pike.

SAR – I do not have any additional species occurrence information to add to your list. Species at risk records found in the NHIC database are not exhaustive and are based on **known** occurrences only. As a result, although there may be no record (or confirmation) of a SAR on site it does not mean that they are not present if appropriate habitat exists. Due diligence is therefore still required and would include an appropriate consideration of what species could be present based on available habitat at the noted study areas. Your field work should inform you on what species on the SARO list could possibly be encountered based on available habitats in the areas of the study and the possible survey methodologies required during your site assessments.

In addition to the species you listed, other species to consider include (but not limited to )...

Hungerford's Crawling Water Beetle (END)

Northern Long eared Bat (END)

Tri-coloured Bat (END)

Eastern Small Footed Bat (END)

Eastern Ribbon snake (SC)

You should note the Rainbow mussel (now known just as Rainbow) was delisted provincially in June 2107 and is now considered to be a special concern species. It is however still considered endangered federally and I encourage you to contact DFO.

If you have any additional questions, please feel free to give me a call.

Kathy Dodge

---

**Kathy Dodge**

MANAGEMENT BIOLOGIST | ONTARIO MINISTRY of NATURAL RESOURCES and FORESTRY | OWEN SOUND FIELD OFFICE -MIDHURST DISTRICT

1450 7<sup>TH</sup> Ave. East, Owen Sound, ON N4K 2Z1 | PH: 519.371.8422 | FAX: 519.372.3305 | EMAIL: [kathy.dodge@ontario.ca](mailto:kathy.dodge@ontario.ca)



---

**From:** Shannon Ferguson [<mailto:sferguson@aboudtng.com>]

**Sent:** July-07-17 9:57 AM

**To:** MIDHURSTINFO (MNR)

**Cc:** [Drea.Nelson@gmblueplan.ca](mailto:Drea.Nelson@gmblueplan.ca)

**Subject:** 17-120A- MNR Request for Information July 7, 2017

Good Morning,

Please see the attached request for information, regarding a site south of the Village of Paisley within the Municipality of Brockton. If ESA Owen Sound has a form for information requests we would appreciate a copy. We have included a short letter with all pertinent information regarding the site, in lieu of a form. Any information you can provide for the site would be appreciated.

Thank you,

**Shannon Ferguson B.Env. Eco. Rest. Cert.**

Ecologist

MNR Certified Wetland Evaluation . MNR Certified Ecological Land Classification

**ABOUD & ASSOCIATES INC.**, 190 Nicklin Road . Guelph . Ontario . N1H 7L5

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---



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EXPERT OPINION  
OMB TESTIMONY  
LEGAL PROCEEDINGS  
PEER REVIEW  
RESEARCH  
EDUCATION

07/07/2017

Our Project #: AA17-120A  
Sent by email: MidhurstInfo@ontario.ca

Ministry of Natural Resources and Forestry  
Midhurst District  
2284 Nursery Road  
Midhurst, ON L9X 1N8

Attention: ESA Midhurst

**Re: Bridge No. 0011 (Greenock) EA, Municipality of Brockton, Bruce County  
Request for Species at Risk and Local Site Information**

Dear ESA Midhurst:

Please accept this request for Information regarding:

- ☒ Species at Risk
- ☒ Wetland Mapping and/or Evaluation and Data Records [Wetland name]
- ☒ Fish Dot Information
- ☐ ANSI Mapping and/or check-sheet [ANSI name]
- ☒ Other: Any other possible site constraints or information would also be greatly appreciated.

### ***Project Description***

The existing Bridge No. 0011 (Greenock) forms part of Concession Road 20 directly south of the Village of Paisley and crosses the Teeswater River approximately 3.4km south of its confluence with the Saugeen River in Paisley. Information collected applies to an Environmental Impact Study for an Environmental Assessment in regards to replacement of the existing bridge. Figure 1, attached, contains the bridge and the study area including all adjacent lands up to 120m.

Township: Greenock

Lot: 46/47

Concession: A

UTM Coordinates: 477939.62      4902599.10



### **Background Information**

A thorough background search has been completed; using available resources provided online related to the subject lands and adjacent lands and is listed below:

1. The Ontario Reptile and Amphibian Atlas indicates that 2 species of Conservation Concern, Milksnake (SC) and Common Snapping Turtle (SC) have been identified within 10km of the study area.
2. The Natural Heritage Information Center indicates the presence of 1 species of Conservation Concern, Rainbow Mussel (THR provincially, END federally) within 1km of the study area.
3. The Ontario Mammal Atlas indicates that 1 species of Conservation Concern, Little Brown Myotis (END), has been identified within 10km of the study area.
4. The Ontario Breeding Bird Atlas indicates that 10 species of Conservation Concern, Common Nighthawk (SC), Red-headed Woodpecker (SC), Eastern Wood-pewee (SC), Bank Swallow (THR), Barn Swallow (THR), Wood Thrush (SC), Golden-winged Warbler (SC), Grasshopper Sparrow (SC), Bobolink (THR) and Eastern Meadowlark (THR), have been identified within 10km of the study area.
5. A review of the Saugeen Valley Conservation Authority web mapping indicates that the bridge to be replaced is within the Saugeen Valley Conservation Authority screening limit.
6. A review of the Land Information Ontario mapping (2007) indicates the presence of unevaluated wetlands north and south of the bridge, within the study area.

Please contact the undersigned should you require additional information of the above.

Yours truly,

**ABOUD & ASSOCIATES INC.**



Shannon Ferguson, B. Env., Eco. Rest Cert., Ecologist  
T:519.822.6839 x. 5

CC: Andrea Nelson, Senior Hydrogeologist, GM BluePlan  
Attachment: Figure 1

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## LEGEND

- STUDY AREA
   WETLAND (UNEVALUATED)
   BRIDGE
   WOODLAND

Information Sources:  
 1. Orthophotography provided by First Base Solutions  
 Accessed July 5, 2017.  
 2. Wooded Areas provided by Land Information Ontario.  
 Accessed July 5, 2017.  
 3. Wetlands provided by Land Information Ontario  
 Accessed July 5, 2017.

## TITLE:

### STUDY AREA

Project:  
**BRIDGE NO. 0011  
 (GREENOCK)**



Date: JULY 2017  
 Project: AA17-120A  
 Scale: 1 : 2000

  
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Figure No:

1

### **Appendix 3**

# ELC COMMUNITY DESCRIPTION & CLASSIFICATION

Project: **Bridge No. 0011** Project #: **17-120** Observer(s): **SF**

Weather conditions:

Date:

Temp (°C)	Wind*	Cloud Cover	Precipitation	Precipitation(24hrs)
18	1	90	None	None

\*Beaufort Scale: 0- (0 km/hr), 1- (1-5km/hr), 2- (6-11km/hr), 3- (12-19km/hr), 4- (20-28km/hr), 5- (29-38km/hr), 6- (39-49km/hr)

<b>Polygon:</b> A	<b>Polygon UTM</b> E: 477940.97 N: 4902598.10	<b>Community Series</b> MAM- Meadow marsh	<b>Ecosite</b> MAMM 1- Graminoid Mineral Meadow Marsh	<b>Vegetation Type</b> MAMM 1-2- Cattail Graminoid Mineral Meadow Marsh
<b>System</b> Terrestrial <input type="checkbox"/> Wetland Aquatic	<b>Topographic Feature</b> Lacustrine <input type="checkbox"/> Riverine <input type="checkbox"/> Bottomland Terrace Valley slope Tableland Rolling upland Cliff Talus Crevice Cave Alvar Rockland Beach Bar Sand dune Bluff			<b>Dominant Plant Form</b> Plankton Submerged Floating-lvd. <input type="checkbox"/> Graminoid <input type="checkbox"/> Forb Lichen Bryophyte Deciduous Coniferous Mixed
<b>Cover</b> <input type="checkbox"/> Open <input type="checkbox"/> Shrub <input type="checkbox"/> Treed	<b>History</b> <input type="checkbox"/> Natural <input type="checkbox"/> Cultural	<b>Community Class</b> Beach-Bar Sand Dune Bluff Cliff Talus Alvar Rock Barren Crevice-Cave Sand Barren Meadow Tallgrass Prairie Savannah Woodland Forest Thicket Cultural Swamp Fen Bog <input type="checkbox"/> Marsh <input type="checkbox"/> Open Water Shallow Water		
<b>Stand Description:</b>		<b>Soil Analysis:</b>		
<b>Community Age</b> Pioneer Young Mid-Aged Mature Old Growth		<b>Basal Area (m²/ha)</b>		<b>Soil Drainage</b> Very Rapid Rapid Well Moderately Well Imperfect Poor Very Poor
<b>Standing Snags</b> Rare Occasional Abundant Dominant		<b>Soil Moisture Regime</b> Dry Fresh Moist Wet		
<b>Deadfall Logs</b> Rare Occasional Abundant Dominant		<b>Effective Soil Texture</b>		
<b>Healt</b> Low Medium High	<b>Sensitivity</b> Low Medium High	<b>Botanical Quality</b> Low Medium High		<b>Depth to Mottles / Gley</b> Sample: M - -- cm / G - -- cm
<b>Slope</b> none gentle moderate steep (simple or complex)		<b>Depth to Groundwater</b> metres at surface less than 1m more than 1 m		<b>Depth to Bedrock</b> metres at surface less than 1m more than 1 m

Vegetation Layer	Height <sup>1</sup>	Cover <sup>2</sup>	Dominant Species per Vegetation Layer
1 Canopy			
2 Subcanopy	2	1	THUOCCI
3 Understorey	3	1	RHUTYPH > SIUSUAV
4 Ground Layer	4	4	TYPLATI > PHAARUN > EUTMACU > SOLIDAGOSP.

<sup>1</sup> Height Code: 1=>20m, 2=10m-20m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7= < 0.2m <sup>2</sup> Cover Codes: 0 = none, 1 = 0%- 10%, 2 = 10%- 25%, 3 = 25%-60%, 4= >60%

Size Class Analysis <sup>3</sup>	< 10 cm DBH	10 to 24 cm DBH	25 to 50 cm DBH	> 50 cm DBH
<sup>3</sup> Abundance Code: RS=Rare, O=Occasional, A=Abundant, D=Dominant				

Evidence of Disturbance:

Wildlife / Habitat Observations / Comments:  
 AMCO, COYE, WTSP

Community Name				Code	% Coverage
Inclusion		Complex			
Inclusion		Complex			
Inclusion		Complex			

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**Representative Photographs of Vegetation Community:**



# ELC COMMUNITY DESCRIPTION & CLASSIFICATION

Project: **Bridge No. 0011** Project #: **AA17-120A** Observer(s): **SF**

Weather conditions:

Date:

Temp (°C)	Wind*	Cloud Cover	Precipitation	Precipitation(24hrs)
18	1	90	None	None

\*Beaufort Scale: 0- (0 km/hr), 1- (1-5km/hr), 2- (6-11km/hr), 3- (12-19km/hr), 4- (20-28km/hr), 5- (29-38km/hr), 6- (39-49km/hr)

<b>Polygon:</b> B	<b>Polygon UTM</b> E: 477968.28 N: 4902577.57	<b>Community Series</b> MAM- Meadow Marsh	<b>Ecosite</b> MAMM 1- Graminoid Mineral Meadow Marsh	<b>Vegetation Type</b> MAMM 1-3- Reed-canary Grass Graminoid Mineral Meadow Marsh
<b>System</b> Terrestrial <input type="checkbox"/> Wetland Aquatic	<b>Topographic Feature</b> Lacustrine <input type="checkbox"/> Riverine <input type="checkbox"/> Bottomland Terrace Valley slope Tableland Rolling upland Cliff Talus Crevice Cave Alvar Rockland Beach Bar Sand dune Bluff			<b>Dominant Plant Form</b> Plankton Submerged Floating-lvd. <input type="checkbox"/> Graminoid <input type="checkbox"/> Forb Lichen Bryophyte Deciduous Coniferous Mixed
<b>Cover</b> <input type="checkbox"/> Open <input type="checkbox"/> Shrub Tree	<b>History</b> <input type="checkbox"/> Natural Cultural	<b>Community Class</b> Beach-Bar Sand Dune Bluff Cliff Talus Alvar Rock Barren Crevice-Cave Sand Barren Meadow Tallgrass Prairie Savannah Woodland Forest Thicket Cultural Swamp Fen Bog <input type="checkbox"/> Marsh <input type="checkbox"/> Open Water Shallow Water		
<b>Stand Description:</b>		<b>Soil Analysis:</b>		
<b>Community Age</b> Pioneer Young Mid-Aged Mature Old Growth		<b>Basal Area (m²/ha)</b>	<b>Soil Drainage</b> Very Rapid Rapid Well Moderately Well Imperfect Poor Very Poor	
<b>Standing Snags</b> Rare Occasional Abundant Dominant		<b>Soil Moisture Regime</b> Dry Fresh Moist Wet		
<b>Deadfall Logs</b> Rare Occasional Abundant Dominant		<b>Effective Soil Texture</b>		
<b>Health</b> Low Medium High	<b>Sensitivity</b> Low Medium High	<b>Botanical Quality</b> Low Medium High	<b>Depth to Mottles / Gley</b> Sample: M - -- cm / G - -- cm	
<b>Slope</b> none gentle moderate steep (simple or complex)		<b>Depth to Groundwater</b> metres at surface less than 1m more than 1m		<b>Depth to Bedrock</b> metres at surface less than 1m more than 1m

Vegetation Layer	Height <sup>1</sup>	Cover <sup>2</sup>	Dominant Species per Vegetation Layer
1 Canopy			
2 Subcanopy			
3 Understorey	3	1	ACENEGU
4 Ground Layer	4	4	PHAARUN >> EUTMACU > SOLIDAGOSP. > VITRIPA

<sup>1</sup> Height Code: 1=>20m, 2=10m-20m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7= < 0.2m <sup>2</sup> Cover Codes: 0 = none, 1 = 0% - 10%, 2 = 10% - 25%, 3 = 25% - 60%, 4 = >60%

Size Class Analysis <sup>3</sup>	< 10 cm DBH	10 to 24 cm DBH	25 to 50 cm DBH	> 50 cm DBH
<sup>3</sup> Abundance Code: RS=Rare, O=Occasional, A=Abundant, D=Dominant				

Evidence of Disturbance:

Wildlife / Habitat Observations / Comments:  
NOCA

Community Name				Code	% Coverage
Inclusion		Complex			
Inclusion		Complex			
Inclusion		Complex			



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**Representative Photographs of Vegetation Community:**



# ELC COMMUNITY DESCRIPTION & CLASSIFICATION

Project: **Bridge No. 0011** Project #: **AA17-120A** Observer(s): **SF**

Weather conditions:

Date: **07/28/2017**

Temp (°C)	Wind*	Cloud Cover	Precipitation	Precipitation(24hrs)
18	2	90	None	None

\*Beaufort Scale: 0- (0 km/hr), 1- (1-5km/hr), 2- (6-11km/hr), 3- (12-19km/hr), 4- (20-28km/hr), 5- (29-38km/hr), 6- (39-49km/hr)

<b>Polygon:</b> C	<b>Polygon UTM</b> E: 477863.32 N: 4902549.93	<b>Community Series</b> FOM- Mixed Forest	<b>Ecosite</b> FOMM 2- Dry- Fresh White Pine- Hardwood Mixed Forest	<b>Vegetation Type</b>
<b>System</b> Terrestrial Wetland Aquatic	<b>Topographic Feature</b> Lacustrine Riverine Bottomland Terrace Valley slope Tableland Rolling upland Cliff Talus Crevice Cave Alvar Rockland Beach Bar Sand dune Bluff			<b>Dominant Plant Form</b> Plankton Submerged Floating-lvd. Graminoid Forb Lichen Bryophyte Deciduous Coniferous Mixed
<b>Cover</b> Open Shrub Treed	<b>History</b> Natural Cultural	<b>Community Class</b> Beach-Bar Sand Dune Bluff Cliff Talus Alvar Rock Barren Crevice-Cave Sand Barren Meadow Tallgrass Prairie Savannah Woodland Forest Thicket Cultural Swamp Fen Bog Marsh Open Water Shallow Water		
<b>Stand Description:</b>		<b>Soil Analysis:</b>		
<b>Community Age</b> Pioneer Young Mid-Aged Mature Old Growth		<b>Basal Area (m²/ha)</b>	<b>Soil Drainage</b> Very Rapid Rapid Well Moderately Well Imperfect Poor Very Poor	
<b>Standing Snags</b> Rare Occasional Abundant Dominant		<b>Soil Moisture Regime</b> Dry Fresh Moist Wet		
<b>Deadfall Logs</b> Rare Occasional Abundant Dominant		<b>Effective Soil Texture</b>		
<b>Health</b> Low Medium High	<b>Sensitivity</b> Low Medium High	<b>Botanical Quality</b> Low Medium High	<b>Depth to Mottles / Gley</b> Sample: M - -- cm / G - -- cm	
<b>Slope</b> none gentle moderate steep (simple or complex)		<b>Depth to Groundwater</b> at surface less than 1m more than 1 m	<b>Depth to Bedrock</b> at surface less than 1m more than 1 m	

Vegetation Layer	Height <sup>1</sup>	Cover <sup>2</sup>	Dominant Species per Vegetation Layer
1 Canopy	1	3	PINSTRO > POPGRAN
2 Subcanopy	2	4	PINSTRO > THUOCCI > ULMAMER > ACENEGU
3 Understorey	3	3	THUOCCI > PINSTRO > ULMAMER > ACESACC
4 Ground Layer	6	3	SOLCANA > VITAEST > SOLALTI > DAUCARO

<sup>1</sup> Height Code: 1=>20m, 2=10m-20m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7=< 0.2m <sup>2</sup> Cover Codes: 0 = none, 1 = 0%- 10%, 2 = 10%- 25%, 3 = 25%-60%, 4 = >60%

Size Class Analysis <sup>3</sup>	< 10 cm DBH	10 to 24 cm DBH	25 to 50 cm DBH	> 50 cm DBH
<sup>3</sup> Abundance Code: RS=Rare, O=Occasional, A=Abundant, D=Dominant				

<b>Evidence of Disturbance:</b>
<b>Wildlife / Habitat Observations / Comments:</b> MALL, BLJA

Inclusion	Complex	Community Name	Code	% Coverage
Inclusion	Complex			
Inclusion	Complex			
Inclusion	Complex			

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**Representative Photographs of Vegetation Community:**



# ELC COMMUNITY DESCRIPTION & CLASSIFICATION

Project: **Bridge No. 0011** Project #: **AA17-120A** Observer(s): **SF**

Weather conditions:

Date: **07/28/2017**

Temp (°C)	Wind*	Cloud Cover	Precipitation	Precipitation(24hrs)
20	1	85	None	None

\*Beaufort Scale: 0- (0 km/hr), 1- (1-5km/hr), 2- (6-11km/hr), 3- (12-19km/hr), 4- (20-28km/hr), 5- (29-38km/hr), 6- (39-49km/hr)

<b>Polygon:</b> D	<b>Polygon UTM</b> E: 478001.6 N: 4902542.69	<b>Community Series</b> FOM- Mixed Forest	<b>Ecosite</b> FOMM 10- Fresh- Moist Spruce/Fir – Hardwood Mixed Forest	<b>Vegetation Type</b>
<b>System</b> Terrestrial Wetland Aquatic	<b>Topographic Feature</b> Lacustrine Riverine Bottomland Terrace Valley slope Tableland Rolling upland Cliff Talus Crevice Cave Alvar Rockland Beach Bar Sand dune Bluff			<b>Dominant Plant Form</b> Plankton Submerged Floating-lvd. Graminoid Forb Lichen Bryophyte Deciduous Coniferous Mixed
<b>Cover</b> Open Shrub Treed	<b>History</b> Natural Cultural	<b>Community Class</b> Beach-Bar Sand Dune Bluff Cliff Talus Alvar Rock Barren Crevice-Cave Sand Barren Meadow Tallgrass Prairie Savannah Woodland Forest Thicket Cultural Swamp Fen Bog Marsh Open Water Shallow Water		
<b>Stand Description:</b>		<b>Soil Analysis:</b>		
<b>Community Age</b> Pioneer Young Mid-Aged Mature Old Growth		<b>Basal Area (m²/ha)</b>	<b>Soil Drainage</b> Very Rapid Rapid Well Moderately Well Imperfect Poor Very Poor	
<b>Standing Snags</b> Rare Occasional Abundant Dominant		<b>Soil Moisture Regime</b> Dry Fresh Moist Wet		
<b>Deadfall Logs</b> Rare Occasional Abundant Dominant		<b>Effective Soil Texture</b>		
<b>Health</b> Low Medium High	<b>Sensitivity</b> Low Medium High	<b>Botanical Quality</b> Low Medium High	<b>Depth to Mottles / Gley</b> Sample: M - -- cm / G - -- cm	
<b>Slope</b> none gentle moderate steep (simple or complex)		<b>Depth to Groundwater</b> at surface less than 1m more than 1 m	<b>Depth to Bedrock</b> at surface less than 1m more than 1 m	

Vegetation Layer	Height <sup>1</sup>	Cover <sup>2</sup>	Dominant Species per Vegetation Layer
1 Canopy	1	4	PICGLAU >> ULMAMER
2 Subcanopy	2	2	MALUS SP. > ULMAMER
3 Understorey	3	2	RHACATH > VITAEST > ACENEGU
4 Ground Layer	6	3	SOLCANA > DIPFULL > PHAARUN

<sup>1</sup> Height Code: 1=>20m, 2=10m-20m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7=< 0.2m <sup>2</sup> Cover Codes: 0 = none, 1 = 0%- 10%, 2 = 10%- 25%, 3 = 25%-60%, 4 = >60%

Size Class Analysis <sup>3</sup>	< 10 cm DBH	10 to 24 cm DBH	25 to 50 cm DBH	> 50 cm DBH
<sup>3</sup> Abundance Code: RS=Rare, O=Occasional, A=Abundant, D=Dominant				

<b>Evidence of Disturbance:</b>
<b>Wildlife / Habitat Observations / Comments:</b> GRCA

Inclusion	Complex	Community Name	Code	% Coverage
Inclusion	Complex			
Inclusion	Complex			
Inclusion	Complex			

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# ELC COMMUNITY DESCRIPTION & CLASSIFICATION

Project: **Bridge No. 0011** Project #: **17-120A** Observer(s): **SF**  
 Weather conditions: \_\_\_\_\_ Date: **07/28/2017**

Temp (°C)	Wind*	Cloud Cover	Precipitation	Precipitation(24hrs)
20	1	85%	None	None

\*Beaufort Scale: 0- (0 km/hr), 1- (1-5km/hr), 2- (6-11km/hr), 3- (12-19km/hr), 4- (20-28km/hr), 5- (29-38km/hr), 6- (39-49km/hr)

<b>Polygon:</b> E	<b>Polygon UTM</b> E: 477980.16 N: 4902621.74	<b>Community Series</b> WOD- Deciduous Woodland	<b>Ecosite</b> WODM 5- Fresh- Moist Deciduous Woodland	<b>Vegetation Type</b>
<b>System</b> Terrestrial Wetland Aquatic	<b>Topographic Feature</b> Lacustrine Riverine Bottomland Terrace Valley slope Tableland Rolling upland Cliff Talus Crevice Cave Alvar Rockland Beach Bar Sand dune Bluff			<b>Dominant Plant Form</b> Plankton Submerged Floating-lvd. Graminoid Forb Lichen Bryophyte Deciduous Coniferous Mixed
<b>Cover</b> Open Shrub Treed	<b>History</b> Natural Cultural	<b>Community Class</b> Beach-Bar Sand Dune Bluff Cliff Talus Alvar Rock Barren Crevice-Cave Sand Barren Meadow Tallgrass Prairie Savannah Woodland Forest Thicket Cultural Swamp Fen Bog Marsh Open Water Shallow Water		
<b>Stand Description:</b>		<b>Soil Analysis:</b>		
<b>Community Age</b> Pioneer Young Mid-Aged Mature Old Growth		<b>Basal Area (m²/ha)</b>		<b>Soil Drainage</b> Very Rapid Rapid Well Moderately Well Imperfect Poor Very Poor
<b>Standing Snags</b> Rare Occasional Abundant Dominant		<b>Soil Moisture Regime</b> Dry Fresh Moist Wet		
<b>Deadfall Logs</b> Rare Occasional Abundant Dominant		<b>Effective Soil Texture</b>		
<b>Health</b> Low Medium High	<b>Sensitivity</b> Low Medium High	<b>Botanical Quality</b> Low Medium High		<b>Depth to Mottles / Gley</b> Sample: M - -- cm / G - -- cm
<b>Slope</b> none gentle moderate steep (simple or complex)		<b>Depth to Groundwater</b> metres at surface less than 1m more than 1 m		<b>Depth to Bedrock</b> metres at surface less than 1m more than 1 m

Vegetation Layer	Height <sup>1</sup>	Cover <sup>2</sup>	Dominant Species per Vegetation Layer
1 Canopy	1	3	SALFRAG > JUGNIGR
2 Subcanopy	2	3	JUGNIGR > TILAMER
3 Understorey	3	3	ACENEGU > FRAPENN
4 Ground Layer	5	4	PHAARUN > EUTMACU > SOLCANA > VITRIPA

<sup>1</sup> Height Code: 1=>20m, 2=10m-20m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7= < 0.2m <sup>2</sup> Cover Codes: 0 = none, 1 = 0% - 10%, 2 = 10% - 25%, 3 = 25% - 60%, 4 = >60%

Size Class Analysis <sup>3</sup>	< 10 cm DBH	10 to 24 cm DBH	25 to 50 cm DBH	> 50 cm DBH
<sup>3</sup> Abundance Code: RS=Rare, O=Occasional, A=Abundant, D=Dominant				

<b>Evidence of Disturbance:</b>
<b>Wildlife / Habitat Observations / Comments:</b> RESQ

Inclusion	Complex	Community Name	Code	% Coverage
Inclusion	Complex			
Inclusion	Complex			
Inclusion	Complex			

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# ELC COMMUNITY DESCRIPTION & CLASSIFICATION

Project: Bridge No. 0011 Project #: 17-120A Observer(s): SF

Weather conditions:

Date: 07/28/2017

Temp (°C)	Wind*	Cloud Cover	Precipitation	Precipitation(24hrs)
20	1	85	None	None

\*Beaufort Scale: 0- (0 km/hr), 1- (1-5km/hr), 2- (6-11km/hr), 3- (12-19km/hr), 4- (20-28km/hr), 5- (29-38km/hr), 6- (39-49km/hr)

<b>Polygon:</b> F	<b>Polygon UTM</b> E: 478029.98 N: 490270.66	<b>Community Series</b> FODM- Deciduous Forest	<b>Ecosite</b> FODM 4- Dry- Fresh Upland Deciduous Forest	<b>Vegetation Type</b>
<b>System</b> Terrestrial Wetland Aquatic	<b>Topographic Feature</b> Lacustrine Riverine Bottomland Terrace Valley slope Tableland Rolling upland Cliff Talus Crevice Cave Alvar Rockland Beach Bar Sand dune Bluff			<b>Dominant Plant Form</b> Plankton Submerged Floating-lvd. Graminoid Forb Lichen Bryophyte Deciduous Coniferous Mixed
<b>Cover</b> Open Shrub Treed	<b>History</b> Natural Cultural	<b>Community Class</b> Beach-Bar Sand Dune Bluff Cliff Talus Alvar Rock Barren Crevice-Cave Sand Barren Meadow Tallgrass Prairie Savannah Woodland Forest Thicket Cultural Swamp Fen Bog Marsh Open Water Shallow Water		
<b>Stand Description:</b>		<b>Soil Analysis:</b>		
<b>Community Age</b> Pioneer Young Mid-Aged Mature Old Growth		<b>Basal Area (m²/ha)</b>	<b>Soil Drainage</b> Very Rapid Rapid Well Moderately Well Imperfect Poor Very Poor	
<b>Standing Snags</b> Rare Occasional Abundant Dominant		<b>Soil Moisture Regime</b> Dry Fresh Moist Wet		
<b>Deadfall Logs</b> Rare Occasional Abundant Dominant		<b>Effective Soil Texture</b>		
<b>Healt</b> Low Medium High	<b>Sensitivity</b> Low Medium High	<b>Botanical Quality</b> Low Medium High	<b>Depth to Mottles / Gley</b> Sample: M - -- cm / G - -- cm	
<b>Slope</b> none gentle moderate steep (simple or complex)		<b>Depth to Groundwater</b> at surface less than 1m more than 1 m	<b>Depth to Bedrock</b> at surface less than 1m more than 1 m	

Vegetation Layer	Height <sup>1</sup>	Cover <sup>2</sup>	Dominant Species per Vegetation Layer
1 Canopy	1	3	JUGNIGR
2 Subcanopy	2	4	JUGNIGR > THUOCCI
3 Understorey	3	3	THUOCCI > FRAPENN > RHACATH
4 Ground Layer	5	3	SOLCANA > TAROFFI > VIT AEST > PHAARUN

<sup>1</sup> Height Code: 1=>20m, 2=10m-20m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7=< 0.2m <sup>2</sup> Cover Codes: 0 = none, 1 = 0%- 10%, 2 = 10%- 25%, 3 = 25%-60%, 4 = >60%

Size Class Analysis <sup>3</sup>	< 10 cm DBH	10 to 24 cm DBH	25 to 50 cm DBH	> 50 cm DBH
<sup>3</sup> Abundance Code: RS=Rare, O=Occasional, A=Abundant, D=Dominant				

<b>Evidence of Disturbance:</b>
<b>Wildlife / Habitat Observations / Comments:</b>

Inclusion	Complex	Community Name	Code	% Coverage
Inclusion	Complex			
Inclusion	Complex			
Inclusion	Complex			

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# ELC COMMUNITY DESCRIPTION & CLASSIFICATION

Project: **Bridge No. 0011** Project #: **17-120A** Observer(s): **SF**

Weather conditions:

Date: **07/28/2017**

Temp (°C)	Wind*	Cloud Cover	Precipitation	Precipitation(24hrs)
20	1	85	None	None

\*Beaufort Scale: 0- (0 km/hr), 1- (1-5km/hr), 2- (6-11km/hr), 3- (12-19km/hr), 4- (20-28km/hr), 5- (29-38km/hr), 6- (39-49km/hr)

<b>Polygon:</b> G	<b>Polygon UTM</b> E: 477903.0 N: 4902647.99	<b>Community Series</b> FOCM- Coniferous Forest	<b>Ecosite</b> FOCM 4- Fresh- Moist White Cedar Coniferous Forest	<b>Vegetation Type</b>
<b>System</b> Terrestrial Wetland Aquatic	<b>Topographic Feature</b> Lacustrine Riverine Bottomland Terrace Valley slope Tableland Rolling upland Cliff Talus Crevice Cave Alvar Rockland Beach Bar Sand dune Bluff			<b>Dominant Plant Form</b> Plankton Submerged Floating-lvd. Graminoid Forb Lichen Bryophyte Deciduous Coniferous Mixed
<b>Cover</b> Open Shrub Treed	<b>History</b> Natural Cultural	<b>Community Class</b> Beach-Bar Sand Dune Bluff Cliff Talus Alvar Rock Barren Crevice-Cave Sand Barren Meadow Tallgrass Prairie Savannah Woodland Forest Thicket Cultural Swamp Fen Bog Marsh Open Water Shallow Water		
<b>Stand Description:</b>		<b>Soil Analysis:</b>		
<b>Community Age</b> Pioneer Young Mid-Aged Mature Old Growth		<b>Basal Area (m²/ha)</b>	<b>Soil Drainage</b> Very Rapid Rapid Well Moderately Well Imperfect Poor Very Poor	
<b>Standing Snags</b> Rare Occasional Abundant Dominant		<b>Soil Moisture Regime</b> Dry Fresh Moist Wet		
<b>Deadfall Logs</b> Rare Occasional Abundant Dominant		<b>Effective Soil Texture</b>		
<b>Healt</b> Low Medium High	<b>Sensitivity</b> Low Medium High	<b>Botanical Quality</b> Low Medium High	<b>Depth to Mottles / Gley</b> Sample: M - -- cm / G - -- cm	
<b>Slope</b> none gentle moderate steep (simple or complex)		<b>Depth to Groundwater</b> at surface less than 1m more than 1 m	<b>Depth to Bedrock</b> at surface less than 1m more than 1 m	

Vegetation Layer	Height <sup>1</sup>	Cover <sup>2</sup>	Dominant Species per Vegetation Layer
1 Canopy	2	4	THUOCCI
2 Subcanopy	3	4	THUOCCI >> TILAMER
3 Understorey	4	2	TILAMER
4 Ground Layer	5	3	PHAARUN > ONOSENS > IMPCAPE > VITAEST

<sup>1</sup> Height Code: 1=>20m, 2=10m-20m, 3=2m-10m, 4=1m-2m, 5=0.5m-1m, 6=0.2m-0.5m, 7=< 0.2m <sup>2</sup> Cover Codes: 0 = none, 1 = 0%- 10%, 2 = 10%- 25%, 3 = 25%-60%, 4 = >60%

Size Class Analysis <sup>3</sup>	< 10 cm DBH	10 to 24 cm DBH	25 to 50 cm DBH	> 50 cm DBH
<sup>3</sup> Abundance Code: RS=Rare, O=Occasional, A=Abundant, D=Dominant				

<b>Evidence of Disturbance:</b>
<b>Wildlife / Habitat Observations / Comments:</b>

Inclusion	Complex	Community Name	Code	% Coverage
Inclusion	Complex			
Inclusion	Complex			
Inclusion	Complex			

[illegible][illegible]

## Appendix 4



Plant <sup>1</sup> Type	Scientific Name	Common Name	CC <sup>2</sup>	CW <sup>3</sup>	SARO <sup>4</sup> Status	SARA <sup>5</sup> Status	Global <sup>6</sup> Rank	Prov. <sup>7</sup> Rank
TR	Acer negundo	Manitoba Maple	0	2	NL	NL	G5	S5
TR	Acer saccharum	Sugar Maple	4	3	NL	NL	G5	S5
GR	Bromus inermis	Awnless Brome	*	5	NL	NL	G5TNR	SNA
FO	Cichorium intybus	Chicory	*	5	NL	NL	GNR	SNA
FO	Daucus carota	Wild Carrot	*	5	NL	NL	GNR	SNA
FO	Dipsacus fullonum	Fuller's Teasel		5	NL	NL	GNR	SNA
VI	Echinocystis lobata	Wild Mock-cucumber	3	-2	NL	NL	G5	S5
FO	Eutrochium maculatum var. maculatum	Spotted Joe Pye Weed	3	-5	NL	NL	G5T5	S5
TR	Fraxinus pennsylvanica	Green Ash	3	-3	NL	NL	G5	S4
FO	Hieracium lachenalii	Common Hawkweed	*	5	NL	NL	GNR	SNA
FO	Impatiens capensis	Spotted Jewelweed						
SH	Juglans nigra	Black Walnut	5	3	NL	NL	G5	S4
FO	Lotus corniculatus	Garden Bird's-foot Trefoil	*	1	NL	NL	GNR	SNA
TR	Malus sp.	Apple species						
FO	Melilotus albus	White Sweet-clover	*	3	NL	NL	G5	SNA
FO	Onoclea sensibilis	Sensitive Fern	4	-3	NL	NL	G5	S5
VW	Parthenocissus quinquefolia	Virginia Creeper	6	1	NL	NL	G5	S4?
GR	Phalaris arundinacea	Reed-canary Grass	0	-4	NL	NL	G5	S5
TR	Picea glauca	White Spruce	6	3	NL	NL	G5	S5
TR	Pinus strobus	Eastern White Pine	4	3	NL	NL	G5	S5
TR	Populus grandidentata	Large-tooth Aspen	5	3	NL	NL	G5	S5
SH	Rhamnus cathartica	Common Buckthorn	*	3	NL	NL	GNR	SNA
SH	Rhus typhina	Staghorn Sumac	1	5	NL	NL	G5	S5
TR	Salix x fragilis	Crack Willow	*	-1	NL	NL	GNR	SNA
FO	Sium suave	Hemlock Water-parsnip	4	-5	NL	NL	G5	S5
FO	Solidago altissima ssp. altissima	Eastern Late Goldenrod	1	3	NL	NL	GNR	S5
FO	Solidago canadensis var. canadensis	Canada Goldenrod	1	3	NL	NL	G5T5	S5
FO	Taraxacum officinale	Common Dandelion	*	3	NL	NL	G5	SNA
TR	Thuja occidentalis	Eastern White Cedar	4	-3	NL	NL	G5	S5
TR	Tilia americana	American Basswood	4	3	NL	NL	G5	S5
GR	Typha latifolia	Broad-leaved Cattail	3	-5	NI	NL	G5	S5

TR	Ulmus americana	White Elm	3	-2	NL	NL	S5	G5?
VW	Vitis aestivalis	Summer Grape	7	3	NL	NL	G5	S4
VW	Vitis riparia	Riverbank Grape	0	-2	NL	NL	G5	S5

1.	Plant Types: AL = Algae; FE = Fern; FO = Forb; GR = Grass; LC = Lichen; LV = Liverwort; MO = Moss; RU = Rush; SE = Sedge; SH = Shrub; TR = Tree; VI = Herbaceous vine; VW = Woody Vine
2.	CC: Coefficient of Conservatism reflects a species' fidelity to a specific habitat. Range from 0 to 10; 10 = very conservative, not likely in disturbed habitats, 1 = least conservative, likely found in a broad range of habitat. * = value not assigned because they are non-native
3.	CW: Coefficient of Wetness reflects a species' affinity for wet soil conditions. Range from -5 to 5; -5 = obligate wetland species, 5 = obligate upland species.
4.	SARO: Status under the Provincial Endangered Species Act, listed on the Species at Risk in Ontario (SARO) list. In order of severity, statuses include: EXP = Extirpated; END =
5.	SARA: Status under the National Species at Risk Act (SARA), assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). In order of severity, statuses
6.	Global rarity rank. Range from G1 to G5; G1 = Extremely rare, G5 = Very Common. NR = Unranked; U = Unrankable.
7.	Provincial rarity rank. Range from S1 to S5; S1 = Extremely rare, S5 = Very Common. NR = Unranked; U = Unrankable.

## Appendix 5

DATE OBS	COMMON NAME	SCIENTIFIC NAME	SARO	COSEWIC	SARA	S-RANK	G-RANK	COSEWIC_DATE	AREA SENSITIVE	AREA REQUIRED	PIF SPECIES (BCR 13)	COMMENTS
	MOLLUSCS											
DFO (unk.)	Rainbow	Villosa iris		SC	END	S2S3	G5					
	AMPHIBIANS											
ORAA (2002)	American Toad	Anaxyrus americanus				S5	G5					
ORAA (2010)	Gray Treefrog	Hyla versicolor				S5	G5					
ORAA (1992)	Spring Peeper	Pseudacris crucifer				S5	G5					
ORAA (2013)	American Bullfrog	Lithobates catesbeianus				S4	G5		✓			
ORAA (1992)	Green Frog	Lithobates clamitans				S5	G5					
ORAA (1996)	Northern Leopard Frog	Lithobates pipiens	NAR	NAR		S5	G5	17/10/2005				
ORAA (1992)	Wood Frog	Lithobates sylvaticus				S5	G5					
	SNAKES AND LIZARDS											
ORAA (2012)	Milksnake	Lampropeltis triangulum	SC	SC	SC	S3	G5T5	01/05/2002				
ORAA (2013)	Eastern Gartersnake	Thamnophis sirtalis sirtalis				S5	G5T5					
	TURTLES											
ORAA (1996)	Snapping Turtle	Chelydra serpentina	SC	SC	SC	S3	G5T5	30/11/2008				
ORAA (2016)	Midland Painted Turtle	Chrysemys picta marginata				S5	G5T5					
	BIRDS											
OBBA (2007)	Pied-billed Grebe	Podilymbus podiceps				S4B,S4N	G5					
OBBA (2007)	American Bittern	Botaurus lentiginosus				S4B	G4		✓			
OBBA (2007)	Green Heron	Butorides virescens				S4B	G5					
OBBA (2007)	Canada Goose	Branta canadensis				S5	G5					
OBBA (2007)	Wood Duck	Aix sponsa				S5	G5					
OBBA (2007)	American Black Duck	Anas rubripes				S4	G5					
OBBA (2007)	Mallard	Anas platyrhynchos				S5	G5					
OBBA (2007)	Blue-winged Teal	Anas discors				S4	G5					
OBBA (2007)	Common Merganser	Mergus merganser				S5B,S5N	G5		✓			
OBBA (2007)	Red-breasted Merganser	Mergus serrator				S4B,S5N	G5		✓			
OBBA (2007)	Turkey Vulture	Cathartes aura				S5B	G5					

OBBA (2007)	Northern Harrier	Circus cyaneus	NAR	NAR		S4B	G5	17/10/2005	✓	>30ha	✓	
OBBA (2007)	Sharp-shinned Hawk	Accipiter striatus	NAR			S5	G5		✓	>30ha		
OBBA (2007)	Cooper's Hawk	Accipiter cooperii	NAR	NAR		S4	G5	17/10/2005	✓	>10ha		
OBBA (2007)	Red-tailed Hawk	Buteo jamaicensis	NAR	NAR		S5	G5	17/10/2005				
OBBA (2007)	American Kestrel	Falco sparverius				S4	G5				✓	
OBBA (2007)	Ruffed Grouse	Bonasa umbellus				S4	G5					
OBBA (2007)	Wild Turkey	Meleagris gallopavo				S5	G5					
OBBA (2007)	Sora	Porzana carolina				S4B	G5					
OBBA (2007)	Killdeer	Charadrius vociferus				S5B,S5N	G5					
OBBA (2007)	Spotted Sandpiper	Actitis macularius				S5	G5					
OBBA (2007)	Wilson's Snipe	Gallinago delicata				S5B	G5					
OBBA (2007)	American Woodcock	Scolopax minor				S4B	G5					
OBBA (2007)	Rock Pigeon	Columba livia				SNA	G5					
OBBA (2007)	Mourning Dove	Zenaida macroura				S5	G5					
OBBA (2007)	Black-billed Cuckoo	Coccyzus erythrophthalmus				S5B	G5				✓	
OBBA (2007)	Eastern Screech-Owl	Megascops asio	NAR	NAR		S4	G5	17/10/2005				
OBBA (2007)	Great Horned Owl	Bubo virginianus				S4	G5					
OBBA (2007)	Common Nighthawk	Chordeiles minor	SC	THR	THR	S4B	G5	28/04/2007				
OBBA (2007)	Eastern Whip-poor-will	Caprimulgus vociferus	THR	THR	THR	S4B	G5	30/04/2009	✓	>100ha	✓	
OBBA (2007)	Ruby-throated Hummingbird	Archilochus colubris				S5B	G5					
OBBA (2007)	Belted Kingfisher	Megaceryle alcyon				S4B	G5				✓	
OBBA (2007)	Red-headed Woodpecker	Melanerpes erythrocephalus	SC	THR	THR	S4B	G5	28/04/2007			✓	
OBBA (2007)	Red-bellied Woodpecker	Melanerpes carolinus				S4	G5					
OBBA (2007)	Yellow-bellied Sapsucker	Sphyrapicus varius				S5B	G5		✓	2-5ha		
OBBA (2007)	Downy Woodpecker	Picoides pubescens				S5	G5					
OBBA (2007)	Hairy Woodpecker	Picoides villosus				S5	G5		✓	4-8ha		
OBBA (2007)	Northern Flicker	Colaptes auratus				S4B	G5				✓	
OBBA (2007)	Pileated Woodpecker	Dryocopus pileatus				S5	G5		✓	>40ha		
OBBA (2007)	Eastern Wood-pewee	Contopus virens	SC	SC		S4B	G5	27/06/2014			✓	
OBBA (2007)	Alder Flycatcher	Empidonax alnorum				S5B	G5					
OBBA (2007)	Willow Flycatcher	Empidonax traillii				S5B	G5				✓	
OBBA (2007)	Least Flycatcher	Empidonax minimus				S4B	G5		✓	>100ha		
OBBA (2007)	Eastern Phoebe	Sayornis phoebe				S5B	G5					
OBBA (2007)	Great Crested Flycatcher	Myiarchus crinitus				S4B	G5					
OBBA (2007)	Eastern Kingbird	Tyrannus tyrannus				S4B	G5				✓	
OBBA (2007)	Tree Swallow	Tachycineta bicolor				S4B	G5					
OBBA (2007)	Northern Rough-winged Swallow	Stelgidopteryx serripennis				S4B	G5					
OBBA (2007)	Bank Swallow	Riparia riparia	THR	THR		S4B	G5	27/06/2014			✓	

OBBA (2007)	Cliff Swallow	Petrochelidon pyrrhonota				S4B	G5				
OBBA (2007)	Barn Swallow	Hirundo rustica	THR	THR		S4B	G5	09/05/2011			
OBBA (2007)	Blue Jay	Cyanocitta cristata				S5	G5				
OBBA (2007)	American Crow	Corvus brachyrhynchos				S5B	G5				
OBBA (2007)	Common Raven	Corvus corax				S5	G5				
OBBA (2007)	Black-capped Chickadee	Poecile atricapillus				S5	G5				
OBBA (2007)	Red-breasted Nuthatch	Sitta canadensis				S5	G5		✓	>10ha	
OBBA (2007)	White-breasted Nuthatch	Sitta carolinensis				S5	G5		✓	>10ha	
OBBA (2007)	Brown Creeper	Certhia americana				S5B	G5		✓	>30ha	
OBBA (2007)	House Wren	Troglodytes aedon				S5B	G5				
OBBA (2007)	Winter Wren	Troglodytes troglodytes				S5B	G5		✓	>30ha	
OBBA (2007)	Marsh Wren	Cistothorus palustris				S4B	G5				
OBBA (2007)	Eastern Bluebird	Sialia sialis	NAR	NAR		S5B	G5	17/10/2005			
OBBA (2007)	Veery	Catharus fuscescens				S4B	G5		✓	>10ha	
OBBA (2007)	Wood Thrush	Hylocichla mustelina	SC	THR		S4B	G5	27/06/2014			✓
OBBA (2007)	American Robin	Turdus migratorius				S5B	G5				
OBBA (2007)	Gray Catbird	Dumetella carolinensis				S4B	G5				
OBBA (2007)	Brown Thrasher	Toxostoma rufum				S4B	G5				✓
OBBA (2007)	Cedar Waxwing	Bombycilla cedrorum				S5B	G5				
OBBA (2007)	European Starling	Sturnus vulgaris				SNA	G5				
OBBA (2007)	Blue-headed Vireo	Vireo solitarius				S5B	G5		✓	>100ha	
OBBA (2007)	Warbling Vireo	Vireo gilvus				S5B	G5				
OBBA (2007)	Red-eyed Vireo	Vireo olivaceus				S5B	G5				
OBBA (2007)	Golden-winged Warbler	Vermivora chrysoptera	SC	THR	THR	S4B	G4	01/04/2006			✓
OBBA (2007)	Nashville Warbler	Vermivora ruficapilla				S5B	G5				
OBBA (2007)	Yellow Warbler	Dendroica petechia				S5B	G5				
OBBA (2007)	Chestnut-sided Warbler	Dendroica pensylvanica				S5B	G5				
OBBA (2007)	Magnolia Warbler	Dendroica magnolia				S5B	G5		✓	>30ha	
OBBA (2007)	Yellow-rumped Warbler	Dendroica coronata				S5B	G5				
OBBA (2007)	Black-throated Green Warbler	Dendroica virens				S5B	G5		✓	>30ha	
OBBA (2007)	Pine Warbler	Dendroica pinus				S5B	G5		✓	15-30ha	
OBBA (2007)	Black-and-white Warbler	Mniotilta varia				S5B	G5		✓	>100ha	
OBBA (2007)	American Redstart	Setophaga ruticilla				S5B	G5		✓	>100ha	
OBBA (2007)	Ovenbird	Seiurus aurocapilla				S4B	G5		✓	>70ha	
OBBA (2007)	Northern Waterthrush	Seiurus noveboracensis				S5B	G5				
OBBA (2007)	Mourning Warbler	Oporornis philadelphia				S4B	G5				
OBBA (2007)	Common Yellowthroat	Geothlypis trichas				S5B	G5				
OBBA (2007)	Scarlet Tanager	Piranga olivacea				S4B	G5		✓	>20ha	

OBBA (2007)	Northern Cardinal	Cardinalis cardinalis				S5	G5						
OBBA (2007)	Rose-breasted Grosbeak	Pheucticus ludovicianus				S4B	G5					✓	
OBBA (2007)	Indigo Bunting	Passerina cyanea				S4B	G5						
OBBA (2007)	Chipping Sparrow	Spizella passerina				S5B	G5						
OBBA (2007)	Field Sparrow	Spizella pusilla				S4B	G5					✓	
OBBA (2007)	Vesper Sparrow	Poocetes gramineus				S4B	G5					✓	
OBBA (2007)	Savannah Sparrow	Passerculus sandwichensis				S4B	G5		✓	>50ha		✓	
OBBA (2007)	Grasshopper Sparrow	Ammodramus savannarum	SC	SC		S4B	G5TU		✓	>10ha		✓	
OBBA (2007)	Song Sparrow	Melospiza melodia				S5B	G5						
OBBA (2007)	Swamp Sparrow	Melospiza georgiana				S5B	G5						
OBBA (2007)	White-throated Sparrow	Zonotrichia albicollis				S5B	G5						
OBBA (2007)	Dark-eyed Junco	Junco hyemalis				S5B	G5						
OBBA (2007)	Bobolink	Dolichonyx oryzivorus	THR	THR		S4B	G5	01/04/2010	✓	>10ha		✓	
OBBA (2007)	Red-winged Blackbird	Agelaius phoeniceus				S4	G5						
OBBA (2007)	Eastern Meadowlark	Sturnella magna	THR	THR		S4B	G5	09/05/2011	✓	>10ha		✓	
OBBA (2007)	Brewer's Blackbird	Euphagus cyanocephalus				S4B	G5						
OBBA (2007)	Common Grackle	Quiscalus quiscula				S5B	G5						
OBBA (2007)	Brown-headed Cowbird	Molothrus ater				S4B	G5						
OBBA (2007)	Orchard Oriole	Icterus spurius				S4B	G5						
OBBA (2007)	Baltimore Oriole	Icterus galbula				S4B	G5					✓	
OBBA (2007)	Purple Finch	Carpodacus purpureus				S4B	G5						
OBBA (2007)	House Finch	Carpodacus mexicanus				SNA	G5						
OBBA (2007)	Pine Siskin	Carduelis pinus				S4B	G5						
OBBA (2007)	American Goldfinch	Carduelis tristis				S5B	G5						
OBBA (2007)	House Sparrow	Passer domesticus				SNA	G5						
	MAMMALS												
OMA (1994)	Little Brown Myotis	Myotis lucifugus	END	END	END	S4	G3G4	03/02/2012					
OMA (1994)	Big Brown Bat	Eptesicus fuscus				S5	G5						
OMA (1994)	Eastern Cottontail	Sylvilagus floridanus				S5	G5						
OMA (1994)	Snowshoe Hare	Lepus americanus				S5	G5						
OMA (1994)	Woodchuck	Marmota monax				S5	G5						
OMA (1994)	Eastern Gray Squirrel	Sciurus carolinensis				S5	G5						
OMA (1994)	Red Squirrel	Tamiasciurus hudsonicus				S5	G5						
OMA (1994)	Beaver	Castor canadensis				S5	G5						
OMA (1994)	Muskrat	Ondatra zibethicus				S5	G5						
OMA (1994)	Porcupine	Erethizon dorsatum				S5	G5						
OMA (1994)	Red Fox	Vulpes vulpes				S5	G5						



OMA (1994)	Northern Raccoon	Procyon lotor				S5	G5				
OMA (1994)	American Mink	Mustela vison				S4	G5				
OMA (1994)	Wolverine	Gulo gulo	THR	SC		S2S3	G4	17/10/2005			
OMA (1994)	American Badger	Taxidea taxus jacksonii	END	END	END	S2	G5T5	01/11/2012			
OMA (1994)	Striped Skunk	Mephitis mephitis				S5	G5				
OMA (1994)	White-tailed Deer	Odocoileus virginianus				S5	G5				

Legend:

COSARO: Committee on Species at Risk Ontario

COSEWIC: Committee on the status of endangered wildlife in Canada

SARA: Species at Risk Act

ESA: Endangered Species Act

END: Endangered

THR: Threatened

SC: Special Concern

NAR: Not At Risk

NL: Not listed

DD: Data Deficient

G-Rank:

G1: Extremely rare globally

G1G2: Extremely rare to very rare globally

G2: Very rare globally

G2G3: Very rare to uncommon globally

G3: Rare to uncommon globally

G3G4: Rare to common globally

G4: Common globally

G4G5: Common to very common globally

G5: Very common globally; demonstrably secure

T: Denotes that the rank applies to a subspecies or variety

S-Rank:

S1: Critically Imperiled

S2: Imperiled

S3: Vulnerable

S4: Apparently Secure

S5: Secure

SX: Presumed extirpated

SH: Possibly Extirpated (Historical)

SNR: Unranked

SU: Unrankable— lack of information

SNA: Not applicable— not a suitable target for conservation activities

S#S#: Range Rank— (e.g., S2S3) indicateS any range of uncertainty about the status

S#B- Breeding status rank

S#N- Non Breeding status rank

?: Indicates uncertainty in the assigned rank

Source codes

OBAO: Ontario butterfly Atlas Online

ORAA: Ontario Reptile and Amphibian Atlas

OMA: Ontario Mammal Atlas

OBBA: Ontario Breeding Bird Atlas

References:

Ontario Partners in Flight (PIF). 2008. Ontario Landbird Conservation Plan: Lower Great Lakes/St. Lawrence Plain (North American Bird Conservation Region 13), Priorities, Objectives and Recommended Actions. Environment Canada (Ontario Region) and Ontario Ministry of Natural Resources. Final Draft, November, 2008.

COSSARO Status Endangered Species Act, 2007 (Bill 184). Schedules 1- 5. June 30 2008.

COSEWIC Status COSEWIC. 2014. Canadian Species at Risk. Committee on the Status of Endangered Wildlife in Canada.

Endangered Species Act, 2007 (Bill 184). Schedules 1- 5. April 21, 2015

## Appendix 6

#	SIGNIFICANT WILDLIFE HABITAT (SWH)	CANDIDATE SWH CRITERIA	CRITERIA FOR SWH CONFIRMATION	SWH PROTECTED AREA	SITE ASSESSMENT DETAILS	CANDIDATE SWH	FIELD STUDIES REQUIRED/ COMPLETED	CONFIRMED SWH
SEASONAL CONCENTRATION AREAS OF ANIMALS								
1	Waterfowl stopover and Staging Areas (terrestrial)	- Fields with Sheet water in spring (incl. agricultural)	- Mixed species aggregations of 100 or more individuals confirms SWH	flooded field ecosite and 100-300m radius is the SWH	No habitat matching criteria identified in Study Area	No	None required.	No
2	Waterfowl Stopover and Staging (Aquatic)	- Ponds, marshes, lakes, bays, coastal inlets and watercourses and reservoirs - SWTP & SWMP are not SWH	- Aggregations of 100 or more listed species for 7 days (ie. >700 waterfowl use days) confirms SWH	Aquatic ecosite and 100m radius is the SWH	No habitat matching criteria identified in Study Area	No	None required.	No
3	Shorebird Migratory stopover	- Shorelines of Lakes, rivers, wetlands, beaches, bars; seasonally flooded, muddy and un-vegetated shoreline habitat	- 3 or more listed species and >1000 shorebird use days, or >100 whimbrel, confirms SWH	Shoreline ecosite and 100m radius is the SWH	No Habitat matching Criteria identified in Study Area, >5km from any Lake Ontario	No	None required.	No
4	Raptor Wintering Area	- Combination of upland field and woodland habitat >20ha total (includes, >15ha upland field) - least disturbed sites, idle, fallow or lightly grazed field/meadow best	- 1 or more Short-eared Owl, or, at least 10 individuals and 2 listed species for a minimum of 20 days, and 3 of 5 years, confirms SWH	Ecosite communities (field and woodland) is the SWH	No habitat matching criteria identified in Study Area	No	None required.	No
5	Bat Hibernacula	- Caves, mine shafts, underground foundations, karsts - buildings are not SWH	- All sites with confirmed hibernating bats, confirms SWH	Ecosite and 200m radius is the SWH	No Habitat matching Criteria identified in Study Area	No	None required	No
6	Bat Maternity Colony	- All forested ecosites, FOD, FOC, FOM, SWD, SWM, SWC with >10/ha trees (>25cm DBH) in early stages of decay (class 1-3) - buildings are not SWH	- >10 Big Brown Bats, >20 Little Brown Myotis, >5 adult female Silver-haired Bats confirms SWH	Entire woodland or forest stand ELC ecosite containing colony is the SWH	Forested ecosites present in Study area with trees >25cm DBH.	Yes	None required.	Unknown

## APPENDIX 6 CANDIDATE SIGNIFICANT WILDLIFE HABITAT ASSESSMENT

Project #: AA17-120A

#	SIGNIFICANT WILDLIFE HABITAT (SWH)	CANDIDATE SWH CRITERIA	CRITERIA FOR SWH CONFIRMATION	SWH PROTECTED AREA	SITE ASSESSMENT DETAILS	CANDIDATE SWH	FIELD STUDIES REQUIRED/ COMPLETED	CONFIRMED SWH
7	Turtle Wintering Area	- Areas with permanent water deep enough not to freeze, with mud/soft substrates	- 5 over-wintering Midland Painted Turtles, 1 or more Northern Map Turtle or Snapping Turtle confirms SWH	Mapped ELC ecosite, or deep pool element where turtles overwinter is the SWH	Marsh communities along the Teeswater River may provide suitable habitat.	Yes	No turtles identified incidentally or observed in community during summer surveys. No anticipated affects-outside study area	Unknown
8	Reptile Hibernaculum	- Sites below the frost line; rock barren, crevice and cave, talus, alvar, rock piles, slopes, stone fences and crumbling foundations	- Presence of hibernacula with minimum 5 individuals of 1 snake species/ individuals of 2 or more species confirms SWH - Congregations of a minimum of 5 snakes of 1 species/ individuals of 2 or more snake species, near potential hibernacula on sunny warm days in spring and fall confirms SWH	Feature hibernacula is located in, and 30m radius is the SWH	No habitat matching criteria identified in Study Area	No	None required.	No
9	Colonially-nesting Bird Habitat (cliff/bank)	- Eroding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, barns	- 1 or more nest sites with 8 or more Cliff Swallow or, 50 Bank Swallow and Rough-winged Swallow pairs during the breeding season.	Colony and 50m radius around peripheral nest is the SWH	No habitat matching criteria identified in Study Area	No	None required	No
10	Colonially-nesting Bird Habitat (Tree/shrub)	- Live or dead standing trees in wetlands, lakes, islands and peninsulas, occasionally shrubby and emergent vegetation	- 5 or more active Great-blue Heron or other listed species nests	Edge of the colony plus minimum 300m radius, or extent of the forest ecosite, or entire island <15ha is the SWH	No Habitat matching Criteria identified in Study Area	No	None required	No
11	Colonially-nesting Bird Habitat (Ground)	- Rocky islands or peninsulas within a lake or large river(natural or artificial)	- >25 active nests of Herring Gull, Ring-billed Gull, >5 active nests of Common Tern, or >2 active nests of Caspian Tern. 5 or more pairs of Brewer's Blackbird. Any active nesting colony of Little Gull, Great Black-backed Gull.	Edge of colony plus min 150m radius or extent of ELC ecosite, or island <3ha is the SWH	No Habitat matching Criteria identified in Study Area	No	None required	No

#	SIGNIFICANT WILDLIFE HABITAT (SWH)	CANDIDATE SWH CRITERIA	CRITERIA FOR SWH CONFIRMATION	SWH PROTECTED AREA	SITE ASSESSMENT DETAILS	CANDIDATE SWH	FIELD STUDIES REQUIRED/ COMPLETED	CONFIRMED SWH
12	Migratory Butterfly Stopover Area	- At least 10ha, with undisturbed field/meadow and forest or woodland edge habitat present, within 5km of Lake Ontario.	- Presence of Monarch use days >5000 or >3000 where there is a mix of Monarch with Painted Ladies or White Admirals	Field/meadow and forest/woodland is the SWH	No Habitat matching Criteria identified in Study Area, >5km from Lake Ontario	No	None required.	No
13	Land bird Migratory Stopover Area	- Woodlots >5ha in size within 5km of lake Ontario	- Use by >200 birds/day, with >35species, with at least 10sp recorded on 5 different survey dates.	Woodlot is the SWH	No habitat matching criteria identified in Study Area, >5km from Lake Ontario	No	None required.	No
14	Deer Yarding Areas	- ELC communities providing Thermal cover (FOM,FOC,SWM,SWC, CUP2, CUP3, FOD3, CUT)	- Deer yards are managed by MNRF, available through district offices and LIO.	LIO mapping	No Deer yarding areas identified on LIO Mapping	No	None required.	No
15	Deer Winter Congregation Areas	- All forested ecosites >100ha - Conifer Plantations <50ha may be used	- Deer management is the responsibility of the MNRF - Contact MNRF or LIO for known deer winter areas.	LIO mapping	No Deer Winter Congregation areas identified on LIO Mapping	No	None required.	No
<b>RARE VEGETATION COMMUNITIES</b>								
16	Cliffs & Talus Slopes	- Cliff: vertical to near vertical bedrock >3m in height - Talus slope: rock rubble at the base of a cliff made up of coarse rocky debris	- Confirm any ELC Vegetation Type for Cliffs or Talus Slopes	Area of ELC sites: TAO, TAS, TAT, CLO, CLS, CLT	No habitat matching criteria identified in Study Area	No	None required	No
17	Sand Barren	- Exposed, sparsely vegetated & caused by lack of moisture, fires and erosion.	- area >0.5ha in size - Confirm any ELC vegetation Type for Sand Barren - Not dominated by exotic or introduced species	Area of ELC ecosite is the SWH	No habitat matching criteria identified in Study Area	No	None required	No
18	Alvar	- Level, mostly un-fractured calcareous bedrock feature, overlain by a thin veneer or soil	- area >0.5ha in size - Field Studies that identify four of the five Alvar Indicator Species - Not dominated by exotic or introduced species	Area of ELC ecosite is the SWH	No habitat matching criteria identified in Study Area	No	None required	No
19	Old Growth Forest	- >30ha forests with at least 10ha interior habitat and multi-layered canopy	- Dominant Tree Species >140 years old - No recognizable signs forestry practices (old stumps)	Area of ELC ecosite is the SWH	No habitat matching criteria identified in Study Area	No	None required	No

## APPENDIX 6 CANDIDATE SIGNIFICANT WILDLIFE HABITAT ASSESSMENT

Project #: AA17-120A

#	SIGNIFICANT WILDLIFE HABITAT (SWH)	CANDIDATE SWH CRITERIA	CRITERIA FOR SWH CONFIRMATION	SWH PROTECTED AREA	SITE ASSESSMENT DETAILS	CANDIDATE SWH	FIELD STUDIES REQUIRED/ COMPLETED	CONFIRMED SWH
20	Savannah	<ul style="list-style-type: none"> <li>- Tall Grass Prairie Habitat with 25%-60% Tree cover</li> <li>- Remnant sites such as Railway Right of ways are not SWH</li> </ul>	<ul style="list-style-type: none"> <li>- No minimum size, and must be restored to a natural state.</li> <li>- Confirm one or more savannah indicator species</li> <li>- Not dominated by exotic or introduced species</li> </ul>	Area of ELC ecosite is the SWH	No habitat matching criteria identified in Study Area	No	None required	No
21	Tallgrass Prairie	<ul style="list-style-type: none"> <li>- Ground cover dominated by prairie grasses with &lt;25% tree cover</li> <li>- Remnant sites such as Railway Right of ways are not SWH</li> </ul>	<ul style="list-style-type: none"> <li>- No minimum size, and must be restored to a natural state.</li> <li>- Confirm one or more prairie indicator species</li> <li>- Not dominated by exotic or introduced species</li> </ul>	Area of ELC ecosite is the SWH	No habitat matching criteria identified in Study Area	No	None required	No
22	Other Rare Vegetation Communities	<ul style="list-style-type: none"> <li>- All Provincially Rare S1, S2, S3 Vegetation Communities (Appendix M of SWHTG)</li> </ul>	<ul style="list-style-type: none"> <li>- Field Studies Confirming ELC vegetation type is a rare vegetation community</li> </ul>	Area of ELC ecosite is the SWH	No communities identified on site are S1-S3 communities	No	None required	No
SPECIALIZED HABITAT FOR WILDLIFE								
23	Waterfowl Nesting Areas	<ul style="list-style-type: none"> <li>- Upland Habitat, adjacent to Wetland ELC ecosites (except SWC, SWM)</li> <li>- Extends 120m from a wetland (&gt;0.5ha) and any small wetlands (&lt;0.5ha) within a cluster of at least 3</li> <li>- Upland area at least 120m wide</li> </ul>	<ul style="list-style-type: none"> <li>- Presence of 3 or more nesting pairs of listed species excluding Mallards</li> <li>- Presence of 10 or more nesting pairs including mallards</li> <li>- Any active Black Duck nesting site</li> </ul>	SWH may be greater than or less than 120m from the wetland edge and must provide enough habitat for waterfowl to successfully nest	Treed communities adjacent all wetlands, may provide nesting habitat	No	None required	No
24	Bald Eagle or Osprey Nesting, Foraging and Perching Habitat	<ul style="list-style-type: none"> <li>- Forest communities, adjacent to riparian areas</li> <li>- Osprey nests usually at top of tree</li> <li>- Bald Eagle nest usually in super canopy tree in a notch within canopy</li> </ul>	<ul style="list-style-type: none"> <li>- Studies confirm one or more active Bald Eagle or Osprey nest</li> <li>- Alternate nests included in SWH</li> <li>- Nests must be used annually, if found inactive, must be known inactive at least 3 years, or suspected unused for 5 years if unknown</li> </ul>	Active nest plus 300m for Osprey Active nest plus 400-800m for Bald Eagle	No habitat matching Criteria identified in Study Area	No	None required	No



#	SIGNIFICANT WILDLIFE HABITAT (SWH)	CANDIDATE SWH CRITERIA	CRITERIA FOR SWH CONFIRMATION	SWH PROTECTED AREA	SITE ASSESSMENT DETAILS	CANDIDATE SWH	FIELD STUDIES REQUIRED/ COMPLETED	CONFIRMED SWH
25	Woodland Raptor Nesting Habitat	<ul style="list-style-type: none"> <li>- Forested communities, forested swamp communities and cultural Plantations</li> <li>- Natural Forested/conifer plantations &gt;30ha with &gt;10ha interior habitat (200m buffer)</li> </ul>	<ul style="list-style-type: none"> <li>- One or more active nest of listed species</li> </ul>	Nest protection radius: <ul style="list-style-type: none"> <li>- Red-Shouldered Hawk, Northern Goshawk 400m</li> <li>- Barred Owl 200m</li> <li>- Broad-winged Hawk, Coopers Hawk 100m</li> <li>- Sharp-shinned Hawk 50</li> </ul>	Forested communities < 10ha interior habitat	No	None required.	No
26	Turtle Nesting Areas	<ul style="list-style-type: none"> <li>- Exposed Mineral soil (sand or gravel) adjacent (&lt;100m) or within shallow marsh, shallow submerged, shallow floating, bog or fen communities</li> <li>- Located in open sunny areas, away from roads and less prone to predation</li> <li>- Municipal and provincial road shoulders are not SWH.</li> </ul>	<ul style="list-style-type: none"> <li>- Confirm 5 or more nesting Midland Painted Turtles, 1 or more nesting Northern Map Turtle or Snapping Turtle</li> </ul>	Area or sites with exposed mineral soils, plus a radius of 30-100m around the nesting area is the SWH.	Marsh communities adjacent to the stretch of the Teeswater River within the study area may provide suitable habitat.	Yes	None required	Unknown
27	Seeps and Springs	<ul style="list-style-type: none"> <li>- Areas where ground water comes to the surface</li> <li>- Any forested area within the headwaters of a stream or river system</li> </ul>	<ul style="list-style-type: none"> <li>- Confirm site with 2 or more seeps/springs.</li> </ul>	Area of ELC forest ecosite containing seep/spring is the SWH	Seeps and springs possible within forested and wetland communities	Yes	ELC complete, property access not permitted	No
28	Amphibian Breeding Habitat (woodland)	<ul style="list-style-type: none"> <li>- Breeding pools within woodlands</li> <li>- Wetland, pond or pool &gt;500m<sup>2</sup> within or adjacent (&lt;120m) to a woodland.</li> <li>- Woodlands with permanent ponds, or those with water until mid-July more likely to be used.</li> </ul>	<ul style="list-style-type: none"> <li>- Confirm Breeding population of 1 or more listed newt/salamander species, 2 or more of the listed frog species with at least 20 individuals (adults or egg masses), 2 or more of the listed frog species with call code levels of 3.</li> <li>- Wetland adjacent to woodlands includes travel corridor connecting features as SWH.</li> </ul>	Wetland area, plus 230m radius of woodland is the SWH.	Woodland forested throughout study area may provide suitable habitat	Yes	None required.	No

#	SIGNIFICANT WILDLIFE HABITAT (SWH)	CANDIDATE SWH CRITERIA	CRITERIA FOR SWH CONFIRMATION	SWH PROTECTED AREA	SITE ASSESSMENT DETAILS	CANDIDATE SWH	FIELD STUDIES REQUIRED/ COMPLETED	CONFIRMED SWH
29	Amphibian Breeding Habitat (Wetland)	<ul style="list-style-type: none"> <li>- Swamp, marsh, fen, bog, open aquatic and shallow aquatic ELC communities.</li> <li>- Typically isolated from woodlands (&gt;120m), but includes larger wetlands with primarily aquatic species (bull frogs) that are adjacent to woodlands.</li> <li>- Wetlands &gt;500m<sup>2</sup></li> <li>- Presence of shrubs &amp; logs</li> <li>- Bullfrogs require permanent water bodies and abundant emergent vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>- Confirm Breeding populations of 1 or more listed newt/salamander species, or 2 or more listed frog/toad species with at least 20 individuals (adults or egg masses), or 2 or more listed frog/toad species with a call code level of 3</li> <li>- Or any wetland with confirmed breeding Bullfrog.</li> </ul>	ELC ecosite and shoreline is the SWH Movement corridors (SWH) must be considered if this habitat is significant	No wetlands >120m from woodland habitat	No	None required.	No
30	Area-sensitive Breeding Bird Habitat	<ul style="list-style-type: none"> <li>- Habitats where interior breeding birds are breeding</li> <li>- Large mature(&gt;60 years) forest stands or woodlots &gt;30ha</li> <li>- Forest and swamp ELC communities</li> <li>- Interior habitat at least 200m from edge</li> </ul>	<ul style="list-style-type: none"> <li>- Presence of nesting or breeding pairs of 3 or more of the listed species</li> <li>- Any site with Cerulean Warbler or Canada Warbler is SWH</li> <li>-</li> </ul>	ELC ecosite is the SWH	No interior habitat (>200m) identified in study area	no	None required	No
HABITATS OF SPECIES OF CONSERVATION CONCERN CONSIDERED SWH								

#	SIGNIFICANT WILDLIFE HABITAT (SWH)	CANDIDATE SWH CRITERIA	CRITERIA FOR SWH CONFIRMATION	SWH PROTECTED AREA	SITE ASSESSMENT DETAILS	CANDIDATE SWH	FIELD STUDIES REQUIRED/ COMPLETED	CONFIRMED SWH
31	Marsh Bird Breeding Habitat	<ul style="list-style-type: none"> <li>- Some meadow marsh, shallows submerged, shallow floating, mixed shallow floating, fen and bog communities (see SWH Ecoregion guide for specifics)</li> <li>- Nesting occurs in wetlands, all wetland habitat is considered with presence of shallow water with emergent aquatic vegetation</li> <li>- Green heron at edge of water sheltered by shrubs and trees.</li> </ul>	<ul style="list-style-type: none"> <li>- 5 or more nesting pairs of Sedge Wren or Marsh Wren, 1 pair of Sandhill Crane, or breeding by any combination of 5 or more of the listed species</li> <li>- Any Wetland with 1 or more breeding pair Black Tern, Trumpeter Swan, Green Heron or Yellow Rail</li> </ul>	ELC ecosite is the SWH	Marsh communities within study are may provide suitable habitat.	Yes	None required.	No
32	Open Country Bird Breeding Habitat	<ul style="list-style-type: none"> <li>- Grassland area &gt;30ha (natural &amp; cultural fields and meadows)</li> <li>- Grasslands not class 1 or 2 agriculture (no row crops or intensive hay or livestock pasturing)</li> <li>- Mature hayfields or pasture at least 5 years old</li> </ul>	<ul style="list-style-type: none"> <li>- Nesting or breeding of 2 or more of the listed species</li> <li>- Field with 1 or more Short-eared Owls</li> </ul>	Contiguous ELC ecosite is the SWH	No grassland Habitat >30ha identified in study area	No	None required	No
33	Shrub/Early Successional Bird Breeding Habitat	<ul style="list-style-type: none"> <li>- Cultural thickets, savannah and woodland habitat</li> <li>- Large field area succeeding to shrub and thicket habitat &gt;10ha in size</li> <li>- Patches of shrub ecosite may be complexed into larger old field ecosites for some species</li> </ul>	<ul style="list-style-type: none"> <li>- Confirm nesting or breeding of 1 of the listed indicator species and at least 2 of the common species</li> <li>- Habitat with Yellow-breasted Chat Or Golden-winged Warbler is SWH</li> </ul>	SWH is contiguous ELC ecosite field/thicket area	No Habitat matching Criteria identified in Study Area	No	None required	No

#	SIGNIFICANT WILDLIFE HABITAT (SWH)	CANDIDATE SWH CRITERIA	CRITERIA FOR SWH CONFIRMATION	SWH PROTECTED AREA	SITE ASSESSMENT DETAILS	CANDIDATE SWH	FIELD STUDIES REQUIRED/ COMPLETED	CONFIRMED SWH
34	Terrestrial Crayfish	<ul style="list-style-type: none"> <li>- Meadow marsh, shallow marsh, swamp thicket, deciduous swamp and mixed swamp communities</li> <li>- Cultural meadow with inclusions of meadow marsh may be used</li> <li>- Wet edges of marshes and wet meadows should be surveyed for crayfish</li> </ul>	<ul style="list-style-type: none"> <li>- Presence of 1 or more individuals of listed species or their chimneys in suitable habitat</li> </ul>	Area of ELC ecosite or Eco element area of meadow marsh or swamp within the larger ecosite area is the SWH	Candidate habitat identified in study area.	Yes	Incidental observation during ELC conducted	No
35	Special Concern & Rare Wildlife Species	<ul style="list-style-type: none"> <li>- All Special concern and Provincially Rare plant and animal species</li> <li>- Where an element occurrence is identified within a 1 or 10km grid for a species listed, linking candidate habitat on the site must be completed to ELC ecosites</li> </ul>	<ul style="list-style-type: none"> <li>- Assessment/inventory of site for identified special concern or rare species completed during time of year when species is present or easily identifiable</li> <li>- Habitat must be easily mapped and cover an important life stage component (specific nesting habitat, foraging)</li> </ul>	SWH is the finest ELC scale that protects the form and function of the habitat	<p>No element occurrences for Special Concern or rare Wildlife Species identified within 1km of the study area</p> <p>Background Atlas review identified 6 Special concern species within 10km of the Study Area</p> <ul style="list-style-type: none"> <li>- Milksnake (ORAA)</li> <li>- Snapping Turtle (ORAA)</li> <li>- Grasshopper Sparrow (OBBA)</li> <li>- Red-headed Woodpecker (OBBA)</li> <li>- Eastern Wood-pewee (OBBA)</li> <li>- Wood Thrush (OBBA)</li> </ul>	<p>Yes- Woodlands on site and within 120m may provide habitat for Eastern-Wood-pewee and Wood Thrush. Marsh and shallow aquatic habitat on site, and within 120m may provide habitat for Common Snapping Turtle. Meadows and open areas within 120m may provide habitat for Milksnake</p>	One season ELC and Botanical Survey Incidental wildlife	No
ANIMAL MOVEMENT CORRIDORS								

#	SIGNIFICANT WILDLIFE HABITAT (SWH)	CANDIDATE SWH CRITERIA	CRITERIA FOR SWH CONFIRMATION	SWH PROTECTED AREA	SITE ASSESSMENT DETAILS	CANDIDATE SWH	FIELD STUDIES REQUIRED/ COMPLETED	CONFIRMED SWH
36	Amphibian Movement Corridor	<ul style="list-style-type: none"> <li>- Corridors may occur in all ecosites associated with water</li> <li>- Presence of significant amphibian breeding indicates the requirement for identifying corridors</li> <li>- Movement corridors between breeding habitat and summer habitat</li> </ul>	<ul style="list-style-type: none"> <li>- Corridors typically include areas with native vegetation, with several layers of vegetation, unbroken by roads, waterways or waterbodies are most significant</li> <li>- At least 15 of vegetation on both sides of the waterway or up to 200m wide of woodland habitat with gaps of &lt;20m</li> <li>- Shorter corridors are more significant than longer, but amphibians must be able to get to and from their summer breeding habitat</li> </ul>	Corridor is the SWH	Teeswater River with the adjacent wetland and forested communities may provide suitable habitat	Yes	None required	No
37	Deer Movement Corridor	<ul style="list-style-type: none"> <li>- May occur in all forested ecosites</li> <li>- Determined when deer wintering habitat is confirmed as SWH</li> </ul>	<ul style="list-style-type: none"> <li>- Corridors at least 200m wide with gaps &lt;20m leading to wintering habitat</li> <li>- Unbroken by roads and residential areas</li> <li>- Shorter corridors are more significant</li> </ul>	Corridor is the SWH	No Habitat matching Criteria identified in Study Area	No	None required	No

## Appendix 7

COMMON NAME	SCIENTIFIC NAME	SARO	COSEWIC	S-RANK	BACKGROUND SOURCES	HABITAT REQUIREMENTS	SUITABLE HABITAT IN STUDY AREA	FIELD STUDIES COMPLETED/ REQUIRED	OBSERVED BY A & A	REFERENCE
Butterflies, Bees, Damselflies, Dragonflies & Insects										
Hungerford's Crawling Water Beetle	Brychius hungerfordi	END	END	S1	MNRF (Bruce County)	Specialist of small to medium-sized streams with moderate to fast flow, cool water temperatures, inorganic substrates and alkaline water conditions (COSEWIC, 2011)	Teeswater River may provide suitable habitat	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2011. COSEWIC assessment and status report on the Hungerford's Crawling Water Beetle <i>Brychius hunderfordi</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. lx + 40 pp.
Rusty-patched Bumble Bee	<i>Bombus affinis</i>	END	END	S1	MNRF (Bruce County)	Uses a variety of open or semi-open habitat, including meadows, agricultural land and savannah habitat for foraging. Nests are often found underground, in old rodent burrows (COSEWIC 2010c).	Meadow and agricultural lands within study area may provide suitable habitat	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2010. COSEWIC assessment and status report on the Rusty-patched Bumble Bee Bombus affinis in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 34 pp.
Birds										
Bald Eagle	Haliaeetus leucocephalus	SC	NAR	S2N, S4B	MNRF (Bruce County)	Prefers deciduous and mixed-deciduous mature forest habitat close to water bodies including lakes and rivers; nests in super canopy trees including Pine (Armstrong 2014).	Forested communitie s may provide suitable habitat	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	Armstrong, Ted (E.R.). 2014. Management Plan for the Bald Eagle (Haliaeetus leucocephalus) in Ontario. Ontario Management Plan Series. Prepared for the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario. vii + 53 pp.
Bank Swallow	<i>Riparia riparia</i>	THR	THR	S4B	OBBA (2007)	Breeds in a variety of natural and artificial bank type habitat, such as bluffs, stream and river banks, sand and gravel pits, piles of sand, topsoil and other material. Nests are typically in vertical or near-vertical surfaces (COSEWIC 2013b).	No habitat matching criteria identified in Study Area	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2013. COSEWIC assessment and status report on the Bank Swallow Riparia riparia in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 48 pp.
Barn Swallow	<i>Hirundo rustica</i>	THR	THR	S4B	OBBA (2007), MNRF (Bruce County)	Occurs in farmland, along lake/river shorelines, in wooded clearings and in urban populated areas. Nesting may occur inside or outside buildings; under bridges and in road culverts (COSEWIC 2011a).	Farmland on east edge of study area may provide suitable habitat	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2011. COSEWIC assessment and status report on the Barn Swallow <i>Hirundo rustica</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 37 pp.
Black Tern	Chlidonias niger	SC	NAR	S3B	MNRF (Bruce County)	Breeds in large, freshwater marshes, with emergent vegetation, and large areas of open water. Nests are typically within 6 meters of the water, on low emergent vegetation (Burke 2012).	No habitat matching criteria identified in Study Area	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	Peter S. Burke. 2012. Management Plan for the Black Tern (Chlidonias niger) in Ontario. Ontario Management Plan Series. Prepared for the Ontario Ministry of Natural Resources (OMNR), Peterborough, Ontario. vi + 47 pp.
Bobolink	<i>Dolichonyx oryzivorus</i>	THR	THR	S4B	OBBA (2007), MNRF (Bruce County)	Nest in grassland habitats, including hayfields and meadows with a mixture of grasses and broad-leaved forbs with a high litter cover. Area Sensitive, with increased density in grasslands greater than 10ha (Renfrew et. al. 2015)	Grassland habitat within study area may provide suitable habitat	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	Renfrew, R., A.M. Strong, N.G. Perlut, S.G. Martin and T.A. Gavin. 2015. Bobolink (Dolichonyx oryzivorus), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Birds of North America Online: <a href="http://bna.birds.cornell.edu/bna/species/176">http://bna.birds.cornell.edu/bna/species/176</a>
Cerulean Warbler	<i>Setophaga cerulea</i>	THR	END	S3B	MNRF (Bruce County)	Occur in older, mature, deciduous forests, preferentially oak-maple composition, with a full, to partially open canopy, and little to no understory cover. Often in bottomland forests, or adjacent to treed swamplands (COSEWIC 2010f).	No habitat matching criteria identified in Study Area	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2010. COSEWIC assessment and status report on the Cerulean Warbler Dendroica cerulea in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 40 pp.



COMMON NAME	SCIENTIFIC NAME	SARO	COSEWIC	S-RANK	BACKGROUND SOURCES	HABITAT REQUIREMENTS	SUITABLE HABITAT IN STUDY AREA	FIELD STUDIES COMPLETED/ REQUIRED	OBSERVED BY A & A	REFERENCE
Common Nighthawk	<i>Chordeiles minor</i>	SC	THR	S4B	OBBA (2007)	Breeds in open habitat, on the ground, in areas with no vegetation, including sand dunes, burned areas, open forests, railways, and gravel rooftops. Eggs are laid directly on the ground (COSEWIC 2007b).	No habitat matching criteria identified in Study Area	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2007. COSEWIC assessment and status report on the Common Nighthawk <i>Chordeiles minor</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 25 pp.
Eastern Meadowlark	<i>Sturnella magna</i>	THR	THR	S4B	OBBA (2007), MNRF (Bruce County)	Nest in grassland habitats, including hayfields, pasture, savannahs, and other open areas. Preferential habitat includes areas with good grass and thatch (litter) cover (Jaster et. al. 2012).	Grassland habitat within study area may provide suitable habitat	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	aster, Levi A., William E. Jensen and Wesley E. Lanyon. (2012). Eastern Meadowlark ( <i>Sturnella magna</i> ), The Birds of North America (P. G. Rodewald, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America: <a href="https://birdsna.org/Species-Account/bna/species/easmea">https://birdsna.org/Species-Account/bna/species/easmea</a>
Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>	THR	THR	S4B	MNRF (Bruce County)	Often found breeding in semi-open habitats, with little ground cover, and canopy openings allowing light to penetrate the forest floor, often associated with pine or oak, savannahs and barrens, early-successional poplar stands and open conifer plantations (COSEWIC 2009a)	No habitat matching criteria identified in Study Area	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2009. COSEWIC assessment and status report on the Whip-poor-will Caprimulgus vociferus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 28 pp.
Eastern Wood-pewee	<i>Contopus virens</i>	SC	SC	S4B	OBBA (2007)	Associated with mid-age mixed and deciduous forest stands, often dominated by Maple (Acer), Elm (Ulmus) or Oak (Quercus), and include areas with clear-cuts, openings or forest edges. Also prefers forest stands with little to no understory vegetation (COSEWIC 2012a).	No habitat matching criteria identified in Study Area	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	? COSEWIC. 2012. COSEWIC assessment and status report on the Eastern Wood-pewee Contopus virens in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 39 pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm).
Golden-winged Warbler	Vermivora chrysoptera	SC	THR	S4B	OBBA (2007), MNRF (Bruce County)	Nests in early successional shrub habitat, with adjacent forest edges for singing perches, often in hydro cut-overs, recently logged areas and beaver marshes (COSEWIC 2006a).	No habitat matching criteria identified in Study Area	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2006. COSEWIC assessment and status report on the Golden-winged Warbler Vermivora chrysoptera in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 30 pp.
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	SC	SC	S4B	OBBA (2007)	Prefers moderately open grasslands and prairies with patchy bare ground; avoids grasslands with extensive shrub cover (Vickery 1996).	Grassland in the north-west portion of the study area may provide suitable habitat	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	Vickery, Peter D. 1996. Grasshopper Sparrow ( <i>Ammodramus savannarum</i> ), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <a href="http://bna.birds.cornell.edu/bna/species/239">http://bna.birds.cornell.edu/bna/species/239</a>
Henslow's Sparrow	<i>Ammodramus henslowii</i>	END	END	SHB	MNRF (Bruce County)	Breeds in grassland habitat, and is area sensitive. Grasslands with tall, dense cover a thick thatch layer, and are greater than 30ha, but preferentially larger than 100ha are preferred (COSEWIC 2011b).	No habitat matching criteria identified in Study Area	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2011. COSEWIC assessment and status report on the Henslow's Sparrow <i>Ammodramus henslowii</i> in Canada. <a href="#">Committee on the Status of Endangered Wildlife in Canada</a> . Ottawa. x + 37 pp.
King Rail	<i>Rallus elegans</i>	END	END	S2B	MNRF (Bruce County)	Occupies a wide variety of freshwater marsh habitat types. Large marshes that contain a range of water level conditions and mosaic of habitats are thought to be preferred in Canada (COSEWIC, 2011)	Marsh communities within study area may provide suitable habitat	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2011. COSEWIC assessment and status report on the King Rail <i>Rallus elegans</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. X + 32 pp.
Least Bittern	Ixobrychus exilis	THR	THR	S4B	MNRF (Bruce County)	Breeds in large marshes (>5ha) with emergent vegetation, typically cattails, with at least 50% open water, and relatively stable water levels (COSEWIC 2009b).	No habitat matching criteria identified in Study Area	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2009. COSEWIC assessment and update status report on the Least Bittern Ixobrychus exilis in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 36 pp.

COMMON NAME	SCIENTIFIC NAME	SARO	COSEWIC	S-RANK	BACKGROUND SOURCES	HABITAT REQUIREMENTS	SUITABLE HABITAT IN STUDY AREA	FIELD STUDIES COMPLETED/ REQUIRED	OBSERVED BY A & A	REFERENCE
Loggerhead Shrike	<i>Lanius ludovicianus</i>	END	END	S2B	MNRF (Bruce County)	Nests in open, low, grassy habitat with scattered shrubs. Presence of thorny shrubs, such as hawthorn, or barbwire fencing required for impaling prey. Only two recent areas of breeding in the province (Carden Plain and Napanee Plain) (Environment Canada 2015).	No habitat matching criteria identified in Study Area	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed	Environment Canada. 2015. Recovery Strategy for the Loggerhead Shrike, migrans subspecies (Lanius ludovicianus migrans), in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. vii + 35 pp.
Peregrine Falcon	<i>Falco peregrinus</i>	SC	SC	SC	MNRF (Bruce County)	Nests on cliff-ledges (50-200m preferred) near foraging areas. Also nests on anthropomorphic structures, such as tall building ledges, bridges, quarries, mines and cuts for road beds (COSEWIC, 2007a).	No habitat matching criteria identified in Study Area	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed	COSEWIC 2007. COSEWIC assessment and update status report on the Peregrine Falcon <i>Falco peregrinus</i> ( <i>pealei</i> subspecies - <i>Falco peregrinus</i> and <i>pealei anatum/tundrius</i> - <i>Falco peregrinus anatum/tundrius</i> ) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 45 pp. ( <a href="http://www.sararegistry.gc.ca/status/status_e.cfm">www.sararegistry.gc.ca/status/status_e.cfm</a> ).
Piping Plover	<i>Charadrius melodus</i>	END	END	S1B	MNRF (Bruce County)	Nests on wide sandy beaches with little vegetation and a combination of substrates such as pebbles, gravel, shells and sticks (COSEWIC, 2013)	No habitat matching criteria identified in Study Area	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2013. COSEWIC assessment and status report on the Piping Plover <i>circumcinctus</i> subspecies ( <i>Characdrilus melodus circumcinctus</i> ) and the <i>melodus</i> subspecies ( <i>Charadrius melodus melodus</i> ) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. Xiv + 39 pp.
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	SC	THR	S4B	OBBA (2007)	Found in a variety of open areas, with a high density of dead or dying trees, particularly forests dominated by oak or beech (COSEWIC 2007d).	No habitat matching criteria identified in Study Area	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2007. COSEWIC assessment and update status report on the Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 27 pp.
Short-eared Owl	<i>Asio flammeus</i>	SC	SC	S2N, S4B	MNRF (Bruce County)	Breeds in grassland habitat, including pasture and hayfields, meadow marshes and occasionally agricultural fields, nests are scrapes, located on the ground (COSEWIC 2008c).	Grassland and marsh communities may provide suitable habitat	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2008. COSEWIC assessment and update status report on the Short-eared Owl <i>Asio flammeus</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 24 pp.
Wood Thrush	<i>Hylocichla mustelina</i>	SC	THR	S4B	OBBA (2007)	Prefers second growth moist deciduous forests, with tall trees, and a dense understory of low saplings and an open forest floor with decaying leaf litter. Often nests in saplings, shrubs or occasionally dead stumps (COSEWIC 2012b).	Forested communities may provide suitable habitat	The Study Area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2012. COSEWIC assessment and status report on the Wood Thrush <i>Hylocichla mustelina</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 46 pp.
Fish										
Lake Sturgeon (Southern Hudson Bay/James Bay population)	<i>Acipenser fulvescens</i>	SC			MNRF (Bruce County)	Typically found in shallow areas of lakes or larger rivers, moving into smaller rivers to spawn. They are a benthic species that feed over substrates of mud, sand or gravel (COSEWIC 2006)	Teeswater River may provide suitable habitat	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2006. COSEWIC assessment and update status report on the lake sturgeon <i>Acipenser fulvescens</i> in Canada. Committee of the Status of Endangered Wildlife in Canada. Ottawa. Xi + 107 pp.
Northern Brook Lamprey	<i>Ichthyomyzon fossor</i>	SC	SC	S3	MNRF (Bruce County)	Found in clear streams and rivers with rocky or gravelly substrates and presence of fine sands and uni-directional current for egg adherence, larval stage requires soft substrates for burrowing (COSEWIC 2007d).	Teeswater River may provide suitable habitat	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2007. COSEWIC assessment and update status report on the northern brook lamprey <i>Ichthyomyzon fossor</i> (Great Lakes – Upper St. Lawrence populations and Saskatchewan – Nelson population) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 30 pp. ( <a href="http://www.registrelep-sararegistry.gc.ca/sar/assessment/status_e.cfm">http://www.registrelep-sararegistry.gc.ca/sar/assessment/status_e.cfm</a> ).

COMMON NAME	SCIENTIFIC NAME	SARO	COSEWIC	S-RANK	BACKGROUND SOURCES	HABITAT REQUIREMENTS	SUITABLE HABITAT IN STUDY AREA	FIELD STUDIES COMPLETED/ REQUIRED	OBSERVED BY A & A	REFERENCE
Redside Dace	<i>Clinostomus elongatus</i>	END	END	S2	MNRF (Bruce County)	Associated with small, clear, head water streams and creeks with abundant overhanging vegetation and both pool and riffle habitat, often with gravel substrates and cool water temperature regimes (COSEWIC, 2007e).	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2007. COSEWIC assessment and update status report on the Redside Dace clinostomus elongatus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. Vii + 59pp.
Mammals										
American Badger	<i>Taxidea taxus</i>	END	END	S2	MNRF (Bruce County)	Associated with open habitat, including agricultural hedgerows, grasslands, fallow habitat and open linear corridors in forests. Soil composition must be coherent to maintain structure for digging and tunneling, usually coarse silts to fine sands, in Ontario usually found in areas of sandy and loam soils. Prey availability is also important for site suitability (COSEWIC, 2012c).	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2012. COSEWIC assessment and status report on the American Badger Taxidea taxus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. iv + 63 pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm).
Eastern Small-footed Myotis	<i>Myotis leibii</i>	END	NA	S2S3	OMA (1994)	Associated with hilly or mountainous terrain, in or near coniferous or deciduous forest habitat. Maternity roosts located in cracks and crevices of talus slopes and rocky outcrops, or, occasionally in bridges, old buildings, hollow trees (or loose bark) and caves and mines during the maternity season. Hibernate singly or in small clusters in mines and caves (NatureServe, 2015).	Forested communities may provide suitable habitat	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2013. COSEWIC assessment and status report on the Little Brown Myotis Myotis lucifugus, Northern Myotis Myotis septentrionalis and Tri-colored Bat Perimyotis subflavus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxiv + 93 pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm).
Molluscs										
Rainbow Mussel	<i>Villosa iris</i>	THR	SC	S2S3	NHIC (Date unk.)	Usually occur in small to medium rivers, or occasionally inland lakes; within or near riffles and substrates are typically a mix of cobble, gravel and sand. Most abundant in clean, well-oxygenated waters (COSEWIC, 2006b).	Teeswater River may provide suitable habitat	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2006. COSEWIC assessment and status report on the Rainbow mussel Villosa iris in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 38 pp.
Reptiles										
Blanding's Turtle	<i>Emydoidea blandingii</i>	THR	THR	S3	MNRF (Bruce County)	Use a variety of eutrophic wetland habitat types, including lakes, ponds, watercourses, marshes, man-made channels, farm fields, coastal areas and bays. Seasonal overland terrestrial movements up to 2.5 km occur to reach nesting and overwintering areas, generally through wooded coniferous or mixed forest habitat. Nests are usually laid in loose sand or organic soil (COSEWIC 2005b).	Teeswater river and adjacent communities may provide suitable habitat	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2005. COSEWIC assessment and update status report on the Blanding's Turtle Emydoidea blandingii in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. viii + 40 pp. (www.sararegistry.gc.ca/status/status_e.cfm).
Northern Map Turtle	<i>Graptemys geographica</i>	SC	SC	S3	MNRF (Bruce County)	Highly aquatic species, found in deep, large waterbodies, including Lakes and large rivers, with abundant basking sites. Emerge onto land only during nesting, which occurs in soft sand or soil. Waterbodies with slow currents, soft mud bottoms and abundant aquatic vegetation are preferred (COSEWIC, 2002b).	Teeswater river and adjacent communities may provide suitable habitat	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2002. COSEWIC assessment and status report on the northern map turtle Graptemys geographica in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 34 pp.

COMMON NAME	SCIENTIFIC NAME	SARO	COSEWIC	S-RANK	BACKGROUND SOURCES	HABITAT REQUIREMENTS	SUITABLE HABITAT IN STUDY AREA	FIELD STUDIES COMPLETED/ REQUIRED	OBSERVED BY A & A	REFERENCE
Snapping Turtle	<i>Chelydra serpentina</i>	SC	SC	S3	ORAA (1996), MNRF (Bruce County)	Inhabit slow-moving waters with soft, muck bottom and dense aquatic vegetation. Ponds, sloughs and shallow bays are all often used as summering and overwintering habitat (COSEWIC 2008d).	Teeswater river and adjacent communities may provide suitable habitat	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2008. COSEWIC assessment and status report on the Snapping Turtle <i>Chelydra serpentina</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 47 pp. (www.sararegistry.gc.ca/status/status_e.cfm).
Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	SC	SC	S3	MNRF (Bruce County)	A semi-aquatic species that inhabits dense, low- vegetation, edges of ponds, streams, marshes, fens and bogs, with open sunlit areas for basking (COSEWIC 2002c).	Marsh communities adjacent to the Teeswater river may provide suitable habitat	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2002. COSEWIC assessment and status report on the eastern ribbonsnake <i>Thamnophis sauritus</i> . Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 24 pp.
Queensnake	<i>Regina septemvittata</i>	END	END	S2	MNRF (Bruce County)	Most commonly associated within rocky streams and rivers, but are also occasionally found in marsh, pond and lake shore habitats. Usually found within 3 metres of the shoreline and only at sites where there is an abundance of crayfish. (COSEWIC, 2010)	Teeswater river and adjacent communities may provide suitable habitat	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2010. COSEWIC assessment and status report on the Queensnake <i>Regina septemvittata</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 34 pp. (www.sararegistry.gc.ca/status/status_e.cfm)
Massasauga Rattlesnake	<i>Sistrurus catenatus</i>	SC	THR	S3	MNRF (Bruce County)	Only historic observations of Masassauga in the north western portion of Wellington County. Found in wet prairies, old fields, peatlands, rock barrens and coniferous forests, with open-areas, and areas of dense shrub cover. Hibernate in damp areas below the frost line (COSEWIC, 2012b).	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2012. COSEWIC assessment and status report on the Massasauga <i>Sistrurus catenatus</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiii + 84 pp.
Vascular Plants										
American Ginseng	<i>Panax quinquefolius</i>	END	END	S2	MNRF (Bruce County)	Occur in moist, rich, undisturbed, mature Sugar Maple dominated deciduous woodlands. Often, colonies are located at the bottom of south facing slopes (COSEWIC, 2000).	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2000. COSEWIC assessment and update status report on the American ginseng <i>Panax quinquefolius</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 17 pp.
American Hart’s Tongue Fern	<i>Asplenium scolopendrium</i>	SC	SC	S3	MNRF (Bruce County)	Grows on rocks or rocky substrates and requires calcareous soils, preferential to sites with dolomitic limestone, in Ontario found in upper talus and mid-slopes of the Niagara Escarpment (Environment Canada 2013).	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	Environment Canada. 2013. Management Plan for the Hart's-tongue Fern ( <i>Asplenium scolopendrium</i> ) in Canada. Species at Risk Act Management Plan Series. Environment Canada, Ottawa. iii + 16 pp
Broad Beech Fern	<i>Phegopteris hexagonoptera</i>	SC			MNRF (Bruce County)	Prefers rich, undisturbed deciduous forest, particularly Beech-maple forests. Occurs in moister areas such as lower valley slopes, bottomlands and swamps. It is unlikely to withstand major opening of the forest canopy. (van Overbeeke et al. 2013)	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	Van Overbeeke, J.C., J.V. Jalava and R.H. Donley. 2013. Management Plan for the Broad Beech Fern ( <i>Phegopteris hexagonoptera</i> ) in Ontario. Ontario Management Plan Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. v+ 25 pp.
Dwarf Lake Iris	<i>Iris lacustris</i>	SC			MNRF (Bruce County)	Grows on alvars, dolostone bedrock shorelines, sand or gravel beach ridges, and in openings in coniferous woodlands. Majority of populations are within 500 metres of the shore of Lake Huron. (COSEWIC 2010)	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2010. COSEWIC assessment and status report on the Dwarf Lake Iris <i>Iris lacustris</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 29 pp. (www.sararegistry.gc.ca/status/status_e.cfm)



COMMON NAME	SCIENTIFIC NAME	SARO	COSEWIC	S-RANK	BACKGROUND SOURCES	HABITAT REQUIREMENTS	SUITABLE HABITAT IN STUDY AREA	FIELD STUDIES COMPLETED/ REQUIRED	OBSERVED BY A & A	REFERENCE
Eastern Prairie-fringed Orchid	<i>Platanthera leucophaea</i>	END	END	S2	MNRF (Bruce County)	Habitat includes fens, wet tallgrass prairie and moist old fields with open growing conditions. Species does not flower annually (Environment Canada 2012).	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed	Environment Canada. 2012. Recovery Strategy for the Eastern Prairie Fringed-orchid ( <i>Platanthera leucophaea</i> ) in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. ii + 11 pp. + Appendices.
Gattinger's Agalinis	<i>Agalinis gattingeri</i>	END			MNRF (Bruce County)	Occurs in alvar grasslands and jack pine savannacs on Ordovician limestone. Areas are usually dominated by Northern Dropseed or Little Bluestem. Typically found in small patches of bare ground between tussocks of grass. (Jones, 2015)	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	Jones, J. 2015. Recovery strategy for the Gattinger's Agalinis ( <i>Agalinis gattingeri</i> ) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario. vi + 33 pp.
Hill's Pondweed	<i>Potamogeton hillii</i>	SC	SC	S2	MNRF (Bruce County)	Occur in cold clear calcareous streams, ponds and ditches, which are alkaline in nature (COSEWIC 2005c).	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2005c COSEWIC assessment and update status report on the Hill's pondweed <i>Potamogeton hillii</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 19 pp.
Hill's Thistle	<i>Cirsium hillii</i>	THR			MNRF (Bruce County)	Found in a variety of open, dry, sandy, fire-prone habitats including bluff prairies, sand prairies, pine barrens, oak barrens, sand dunes, oak savannah and open woods. (COSEWIC 2004)	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2004. COSEWIC assessment and status report on Hill's thistle <i>Cirsium hillii</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 34 pp. ( <a href="http://www.sararegistry.gc.ca/status/status_e.cfm">www.sararegistry.gc.ca/status/status_e.cfm</a> )
Houghton's Goldenrod	<i>Solidago houghtonii</i>	THR			MNRF (Bruce County)	Occurs on seasonally wet limestone pavements (alvars), calcareous beach sands, or interdunal wetlands along the Great Lakes shoreline. (COSEWIC 2005).	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2005. COSEWIC assessment and status report on the Houghton's goldenrod <i>Solidago houghtonii</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 17 pp. ( <a href="http://www.sararegistry.gc.ca/status/status_e.cfm">www.sararegistry.gc.ca/status/status_e.cfm</a> )
Lakeside Daisy	<i>Tetraneuris herbacea</i>	THR			MNRF (Bruce County)	Most commonly found in alvar habitats, although it occasionally occurs in prairies and cliffs. Habitat is seasonally wet in spring and fall and moderately drought-like in the summer. (COSEWIC 2002)	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2002. COSEWIC assessment and status report of the Lakeside daisy <i>Hymenoxys herbacea</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 24 pp.
Pitcher's Thistle	<i>Cirsium pitcheri</i>	THR			MNRF (Bruce County)	Occurs only on sand dunes and sandy beaches. Optimal habitat is open, dry, loose sand with sparse or no vegetation immediately surrounding or shading the thistles. (COSEWIC 2010)	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC. 2010. COSEWIC assessment and status report on the Pitcher's Thistle <i>Cirsium pitcher</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 32 pp. ( <a href="http://www.sararegistry.gc.ca/status/status_e.cfm">www.sararegistry.gc.ca/status/status_e.cfm</a> )
Tuberous Indian Plantain	<i>Arnoglossum plantagineum</i>	SC	SC	S3	MNRF (Bruce County)	Habitat includes open, sunny areas in wet calcareous soils, including wet meadows and shoreline fens (COSEWIC 2002d).	No habitat matching criteria identified in Study Area	The Study area was investigated for habitat during ELC and botanical surveys. No further studies required.	None observed.	COSEWIC 2002. COSEWIC assessment and update status report on the tuberous Indian-plantain <i>Arnoglossum plantagineum</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 11 pp.

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## Appendix 8

Survey	Time	Date	Staff	Temp. (°C)	Wind (Beaufort)	Cloud Cover %	Precipitation	Past Precipitation
Ecological Land Classification & Botanical Survey	08:00-11:00	28/07/2017	SF	18	1	90	None	None



## Appendix 9

## **APPENDIX 12. Glossary of terms and Impact Ratings**

### **Duration of Impact**

ST – Short-term (define based on project)

LT- Long-term (define based on project)

### **Reversibility**

R- Reversible

P – Permanent

### **Geographic Extent of Influence**

SA– Subject Area (physical disturbance area)

AA- Assessment Area (120m zone of influence)

LA – Landscape Area (Area outside AA that may be affected)

### **Frequency of Disturbance**

O - Occurs once.

S - Occurs sporadically at irregular intervals.

R - Occurs on a regular basis and at regular intervals.

C – Continuous, ongoing and all the time.

### **Existing Ecological Site Context**

U - Undisturbed: Area relatively or not adversely affected by human activity.

PD – Past Disturbance: Area Adversely affected by human activity in recent past, but regeneration has occurred.

D -Disturbed: Area has been substantially previously disturbed by human development or human development is still present.

### **Likelihood of impact occurring**

If the Proposed activity occurs, the likelihood of the impact occurring is:

L: Low probability of occurrence.

M: Medium probability of occurrence.

H: High probability of occurrence.

### **Cumulative Environmental Effects**

Will the proposed activity interact with other impacts?

Y: Potential for environmental effect to interact with the environmental effects of other past, present or foreseeable future activities

N: Environmental effect will not or is not likely to interact with the environmental effects of other past, present or foreseeable future activities.

### **Impact Rating**

None: An event that, if it occurs, will cause no foreseeable impact.

Minor: An event that, if it occurs, will cause small, reversible and geographically localized impact that can be easily mitigated.

Moderate: Significant but reversible, OR irreversible and geographically localized, impact that requires significant mitigation.

Severe: Significant AND irreversible impact on the environment, impacts cannot be fully mitigated.

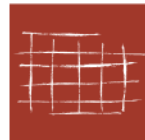
### **Potential vs. Actual impact**

<sup>1</sup> *Potential Impact* is a relative rating of the expected impact to occur in the absence of any mitigation measures.

<sup>2</sup> *Actual Impact* is the expected impact in consideration of implementation of mitigation measures or where potential impact may cause little to no actual impact.

- Urban Forestry
- Ecological Restoration
- Landscape Architecture
- Environmental Studies
- Expert Opinion

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April 12, 2018  
Our File: 212328

Via Email: [jstrader@brockton.ca](mailto:jstrader@brockton.ca)

Municipality of Brockton  
100 Scott Street, Box 68  
Walkerton, ON N0G 2V0

Attention: Mr. John Strader  
Roads Superintendent

Re: Existing Conditions Flood Study  
Greenock Bridge No. 0011  
Lot 46/47 Concession 'A', Greenock

Dear John,

As part of the Municipal Class Environmental Assessment (EA) process for the aging Bridge No. 0011, located at Lot 46/47 Concession 'A', in the former Township of Greenock, the existing conditions Regional and 100-year floodline elevations at the bridge location were approximated.

The study area is located within the Saugeen Valley Conservation Authority (SVCA) watershed. Refer to Figure 1 for a Site Location Plan. Backwater analysis is considered for the existing bridge during the 100-year Return Period storm event as well as the Regional (Hurricane Hazel) storm event. The study sub-watershed area is shown on Figure 2, encompassing a total drainage area of approximately 679.3 km<sup>2</sup>.

HEC-RAS computer floodplain (backwater) modelling was completed to determine the 100-year and Regional water surface elevations at the existing bridge location. The HEC-RAS cross-sections were developed using publicly available resources, including Bruce County Maps data (1m elevation contours). The Ontario Flow Assessment Tool (OFAT), provided by the Ministry of Natural Resources and Forestry (MNRF), and the aforementioned mapping data was used to determine the sub-watershed area for peak flow hydrologic modelling and transposition calculations.

Bridge No. 0011 crosses the Teeswater River and is located downstream from Bridge No. 0002. GM BluePlan Engineering Limited (GMBP) previously provided the draft Floodplain Analysis Report (Feb. 2018) for Bridge No. 0002 to the SVCA on February 1<sup>st</sup>, 2018. As noted in the aforementioned report, the drainage area of the Teeswater River at the Bridge No. 0002 location is approximately 415.4 km<sup>2</sup>. The total drainage area at the Bridge No. 0011 location, as shown on Figure 2, is approximately 679.3 km<sup>2</sup>. The MNRF OFAT data enclosed in Attachment A provides the study sub-watershed characterization parameters including the total drainage area.

The Return Period peak flows determined at the Bridge No. 0002 location can be transposed to the Bridge No. 0011 location, using ratios between discharge and drainage area; as follows:

$$Q2 = Q1 * (A2/A1)^{0.75}$$

Where: Q2 = Instantaneous peak flow for the Teeswater River at the location of Bridge No. 0011.

Q1 = Instantaneous peak flow for the Teeswater River at the location of Bridge No. 0002.

A2 = Area of Teeswater River sub-watershed at the location of Bridge No. 0011.

A1 = Area of Teeswater River sub-watershed at the location of Bridge No. 0002.

Therefore, the 100-year Return Period and Regional event peak flows at Bridge No. 0011, as determined by the transposition calculation and using the Bridge No. 0002 peak flows per the above noted report, are as shown in Table 1.

The hydrologic MIDUSS model (transposed from the Bridge No. 0002 study) was developed using intensity-duration-frequency (IDF) data per the Mount Forest IDF station (ID 6145504) for the 100-year storm event. The 24-hour SCS Type-II rainfall distribution was observed to generate the most conservative peak flows. The full 48-hour Hurricane Hazel storm data was used for the Regional event modelling with Antecedent Moisture Condition (AMC) II. The hydrologic parameters used in MIDUSS were developed using land cover data per the MNRF OFAT tool. Given that the Regional (Hurricane Hazel) storm event is an actual historic storm event, the associated flow cannot be approximated using Statistical Flood Frequency Analysis. The transposed MIDUSS model was used to determine the peak flow associated with the Regional Storm event.

The MNRF OFAT model (Primary Multiple Regression) and transposed MIDUSS model peak flows at the Bridge No. 0011 location are shown below in Table 1.

**Table 1 – Return Period Peak Flows at Bridge No. 0011**

<b>Return Period Storm Event</b>	<b>MNRF OFAT Model (Primary Multiple Regression) (m<sup>3</sup>/s)</b>	<b>Transposed MIDUSS Model at Bridge No. 0011 (m<sup>3</sup>/s)</b>
100-year	363.5	663.0
Regional	N/A	1,062.1

The transposed MIDUSS model appeared to generate highly conservative peak flows for the 100-year event when compared to the MNRF OFAT model, attributed to the MIDUSS model being more suited for modeling drainage areas of a lesser scale or with more detailed sub-catchment delineation.

The subcritical flow regime was applied for the HEC-RAS modelled reach of the Teeswater River given the relatively flat channel gradient. The HEC-RAS modelling computed Froude numbers of less than 1.0 in all cases which confirmed the subcritical flow regime. Given that no existing flood modelling was available in close proximity to Bridge No. 0011, the normal depth boundary condition was applied within the HEC-RAS modelling, using a slope of 0.001 m/m (flat channel gradient) at the downstream limit of the modelled area.

The lower flow channel of the river was modelled with a Manning's roughness (n) value of 0.035 within HEC-RAS based on the values listed within the current HEC-RAS Reference Manual and the observed Teeswater River characteristics. Overbank Manning's roughness (n) values were selected to be 0.040 to reflect the land cover for the modelled reach location (primarily agricultural land use).

HEC-RAS modelling was completed for the full range of Return Period flows as listed above in Table 1. The HEC-RAS cross-sectional plot and output table for the existing bridge conditions are enclosed in Attachment B. Existing bridge photos are also provided in Attachment C.

The 100-year and Regional event water surface elevations for the existing bridge conditions are summarized in Table 2 below. The water surface elevations noted below in Table 2 are for the modelled HEC-RAS section immediately downstream of Bridge No. 0011. Water surface elevations upstream of the bridge are expected to be slightly higher.

**Table 2 – HEC-RAS Flood Water Surface Elevations**

<b>Return Period Storm Event</b>	<b>MNRF OFAT Model (Primary Multiple Regression) (m)</b>	<b>Transposed MIDUSS Model at Bridge No. 0011 (m)</b>
100-year	227.80	228.86
Regional	N/A	229.97

The existing bridge deck elevations across the river crossing range from 228.10 to 228.50. Therefore, based on the transposed MIDUSS model peak flows and associated flood water surface elevations noted above, the existing bridge would be submerged in the 100-year and Regional design storm events. In the Regional event, the existing bridge deck would be submerged by 1.47 m to 1.87 m of flood water. In the case of the MNRF OFAT 100-year design storm event, the flood water surface elevation would range from 0.30 m to 0.70 m below the existing bridge deck.

In conclusion, based on the results of the flood model backwater analysis, the existing bridge deck would be significantly submerged in the Regional event by 1.47 m to 1.87 m of flood water. Any planned encroachment into the floodplain below elevation 230.00 m should be reviewed for potential impacts to backwater effects.

Please feel free to contact me for any comments and/or questions.

Yours truly,

**GM BLUEPLAN ENGINEERING LIMITED**

Per:



John Slocombe, P.Eng.  
OD/mz

Encl.

cc: GM BluePlan: Brent Willis, P.Eng., via Email – [brent.willis@gmblueplan.ca](mailto:brent.willis@gmblueplan.ca)  
File No. 212328

**FIGURES:**



212328  
Greenock Bridge No. 0011  
Schedule C EA



SCALE - N.T.S.  
OCTOBER 2017

**SITE LOCATION  
MAP**

Lot 46/47, Concession A  
Former Township of Greenock  
Municipality of Brockton

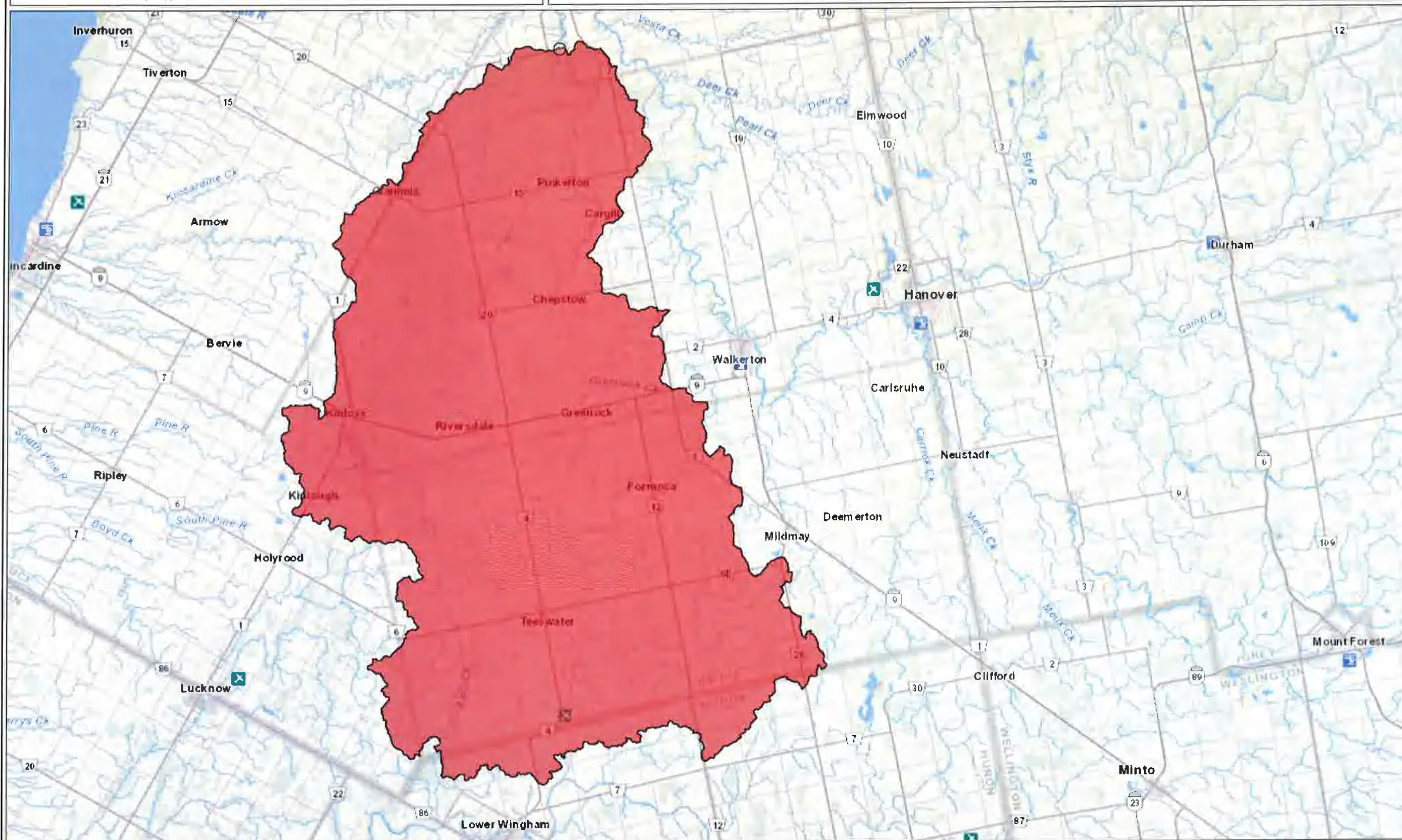
Figure No. 1





Figure 2 - Brockton Bridge 11 - Sub-Watershed Area

Notes:



Legend

- Assessment Parcel
  - Secondary Watershed
  - Tertiary Watersheds
  - Great Lakes - St. Lawrence Basin
  - Hudson - James Bay Basin
  - Nelson River Basin
  - Diversion
  - Waterbody Outlet
  - Conservation Authority Dam
  - Provincial Dam
  - Federal Dam
  - CPG Dam
  - Other Dam
  - HYDAT Gauge
  - HYDAT Gauge (RHN)
- Land Cover Compilation**
- Other
  - Cloud/Shadow
  - Clear Open Water
  - Turbid Water
  - Shoreline
  - Mudflats
  - Marsh
  - Swamp
  - Fen
  - Bog
  - Heath
  - Sparse Treed
  - Treed Upland
  - Deciduous Treed
  - Mixed Treed
  - Coniferous Treed
  - Plantations - Treed Cultivated
  - Hedge Rows
  - Disturbance
  - Open Cliff and Talus
  - Alvar
  - Sand Barren and Dune
  - Open Tallgrass Prairie
  - Tallgrass Savannah
  - Tallgrass Woodland
  - Sand/Gravel/Mine
  - Tailings/Extraction
  - Bedrock
  - Community/Infrastructure
  - Agriculture and Undifferentiated Rural Land Use

10.5 0 km 5.27 10.5

Scale: 1 : 207,497

Projection: Web Mercator



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**ATTACHMENT A:  
MNRF OFAT MODEL**





# MINISTRY OF NATURAL RESOURCES AND FORESTRY

## ONTARIO FLOW ASSESSMENT TOOL

Navigation | Map Layers: **OEAT** | Find Information | Map & Printing

Create Watershed | Watershed Characterization | Land Cover | Hydrology/Models | Flow Statistics | Find Watershed | Export | Help

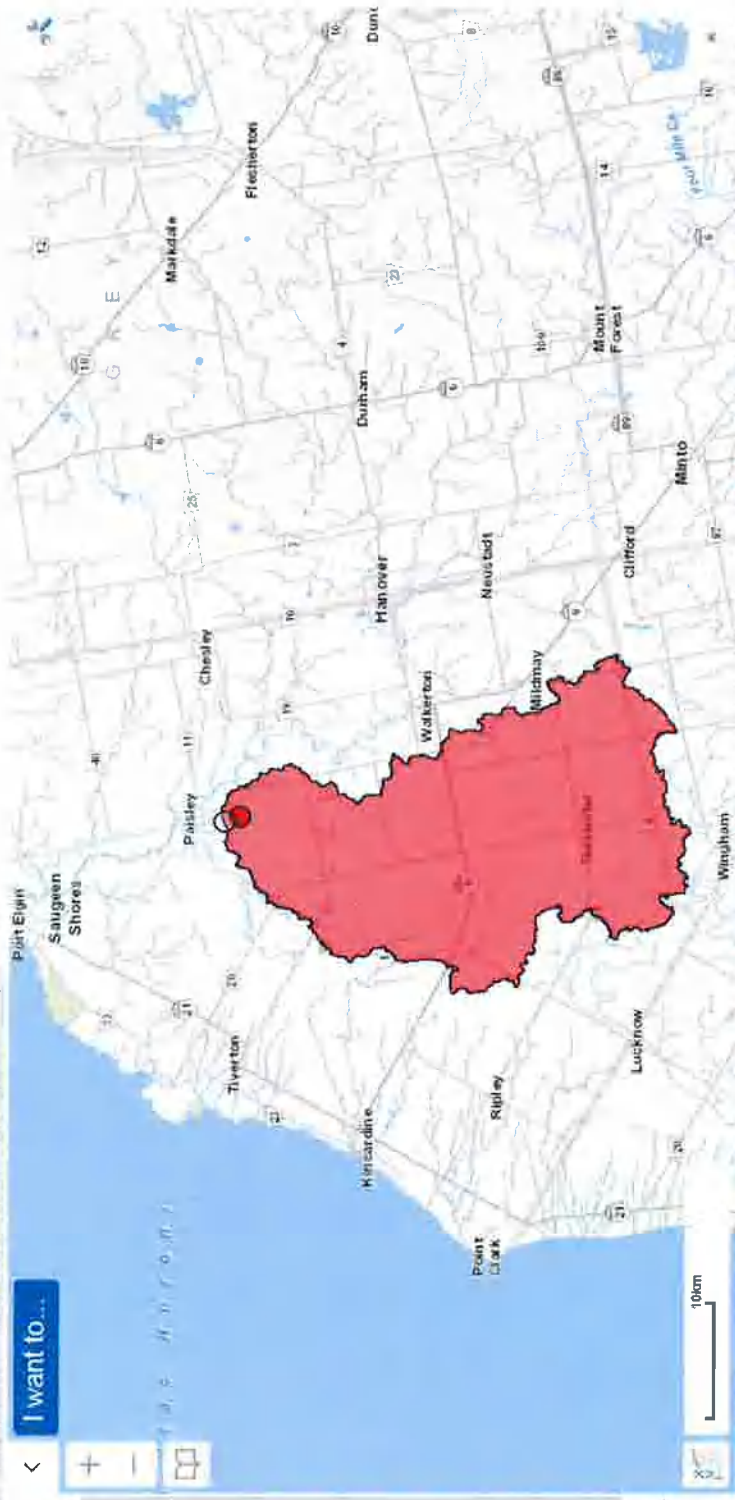
### Watershed Characterization

I want to...

Drainage Area (km <sup>2</sup> )	679.340
Shape Factor (I)	20.144
Length of Main Channel (km)	116.981
Maximum Channel Elevation (m)	383.120
Minimum Channel Elevation (m)	224.860
Slope of Main Channel (m/km)	1.350
Slope of Main Channel (%)	0.135
Area Lakes/Wetlands (km <sup>2</sup> )	168.132
Area - Lakes (km <sup>2</sup> )	3.808
Area - Wetlands (km <sup>2</sup> )	164.324
Mean Elevation (m)	296.735
Maximum Elevation (m)	385.636
Mean Slope (%)	2.532
Annual Mean Temperature (°C)	7.080
Annual Precipitation (mm)	1113.000

Calculate All

Watershed Name On/Off Delete



AboutNavigationMap LayersOFATFind InformationMarkup & Printing

Create WatershedWatershed CharacterizationLand CoverHydrology ModelsFlow StatisticsFind WatershedExportHelp

Hydrology Models

Please note that each model in OFAT has its own limitations. Please refer to the original model document, or if necessary, a practicing water professional, before using generated flow values for any decision making purpose.

	View Results
Mean Annual Flow (MNR 2003)	<a href="#">View Results</a>
Low Flow: Graphical Index Method (MOEE 1995)	<a href="#">View Results</a>
Low Flow: Regression Method (MOEE 1995)	<a href="#">View Results</a>
Flood Flow: Index Flood Method with EPA (Moin & Shaw 1985)	<a href="#">View Results</a>
Flood Flow: Primary Multiple Regression (Moin & Shaw 1985)	<a href="#">View Results</a>

Hydrology Models Limitations

Please note that each model in OFAT has its own limitations. Please refer to the original model document, or if necessary, a practicing water professional, before using generated flow values for any decision making purpose.

Hydrology Models

Map of Ontario showing the location of the watershed (highlighted in red) and the flow assessment tool interface.

Map of Ontario showing the location of the watershed (highlighted in red) and the flow assessment tool interface.

Map of Ontario showing the location of the watershed (highlighted in red) and the flow assessment tool interface.

Hydrology Models

Flood Flow: Primary Multiple Regression (Moin & Shaw 1985)

Flow	Results (m³/s)
RngQ2Q20	Parameters ACLS are outside of the range of parameters used to create this model.
RngQ50Q100	Parameters ACLS are outside of the range of parameters used to create this model.
Q <sub>2</sub>	147.168363
Q <sub>5</sub>	206.748296
Q <sub>10</sub>	246.841599
Q <sub>20</sub>	285.545649
Q <sub>50</sub>	324.631846
Q <sub>100</sub>	363.47755

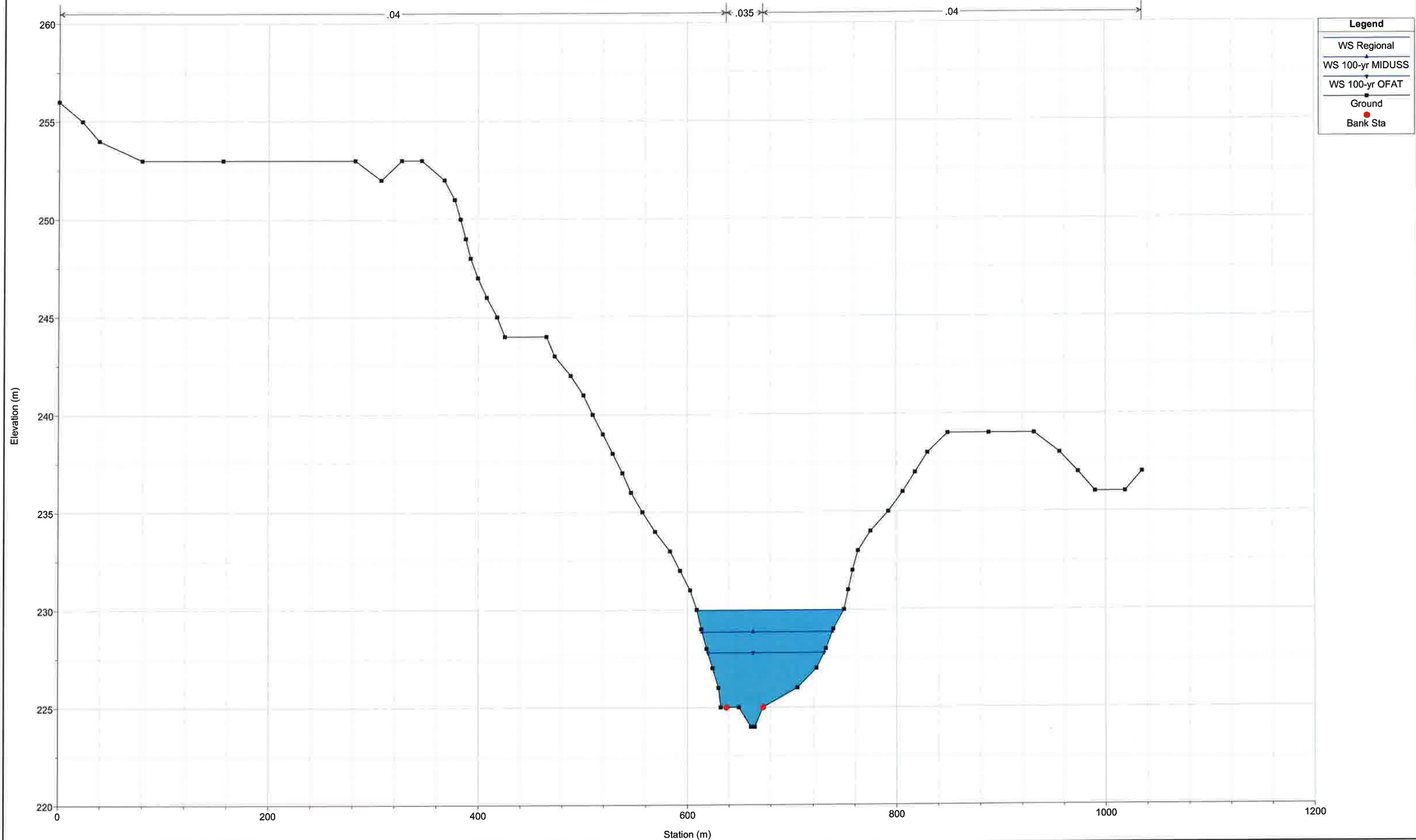
Powered By: Land Information Ontario | ACCESSIBILITY | PRIVACY | IMPORTANT NOTICES | © QUEEN'S PRINTER FOR ONTARIO, 2014 | IMAGERY COPYRIGHT NOTICES



**ATTACHMENT B:  
HEC-RAS FLOOD MODEL**



Bridge 11 Plan: EXISTING 4/3/2018  
Geom: EXISTING Flow: BRIDGE 11  
River = TEESWATER Reach = BRIDGE 11 RS = 101



HEC-RAS Plan: EX River: TEESWATER Reach: BRIDGE 11

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
BRIDGE 11	101	Regional	1062.10	224.00	229.97		230.23	0.000999	2.76	513.38	140.18	0.38
BRIDGE 11	101	100-yr MIDUSS	663.00	224.00	228.86		229.06	0.000998	2.36	366.96	124.24	0.37
BRIDGE 11	101	100-yr OFAT	363.50	224.00	227.80		227.94	0.000999	1.95	241.53	110.76	0.35
BRIDGE 11	100	Regional	1062.10	224.00	229.97	227.88	230.23	0.001001	2.76	513.07	140.15	0.38
BRIDGE 11	100	100-yr MIDUSS	663.00	224.00	228.86	227.21	229.06	0.001001	2.36	366.67	124.21	0.37
BRIDGE 11	100	100-yr OFAT	363.50	224.00	227.79	226.51	227.94	0.001002	1.95	241.27	110.73	0.35



1100 • J. Neurosci., July 2, 2003 • 23(27):1100–1105  
DOI: 10.1523/JNEUROSCI.1555-03.2003

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**ATTACHMENT C:  
EXISTING BRIDGE PHOTOS**

**BRIDGE/CULVERT INSPECTION REPORT– 2016  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

Structure No. 0011



**Photo 1** - View of structure from west.



**Photo 2** - View of structure from southeast

**BRIDGE/CULVERT INSPECTION REPORT– 2016  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

Structure No. 0011



**Photo 3 - View of soffit.**



**Photo 4 - View of damaged truss lattice.**



**BRIDGE/CULVERT INSPECTION REPORT– 2016  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

Structure No. 0011



**Photo 5** - View of typical wingwall/abutment condition.



**Photo 6**- View of spalled abutment at truss bearing.



**BRIDGE/CULVERT INSPECTION REPORT– 2016  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

Structure No. 0011



**Photo 7** - View of recently replaced web member with impact damage



**Plate 1** – View of the structure from the east.



**Plate 2** – View of the structure from the south-east.

## WC-1 Design Flows (Bridges and Culverts)

### SCOPE

This standard identifies the minimum Design Flows for the sizing of bridges and culverts for flow conveyance on Regulated and non-Regulated Watercourses. It also identifies the requirement for accommodating the Regulatory Flow on Regulated Watercourses, and for determining the maximum allowable increase in flood elevations upstream of a bridge or culvert. This standard provides the hydrologic basis for all water crossing standards, WC-1 to WC-13.

### DESIGN REFERENCES

Canadian Highway Bridge Design Code (CHBDC, 2000).

Exceptions to the Canadian Highway Bridge Design Code, CAN/CSA-S6-00 For Ontario, June 2002

### 1. HYDROLOGY

This standard addresses the Design Flow requirements for standard road classifications and low volume roads.

#### 1.1 Standard Road Classifications

**1.1.1** As a minimum, bridges and culverts of Provincial Highways shall be designed to the criteria shown in the following table, except as outlined in Section 1.1.2 to Section 1.1.4 of this standard:

Design Flow Return Period for Bridges and Culverts - Standard Road Classifications			
Functional Road Classification	Return Period of Design Flows (Years) <sup>1,2,3</sup>		Check Flow for Scour
	Total Span less than or equal to 6.0 m	Total Span greater than 6.0 m	
Freeway, Urban Arterial	50	100	130% of 100 year
Rural Arterial, Collector Road	25	50	115% of 100 year
Local Road	10	25	100% of 100 year
Note: 1. The listed design flows apply to roads under the jurisdiction of the Ministry of Transportation. 2. The Fish Passage Design Flow for culverts is defined in Standard WC-12 Fish Passage Requirements Through Culverts 3. Sometimes referred to as Normal Design Flow			

**1.1.2** On Regulated Watercourses the Regulatory Flow shall be calculated in all cases where Floodline Mapping is available, where there is a potential risk to public safety, or where there is potential damage to adjacent properties, as applied in Section 2.3 of this standard.

**1.1.3** The criteria may be modified in exceptional cases, such as for unusually large structures, or for vital routes which must remain useable during Regulatory Flow conditions. Use of Regulatory Flow criteria in the latter case shall be justified by a cost-benefit analysis.

- 1.1.4** If the road classification is likely to be upgraded or downgraded within 5 years of construction, the Return Period shall be based on the future classification.

## **1.2 Low Volume Roads**

Design Flow Return Periods for Bridges on Low Volume Roads were developed to achieve economies without compromising safety. These requirements apply only to bridges. Culverts shall be designed in accordance with Section 1.1 of this standard.

- 1.2.1** As a minimum, bridges shall be designed to accommodate the Design Flow without damage to the structure or approaches. Relief Flow over the road shall be in accordance with Standard WC-13 Relief Flow (Bridges and Culverts). Drainage facilities for Low Volume Roads shall be designed to the criteria shown in the following table, except as provided in Section 1.2.2 to 1.2.5 of this standard:

<b>Design Flow Return Period for Bridges on Low Volume Roads</b>			
		<b>Return Period of Design Flow (Years)<sup>(1,2)</sup></b>	
<b>Road Function</b>	<b>Vulnerability</b>	<b>Total Span less than or equal to 6.0 m</b>	<b>Total Span greater than 6.0 m</b>
Collector and Arterial	High	25	50
	Low	25	50
Local	High	10	25
	Low	10	25
Resource Access	High	5	10
	Low	5	10
Recreation	High	5	10
	Low	2	2
<b>Notes:</b> <sup>1</sup> The listed design storms apply to roads under the jurisdiction of the Ministry of Transportation. <sup>2</sup> Sometimes referred to as Normal Design Flow			

- 1.2.2** The Check Flow need not be considered.

- 1.2.3** On Regulated Watercourses the Regulatory Flow shall be calculated in all cases where Floodline Mapping is available, where there is a potential risk to public safety, or where there is potential damage to adjacent properties, as applied in Section 2.3 of this standard.

- 1.2.4** Low water crossings, which accommodate the Design Flow but overtop during more severe flooding, may be considered as an alternative, but not for Collector or Arterial Roads.

- 1.2.5** The Return Period should be determined by the owner in order to establish the acceptable length of time the structure is impassable. Where required, approval shall be sought from other agencies having jurisdiction.

- 1.2.6** The hydrology criteria may be modified in exceptional cases, such as for unusually large structures or for vital routes which must remain useable during more severe storm conditions. Use of a more severe design storm in the latter case shall be justified by a cost-benefit analysis.

## Drea Nelson - GM BluePlan

---

**From:** Michelle Gallant <m.gallant@SVCA.ON.CA>  
**Sent:** Tuesday, July 18, 2017 11:14 AM  
**To:** John Slocombe - GM BluePlan  
**Cc:** Drea Nelson - GM BluePlan  
**Subject:** RE: 212328 Bridge No. 0011 Greenock: Hydrological Considerations  
**Attachments:** 212328 Bridge No. 0011 Greenock: Hydrological Considerations

Hi John,

Yes I have recently been assigned this file as well. Gary would not have provided a regulatory review response, but he did respond to Drea Nelson in the response as attached. A SVCA Permit or written response will be required for the replacement, but if a like for like is proposed that will not alter the flow, there will not be hydrological evaluations required for SVCA review but there are other review factors including possible wetland considerations.

A Lakes and Rivers Improvement Act (LRIA) approval may be required. Please confirm with Ministry of Natural Resources and Forestry (MNRF) with Tarique.Kamal@ontario.ca or Raffaella.Mooney@ontario.ca.

In the past, Conservation Authorities served as the first point of contact and the local service provider for review of Section 35 of the previous version of the Fisheries Act, and had entered into agreements with Fisheries and Oceans Canada (DFO) to facilitate this process. Changes to the Fisheries Act effective November 25, 2013, have resulted in the cancellation of these agreements. It is now the responsibility of the proponent to contact the Department of Fisheries and Oceans at 1-855-852-8320 or <http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html> to ensure their project addresses the Fisheries Act.

I would suggest getting DFO involved in this process as early as possible if there is to be any in-water works required for the replacement as there are SAR species present in this section of the Teeswater River. If the bridge is to be replaced from the road with a crane and no in water works are required, please provide that information because that will reduce the amount of SVCA review that is required.

Michelle



**Michelle Gallant**, Regulations Officer  
1078 Bruce Rd. 12, Box 150 Formosa ON N0G 1W0  
519-367-3040 Ext. 224 Fax 519-367-3041  
[m.gallant@svca.on.ca](mailto:m.gallant@svca.on.ca)  
[www.svca.on.ca](http://www.svca.on.ca)





---

**From:** John Slocombe - GM BluePlan [mailto:John.Slocombe@gmblueplan.ca]  
**Sent:** Tuesday, July 18, 2017 10:15 AM  
**To:** Michelle Gallant <m.gallant@SVCA.ON.CA>  
**Cc:** Drea Nelson - GM BluePlan <Drea.Nelson@gmblueplan.ca>  
**Subject:** 212328 Bridge No. 0011 Greenock: Hydrological Considerations

Michelle,

Are you also assigned the file for Brockton Bridge No. 11?

The following e-mail was sent to Gary Senior, but I don't think we received any response.

Please note the highlighted section below and provide us with any comments.

Thanks again.

**John Slocombe, P.Eng.**  
Branch Manager, Vice President

**GM BluePlan Engineering Limited**  
1260-2<sup>nd</sup> Avenue East | Owen Sound ON N4K 2J3  
t: 519.376.1805 | c: 519.372.4600  
[john.slocombe@gmblueplan.ca](mailto:john.slocombe@gmblueplan.ca) | [www.gmblueplan.ca](http://www.gmblueplan.ca)



---

**From:** Drea Nelson - GM BluePlan  
**Sent:** Thursday, June 29, 2017 2:48 PM  
**To:** [g.senior@svca.on.ca](mailto:g.senior@svca.on.ca); [jstrader@brockton.ca](mailto:jstrader@brockton.ca)  
**Cc:** John Slocombe - GM BluePlan; Brent Willis - GM BluePlan  
**Subject:** 212328 Bridge No. 0011 Greenock: Hydrological Considerations

Gary and John,

We have been retained by the Municipality of Brockton to complete an Environmental Assessment process for an aging bridge located directly south of the Village of Paisley. More specifically Bridge No.0011 which is located within Lot 46/47, Concession A, in the former Township of Greenock, where shown on the attached Figure. The subject bridge forms part of Concession Road 20 and crosses the Teeswater River at a location that is an estimated 3.4 km south of its confluence with the Saugeen River in Paisley. The structure is a steel pony truss bridge with steel floor beams and stringers supporting a wooden deck. The structure is supported by cast in place concrete abutments and wingwalls with an overall span of 30.9m. A photo is attached for your reference.

At this time it is anticipated that the existing bridge will be replaced with a similar single-lane structure. Furthermore, it is not expected that the span between the abutments will be altered, therefore the replacement bridge will not further constrain the flow in the river in the vicinity of the Concession Road 20. Based on the provision that the bridge design will provide for a span between the abutments that is the same as the existing structure, it is assumed that the hydrology will not be altered and a Hydrology and Hydraulic Evaluation will not be required. However, in order to ensure that the river hydrology is considered, we are asking whether you are aware of any issues (i.e. flooding) that may have historically been experienced. Please advise.

Regards,  
Andrea

**Andrea Nelson, M.Sc.**  
Senior Hydrogeologist

**GM BluePlan Engineering Limited**  
1260-2<sup>nd</sup> Avenue East | Owen Sound ON N4K 2J3  
t: 519.376.1805 | c: 519.372.4678  
[andrea.nelson@gmblueplan.ca](mailto:andrea.nelson@gmblueplan.ca) | [www.gmblueplan.ca](http://www.gmblueplan.ca)



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**From:** Shannon Ferguson  
**Sent:** Mon, 10 Jul 2017 12:52:21 +0000  
**To:** Drea Nelson - GM BluePlan  
**Subject:** FW: Rainbow Mussel Critical Habitat, Municipality of Brockton

Good Morning Andrea,

I contacted the DFO last week regarding the critical habitat for Rainbow Mussel found in the study area for Bridge No. 0011, below is their response. Seeing as they have already sampled the area we will not be required to conduct any other studies prior to gaining a permit in the detailed design stage. If you have any questions, please let me know.

Thanks,

Shannon Ferguson B.Env. Eco. Rest. Cert.  
Ecologist  
MNRF Certified Wetland Evaluation . MNRF Certified Ecological Land Classification  
**ABOUD & ASSOCIATES INC.** 190 Nicklin Road . Guelph . Ontario . N1H 7L5  
T:519.822.6839 . C : 289.686.9499 . F:519.822.4052 [www.aboudtng.com](http://www.aboudtng.com) . [sferguson@aboudtng.com](mailto:sferguson@aboudtng.com)

**From:** FPP.CA / PPP.CA (DFO/MPO) [<mailto:fisheriesprotection@dfo-mpo.gc.ca>]  
**Sent:** July-10-17 7:54 AM  
**To:** Shannon Ferguson  
**Subject:** RE: Rainbow Mussel Critical Habitat, Municipality of Brockton

Hello Shannon,

A study will not be needed as Fisheries and Oceans Canada (DFO) has previously sampled the site and observed that Rainbow Mussel are present at this location.

Once you are ready to seek approval from DFO, we request that you visit our website at <http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html> and undertake a Self-Assessment to determine if DFO needs to review your project.

If your project IS NOT in one of the listed waterbody types, and its activities ARE NOT listed, nor does it meet the associated criteria (if applicable), you may submit a ***Request for Review*** to DFO before proceeding further with in-water works.

Yours sincerely,

Kathleen Buck  
Fisheries Protection Biologist  
Fisheries and Oceans Canada

Fisheries and Oceans Canada has changed the way new project proposals (referrals), reports of potential Fisheries Act violations (occurrences) and information requests are managed in Central and Arctic Region (Alberta, Saskatchewan, Manitoba, Ontario, Nunavut and the Northwest Territories). Please be advised that general information regarding the management of impacts to fish and fish habitat and self-assessment tools (e.g. Measures to Avoid Harm) that enable you to determine Fisheries Act requirements are available at DFO’s “Projects Near Water” website at [www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html](http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html). For all occurrence reports, or project proposals where you have determined, following self-assessment, that you cannot avoid impacts to fish and fish habitat, please submit to [fisheriesprotection@dfo-mpo.gc.ca](mailto:fisheriesprotection@dfo-mpo.gc.ca). For general inquiries call 1 855 852-8320.

**From:** Shannon Ferguson [<mailto:sferguson@aboudtng.com>]  
**Sent:** July-05-17 8:50 AM  
**To:** FPP.CA / PPP.CA (DFO/MPO)  
**Subject:** Rainbow Mussel Critical Habitat, Municipality of Brockton

Good Morning,

My name is Shannon Ferguson and I am an Ecologist with Aboud & Associates. We have been retained to complete a scoped Environmental Impact Study as part of the Environmental Assessment process for a bridge replacement within the Municipality of Brockton, Bruce County. While doing our background research we have found that the bridge spans waters that contain critical habitat for Rainbow Mussel. Since we are only in the EA phase we aren’t in need of a permit at this point, but I am hoping you could let me know what studies may be necessary to obtain one in the future? I have attached a map of the location for your information. If you require anything else, please let me know.

Regards,

Shannon Ferguson B.Env. Eco. Rest. Cert.  
Ecologist  
MNRF Certified Wetland Evaluation . MNRF Certified Ecological Land Classification  
**ABOUD & ASSOCIATES INC.** 190 Nicklin Road . Guelph . Ontario . N1H 7L5  
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**APPENDIX D:**  
**CULTURAL ENVIRONMENT – SUPPORTING INFORMATION**

**Ministry of Tourism, Culture and Sport**

Archaeology Programs Unit  
Programs and Services Branch  
Culture Division  
401 Bay Street, Suite 1700  
Toronto ON M7A 0A7  
Archaeology@ontario.ca

**Ministère du Tourisme, de la Culture et du Sport**

Unité des programmes d'archéologie  
Direction des programmes et des services  
Division de culture  
401, rue Bay, bureau 1700  
Toronto ON M7A 0A7  
Archaeology@ontario.ca



Jul 25, 2017

Scarlett Janusas (P027)  
Scarlett Janusas Archaeology Inc.  
PO BOX none Tobermory ON N0H 2R0

**RE: Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "STAGE 1 AND 2 ARCHAEOLOGICAL ASSESSMENT PROPOSED BRIDGE REPLACEMENT OR UPGRADE PART LOTS 47 AND 48, CONCESSION A FORMER GEOGRAPHIC TOWNSHIP OF GREENOCK MUNICIPALITY OF BROCKTON BRUCE COUNTY, ONTARIO ORIGINAL REPORT ", Dated Jul 13, 2017, Filed with MTCS Toronto Office on N/A, MTCS Project Information Form Number P027-0316-2017, MTCS File Number 0007027**

Dear Ms. Janusas:

The above-mentioned report, which has been submitted to this ministry as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18, has been entered into the Ontario Public Register of Archaeological Reports without technical review.<sup>1</sup>

Please note that the ministry makes no representation or warranty as to the completeness, accuracy or quality of reports in the register.

Should you require further information, please do not hesitate to send your inquiry to [Archaeology@Ontario.ca](mailto:Archaeology@Ontario.ca)

cc. Archaeology Licensing Officer  
John Strader, Municipality of Brockton  
Chris LaForest, Bruce County

<sup>1</sup>In no way will the ministry be liable for any harm, damages, costs, expenses, losses, claims or actions that may result: (a) if the Report(s) or its recommendations are discovered to be inaccurate, incomplete, misleading or fraudulent; or (b) from the issuance of this letter. Further measures may need to be taken in the event that additional artifacts or archaeological sites are identified or the Report(s) is otherwise found to be inaccurate, incomplete, misleading or fraudulent.

**STAGE 1 AND 2 ARCHAEOLOGICAL ASSESSMENT  
PROPOSED BRIDGE REPLACEMENT OR UPGRADE  
PART LOTS 47 AND 48, CONCESSION A  
FORMER GEOGRAPHIC TOWNSHIP OF GREENOCK  
MUNICIPALITY OF BROCKTON  
BRUCE COUNTY, ONTARIO  
ORIGINAL REPORT**

Prepared for

**County of Bruce**  
and  
**Ministry of Tourism, Culture and Sport**

**SCARLETT JANUSAS ARCHAEOLOGY INC.**  
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License # P027, PIF #P027-0316-2017  
July 13, 2017

## Executive Summary

The proponent retained the services of Scarlett Janusas Archaeology Inc. (SJA) to conduct a Stage 1 and 2 archaeological resource assessment on property, hereafter referred to as the “study area”, proposed for bridge replacement or upgrading of bridge structure. Development outcome is still pending. The bridge is known as Bridge 11.

Permission to access the study area and to conduct all activities associated with the Stage 1 and 2 archaeological assessment was provided by the proponent. The study area encompassed an area on either side of Concession Road 20, and on either side of the bridge, which passes over the Teeswater River. The study area (adjacent to bridge) is located on part of Lots 47 and 48, Concession A, in the former geographic township of Greenock, now the Municipality of Brockton, Bruce County, formerly Saugeen County. The study area is 1600 m<sup>2</sup> in size, comprised of four areas measuring 20 metres by metres at each of the corners of the bridge/road/water intersection.

The County of Bruce required an archaeological assessment for the proposed area to ensure there were no archaeological resources that might be impacted from the replacement or upgrading of the bridge. The archaeological assessment was triggered by the Planning Act. There is no formal application for development at this time, and the Stage 1 and 2 assessment is being undertaken as due diligence on the part of the proponent.

A Stage 1 archaeological assessment was conducted by Wm. Fitzgerald (P097-058-2012) in 2012 as part of the central Bruce County Bridge Infrastructure Master Plan. The results determined that archaeological potential exists for both “Native and Euro-Canadian” archaeological resources in the study area. No detailed lot research was conducted by Fitzgerald. That, and other aspects of a complete Stage 1 are included in this report. There was a recommendation for Stage 2 archaeological assessment of all undisturbed areas.

There are no registered archaeological sites located within one kilometre of the study area (from 2017 and 2012 access to the site database). There was no discussion of soil types in Fitzgerald’s Stage 1 nor discussion of commemorative plaques. Valley soils are bottomland. While removed from the site, there is a commemorative plaque celebrating the founding of Paisley, located north of the study area. Topography in the area is a valley land, and the study area itself, floodplain and a rise to higher elevations on the west and east sides of the study area.

The Stage 2 archaeological assessment of the study area was conducted on May 6<sup>th</sup>, 2017 under appropriate lighting and weather conditions using a test pitting methodology. No archaeological sites were located during the Stage 2 assessment.

Based upon the background research of past and present conditions, and, the Stage 2 archaeological assessment, the following is recommended:

- There are no archaeological resources located on the study area and there is no requirement to conduct additional archaeological assessment;
- Compliance legislation must be adhered to in the event of discovery of deeply buried cultural material or features.

This archaeological assessment has been conducted under the 2011 Standards and Guidelines for Consultant Archaeologists (Ministry of Tourism, Culture and Sport, 2011).

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**Project Personnel**

Project Manager  
Principal Archaeologist

Scarlett Janusas (P027)

Report Preparation

Scarlett Janusas (P027)

Historic Research

Patrick Folkes

Field Crew

Chelsea Robert (R403)  
Pete Demarte (R1073)

Graphics

Scarlett Janusas

**STAGE 1 AND 2 ARCHAEOLOGICAL ASSESSMENT  
PROPOSED BRIDGE REPLACEMENT OR UPGRADE  
PART LOTS 47 AND 48, CONCESSION A  
FORMER GEOGRAPHIC TOWNSHIP OF GREENOCK  
MUNICIPALITY OF BROCKTON  
BRUCE COUNTY, ONTARIO  
ORIGINAL REPORT**

## **1.0 PROJECT CONTEXT**

### **1.1 Development Context**

The proponent retained the services of Scarlett Janusas Archaeology Inc. (SJA) to conduct a Stage 1 and 2 archaeological resource assessment on property, hereafter referred to as the “study area”, proposed for bridge replacement or upgrading of bridge structure. Development outcome is still pending. The bridge is known as Bridge 11 (Maps 1 – 4).

Permission to access the study area and to conduct all activities associated with the Stage 1 and 2 archaeological assessment was provided by the proponent. The study area encompassed an area on either side of Concession Road 20, and on either side of the bridge, which passes over the Teeswater River. The study area (adjacent to bridge) is located on part of Lots 47 and 48, Concession A, in the former geographic township of Greenock, now the Municipality of Brockton, Bruce County, formerly Saugeen County. The study area is 1600 m<sup>2</sup> in size, comprised of four areas measuring 20 metres by metres at each of the corners of the bridge/road/water intersection.

The County of Bruce required an archaeological assessment for the proposed area to ensure there were no archaeological resources that might be impacted from the replacement or upgrading of the bridge. The archaeological assessment was triggered by the Planning Act. There is no formal application for development at this time, and the Stage 1 and 2 assessment is being undertaken as due diligence on the part of the proponent.

This archaeological assessment has been conducted under the 2011 Standards and Guidelines for Consultant Archaeologists (Ministry of Tourism, Culture and Sport, 2011).

### **1.2 Historical Context**

#### **1.2.1 Current Environment**

The study area encompassed an area on either side of Concession Road 20, and on either side of the bridge, which passes over the Teeswater River. The study area (adjacent to bridge) is located on part of Lots 47 and 48, Concession A, in the former geographic township of Greenock, now the Municipality of Brockton, Bruce County, formerly Saugeen County. The study area is 1600 m<sup>2</sup> in size, comprised of four areas measuring 20 metres

by metres at each of the corners of the bridge/road/water intersection. The northwest, northeast, southeast and southwest corners are floodplain with overgrown vegetation. In the southeast corner is a small wet meadow that is located partially within the study area. Crops are still very small and well-spaced allowing for pedestrian transect survey in this area. The road cuts leading down from the bridge are steep (in excess of 20°) and obviously disturbed from bridge construction (abutments, etc.). There are steep slopes on the northwest, northeast, and southwest corners of the study area, leading to higher elevations (the latter are not in the study area).

The bridge is a pony truss dating to 1920, but there were other bridge predecessors to this extant bridge.

### **1.2.2 Stage 1 Land Use History (P097-058-2012)**

The following is taken from Fitzgerald (2012: 4 – 6), who conducted a Stage 1 archaeological assessment on six bridges, including the one which is the subject of this report:

“The study area [encompasses more than the current study area] is located within the Sauking (Saugeen Ojibway) Indian hunting territory south of the Bruce Peninsula that was surrendered to the “Great Father” (William IV) under the terms of Treaty No. 45 ½ on August 9, 1836.

Treaty No. 45 ½'s configuration is a byproduct of earlier historical events. What would eventually be defined as the southeast corner of Saugeen Ojibway hunting territory – the current intersection of Highway 6 and Wellington Road 109/Highway 9, has been established within Treaty No. 3 between the Mississauga and the Crown on December 7, 1792 as the endpoint of a 50-mile survey transect originating at the outlet of Burlington Bay into Lake Ontario. This reference point was subsequently used in all major southern Ontario treaties of the late-18<sup>th</sup> and early-19<sup>th</sup> centuries.

On October 17, 1818, Treaty No. 18 conveyed a 1.592 million-acre tract of Chippewa lands within the northern section of the Home District to the Crown. The treaty area's western limit was defined by a line projecting northward (15'W) from the 1792 50-mile endpoint – now beginning as County Road 14, to Vail's Point on Georgian Bay. This line, by default, would later serve as Treaty No. 45 ½'s eastern limit.

On April 26, 1825, Treaty No. 27 ½ surrendered and conveyed another substantial section of Chippewa territory to the Crown (George IV). This time the future intersection of Highway 6 and Highway 9/Wellington Road 109 served as the treaty area's northeast corner of reference - - the northern limit of the surrender stretched westward (5W) from the 1792 50-mile endpoint to a point on Lake Huron 10 ¾ miles north of the mouth of the William FitzWilliam Owen's Red River. By 1825 [sic] it was known as the Menesetunk River – today it is the Maitland River. This line would in 1836 serve, also by default, as the southern boundary of Saugeen Ojibway territory.

With the colonial government's desire to expedite the opening of the newly-acquired Treaty 45 ½ lands – the “Queen's Bush”, for Euro-Canadian settlement and commerce, routes were initially scouted for roads that would link Oakville and Toronto to the head of Owen's Sound (Sydenham) on Georgian Bay.

The first was a route surveyed in 1837 by Charles Rankin that would serve as the northern extension of the Oakville-Owen's Sound Road between the northwest corner of Wellington County's Garafraxa Township – the aforementioned 1792 “50-mile endpoint”, and the east side of the head of Owen's Sound. In 1 40 and 1 41 [sic] John McDonald formalized Rankin's route and established 50-acre free land grants on either side of it to entice settlers and as a means to open the road. The route became more popularly known as the Garafraxa Road – today it is the stretch of Highway 6 between Arthur and Owen Sound.

Another colonization road was ordered in 1848 to link Hurontario Street in Nottawasaga Township (Simcoe County) and the mouth of the Penetangore River on Lake Huron. This east-west road crossed the north-south Garafraxa Road at the reserve for the future town of Durham – hence the road's name. Allan Park Brough surveyed the western section of the Durham Road – between Garafraxa Road and the mouth of the Penetangore, between 1848 and 1850. As with the Garafraxa Road, 50-acre free land grants were offered along sections of the Durham Road that passed through the future townships of Bentinck, Brant, Greenock, Kinloss, and Kincardine. Two town reserves were set aside by Brough along the western section of the Durham Road: Penetangore at the road's western terminus (present-day Kincardine); the other straddling the Brant-Greenock town line (never established). Today the western section of the Durham Road is better known as Grey/Bruce Road 4 between Durham and Walkerton and Highway 9 between Walkerton and Kincardine.

With the completion of the survey of the Durham Road, the lands on either side of the road and its free grants – and further into the interior, began in 1850 to be divided into townships and farm lots...

....

As part of his April 7 to August 26, 1851 survey of Saugeen Township, Alexander Vital established a range of lots on either side of the proposed route of the Saugeen [sic] and Elora Road in Elderslie and Greenock townships. Robert Walsh surveyed the remaining areas of Greenock Township between May 26 and October 6, 1851. Between May 15 and November 3, 1851, George McPhillips surveyed the remainder of Elderslie Township.

The surveyors who liad out Brant, Greenock, and Elderslie townships must have reported to the Commissioners of Crown Lands the challenges of construction the Saugeen [sic] and Elora Road along the town lines of the townships in the vicinity of the confluence of the Teeswater and Saugeen Rivers. On July 14, 1851 – likely due to the meandering of the Teeswater and large number of crossings that would have to be constructed, George McPhillips was instructed to:

*...mark out a line for a road from the rear of Brant to the Saugeen River in*

*Elderslie...selecting the best site for bridges over the Mud River and River Saugeen, and making the necessary sinuosities to avoid hills and swamps.*

McPhillip's Saugeen and Elora Road deviation through Elderslie Township – now part of Bruce Road 3, avoided river crossings until it reached the confluence of the Teeswater and Saugeen rivers at the town reserve of Paisley. Not only did the route of the Saugeen and Elora Road deviate eastward from the Greenock-Brant town line, within Brant Township its route was shifted eastward from the Greenock-Brant town line to the road right-of-way along the east side of Brant Concession B.

...

Today, Brough and Vidal's originally-proposed route of the Saugeen and Elorra Road is a series of town lines of varying quality whose northern end is Greenock Township's Concession 20 Road – the road having never been pushed through to the town reserve of Paisley. Watson's and Dudgeon bridges are located along this original route; the Concession 20 Bridge lies to its immediate west in Greenock Township."

"Archaeological and historical evidence reveals that the rivers and valleys of the Teeswater and Saugeen rivers have served as travel corridors for Native groups for millennia and Euro-Canadians since the mid-19<sup>th</sup> century. No unexpectedly, the potential is high that cultural heritage resources – eg., habitation, resource-procurement, ritual and burial sites, exist in the areas between the rivers' banks and their valley edges. Active [sic] archaeological sites could potentially date from the first appearance of Paleo-Indian bands into the sub-arctic landscape of this part of the province about 11,000 years ago up until and – as historically documented, following the appearance of Euro-Canadian surveyors and settlers after the Saugeen Ojibway surrender of August 9, 1836" (Fitzgerald 2012: 7)

### **1.2.3 Specific Lot History: Lot 47, Concession A**

The following specific lot histories were conducted by SJA. According to the "Abstract Land Index" Robert Kay obtained the Crown patent to Lot 47 (100 acres/~40 hectares) on June 19<sup>th</sup>, 1863. Previously, in 1856, the lot was occupied by a squatter, Abraham Davis. It then passed to E.C. Dowling, who cleared 5 acres (~2 hectares) (Dowling nd). From Dowling, it appears to have been acquired by Robert Kay who fulfilled the settlement requirements and secured the patent.

Kay sold Lot 47 to William Watson, Sr., on March 26<sup>th</sup>, 1866. William sold to Andrew Watson on May 28<sup>th</sup>, 1885. Thereafter, the property remained in the Watson family. Following the death of Andrew, Lot 47 was left to Frank Watson on October 23<sup>rd</sup>, 1884. He, alone, secured title, in respect of other members of the Watson family, by a "grant" dated March 5<sup>th</sup>, 1885.

#### **1.2.4 Specific Lot History: Lot 48, Concession A**

The Crown patent to Lot 48 (100 acres/~40 hectares) was issued to James Mair on January 21<sup>st</sup>, 1870. Mair, subsequently, divided the lot, selling the 50 acres (~20 hectares) of the west half to Joseph Rowley on January 31<sup>st</sup>, 1874. On April, 1883, he sold the east half to William Dryden.

The Rowley property continued to be held by the family until September 7<sup>th</sup>, 1920, then an “agreement for sale” was made with Frederick, Nathaniel, and Mary Rowley, executors to the deceased Joseph, with George Nicoll. This agreement was not formalized until April 28<sup>th</sup>, 1928, by a “grant” to George Nicoll and his wife Charlotte. This transaction also involved an undefined part of Lot 49. Following the death of George, Charlotte sold out to William Dryden on November 28<sup>th</sup>, 1942.

The east half of Lot 48 remained in the Dryden family. Following the death, c. 1909, of William Dryden, the purchaser in 1883, the property passed on May 1<sup>st</sup>, 1909 to multiple members of the Dryden family. On June 24<sup>th</sup>, 1922, Elizabeth and Isabella Dryden sold to William Dryden (the second).

There is no evidence in the “Abstract Land Index” that land use modification on either Lot 47 or 48 impinged on the bridge area over the Teeswater River. That structure and its approaches were apparently confined to the define road allowance.

#### **1.2.5 Plaques or Monuments**

While removed from the site, there is a commemorative plaque celebrating the founding of Paisley, located north of the study area (Ontario Heritage Trust 2017).

#### **1.2.6 Determination of Archaeological Potential**

There are a number of variables that are evaluated when determining archaeological potential. These include:

- presence of previously identified archaeological sites,
- water sources (primary, secondary, features indicating past water sources, accessible or inaccessible shoreline),
- elevated topography,
- pockets of sandy soil in heavy soil or rocky ground,
- distinctive land formations,
- resource areas (food or medicinal plants, scarce raw materials, early Euro-Canadian industry),
- non-Aboriginal settlement (monuments, cemeteries),
- areas of early Euro-Canadian settlement;
- early historic transportation routes;
- listed or designated heritage property;



- and properties with archaeological potential as identified by local histories or informants.

The study area exhibits archaeological potential based on the proximity of the Teeswater River, the presence of nearby elevated topography (although these are adjacent not in the study area), possible prehistoric use of the river and its environs, and possible early use by Euro-Canadians.

### **1.2.7 Rationale for Fieldwork Strategy**

The entire study area was subject to Stage 2 archaeological assessment, although only 35% of it was subject to actual field testing. Approximately 15% of the study area consisted of steep slopes in excess of over 20 degrees, and were also disturbed – being the product of cutting and filling for the construction of the bridge. The remaining 50% of the study area was permanently wet. This area was subject to sporadic shovel testing to confirm the nature of the area – and all test pits filled with water, even those at a higher elevation – suggesting that there was a spring in the area. Test pitting was conducted in five metre intervals, as per the Standards and Guidelines.

## **1.3 Archaeological Context**

### **1.3.1 Previously Known Archaeological Resources/Assessments**

The Ministry of Tourism, Culture and Sport PastPortal site (2017) indicated there are no sites located within one kilometer of the study area.

### **1.3.2 Current Environment – Existing Features**

The study area is 1600 m<sup>2</sup> in size, comprised of four areas measuring 20 metres by metres at each of the corners of the bridge/road/water intersection. The northwest, northeast, southeast and southwest corners are floodplain with overgrown vegetation. In the southeast corner is a small wet meadow that is located partially within the study area. Crops are still very small and well-spaced allowing for pedestrian transect survey in this area. The road cuts leading down from the bridge are steep (in excess of 20°) and obviously disturbed from bridge construction (abutments, etc.). There are steep slopes on the northwest, northeast, and southwest corners of the study area, leading to higher elevations (the latter are not in the study area).

The steel pony truss, constructed in 1920, crosses the Teeswater River on Concession Road 20.

### **1.3.3 Summary of Previous Stage 1 Archaeological Assessment**

Fitzgerald conducted a Stage 1 archaeological assessment (did not include adjacent lots) of the study area. As part of the assessment he conducted a property visit on March 1<sup>st</sup> and 22<sup>nd</sup> of 2012. The following is this assessment of the area (Fitzgerald 2012: 8).

“Both the steep western approach and the more gentle eastern approach to the Concession 20 Bridge cut through the valley edge of the Teeswater River. Concrete footings and fill – likely from those cuts, has raised the elevation of the river banks where the bridge crosses. If widening of the approaches or improvement of bridge footings – either by cutting or filling extend beyond the current limits into undisturbed valley edges and terraces or river banks, potentially impacted wooded areas and meadows must be rigorously shovel test-pitted. Especial attention must be paid to the slumping/eroding bank on the northwest side of the bridge.”

Fitzgerald (ibid: 10) concluded that the study area exhibited archaeological potential and needed to undergo Stage 2 archaeological assessment is the area is to be altered by bridge replacement/reconstruction or road approaches were to be modified.

### **1.3.4 Bedrock, Physiography and Topography**

The underlying bedrock of the area is Salina and Bass Island formation (Chapman and Putnam 1973:4-5).

The study area lies in the physiographic region of the Saugeen clay plain (Chapman and Putnam 1973).

The study area has an elevation of 226 to 229 metres above sea level, the lowest elevation representing the floodplain.

### **1.3.5 Prehistoric Shorelines**

There is a raised beach northeast of the study area distant some seven kilometres. Other prehistoric shorelines lie over 20 kilometres distant near the Lake Huron shoreline.

### **1.3.6 Soils**

Soils of the valley lands are classified as bottom lands with poor drainage. To the east, at the higher elevation, is Saugeen silty clay loam with good drainage, and to the west, at the higher elevations, is Waterloo sandy loam. The study areas just touched on each of the latter soil types, and were not wholly within these soil type areas.

### **1.3.7 Drainage**

The Teeswater River is part of the Saugeen watershed. The Teeswater River is a tributary of the Saugeen River, and has been called *Ah-shushki-sebi* or the Muddy or Mud River (Brough 1850). It is crossed by the Bridge, 11, on Concession Road 20. The river abuts the study area on both sides of Concession Road 20, north and south.

### **1.3.8 Vegetation**

All four sections that underwent archaeological assessment consisted of trees and grassy areas. The lowest areas contained wetland species, as well as the area in the northeast upper elevation – suggesting a spring in the area. A small area in the southeast corner of the assessment area was planted.

### **1.3.9 Dates of Fieldwork**

The Stage 2 archaeological assessment was conducted on July 6<sup>th</sup>, 2017 under sunny skies and a high of 28 degrees C.

As per the Ministry of Tourism, Culture and Sports' Standards and Guidelines (2011: Section 2.1, Standard 3) the fieldwork was conducted under the appropriate lighting and weather conditions.

### **1.3.10 Unusual Physical Features Affecting Fieldwork**

There are no unusual physical features affecting fieldwork.

## **2.0 FIELD METHODOLOGY**

### **2.1 Stage 1 (Background Research)**

As part of the background research, an examination of the following was conducted:

- the Site Registration Database (maintained by the Ontario Ministry of Tourism, Culture and Sport) was examined for the presence of known archaeological sites in the project area and within a radius of one kilometer of the project area by contacting the data coordinator of the Ministry of Tourism and Culture;
- reports of previous archaeological fieldwork within a radius of 50 m around the property;
- topographic maps at 1:10 000 (recent and historical) or the most detailed map available;
- historic settlement maps such as the historic atlases;
- available archaeological management/master plans or archaeological potential mapping;
- commemorative plaques or monuments; and,
- any other avenues that assist in determining archaeological potential were examined.

The following table identifies the standards and guidelines within the Ministry of Tourism, Culture and Sport Standards and Guidelines document (2011) and how they were met with respect to the Stage 1 background study.

The most up-to-date listing of registered sites dates was accessed through Past Portal on July 5<sup>th</sup>, 2017. Although not listed – because there were no registered sites reported – an internet search provided a Stage 1 archaeological assessment report which included the study area (P097-058-2012). Topographic maps at a scale of 1:10,000 (and other scales) were accessed and are presented in the map section of this report. Various historic maps are also presented in the report. Bruce County has no archaeological master plan. While there is one commemorative plaque for the founding of Paisley, it is removed from the study area.

### **2.2 Stage 2 (Archaeological Assessment)**

The entire study area was subject to Stage 2 archaeological assessment, although only 35% of it was subject to actual field testing. Approximately 15% of the study area consisted of steep slopes in excess of over 20 degrees, and were also disturbed – being the product of cutting and filling for the construction of the bridge. The remaining 50% of the study area was permanently wet. This area was subject to sporadic shovel testing to confirm the nature of the area – and all test pits filled with water, even those at a higher elevation – suggesting that there was a spring in the area.

Stage 2 archaeological assessment was conducted on July 6<sup>th</sup>, 2017 under sunny skies with a high of 28°C. An area of 20 metres by 20 metres at each corner of the bridgeworks comprised the study area. The corners of the study area are: (GPSMap 60 Cx, accuracy of +/- 2 metres, NAD83) northeast 17T 477972.3E, 4902628.5N, northwest 17T 477905.6E, 4902613.9N, southeast 17T 477904.8E, 4902567.7N, and, southwest 17T 477974E, 4902581.7N.

Field methodology was recorded both in field notes, a field map and is presented here in Map 13. Images of all the fieldwork is presented in the images section of the report, and direction and orientation of the images are illustrated in Map 14. No heavy machinery was used in the Stage 2 assessment.

Test pitting was conducted on flood plain, wet meadow, bottom of slope and grassy and treed areas, where no ploughing could be carried out. Test pits were spaced at intervals of five metres, and contents screened through six mm mesh. Test pits were a minimum of 30 cms in diameter and were excavated five centimetres into subsoil, as all test pits were sterile. There was no evidence of any complex stratigraphy – it was topsoil/organic over clay or water. All test pits were backfilled. Test pits ranged in depth to about 35 cms. Test pits in wet areas tended to fill at the 20 cm depth. No artifacts were located in any of the test pits.

Maps 1 - 4 illustrate the location of the study area. Map 14 illustrates the images taken of the archaeological assessment (Images 1 - 18), Map 12 illustrates the archaeological potential of the area, and, Map 13 illustrates assessment methodology.

The entire study area was subject to Stage 2 archaeological assessment, although only 35% of it was subject to actual field testing. Approximately 15% of the study area consisted of steep slopes in excess of over 20 degrees, and were also disturbed – being the product of cutting and filling for the construction of the bridge. The remaining 50% of the study area was permanently wet. This area was subject to sporadic shovel testing to confirm the nature of the area – and all test pits filled with water, even those at a higher elevation – suggesting that there was a spring in the area. Test pitting was conducted in five metre intervals, as per the Standards and Guidelines.

No cultural materials or features were located in the study area, and there is no recommendation for any additional (Stage 3) archaeological testing.

Section 2.2 of the Standards and Guidelines (MTC 2011) sets out standards to determine the need for Stage 3 archaeological assessment.

### **3.0 RESULTS**

#### **3.1 Stage 1 Archaeological Assessment**

The study area exhibits archaeological potential based on the proximity of the Teeswater River, the presence of nearby elevated topography (although these are adjacent not in the study area), possible prehistoric use of the river and its environs, and possible early use by Euro-Canadians.

#### **3.2 Stage 2 Archaeological Assessment**

Stage 2 archaeological assessment was conducted on July 6<sup>th</sup>, 2017.

#### **3.3 Summary of Finds**

No artifacts, features or archaeological sites were located during the Stage 2 assessment.

#### **3.4 Inventory of Documentary Records Made In Field**

Documents made in the field include:

- Daily record log and field notes – 2 pages
- Photograph log – 1 page
- Digital photographs – 21 photographs.
- Field map showing location and orientation of photos taken.

## **4.0 ANALYSIS AND CONCLUSIONS**

The entire study area was subject to Stage 2 archaeological assessment, although only 35% of it was subject to actual field testing. Approximately 15% of the study area consisted of steep slopes in excess of over 20 degrees, and were also disturbed – being the product of cutting and filling for the construction of the bridge. The remaining 50% of the study area was permanently wet. This area was subject to sporadic shovel testing to confirm the nature of the area – and all test pits filled with water, even those at a higher elevation – suggesting that there was a spring in the area. Test pitting was conducted in five metre intervals, as per the Standards and Guidelines.

No cultural materials or features were located in the study area.

Based on Section 2.2 of the Standards and Guidelines, no further archaeological assessment is required for this area.



## **5.0 RECOMENDATIONS**

Based upon the background research of past and present conditions, and, the Stage 2 archaeological assessment, the following is recommended:

- There are no archaeological resources located on the study area and there is no requirement to conduct additional archaeological assessment;
- Compliance legislation must be adhered to in the event of discovery of deeply buried cultural material or features.

## 6.0 ADVICE ON COMPLIANCE WITH LEGISLATION

According to the 2011 Standards and Guidelines (Section 7.5.9) the following must be stated within this report:

This report is submitted to the Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18. 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 Ministry of Tourism, Culture and Sport, 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.

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 Archaeological Reports referred to in Section 65.1 of the Ontario Heritage Act.

Should previously undocumented archaeological resources be discovered, they may be an 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 sec. 48 (1) of the Ontario Heritage Act.

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.

Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the Ontario Heritage Act and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.

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Bruce County Interactive Mapping

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Topographic Mapping

[www.atlas.nrcan.gc.ca](http://www.atlas.nrcan.gc.ca)

Soils of Bruce County, <http://sis.agr.gc.ca/cansis/publications/surveys/on/on16/index.html>

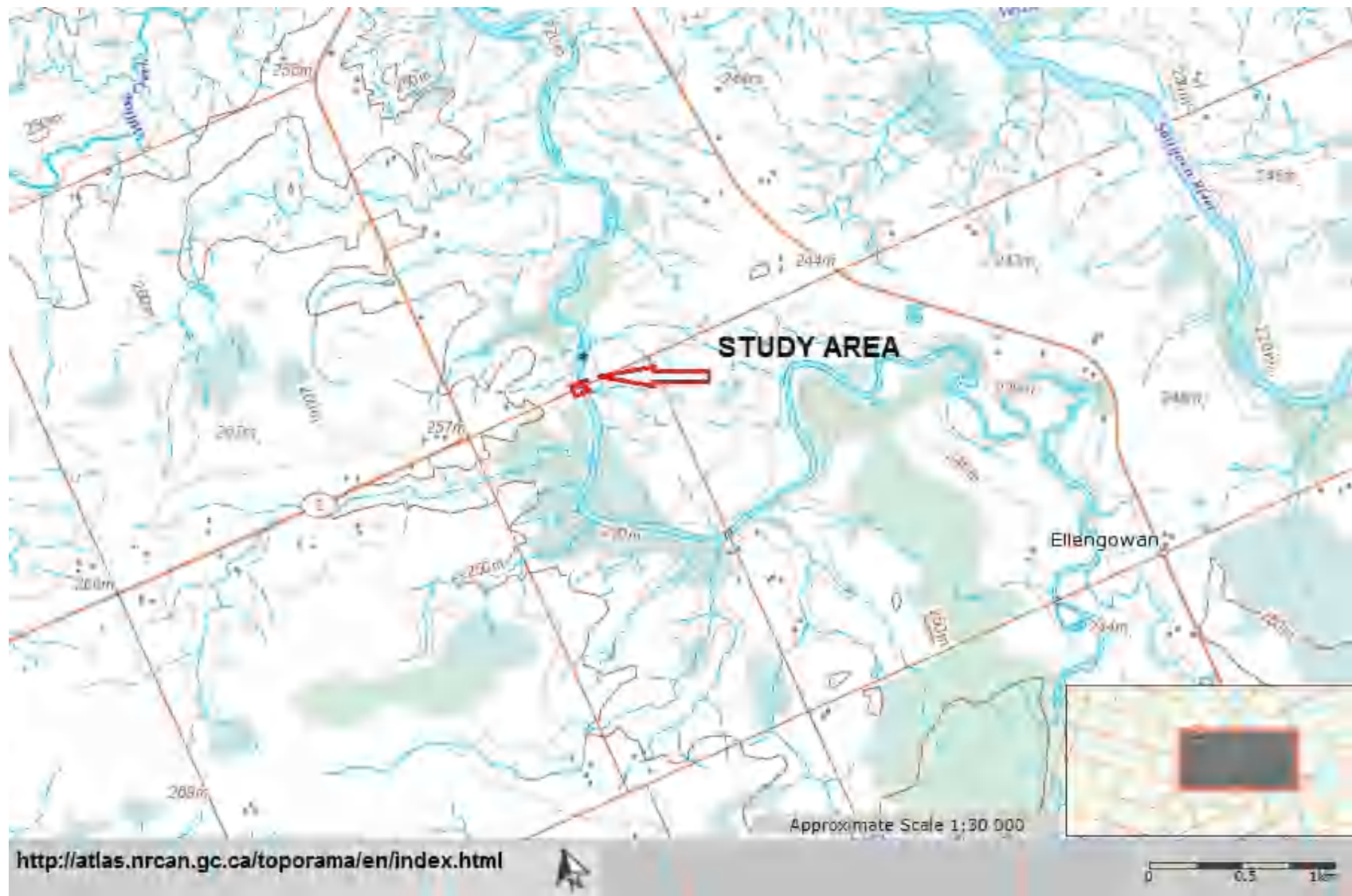
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Map: First Nations and Treaties

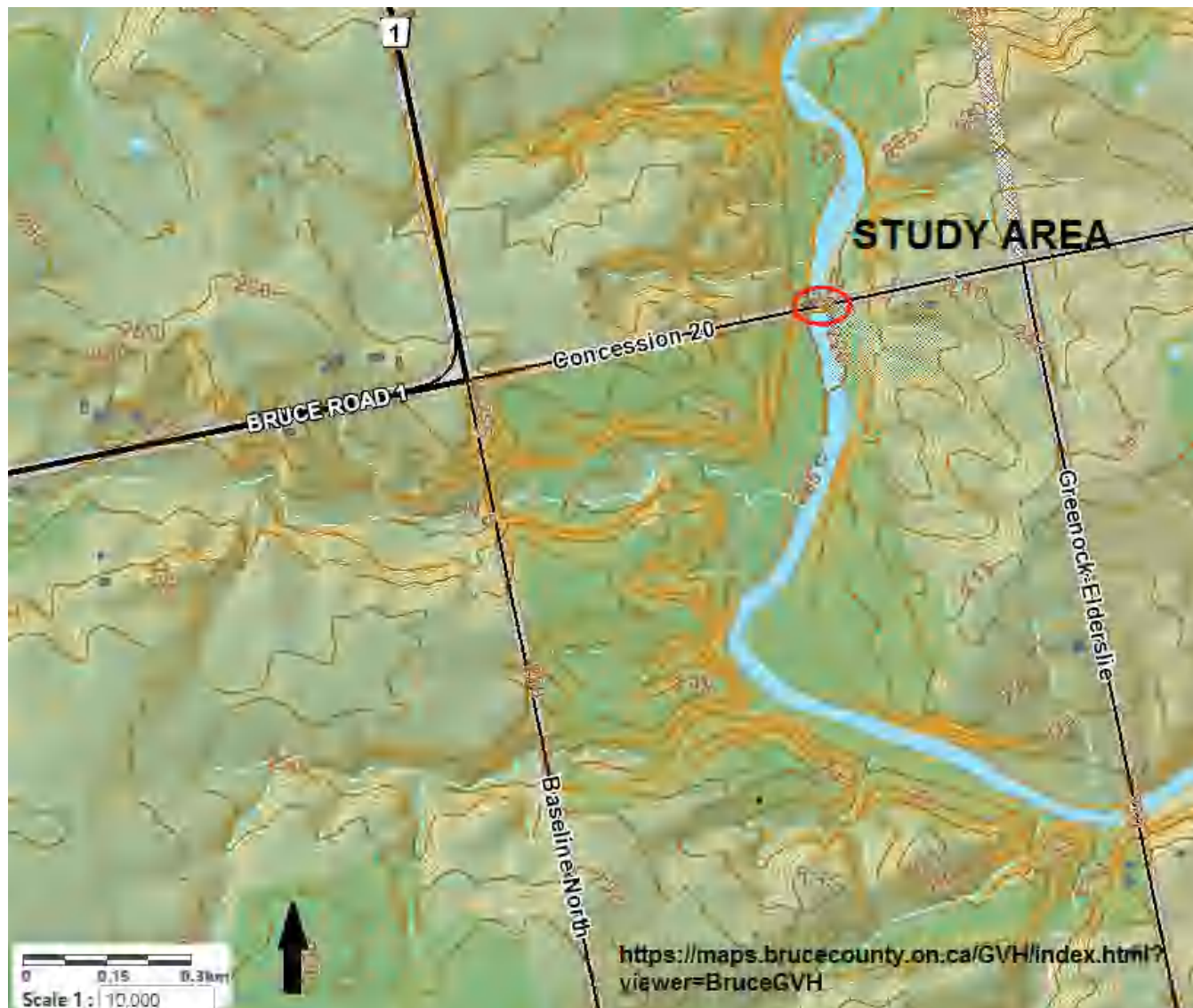
[www.Ontario.ca/treaties](http://www.Ontario.ca/treaties)

## MAPS

**Map 1: Regional Location of Study Area** (Toporama 2017)



**Map 2: Topographic Map of Study Area (Bruce County Mapping 2017)**

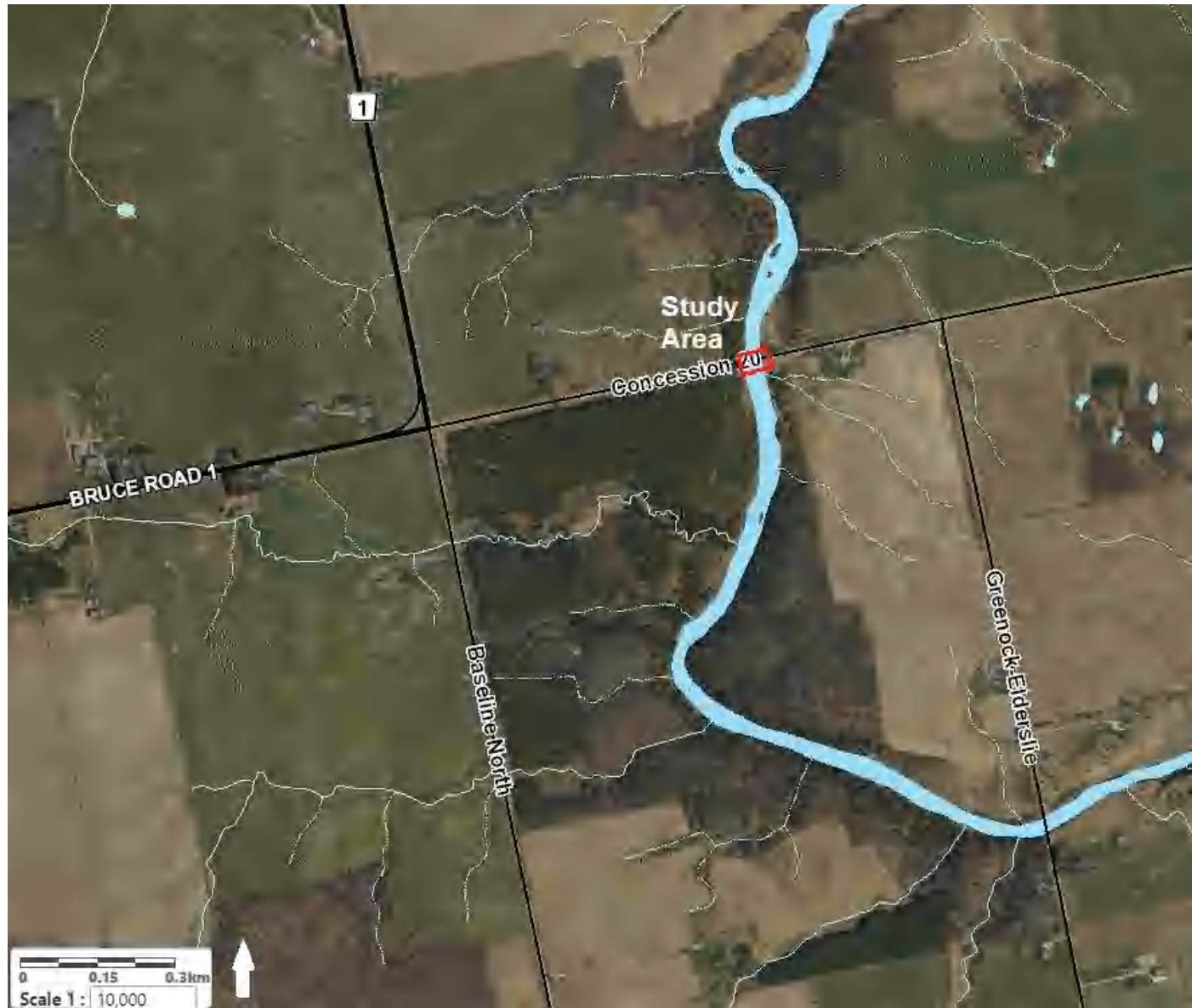




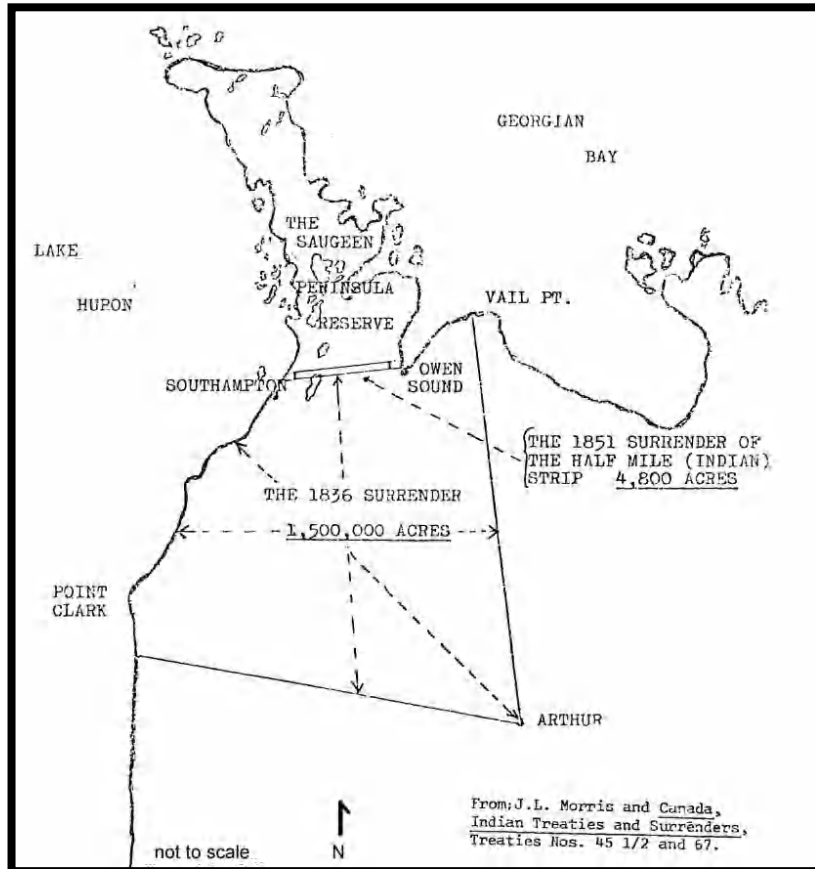
Map 3: Development Map of Study Area



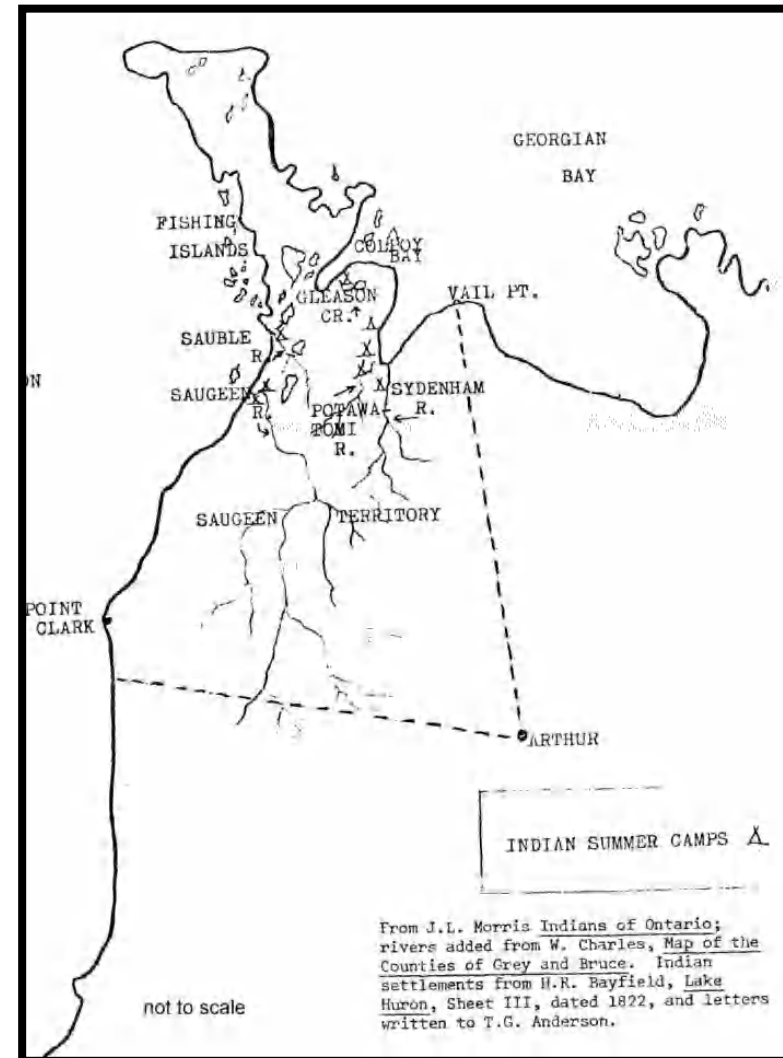
**Map 4: Aerial of Study Area** (Bruce County Mapping 2015)



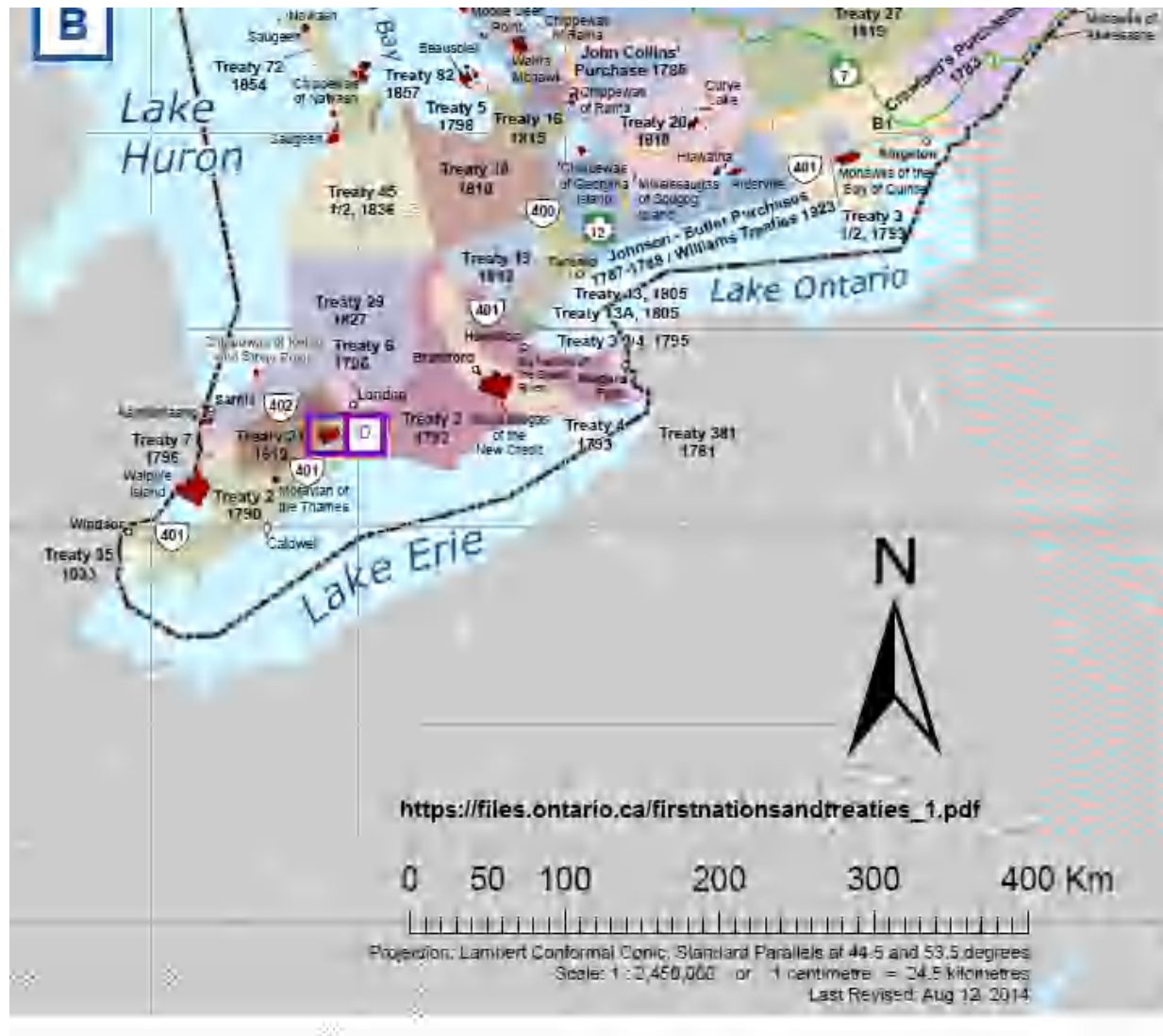
Map 4: 1836 Surrender (Schmalz 1977:233)



Map 5: Saugeen Lands Before Surrender (Schmalz 1977)

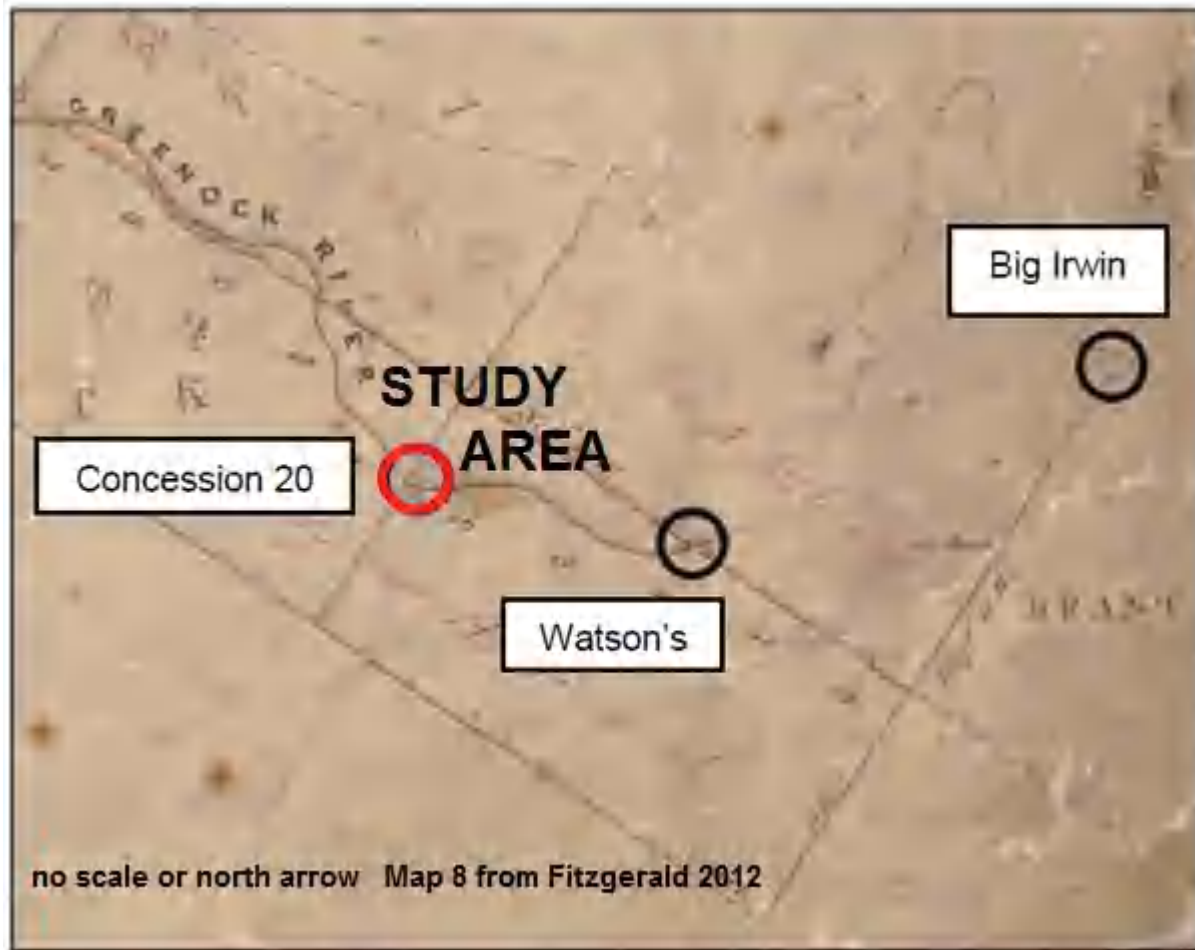


Map 6: Map of Treaty Lands with Dates (ontario.ca/treaties)





**Map 7: Section of Saugeen, Elderslie and Greenock Townships (Vidal 1851)**



**Map 9: 1852 Section of Greenock Township (Walsh 1852)**



Map 10: 1851 McPhillips Map of Study Area





Map 11: 1880 Illustrated Historic Atlas Map Section (Belden & Co)



Map 12: Stage 2 Assessment Area



**Map 13: Archaeological Potential**



Map 14: Archaeological Methodology



Map 15: Location & Direction of Photographs





## IMAGES

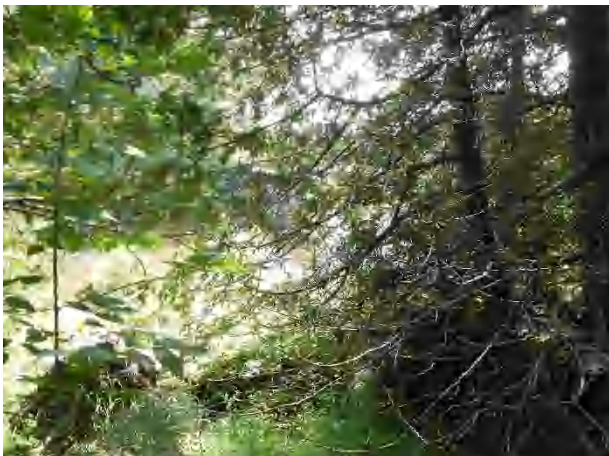
**Image 1: Slope along north side of bridge, NW corner, facing north**



**Image 2: Wet area, slope, north side of bridge facing south**



**Image 3: North side of bridge, Teeswater River facing SE**



**Image 4: Test Pitting facing NW**



**Image 5: Sample wet test pit, facing down, northwest corner**



**Image 6: Gravel (disturbed) test pit, southwest corner, facing down**





**Image 7: Disturbed Road Cut, Southwest Corner, facing ENE**



**Image 10: Road Cut and Bridge facing ENE**



**Image 8: Steep slope leading to river facing SE**



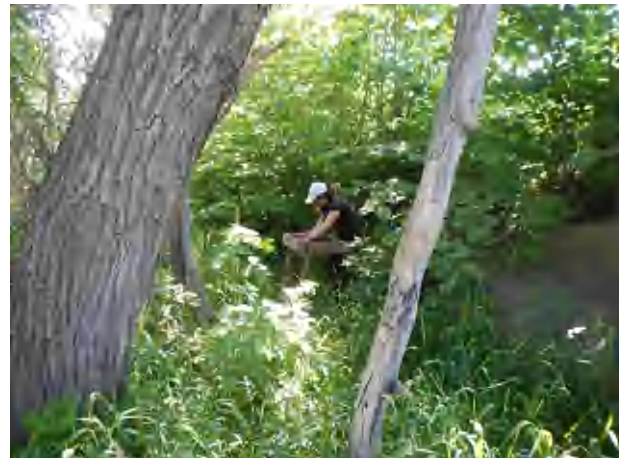
**Image 11: Steep slope facing NW, northeast corner**



**Image 9: Test Pitting flood plain, southwest corner, facing ENE**



**Image 12: Test pitting, northeast corner, facing S**





**Image 13: View of southwest corner from northeast corner, facing SW**



**Image 14: Road Cut and Bridge facing WSW**



**Image 15: Nearshore of SE corner, and far shore of NW corner, facing NW**



**Image 16: SE corner, permanently wet area, facing down**



**Image 17: SE corner, permanently wet area, facing down**



**Image 18: Test pitting southeast corner, facing S**



## APPENDICES

### APPENDIX A – Photo Log

Image #	Image # in report	Direction	Description
3922	1	N	Slope along north side of bridge, NW corner
3923		N	Slope along north side of bridge, NW corner
3924	2	S	Wet area, slope, north side of bridge
3925	3	SE	North side of bridge, Teeswater River
3926	4	NW	Test Pitting, northwest corner
3927	5	down	Sample wet test pit, northwest corner
3928		Down	Sample wet test pit, northwest corner
3929	6	Down	Gravel (disturbed) test pit, southwest corner
3930	7	ENE	Disturbed Road Cut, Southwest Corner
3931	8	SE	Steep slope leading to river
3932	9	ENE	Test Pitting flood plain, southwest corner
3933	10	ENE	Road Cut and Bridge
3934	11	NW	Steep slope, northeast corner
3935	12	S	Test pitting, northeast corner
3936	13	SW	View of southwest corner from northeast corner
3937		SW	View of southwest corner from northeast corner
3938	14	WSW	Road Cut and Bridge
3939	15	NW	Nearshore of SE corner, and far shore of NW corner
3940	16	down	SE corner, permanently wet area
3941		down	SE corner, permanently wet area
3942	17	down	SE corner, permanently wet area
3943		down	SE corner, permanently wet area
3944	18	S	Test pitting, southeast corner

# **BROCKTON BRIDGE (BRIDGE 11) CULTURAL HERITAGE EVALUATION REPORT AND PRELIMINARY CULTURAL HERITAGE IMPACT ASSESSMENT**



Prepared for:  
**Municipality of Brockton**

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# **BROCKTON BRIDGE (BRIDGE 11) CULTURAL HERITAGE EVALUATION REPORT AND PRELIMINARY CULTURAL HERITAGE IMPACT ASSESSMENT**

## **1.0 Introduction**

### **1.1 Project Description**

GM BluePlan Engineering retained the services of Scarlett Janusas Archaeology Inc. (SJAI) to conduct a cultural heritage evaluation report (CHER) and Preliminary Cultural Heritage Impact Assessment (CHIA) on behalf of the Municipality of Brockton for the Brockton Bridge, also referred to as Bridge 11, located on Concession Road 20, between lots 46 and 47, Concession A, former geographic township of Greenock, now the Municipality of Brockton, Bruce County (Figures 1 and 2).

The bridge is a 101.4' (~31 metres) metal rivet-connected Warren pony truss, fixed. The bridge crosses the Teeswater River southwest of the town of Paisley, Ontario. The bridge was constructed by the Hamilton Bridge Company of Hamilton, Ontario. This is a municipally owned bridge located on a municipal road. The bridge was evaluated under a bridge infrastructure master plan by BM Ross (2012) as being old, in poor condition, having a load limit restriction, deficient width, and having to undergo truss repairs every two years. It is also referred to by MTO as bridge #2-413. A Municipal Heritage Bridges Cultural, Heritage and Archaeological Resources Assessment Checklist (revised April 11<sup>th</sup>, 2014) was completed on March 3<sup>rd</sup>, 2018.

The cultural heritage evaluation was conducted to determine the appropriate Project Schedule of the Environmental Assessment process that will be required to address the existing structural deficiencies for the aging bridge located southwest of Paisley, Ontario. Community engagement and public consultation will be completed as part of the Environmental Assessment process. At the time of the submission of this report, community engagement and public consultation have not taken place.

Appendix A presents the bridge engineering report conducted May 26, 2015 (Palmay 2016). Details of the inspection are presented in the appendix, but the summary and recommendations of the same are presented as follows:

“Generally the structure appears to be in overall poor condition. The south truss appears to be out of alignment, both bottom chords are out of alignment and numerous vertical web truss members are damaged or broken. These members are secondary members that are theoretically zero force members, so failure of these members does

not automatically mean failure of the structure. Nonetheless, these members should be replaced or reinforced. The concrete facing is also badly deteriorating and may be becoming unstable.

It is recommended that a detailed structural evaluation of the bridge be completed to confirm the current posting.

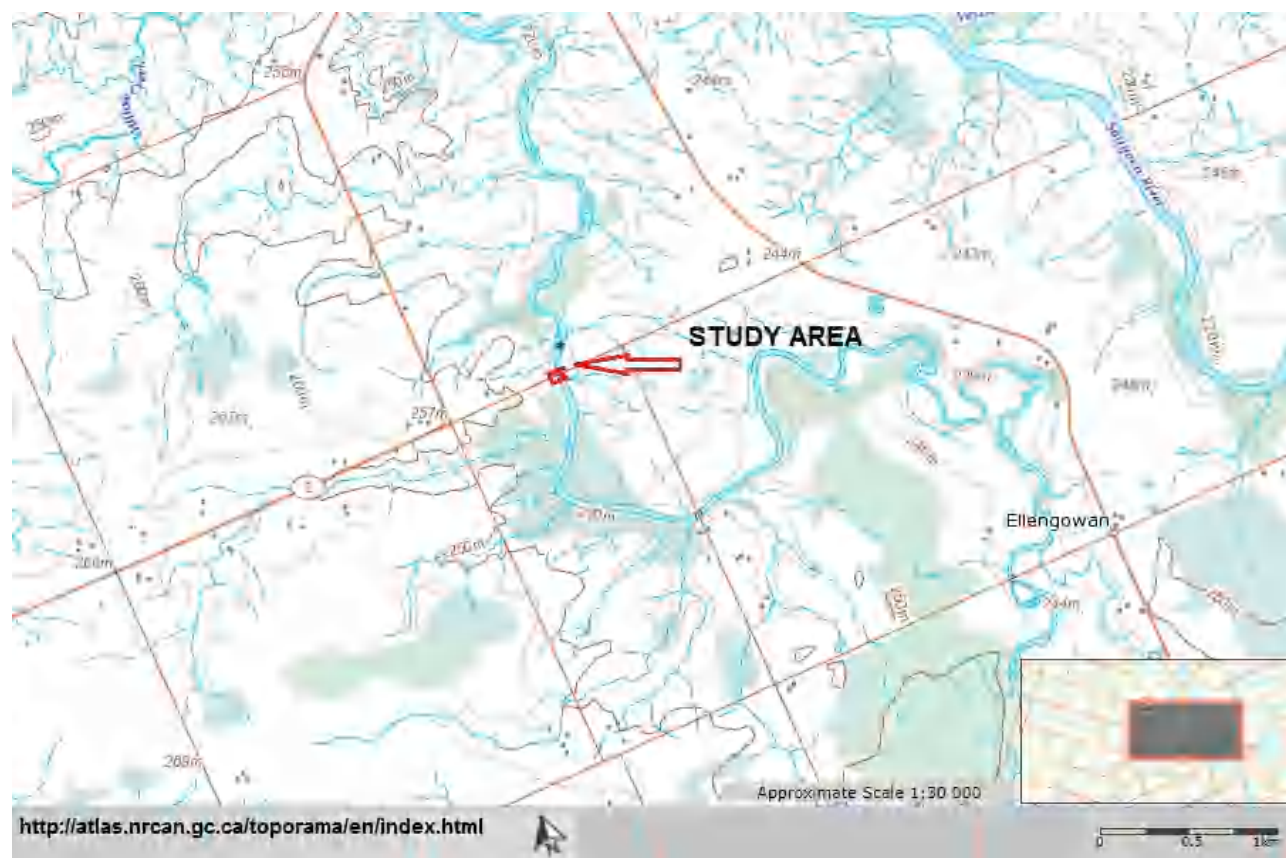
#### Recommendations:

1. Complete a load posting evaluation immediately to determine if current posting is accurate.
2. Consider closing the bridge or completing major rehabilitation within 1 year.
3. Reduce speed limit on structure to 30 km/hr to avoid additional impact to structure.
4. Install bearing blocks behind guiderail on deck or install curb along each side of deck to prevent vehicles from impacting the web members of the trusses (within 2 years).
5. New abutment seats are required at the east end and the east abutment is to be refaced. This was recommended in our 2007 report.
6. Clear gravel off deck (1 – 3 years).
7. Clean bearing seats (1 – 3 years)” (Palmay 2016).

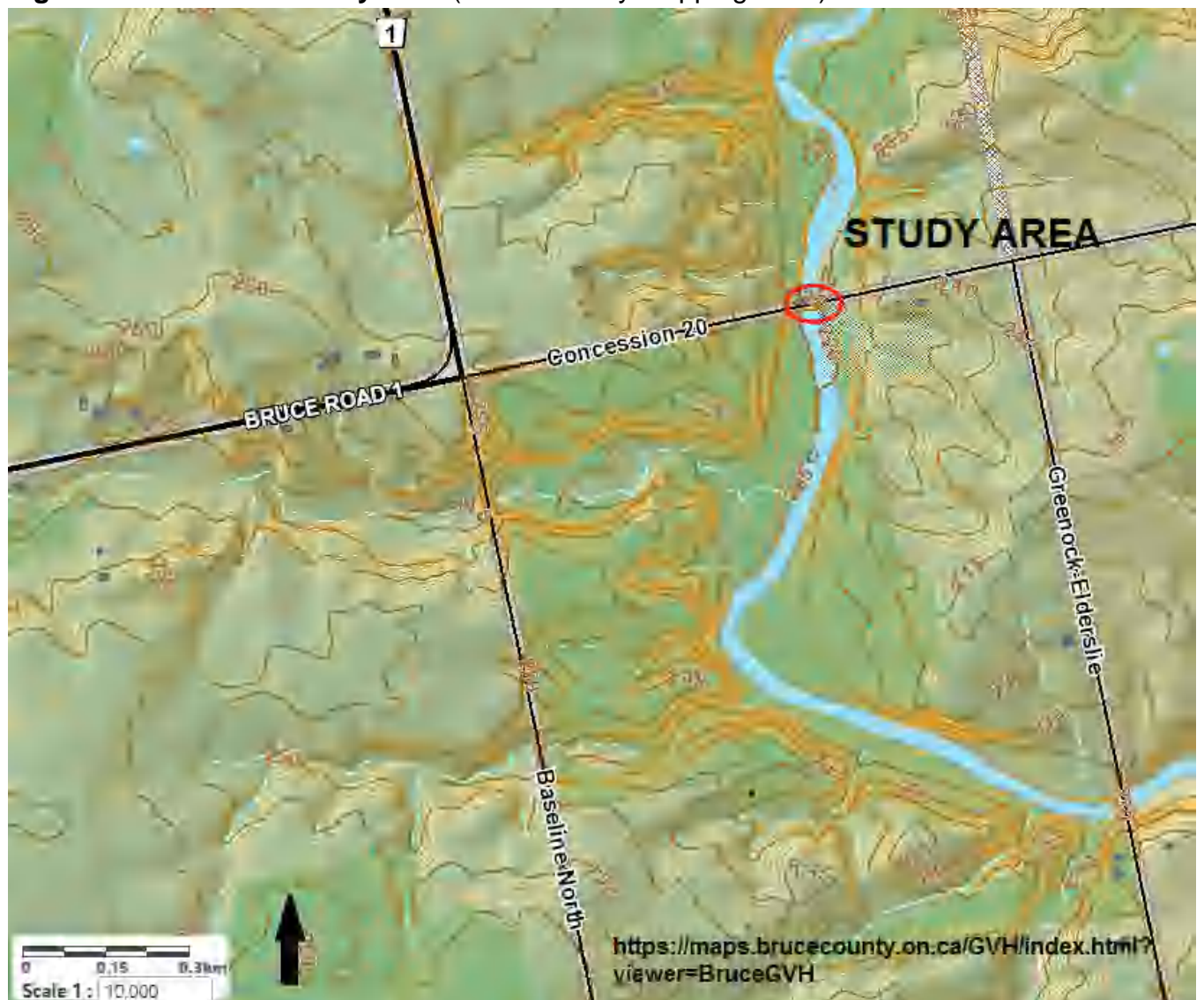
This report includes a historical summary of the bridge environs, a description and history of the bridge, an evaluation of the cultural heritage value of the bridge, a summary of cultural heritage value and recommendations stemming from the same. The bridge has been evaluated using prescribed criteria from Ontario Regulation 9/06, developed for the purpose of identifying cultural heritage value or interest for properties proposed for protection under the Ontario Heritage Act (Section 29). There are three criteria used in the evaluation: design or physical value; historical or associative value; and, contextual value.

Appendix B presents the MCEA, Municipal Heritage Bridges Cultural, Heritage and Archaeological Resources Assessment Checklist for the Brockton Bridge. Appendix C is the Bridge Survey Form. Appendices D to J present supporting documentation. Historic maps are presented within Section 2.0 (Historic Background), and Images of the bridge are presented in the Images section.

**Figure 1: Regional Location of Study Area (Toporama 2017)**



**Figure 2: Location of Study Area** (Bruce County Mapping 2017)



## 2.0 HISTORIC BACKGROUND

### 2.1 General History

The following is from Fitzgerald (2012: 4 – 6), who conducted a Stage 1 archaeological assessment (P097-058-2012) on six bridges, including the one which is the subject of this report:

*“The study area [encompasses more than the current study area] is located within the Sauking (Saugeen Ojibway) Indian hunting territory south of the Bruce Peninsula that was surrendered to the “Great Father” (William IV) under the terms of Treaty No. 45 ½ on August 9, 1836.*

*Treaty No. 45 ½’s configuration is a byproduct of earlier historical events. What would eventually be defined as the southeast corner of Saugeen Ojibway hunting territory – the current intersection of Highway 6 and Wellington Road 109/Highway 9, has been established within Treaty No. 3 between the Mississauga and the Crown on December 7, 1792 as the endpoint of a 50-mile survey transect originating at the outlet of Burlington Bay into Lake Ontario. This reference point was subsequently used in all major southern Ontario treaties of the late-18<sup>th</sup> and early-19<sup>th</sup> centuries.*

*On October 17, 1818, Treat No. 18 conveyed a 1.592 million-acre tract of Chippewa lands within the northern section of the Home District to the Crown. The treaty area’s western limit was defined by a line projecting northward (15°W) from the 1792 50-mile endpoint – now beginning as County Road 14, to Vail’s Point on Georgian Bay. This line, by default, would later serve as Treaty No. 45 ½’s eastern limit.*

*On April 26, 1825, Treaty No. 27 ½ surrendered and conveyed another substantial section of Chippewa territory to the Crown (George IV). This time the future intersection of Highway 6 and Highway 9/Wellington Road 109 served as the treaty area’s northeast corner of reference - - the northern limit of the surrender stretched westward (5°W) from the 1792 50-mile endpoint to a point on Lake Huron 10 ¾ miles north of the mouth of the William FitzWilliam Owen’s Red River. By 1825 [sic] it was known as the Menesetunk River – today it is the Maitland River. This line would in 1836 serve, also by default, as the southern boundary of Saugeen Ojibway territory.*

*With the colonial government’s desire to expedite the opening of the newly-acquired Treaty 45 ½ lands – the “Queen’s Bush”, for Euro-Canadian settlement and commerce, routes were initially scouted for roads that would link Oakville and Toronto to the head of Owen’s Sound (Sydenham) on Georgian Bay.*

*The first was a route surveyed in 1837 by Charles Rankin that would serve as the northern extension of the Oakville-Owen’s Sound Road between the northwest corner of Wellington County’s Garafraxa Township – the aforementioned 1792 “50-mile endpoint”, and the east side of the head of Owen’s Sound. In 1840 and 1841 [sic] John McDonald formalized Rankin’s route and established 50-acre free land grants on either side of it to entice settlers and as a means to open the road. The route became more popularly*

*known as the Garafraxa Road – today it is the stretch of Highway 6 between Arthur and Owen Sound.*

*Another colonization road was ordered in 1848 to link Hurontario Street in Nottawasaga Township (Simcoe County) and the mouth of the Penetangore River on Lake Huron. This east-west road crossed the north-south Garafraxa Road at the reserve for the future town of Durham – hence the road's name. Allan Park Brough surveyed the western section of the Durham Road – between Garafraxa Road and the mouth of the Penetangore, between 1848 and 1850. As with the Garafraxa Road, 50-acre free land grants were offered along sections of the Durham Road that passed through the future townships of Bentinck, Brant, Greenock, Kinloss, and Kincardine. Two town reserves were set aside by Brough along the western section of the Durham Road: Penetangore at the road's western terminus (present-day Kincardine); the other straddling the Brant-Greenock town line (never established). Today the western section of the Durham Road is better known as Grey/Bruce Road 4 between Durham and Walkerton and Highway 9 between Walkerton and Kincardine.*

*With the completion of the survey of the Durham Road, the lands on either side of the road and its free grants – and further into the interior, began in 1850 to be divided into townships and farm lots...*

....

*As part of his April 7 to August 26, 1851 survey of Saugeen Township, Alexander Vital established a range of lots on either side of the proposed route of the Saugeen [sic] and Elora Road in Elderslie and Greenock townships. Robert Walsh surveyed the remaining areas of Greenock Township between May 26 and October 6, 1851. Between May 15 and November 3, 1851, George McPhillips surveyed the remainder of Elderslie Township.*

*The surveyors who liad out Brant, Greenock, and Elderslie townships must have reported to the Commissioners of Crown Lands the challenges of construction the Saugeen [sic] and Elora Road along the town lines of the townships in the vicinity of the confluence of the Teeswater and Saugeen Rivers. On July 14, 1851 – likely due to the meandering of the Teeswater and large number of crossings that would have to be constructed, George McPhillips was instructed to:*

*...mark out a line for a road from the rear of Brant to the Saugeen River in Elderslie...selecting the best site for bridges over the Mud River and River Saugeen, and making the necessary sinuosities to avoid hills and swamps.*

*McPhillip's Saugeen and Elora Road deviation through Elderslie Township – now part of Bruce Road 3, avoided river crossings until it reached the confluence of the Teeswater and Saugeen rivers at the town reserve of Paisley. Not only did the route of the Saugeen and Elora Road deviate eastward from the Greenock-Brant town line, within Brant Township its route was shifted eastward from the Greenock-Brant town line to the road right-of-way along the east side of Brant Concession B.*

...

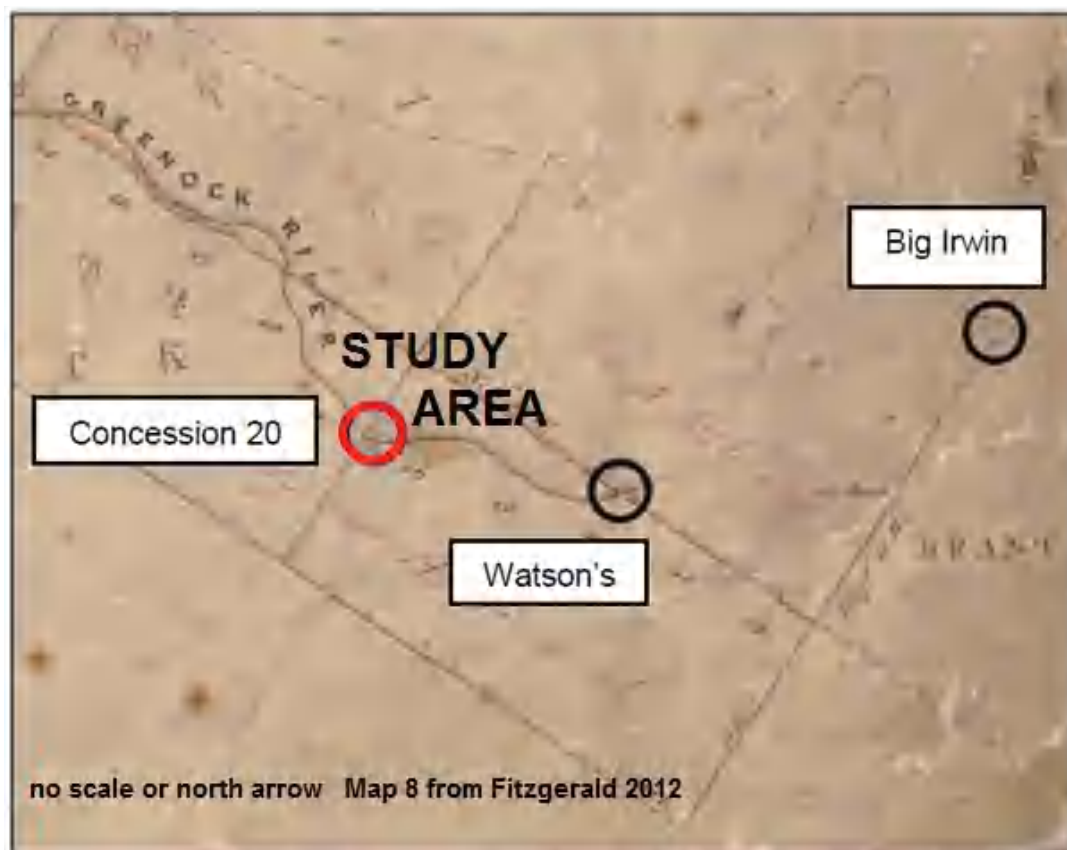
*Today, Brough and Vidal's originally-proposed route of the Saugheen and Elorra Road is a series of town lines of varying quality whose northern end is Greenock Township's Concession 20 Road – the road having never been pushed through to the town reserve of Paisley. Watson's and Dudgeon bridges are located along this original route; the Concession 20 Bridge lies to its immediate west in Greenock Township."*

*"Archaeological and historical evidence reveals that the rivers and valleys of the Teeswater and Saugeen rivers have served as travel corridors for Native groups for millennia and Euro-Canadians since the mid-19<sup>th</sup> century. Not unexpectedly, the potential is high that cultural heritage resources – eg., habitation, resource-procurement, ritual and burial sites, exist in the areas between the rivers' banks and their valley edges. active [sic] archaeological sites could potentially date from the first appearance of Paleo-Indian bands into the sub-arctic landscape of this part of the province about 11,000 years ago up until and – as historically documented, following the appearance of Euro-Canadian surveyors and settlers after the Saugeen Ojibway surrender of August 9, 1836" (Fitzgerald 2012: 7).*

Figures 3 to 6 illustrate maps of the bridge area from 1851 to 1880. Given that a roadway appears in the bridge area, it is assumed that a bridge of some type was present during these early time periods. They do not, however, provide additional information regarding bridge type.



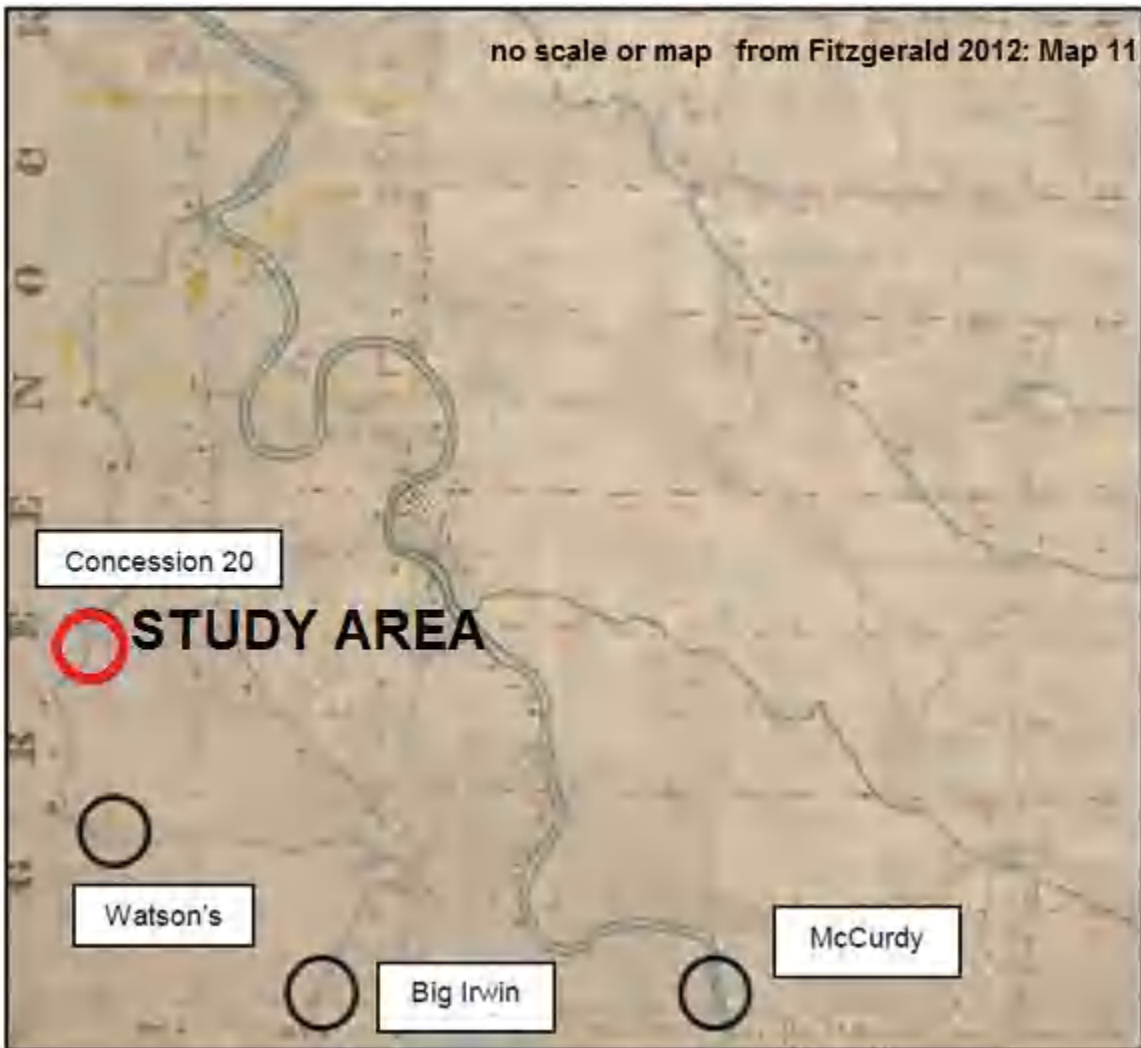
**Figure 3: Section of Saugeen, Elderslie and Greenock Townships (Vidal 1851)**



**Figure 4: 1852 Section of Greenock Township (Walsh 1852)**



Figure 5: 1851 McPhillips Map of Study Area



**Figure 6: 1880 Illustrated Historic Atlas Map Section (Belden & Co)**



## 2.2 Township History

Greenock Township was the last township south of the peninsula to be surveyed in the original county of Bruce (Robertson 1904: 401-407). Excerpts from the Report of the County Valuers of 1879 indicate:

*"Greenock township has more inferior land than any other south of the peninsula. The Mud River having hardly any banks around it for a long distance is flooded in the spring to the depth of three or four feet. It has a far larger amount of swamp than any other in the county, and when the pine is taken off it will not be of any value. There is a portion of good land around Chepstowe, and the most of the gore is first-class land. It has a large amount of mill property. Its average price is \$22.60 per acre."*

And, in 1901:

*"Greenock is a gore township and very few roads are open through from east to west, none being open between the Durham Road and the 10th concession, on account of what is known as the Greenock swamp. A portion of this swamp has been reclaimed since the last valuation, but still there is a great deal to do in the same line. The 6th*

*concession was being opened through the swamp when your valuers were there, which will be a great convenience, especially to the settlers in the western part of the township, and also to those of the eastern part of Kincardine township. There are portions of Greenock as good as can be found in the county, but a very considerable portion is swamp, and a great deal of the northern part is stiff clay, in fact, so stiff that it affects its value considerably. The rate per acre, including village property, is \$25.66, of which amount the village property is \$2.39 per acre."*

Mr. R. Walsh surveyed the Township of Greenock in 1852, however, it was not until September 27<sup>th</sup>, 1854 that the Crown sold the lands, excepting the free grants, during the "big land sale". The Crown sold the lands at 7s. 6d. per acre. The first settlers to take up land in the township were Joseph Chartrand and John Caskanete, French Canadians, who had been on the staff of A. P. Brough, P.L.S., when he surveyed the Durham Road. Greenock settlement was slow to start, and there were no roads going east and west through the county due to the large swampland at its centre. Many bridges and roads were constructed in later years to aid in travel across the county, and at one point talk of dredging "Mud River" or Teeswater River was undergone to improve the flood plains drainage (Robertson 1904: 401-407).

### **2.2.1 Specific Lot History: Lot 47, Concession A**

According to the "Abstract Land Index" Robert Kay obtained the Crown patent to Lot 47 (100 acres/~40 hectares) on June 19<sup>th</sup>, 1863. Previously, in 1856, the lot was occupied by squatter Abraham Davis. It then passed to E.C. Dowling, who cleared five acres (~2 hectares). From Dowling, it appears to have been acquired by Robert Kay who fulfilled the settlement requirements and secured the patent.

Kay sold Lot 47 to William Watson, Sr. on March 26<sup>th</sup>, 1866. William sold to Andrew Watson on May 28<sup>th</sup>, 1885. Thereafter, the property remained in the Watson family. Following the death of Andrew, Lot 47 was left to Frank Watson on October 23<sup>rd</sup>, 1834. He, alone, secured title, in respect of other members of the Watson family, by a "grant" dated March 5<sup>th</sup>, 1845.

### **2.2.2 Specific Lot History: Lot 46, Concession A**

The Crown patent to Lot 46 (presumably for 100 acres/ 40.5 hectares, however not specified in the "Abstract Land Index") was issued to Janice Ledgerwood on March 8<sup>th</sup>, 1873. Janice Ledgerwood, subsequently sold 31 acres (12.5 hectares) of the east half to Alex Ledgerwood in February of 1845, leaving the remaining acres as reserved for Road Allowance.

Alex Ledgerwood and his wife sold 31 acres (12.5 hectares) east part to Joseph MacArtney for \$1664.74 less road allowance on April 27<sup>th</sup>, 1897. MacArtney held the land until February 8<sup>th</sup>, 1904 when he sold it to Andrew Carwack for \$2100.00, again less the road allowance. The 31 acres, less road allowance and part in instrument 1841 (the first sale from Janice to Alex Ledgerwood) exchanged hands several times. The only mention of the extent of the road allowance was in a grant issued to William G.

Cormack and Carol Cormack claiming that the east 31 acres was subject to road allowance over southern 16.5 feet (5.0 meters).

There is no evidence in the “Abstract Land Index” that land use modification on either Lot 47 or 48 impinged on the bridge area over the Teeswater River. That structure and its approaches were apparently confined to the defined road allowance.

### **2.3 Bridge Building In Ontario**

Bridges in Ontario can be owned by a municipality (county, township) or the province. Brockton Bridge (Bridge 11) is a municipally owned bridge.

*“Bridges over water courses that formed boundaries between townships were always assumed by the County. However, arguments began in the early 19<sup>th</sup> century – sometimes acrimonious – over the responsibility for building and maintaining bridges over rivers located entirely within a township. The 1866 Municipal Institutions Act stated that county councils were responsible for all bridges over 200 feet long within the county. An 1871 amendment to the Act increased this length to a remarkable 500 feet. Building such large structures was far beyond most townships financial resources. Needless to say, large bridges were relatively rare to the detriment of efficient road travel. The few major bridges constructed in this era were built by the provincial government. Fortunately, at least for townships, by 1883 the defining length of bridges had been reduced to 100 feet.*

*The responsibility for bridge financing became an issue again in the early 20<sup>th</sup> century. This time it was driven by the cost for building stronger bridges – not longer ones. The economic value to rural communities of good roads, and by extension good bridges, was becoming evident. Nineteenth-century wooden bridges could not carry the weight of heavier wagon and farm equipment coming into use. By the First World War, motor vehicles were becoming increasingly common and the provincial government began to provide grant programs and technical advice on bridge building. At the same time, counties began to create county-wide road networks by assuming the ownership of key township roads and bridges....*

*Regarding changes made to the Highway Improvement Act (Unterman-McPhail Associates 2017: 8):*

*“In 1916, the province approved a funding initiative for road construction and maintenance under the Highway Improvement Act. Soon county councils began to organize county road systems in order to qualify for financial assistance. Generally, the province would contribute 40% of the cost of construction of a designated county road and 20% of the cost of maintenance. As part of its program, the Department of Public Highways required a county engineer or capable superintendent be placed in charge of the engineering work and that the county and townships adhere to provincial design standards for bridges. This was outlined in the Municipal Act as amended in 1916.*

*“ Every iron, steel, concrete or stone bridge constructed by the corporation of a county, and every such bridge exceeding twenty feet (20) clear span constructed by the*



*corporation of a township shall be designed and built in accordance with general specifications approved by the Department of Public Highways.”*

*To assist municipalities, in 1917, the Province provided standard plans and general specifications for concrete and steel highway bridges. All bridge plans were submitted to the province for approval before funding was provided.”*

*“The technical evolution of bridge designs ran parallel to the economic need for good roads. In southern Ontario most 19<sup>th</sup> century bridges were built of timber. Very short ones were beam structures; longer spans employed simple trusses, such as King and Queen Post trusses. A few iron truss bridges were built in the 1870s - 1880s but were generally too costly to be widely used. Inexpensive steel trusses came into use in the 1890s and the designs were commonly used into the 1930s. The Warren pony truss [subject of this report] was a work-horse design for short span, low traffic situations. The Pratt through truss and the Warren truss dominated in the early 20<sup>th</sup> century. Somewhat less common was the double-intersection Warren truss. Unusual trusses were used for special bridging needs such as requiring a long single span. Due to the demand for steel trusses, several specialized, local bridge companies came into existence including the Hamilton Bridge Works, Sarnia Bridge Company and the Hunter Bridge and Boiler Company, Kincardine.*

*Instead of building new bridges, structures were sometimes recycled as an inexpensive alternative to new construction....*

*Concrete began to be accepted as a bridge material by the 1920s.... In the 1930s the concrete rigid frame became one of the most widely used designs.... Concrete is the most common bridging material used today in southern Ontario and employed in a variety of designs including rigid frame and as a composite in pre-stressed and post-tensioned concrete beams” (Golder 2012: 3- 4).*

### **2.3.1 Structure Type: Truss Bridges**

Bridges are considered to be industrial sites. Bridges constructed from iron and steel are the subsequent evolution from wooden bridges. The premise was that iron and steel would not need protection from the elements and made for strong and safe structures. Often, iron and steel bridges were prefabricated by companies specializing in bridge construction. The most common bridge built between 1850 and 1925 was the metal truss bridge. The truss bridge used many small pieces to make a long truss that provided both length and strength. The arrangement of these pieces determines the type of truss bridge.

*“In a metal truss, many comparatively small pieces of iron or steel are joined together in a series of triangles. These structural triangles interconnect with one another to form the complete bridge. In resisting the loads placed by gravity upon a truss bridge, each of these pieces, or members, within the structure is put in either tension or compression. If a member is in compression, then the forces acting on it tend to push it together. If it is in tension, then these forces tend to pull it apart. The main members of truss are either stiff, heavy struts or posts, or then flexible rods or bars. Stiff struts or posts are*

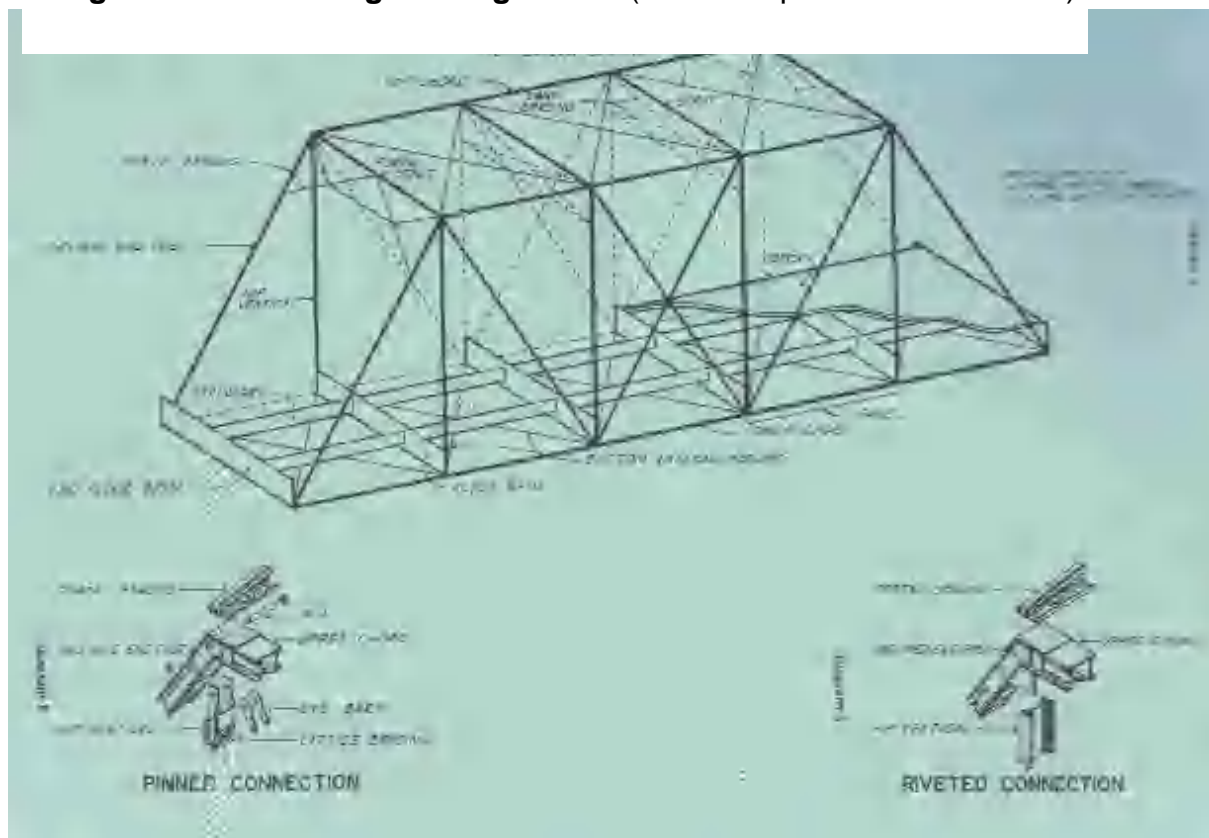


capable of withstanding both tension and compression, however, thin rods or bars are only capable of withstanding tension, and this difference provides a major clue in truss identification. On the diagrams [Figures 7 and 8]..., the main compression members are delineated with a thick, heavy line and the main tension members with a thin, light line.... The dotted lines in the diagrams indicate secondary counter-ties included in some trusses as tension members to help stiffen the structure" (Comp and Jackson 1977: 2).

The length of a truss bridge helps to establish the type of bridge, but not the number of panels. A through truss carries its traffic load level with the bottom chords. A pony truss is a through truss with no lateral bracing between the top chords. And finally, a deck truss, carries its traffic load level with the top chords (ibid).

The Warren Truss (Brockton Bridge is a type of pony Warren Truss) dates back to the 1840s, but most surviving bridges dates to the turn of the century. The Warren bridge was patented by two British engineers in 1848. The bridge type was quickly adopted by both Americans and Canadians. The most basic Warren truss is recognized by its diagonals, placed in either tension or compression, and has a triangular outline. Most Warren trusses are built with vertical members to stiffen the entire structure.

**Figure 7: Truss Bridge Configuration** (from Comp and Jackson 1977)

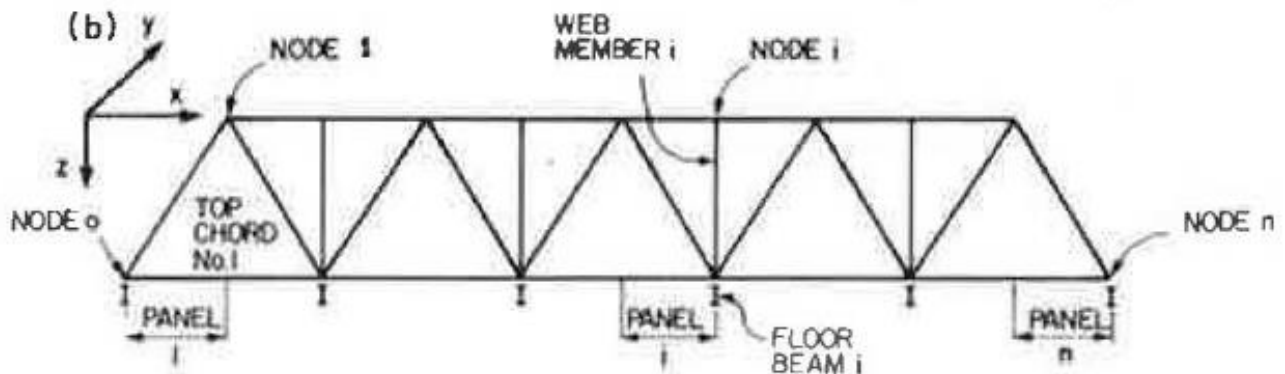


The Warren pony truss bridge under study resembles both of the Warren truss bridges above in Figure 8 but is not either of the two examples shown above. The basic triangular outline is present, however, there are also some verticals or web members. In the second bridge configuration in Figure 8, the verticals are located at every triangle, whether located at top or bottom chord. The current bridge only has verticals at every bottom chord intersection, and these are not single verticals but rather small perpendicularly placed and braced triangles. Csagoly and Bakht (1976) illustrate (Figure 9) an example of an American Truss bridge, which has the same configuration as the Brockton Bridge.

**Figure 8: Truss Bridge** (From Comp and Jackson 1977)



**Figure 9: American Pony Truss** (Csagoly and Bakht 1976:15)



The low, or, pony truss bridges were popular as they were economical to build and easy to build. Commercial vehicles increased substantially in weight following World War II, and the load-carrying capacity of these types of bridges was called into question, resulting in the removal of many of them to be replaced with modern bridges. Interestingly, load tests were conducted by the Structural Research Station of the

Ontario Ministry of Transportation and Communications (now Ministry of Transportation) which determined that the strength of these pony bridges exceeded predicated values (Csagoly and Bakht 1976: 14).

After 1900, steel bridges were a very popular bridge type in Ontario, and the pony trusses were once quite prolific given that they were “easy to erect, comparatively inexpensive and readily available” (<http://www.historicplaces.ca/>).

“The pony truss design is low, lying alongside the bridge deck which allows light truss units to cross relatively large spans. The single land capacity of pony trusses, however, resulted in many municipalities upgrading to two lane bridges” (ibid).

### **2.3.2 Brockton Bridge No. 11, MTO Bridge 2-413**

There were no files, blueprints or historic photos in the MTO files (Appendix I). The subject bridge is probably not the original bridge in this location which would have dated to circa 1851. There is no evidence of any remnants of the original bridge in this location.

A review of the Minutes of Council of the Township of Greenock provided only one piece of information regarding the Brockton Bridge 11. In the minutes from September of 1892 there was a mention of repairing Bridge Concession 20 on Lots 46 and 47 for the cost of \$27.90 per Thomas Dryden. No other references were found within either township or county minutes for the years checked (1892, 1905, 1906, 1910, 1915, 1919, 1920 and 1921; Minutes for the township checked: 1859-1860, 1863, 1865, 1870 [minutes missing due to a fire from 1871-1877], 1888, 1890, 1892, 1895 and 1899).

According to [historicbridges.org](http://historicbridges.org) the subject bridge is a “single span pony truss that is located downstream from two crossings that are through truss spans. Since rivers usually grow as they flow downstream, and through truss bridges are used for longer spans, it is evident that this bridge is both a relatively long example of a pony truss bridge, and appears to also perhaps cross the river at an unusually narrow location. Despite its relatively long span length, the bridge is an example of a light weight pony truss bridge, with built-up beams composed largely of angles as opposed to channels found on more massive truss bridges”.

The Brockton Bridge No. 11 is 101.4 feet and was built by the Hamilton Bridge Works Company. As there are no records for date of bridge completion or building, and only one record of a repair, it can be assumed that if the bridge was built prior to 1883, it was potentially built or at least paid in part by the County, as the county assumed responsibility for all bridges over 100 feet. No record could be found, but as mentioned previously, if repairs were being conducted on the study bridge in 1892 it is reasonable to conclude it was constructed previous to 1890 and withstood enough damages through use to justify repairs in 1892.

### **2.3.3 Hamilton Bridge Building Company**

The Hamilton Bridge Works Company supplied the designs and steel for many bridges in Ontario. It is a manufacturer based in Hamilton, Ontario and was founded sometime around 1872 by Sir John Hendrie, 11<sup>th</sup> Lieutenant Governor General of Ontario, for machine tools and held the original name of the Hamilton Tools Works. Shortly after 1872 the company began constructing simple railway bridges, including structures for the Great Western Railway, changing the company name to Hamilton Bridge and Tool Works. It continue to design and manufacture bridges, so much so, that in 1894 they settled on the name Hamilton Bridge Works Company to emphasize the skill in steel and bridge design (ASI 2016: 9).

Some of the company's projects of note are the Burlington Skyway Bridge, the Blue Water Bridge in Sarnia, The Burlington Canal Lift Bridge, the reconstruction of the Victoria Bridge in Montreal, and the Lions Gate Bridge in Vancouver. The company also held military contracts during the World Wars for armored vehicles and tanks. Unfortunately the company closed in 1984, after more than 100 years of operation and notoriety (ibid: 9).

### 3.0 Archaeological Assessment

A Stage 1 archaeological assessment was conducted by Fitzgerald (P097-058-2012) in 2012 as part of the central Bruce County Bridge Infrastructure Master Plan. The results determined that archaeological potential exists for both “Native and Euro-Canadian” archaeological resources in the study area. No detailed lot research was conducted by Fitzgerald. That, and other aspects of a complete Stage 1 are included in a report produced by Scarlett Janusas Archaeology Inc. (P027-0316-2017). SJA (SJA 2017) recommended a Stage 2 archaeological assessment of all undisturbed areas.

There are no registered archaeological sites located within one kilometre of the study area (from 2017 and 2012 access to the site database). There was no discussion of soil types in Fitzgerald’s Stage 1 nor discussion of commemorative plaques. Valley soils are bottomland. While removed from the site, there is a commemorative plaque celebrating the founding of Paisley, located north of the study area. Topography in the area is a valley land, and the study area itself, floodplain and a rise to higher elevations on the west and east sides of the study area.

The Stage 2 archaeological assessment was conducted by Scarlett Janusas Archaeology Inc. (P027-0316-2017) (SJA 2017). The assessment was conducted on May 6<sup>th</sup>, 2017 under appropriate lighting and weather conditions using a test pitting methodology. An area of 20 metres by 20 metres was assessed at the four corners of the bridge. No archaeological sites were located during the Stage 2 assessment. The recommendation for the study area was that no further archaeological assessment was required, however, in the event of discovery of deeply buried archaeological resources, that development activities be halted, and a licenced archaeologist be retained to address the archaeological resources.

**Figure 10: Area of Stage 2 Archaeological Assessment**





**Figure 11: Methodology and Results of Stage 2 Assessment**



## 4.0 CULTURAL HERITAGE LANDSCAPE DESCRIPTION

### 4.1 Area Context

Bruce County is largely rural in character. It consists of several main towns such as Walkerton, Southampton, Kincardine, Wiarton and numerous small village and settlement nodes set in rural agricultural land. The County seat is Walkerton on the Saugeen River about 75 kilometres southwest of Owen Sound. A network of county and local township roads provides access in the area, while three provincial highways run through the County (Highways 6, 9, and 21). The Municipalities of Northern Bruce Peninsula, Town of South Bruce Peninsula and Town of Saugeen Shores are located in the northern part of the county, while the southern part of the County is occupied by the Municipalities of Arran-Elderslie, Brockton, Kincardine and the Township of Huron-Kinloss. The Municipality of Brockton includes the former geographic Townships of Brant and Greenock.

The study area lies in the physiographic region of the Saugeen clay plain (Chapman and Putnam 1973). The clay plain is comprised of deep stratified clay, and the Saugeen watershed is generally agricultural. The clay plain is largely level in topography, however rivers have cut valleys deep into the clay beds.

The study area has an elevation of 226 to 229 metres above sea level, the lowest elevation representing the floodplain. The bridge lies in a small valley and the surrounding area rises from the valley lands in steep slopes to agricultural lands to the north, south, east and west. These lands are level to gently rolling.

The bridge crosses the Teeswater River southwest of Paisley. The Teeswater River has a length of about 75 kilometres and empties into the Saugeen River.

Mr. R. Walsh surveyed the Township of Greenock in 1852, however it was not until September 27<sup>th</sup>, 1854 that the Crown sold the lands, excepting the free grants, during the “big land sale”. Greenock settlement was slow to start, and there were no roads going east and west through the county due to the large swampland at its centre. Many bridges and roads were constructed in later years to aid in travel across the county, and at one point talk of dredging “Mud River” or Teeswater River was undergone to improve the flood plains drainage (Norman Robertson 1904; 401-407).

### 4.2 Site Description

For the purposes of this study, the Brockton Bridge is considered to run in a west-east direction. It forms part of Concession Road 20. It is located approximately 1.4 kilometre west of County Road 3, approximately 640 metres east of Baseline Road North, and, approximately three kilometres from the south end of Paisley, Ontario. Concession Road 20 is a two lane dirt/gravel road with no posted speed limit. A limit of 18 tonnes is posted before the bridge crossing at both east and west ends, and a 10% grade sign is also posted along the roadway at both ends. The Teeswater River is not signed. It flows in an approximate south to north direction at the subject bridge.



The vicinity of the bridge is mostly forested, and flood plain, although the southeast area of the bridge is agricultural. There is a steep slope down to the rivers' edge at the west side of the river, and at the northeast corner. The northwest corner is more gradual in slope to the water's edge. There is one adjacent built properties (Figure 12).

**Figure 12: Aerial Photograph Illustrating Cultural Heritage Landscape**



Images 3 - 5, 26 - 28 illustrate the surrounding topography of the subject bridge, including approaches to the bridge. Images 29 and 30 illustrate viewsheds from the centre of the bridge.

## 5.0 BUILT HERITAGE DESCRIPTION

### 5.1 Existing Bridge

The internet site, [historicbridges.org](http://historicbridges.org), has a list of North American bridges, including Ontario bridges. It lists the Brockton Bridge as having a national significance of 7 and a local significance of 8. [Historicbridges.org](http://historicbridges.org) is not for profit website which strives for accuracy in recording and documenting all bridges dating to pre-1970, with the exception of wood covered bridges. They have no government affiliation and strive for accuracy however they cannot guarantee it. The organization uses an amalgamation of the United States National Rating system, Canadian Federal and provincial legislature, and even some European (mainly from the United Kingdom) guidelines to create their rating scale. The rating scale on the website is divided into two categories, National Historic Rating and local Historic Rating. The National Historic rating is based on the above mentioned legislatures, and the technological significance of the Bridge. As the specifications are more design based, very few of the bridges on the website can score above 8 or below 2 on the National Historic Scale. It is the websites' belief that every bridge built prior to 1970 (as that year saw the standardization of bridges in uniformity and construct) have some historic value to the country at large, therefore only those post 1970 would receive a 0 rating, unless they are unique or of great local importance. The Local Historic Rating is much more ambiguous. It will allow a bridge to receive a higher rating based on the engineer, design and materials in relation to the localized area. An example would be a common concrete bridge of which thousands exist in good standing, receiving a higher rating of say 8 out of 10 as it is the only bridge at all or of that kind in a small town or village. As it is not in any way unique or rare when compared to bridges on a national scale, the final rating for a mundane bridge could have a rating as follows: 2 out of 10 National Historic Rating and 8 out of 10 Local Historic Rating.

[Historicbridges.org](http://historicbridges.org) states: *"The HSR (Historic Rating Scale) is designed to show that some bridges are more important than others, while also showing that bridges that are not as rare still indeed have historic value, and should be considered for preservation."* As this is the case the website is considered an excellent reference tool however the HSR should only be regarded as community or individual thought, and not as a definitive scale of findings.

The website, above, identified the subject bridge as a metal, rivet-connected Warren Pony Truss, fixed, with one span. The builder is the Hamilton Bridge Works Company. The Brockton bridge is lightly built which suggests that this is a lightly-travelled, municipal road. The bridge is an example of an American pony truss (has the verticals, or web member, emanating from the bottom chord). An example of this is presented in Figure 8. This is a variation of the Warren pony truss. There are no known existing drawings for the bridge or no historic photographs have come to light with this research.

Images 1 - 25 illustrate the bridge in its current state.

### **5.1.1 Approaches**

Both approaches to the bridge have been subject to some cut and infilling, and both lead to the bridge as it crosses the Teeswater River. The approaches are both very steep, indicated by a 10% grade sign for vehicles. Concession Road 20 is a two-lane gravel and dirt road. The deck of the bridge is wood. The road on both sides of the river have been built up to ensure clearance of the river (Images 3 -5, 7).

### **5.1.2 Abutments**

The abutments are constructed of cast-in-place concrete and built into the steep sloping embankments of the river. It is unknown who built the abutments, but it was likely another construction company other than Hamilton Bridge Works Company. The concrete abutments at the four corners of the bridge allow for the single beam span of the bridge. All four abutments show deterioration of the concrete facing (Images 12 – 17).

### **5.1.3 Truss**

The subject bridge consists of a single span of 101.4' and a deck width of 14.8' with open railing barriers on both sides of the bridge. The bridge aspects show it to be a pony Warren truss with modifications (Images 6 – 9). The truss web is illustrated in Images 7 – 9. Top chord connections are illustrated in Images 7 – 9, and 23 – 25. Bottom chord connections are illustrated in Images 6, 8, 9, 12 and 16.

### **5.1.4 Deck**

The wooden deck is supported by cross beams that are riveted to the bottom chords of the two trusses. Parts of the deck (constructed with 2 x 6" wooden planks placed side by side rather than end to end for strength) are in need of repair, but superficially, the deck appears sound (Images 10 and 11).

Pipe railings are fastened to the trusses on either side of the bridge, but are generally in poor repair. The railing has been repaired on both sides (Images 18 and 19). There is a hook attaching the railing to the bridge, and passes through at the ends to secure the railing at a minimum height (Images 21 and 22). A modern guard rail runs the length of the bridge on both sides.

### **5.1.5 Condition & Modifications**

There appears to have been no major modifications made to the bridge. Maintenance has been conducted with the replacement and partial repair of the handrail and some bolted repairs and the outriggers (perpendicular triangles) have also been repaired through the replacement of rivets with bolts (Image 20). The deck of the bridge has likely been replaced at least once since its initial construction. The concrete abutments show signs of deterioration common in concrete construction. The majority of the bridge retains historic integrity of both materials and design.

## **5.2 Adjacent Structures**

There is only one other property in close proximity to the bridge, and this is located at the municipal address of 289 Concession Road 20. There are two structures on the property, both less than 40 years of age. The house is a single detached, vinyl and brick clad house with a raised basement. The garage is classified as a type III uninsulated barn by the County of Bruce (interactive mapping), and has two doors for vehicles, is on a concrete slab and is also vinyl clad. Neither is considered to have cultural heritage value nor interest, and neither will be directly impacted by any modifications to the bridge. Images 26 to 28 illustrate the property.

## **5.3 Comparative Analysis**

### **5.3.1 Municipal**

There are 12 Warren pony trusses in the County of Bruce, eight of which are in Arran-Elderslie. All of the 12 bridges are slightly different in construction than each other. These include Arranvale Bridge (6 panel); B-Line Bridge (4 panel); Bannerman Bridge (6 panel); Bruce-Saugeen Townline Bridge (6 panel); Chesley Bridge (5 panel); Sideroad 25 (5 panel); Sideroad 5 (7 panel); Snake Creek Private Bridge (5 panel); South Pine River Private Bridge (4 panel); Walkers Bridge (6 panel); Youngs Bridge North (5 panel); and, Youngs Bridge South (5 panel). Only the subject bridge has 8 panels. The Brockton Bridge is evaluated on the heritage.org website as having a national significance of 7, and a local significance of 8. Section 5.1 explains the rating system.

The Brockton Bridge is not included on a municipal heritage register as a registered property or as a municipally designated property under Part IV or Part V of the OHA and is not protected by a municipal heritage easement.

The subject bridge is not the subject of an Ontario Heritage Trust easement or commemorative plaque.

### **5.3.2 Provincial**

All properties, including bridges that are owned and/or controlled by the Province and identified as having cultural heritage value are included on the list of provincial heritage properties maintained by the Ministry of Tourism, Culture and Sport (part iii.1 of the Ontario Heritage Act). As of the time of this report, there are no heritage bridges identified in the Bruce County area (Herczeg, 2018, correspondence).

The website, [historicbridges.org](http://historicbridges.org) was used to determine if there were any similar bridges located in listed counties. There are 125 Warren pony truss bridges, rivet-connected, located in the province of Ontario according to the website [historicbridges.org](http://historicbridges.org). Of these, there were only ten (including the subject bridge) that were 9 panel Warren, rivet-connected, pony truss bridges. The following presents data regarding these bridges. Of these additional 8 panel bridges, only KH-89, Stanley Line, Blatchford and Woolwich Street (n=4) are single span and most similar to the subject bridge. Of these four, three have dates of 1949 or later. The Lambton County Stanley Line bridge has no known date for construction or builder.

**Table 1: Comparative Analysis for 8 Panel Rivet-Connected Warren Pony Truss Bridges**

County	Bridge Name and Specifics	Builder	Date of Construction
Bruce	Brockton – 1 span	Hamilton Bridge Company of Hamilton	Ca. 1920?
Grey	KH-89 – 1 span	Hamilton Bridge Company of Hamilton	1953
Lambton	Stanley Line - 1 span	Unknown	Unknown
Simcoe	Port Severn – swing bridge	Hamilton Bridge Company of Hamilton	1915
Wellington	Blatchford	Dominion Bridge Company of Montreal	1949
Wellington	Bosworth - polygon	Hamilton Bridge Company of Hamilton	1949
Wellington	Emerson Simmons – multi-span	A.H. MacLellan and W.H. Keith	1952
Wellington	Woolwich Street	Hamilton Bridge Company of Hamilton	1952

### 5.3.3 Federal

The Canadian Register of Historic Places (CRHP) provides a single source of information about all historic places recognized for their heritage value at the local, provincial, territorial and national levels throughout Canada. The Register contains 12 bridges (Appendix F). Of these 12, there is one that is a Warren pony truss through bridge.

This is the Otter Creek Bridge located in the Township of Norwich. From the webpage, <http://www.historicplaces.ca/en/rep-reg/place-lieu.aspx?id=11865&pid=0>:

*“The Otter Creek Bridge, spans the Big Otter Creek and is located on Middletown Line between Cornell and New Roads, in the Township of Norwich. The steel pony truss bridge was constructed circa 1900.*

*The property was designated, by the Township of Norwich, in 1987, for its historical or architectural value or interest, under Part IV of the Ontario Heritage Act (By-law 33-87). The Otter Creek Bridge has also been listed on the [previous] Ontario Heritage Bridge list, a list of provincially significant bridges maintained by the Ontario Ministry of Culture.*

*Built by the Hamilton Bridge Company in circa 1900, the Otter Creek Bridge is one of a few remaining steel, pony truss bridges in Ontario...*

*The Otter Creek Bridge is one of the Warren Truss form which uses diagonals in the shape of “W’s” as its bracing and load bearing system. It also features bolted joints and a wooden deck.*

*The Otter Creek Bridge is a significant landmark in Oxford county. It is located on what was once a well-travelled rural road in South Norwich. The Otter Creek Bridge’s location on a forested winding road, contributes to the scenic rural landscape...”.*

#### **5.3.4 Conclusion**

There are 125 Warren truss pony metal-riveted bridges listed in Ontario ([www.historicbridges.org](http://www.historicbridges.org)). Of these, there are only four that are single span, eight panel Warren truss bridges (excludes swing bridges, polygon). Three of these were constructed in 1949 or later. And the remaining example has no known builder or construction date.

The Brockton Bridge is not recognized as being of municipal, provincial or federal heritage value from existing lists.

## 6.0 CULTURAL HERITAGE RESOURCE EVALUATION

### 6.1 Introduction

The Brockton Bridge is not recognized as being of municipal, provincial or federal heritage value from existing lists.

The criteria for determining cultural heritage value or interest were set out under Ontario Regulation 9/06 made under the OHA, as amended in 2005. These criteria were developed to assist municipalities in the evaluation of properties considered for designation. The regulation states:

*“A property may be designated under section 29 of the Act if it meets one or more of the following criteria for determining whether it is of cultural heritage value or interest:*

1. *The property has design value or physical value because it,*
  - i. *is a rare, unique, representative or early example of a style, type, expression, material or construction method,*
  - ii. *displays a high degree of craftsmanship or artistic merit,*

or

  - iii. *demonstrates a high degree of technical or scientific achievement.*
2. *The property has historical value or associative value because it,*
  - i. *has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community,*
  - ii. *yields, or has the potential to yield , information that contributes to an understanding of a community or culture, or*
  - iii. *demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.*
3. *The property has contextual value because it,*
  - i. *is important in defining, maintaining, or supporting the character of an area,*
  - ii. *is physically, functionally, visually or historically linked to its surroundings,*

or

  - iii. *is a landmark.”*

### 6.2 Evaluation

The “Criteria for Determining Cultural Heritage Value or Interest” set out in Ontario Regulation 9/06 under the OHA was applied to the Brockton Bridge to determine its cultural heritage value or interest. The results are contained in Table 2 and in associated text descriptions.



**Table 2: Evaluation Under “Criteria for Determining Cultural Heritage Value or Interest”, Ontario Regulation 9/06**

Criterion	Response	Analysis
<b>Design/Physical Value</b>		
i. Rare, unique, representative or early example of a style, type, expression, material or construction method.	Yes	The subject bridge was built circa 1890 to 1920 (no definitive date) and has been subject to mediation repairs over time. This is a Warren pony through truss bridge. There are 125 listed (historicbridges.org) Warren pony truss bridges in Ontario, however, only four are eight panel configurations (excludes swing and polygon). Three were constructed in 1949 or later. The remaining example has no known date of construction or builder.
ii. Displays a high degree of craftsmanship or artistic merit.	No	No great degree of craftsmanship or artistic merit.
iii. Demonstrates a high degree of technical or scientific achievement.	No	There is no great degree of technical or scientific achievement associated with the subject bridge.
<b>Historical or Associative Value</b>		
i. Has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community.	Yes	Theme: a bridge crossing was probably first established in this location ca. 1851 with the initial township survey and settlement. There is no evidence on adjacent shorelines or above the water of the earlier crossings. The bridge was constructed by the Hamilton Bridge Works of Hamilton, Ontario and is so plaqued at either end of the northern truss. There is no date indicated on the plaques. Based on historic township minutes recording repairs, the bridge may have been built ca. 1890 to 1920. The bridge has direct associations with the agricultural and rural community. The early bridge served as a general transportation route and one serving the local agricultural community where produce and livestock would have been transported to towns via the bridge.
ii. Yields, or has the potential to yield information that contributes to an understanding of a community or culture.	Yes	The bridge was built ca. 1890 to 1920, and was used by local residents/farmers to cross the river and would have played a role in the local community both in terms of access to social visiting and family ties, as well as economically, through the transportation and distribution of goods using the bridge as a conduit to points south or north of the river.

Criterion	Response	Analysis
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.	Yes	The builder of the current bridge is the Hamilton Bridge Company of Hamilton, Ontario and built ca. 1890 to 1920. The Hamilton Bridge Works Company supplied the designs and steel for many bridges in Ontario. It is a manufacturer based in Hamilton, Ontario and was founded sometime around 1872 by Sir John Hendrie, 11 <sup>th</sup> Lieutenant Governor General of Ontario.
<b>Contextual Value</b>		
i. Is important in defining, maintaining, or supporting the character of an area.	Yes	The bridge served as a conduit to points east and west of the Teeswater River for the local rural and agricultural community.
ii. Is physically, functionally, visually or historically linked to its surroundings.	Yes	The bridge contributes to the landscape character of the area, emphasizing its former function to serve as a conduit to areas on either side of the Teeswater River. It is one of the longest pony truss bridges of one span in Ontario.
iii. Is a landmark.	No	The definition of a landmark is: an object or feature of a landscape or town that is easily seen and recognized from a distance, especially one that enables someone to establish their location ( <a href="http://www.oxforddictionaries.com">www.oxforddictionaries.com</a> ). The subject bridge is a local landmark, but is not visible from the well-travelled County Road 3 to the east. The bridge is located in a valley and cannot be seen until cresting the hill on either side of County Road 20.

### **6.2.1 Design Value**

The Brockton Bridge is representative of an early style of bridge. The subject bridge is an 8 panel metal rivet-connected Warren pony truss bridge, fixed, with one main span. The most common bridge built between 1850 and 1925 was the metal truss bridge. The truss bridge used many small pieces to make a long truss that provided both length and strength. The arrangement of these pieces determines the type of truss bridge. The Pratt through truss and the Warren truss dominated bridge construction types in the early 20<sup>th</sup> century. The pony truss was a relatively inexpensive, easy to construct, and readily available type of bridge, and at one time “peppered the landscape” (Cumming 1978: 43).

Due to the demand for steel trusses, several specialized, local bridge companies came into existence including the Hamilton Bridge Works, Sarnia Bridge Company and the Hunter Bridge and Boiler Company, Kincardine.

From a 1990 paper by Farago (1990: 555), in 1990 there were “...3251 structures on the provincial road system in Ontario, 2455 are concrete and 796 are steel. Of these only 106 are truss bridges. ... Most of these structures are of the through or half-through (pony-truss) type, and only a few are of the deck type.”

Of these, only 45 were built prior to 1940.

The above does not include municipal bridges. Given that municipal bridges often are used on secondary roads, there may be more examples of them. From the site [historicbridges.org](http://historicbridges.org) for Bruce County, there are 12 Warren pony trusses in the County of Bruce. All of the bridges are slightly different in construction than each other. These include Arranvale Bridge (6 panel); B-Line Bridge (4 panel); Bannerman Bridge (6 panel); Bruce-Saugeen Townline Bridge (6 panel); Chesley Bridge (5 panel); Sideroad 25 (5 panel); Sideroad 5 (7 panel); Snake Creek Private Bridge (5 panel); South Pine River Private Bridge (4 panel); Walkers Bridge (6 panel); Youngs Bridge North (5 panel); and, Youngs Bridge South (5 panel). Only the subject bridge has 8 panels.

The subject bridge is considered representative of an early example of a style, type, material and construction method.

The Brockton bridge does not display a degree of craftsmanship or artistic merit.

Bridge construction does not demonstrate a great degree of technical or scientific achievement.

### **6.2.2 Historical or Associative Value**

The bridge is located southwest of the town of Paisley where the Teeswater River is crossed by Concession Road 20. Mr. R. Walsh surveyed the Township of Greenock in 1852, however, it was not until September 27<sup>th</sup>, 1854 that the Crown sold the lands, excepting the free grants, during the “big land sale”. The first settlers to take up land in the township were Joseph Chartrand and John Caskanete, French Canadians, who had

been on the staff of A. P. Brough, P.L.S., when he surveyed the Durham Road. Greenock settlement was slow to start, and there were no roads going east and west through the county due to the large swamp land at its centre. Many bridges and roads were constructed in later years to aid in travel across the county, and at one point talk of dredging “Mud River” or Teeswater River was undergone to improve the flood plains drainage (Robertson 1904: 401-407).

Early maps suggest that a bridge (configuration unknown) was in this location as early as 1851. There is no definitive construction date for the subject bridge, however, based on County/township minutes, a repair was made to the bridge in 1892, suggesting that the bridge may have been standing at least two years prior to be in need of repairs. Garvey (a reporter, 2016) indicates the bridge dates to 1920. There has been no corroboration of this date, however. A suggested date range of between 1890 and 1920 is provided for the construction of the subject bridge. The bridge continues to be used by local traffic.

The subject bridge was built by the Hamilton Bridge Works Company who supplied the designs and steel for many other bridges in Ontario. It was based in Hamilton, Ontario and was founded sometime around 1872 by Sir John Hendrie, 11<sup>th</sup> Lieutenant Governor General of Ontario and closed in 1984.

The subject bridge has direct associations with an agricultural/rural theme that is significant to a community.

The subject bridge has the potential to yield information that contributes to an understanding of a community or culture.

The bridge demonstrates the work or ideas of a builder that is significant to the community.

### **6.2.3 Contextual Value**

The bridge is still functional providing a conduit over the Teeswater River southwest of the town of Paisley. The bridge does contribute to the landscape character of the area highlighting the need for a bridge for the local population to transport people, livestock and goods. The subject bridge is not, however, visible to the general public unless one travels on Concession Road 20, as it is some distance from County Road 3 (well-travelled) and cannot be seen unless cresting the hill on either side of the bridge approaches.

The bridge is linked historically to its surroundings.

The development of road patterns effects the contextual value of bridges. Bridges sometimes crossed rivers at sharp angles, or were located at the base of steep slopes. This bridge likely stands where the river crossing was during the early settlement of Bruce County. The bridge achieved lesser status with the development of paved roadways, but is still used by the local populace. The viewsheds illustrate the

agricultural aspect of the area to the southeast, and the natural riverside vegetation to the south.

The bridge contributes to the landscape character of the area, emphasizing its former function to serve as a conduit across the Teeswater River in Bruce County.

The definition of a landmark is: an object or feature of a landscape or town that is easily seen and recognized from a distance, especially one that enables someone to establish their location ([www.oxforddictionaries.com](http://www.oxforddictionaries.com)). The subject bridge cannot be seen from County Road 3, and only when cresting the hill on either side of the bridge along County Road 20. The subject bridge is not considered a landmark.

### **6.3 Summary of Cultural Heritage Value**

It is determined through the application of the Criteria for Determining Cultural Heritage Value under Ontario Regulation 9/06, as presented above in Table 2, that the Brockton Bridge has design and physical value, historical or associative value; and contextual value.

### **6.4 Statement of Cultural Heritage Value**

The Brockton Bridge is located on the Teeswater that empties into the Saugeen River at Paisley, Ontario. The bridge is located on Concession Road 20, between lots 46 and 47, Concession A, former geographic township of Greenock, now the Municipality of Brockton, Bruce County between two hills located on either approach to the bridge. The surrounding area is rural agricultural in nature and undeveloped river bottom. One cannot see the bridge unless the crest of these two hills is crossed.

There are 12 Warren pony trusses in the County of Bruce. All of the bridges are slightly different in construction than each other. These include Arranvale Bridge (6 panel); B-Line Bridge (4 panel); Bannerman Bridge (6 panel); Bruce-Saugeen Townline Bridge (6 panel); Chesley Bridge (5 panel); Sideroad 25 (5 panel); Sideroad 5 (7 panel); Snake Creek Private Bridge (5 panel); South Pine River Private Bridge (4 panel); Walkers Bridge (6 panel); Youngs Bridge North (5 panel); and, Youngs Bridge South (5 panel). Only the subject bridge has 8 panels.

The subject bridge was built between 1890 and 1920 based on historical records indicating a repair in 1892. Moderate maintenance repairs have been made over time to the bridge. It retains its reinforced, cast-in-place concrete abutments and the subject bridge has a single span of 101.4' and a deck width of 14.8' with open pipe railings on either side of the bridge. It has a truss web with top and bottom chord connections. The bridge has a wooden deck.

The nature of the probably earliest bridge indicated on the map of 1851 is unknown, although, it may have been a wooden bridge or an early iron bridge, etc. It was probably the same structure repaired in 1892.

The Brockton Bridge is interpreted to be between 98 and 126 years of age, and is physically, functionally, visually, and historically linked to its surroundings. Bridges have been built at this location from the mid-19<sup>th</sup> century onwards. The bridge served as part of the early settlement roads of Bruce County, prior to having a less impact with the development of alternative paved roadways in the vicinity.

The Brockton Bridge is considered to exhibit cultural heritage value based on an evaluation of the bridge under “Criteria for Determining Cultural Heritage Value or Interest” as per Ontario Regulation 9/06 (see Table 2). Under Design and Physical Value, criteria i (Rare, unique, representative or early example of a style, type, expression, material or construction method) is satisfied by the following: The subject bridge was built circa 1890 to 1920 (no definitive date) and has been subject to periodic repairs over time. This is a Warren pony through truss bridge. There are 125 listed ([historicbridges.org](http://historicbridges.org)) Warren pony truss bridges in Ontario, however, only four are eight panel configurations (excludes swing and polygon). Three were constructed in 1949 or later. The remaining example has no known date of construction or builder. The bridge has no great degree of craftsmanship or artistic merit nor is there a great degree of technical or scientific achievement associated with the subject bridge.

Under Historical or Associative Value, criteria i (Has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community), ii (Yields, or has the potential to yield information that contributes to an understanding of a community or culture), and iii (Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community) are satisfied by the following: i) Theme: a bridge crossing was probably first established in this location ca. 1851 with the initial township survey and settlement. There is no evidence on adjacent shorelines or above the water of the earlier crossings. The bridge was constructed by the Hamilton Bridge Works of Hamilton, Ontario and is so plaqued at either end of the northern truss. There is no date indicated on the plaques. Based on historic township minutes recording repairs, the bridge may have been built ca. 1890 to 1920. The bridge has direct associations with the agricultural and rural community. The early bridge served as a general transportation route and one serving the local agricultural community where produce and livestock would have been transported to towns via the bridge; ii) The bridge was built ca. 1890 to 1920, and was used by local residents/farmers to cross the river and would have played a role in the local community both in terms of access to social visiting and family ties, as well as economically, through the transportation and distribution of goods using the bridge as a conduit to points south or north of the river; and iii) The builder of the current bridge is the Hamilton Bridge Company of Hamilton, Ontario and built ca. 1890 to 1920. The Hamilton Bridge Works Company supplied the designs and steel for many bridges in Ontario. It is a manufacturer based in Hamilton, Ontario and was founded sometime around 1872 by Sir John Hendrie, 11<sup>th</sup> Lieutenant Governor General of Ontario.

Under Contextual Value, criteria i (Is important in defining, maintaining, or supporting the character of an area) is satisfied as follows: i) The bridge served as a conduit to points east and west of the Teeswater River for the local rural and agricultural

community; ii) The bridge contributes to the landscape character of the area, emphasizing its former function to serve as a conduit to areas on either side of the Teeswater River. It is one of the longest pony truss bridges of one span in Ontario; and iii) is not considered a landmark.

The following heritage attributes listed in Section 6.5 below must be retained to conserve the CHVI.

### **6.5 Description of Heritage Attributes**

The character defining heritage attributes of the Brockton Bridge include, but not limited to:

- Hamilton Bridge Works plaque located either end of the bridge on the northern truss
- Two lane width
- Warren truss construction
- Timber deck beams
- 8 panel design
- Rivet-connected skeletal framework, including diagonal steel members and horizontal bracing, and outriggers (perpendicular support)
- Location spanning the Teeswater River in a rural setting
- Location on a rural road in a valley land.

### **6.6 Conclusion**

This is a preliminary cultural heritage impact assessment because the “Environmental Assessment process is a project planning process, intended to fully review alternative solutions to a problem without ‘pre-determining an outcome’. The cultural heritage evaluation report (CHER) helps to identify ‘significant’ cultural heritage aspects of the project, which will need to be considered during the project planning phase. The consideration of ‘other Environments’, in addition the Cultural Environment will be reflected in a ‘Recommended Solution’, presented to Council for acceptance... Cost implications need to be understood at the ‘Recommended Solution’ stage, before a final decision is made so a “preferred solution” under the EA is not ‘pre-determined’” (Slocombe 2018 personal correspondence).

The cultural heritage evaluation report has determined that the subject bridge (Brockton, No. 11 (MTO #2-413), located on Concession Road 20, between lots 46 and 47, Concession A, former geographic township of Greenock, now the Municipality of Brockton, Bruce County, meets one or more of the evaluation criteria under “Criteria for Determining Cultural Heritage Value or Interest” under Ontario Regulation 9/06. Based on the evaluation of these criteria, the subject bridge is considered to be of cultural heritage value or interest, and is therefore “worthy of consideration” by the municipality for registering the bridge on a municipal heritage register or to municipally designated the structure under Part IV of the Ontario Heritage Act.



The cultural heritage evaluation was conducted to determine the appropriate Project Schedule of the Environmental Assessment process that will be required to address the existing structural deficiencies for the aging bridge located along Concession Road 20, southwest of Paisley, within the Municipality of Brockton, Bruce County.

As set out in the MCEA Checklist, Part C – Heritage Assessment, and because of its evaluation of having cultural heritage or interest, a Preliminary Heritage Impact Assessment has been included as part of this report.

## 7.0 CULTURAL HERITAGE IMPACT ASSESSMENT

### 7.1 Mitigation Recommendations

Mitigation options are based solely on heritage values and do not include considerations of load-capacity, etc. These technical considerations and other “environments” assessed through the MCEA process need to be evaluated by an engineer or similar professional and coupled with the following mitigation options, may present a clear direction.

The bridge has been evaluated as having cultural heritage value and interest. The Pratt Truss through steel bridge replaced an earlier bridge, of which there are no apparent remnants. There are deterioration problems evident on the bridge, but rehabilitation of a similar bridges demonstrates that repairs can be made to the bridge.

Bridge improvement alternatives presented herein are based solely on heritage values and are to be considered within the context of the overall EA process. The following options include seven conservation options and two for the complete removal or replacement of the bridge. They are presented in order of priority, where alternative 1 should be considered before alternative 2, and so on. Bridge replacement or removal does not preclude these alternatives as mitigation measures can be implemented to address heritage concerns regardless of the alternative selected (for example, new construction). New construction can be configured to reflect heritage concerns, retention of the existing structure or elements thereof might be a consideration:

1. retention of existing bridge with no major modification undertaken;
2. restoration of missing or deteriorated elements where physical or documentary evidence can be used for their design
3. retention of existing bridge with sympathetic modification;
4. retention of existing bridge with sympathetically designed new structure in proximity to existing location;
5. retention of existing bridge no longer in use for vehicular purposed but adapted for pedestrian walkaways, cycle paths, scenic viewing, etc.;
6. retention of bridge as heritage monument for viewing purposes only;
7. relocation of bridge to appropriate new site for continued use (see 4) or adaptive re-use (see 5);
8. salvage of elements/members of bridge for incorporation into a new structure or for future conservation work or displays;
9. full recording and documentation of structure if it is to be demolished.

Where the demolition of a structure cannot be avoided, there are two recommendations:

- a) “salvage of elements/members of bridge for incorporation into new structure or for future conservation work or display; and
- b) Full recording and documentation of structure prior to demolition” (Cumming 1984: 243).

Table 3 presents an evaluation of the potential impacts of the above alternatives on the cultural heritage resources and identified heritage attributes.

1. Mitigation options 1 – 3 are the preferred conservation options, whereby the bridge is retained in its original location. Option 1 is the preferred option of the three.
2. Mitigation options 4 – 6 retain the bridge but with sympathetic modifications, or, a new bridge with sympathetic build nearby. The heritage attributes addressed Section 6.5 should be retained wherever possible, or where necessary, have sympathetic modifications.
3. Relocation of the bridge if chosen as a preferred option should be for continued use in a close location or for adaptive reuse.
4. If replacement/removal is considered, alternatives 8 and 9, the following needs consideration:
  - a) “salvage of elements/members of bridge for incorporation into new structure or for future conservation work or display; and
  - b) Full recording and documentation of structure prior to demolition” (Cumming 1984: 243).

In addition to the options presented above, the following recommendations/mitigation measures should be considered for the work plan involving the Brockton Bridge:

1. The final cultural heritage evaluation and cultural heritage impact assessment report should be filed with the County of Bruce and the Ministry of Tourism, Culture and Sport for review.
2. The Brockton Bridge may be considered for designation under the Ontario Heritage Act (Part IV), and added to the County of Bruce’s Municipal Heritage List.
3. If preservation of the bridge is found to be unsustainable due to a) safety issues b) rehabilitation costs too extensive c) rehabilitation too extensive to warrant preservation; etc.; the County of Bruce may consider retaining heritage attributes of the bridge and use for the construction of a new bridge.
4. Scenic views from the bridge could be maintained, but as a safeguard, the railing work on the bridge would require sympathetic upgrading that will retain the character of the bridge.
5. If replacement of the bridge is the preferred County option, the demolition and new build should consider minimizing impacts to the landscape setting, and retaining the visual scenic character of the area.
6. As a commemorative action, a plaque may be considered.

TABLE 3: EVALUATION OF THE POTENTIAL IMPACTS OF BRIDGE IMPROVEMENT ALTERNATIVES ON THE CULTURAL HERITAGE RESOURCE AND IDENTIFIED HERITAGE ATTRIBUTES

BRIDGE ALTERNATIVES BROCKTON BRIDGE No. 0011		DESIGN OR PHYSICAL VALUE	HISTORICAL OR ASSOCIATIVE VALUE	CONTEXTUAL VALUE	MITIGATION OPTIONS
		Representative of an early style of a single span Warren pony through truss bridge. Attributes Identified include: i. Cast-in-place concrete abutments; ii. Single span, two lane, metal Warren pony truss bridge with 8 panel design; iii. Rivet-connected skeletal framework, including diagonal steel members, horizontal bracing, and outriggers (perpendicular support); iv. Timber deck beams; and v. Hamilton Bridge works plaques	1. The bridge demonstrates the work or ideas of a builder (or designer/engineer) that is significant to Province. It was built by the Hamilton Bridge Works company sometime between 1890 and 1920, which supplied the steel and designs for many bridges in Ontario. 2. The bridge has direct associations with an agricultural/rural theme that is significant to the community and was an important part of local transportation routes.	1. The bridge contributes to the landscape character of the area and is visually linked to the surrounding countryside. 2. The bridge serves as a conduit linking the areas on either side of the Teeswater River.	
1	Retain existing bridge with no major modifications.	No Impact	No Impact	No impact	A B
2	Retention of existing bridge, restoration of missing or deteriorated elements where physical or documentary evidence (i.e. photographs or drawings) can be used for their design.	No Impact	No Impact	No Impact	A B C D
3	Retention of existing bridge with sympathetic modifications.	No Impact Alterations would be sympathetic to the heritage attributes identified.	No Impact	No Impact	A B C D
4	Retention of existing bridge with sympathetically designed new bridge in proximity to existing location.	No Impact	No Impact	Yes • Change in Land Use: Use of the existing structure would change, as current traffic levels and loads would continue to be unsuitable and this traffic would be re-directed to the new structure. • A new bridge in proximity to the existing bridge will alter the use, immediate setting and context of the bridge site. • Soil disturbance would be expected through the construction of a new bridge in proximity to the existing heritage resource.	A B E
5	Retention of existing bridge (no vehicle use) adapted for pedestrian and bicycle conduits, scenic viewing, etc.	Yes May require the installment of new safety features. Impacts to the design value could be minimized by providing consideration to sympathetically designed safety features.	No Impact	Yes • Would require rerouting of local through traffic to other bridge crossings along the Teeswater River. • Use of the bridge for pedestrian walkways, cycle paths, scenic viewing etc. would result in a change from the original use of the structure.	A B F
6	Retention of bridge as heritage monument for viewing purposes only.	No Impact	No Impact	Yes • Use of the bridge for viewing purposes only would result in a in the alteration of the current use of the structure. • Would require rerouting of local through traffic to other bridge crossings along the Teeswater River.	A B C
7	Relocation of bridge for adaptive re-use in an appropriate new site.	Yes Impacts and alterations to the heritage attributes and features are expected through relocation of any, or part of any, heritage attribute or feature.	Yes • Relocation of this cultural heritage resource will isolate it from its original context and its relationship to the community. • The river crossing at this location would no longer exist.	Yes • Relocation of this cultural heritage resource will isolate it from its original context and its relationship to the community. • If bridge removal, without replacement, is considered the river crossing at this location would no longer exist. • Soil disturbance is expected through the process of removing the bridge from its current location.	A B C D F
8	Replacement/removal of existing bridge with salvage of elements for use into a new structure or future conservation work/displays.	Yes Alterations to the cultural heritage attributes and features are expected through removal and/or the re-location of any, or part of any, heritage attribute or feature.	Yes Alterations to the resource are expected through replacement or removal which would result in negative impacts to its historical value.	Yes • Replacement or removal of this cultural heritage resource would alter the views to and from the bridge, resulting in significant impacts to the landscape character of the area. • Soil disturbance is expected through replacement or removal of the existing structure.	B C G

TABLE 3: EVALUATION OF THE POTENTIAL IMPACTS OF BRIDGE IMPROVEMENT ALTERNATIVES ON THE CULTURAL HERITAGE RESOURCE AND IDENTIFIED HERITAGE ATTRIBUTES

		DESIGN OR PHYSICAL VALUE	HISTORICAL OR ASSOCIATIVE VALUE	CONTEXTUAL VALUE	MITIGATION OPTIONS
BRIDGE ALTERNATIVES BROCKTON BRIDGE No. 0011		Representative of an early style of a single span Warren pony through truss bridge. Attributes Identified include: i. Cast-in-place concrete abutments; ii. Single span, two lane, metal Warren pony truss bridge with 8 panel design; iii. Rivet-connected skeletal framework, including diagonal steel members, horizontal bracing, and outriggers (perpendicular support); iv. Timber deck beams; and v. Hamilton Bridge works plaques	1. The bridge demonstrates the work or ideas of a builder (or designer/engineer) that is significant to Province. It was built by the Hamilton Bridge Works company sometime between 1890 and 1920, which supplied the steel and designs for many bridges in Ontario. 2. The bridge has direct associations with an agricultural/rural theme that is significant to the community and was an important part of local transportation routes.	1. The bridge contributes to the landscape character of the area and is visually linked to the surrounding countryside. 2. The bridge serves as a conduit linking the areas on either side of the Teeswater River.	
9	Replacement/removal of bridge with full recording and documentation.	Yes Alterations to the cultural heritage attributes and features are expected through replacement or removal.	Yes Alterations to the resource are expected through replacement or removal which would result in negative impacts to its historical value.	Yes <ul style="list-style-type: none"> <li>Replacement or removal of this cultural heritage resource would alter the views to and from the bridge, resulting in significant impacts to the landscape character of the area.</li> <li>Soil disturbance is expected through replacement or removal of the existing structure.</li> </ul>	B C G

**NOTES:**

Screening for Potential Impacts completed in consideration of the criteria presented in the MTCS document entitled 'Screening for Impacts to Built Heritage and Cultural Heritage Landscapes' (November 2010)

- i. **Destruction, removal or relocation** of any, or part of any, heritage attribute or feature.
- ii. **Alteration** (which means a change in any manner and includes restoration, renovation, repair or disturbance).
- iii. **Shadows** created that alter the appearance of a heritage attribute or change the exposure or visibility of a natural feature or plantings, such as a garden.
- iv. **Isolation** of a heritage attribute from its surrounding environment, context or a significant relationship.
- v. **Direct or indirect obstruction** of significant views or vistas from, within, or to a built or natural heritage feature.
- vi. **A change in land** use such as rezoning a battle field from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces.
- vii. **Soil Disturbance** such as a change in grade, or an alteration of the drainage pattern, or excavation, etc.

**Mitigation Alternatives**

- A. Maintain existing bridge.
- B. Signage (plaque, monument).
- C. Architectural drawings (where none available, or where major changes to structure have been made).
- D. Sympathetic replacement/restoration of missing or damaged part.
- E. Build sympathetic new bridge nearby.
- F. Sympathetic modification to bridge for adaptive reuse (pedestrian/bicycle, etc.).
- G. Salvage elements for new structure, conservation/displays (latter could include heritage parks, museums, etc.).

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## Images

**Image 1: Plaque at NW End of Bridge**



**Image 2: Plaque at NE End of Bridge**



**Image 3: Approach from East End facing Westerly**



**Image 4: Approach from West End facing Easterly**



**Image 5: Approach from West End at Crest of Hill facing easterly**



**Image 6: Underside of Bridge**



**Image 7: Bridge facing ENE**



**Image 8: Bridge facing NW**





**Image 9: Bridge Facing WNW**



**Image 10: The Wooden Deck**



**Image 11: Wear to the Deck**



**Image 12: Concrete Deterioration on Abutment**



**Image 13: Concrete Deterioration on Abutment SE End of Bridge**



**Image 10: Bearing and Abutment SW side facing down**



**Image 14: Abutment Facing down at NW side**



**Image 11: Bearing and Abutment SE side of bridge facing down**



**Image 12: Bearing and Abutment NE side of bridge facing down**





**Image 13: Railing Repairs South Side of Bridge**



**Image 14: Railing Repairs North Side of Bridge**



**Image 20: Modern Replacements to Rivets**



**Image 151: Railing Securing Hook**



**Image 16: Railing and Pass Through at Southwest End**



**Image 23: Upper Chord, Riveted**





**Image 17: Upper Chord**



**Image 18: Rivets (upper chord)**



**Image 19: 289 Concession 20, East Elevation of house**



**Image 20: 289 Concession 20, South Elevation**



**Image 21: 289 Concession 20, Two Car Garage/workshop, SE elevation**



**Image 22: View shed facing SE from Bridge Centre**



**Image 30: View shed facing NW from Bridge Centre**



## APPENDICES

### Appendix A: Bridge Inspection Report



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#### BRIDGE INSPECTION REPORT

**Structure No.:** 0011  
**Location:** Lot 46/47, Concession "A", Greenock Survey  
**Date of Inspection:** May 25, 2016/May 25, 2016  
**Inspector:** Frank R. Palmay, P.Eng.  
**Estimated Safe Loading:** 7 tonnes (reduce from triple posting: 9, 12 and 18 tonnes)

#### Structure Description:

<b>Structure:</b>	Steel pony truss	<b>Year Constructed:</b>	1920 (est.)
<b>No. Spans:</b>	1	<b>Width:</b>	4.5m
<b>Approaches:</b>	Asphalt	<b>Length:</b>	30.9m
<b>Wearing Surface:</b>	Laminated 2x6 timber deck		

#### Remarks:

- Hazard marker signs on all four corners.
- The steel guiderail is damaged due to impact on the northwest, southwest, northeast corners and each side of the deck. Two posts on the southwest approach have severe damage.
- The steel guiderail is no longer connected to one vertical web member on the south truss.
- The south truss appears to be out of alignment, bowed outwards.
- Steel pony trusses and stringers are moderately rusted. Floor beams are deteriorating more rapidly due to corrosion.
- Bottom chord on east side of south truss has been permanently deformed by impact.
- Bottom chord on north truss is out of alignment.
- Five vertical web members on the south truss and three vertical web members on the north truss are which were previously noted to be damaged have been replaced. One of the new members has been impacted and is permanently deformed.
- The diagonal flat bar members which make up the lattice work on the trellises have been permanently deformed on all 6 trellises on the north truss.
- Concrete facing of east abutment is severely spalled and delaminated. The facing in the southeast corner of abutment and ballast wall have severely deteriorated exposing reinforcing steel.
- 200 mm concrete facing has been added at east and west abutment. The concrete facing is spalling, cracking and delaminating on both sides.
- All truss bearing seats on east side are badly deteriorated with reinforcing steel exposed. A portion of the seat is exposed where concrete has spalled away.
- Concrete in northeast ballast walls has spalled.
- There is severe spider cracking and delamination in the east abutment wall.
- There is no rip-rap protection in front of the abutment walls. There are small amounts of scour damage on each abutment.
- There is significant build-up of gravel and sand at either side of the deck.
- Note that when a regular pickup truck crosses the bridge the structure shakes.





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### **Conclusions:**

Generally the structure appears to be in overall poor condition. The south truss appears to be out of alignment, both bottom chords are out of alignment and numerous vertical web truss members are damaged or broken. These members are secondary members that are theoretically zero force members, so failure of these members does not automatically mean failure of the structure. Nonetheless, these members should be replaced or reinforced. The concrete facing is also badly deteriorating and may be becoming unstable.

It is recommended that a detailed structural evaluation of the bridge be completed to confirm the current posting.

### **Recommendations:**

1. Complete a load posting evaluation immediately to determine if current posting is accurate
2. Consider closing the bridge or completing major rehabilitation within 1 year.
3. Reduce speed limit on structure to 30 km/hr to avoid additional impact to structure.
4. Install bearing blocks behind guiderail on deck or install curb along each side of deck to prevent vehicles from impacting the web members of the trusses (within 2 years).
5. New abutment seats are required at the east end and the east abutment is to be refaced. This was recommended in our 2007 report.
6. Clean gravel off deck (1-3 years).
7. Clean bearing seats (1-3 years).

GM BLUEPLAN ENGINEERING LIMITED

Per:

A handwritten signature in blue ink, appearing to read 'Frank R. Palmay'.

Frank R. Palmay, P.Eng.



**BRIDGE/CULVERT INSPECTION REPORT– 2016  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

Structure No. 0011



**Photo 1** - View of structure from west.



**Photo 2** - View of structure from southeast

**BRIDGE/CULVERT INSPECTION REPORT– 2016  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

Structure No. 0011



**Photo 3** - View of soffit.



**Photo 4** - View of damaged truss lattice.



**BRIDGE/CULVERT INSPECTION REPORT– 2016  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

Structure No. 0011



**Photo 5** - View of typical wingwall/abutment condition.



**Photo 6**- View of spalled abutment at truss bearing.

File No. 216137



**BRIDGE/CULVERT INSPECTION REPORT– 2016  
MUNICIPALITY OF BROCKTON  
GREENOCK SURVEY**

**Structure No. 0011**



**Photo 7** - View of recently replaced web member with impact damage

## Appendix B: Brockton Bridge MEA Heritage Checklist

### Municipal Heritage Bridges Cultural, Heritage and Archaeological Resources Assessment Checklist Revised April 11, 2014

*This checklist was prepared in March 2013 by the Municipal Engineers Association to assist with determining the requirements to comply with the Municipal Class Environmental Assessment. View all four parts of the module on Structures Over 40 Years at [www.municipalassoc.ca](http://www.municipalassoc.ca) to assist with completing the checklist.*

**Project Name:** Brockton Bridge

**Location:** Concession Road 20

**Municipality:** Municipality of Brockton





**Project Engineer:**




**Checklist completed by:** Scarlett Janusas Archaeology Inc.

**Date:** March 5, 2018




**NOTE:** Complete all sections of Checklist. Both Cultural Heritage and Archaeological Sections must be satisfied before proceeding.












#### Part A – Municipal Class EA Activity Selection

Description	Yes	No
Will the proposed project involve or result in construction of new water crossings? This includes ferry docks.	<input type="checkbox"/> Schedule B or C	 Next
Will the proposed project involve or result in construction of new grade separation?	<input type="checkbox"/> Schedule B or C	 Next
Will the proposed project involve or result in construction of new underpasses or overpasses for pedestrian recreational or agricultural use?	<input type="checkbox"/> Schedule B or C	 Next
Will the proposed project involve or result in construction of new interchanges between any two roadways, including a grade	<input type="checkbox"/> Schedule B or C	 Next

separation and ramps to connect the two roadways?		
Will the proposed project involve or result in reconstruction of a water crossing where the structure is less than 40 years old and the reconstructed facility will be for the same purpose, use, capacity and at the same location? (Capacity refers to either hydraulic or road capacity). This includes ferry docks.	<input type="checkbox"/> Schedule A+	 Next
Will the proposed project involve or result in reconstruction of a water crossing where the reconstructed facility will not be for the same purpose, use, capacity or at the same location? (Capacity refers to either hydraulic or road capacity). This includes ferry docks.	<input type="checkbox"/> Schedule B or C	 Next
Will the proposed project involve or result in reconstruction or alteration of a structure or the grading adjacent to it when the structure is over 40 years old where the proposed work will alter the basic structural system, overall configuration or appearance of the structure?	 Next	<input type="checkbox"/> Assess Archaeological Resources

### Part B – Cultural Heritage Assessment

Description	Yes	No
Does the proposed project involve a bridge construction in or after 1958?	<input type="checkbox"/> Next	 Prepare CHER Undertake HIA
Does the project involve one of these four bridge types?	<input type="checkbox"/> Rigid Frame      Next <input type="checkbox"/> Precast with Concrete Deck      Next <input type="checkbox"/> Culvert or Simple Span      Next <input type="checkbox"/> Steel Beam/Concrete Deck      Next	 Prepare CHER Undertake HIA
Does the bridge or study area contain a parcel of land that is the subject of a covenant or	<input type="checkbox"/> Prepare CHER Undertake HIA	 Next

agreement between the owner of the property and a conservation body or level of government?		
Does the bridge or study area contain a parcel of land that is listed on a register or inventory of heritage properties maintained by the municipality?	<input type="checkbox"/> Prepare CHER Undertake HIA	 Next
Does the bridge or study area contain a parcel of land that is designated under Part IV of the Ontario Heritage Act?	<input type="checkbox"/> Prepare CHER Undertake HIA	 Next
Does the bridge or study area contain a parcel of land that is subject to a notice of intention to designate issued by a municipality?	<input type="checkbox"/> Prepare CHER Undertake HIA	 Next
Does the bridge or study area contain a parcel of land that is located within a designated Heritage Conservation District?	<input type="checkbox"/> Prepare CHER Undertake HIA	 Next
Does the bridge or study area contain a parcel of land that is subject to a Heritage Conservation District study area by-law?	<input type="checkbox"/> Prepare CHER Undertake HIA	 Next
Does the bridge or study area contain a parcel of land that is included in the Ministry of Tourism, Culture and Sport's list of provincial heritage properties?	<input type="checkbox"/> Prepare CHER Undertake HIA	 Next
Does the bridge or study area contain a parcel of land that is part of a National Historic Site?	<input type="checkbox"/> Prepare CHER Undertake HIA	 Next
Does the bridge or study area contain a parcel of land that is part of a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?	<input type="checkbox"/> Prepare CHER Undertake HIA	 Next
Does the bridge or study area contain a parcel of land that is designated under the Heritage Railway Station Protection Act?	<input type="checkbox"/> Prepare CHER Undertake HIA	 Next
Does the bridge or study area contain a parcel of land that is identified as a Federal Heritage Building by the Federal Heritage Building Review Office (FHERO)?	<input type="checkbox"/> Prepare CHER Undertake HIA	 Next
Does the bridge or study area contain a parcel of land that is the subject of a municipal	<input type="checkbox"/> Prepare CHER Undertake HIA	 Next



provincial or federal commemorative or interpretive plaque that speaks to the historical significance of the bridge?		
Does the bridge or study area contain a parcel of land that is in a Canadian Heritage River watershed?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input checked="" type="checkbox"/> Next
Will the project impact any structures or sites (not bridges) that are over forty years old, or are important to defining the character of the area or that are considered a landmark in the local community?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input checked="" type="checkbox"/> Next
Is the bridge or study area adjacent to a known burial site and/or cemetery?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input checked="" type="checkbox"/> Next
Is the bridge considered a landmark or have a special association with a community, person or historical event in the local community?	<input checked="" type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Does the bridge or study area contain or is it part of a cultural heritage landscape?	<input checked="" type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Assess Archaeological Resources

### Part C – Heritage Assessment

Description	Yes	No
Does the Cultural Heritage Evaluation Report identify any Heritage Features on the project?	<input checked="" type="checkbox"/> Undertake HIA	<input type="checkbox"/> Part D – Archaeological Resources
Does the Heritage Impact Assessment determine that the proposed project will impact any of the Heritage Features that have been identified?	<input type="checkbox"/> Schedule B or C <b>depends on selected bridge alternative</b>	<input type="checkbox"/> Part D – Archaeological Resources

### Part D – Archaeological Resources Assessment

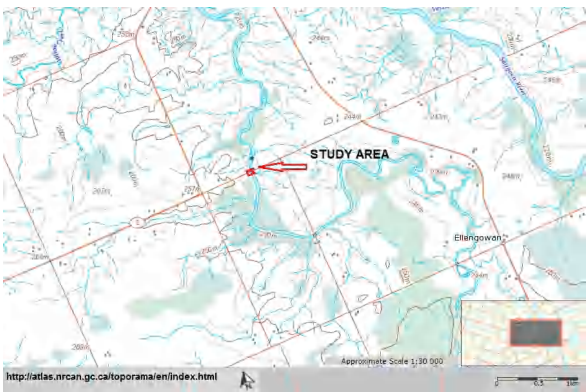
Description	Yes	No
Will any activity, related to the project, result in land impacts/significant ground disturbances?	<input checked="" type="checkbox"/> Next	<input type="checkbox"/> Schedule A - proceed
Have all areas to be impacted by ground disturbing activities, been subjected to recent extensive and intensive	<input type="checkbox"/> Schedule A - proceed	<input checked="" type="checkbox"/> Next

disturbances and to depths greater than the depths of the proposed activities?		
Has an archaeological assessment previously been carried out that includes all of the areas to be impacted by this project?	<input checked="" type="checkbox"/> Next	<input type="checkbox"/> Archaeological Assessment
Does the report on that previous archaeological assessment recommend that no further archaeological assessment is required within the limits of the project for which that assessment was undertaken, and has a letter been issued by the Ministry of Tourism, Culture and Sport stating that the report has been entered into the Ontario Public Register of Archaeological Reports?	<input checked="" type="checkbox"/> Schedule A - proceed	<input type="checkbox"/> Obtain satisfaction letter - proceed

**\*\* Include Documentation Summary in Project File \*\***

**Note:**

## Appendix C: Brockton Bridge Survey Form

<b>BRIDGE NAME:</b> Brockton Bridge No. 11	Recorder: Scarlett Janusas Archaeology Inc.	Ref. No.11 MTO: 2-413
<b>ROAD:</b> Concession Road 20	Map:	Date: March 5, 2018
<b>Lot:</b> 46 and 47 <b>Con:</b> A		
<b>Municipality:</b> Former Greenock Township, Municipality of Brockton		
<b>County / R.M.:</b> Bruce County		
<b>Map Ref:</b>		
<b>Military Grid Ref:</b> 17T477939E 49025696N		
<b>Air Photo Ref:</b>		
<b>Description:</b> The Brockton Bridge crosses the Teeswater River southwest of the town of Paisley, Ontario on Concession 20		
<b>BRIDGE ENVIRONMENT &amp; USES</b>		
<b>Water/Road/Rail/Other Crossing:</b> Brockton Bridge carries Concession 20/ Concession 2A over Teeswater River		
<b>Surrounding Land-Uses &amp; Landscape:</b> The surrounding landscape is agricultural/rural. The bridge crossed the Teeswater Bridge in a valley land, with steep hills of Concession 20 rising to the east and west. There is some agricultural land immediately at the southeast side of the bridge.		
<b>Bridge Uses:</b> Vehicular Traffic		
<b>DESIGN</b>		
<b>Materials:</b> Steel and Concrete		
<b>Construction:</b> Warren Pony Truss, 8 panel, metal rivet-connected		
<b>Decorative Features:</b> Latticed Outriggers		
<b>Landscape Quality:</b> valley land with one small area of agricultural (SW corner)		
<b>State of Preservation:</b> deterioration of both concrete and metal, integrity relatively intact		
<b>Other Comments:</b>		



<b>DIMENSIONS</b>	
<b>Carriageway Width: 14.8'</b>	<b>Longest Span:</b>
<b>No. of Lanes: 2</b>	<b>Shortest Span:</b>
<b>Sidewalks: None</b>	<b>Overall Structure Length: 101.4'</b>
<b>Capacity: 18 tonnes</b>	<b>Overall Structure Width:</b>
<b>No. of Spans: 1</b>	<b>Clearance: no obstructions</b>
<b>HISTORY</b>	
<b>Date Built: between 1890 and 1920 (no archival definitive date)</b>	
<b>Engineer/Designer: Hamilton Bridge Works</b>	
<b>Construction Firm: Hamilton Bridge Works</b>	
<b>Drawings/Specifications: neither MTO nor County/municipality have any drawings or specs</b>	
<b>Photos: neither MTO nor County/municipality have any historic photos</b>	
<b>Historical Association: The bridge is located in an agricultural/rural landscape setting, it was built by a prominent bridge building company, Hamilton Bridge Works, and has a direct connection with the local community.</b>	
<b>Previous Bridges: possibly as early as 1851, but no remaining evidence of previous bridge</b>	
<b>Other Comments:</b>	
<b>PROPERTY RIGHTS &amp; RESPONSIBILITIES</b>	
<b>Owner: Municipality of Brockton</b>	<b>Maintenance: Municipality of Brockton</b>
<b>PLANNED UNDERTAKING</b>	
<b>Remediation</b>	
<b>GENERAL COMMENTS</b>	

## Appendix D: Municipally Designated Sites

The bridge is not included in a list of municipally designated sites in Brockton. The website, <http://www.brockton.ca/en/visit-us/heritage-properties.asp>, was accessed on July 19<sup>th</sup>, 2017.

Click on the links below to learn more about Brockton's designated heritage properties:

- St. Thomas Anglican Church – 305 Colborne Street, Walkerton
- Walkerton Baptist Church – 120 Cayley Street, Walkerton
- Joseph Walker House – 15 McNab Street, Walkerton
- Victoria Jubilee Hall – 111 Jackson Street, Walkerton
- James Rethywell Block – 336 Durham Street East, Walkerton
- Hartley House Hotel – 7 Jackson Street North, Walkerton
- John Rowland House – 410 Jackson Street, Walkerton
- Walkerton Carnegie Library – 249 Durham Street East, Walkerton
- St. John's Old Lutheran Pioneer Cemetery – 280 Sideroad 30, Brant Township
- Henry Gargill White House – 12 Concession 10, Gargill

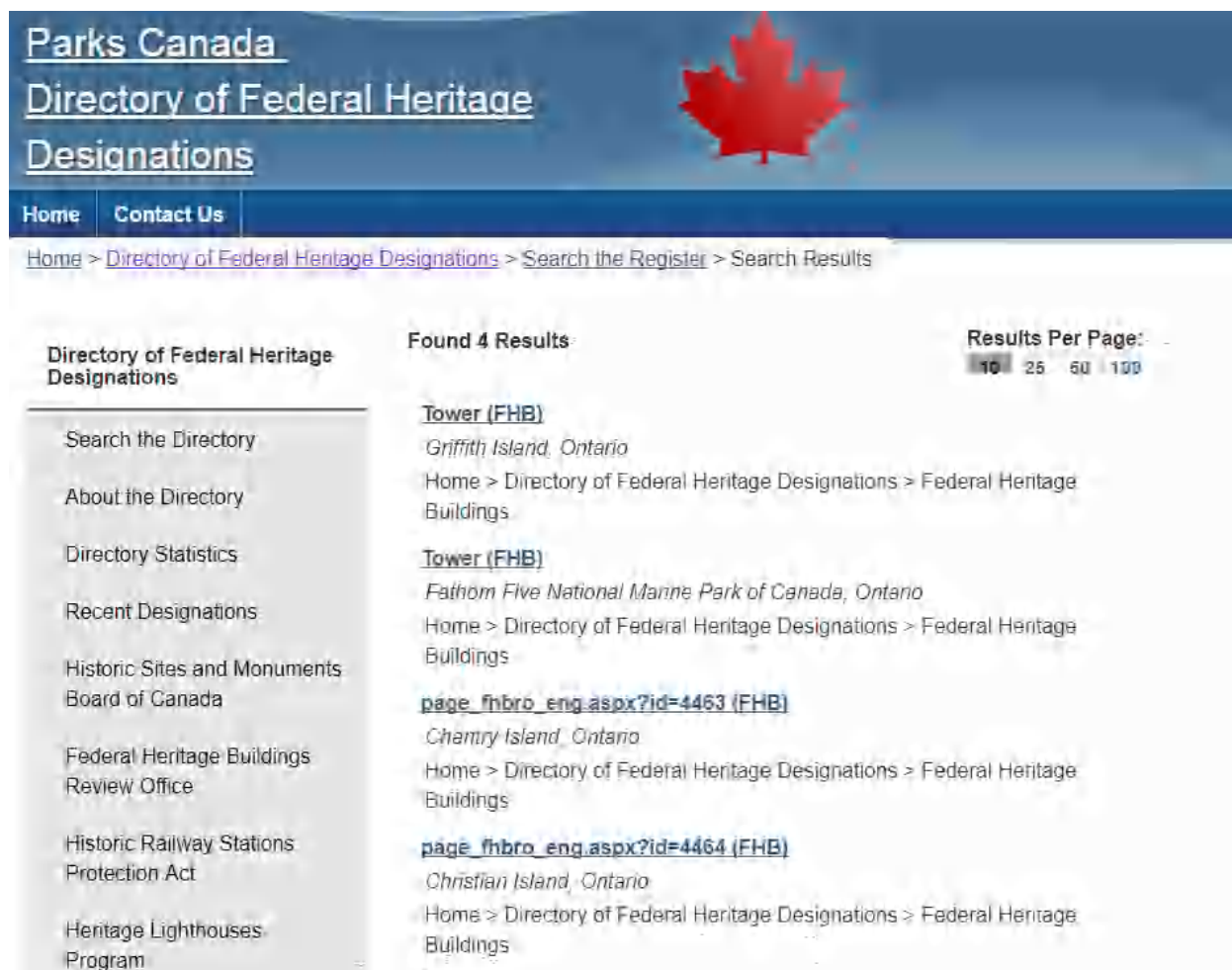
Nor was the bridge included on the “listed” heritage properties.

Click on the links below to learn more about Brockton's listed heritage properties:

- Walkerton Armoury – 215 Jane Street, Walkerton
- Dickison House – 124 Colborne Street, Walkerton
- Babler House – 404 Victoria Street, Walkerton
- Shan-Vienfield House – 951 Old Durham Road, Walkerton
- R.E. Truax House – 414 Scott Street, Walkerton
- R. Truax House – 411 Scott Street, Walkerton
- H.F. O'Connor House – 430 Jackson Street, Walkerton
- Mc Connell House – 310 Victoria Street, Walkerton
- Pellow's Pharmacy – 228 & 232 Durham Street East, Walkerton
- Skelton House – 6 Scott Street, Walkerton
- T. Cameron House – 106 Cayley Street, Walkerton
- Dr. M. Stalker House – 107 Cayley Street, Walkerton
- J. Hargreaves House – 7 Cayley Street, Walkerton
- Campbell Grant House – 620 Gibson Street, Walkerton
- Hobley House – 108 Cayley Street, Walkerton
- Binder Twine Factory – 106 Colborne Street N., Walkerton
- Hampson Foundry – 10 Yonge Street North, Walkerton
- Sacred Heart Parish – 220 Victoria Street
- Old Anglican Rectory – 311 Colborne Street, Walkerton
- Judge Barrett House (Wesley) – 810 Yonge Street, Walkerton
- Dr. Mullen House – 415 Gibson Street, Walkerton
- Kilmer Livery Stable – 11 Victoria Street South, Walkerton
- Brown's Pharmacy – 331 Durham Street East, Walkerton
- Walkerton Gaol – 207 & 213 Cayley Street, Walkerton
- Bruce County Court Complex 207-215 Cayley Street, Walkerton

## Appendix E: Federal Heritage Buildings/Structures


A search was made for Federal heritage buildings using the key words “Bruce County”. Four places were noted, but none of them pertain to the bridge or its environs. The website, <http://www.pc.gc.ca/apps/dfhd/result>, was accessed July 19<sup>th</sup>, 2017.



The screenshot shows the Parks Canada website's search results for Federal Heritage Buildings. The header includes the Parks Canada logo and navigation links. The search results are displayed in a table with four entries, each showing the name of the building, its location, and a link to the full record.


Directory of Federal Heritage Designations	Found 4 Results	Results Per Page: 10 25 50 100
<a href="#">Search the Directory</a>	<a href="#">Tower (FHB)</a> <i>Griffith Island, Ontario</i> Home > Directory of Federal Heritage Designations > Federal Heritage Buildings	
<a href="#">About the Directory</a>	<a href="#">Tower (FHB)</a> <i>Fathom Five National Marine Park of Canada, Ontario</i> Home > Directory of Federal Heritage Designations > Federal Heritage Buildings	
<a href="#">Directory Statistics</a>	<a href="#">page_fhb_ro_eng.aspx?id=4463 (FHB)</a> <i>Chantry Island, Ontario</i> Home > Directory of Federal Heritage Designations > Federal Heritage Buildings	
<a href="#">Recent Designations</a>	<a href="#">page_fhb_ro_eng.aspx?id=4464 (FHB)</a> <i>Christian Island, Ontario</i> Home > Directory of Federal Heritage Designations > Federal Heritage Buildings	
<a href="#">Historic Sites and Monuments Board of Canada</a>		
<a href="#">Federal Heritage Buildings Review Office</a>		
<a href="#">Historic Railway Stations Protection Act</a>		
<a href="#">Heritage Lighthouses Program</a>		

## Canadian Registered Historic Places accessed March 5, 2018


**Canada's Historic Places**  
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### CANADIAN REGISTER SEARCH RESULTS



**ADVANCED REGISTER SEARCH**

Enter a keyword or search term(s)

Province / Territory

Location (city, town, township)


Jurisdiction

Postal code (first three characters)


Purpose Group


Purpose

Total Results: 12, Page: 1 of 2      Results per page: 10




**Cambridge Main Street Bridge**  
0, Main Street, City of Cambridge, Ontario  
The Cambridge Main Street Bridge spans the Grand River between Water and Melville Streets, in the former City of Galt, now the City of Cambridge. The bridge is a multiple-span.





**Gow's Bridge**  
McCrae Boulevard, Guelph, Ontario  
Gow's Bridge spans the Speed River on the west side of Royal City Park. This stone bridge continues to serve both vehicular and pedestrian traffic. Gow's Bridge has been





**Main Street Bridge**  
0, Main Street East, Welland, Ontario  
Towering over the Welland Canal and constructed in 1927 is the City of Welland's most recognizable landmark: the Main Street Bridge. The bridge spans the Welland Canal at East.





**Freeport Bridge**  
0, King Street, City of Kitchener, Ontario  
The Freeport Bridge spans the Grand River on King Street East between Riverbank Drive and Stonewall Drive in the City of Kitchener. The property consists of a multiple-span...





**Otter Creek Bridge**  
0, Middletown Line, Township of Norwich, Ontario  
The Otter Creek Bridge spans the Big Otter Creek and is located on Middletown Line between Cornell and New Roads, in the Township of Norwich. The steel pony truss bridge was





### Norwich Street Bridge

0, Norwich Street, City of Guelph, Ontario

The Norwich Street Bridge, built in 1882, crosses the Speed River to connect two sections of Norwich Street, in the Goldie Mill neighbourhood of Guelph. The single-span...



### Blackfriars Bridge

0, Blackfriars Street, City of London, Ontario

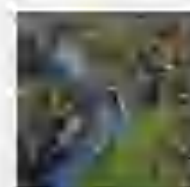
The Blackfriars Bridge, a reinforced wrought-iron bowstring bridge, was constructed in 1875. It spans the North Branch of the Thames River, on Blackfriars Street, in the City of...



### West Montrose Covered Bridge

0, Covered Bridge Drive, Township of Woolwich, Ontario

The West Montrose Covered Bridge is a late 19th century covered wooden bridge that spans the Grand River in the rural village of West Montrose. Connecting Hill Street, Covered



### Seneca Bridge

651, Caithness Street E., Haldimand County, Ontario

The Seneca Bridge is a small steel and concrete bridge crossing the Black Creek on the River Road (Highway 54, between Caledonia and Cayuga) in Haldimand County. Following the



### The Radial Arch

0, Queen Street, Newmarket, Ontario

The Radial Arch, built in 1909, is located on Queen Street between Main Street and Charles Street. Erected to support a wooden trestle bridge spanning the Holland River, it is...





## CANADIAN REGISTER SEARCH RESULTS



Total Results: 12, Page: 2 of 2

Results per page: 10



### Stone Road Bridge

0, Stone Road, City of Guelph, Ontario

The Stone Road Bridge spans the Eramosa River on Stone Road East, between Victoria Road South and Watson Road South, in the City of Guelph. The single-span concrete bowstring



### Church Street Bridge

0, Church Street North, St. Marys, Town of, Ontario

The Church Street Bridge spans Trout Creek, between Station Street and Queen Street East, in the Town of St. Marys. The two-arch stone bridge was constructed in 1884.

The...



## ADVANCED REGISTER SEARCH

Enter a keyword or search term(s)

Province / Territory

Location (city, town, township)

Jurisdiction

Postal code (first three characters)

Purpose Group

Purpose

Search

Clear Fields



## Appendix F: Heritage Rivers

From the website, <http://chrs.ca/the-rivers/>, the following rivers are Canadian Heritage Rivers in Ontario. The Teeswater River is not on the list. This list was accessed on July 19<sup>th</sup>, 2017.




### Ontario

---


- ~ Bloodvein River
- ~ Boundary Waters/Voyageur Waterway
- ~ Detroit River
- ~ French River
- ~ Grand River
- ~ Humber River
- ~ Mattawa River
- ~ Missinaibi River
- ~ Ottawa River
- ~ Rideau Waterway
- ~ St. Mary's River
- ~ Thames River

## Appendix G: Cemetery Search


**Ontario**

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[Data last updated on Jul 19, 2017 at 16:39 hours]

### Search Results

Your search result on County/District: **BRUCE, COUNTY OF**, Municipality: **BROCKTON, MUNICIPALITY OF (TWP)**, Lot: **47**, Concession: **A**, requested on Jul 19, 2017 returns **0** record. Please verify your search criteria or [click here for search tips](#).


[\[MAIN SEARCH SCREEN\]](#) | [\[NEW SEARCH\]](#)

The Licensing, Inspections and Investigations Branch provides this information as a public service. All search results are current as of the date of the search. As this is an unofficial search, if you require an official search or clarification, or to report any errors or discrepancy, contact the Licensing, Inspections and Investigations Branch at:


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[Data last updated on Jul 19, 2017 at 16:39 hours]

### Search Results

Your search result on County/District: **BRUCE, COUNTY OF**, Municipality: **BROCKTON, MUNICIPALITY OF (TWP)**, Lot: **48**, Concession: **A**, requested on Jul 19, 2017 returns **0** record. Please verify your search criteria or [click here for search tips](#).

[\[MAIN SEARCH SCREEN\]](#) | [\[NEW SEARCH\]](#)

The Licensing, Inspections and Investigations Branch provides this information as a public service. All search results are current as of the date of the search. As this is an unofficial search, if you require an official search or clarification, or to report any errors or discrepancy, contact the Licensing, Inspections and Investigations Branch at:

## Appendix H: National Historic Sites

From the website, <http://www.soto.on.ca/national-historic-sites-of-southern-ontario/>, the following are National Historic Sites in Southern Ontario. The bridge located on Concession Road 20, Municipality of Brockton does not appear on the list. The list was accessed July 19<sup>th</sup>, 2017.

### National Historic Sites

- ▶ Bell Homestead
- ▶ Fort George
- ▶ Fort Malden
- ▶ HMCS Haida
- ▶ Navy Island
- ▶ Point Clark Lighthouse
- ▶ Queenston Heights
- ▶ Southwold Earthworks
- ▶ Trent-Severn Waterway
- ▶ Woodside

**Appendix I: Correspondence****SCARLETT JANUSAS ARCHAEOLOGY INC.****269 Cameron Lake Road, Tobermory, Ontario N0H 2R0****Phone 519-596-8243, cell 519-374-1119****jscarlett@amtelecom.net****www.actionarchaeology.ca**

July 19, 2017

Mr. Thomas Wicks, Heritage Planner  
 Ontario Heritage Trust  
 10 Adelaide Street West  
 Toronto, Ontario  
 M5C 1J3

**Via email:** Thomas.Wicks@heritagetrust.on.ca

To Whom It May Concern:

**RE: Cultural Heritage Evaluation**

**Brockton Bridge, between Lots 47 and 48, Concession A, Municipality of  
 Brockton, Bruce County**

I have been retained by the County of Bruce to conduct a cultural heritage evaluation of the proposed development for the Brockton Bridge located on Concession Road 20, Municipality of Brockton, Bruce County.

As part of our due diligence, we are requesting if the Ontario Heritage Trust has any heritage concerns regarding this area – and if so, could you please elaborate on what these specific concerns relate to in general and specifically.  
 I attach a map of the study area.

Many thanks.

Sincerely

Scarlett E. Janusas, B.A., M.A., CAHP  
 President, SJAI  
 Member, APA, CNEHA, SHA, OMHC, CAHP  
 Response from Ontario Heritage Trust



Tue 7/25/2017 11:27 AM

Thomas Wicks <Thomas.Wicks@heritagetrust.on.ca>

RE: OHT heritage concerns re: Brockton Bridge

To Scarlett Janusas

Hi Scarlett,

Thank you for the letter dated July 19, 2017 requesting information from the Trust regarding potential heritage concerns regarding the proposed development of Brockton Bridge on Concession Road 20, Bruce County.

The Ontario Heritage Trust does not own any properties within or adjacent to the subject property area, nor do we hold an easement agreement on any properties within or adjacent to the subject site. As we do not have any legal interests in this area we will not be providing comments regarding the site's cultural heritage.

Thank you for consulting with the Trust regarding this matter.

Regards  
Thomas

**SCARLETT JANUSAS ARCHAEOLOGY INC.**  
269 Cameron Lake Road, Tobermory, Ontario N0H 2R0  
Phone 519-596-8243, cell 519-374-1119  
jscarlett@amtelecom.net  
www.actionarchaeology.ca



July 19, 2017

Ms. Kelly Coulter  
Chief Administrative Officer  
Bruce County

Via email: KCoulter@brucecounty.on.ca

Dear Ms. Coulter:

**RE: Cultural Heritage Evaluation**  
**Brockton Bridge, between Lots 47 and 48, Concession A, Municipality of**  
**Brockton, Bruce County**

I have been retained by the County of Bruce to conduct a cultural heritage evaluation of the proposed development for the Brockton Bridge located on Concession Road 20, Municipality of Brockton, Bruce County.

As part of our due diligence, we are requesting if the Ontario Heritage Trust has any heritage concerns regarding this area – and if so, could you please elaborate on what these specific concerns relate to in general and specifically.  
I attach a map of the study area.

Many thanks.

Sincerely

The signature is written in a cursive, flowing style in blue ink. It appears to read 'Scarlett Janusas'.

Scarlett E. Janusas, B.A., M.A., CAHP  
President, SJAI  
Member, APA, CNEHA, SHA, OMHC, CAHP  
No response from County of Bruce – assuming no concerns.

## Email Correspondence with MTO

From: Scarlett Janusas (mailto:[scarlett@amtelecom.net](mailto:scarlett@amtelecom.net))  
 Sent: Tuesday, February 13, 2018 9:13 AM  
 To: Brian Knox <[bknox@brucecounty.on.ca](mailto:bknox@brucecounty.on.ca)>  
 Subject: Bridges

Good Morning Brian - I'm doing some revisions to two bridge reports for the County of Bruce and was hoping that you (the County) would have a file for both bridges which would provide information on maintenance, upgrades, photos, blueprints, etc. The bridges are Bridge 0002 or the Riversdale Bridge and Bridge 11, Brockton Bridge.

Attaching location maps for same.

If you have such a file for each, I can arrange to come and copy the portions of the file that apply to the CHER.

Thanks -hope you are enjoying the winter so far.

Scarlett

Scarlett Janusas, BA, MA, CAHP, RPA  
 Member CAHP, CNHEA, OMHC, SHA  
 President, Scarlett Janusas Archaeology Inc.  
 289 Cameron Lake Road  
 Tobemory, ON N0H 2R0  
 Office 519-596-2343  
 Mobile 519-371-1119  
[scarlett@amtelecom.net](mailto:scarlett@amtelecom.net)  
[www.archaeology.ca](http://www.archaeology.ca)

Individuals who submit letters and other information to Council and its Committees should be aware that any personal information contained within their communications may become part of the public record and may be made available through the agenda process which includes publication on the County's website.  
 If you have received this communication in error, please notify the sender immediately and delete all copies (electronic or otherwise). Thank you for your cooperation.

If you feel that this email was commercial in nature and you do not wish to receive further electronic messages from the County of Bruce, please click on the following link to unsubscribe:  
<http://unsubscribe.brucecounty.on.ca/view.php?id=22357>  
 Please be advised that this may restrict our ability to send messages to you in the future.

-----Original Message-----

From: Brian Knox (mailto:[bknox@brucecounty.on.ca](mailto:bknox@brucecounty.on.ca))  
 Sent: Tuesday, February 13, 2018 2:07 PM  
 To: Scarlett Janusas <[scarlett@amtelecom.net](mailto:scarlett@amtelecom.net)>  
 Cc: Laurie Bester <[lbester@brucecounty.on.ca](mailto:lbester@brucecounty.on.ca)>  
 Subject: RE: Bridges

Good afternoon

I believe the bridges are both in Brockton and we do not have files on the Riversdale Bridge yet might have something on the northerly bridge that was part of a Master Plan study done in about 2005. I recall Brockton, John Strader, overseeing a deck repair on the northerly bridge. I understand that MTO used to be the custodians of bridge files yet I believe their municipal bridge office has closed and they sent out the information (maybe copies?).

We shall look into the North Bridge information we have and email, hopefully this week.

Many thanks,

Brian

Brian Knox  
 Engineer  
 Transportation & Environmental Services  
 Corporation of the County of Bruce

519-881-2400 ext 283  
[www.brucecounty.on.ca](http://www.brucecounty.on.ca)

-----Original Message-----

From: Laurie Bester (mailto:[lbester@brucecounty.on.ca](mailto:lbester@brucecounty.on.ca))  
 Sent: Tuesday, February 13, 2018 4:06 PM  
 To: Scarlett Janusas <[scarlett@amtelecom.net](mailto:scarlett@amtelecom.net)>  
 Cc: Brian Knox <[bknox@brucecounty.on.ca](mailto:bknox@brucecounty.on.ca)>  
 Subject: RE: Bridges

Scarlett,

We have inquired to our Masterplan Consultant and they do not have any files on the Bridge 11, Brockton Bridge (20th Concession Bridge as referred to in the Masterplan). I have attached a copy of the Bridge Infrastructure Masterplan which includes this particular bridge.

Thank you:

Laurie

Laurie Bester  
 Administrative Assistant  
 Transportation & Environmental Services  
 Corporation of the County of Bruce

519-881-2400 ext 308  
[www.brucecounty.on.ca](http://www.brucecounty.on.ca)



-----Original Message-----

From: Scarlett Janusas [mailto:[scarlett@amtelecom.net](mailto:scarlett@amtelecom.net)]

Sent: February 13, 2018 2:15 PM

To: Hayes, Chris (MTO); Haalstra, Martin (MTO)

Cc: Drea Nelson - GM BluePlan

Subject: additional bridges

Importance: High

Hi again - I just had contact with the County of Bruce Roads Transportation Director and he said that MTO used to have a municipal bridge office (now closed). They have no files at their end - but thought maybe you could track them down. I'm attaching the maps for both. If it is possible, could you please provide all information (plans, repairs, reports, pictures) for these two bridges.

Very much appreciated

Regards

Scarlett

Scarlett Janusas, BA, MA, CAHP, RPA  
Member CAHP, CNEHA, OMHC, SHA  
President Scarlett Janusas Archaeology Inc.  
269 Cameron Lake Road  
Tobermory, ON N0H 2R0  
Office 519-596-8243  
Mobile 519-374-1119  
[scarlett@amtelecom.net](mailto:scarlett@amtelecom.net)  
[www.actionarchaeology.ca](http://www.actionarchaeology.ca)

-----Original Message-----

From: Hayes, Chris (MTO) [mailto:[Chris.Hayes2@ontario.ca](mailto:Chris.Hayes2@ontario.ca)]

Sent: Thursday, February 15, 2018 3:50 PM

To: Scarlett Janusas <[scarlett@amtelecom.net](mailto:scarlett@amtelecom.net)>

Subject: RE: additional bridges

Scarlett,

I found out the site numbers for the Bruce County structures, 2-262 in Riversdale and 2-413 in Paisley. I had a look around our off and again found nothing. So, I sent the request off to Bridge Office. I would hope to hear back from them within a weeks time.

I'll let you know what they find either way.

Regards,

Chris Hayes  
Ministry of Transportation  
Structural Technician  
[Chris.Hayes2@ontario.ca](mailto:Chris.Hayes2@ontario.ca)  
519-873-4343

-----Original Message-----

From: Scarlett Janusas [mailto:[jscarlett@amtelecom.net](mailto:jscarlett@amtelecom.net)]  
Sent: February 25, 2018 1:42 PM  
To: Hayes, Chris (MTO)  
Subject: RE: additional bridges

Hi Chris - any updates on these two bridges? Much appreciated.

Regards  
Scarlett

-----Original Message-----

From: Hayes, Chris (MTO) [mailto:[Chris.Hayes2@ontario.ca](mailto:Chris.Hayes2@ontario.ca)]  
Sent: Tuesday, February 27, 2018 3:33 PM  
To: Scarlett Janusas <[jscarlett@amtelecom.net](mailto:jscarlett@amtelecom.net)>  
Subject: RE: additional bridges

Scarlett,

Sorry, I haven't heard back from bridge office yet. Again I'll let you know if they send me anything.

Regards,

Chris Hayes  
Ministry of Transportation  
Structural Technician  
[Chris.Hayes2@ontario.ca](mailto:Chris.Hayes2@ontario.ca)  
519-873-4343

-----Original message-----

From: Scarlett Janusas [mailto:[jscarlett@amtelecom.net](mailto:jscarlett@amtelecom.net)]  
Sent: February 27, 2018 3:40 PM  
To: Hayes, Chris (MTO)  
Cc: Drea Nelson - GM BluePlan  
Subject: RE: additional bridges

Thank you.

From: Hayes, Chris (MTO) [mailto:[Chris.Hayes2@ontario.ca](mailto:Chris.Hayes2@ontario.ca)]  
Sent: Wednesday, February 28, 2018 11:00 AM  
To: Scarlett Janusas <[jscarlett@amtelecom.net](mailto:jscarlett@amtelecom.net)>  
Subject: RE: additional bridges

Scarlett,

Sorry, but Bridge Office couldn't find any drawings for either 2-262 or 2-413.

And sorry for the wait.

Regards,

Chris Hayes  
Ministry of Transportation  
Structural Technician  
[Chris.Hayes2@ontario.ca](mailto:Chris.Hayes2@ontario.ca)  
519-873-4343

---

-----Original Message-----

From: Scarlett Janusas [mailto:[jscarlett@amtelecom.net](mailto:jscarlett@amtelecom.net)]

Sent: February 28, 2018 11:01 AM

To: Hayes, Chris (MTO)

Subject: RE: additional bridges

Really appreciate everyone having a look. Thank you Chris.

Regards

Scarlett

From: Hayes, Chris (MTO) [mailto:[Chris.Hayes2@ontario.ca](mailto:Chris.Hayes2@ontario.ca)]

Sent: Wednesday, February 28, 2018 11:04 AM

To: Scarlett Janusas <[jscarlett@amtelecom.net](mailto:jscarlett@amtelecom.net)>

Subject: RE: additional bridges

No problem.

Just a little disappointed that we didn't find any drawings.

Let us know if you need us to look up any drawings in the future.

-----

## Appendix J: Partial CV of Scarlett Janusas

### **SCARLETT JANUSAS ARCHAEOLOGY INC.**

**269 Cameron Lake Road Tobermory, Ontario N0H 2R0**

**Phone 519-596-8243 cell 519-374-1119**

**jscarlett@amtelecom.net**

**www.actionarchaeology.ca**

### **COMPANY PROFILE**

**Scarlett Janusas Archaeology Inc.** (SJAI) is a consulting firm with area representatives in Owen Sound, Kingston, the Greater Toronto Area, Hamilton, London, Peterborough, Niagara-on-the-Lake, and Tobermory, Ontario. We conduct archaeological work **anywhere** in the province of Ontario, on land and underwater. Our experience has taken us to Thunder Bay in the north, Pembroke and Ottawa in the east, Amherstburg in the east; and Niagara on the Lake in the south, and all points in between. Our work has included partnerships and engagement with many First Nation and Métis groups across the province.

Staff and associates include:

- Ms. Scarlett Janusas, President of the company, and an experienced underwater and land based archaeologist, with experience in both prehistoric and historic archaeology, and over 39 years' experience.
- Ms. Susan Bazely, Senior Archaeologist and Education Coordinator, with 33 years' experience;
- Mr. John Grenville, Cultural Heritage Specialist, over 35 years' experience;
- Dr. Thomas Arnold, Senior Archaeologist and surveyor, 37 years' experience
- Mr. James Badow, Senior Archaeologist, 33 years' experience
- Ms. Chelsea Robert; Field Director/Archaeologist; lab supervisor; 10 years' experience;
- Mr. Pete Demarte, Field Director/Archaeologist, 9 years' experience
- Ms. Gina Martin, historian, land conveyancer and genealogist with over 30 years' experience;
- Mr. Patrick Folkes, a recognized marine and land historian with over 40 years research experience;
- Mr. Douglas Sweiger, a material culture specialist in small arms and military history with over 25 years' experience;
- Mr. David Gilchrist, a marine archaeologist and teaching specialist with over 30 years' experience;
- Dr. Kimberly Monk, marine archaeologist and education expert;
- Mr. Jim Garrington, Shark Marine Technologies for geophysical projects.

Our vast experience allows us to offer our clients a multitude of services including both land and underwater archaeology, and prehistoric and historic archaeology. The company has licensed archaeologists under the requirements of the Ontario Heritage Act and is able to conduct Stage 1 (background research), Stage 2 (preliminary field

assessment), Stage 3 (definitive field assessment) and Stage 4 (complete site mitigation) for all archaeological projects. In addition, we have the resources to offer our clients follow-up services such as development of interpretative displays, hands-on education, and educational course development.

## SCARLETT E. JANUSAS

269 Cameron Lake Road, Tobermory, Ontario N0H 2R0 [www.actionarchaeology.ca](http://www.actionarchaeology.ca)  
Phone 519-596-8243 cell 519-374-1119 [jscarlett@amtelecom.net](mailto:jscarlett@amtelecom.net)

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**EDUCATION**      B.A., Anthropology/Archaeology, University of Western Ontario, London, Ontario  
M.A., Anthropology/Archaeology, Trent University, Peterborough, Ontario  
National Museum of Canada, Ottawa, Ontario  
Basic Museum Management Certificate

University of Waterloo, Waterloo, Ontario  
Courses towards a Certificate in Environmental Assessment  
Submerged Worlds and Marine Archaeology, University of Southampton

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**AFFILIATIONS**      ONTARIO MARINE HERITAGE COMMITTEE  
ONTARIO ARCHAEOLOGICAL SOCIETY  
SOCIETY FOR HISTORICAL ARCHAEOLOGY  
ASSOCIATION OF PROFESSIONAL ARCHAEOLOGISTS  
(V.P. 2005-2009) (PRES. 2009-2013) (PAST PRESIDENT 2013-2015)  
COUNCIL FOR NORTHEASTERN HISTORIC ARCHAEOLOGY  
CHAIR OF TOBERMORY HYPERBARIC FACILITY BOARD  
(2017-2019)

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### Experience:

2013 to date      **SCARLETT JANUSAS ARCHAEOLOGY INC.**

**President** – Responsible for conducting cultural impact assessment and site mitigation and development of cultural resource management plans for clients in Ontario as part of the Ontario Heritage Act, the Planning Act, the Aggregates Act and as part of environmental impact assessment both on land and underwater. Compliance with the Ministry of Labour Regulations for work conducted underwater. Responsible for day to day management of above mentioned firm. Responsible for varied crew sizes, ranging from 1 to 60 persons depending on project needs. Experience includes writing proposals and schedules, administration, co-ordination of projects and crew, data collection and analysis, photography, graphics, report writing and preparation, invoicing, payroll, accounting, and compliance mitigation.

2002 -2013      **SCARLETT JANUSAS ARCHAEOLOGICAL AND HERITAGE CONSULTING AND EDUCATION**

**President** – Responsible for conducting cultural impact assessment and site mitigation and development of cultural resource management plans for clients in Ontario as part of the Ontario

Heritage Act, the Planning Act, the Aggregates Act and as part of environmental impact assessment both on land and underwater. Compliance with the Ministry of Labour Regulations for work conducted underwater. Responsible for day to day management of above mentioned firm. Responsible for varied crew sizes, ranging from 1 to 30 persons depending on project needs. Experience includes writing proposals and schedules, administration, co-ordination of projects and crew, data collection and analysis, photography, graphics, report writing and preparation, invoicing, payroll, accounting, and compliance mitigation.

2009, 2010

#### **THIS LAND ARCHAEOLOGY**

**FIELD DIRECTOR/ASSOCIATE – STAGE 2, 3 AND 4 PROJECTS IN GREATER TORONTO AREA, RICHMOND HILL, AURORA, BOND HEAD, BRAMPTON, BRANTFORD, INNISFIL, BRADFORD, VAUGHAN, OSHAWA.**

1995 to 2002 **MAYER HERITAGE CONSULTANTS**

**Consulting Archaeologist** – Responsible for conducting cultural impact assessment and site mitigation and development of cultural resource management plans for clients in Ontario as part of the Ontario Heritage Act, the Planning Act, and as part of environmental impact assessment both on land and underwater. Responsible for varied crew sizes, ranging from 1 to 16 persons, depending on project needs. Responsibilities include writing proposals, schedules, co-ordination of projects and crew, data collection and analysis, photography, graphics, and report writing and preparation.

1993 to 1995 **GOLDER ASSOCIATES LIMITED**

**Senior Archaeologist** – Responsible for eastern Canada, development of an archaeology section, preparation of proposals, field and laboratory work, preparation of reports, marketing and budgeting. Associate in environmental assessment projects.

1993 to 2002 **ONTARIO MARINE HERITAGE COMMITTEE**

**Co-Principal** in the Submerged Prehistoric Shoreline Study in Georgian Bay in cooperation with the Ontario Marine Heritage Committee, Parks Canada, Fathom Five National Marine Park and the Geological Survey of Canada. The study focused on the geological history of previously exposed watercourses and the archaeological potential of the former exposed areas for archaeological sites dating to the Paleo and Archaic periods of southwestern Ontario. The technical portion of the project includes the use of side scan sonar, GPS, depth sounders, navy submersibles, remote videos, SCUBA, and computers.

1991 to 2001 **ONTARIO MARINE HERITAGE COMMITTEE**

**Chairperson** – Responsibilities include scheduling, organization of workshops and meetings, administrative duties, chairing meetings and providing archaeological input into proposed and active projects.

1986 to 1993 **REGIONAL MUNICIPALITY OF WATERLOO**

**Regional Archaeologist** – Responsibilities included 1) the provision of expert advice on archaeological matters to municipalities, developers, planning, engineering and archaeological consultants regarding archaeological potential of the Region, and Planning and Development policy pertaining to heritage resource management; 2) undertaking research and special studies to support Regional decisions on archaeologically related matters; 3) acted as an archaeological consultant for the Region; 4) acted as the liaison between the Province of Ontario and the Municipality; 5) developed policy for the effective management of archaeological resources; 6) acted as an information source for private, business and public sectors on matters of archaeology;



7) initiated and conducted special projects a) the creation of a permanent Archaeology Division for the Regional Municipality of Waterloo b) researched, developed and published the **first** Archaeological Master Plan in the Province of Ontario c) invited participant for the Federal Environmental Assessment Review Office Environmental Assessment and Heritage National Workshop, Ottawa; d) staff liaison for the Regional Official Policies Plan Heritage Advisory Committee (1991-1993); e) acquired the loan of the prehistoric and historic Lissos collection and conducted analysis of the collection f) organized and supervised the collection and analysis of urban historic archaeological potential data for urban centres in the Regional Municipality of Waterloo g) member of the Regional Official Policies Plan Management Team h) Regional courses in field archaeology i) volunteer program j) designation of an Aboriginal cemetery for remains located during development and k) field school at the Waterloo County Jail for primary grade students.

1984 to 1997 **SCARLETT JANUSAS AND ASSOCIATES INC.**

**President of Archaeological Consulting Firm**– Created firm in response to development pressures on archaeological resources. Services provided by the firm included background research studies, archaeological resource assessments, cultural impact studies, interpretative design projects, resource evaluation and interpretation models, extant artifact collection documentation, analysis and interpretation, archaeological excavation and monitoring, cultural resource management, historic research to locate environmental hazards, historic interpretation of properties (genealogy of historic properties). Scarlett Janusas and Associates Inc. was a Canadian heritage and archaeological consulting firm specializing in archaeological resource assessment, cultural impact studies, cultural resource management and interpretative studies for land and underwater heritage resources.

1992 to 1995 **MAYER HERITAGE CONSULTANTS INC.**

Marine Heritage Associate – Responsibilities included management of all marine heritage projects.

1990 **ONTARIO MARINE HERITAGE COMMITTEE**

**Co-principal** for the archaeological documentation of the HMS NEWASH.

1990 **ONTARIO HERITAGE FOUNDATION**

**Principal Conservator** – Responsible for the restoration of ceramic class from Inge Va, Perth County, Ontario.

1989 **CANADIAN PARKS SERVICE**

**Volunteer** – Mapping of the shipwreck the MINCH in Fathom Five National Marine Park.

1988 **SCARLETT JANUSAS AND ASSOCIATES INC.**

**Principal Investigator** – Responsible for the underwater survey of Ste. Marie II, Christian Island and for research for the marine history of the Christian Islands for the Christian Island Archaeological Master Plan.

1987 **MAYER, PIHL, POULTON AND ASSOCIATES**

**Principal Investigator** – Responsible for conducting the TransCanada Kirkwell Pipeline Survey.

1987 **SCARLETT JANUSAS AND ASSOCIATES INC.**

**Principal Investigator** – Responsible for the preliminary investigations of a scuttled ship located in the excavation of the Dome Stadium.

1986 **MAYER, PIHL, POULTON AND ASSOCIATES**

**a) Field Assistant** – Responsible for the Union Gas pipeline heritage assessment in Ancaster/Hamilton area, housing development.

**b) Field Assistant** – excavation of the Pengelly site near Mississauga, a Middle Woodland village.

**c) Field Assistant** – several housing subdivision heritage resource assessments in the cities of Kitchener and Waterloo.

1986 **EMPRESS OF IRELAND HISTORICAL SOCIETY**

**Archaeological Consultant** – Providing archaeological advice to the Society.

1986 **ONTARIO MARINE HERITAGE COMMITTEE**

**Archaeological Assistant** – Responsible for the preliminary mapping and excavation of an unidentified mid-19<sup>th</sup> century ship located in Lake Erie at a depth of 70’.

1986 **SCARLETT JANUSAS AND ASSOCIATES**

**Principal** – Responsible for investigation of a proposed dock area at Historic Naval and Military Establishments. Underwater archaeological survey.

1985 **TORONTO HISTORICAL BOARD**

**Senior Archaeologist** – Developed a study report recommending a City Archaeology Policy and implementation guidelines. Two excavations were also conducted at the MacKenzie House and St. James Cathedral. Impact assessment of Toronto Island historic midden.

1984-1987 **MAYER, PIHL, POULTON AND ASSOCIATES**

**Consulting Archaeologist** – Conducting impact assessments and site mitigation on such projects as Union Gas Pipeline impact assessment in Ancaster/Hamilton area, subdivision in Niagara Region, excavation of the Pengelly site near Mississauga, subdivision assessment in Kitchener, excavation of 19<sup>th</sup> century mill (Elmdale Mill) in Ajax, and archaeological assessment along Moira River, Belleville.

1984 **CANADIAN PARKS SERVICE**

**a) Archaeologist** – Responsible for conducting an archaeological resource evaluation of Point Pelee National Park and the development of the Point Pelee National Park Cultural Resource Management Plan. Also conducted two field campaigns to Central Grenadier Island in St. Lawrence Islands National Park. Acted as co-leader in the presentation of a special seminar at Point Pelee National Park to inform staff of progress of the Archaeological Resource Management Plan and to aid in establishing and interpretation exhibition of the prehistory of man at the Park.

**b) Marine Archaeologist (GT-2), Marine Heritage Unit** – Red Bay project, Labrador. Responsible for the excavation of a 16<sup>th</sup> century Spanish Basque whaling ship locating in approximately 40’ of water including mapping and recording. Experience with airlifts, dry suits and hot water suits.

1983 **FATHOM FIVE PROVINCIAL PARK**

**Docent** – Aided visiting divers in orientation to the Park, its rules and regulations, and provided information of shipwrecks of the area.

#### 1983 to 1986 **ONTARIO UNDERWATER COUNCIL**

**Vice-President of Marine Conservation** – Responsible for providing initiative for the certifying agencies to include an underwater archaeological component in their teaching programs. Developed a slide show on underwater archaeology. Established the Marine Heritage Trust Fund. Hosted and organized numerous underwater archaeological seminars and workshops including Thunder Bay and Toronto.

#### 1983 **MINISTRY OF CITIZENSHIP AND CULTURE**

**Archaeologist** – Assisted in various underwater archaeological projects across the province including Port Abino and Niagara-on-the-Lake.

#### 1983 **ONTARIO MARINE HERITAGE COMMITTEE**

**Consultant** – Provided advice on submerged resource survey of waters off the Penetanguishene Naval and Military Establishments.

#### 1983 **SAVE ONTARIO SHIPWRECKS**

**Consultant** – Provided advice on the recording and survey of an 18<sup>th</sup> century wharf at Navy Hall.

#### 1983 **ONTARIO HERITAGE FOUNDATION**

**Originator, Designer, Producer and Promoter** – slide and cassette show on underwater archaeology, lecture material for various diving agencies in Ontario on marine conservation. Grant.

#### 1983 **ONTARIO UNDERWATER COUNCIL**

a) **Program Chairperson** – 3<sup>rd</sup> Annual Underwater Archaeological Seminar.

b) **Originator and Developer** – Ontario Underwater Council Heritage Trust Fund.

c) **OUC Representative** – Provided input for the National Marine Parks Policy.

#### 1983 to 1991 **MAYER, POULTON AND ASSOCIATES**

**Marine Heritage Associate** – Provide advice on all marine projects.

#### 1983 **MUSEUM OF INDIAN ARCHAEOLOGY**

**Assistant Archaeologist** – GO TRAIN (Ministry of Transportation and Communication) survey conducted near Oshawa, Ontario.

**Field Director** – Crawford Lake site, a Middle Woodland village for the Halton Region Conservation Authority. Supervision of a crew of 8 in the excavation and recording of a longhouse and test trenches.

**Field Assistant** – archaeological resource assessment of the McGrath Site, Middlesex County.

#### 1982 **MUSEUM OF INDIAN ARCHAEOLOGY**

**Assistant Field Director** – Willcock site, Byron, Ontario. Responsible for the supervision of the excavation of an undisturbed prehistoric (circa 1250 A.D.) site, and the preliminary conservation and cataloguing of artifacts.

**Field Director** – Crawford Lake site, Halton Region Conservation Authority. Responsible for the excavation of a longhouse and the survey and excavation of a conservation roadway.

**Assistant Field Director and Acting Director** – Crawford Lake Village site, Halton Region Conservation Authority. Responsible for the excavation of the prehistoric Middleport village, preliminary conservation, cataloguing and flotation.

**Assistant Photographer and Designer** – Responsibilities included preparation of plates for publication, developing film and PMT production.

**Principal Investigator** – preliminary underwater archaeological survey of Crawford Lake, Halton Region.

**Archaeological Assistant** – archaeological resource assessment, City of London.

#### 1981 MUSEUM OF INDIAN ARCHAEOLOGY

**Assistant Contract Archaeologist** – Responsible for conducting archaeological resource assessments on properties scheduled for development.

**Contract Archaeologist** – responsible for conducting archaeological resource assessment on properties scheduled for development.

#### **Research Associate**

1981-1983 SELF-EMPLOYED

**Principal Investigator** – Preliminary underwater survey of the Kettle Point chert outcrops off Kettle Point, Lambton County (part of Master's thesis).

1981 to 1982 SELF-EMPLOYED

**Principal Investigator** – Kettle Point Chert project. Kettle Point chert samples were collected and used in a petrological study and spatial and temporal distribution analysis. Methods of investigation included thin section analysis, x-ray fluorescence, neutron activation analysis and isotopic composition analysis. Master's thesis.

#### 1980 MUSEUM OF INDIAN ARCHAEOLOGY

**Lab analyst** – Conducted the preliminary conservation and cataloguing of the 19<sup>th</sup> century Van Egmond house materials (Seaforth, Ontario).

**Assistant Field Director** – prehistoric Neutral Lawson village site, London. Responsible for directing excavation, public relations and technical assistance.

**Field Director** – Archaic site was subject of salvage excavation utilizing waterscreens and heavy machinery.

**Field Assistant** – excavation of the 19<sup>th</sup> century Van Egmond House.

**Assistant Field Director** – multi-component site of Squaw Island in St. Lawrence Islands National park. In association with the Archaeological Survey of Canada, National Museum of Man.

#### 1979 to 1980 MUSEUM OF INDIAN ARCHAEOLOGY

**Research Assistant** – Analysis of the Draper site castellations employing SPSS, using the DEC10 and PDP11 systems. Completed an edit of the Draper rim sherd file.

#### 1979 MUSEUM OF INDIAN ARCHAEOLOGY

#### **Research Associate.**

**Field Director** – Upper Thames Conservation Authority. Conducted an intensive field survey of the prehistoric and historic resources in the Glengowan Dam project area and analyzed materials.

**Project Director** – Upper Thames Conservation Authority. Conducted a preliminary assessment of the prehistoric and historic cultural resources of the Glengowan Dam Project area.

**Field Director** – excavation of a Glen Meyer village located in Longwoods Conservation Area and acted as public relations liaison.

**Volunteer** – Fathom Five Provincial Park, Tobermory, Ontario. Mapping of the 19<sup>th</sup> century shipwreck, WETMORE.

#### 1978 MUSEUM OF INDIAN ARCHAEOLOGY

**Research Assistant** – Researching reference material for the Museum gallery, including such topics as trade networks, ceremonial goods, settlement patterns, burial practices, and artifact

types and interpretation.

**1977 MUSEUM OF INDIAN ARCHAEOLOGY**

**Curatorial Assistant** – Inventory and preliminary analysis of the complete Wilfred Jury collection.

**Archaeological Assistant** – Survey of the New Toronto International Airport proposed location, Pickering. Project objectives included locating archaeological resources and preparing a site inventory. Also conducted preliminary conservation and cataloguing of recovered materials.

**Research Assistant** –analysis of material recovered from the New Toronto International Airport Survey.

**SCARLETT E. JANUSAS**

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## **PROJECT RELATED EXPERIENCE – CULTURAL HERITAGE ASSESSMENT**

**DG Group** **Caledon East**  
Cultural Heritage impact assessment of farm, Airport Road, subdivision (2017).

**County of Bruce** **Paisley**  
Cultural Heritage Impact Assessment of Bridge 11, Pratt Through Truss (2017)

**County of Bruce** **Riversdale**  
Cultural Heritage Assessment of Bridge 0002 – Pony Truss (2017)

**Arcadis Canada Inc.** **Thunder Bay**  
Cultural Heritage Evaluation of Proposed Boulevard Lake Dan Rehabilitation.

**Angil Development Group** **Brantford**  
Heritage Impact Assessment, Block Bounded by Wellington Street, West Street, Darling Street and Bridge Street, City of Brantford (2016)

**Block 59, Vaughan** **Vaughan**  
Cultural Heritage Impact Assessment of Block 59 in City of Vaughan. Industrial/commercial block development (2014).

**Bracebridge Power Generation** **Parry Sound**  
Cultural Heritage Impact Assessment of Cascade Street Power Generation Station (2014)

**East Durham Wind Farm** **Grey County**  
Cultural Heritage Assessment for proposed Wind Farm.

**Gotham/Conestogo Wind Farm** **Perth and Region of Waterloo**  
Cultural Heritage Assessment for proposed Wind Farm. Invenergy LLC

**NextEra** **Middlesex Co.**  
Self-Assessment Bornish and parts of Adelaide Wind Farm (2012)

**AREA Architects**  
2008 Cultural Heritage Assessment of former Ontario Bedding Company, Waterloo, Ontario.

**AREA Architects**  
2009 Cultural Heritage Assessment of Hergott Cider Mill and Property, Waterloo, Ontario.

**METRUS Development Inc.**  
2010 Cultural Heritage Impact Assessment of Two Properties in City of Brampton, Ontario.

**METRUS Development Inc.**

2010 Cultural Heritage Impact Assessment of Four Properties in City of Brampton, Ontario.

**Penn Energy**

2010 Cultural Heritage Assessment of Stewart South and Stewart North properties, Northumberland County.

**Helimax**

2010 Cultural Heritage Assessment of Capreol Solar Farm, Sudbury District.

**Helimax**

2010 Cultural Heritage Assessment of Glenarm Solar Farm, Kawartha Lakes.

**GL Garrad Hassan****Sophiasburg, Prince Edward County**

Stage 1 Archaeological Assessment Sunny Shores Solar Facility (2012).

**Schneider Power**

2010 Cultural Heritage Assessment of Trout Creek Wind farm, Parry Sound.

**GL-Garrad Hassan****Bruce County**

Heritage Screening Skyway 127 Wind Energy Inc. Bruce County (2011)

**Dillon Consulting Ltd****Mono Township, Ontario**

Self- Assessment Dufferin Wind Farm 69 KV Transmission Line (2011)

**Dillon Consulting Ltd****Amaranth Township, Ontario**

Self-Assessment Dufferin Wind Farm 230 KV Transmission Line (2011)

**Dillon Consulting Ltd****Amaranth Township, Ontario**

Stage 1 Archaeological Assessment Dufferin Wind Farm – Additional Lands (2011)

**Dillon Consulting Ltd.****Melancthon Township, Ontario**

Stage 2 Archaeological Assessment Dufferin Wind Farm Alternate #5 Turbine (2011)

**Dufferin Wind Power Inc. and Dillon Consulting Ltd.****Melancthon Township, Ontario**

Self-Assessment Protected Properties, Archaeological and Heritage Resources Dufferin Wind Power Project (2011)

**Dufferin Wind Power Inc. and Dillon Consulting Ltd.****Melancthon Township, Ontario**

Self-Assessment Protected Properties, Archaeological and Heritage Resources Dufferin Wind Project proposed 69KV transmission line and POI (2012)

**Melancthon and Amaranth Townships, Ontario**

Cultural Heritage Assessment Proposed 230 KV Transmission Line Dufferin Wind Farm (2012)



**Dillon Consulting Ltd.** **Melancthon Township, Ontario**  
Stage 1 Arch. Ass. Dufferin Wind Farm 69 JV Transmission Line (2012)

**Dillon Consulting Ltd.** **Melancthon Township, Ontario**  
Cultural Heritage Assessment Proposed Dufferin Wind Farm (Including proposed 230 KV and 69 KV Transmission Line) (2012)

**Dillon Consulting Ltd.** **Melancthon Township, Ontario**  
Cultural Heritage Assessment and Stage 1&2 PRIVATE EASEMENT Proposed 230 KV Transmission Line Dufferin Wind Farm (2012)

**Dufferin County, Ontario**  
Stage 2 Arch. Ass. Dufferin Wind Farm Layout Modifications (2012)

**Canadian Solar Solutions Inc. & Dillon Consulting Ltd.** **Temiskaming, Ontario**  
Self-Assessment Protected Properties, Archaeological & Heritage Resources and Stage 1 Archaeological Assessment Liskeard 1, 3, & 4 Solar Farms (2011)

**Capreol, Ontario**  
Cultural Heritage Assessment for proposed Highlight Solar Project (2011)

**SkyPower Limited** **Durham, Ontario**  
Cultural Heritage Assessment Proposed Discovery light Solar Farm (2012)

**SkyPower Limited** **Durham, Ontario**  
Self – Assessment Protected Properties, Arch. & Heritage Resources (2012)

**SkyPower Limited** **Durham, Ontario**  
Self – Assessment Protected, Arch. & Heritage Resources - ILLUMINATIONLIGHT LP Solar Power Project (2012)

**Sky Power Limited**  
Self- Assessment Protected Properties, Archaeological & Heritage Resources Fotolight LP Solar Power Project 2011)

**SkyPower Limited** **Dundas County, Ontario**  
Self-Assessment Protected Properties and Stage 1&2, Archaeological and Heritage Resources Mighty LP Solar Power Project (2012)

**SkyPower Limited** **Dundas County, Ontario**  
Self-Assessment Protected Properties and Stage 1&2, Archaeological and Heritage Resources CityLights LP Solar Power Project

**SkyPower Limited** **York County, Ontario**  
Cultural Heritage Assessment, Self-Assessment, and Stage 1&2 Proposed Goldlight Solar Farm (2012)

**SkyPower Limited****York County, Ontario**

Protected Properties, Archaeological and Heritage Resources Good Light LP Solar Power Project (2012)

**SkyPower Limited****York County, Ontario**

Cultural Heritage Assessment, Self -Assessment, and Stage 1&2 Proposed Earthlight Solar Farm (2012)

**SkyPower Limited****York County, Ontario**

Cultural Heritage Assessment, Self -Assessment, and Stage 1&2 Proposed Goldlight Solar Farm (2012) and CHIA

**SkyPower Limited****York County, Ontario**

Cultural Heritage Assessment, Self -Assessment, and Stage 1&2 Proposed Beam Light Solar Farm (2012)

**SkyPower Limited****Simcoe County, Ontario**

Self-Assessment, Cultural Heritage Assessment, and Stage 1&2 Archaeological Assessment for proposed Raylight Solar Farm, formerly Aria solar farm (2012).

**Waste Management of Canada Corp.****Ottawa, Ontario**

Environmental Assessment for a New Landfill Footprint at the West Carleton Environmental Centre Final – Cultural Heritage Detailed Impact Assessment (2012)

**Municipal Heritage Bridges  
Cultural, Heritage and Archaeological  
Resources Assessment Checklist  
Revised April 11, 2014**

*This checklist was prepared in March 2013 by the Municipal Engineers Association to assist with determining the requirements to comply with the Municipal Class Environmental Assessment. View all 4 parts of the module on Structures Over 40 Years at [www.municipalclassea.ca](http://www.municipalclassea.ca) to assist with completing the checklist.*

**Project Name:** BRIDGE No. 11 - GREENOCK  
**Location:** CONCESSION 20 - SOUTH OF PAISLEY  
**Municipality:** MUNICIPALITY OF BURLINGTON  
**Project Engineer:** GM BLUEPLAN ENGINEERING LIMITED  
**Checklist completed by:** JOHN SLOCOMBE, P. ENG.  
**Date:** JANUARY 29, 2018

**NOTE: Complete all sections of Checklist. Both Cultural Heritage and Archaeological Sections must be satisfied before proceeding.**

**Part A - Municipal Class EA Activity Selection**

Description	Yes	No
Will the proposed project involve or result in construction of new water crossings? This includes ferry docks.	<input type="checkbox"/> Schedule B or C	<input checked="" type="checkbox"/> Next
Will the proposed project involve or result in construction of new grade separation?	<input type="checkbox"/> Schedule B or C	<input checked="" type="checkbox"/> Next
Will the proposed project involve or result in construction of new underpasses or overpasses for pedestrian recreational or agricultural use?	<input type="checkbox"/> Schedule B or C	<input checked="" type="checkbox"/> Next
Will the proposed project involve or result in construction of new interchanges between any two roadways, including a grade separation and ramps to connect the two roadways?	<input type="checkbox"/> Schedule B or C	<input checked="" type="checkbox"/> Next

Description	Yes	No
Will the proposed project involve or result in reconstruction of a water crossing where the structure is less than 40 years old and the reconstructed facility will be for the same purpose, use, capacity and at the same location? (Capacity refers to either hydraulic or road capacity.) This include ferry docks.	<input type="checkbox"/> Schedule A+	<input checked="" type="checkbox"/> Next
Will the proposed project involve or result in reconstruction of a water crossing, where the reconstructed facility will not be for the same purpose, use, capacity or at the same location? (Capacity refers to either hydraulic or road capacity). This includes ferry docks.	<input type="checkbox"/> Schedule B or C	<input checked="" type="checkbox"/> Next
Will the proposed project involve or result in reconstruction or alteration of a structure or the grading adjacent to it when the structure is over 40 years old where the proposed work will alter the basic structural system, overall configuration or appearance of the structure?	<input type="checkbox"/> Next	<input checked="" type="checkbox"/> Assess Archaeological Resources (skip to Part D) (repair only)

#### Part B - Cultural Heritage Assessment

Description	Yes	No
Does the proposed project involve a bridge construction in or after 1956?	<input type="checkbox"/> Next	<input type="checkbox"/> Prepare CHER Undertake HIA
Does the project involve one of these four bridge types?	<input type="checkbox"/> Rigid frame      Next <input type="checkbox"/> Precast with Concrete Deck      Next <input type="checkbox"/> Culvert or Simple Span      Next <input type="checkbox"/> Steel Beam/Concrete Deck      Next	<input type="checkbox"/> Prepare CHER Undertake HIA

Description	Yes	No
Does the bridge or study area contain a parcel of land that is subject of a covenant or agreement between the owner of the property and a conservation body or level of government?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Does the bridge or study area contain a parcel of land that is listed on a register or inventory of heritage properties maintained by the municipality?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Does the bridge or study area contain a parcel of land that is designated under Part IV of the Ontario Heritage Act?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Does the bridge or study area contain a parcel of land that is subject to a notice of intention to designate issued by a municipality?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Does the bridge or study area contain a parcel of land that is located within a designated Heritage Conservation District?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Does the bridge or study area contain a parcel of land that is subject to a Heritage Conservation District study area by-law?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Does the bridge or study area contain a parcel of land that is included in the Ministry of Tourism, Culture and Sport's list of provincial heritage properties?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Does the bridge or study area contain a parcel of land that is part of a National Historic Site?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Does the bridge or study area contain a parcel of land that is part of a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input checked="" type="checkbox"/> Next

Description	Yes	No
Does the bridge or study area contain a parcel of land that is designated under the Heritage Railway Station Protection Act?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Does the bridge or study area contain a parcel of land that is identified as a Federal Heritage Building by the Federal Heritage Building Review Office (FHBRO)	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Does the bridge or study area contain a parcel of land that is the subject of a municipal, provincial or federal commemorative or interpretive plaque that speaks to the Historical significance of the bridge?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Does the bridge or study area contain a parcel of land that is in a Canadian Heritage River watershed?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Will the project impact any structures or sites (not bridges) that are over forty years old, or are important to defining the character of the area or that are considered a landmark in the local community?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Is the bridge or study area adjacent to a known burial site and/or cemetery?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Is the bridge considered a landmark or have a special association with a community, person or historical event in the local community?	<input type="checkbox"/> Prepare CHER Undertake HIA	<input type="checkbox"/> Next
Does the bridge or study area contain or is it part of a cultural heritage landscape?	<input type="checkbox"/> Prepare Cher Undertake HIA	<input type="checkbox"/> Assess Archaeological Resources

**PART C - HERITAGE ASSESSMENT**

Description	Yes	No
Does the Cultural Heritage Evaluation Report identify any Heritage Features on the project?	<input type="checkbox"/> Undertake HIA	<input type="checkbox"/> Part D - Archaeological Resources
Does the Heritage Impact Assessment determine that the proposed project will impact any of the Heritage Features that have been identified?	<input type="checkbox"/> Schedule B or C	<input type="checkbox"/> Part D - Archaeological Resources

**PART D - ARCHAEOLOGICAL RESOURCES ASSESSMENT**

Description	Yes	No
Will any activity, related to the project, result in land impacts/significant ground disturbance?	<input type="checkbox"/> Next	<input checked="" type="checkbox"/> Schedule A - proceed
Have all areas, to be impacted by ground disturbing activities, been subjected to recent extensive and intensive disturbances and to depths greater than the depths of the proposed activities?	<input type="checkbox"/> Schedule A - proceed	<input type="checkbox"/> Next
Has an archaeological assessment previously been carried out that includes all of the areas to be impacted by this project?	<input type="checkbox"/> Next	<input type="checkbox"/> Archaeological Assessment
Does the report on that previous archaeological assessment recommend that no further archaeological assessment is required within the limits of the project for which that assessment was undertaken, and has a letter been issued by the Ministry of Tourism, Culture and Sport stating that the report has been entered into the Ontario Public Register of Archaeological Reports?	<input type="checkbox"/> Schedule A - proceed	<input type="checkbox"/> Obtain satisfaction letter - proceed

**\*\* Include Documentation Summary in Project File\*\***



Prepared By:



## Municipality of Brockton: Greenock Structure No.0011

### Cultural Heritage Evaluation Report and Preliminary HIA (ADDENDUM) and Heritage Impact Assessment

**GMBP File: 212328**

**May 1, 2019**



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## **ATTACHMENTS**

**ATTACHMENT A: MTCS CORRESPONDENCE**

**ATTACHMENT B: BROCKTON MUNICIPAL HERITAGE COMMITTEE**

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## CULTURAL HERITAGE EVALUATION REPORT AND PRELIMINARY HIA (ADDENDUM) AND HERITAGE IMPACT ASSESSMENT

### MUNICIPALITY OF BROCKTON: GREENOCK STRUCTURE NO.0011

MAY 1, 2019

GMBP FILE: 212328

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## 1. INTRODUCTION

Cultural Heritage assessments are required to satisfy Section 2(d) of the Planning Act which necessitates *'the conservation of features of significant architectural, cultural, historical, archeological or scientific interest'*. The Ministry of Tourism, Culture and Sport (MTCS) requires evaluation under O.Reg. 9/06. Scarlett Janusas Archaeology Inc. was retained to complete a Cultural Heritage Evaluation Report (CHER) and a Preliminary Heritage Impact Assessment (HIA) for Bridge No.11. A copy of the Report dated July 20, 2017 and revised September 12, 2018, is included herein (i.e. Appendix D of the Project File for Bridge 11). This Addendum to the subject report (i.e. CHER/HIA), which is prepared to satisfy the outstanding issues outlined by the MTCS in email correspondence dated April 15, 2019 (provided in Attachment A), addresses the following:

- i. Provides a response to the outstanding MTCS Comments outlined in a Summary Table provided to GM BluePlan in the April 15, 2019 correspondence.
- ii. Provides a summary of the Municipality's community engagement efforts, including consultation with the Brockton Municipal Heritage Committee.
- iii. Provides a Heritage Impact Assessment based on the *Recommended Solution* to the Schedule 'B' Environmental Assessment, including a more specific review of the potential impacts and mitigation measures.

## 2. CHER UPDATE: RESPONSE TO MTCS COMMENTS

MTCS comments were summarized in a Comment Table, included in the April 15, 2019 correspondence from the MTCS and provided in Attachment A. This Section provides a summary of the comments in the same order in which they are outlined on the MTCS Table.

### 2.1 Response to MTCS Comment Table

#### 1. Section: Title and Report Contents

MTCS Comment: *'MTCS received the CHER/HIA prior to the Notice of Commencement being issued for this project. As such, the inclusion of a heritage impact assessment, no matter how preliminary, is considered premature as it cannot speak to the possible alternatives that would be outlined in an Environmental Study Report (ESR) or Project File Report.'*

#### GMBP Response

As part of the EA process, several background studies are requisitioned to inform the impacts of the alternative solutions considered for the project on the various 'environments' (i.e. Social, Technical, Natural, Cultural and Economic). With the exception of the Archaeological Assessment, which is to be submitted to the Ministry in accordance with Part IV of the Ontario Heritage Act, R.S.O., c0.18, the background studies are intended to form part of the Environmental Assessment Project File (or ESR) and be circulated to the public, stakeholders and agency groups in conjunction with the Project Notices (i.e. Notice of Project Initiation).

The issuance of the CHER/HIA report for Brockton Bridge 11 by the subconsultant, prior to the issuance of the Notice of Project Initiation, was not intended. The preliminary HIA, when included as part of the Project File, is used to identify where a project alternative may have an impact on an identified cultural heritage resource, and considers preliminary mitigation measures, which should be considered in the context of the overall project planning process.

## 2. Section: Table 2

A. MTCS Comment: Historical or Associative Value – sub-criterion i)

*'Elaborate on the types of associations the bridge has with the community and how these associations meet this criterion'.....'This comment holds for Section 6.2.2.'*

B. MTCS Comment: Historical or Associative Value – sub-criterion ii)

*'Elaborate on how the bridge yields, or has the potential to yield, information to understanding the community or culture'.*

C. MTCS Comment: Contextual Value – sub-criterion iii)

*'Explain why the bridge is not considered a landmark but is noted as such in the Analysis column'.*

### GMBP Response

In consideration of the MTCS Comments provided, Table 2 of the CHER/HIA (September 2018) is revised as follows:

**Table 2 (CHER/HIA) Revised Sub-Criterion Responses and Analyses**

Criterion	Response	Analysis
<b>Historical or Associative Value</b>		
i. Has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community.	No	The structure is not associated with any person, theme, organization, or institution within the former Township of Greenock. Accordingly, the subject bridge does not meet this criterion.
ii. Yields, or has the potential to yield information that contributes to an understanding of a community or culture.	No	No aspects of the bridge have been identified that would contribute to an understanding of the community or culture within the former Township of Greenock. Therefore, Bridge 11 does not yield or have the particular potential to yield information about the community and/or culture. Accordingly, the subject bridge does not meet this criterion.
<b>Contextual Value</b>		
iii. Is a landmark	No	The definition of a landmark is: an object or feature of a landscape or town that is easily seen and recognized from a distance, especially one that enables someone to establish their location ( <a href="http://www.oxforddictionaries.com">www.oxforddictionaries.com</a> ). The subject bridge is <u>not</u> a local landmark. It is not visible from the well travelled County Roads to the east and west. The bridge is located in a valley and cannot be seen until cresting the hill on either side of County Road 20.

**Section 6.2.2 Update:**

Based on the Table 2 revisions presented above, Section 6.2.2, Paragraphs 4 and 5 are revised to state the following:

The subject bridge does not have direct associations with an agricultural/rural theme that is significant to a community.

The subject bridge does not have the potential to yield information that contributes to an understanding of a community or culture.

**3. Section 6.2.3: Terminology**

MTCS Comment: *Clarify the sentence "... its former function to serve as a conduit across the Teeswater River..." (is it no longer used as a crossing).*

GMBP Response

It is acknowledged that the use of the word 'former' is misleading. Consistent with the first sentence presented in Section 6.2.3 which states that 'the bridge is still functional providing a conduit over the Teeswater River', the above-referenced statement is revised to say "... its function to serve as a conduit across the Teeswater River...".

**2.2 Additional Report Revisions**

The above referenced clarifications and/or revisions have implications on the Statement of Cultural Heritage Value. To provided consistency, the following revisions to the CHER/HIA are also required:

Section 6.4: Paragraph 7 (Historical or Associative Value) is replaced with the following:

Under Historical or Associative Value, criteria iii (Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community) is reportedly satisfied as the builder of the current bridge is the Hamilton Bridge Company of Hamilton, Ontario and built ca. 1890 to 1920. The Hamilton Bridge Works Company supplied the designs and steel for many bridges in Ontario. It is a manufacturer based in Hamilton, Ontario and was founded sometime around 1872 by Sir John Hendrie, 11<sup>th</sup> Lieutenant Governor General of Ontario.

### 3. COMMUNITY ENGAGEMENT

#### 3.1 Environmental Assessment Schedule 'B' Process Consultations

Community engagement has generally been completed as part of the Schedule 'B' Environmental Assessment process that is being completed for Bridge 11. As part of this process, a Notice of Project Initiation was issued on May 17, 2018 and a Notice of Project Update was subsequently issued on January 8, 2019. Project notices are advertised in the Walkerton Herald-Times and the Hanover Post and are circulated to various agencies and First Nations groups. In addition, project notices are also mailed to property owners within a 2-kilometer radius surrounding the bridge. The Notices include information pertaining to how the Project File, which includes a copy of the CHER/HIA, can be viewed (i.e. a link to the report or the Municipal website). Circulation lists summarizing the consultation efforts completed in conjunction with the EA process are provided in Appendix A of the Bridge No.11 Project File. A final project notice will be issued as part of the Notice of Completion specific to this EA.

#### 3.2 Brockton Municipal Heritage Committee

In March 2019 the Municipality requested the Brockton Municipal Heritage Committee to review the Cultural Heritage Evaluation Report and Preliminary Heritage Impact Assessment for Bridge No.11, as well as the Schedule 'B' Environmental Assessment Project File (Version 2: January 2019). The reports and a copy of the presentation provided to Council on January 22, 2019, which provided a summary of the evaluation and assessment of the alternatives considered for the Schedule 'B' EA, was provided to facilitate the review process. As part of the review process, the Heritage Committee was specifically requested to confirm the following:

- ☐ The Brockton Municipal Heritage Committee has reviewed the CHER/HIA (revised September 2018).
- ☐ The Brockton Municipal Heritage Committee supports (or otherwise) the conclusions with respect to the cultural heritage value assigned to Bridge No.11.
- ☐ The Brockton Heritage Committee supports (or otherwise) the findings of the Schedule 'B' Environmental Assessment (last updated in Jan 2019), which identified the removal of the existing bridge as the *Preliminary Recommended Solution*.
- ☐ The Brockton Municipal Heritage Committee supports (or otherwise) the mitigation measures proposed in the CHER/HIA.

Following the Brockton Heritage and Library Committee meeting on April 1, 2019, during which an overview of the EA Process and the CHER/HIA was presented by a Municipal representative and discussed, the Committee provided confirmation that the reports had been reviewed and indicated that they concurred with the *Preliminary Recommended Solution* outlined in the Project File provided, to remove the bridge, and generally concurred with the mitigation measures proposed in the CHER/HIA. Confirmation is provided in the Request of Review and Comment document provided in Attachment B.

Within the meeting minutes, also provided in Attachment B, the Committee more specifically discussed the mitigation measures and indicated that the Committee '*supports the mitigation measures proposed in the CHER/HIA, with the amendment that the plate indicating the name of the builder be removed if possible and stipulating that a simple commemorative plaque replace the proposed architectural drawings*'. This feedback from the Municipal Heritage Committee is reflected in the updated Heritage Impact Assessment, presented below.

## 4. HERITAGE IMPACT ASSESSMENT

### 4.1 Evaluation of Alternatives and Potential Impacts

#### 4.1.1 Alternatives to be Considered for the Heritage Bridge

The CHER determined through the application of the *'Criteria for Determining Cultural Heritage Value or Interest'* under Ontario Regulation 9/06 that the subject cultural heritage resource retains cultural heritage value. The following nine conservation options/alternatives are arranged according to the level or degree of intervention from minimum to maximum. The conservation options are based on the Ontario Heritage Bridge Program (1991), which is reportedly regarded as current best practice for conserving heritage bridges in Ontario and ensures that heritage concerns, and appropriate mitigation options, are considered.

1. Retention of existing bridge and restoration of missing or deteriorated elements where physical or documentary evidence (e.g., photographs or drawings) can be used for their design;
2. Retention of existing bridge with no major modifications undertaken;
3. Retention of existing bridge with sympathetic modification;
4. Retention of existing bridge with sympathetically designed new structure in proximity;
5. Retention of existing bridge no longer in use for vehicular purposes but adapted for pedestrian walkways, cycle paths, scenic viewing etc.;
6. Relocation of bridge to appropriate new site for continued use or adaptive re-use;
7. Retention of bridge as heritage monument for viewing purposes only;
8. Replacement/removal of existing bridge with salvage elements/members of heritage bridge for incorporation into new structure for future conservation work or displays; and
9. Replacement/removal of existing bridge with full recording and documentation of the heritage bridge.

#### 4.1.2 Impact Assessment

To assess the potential impacts of a proposed project on the cultural heritage value of a structure, the identified heritage attributes are considered against a range of possible impacts as outlined in the MTCS document entitled *'Screening for Impacts to Built Heritage and Cultural Heritage Landscapes'* (November 2010), which include:

- Destruction of any, or part of any, significant heritage attribute or feature.
- Alteration which means a change in any manner and includes restoration, renovation, repair or disturbance.
- Shadows created that alter the appearance of a heritage attribute or change the visibility of a natural feature of plantings, such as a garden.
- Isolation of a heritage attribute from its surrounding environment, context, or a significant relationship.
- Direct or indirect obstruction of significant views or vistas from, within, or to a built and natural feature.
- A change in land use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces.
- Soil disturbance such as a change in grade, or an alteration of the drainage pattern or excavation etc.

Provided that the bridge was found to retain cultural heritage value under O.Reg. 9/06, the potential impacts associated with the nine conservation options were considered as part of the preliminary impact assessment presented in Table 3 of the CHER/HIA (revised September 2018). The preliminary overview of potential impacts, when included as part of the Project File, was used to identify where a project alternative may have an impact on an identified heritage attribute, and outlined mitigation measures, which were considered in the context of the overall EA planning process.



## 4.2 Environmental Assessment: Recommended Solution

The Municipality of Brockton initiated a Class Environmental Assessment Study to develop, identify and evaluate alternative options to address the deteriorated condition of Bridge 11 (Greenock). The study is being completed in accordance with the Municipal Class Environmental Assessment (October 2000, as amended 2007, 2011 and 2015) as a Schedule 'B' project. Based on the *Recommended Solution* to the Schedule 'B' EA for Bridge No.11 (Version 3), the Municipality is proposing to remove the existing bridge. Bridge removal has the potential to impact the identified cultural heritage values and /or attributes associated with the structure.

Given the identified cultural heritage value of Bridge 11, a Heritage Impact Assessment is provided herein to more specifically evaluate the potential impacts and mitigation strategies that may be considered to preserve the identified heritage attributes of the bridge. It is noted that of the nine conservation options presented in Section 4.1.1, only two are applicable to bridge replacement/removal (i.e. Conservation Options 8 and 9).

While Conservation Option 8, removal of the heritage bridge with salvage of elements for incorporation into new structure for future conservation work or displays is technically feasible, the size (i.e. length of greater than 30-feet) would make this potential mitigation option very expensive for the Municipality. Further, with the exception of the removal of the plate indicating the name of the builder (i.e. the Hamilton Bridge Works Company), as possible, the Brockton Municipal Heritage Committee has indicated that bridge relocation, and/or preservation of other bridge components from the existing structure, is not considered to be necessary. Therefore, Conservation Option 9, removal of the existing bridge with full recording and documentation of the heritage structure, is considered appropriate for this undertaking.

It is also noted that Conservation Option 5, retention of the bridge for pedestrian walkways, cycle paths, scenic viewing etc., was further evaluated within the framework of the Project File following input from a Council member received following the presentation to Council on January 22, 2019. This option is presented as Alternative 5 within the updated Project File (i.e. Version 3) and is discussed in detail therein. Following a detailed review, and in consideration of the economic and social implications, this option (i.e. Alternative 5) was not recommended.

## 4.3 Evaluation of Potential Impacts of Bridge Removal on the Cultural Heritage Resource

Based on the range of possible impacts outlined in Section 4.1.2 of this document, an assessment of the potential impacts of the proposed bridge removal on the cultural heritage attributes identified for Bridge 11 is provided in the following Table 1.

**ADDENDUM TABLE 1: Impact Assessment**

Impact	Potential Impacts of the Proposed Bridge Removal
Destruction, Removal or Re-location	Bridge removal is recommended, this would have an impact the design/physical nature of the structure, namely the heritage attributes associated with the bridge.
Alteration	Yes, alterations to the bridge are expected through removal.
Shadows	No Impact.
Isolation	The proposed removal will impact the relationship of the structure with the surrounding environment and context.
Direct or Indirect obstruction of significant views	No significant impacts to the views are expected. The bridge is not visible from the well-travelled County Roads to the east and west. Further, the bridge is located in a valley and cannot be seen until cresting the hill on either side of County Road 20.
A change in land use	No Impact.
Soil Disturbance	Yes, minor impacts are expected through the removal of the existing structure from its current location. Naturalized river banks will be restored.

#### 4.4 Conclusions and Mitigation Recommendations

Based on the results of the cultural heritage evaluation, Bridge 11 was determined to retain cultural heritage value. Its heritage significance centres on its historical relationship with the Hamilton Bridge Works Company, its design/physical attributes, and its historical link as a Bridge crossing along Concession Road 20 (Brockton), across the Teeswater River, south of the Village of Paisley. As such, the structure was found to meet at least one of the criteria of Regulation 9/06 under the *Ontario Heritage Act* (OHA). Based on a review of the alternatives for Bridge 11 considered as part of the EA process, which generally included bridge rehabilitation, replacement and removal, Conservation Option 9, bridge removal with full recording and documentation of the heritage bridge, was recommended. As such, impacts on the heritage resource are expected.

In general, when the nature of the proposed works is such that adverse impacts are unavoidable (i.e. public safety, cost, etc.), it is necessary to implement management or mitigation strategies that alleviate the detrimental effects to cultural heritage resource. Mitigation measures are intended to lessen (or negate) anticipated impacts to cultural heritage attributes identified. In consideration of bridge removal, the following mitigation measures are recommended for Bridge 11:

1. Documentation:

The history of Bridge 11 is contained within the CHER/HIA. No known original drawings of the structure have been located, however, general schematic drawings of Warren Pony Truss Bridges and photos of the existing structure are contained within the CHER/HIA. As a mitigation measure, and consistent with the recommendations of the Brockton Municipal Heritage Committee, it is recommended that the CHER/HIA (July 20, 2017 Revised September 12, 2018), including this addendum, form the documentation for Bridge 11.

It is recommended that a hard copy or digital copy be deposited, as a single documentation report, in the Paisley Branch of the Bruce County Public Library System and the Bruce County Museum and Cultural Centre.

2. Commemoration:

It is recommended that the Municipality of Brockton consider the preparation of a historical plaque to commemorate the cultural heritage value of Bridge 11 for installation at the site. Consistent with the recommendations of the Heritage Committee, the commemorative plaque should include the plate indicating the name of the builder, as possible. This plate would require removal prior to the complete removal of the structure. As an alternative, a photo of the plate may be included in the plaque.

**ATTACHMENT A:  
MTCS CORRESPONDENCE**

## Drea Nelson - GM BluePlan

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**From:** Kirzati, Katherine (MTCS) <Katherine.Kirzati@ontario.ca>  
**Sent:** Monday, April 15, 2019 12:36 PM  
**To:** John Slocombe - GM BluePlan; Drea Nelson - GM BluePlan  
**Cc:** Barboza, Karla (MTCS)  
**Subject:** 0007027 -Brockton Bridge 11 -MTCS Comments on CHER/HIA  
**Attachments:** 0007027 -Brockton -Bridge 11 -MTCS Comment Table.docx

Hi John and Andrea:

Thank you for taking the time on Fri Apr 12 to discuss the heritage documentation for the Brockton Bridge 11 project. Below are the highlights (let me know if I've missed anything):

- the purpose of a Cultural Heritage Evaluation Report (CHER) is to outline the existing conditions with respect to cultural heritage resources by determining if any exist within or adjacent to the study area
- it should include both known and potential heritage resources and in this instance would involve the bridge itself
- all identified resources are to be assessed against Ontario Regulation 9/06, illustrating which properties contain cultural heritage value or interest
- the purpose of a Heritage Impact Assessment (HIA) is to determine whether the proposed project would have any negative impacts to the cultural heritage resources that were identified in the CHER
- it should outline each proposed option/alternative, describe the potential impact and recommend the appropriate mitigation measure
- ideally, the HIA is a separate document, building on the findings of the CHER and the EA reports
- both documents should include a section on community engagement, particularly with the municipal heritage committee. This can be presented as a summary describing:
  - the groups and individuals that were engaged
  - how and when community engagement was undertaken
  - whether community engagement was combined with another land use process, such as Planning Act application/approvals
  - the results of the engagement, including responses, comments or concerns expressed and how they were considered (the documents provided in the email of 08 Apr 2019 can be attached as an appendix)

At this point, since considerable work has already been undertaken for the CHER component, it's now a matter of addressing the outstanding comments, which are provided as an attached table. This can be submitted as an addendum, illustrating how the issues have been addressed.

As to the HIA, a more extensive piece is required to address the potential impacts and mitigations. I found some CHERs and HIAs online that would serve as good examples. I'll send them via our large file service, as this email becomes too large with all these attachments.

I hope this helps. Do contact me if you need further assistance or have any additional questions.

Regards, Katherine

Katherine Kirzati  
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MTCS Comments on the Cultural Heritage Evaluation and Preliminary Cultural Heritage Impact Assessment, prepared by Scarlett Janusas Archaeology Inc., dated July 20, 2017, revised September 12, 2018

Section	Item	MTCS Comments	GMBP Response
Report Title	Title and Report Contents	MTCS received the CHER/HIA prior to the Notice of Commencement being issued for this project. As such, the inclusion of a heritage impact assessment, no matter how preliminary, is considered premature as it cannot speak to the possible alternatives that would be outlined in an Environmental Study Report or Project File Report.	
Table 2	Historical or Associative Value sub-criterion i	Elaborate on the types of associations the bridge has with the community and how these associations meet this criterion.  This comment holds for Section 6.2.2.	
	sub-criterion ii	Elaborate on how the bridge yields, or has the potential to yield, information to understanding the community or culture.	
	Contextual Value sub-criterion iii	Explain why the bridge is not considered a landmark but is noted as such in the Analysis column.	
6.2.3	Terminology	Clarify the sentence "...it's former function to serve as a conduit across the Teeswater River..." (is it no longer used as a crossing).	

**ATTACHMENT B:**  
**BROCKTON MUNICIPAL HERITAGE COMMITTEE**



## **BACKGROUND**

GM BluePlan Engineering Limited (GMBP) was retained by the Municipality of Brockton to undertake a planning process toward addressing the deteriorated condition of Bridge No.11 (Greenock), located south of Paisley on Concession Road 20. The Municipal Engineers Association, in cooperation with the Ministry of the Environment, Conservation and Parks (MECP), has developed a Municipal Class Environmental Assessment (EA) process to assist in planning projects of this nature.





The Municipal Class EA outlines a comprehensive planning process that provides a rational approach to consider the advantages and disadvantages of various alternatives on several 'environments' in order to determine a *Preferred Solution* to address an identified problem (or opportunity). The assessment process is to include consideration for the technical, social, natural heritage, cultural and economic implications and potential mitigation measures. The process also involves consultation with various government agencies, directly affected stakeholders and the public. Based on recent feedback from the Ministry of Culture, Tourism and Sport (MTCS) regarding the Cultural Heritage Evaluation Report which was prepared as part of the background documentation for the process, the Brockton Municipal Heritage Committee is being requested to provide more specific review and comment at this time.

## **REQUEST FOR REVIEW AND COMMENT**

As part of the EA Process, the Brockton Municipal Heritage Committee is being requested to review and provide comment on the Cultural Heritage Evaluation Report and Preliminary Heritage Impact Assessment for Bridge No.11, prepared by Scarlett Janusas Archaeology Inc (July 20, 2017, revised September 12, 2018), herein referred to as the CHER/HIA. A copy of the report is enclosed, and a summary of the findings provided below.

The findings of the CHER/HIA helped to inform the cultural heritage 'environment' of the alternatives considered for the Bridge No.11 EA Process, including bridge replacement, rehabilitation or removal. A link to the updated Project File (Revision 2) for Bridge No.11, dated January 22, 2019, is provided on the Municipality's website (<https://www.brockton.ca/en/our-services/bridge-11-project.aspx>) and a copy of the Presentation to Council prepared by GM BluePlan Engineering dated January 22, 2019 is enclosed. The presentation provides a summary of the evaluation and assessment of the alternatives considered.

The MTCS has requested the Brockton Municipal Heritage Committee to comment on the following:

-  ☒ The Brockton Municipal Heritage Committee has reviewed the CHER/HIA (revised September 2018).
-  ☒ The Brockton Municipal Heritage Committee supports (or otherwise) the conclusions with respect to the cultural heritage value assigned to Bridge No.11.
-  ☒ The Brockton Heritage Committee supports (or otherwise) the findings of the Schedule 'B' Environmental Assessment (last updated in Jan 2019), which identified the removal of the existing bridge as the *Preliminary Recommended Solution*.
-  ☒ The Brockton Municipal Heritage Committee supports (or otherwise) the mitigation measures proposed in the CHER/HIA (summarized below).

## **SUMMARY OF FINDINGS AND RECOMMENDATIONS (CHER/HIA)**

Cultural Heritage assessments are required as part of the EA planning process which necessitates 'the conservation of features of significant architectural, cultural, historical, archeological or scientific interest'. The CHER/HIA was completed to inform the cultural heritage aspects of the Bridge No.11 EA. A summary of the findings is provided below.

## **Report Findings**

Based on a search of the of the municipal, provincial and federal registers, Bridge No.11 is not designated as being a property of cultural heritage value or interest. However, to determine the potential cultural heritage value of Bridge No.11 the "Criteria for Determining Cultural Heritage Value or Interest" set out in Ontario Regulation 9/06 under the Ontario Heritage Act (OHA), as amended in 2005, were used. The CHER identified that the bridge may meet three of the cultural heritage assessment. Input from the local Heritage Committee is being sought to gauge the degree of local interest in these elements:

### **Design or Physical Value:**

The bridge is representative of an early style of a single-span Warren pony through truss bridge. At this time there are reportedly 125 listed Warren Pony truss bridges in Ontario. Heritage attributes specific to the subject bridge identified included the following:

- i. Cast in place concrete abutments;
- ii. Single span, metal Warren pony truss bridge with 8-panel design;
- iii. Rivet-connected skeletal framework, including diagonal steel members, horizontal bracing, and outriggers (perpendicular support).
- iv. Timber deck beams; and
- v. Hamilton Bridge Works plaques.

### **Historical or Associative Value:**

- The bridge demonstrates the work or ideas of a builder (or designer/engineer) that may be significant to the community and/or Province. It was built by the Hamilton Bridge Works company, which supplied the steel and designs for many bridges in Ontario.
- The bridge has direct associations with an agricultural/rural theme that may be significant to the community and was an important part of local transportation routes.

### **Contextual Value**

- The bridge contributes to the landscape character of the area and is visually linked to the surrounding countryside.
- The bridge serves as a conduit linking the areas on either side of the Teeswater River.

The CHER concluded that *"the bridge has been evaluated as having cultural heritage value and interest"*.

We request that the Brockton Municipal Heritage Committee review these findings and provide concurrence or other commentary.

## **Proposed Mitigation Measures**

A preliminary Heritage Impact Assessment (HIA) was also included in the CHER, better to inform the alternatives considered in the EA process. In consideration of the *Ontario Heritage Bridge Guidelines Conservation Options*, the mitigation options that could be considered for the Recommended Preferred Solution, to remove the bridge, included the following:

- i. Commemorative actions (i.e. plaque or monument);
- ii. Completion of architectural drawings (where none available or where major changes to the structure have been made); and/or
- iii. Salvage elements for new structure, conservation/displays (latter could include heritage parks, museums etc.).

We request that the Brockton Municipal Heritage Committee consider these measures and provide concurrence, or other commentary.

### **RELEVANT DOCUMENTATION**

1. Copy of the Cultural Heritage Evaluation Report and Preliminary Heritage Impact Assessment (HIA) for Bridge No.11, prepared by Scarlett Janusas Archaeology Inc.
2. Copy of the Presentation to Council prepared by GM BluePlan Engineering, dated January 22, 2019.
3. A link to the Bridge No.11 Project File can be found on the Municipality's website. The most recent Project File for Bridge No.11 is dated January 22, 2019.  
<https://www.brockton.ca/en/our-services/bridge-11-project.aspx>

## **Brockton Heritage and Library Committee Minutes**

Monday, April 1, 2019

**Location:** Brockton Municipal Office (100 Scott Street, Walkerton)

**Time:** 4:30 p.m.

### **Attendance:**

**(Quorum: 9/12)**

Darlene Bohnert, Committee Member	Absent
Lynda Breig, Committee Member	Present
Ted Cobean, Chair	Present
Fiona Hamilton, Clerk (Acting Recording Secretary)	Present
Sarah Johnson, Committee Secretary (Non-Voting)	Absent
Barb Kerry, Committee Member	Present
Denise Lagundzin, Committee Member	Present
Dean Leifso, Councillor	Present
Eric McDougall, Parks, Recreation and Facilities Manager (Non-Voting)	Present
Ron McKinnon, Committee Member	Present
Alishia Oberle, Committee Member	Absent
Joe Reichenbach, Committee Member	Absent
Tanya Tilson, Committee Member	Absent
Frank Weiler, Committee Member	Absent
Murray Wells, Committee Member	Present
Tracey Knapp, Librarian (Non-Voting)	Present

---

### **1. Call to Order**

Chair Ted Cobean called the meeting to order at 4:37 p.m. Fiona Hamilton, Clerk acted as Recording Secretary for the meeting.

The committee introduced themselves.

### **2. Acceptance of Agenda**

Motion: Moved by Ron McKinnon                      Seconded by Lynda Breig  
That the amended agenda from the April 1, 2019 Brockton Heritage Committee meeting be approved.  
Carried.

### **3. Disclosure of Pecuniary Interest and the General Nature Thereof**

None.

### **4. Delegations**

None.

### **5. Approval of Minutes**

Motion: Moved by Denise Lagundzin                      Seconded by Ron McKinnon  
That the minutes of the March 4, 2019 meeting of the Brockton Heritage Committee be approved.  
Carried.

### **6. Business Arising From the Minutes**

Chair Ted Cobean informed the Committee that there was now an update to Item 10.3 – Walkerton Downtown Photo Murals. Dean Leifso then informed the Committee that he had confirmed that there was \$28,626.00 currently in the Heritage Reserve Fund available for acquisitions, etc. and

**10.3 Walkerton Downtown Photo Murals**

Chair Ted Cobean informed the Committee that one of the large Downtown Photo Murals had been removed in sections. A new location for the Downtown Photo Mural was being considered, but the large size of the mural limited the number of suitable locations.

Dean Leifso informed the Committee that Council had directed that the Downtown Improvement funds be budgeted to the Community Improvement Community for sidewalk repairs as these funds would be leveraged to receive additional money through the Spruce the Bruce grant.

**10.4 Armoury Building**

- **Lease Agreement with G.R.O.W rooted in love Maternity Home**

Fiona Hamilton, Recording Secretary informed the Committee that the Lease Agreement with G.R.O.W rooted in love Maternity Home had not yet been finalized, but was anticipated to be an item to be considered by Council of the Municipality of Brockton at the Council Meeting on April 9, 2019.

**10.5 Bridge 11 Greenock**

Fiona Hamilton, Acting Recording Secretary provided the Committee with an overview of the Engineer's Presentation regarding Bridge 11 (Greenock) and the Preliminary Preferred Solution. The Committee then reviewed the Cultural Heritage Evaluation Report and Preliminary Heritage Impact Assessment for Bridge 11 (Greenock) that was prepared by Scarlett Janusas Archaeology Inc. (the "CHER/HIA") and noted that there were a fair number of bridges in Bruce County and Brockton with similar architectural features.

The Committee then discussed the mitigation measures that were proposed in the CHER/HIA and noted that the Committee would recommend having the plate that indicated the name of the builder removed and placed with a commemorative plaque at the site. The Committee decided it was not necessary to include displays of the architectural drawings given the number of similar bridges in the area.

Motion:            Moved by Dean Leifso            Seconded by Barb Kerry

That the Municipality of Brockton Heritage Committee has reviewed the CHER/HIA (revised September 2018) and supports the conclusions with respect to the cultural heritage value assigned to Bridge No. 11 (Greenock) and support the findings of the Schedule "B" Environmental Assessment (last updated in January 2019), which identified the removal of the existing bridge as the Preliminary Recommended Solution,

And further that the Municipality of Brockton Heritage Committee supports the mitigation measures proposed in the CHER/HIA, with the amendment that the plate indicating the name of the builder be removed if possible and stipulating that a simple commemorative plaque replace the proposed architectural drawings.

Carried.

**11. New Business**

**11.1 Projects for 2019**

**12. Adjournment**

Motion: Moved by Dean Leifso                      Seconded by Denise Lagundzin  
That the Heritage Committee meeting be adjourned at 6:30 p.m.  
Carried.

**Next Brockton Heritage Committee Meeting**

**Date:** Monday, May 6, 2019 at 4:30 p.m.

**Location:** Brockton Meeting Room, Municipal Office

*E. J. O'Keefe*  
*Chairman*  
*Brockton Heritage Committee*

08 May 2019

Email Only

Andrea Nelson  
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**MTCS File : 0007027**  
**GMBP File : 212328**  
**Proponent : Municipality of Brockton**  
**Subject : Review of Cultural Heritage Evaluation Report Addendum**  
**Project : Replacement of the Brockton Bridge 11 (Greenock)**  
**Location : Concession Road 20, Between Lots 46 and 47, Concession A,  
Geographic Township of Greenock, Municipality of Brockton**

---

Dear Ms. Nelson:

Thank you for providing the addendum to the Cultural Heritage Evaluation Report/ Heritage Impact Assessment (CHER/HIA), dated 01 May 2019, for the above-noted project. This addendum was prepared in response to our discussion on 12 April 2019 and an email from MTCS on 15 April 2019, which included a comment table.

In reviewing the addendum, MTCS is satisfied that its comments have been addressed, due diligence has been undertaken in consulting with the Municipal Heritage Committee for its position on the matter and the addendum is to be attached to the final Project File Report

As such, MTCS has no further comments on this project.

Regards,

Katherine Kirzati  
Heritage Planner  
[katherine.kirzati@ontario.ca](mailto:katherine.kirzati@ontario.ca)

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. MTCS makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MTCS be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

Please notify MTCS if archaeological resources are impacted by EA project work. All activities impacting archaeological resources must cease immediately, and a licensed archaeologist is required to carry out an archaeological assessment in accordance with the *Ontario Heritage Act* and the *Standards and Guidelines for Consultant Archaeologists*.

If human remains are encountered, all activities must cease immediately and the local police as well as the Registrar, Burials of the Ministry of Government and Consumer Services (416-326-8800) must be contacted. In situations where human remains are associated with archaeological resources, MTCS should also be notified to ensure that the site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.



**APPENDIX E:**  
**COUNTY OF BRUCE: INFRASTRUCTURE MASTER PLAN (2013)**

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**COUNTY OF BRUCE**

**BRIDGE INFRASTRUCTURE MASTER PLAN**

**CENTRAL BRUCE COUNTY**

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**COUNTY OF BRUCE**

**BRIDGE INFRASTRUCTURE MASTER PLAN**

**CENTRAL BRUCE COUNTY**

April 24, 2013

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File No. 11101

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**COUNTY OF BRUCE**  
  
**BRIDGE INFRASTRUCTURE MASTER PLAN**  
**CENTRAL BRUCE COUNTY**  
  
**FINAL REPORT**

## **1.0 INTRODUCTION**

### **1.1 Purpose of the Report**

The County of Bruce initiated a Bridge Infrastructure Master Plan process in July 2011 to define the best strategy for resolving deficiencies identified with a group of bridges situated in central Bruce County. The structures span the main branches of the Saugeen and Teeswater Rivers within a defined study area located immediately south of Paisley. Six of the bridges are at least 80 years in age and exhibit extensive deficiencies which will require either significant repairs or replacement within the next 5 – 10 years. The process followed the procedures set out in the Municipal Class Environmental Assessment (Class EA) document, dated October 2000, as amended in 2007 and 2011. B. M. Ross and Associates Limited (BMROSS) was engaged to conduct the Class EA process on behalf of the proponent.

The purpose of this report is to document the Master Planning process followed for this project. The report includes the following major components:

- An overview of the general project area.
- A summary of deficiencies associated with the existing structures.
- A review of specialized investigations completed in support of the Master Plan.
- A description of the alternative solutions considered for resolving the defined problems.
- A synopsis of the decision-making process conducted to select a preferred alternative.
- A detailed description of the preferred alternative.

The Bridge Infrastructure Master Plan established through this process sets out a preferred long-term strategy for transportation infrastructure within the defined study area. In this regard, the Master Plan will become the basis for, and be used in support of, future investigations for specific projects required to implement this strategy.

## **1.2 General Description of Master Plans**

Master Plans are long-range plans which integrate infrastructure requirements for existing and future land uses with environmental assessment planning principles. These plans examine existing infrastructure systems within defined areas in order to outline a framework for planning subsequent works. Master Plans typically exhibit several common characteristics. They:

- Address the key principles of successful environmental planning.
- Provide a strategic level assessment of various options to better address overall system needs and potential impacts and mitigation.
- Address at least the first two phases of the Municipal Class EA process.
- Are generally long-term in nature.
- Apply a system-wide approach to planning which relates infrastructure either geographically or by a particular function.
- Recommend an infrastructure servicing plan which can be implemented through the completion of separate projects.
- Include a description of the specific projects needed to implement the Master Plan.

## **1.3 Integration with the Class EA Process**

### **1.3.1 Class EA Project Phases**

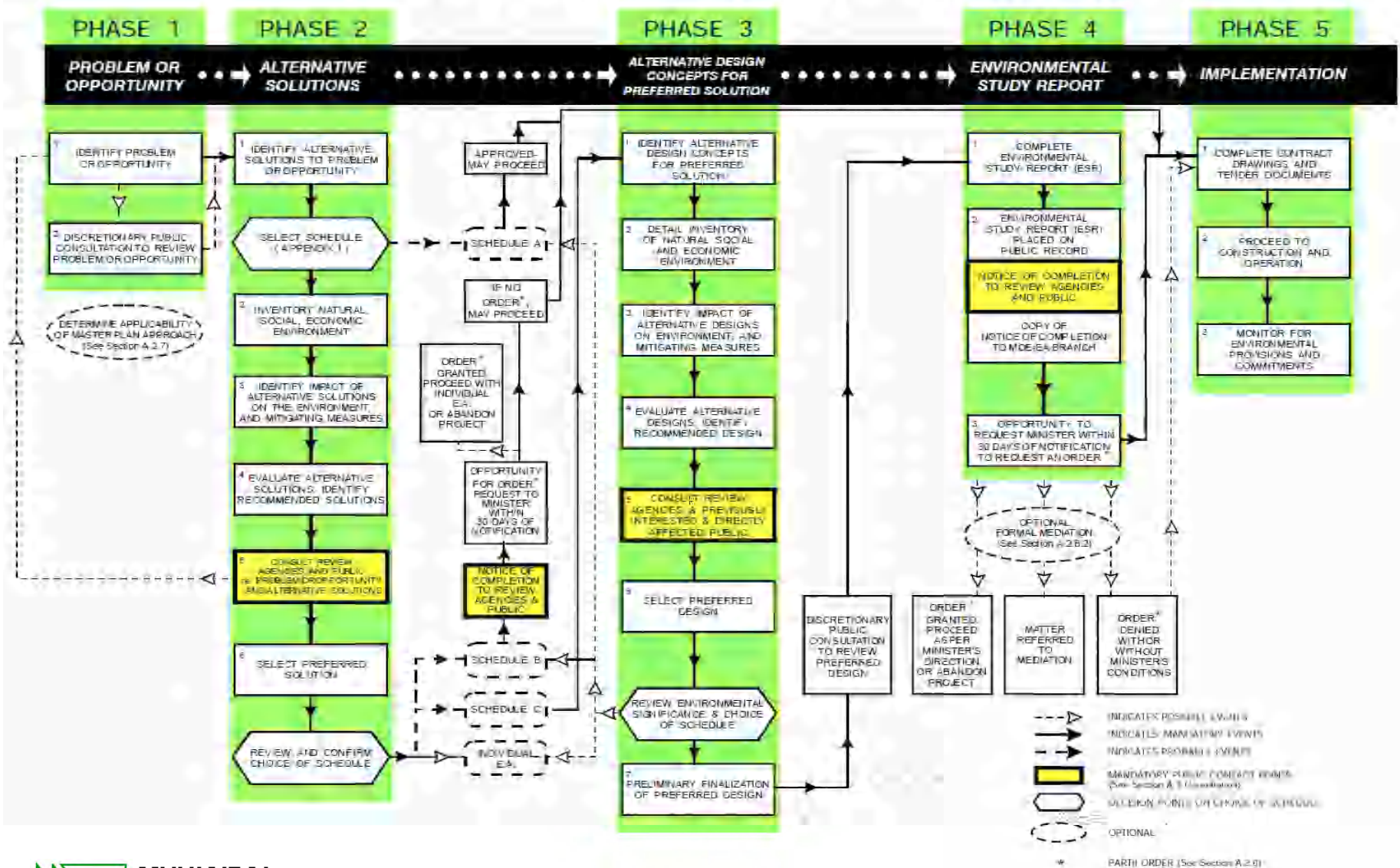
The Bridge Infrastructure Master Plan has been completed in accordance with the planning and design process of the Municipal Class Environmental Assessment. The Class EA is an approved planning document which describes the environmental assessment process that proponents must follow in order to meet the requirements of the Environmental Assessment Act (EA Act).

The Class EA approach allows for the evaluation of alternatives methods of carrying out a project, and identifies potential environmental impacts. The Class EA process is self-regulatory and municipalities are expected to identify the appropriate level of environmental assessment based upon the project they are considering.

The Class EA planning process is divided into five project phases which are described below and illustrated in Figure 1.1.

- Phase 1 - Problem identification.
- Phase 2 - Evaluation of alternative solutions to the defined problems and selection of a preferred solution.
- Phase 3 - Identification and evaluation of alternative design concepts in selection of a preferred design concept.
- Phase 4 - Preparation and submission of an Environmental Study Report (ESR) for public and government agency review.
- Phase 5 - Implementation of the preferred alternative and monitoring of any impacts.

**NOTE:** This flow chart is to be read in conjunction with Part A of the Municipal Class EA



### 1.3.2 Classification of Project Schedules

Projects associated with Master Plans are classified to different project schedules according to the potential complexity and the degree of environmental impacts that could be associated with the project. There are four levels of schedules:

Schedule A – Projects that are approved with no need to follow the Class EA process.

Schedule A+ – Projects that are pre-approved but require some form of public notification.

Schedule B – Projects that are approved following the completion of a screening process that incorporates Phases 1 and 2 of the Class EA process, as a minimum.

Schedule C – Projects that are approved subject to following the full Class EA process.

The Class EA process is self-regulatory and municipalities are expected to identify the appropriate level of environmental assessment based upon the project they are considering.

## 1.4 Master Plan Framework

### 1.4.1 Alternative Approaches

The Class EA document provides proponents with four approaches for conducting Master Plan investigations, given the broad nature and scope of these studies. Proponents are encouraged to adapt and tailor the Master Planning process to suit the needs of the study being undertaken, providing that at a minimum, the assessment involve an evaluation of servicing deficiencies followed by an review of possible solutions (i.e., Phases 1 and 2 of the Class EA process).

Table 1.1 summarizes the primary components associated with the four Master Plan approaches outlined within the MEA Class EA document.

**Table 1.1**  
**Summary of Master Planning Approaches**

<b>Approach</b>	<b>Key Characteristics</b>	<b>Project Implementation</b>
# 1	<ul style="list-style-type: none"><li>- Master Plan prepared at the conclusion of Phases 1 and 2 of the Class EA process.</li><li>- Completed at a broad level of assessment.</li><li>- Serves as basis for future investigations associated with specific Schedule B and C projects.</li></ul>	<ul style="list-style-type: none"><li>- Schedule B and C projects would require further Class EA investigations.</li></ul>
# 2	<ul style="list-style-type: none"><li>- Master Plan prepared at the conclusion of Phases 1 and 2 of MEA Class EA process.</li><li>- More detailed level of investigation and consultation completed, such that it satisfies requirements for Schedule B screenings.</li><li>- Final public notice for Master Plan serves as Notice of Completion for individual Schedule B projects.</li></ul>	<ul style="list-style-type: none"><li>- Schedule B projects are approved.</li><li>- Schedule C projects must complete Phase 3 to 4 of Class EA process.</li></ul>

<b>Approach</b>	<b>Key Characteristics</b>	<b>Project Implementation</b>
# 3	<ul style="list-style-type: none"><li>- Master Plan prepared at the conclusion of Phase 4 of Class EA process.</li><li>- Level of review and consultation encompasses Phases 1 to 4 of the Class EA process.</li><li>- Final public notice for Master Plan serves as Notice of Completion for Schedule B and C projects reviewed through the Master Plan.</li></ul>	<ul style="list-style-type: none"><li>- Class EA investigations are not required for projects reviewed through the Master Plan.</li></ul>
# 4	<ul style="list-style-type: none"><li>- Integration of Master Plan with associated Planning Act approvals.</li><li>- Establishes need and justification in a very broad context.</li><li>- Best suited when planning for a significant geographical area in the long term.</li></ul>	<ul style="list-style-type: none"><li>- Depending on level of investigation associated with the Master Plan, Class EA investigations may be required for specific projects.</li></ul>

### 1.4.2 Applied Framework

For the purposes of the Bridge Infrastructure Master Plan, it was determined during the course of the investigation that Approach #2 would be the most appropriate planning framework to utilize for this assessment. The Infrastructure Master Plan therefore defines broad infrastructure requirements within the study area, but also provides sufficient detail to satisfy future site specific issues associated with the implementation of project specific components.

The decision to apply Approach #2 for this Master Plan was based upon the following rationale:

- The level of consultation completed in conjunction with the Master Plan was sufficient to satisfy the MEA Class EA process associated with Schedule B Activities;
- Several Schedule B projects identified as a component of the preferred infrastructure servicing alternative must be implemented immediately to address ongoing deterioration at existing bridge sites. Utilization of this approach will permit implementation of these projects immediately upon completion of the Master Plan.

Upon completion, the Master Plan document will become the basis for Schedule B projects identified as part of the preferred infrastructure plan, and will be used in support of future investigations for specific Schedule C projects identified within it. Schedule B projects will be pre-approved based upon consultation completed as part of the Master Plan. Schedule C projects would be required to fulfill Phases 3 and 4 of the Class EA process and file an Environmental Study Report for public review.

### **1.4.3 Approval Requirements**

The Bridge Infrastructure Master Plan is subject to approval from the County of Bruce as well as support from the Municipalities of Brockton and Arran-Elderslie, but does not require formal approval under the EA Act. However, those Schedule B activities which were reviewed in conjunction with the Master Plan are subject to formal approval, therefore the Completion Notice issued at the conclusion of the Master Plan will also serve as a Notice of Study Completion for Schedule B activities identified within.

If significant environmental impacts are identified with Schedule B activities identified within the Master Plan, or with Schedule C activities undertaken subsequent to completion of the Master Plan, a person/party may request that the County of Bruce voluntarily elevate the project(s) to a higher level of environmental assessment. If the proponent declines, or if it is believed that the concerns are not properly dealt with, any individual or organization has the right to request that the Minister of the Environment make an order for the project(s) to comply with Part II of the EA Act which addresses individual environmental assessments. This request must be submitted to the Minister within 30 days of the publication of the Notice of Completion of the Class EA process for any specific project.

### **1.5 Study Co-ordination**

B. M. Ross and Associates Limited (BMROSS) conducted the Class EA planning process on behalf of the proponent, the County of Bruce. A Technical Steering Committee (TSC) was also formed to provide direction to study investigations. The Committee consisted of representatives from the Municipalities of Brockton and Arran-Elderslie, Bruce County Highways Department staff, representatives from the Bruce County Highways Committee, and BMROSS staff. Project information was presented to the TSC for input at all major stages in the process and prior to presentation to the general public. The Steering Committee reported to the Bruce County Highways Committee which reported directly to County Council, providing direction and recommendations on study investigations and results. Information associated with the Steering Committee meetings is included in Appendix 'A'.

## **2.0 STUDY AREA DESCRIPTION**

### **2.1 Background Review**

A background review was carried out to obtain a general characterization of the project area and to identify factors that could influence the selection of alternative solutions to the defined problem.

The background review for the Master Plan process incorporated these activities:

- Assembly of information on the existing structures and the environmental setting.
- Review of deficiencies at each bridge site.
- Preliminary assessment of the identified deficiencies and potential remediation.

A desktop analysis of the project setting was completed as part of the background review process. The following represent the key sources of information for this analysis:

- BMROSS. Ontario Structure Inspection Manual (OSIM) reports and files.
- Saugeen Valley Conservation Authority (SVCA). Website and Mapping Services.
- Government of Canada. Species at Risk Public Registry website.
- Ministry of Natural Resources. Natural Heritage Information Centre website.
- County of Bruce. Files and discussions with staff.

### **2.2 General Environmental Setting**

#### **2.2.1 Central Bruce County**

The County of Bruce forms the northwest portion of Southern Ontario and is bounded on the west by Lake Huron and on the northeast by Georgian Bay. The project study area is located in central Bruce County, just south of the Community of Paisley. The southwest portion of the study area is located within the Municipality of Brockton, while the northeast quadrant is within Arran-Elderslie. The limits of the study area boundary, as illustrated on Figure 2.1 (attached), are bounded by Bruce Road No. 1 to the north and west, Bruce Road 15 to the south and Bruce Road 19 to the east. Bruce Road 3 bisects the middle of the study area along the north/south axis.

Two main river systems traverse the countryside within central Bruce County being the Saugeen and Teeswater Rivers. The two watercourses converge in Paisley, just north of the study area limits. The two river systems have posed significant barriers to transportation in this portion of the County since overland transportation routes were first surveyed in the mid-19<sup>th</sup> century. The potential for numerous river crossings created a significant eastward deviation of the proposed Saugeen and Elora Roads, one of the first roadways surveyed within the region, and is the current route of Bruce Road 3. Five of the primary bridge structures included in the Master Plan are located on former municipal boundaries being the boundaries between the Townships of Brant, Greenock and Elderslie. The location of the primary bridge structures are illustrated on Figure 2.1.





## 2.2.2 Physiography and Soils

Table 2.1 summarizes the general physiographic features and soils evident in the vicinity of the subject properties.

**Table 2.1**  
**Physiographic Features and Soil Types**

Feature	General Characteristics
Physiography	<ul style="list-style-type: none"> <li>The bridge sites are located within the Saugeen Clay Plain physiographic region which is situated in the Saugeen River drainage basin, north of the Walkerton Moraine.</li> <li>The Saugeen Clay Plain is a small clay plain underlain by deep stratified clay deposited in a bay of historic Lake Warren.</li> </ul>
Soils (General)	<ul style="list-style-type: none"> <li>The river valleys at all bridge sites are classified as Bottomland. This is comprised of alluvial soils exhibiting variable drainage characteristics.</li> <li>Soils immediately adjacent to the stream channels vary from Saugeen silty loam and Fox sandy loam to Elderslie clay loam. Most soils are a series of the Grey-Brown Podzolic soil group. These sandy till loams are typically comprised of brown, sandy loam, overlaying heavy clay till material. The series exhibits imperfect drainage characteristics.</li> </ul>

## 2.2.3 Hydrology

Two major river systems bisect the study area limits; the Saugeen River to the east and the Teeswater River to the west. Six of the structures being examined as part of the Master Plan are located within the limits of the Teeswater river watershed, while two span the Lower Saugeen River channel.

The Lower Saugeen River, adjacent to the bridge sites, is utilized by local fisherman and canoeists; a launch site is currently situated on the northwest riverbank at the McCurdy Bridge. The river is located within the watershed limits of the Saugeen Valley Conservation Authority and is one of the largest river systems in southwestern Ontario, draining 2360 km<sup>2</sup> of predominantly rural Ontario from the community of Dundalk west towards its outlet at Lake Huron. The presence of numerous cold water streams in the upper reaches of the watershed provide excellent habitat for a variety of salmonoid species such as Brook Trout, Rainbow Trout, Brown Trout and Chinook Salmon. Bass and pike are also found within the Saugeen River watershed making it an important recreational fishery in the area.

The land use of the basin is predominately agricultural in nature with the intensity of cropping increasing generally from east to west. Forest cover varies from 40 to 50 percent in the eastern headwaters area to 10 to 15 percent in the western portion of the basin. Approximately thirty percent of the watershed remains in forest cover. The Teeswater River converges with the Saugeen at Paisley and drains an area of 683 km<sup>2</sup> from Paisley to the community of Teeswater. The watershed is home to the Greenock Swamp which is the largest forested wetland in Southern Ontario. Land uses within the Teeswater drainage basin are similar to the Saugeen, with agricultural uses being the predominant form.

## **2.2.4 Sensitive Natural Features in the Vicinity of the Project Sites**

The project study area is located in central Bruce County within the Teeswater and Saugeen River watersheds, which are managed by the Saugeen Valley Conservation Authority (SVCA). The landscape is comprised of rural farmland with rolling terrain bisected by the many river systems. A review of sensitive natural heritage features located in the vicinity of the project area was carried out as part of the Master Plan background review. The Ontario Ministry of Natural Resources' Natural Heritage Information Centre (NHIC) database was consulted to verify the current status of significant natural areas in the vicinity of bridge sites. Utilizing a jurisdictional search method, five significant features were identified within a 10 km radius. Figure 2.2 illustrates the location of these sensitive natural features in relation to the project study area boundaries.

### **i. Greenock Swamp – Provincially Significant Wetland, LS-ANSI**

The Greenock Swamp, which is located southwest of the project study area, is southern Ontario's single largest forested wetland. The swamp is designated as a Provincially Significant Wetland (PSW) as well as a Provincially Significant Life Science Area of Natural and Scientific Interest (ANSI). The swamp is situated in the headwaters of the Teeswater River system and is located approximately 8 km southwest of the Dudgeon Bridge.

### **ii. Elderslie Swamp - Locally Significant Wetland, LS-ANSI**

The Elderslie Swamp is a locally significant wetland complex located approximately 7 km north of the McCurdy Bridge. This natural area has also been identified as a regionally significant Life Science ANSI and is approximately 280 ha in size.

### **iii. Edengrove Wetland Complex – Provincially Significant Wetland**

Edengrove Wetland Complex is a provincially significant wetland located adjacent to the south boundary of the study area. It is comprised of four individual wetlands and three wetland types (3% fen, 83.6% swamp and 13.4% marsh) (Huizer, 1989). The site is situated approximately 3.5 km southwest of the 12<sup>th</sup> of Brant Bridge.

### **iv. Dunkeld Saugeen Oxbows – Locally Significant Wetland, LS-ANSI**

The Dunkeld Saugeen Oxbows are located within abandoned river meanders (oxbows) adjacent to the Saugeen River channel, south of the study area. The site is comprised of several wetlands and woodlands which have formed within these abandoned channels and have been designated as a regionally significant Life Science ANSI as well as a locally significant wetland. This natural heritage features is situated approximately 5 km southwest of the 12<sup>th</sup> of Brant structure.







## **2.3 Bruce County Road Network**

The County of Bruce is responsible for the maintenance and upkeep of approximately 600 kilometers of roadway. This road system contains 123 bridges that are located on, and form part of this road system. In addition to the bridges on the County road system, the Department is responsible for a number of bridges located on local municipal roads. Figure 2.2 identifies the location of most of the bridges that are currently part of the County road network.

The County bridges located on local roads became the County's responsibility either because the bridge was in excess of twenty feet and was located on a municipal boundary or the bridge was deemed the responsibility of the County by a Judge's Order. Following municipal amalgamations that occurred in 2000 and 2001, many of these bridges were no longer located on a municipal boundary. As of November 1, 2005, the County had jurisdiction over seventeen bridges on current or former Municipal boundary roads (roads which are not County Roads). Of the 17 bridges, 7 of these structures are on the Bruce/Grey boundary between Scone and Albanley. Grey and Bruce Counties assumed this section of the Grey-Bruce Line on January 1, 2005 and the seven bridges became County bridges on a county road. Of the remaining 10 bridges, 5 are on current municipal boundaries while the other 5 are no longer on a municipal boundary.

Five of the bridges which are part of the Master Plan study are County maintained bridges located on local roads. Three of the structures are located on a current municipal boundary (McCurdy, Big Irwin, Watson's) while two (Dudgeon & 12<sup>th</sup> of Brant) are not. These five structures are also some of the oldest bridges currently maintained by the county, with the oldest (Big Irwin) being constructed in 1900 and the youngest (Dudgeon) constructed in 1930. At an estimated replacement cost in excess of 13 million, these five structures represent a significant capital commitment to the county when replacement of the structures becomes a necessity over the next 5 – 10 years as the condition of the bridges continues to deteriorate.






Given the close physical proximity of the structures and other similarities such as age, condition and capacity, the County felt that a review of the structures through a Master Plan assessment process was the most appropriate means to examine future outcomes associated with the crossings from a wider context that would consider a range of possibilities and the potential impacts associated with each.

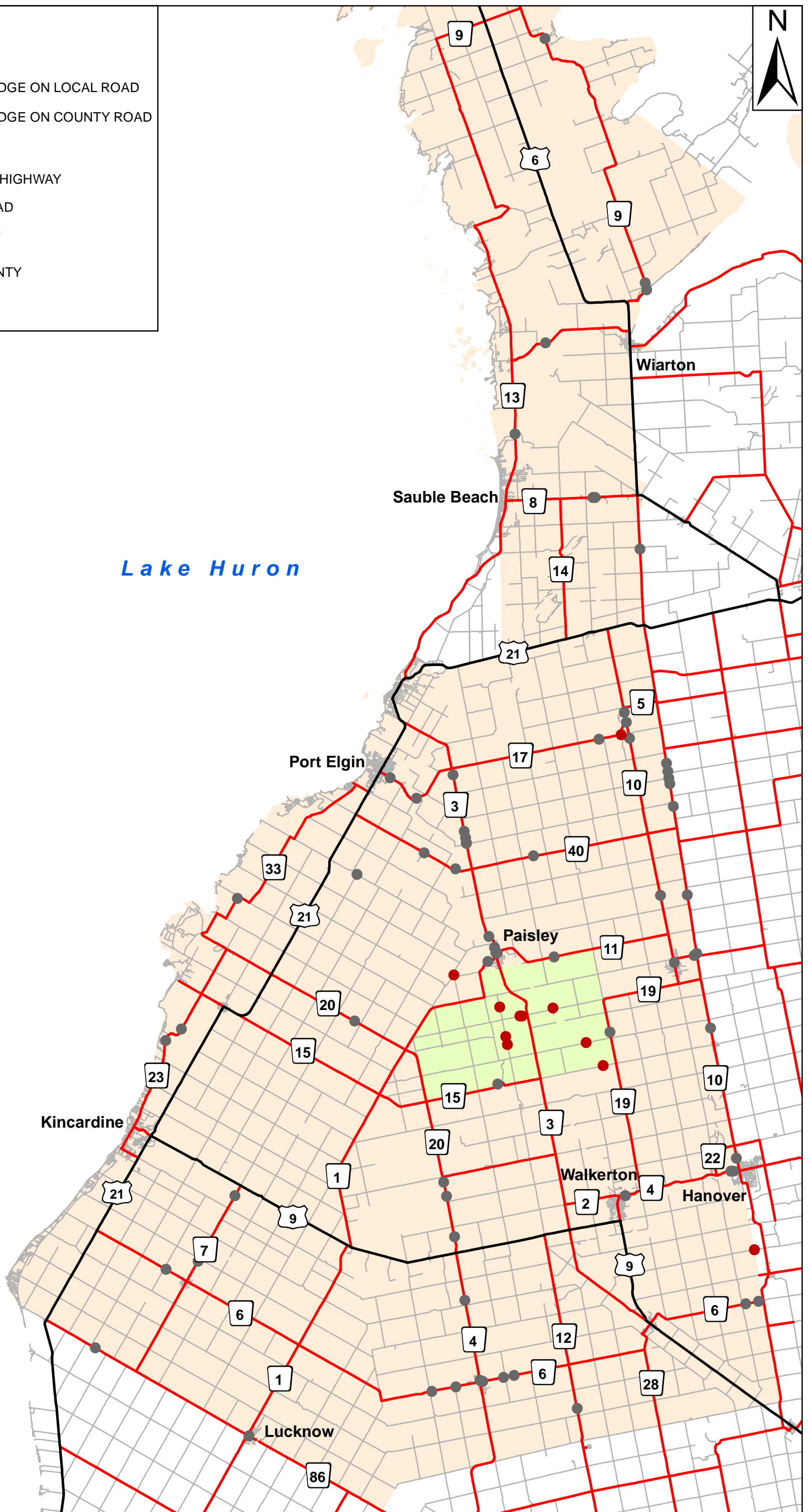
## LEGEND

## BRIDGE

- COUNTY BRIDGE ON LOCAL ROAD
- COUNTY BRIDGE ON COUNTY ROAD

## ROAD TYPE

-  PROVINCIAL HIGHWAY  
 COUNTY ROAD  
 LOCAL ROAD  
 BRUCE COUNTY  
 STUDY AREA



**BMROSS**  
engineering better communities

## COUNTY OF BRUCE

**BRIDGE INFRASTRUCTURE MASTER PLAN  
FOR CENTRAL BRUCE COUNTY  
COUNTY BRIDGE NETWORK**

DATE OCT. 10, 2012	PROJECT No. 11101
SCALE 1 : 300,000	FIGURE No. 2.3

30 KILOMETRES

## **2.4 Bridge Descriptions**

The following section provides a brief description of each bridge included in the Master Plan study. Distinguishing features of each structure are identified, including notable deficiencies. Deficiencies associated with the bridges were identified during recent engineering inspections conducted by BMROSS and are summarized within 2010 Ontario Structure Inspection Manual (OSIM) reports provided in Appendix 'B'. Figure 2.3 illustrates the approximate location of each structure described below.

### **2.4.1 12<sup>th</sup> of Brant**

Spanning the Saugeen River, the 12<sup>th</sup> of Brant Bridge is located on Concession 12 in the former Township of Brant (Brockton), 1.9 km west of County Road 19. This single lane, dual span steel through truss bridge was placed at the crossing in the 1920's following destruction of the previous crossing during a flood. With a total structural area of 472.42 square meters, the last inspection of the bridge occurred in 2010 and included repairs to the deck within the westerly span. The photo below illustrates the overall structural layout of the two separate truss spans.

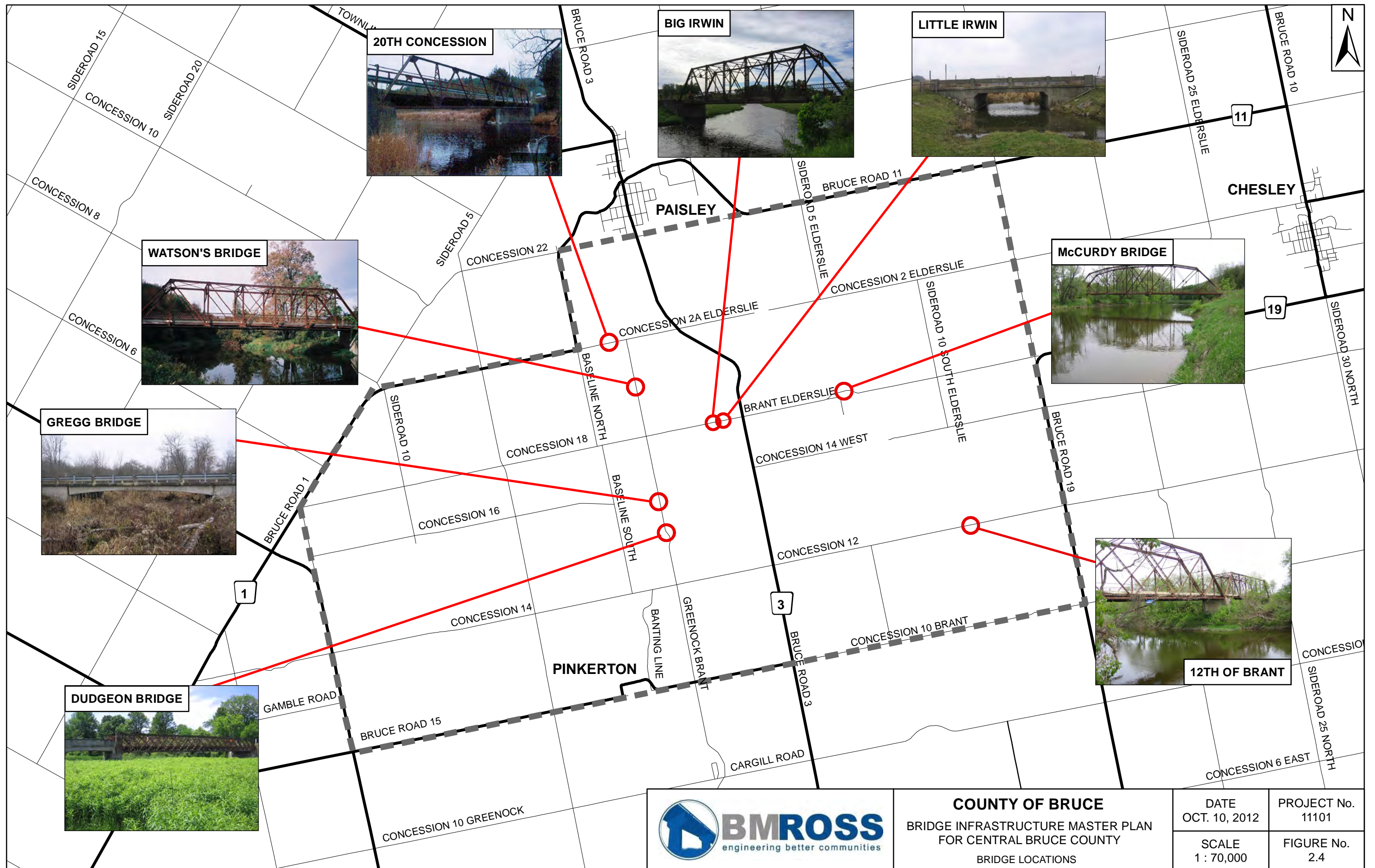
**12<sup>th</sup> of Brant Bridge**



### **2.4.2 McCurdy's Bridge**

Built in 1913, the McCurdy Bridge spans the Saugeen River on the Brant-Elderslie Road, 2 km east of County Road 3. This single span, through truss bridge can accommodate a single lane of traffic and covers a total structural area of 320.46 square meters. The 2010 OSIM inspection identified a number of deteriorated bridge components that would require remediation within 1-5 years including repairs to railings, trusses, floor beams, joints and bank erosion protection. The load limit of the structure was reduced to 5 tonnes in November 2012 due to significant corrosion identified during the 2012 bridge inspection. Repairs to the structure were initiated immediately, as the lower weight limit would not permit traditional snow removal equipment to cross the structure. The repairs were completed on December 20<sup>th</sup>, 2012 and the former triple load posting of 17/20/28 was restored. The photo below of McCurdy's Bridge demonstrates the overall shape and form of the steel truss.





McCurdy's Bridge



### 2.4.3 Watson's Bridge

Watson's Bridge, which is located 6.3 km north of County Road 15 on the Greenock Brant Townline Road, spans the Teeswater River and was constructed in the 1920's. This single span, steel through truss bridge was last inspected in 2012. Repairs to the abutments and replacement of the end beams were identified as needing immediate attention. Replacement of the entire structure was recommended within the next 5 years. Emergency repairs to this structure were also required in December of 2012 due to significant deterioration identified during 2012 safety inspections of the bridge, requiring a reduced load posting to 5 tonnes. The necessary repairs were successfully completed and the structure subsequently reopened to traffic. The photos below demonstrate the overall structural layout and evidence of deterioration in the structure.

Watson's Bridge





#### **2.4.4 Big Irwin**

Spanning the Teeswater River, the Big Irwin Bridge is located on the Brant-Elderslie Road, 0.8 km west of County Road 3. This single lane, steel span bridge was erected in 1900 and has a total structural area of 151.9 square meters. The last inspection, completed in 2010 determined that repairs to the curbs and abutments would be needed within the next five years. Significant repairs to the structure were completed in 2010 due to a vehicle collision. Some of the same areas required additional repairs in 2012 due to another vehicle strike. The photos below demonstrate the overall structural layout and ongoing deterioration evident in the east abutment.

**Big Irwin Bridge**



#### **2.4.5 Little Irwin**

Constructed in 1953, the Little Irwin Bridge is a concrete rigid frame bridge located on the Brant-Elderslie Road, 0.4 km east of the Big Irwin. This two lane structure spans a tributary of the Teeswater River. The last inspection in 2010 determined that minor repairs to the structure were required due to spalling of concrete. The photos below of the Little Irwin Bridge demonstrate the overall structural layout of the bridge.

**Little Irwin Bridge**



### 2.4.6 Dudgeon Bridge

The Dudgeon Bridge is a three span structure located 3 km north of County Road 15 on the Greenock Brant Townline Road. Spanning the Teeswater River this half-through truss former rail bridge was constructed in 1930. Due to deficiencies relating to concrete spalling, deterioration of abutments, and poor alignment of approaches, it was recommended for replacement within the next 5 years. The photos below demonstrate the overall structural layout and a deficiency of concern associated with the Dudgeon Bridge.

**Dudgeon Bridge**



### 2.4.7 Gregg

The Gregg Bridge is located 3.8 km north of County Road 15 on the Greenock Brant Townline Road, spanning a tributary of the Teeswater River. The bridge is a two lane, concrete rigid frame bridge constructed in 1965 and was last inspected in 2012. There were no significant deficiencies identified at the time. The photo below of the Gregg Bridge demonstrates the overall structural layout.

**Gregg Bridge**



### 2.4.8 20<sup>th</sup> Concession

The Concession 20 Bridge is the only municipally owned structure that is being included as part of the Master Plan study. Constructed in 1920, the crossing is a single lane bridge located 0.6 km east of County Road 1 on Concession 20 of former Greenock Township. Spanning the Teeswater River this single lane, half-through truss bridge was last inspected in 2009. Major repairs were recommended which would reduce the load capacity or eventually lead to closure if not remediated. The photos below of the Concession 20 Bridge demonstrate the overall structural layout of the crossing and a deficiency of concern.

**Concession 20 Bridge**



## 2.5 Background Studies

### 2.5.1 General

A number of background reports were commissioned at the start of the Master Plan process in order to gain a better understanding of the project study area and to aid in the selection of preferred Master Plan alternatives. Specialists in cultural heritage, natural environment and transportation, were retained to provide individual reports on those specific aspects of the environment. The specialized studies completed in conjunction with the Master Plan include:

- Natural Environment Characterization Report, summarized within Section 2.4.5
- Cultural Heritage Evaluation Report, which examined the cultural significance of each of the structures.
- Stage 1 Archaeological Assessment, which identified the potential for buried cultural artefacts; and
- Traffic Analysis, which examined the impact of various study alternatives on the transportation network through the study area.

In addition, several studies were previously completed by the County of Bruce which have some bearing on the current analysis.



## 2.5.2 Bruce County Studies

### i. Bruce County Road Designation Study (2004)

In 2003, the Bruce County Highways Committee undertook a study to assess the status of the County Road network in order to ensure that it was reflective of the current and future transportation needs of the County. The study reviewed the status of all roads within the county in order to identify those routes serving, 1) primarily local functions, and 2) those acting as through traffic roads. The study was also required to confirm that plans associated with a long-term bridge replacement program were in conformity with roads serving a County or regional function. None of the roads that are part of the current Bridge Infrastructure Master Plan were included in recommendations associated with the Road Designation Study.

### ii. Bruce County Bridge Report (2005)

Following completion of the Road Designation Study, the County of Bruce released a report which inventoried and reviewed all bridges under the County's jurisdiction located on County roads as well as County-maintained bridges located on local roads. The report was undertaken in order to determine which bridges should remain County structures and which should be transferred to the jurisdiction of the local municipality. An additional goal of the report was to identify an appropriate Five-Year Bridge Repair Program and a Ten-Year Bridge Replacement Program, to achieve the transfers and to maintain the bridges remaining under the County's jurisdiction. Table 2.2 summarizes recommendations associated with seven of the eight bridges included in the Master Plan study, which were recognized in the report.

**Table 2.2**  
**Primary Bridge Structures Associated with**  
**Findings from the Bruce County Bridge Report (2005)**

<b>Bridge Name</b>	<b>Location</b>	<b>Recommended Actions</b>	<b>Proposed Transfer</b>
Dudgeon Bridge	Greenock-Brant Boundary	<ul style="list-style-type: none"> <li>Replace bridge in 2012</li> </ul>	<ul style="list-style-type: none"> <li>Transfer to Brockton in 2012</li> </ul>
Gregg Bridge	Brant-Greenock Boundary	<ul style="list-style-type: none"> <li>No major repair work needed</li> </ul>	<ul style="list-style-type: none"> <li>Transfer to Brockton in 2006</li> </ul>
McCurdy Bridge	Brockton/Arran-Elderslie Boundary	<ul style="list-style-type: none"> <li>Bridge should be considered for replacement in 15 – 20 years</li> </ul>	<ul style="list-style-type: none"> <li>Retain ownership</li> </ul>
Big Irwin Bridge	Brockton/Arran-Elderslie Boundary	<ul style="list-style-type: none"> <li>Closure in the period 2010 – 2015</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
Little Irwin Bridge	Brockton/Arran-Elderslie Boundary	<ul style="list-style-type: none"> <li>Closure in the period 2010 – 2015</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
Watson's Bridge	Brockton/Arran-Elderslie	<ul style="list-style-type: none"> <li>Replacement of bridge in 2014</li> </ul>	<ul style="list-style-type: none"> <li>Retain ownership</li> </ul>
12 <sup>th</sup> of Brant Bridge	Concession 12, Brant Township	<ul style="list-style-type: none"> <li>Closure in the period 2010 – 2015</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>

### **2.5.3 Cultural Heritage Evaluation Report**

#### **i. Background**

In accordance with the Ontario Heritage Act, R.S.O. 1990, which is administered by the Ministry of Tourism and Culture, a Heritage Impact Assessment is often required as a component of the Class EA process, when the structure being considered as part of the project is greater than 40 years in age. A preliminary Heritage Assessment was completed for all eight bridges included in the Bridge Infrastructure Master Plan in order to identify potential issues associated with the structural heritage features of the study bridges.

#### **ii. Methodology**

Golder Associates Limited (Golder) was retained by BMROSS to assess the cultural heritage value of each structure and to provide recommendations for future works. The study team consisted of a Senior Built Heritage Specialist and Cultural Heritage Specialist. Field reviews were conducted August 31<sup>st</sup> and September 1<sup>st</sup> of 2011 and included a site visit to each structure as well as examination of historical records associated with each bridge on file with the County.

#### **iii. Cultural Heritage Evaluation**

The Cultural Heritage Evaluation completed for the Bridge Infrastructure Master Plan utilized a scoring system based on criteria provided in Ontario Regulation 9/06 of the *Ontario Heritage Act*. The scoring system was designed to assess three primary characteristics of a structure being the design or physical value of the structure, the contextual value, and the historic or associative value. Each of the eight bridges was assigned a score based upon the criteria, along with comments explaining how the value was assigned.

The report also provided a brief description of other relevant provincial legislation that might have an impact on the cultural heritage of each bridge, including the Provincial Policy Statement (PPS), Ministry of Transportation, and local Official Plan policies. Sections 27 and 29 of the *Ontario Heritage Act* allow a municipality to list or designate a property or structure that is deemed to have cultural value or interest. Table 2.3 provides a summary of the cultural heritage evaluation completed for the eight structures included in the Bridge Infrastructure Master Plan.

#### **iv. Recommendations**

A number of recommendations were provided at the conclusion of the report which will be considered by the County Highways Committee in determining the most appropriate Master Plan option for implementation as well as identifying final outcomes for the study area bridges.

A copy of the Heritage Evaluation report is included within Appendix 'C'.



**Table 2.3**  
**Cultural Heritage Evaluation Summary**

<b>Bridge Name</b>	<b>Cultural Heritage Characteristics</b>	<b>Score *</b>
12 <sup>th</sup> of Brant	<ul style="list-style-type: none"> <li>• Two truss types; Pratt and more rare double-intersection Warren truss;</li> <li>• Technically advanced, rare designs, rare materials; some modifications; balanced and well proportioned;</li> <li>• Prominent structure, contributing factor in character of the region.</li> </ul>	75
McCurdy's	<ul style="list-style-type: none"> <li>• Pennsylvania truss is rare design; Intricately designed, rare materials;</li> <li>• Relatively unmodified for age;</li> <li>• Locally significant; Character defining structure.</li> </ul>	75
Watson's	<ul style="list-style-type: none"> <li>• Pratt through truss with lattice railings, concrete abutments &amp; deck;</li> <li>• Well designed and relatively rare in region; rare materials;</li> <li>• Regionally significant and contributes to local character;</li> <li>• Constructed by Hamilton Bridge Works Co. Ltd., prolific builder-designer.</li> </ul>	70
Big Irwin	<ul style="list-style-type: none"> <li>• Single span Pratt through truss structure has been modified significantly over the years;</li> <li>• Regionally significant and contributes to local character;</li> <li>• Well designed and relatively rare in region, rare materials;</li> <li>• Constructed by Sarnia Bridge Company Ltd., prolific builder-designer.</li> </ul>	65
Concession 2	<ul style="list-style-type: none"> <li>• Warren pony truss with concrete abutments, modern deck constructed with timber;</li> <li>• Relatively rare survivor in region, rare materials;</li> <li>• Contributes to local character.</li> </ul>	50
Dudgeon	<ul style="list-style-type: none"> <li>• Two structure types; concrete and converted steel truss railway bridge;</li> <li>• Concrete and steel designs rare within region;</li> <li>• Lattice work on steel truss altered but rare;</li> <li>• Known builder-designer.</li> </ul>	50
Little Irwin	<ul style="list-style-type: none"> <li>• Concrete rigid frame structure;</li> <li>• Typical bridge design of era and region;</li> <li>• Familiar association with neighbouring bridge, Big Irwin.</li> </ul>	20
Gregg	<ul style="list-style-type: none"> <li>• Concrete rigid frame structure with modern steel guard rails and posts;</li> <li>• Typical bridge design of era and region, known builder;</li> <li>• Appropriate massing within landscape.</li> </ul>	20

\* Out of 100

## **2.5.4 Natural Environment Characterization Report**

Natural Resource Solutions Inc. (NRSI) was retained to conduct a Natural Environment Characterization study in conjunction with the Master Plan. Individual habitat characterizations of the eight bridge sites in the Saugeen and Teeswater watersheds were completed, as well as one potential bridge site on the Saugeen north of McCurdy. The investigation examined sensitivities at each bridge site associated with each option being considered for the structure.

### **i. Methodology**

Field investigations were conducted during the summer and fall of 2011. The study consisted of three primary components in order to analyse all potential impacts associated with the proposed Master Plan study. They are as follows:

- Background (Desktop) Analysis
- Individual Site Habitat Characteristics and Considerations
- Overall Recommendations

### **ii. Background Analysis**

A background review of species at risk (SAR) occurrences was conducted using information collected from the Ontario Ministry of Natural Resources and Natural Heritage Information Centre (NHIC), Ontario Breeding Bird Atlas, and the Saugeen Valley Conservation Authority. The review indicated that no SAR records were present within the vicinity of any of the bridge sites. However, discussions with MNR staff indicated that ten SAR had the potential to be present within the study area. It should be noted that no SAR were found during the 2011 site visits. Table 2.4 lists the individual species, their preferred habitats and the potential for them to be present in the vicinity of the bridge sites.

### **iii. Individual Site Habitat Characteristics and Considerations**

Individual site characteristics were examined in order to identify natural features that may be potentially impacted by construction activities at a given crossing. Both terrestrial and aquatic habitats adjacent to each of the bridge sites were reviewed to determine:

- Extent and sensitivity of natural areas present.
- Potential occurrences of SAR
- Significant vegetation communities.
- Aquatic habitat inventories up/downstream of crossings.

Table 2.5 summarizes the site characteristics and considerations for each of the crossing locations.

**Table 2.4**  
**Species at Risk Potential**  
**Bruce County Infrastructure Master Plan**

<b>Species</b>	<b>Status</b>	<b>Preferred Habitat</b>	<b>Potential</b>
Butternut ( <i>Juglans cinerea</i> )	Endangered	Forested floodplains	Moderate
Tuberous Indian Plantain ( <i>Arnoglossum plantagineum</i> )	Special Concern	Wet, sandy areas along river banks near Lake Huron	Low
Short-eared Owl ( <i>Asio flammeus</i> )	Special Concern	Open grasslands and marshes	Low
Monarch Butterfly ( <i>Danaus plexippus</i> )	Special Concern	Anywhere where milkweed is present	High
Least Bittern ( <i>Ixobrychus exilis</i> )	Threatened	Large undisturbed marsh habitats	Low
Loggerhead Shrike ( <i>Lanius ludovicianus</i> )	Endangered	Open pasture and grasslands with scattered low trees and shrubs	Low to Moderate
Pugnose Shiner ( <i>Notropis anogenus</i> )	Endangered	Slow moving watercourses with clear water.	Moderate
Eastern Ribbonsnake ( <i>Thamnophis sauritus septentrionalis</i> )	Special Concern	Close to watercourses and marshes	Low to Moderate
Rainbow Mussel ( <i>Villosa iris</i> )	Endangered	Small to medium sized rivers	Low to Moderate
Hungerford's Crawling Water Beetle ( <i>Brychius hungerfordi</i> )	Endangered	Cool, swift flowing alkaline streams with gravel and sand bottoms	Low

Figure 2.5 illustrates some of species identified as potentially being present.

#### **iv. Recommendations**

Based upon the results of the background review and on-site investigations of individual habitat characteristics and considerations, the following recommendations were developed in conjunction with the County of Bruce Bridge Infrastructure Master Plan:

- The less interference a crossing has on the watercourse and floodplain, the less of an overall impact it will have;
- Movement of abutments and/or piers out of the active channel, and decreasing the encroachment of approach-roads into the floodplain, will provide long-term benefit to wildlife by restoring some of the natural movement through the floodplain;
- Increasing floodplain capacity at a crossing would help to restore natural river-processes, however the impact and/or benefit on fish habitat must be further assessed;

A copy of the Natural Environment Characterization Report is contained within Appendix 'D'.

**Figure 2.5**  
**Potential SAR located within the Project Study Area**



**Top:** Eastern Ribbonsnake (Left); Rainbow Mussel (Right)  
**Middle:** Butternut (Left); Hungerford's Crawling Water Beetle (Right)  
**Bottom:** Pugnose Shiner

Table 2.5: Natural Environment Site Characteristics and Considerations

Site Characteristic and Considerations	Bridge								
	12 <sup>th</sup> of Brant	McCurdy	Watson’s	Big Irwin	Concession 20	Dudgeon	Little Irwin*	Gregg*	No Existing Bridge (Concession 2A)
Watercourse	Saugeen River	Saugeen River	Teeswater River	Teeswater River	Teeswater River	Teeswater River	Teeswater River Trib.	Teeswater River Trib.	Saugeen River
Species at Risk (SAR) Potential	Potential for SAR (Rainbow mussel)	Potential for SAR (Rainbow Mussel)	Potential for SAR (Pugnose Shiner, Butternut, Tuberous Indian Plantain)	Potential for SAR (Pugnose Shiner, Butternut, Tuberous Indian Plantain)	Potential for SAR (Pugnose Shiner, Butternut, Tuberous Indian Plantain)	Potential for SAR (Pugnose Shiner, Butternut, Tuberous Indian Plantain)	n/a	n/a	Potential for SAR (Rainbow Mussel, Butternut, Tuberous Indian Plantain)
Riparian Corners	•NW/SW: Pasture •NE/SE: Thick scrub brush with lots of herbaceous vegetation cover	•NW/SW: Cultural meadow •NE: Cattle fencing with regenerating scrub •SE: Scrub-brush of Willow, Maple and Poplar	•NE: Basswood and Walnut, with grassed banks •SW: Mature mixed forest •NE: Basswood and Willow meadow/shrub •SE: Graminoid/Goldenrod meadow	•NW/NE: Graminoid meadow •SW: Cedar scrub with historical or current grazing •SE: Graminoid meadow with active pasture	•NW: Meadow transitioning into Cedar bush •SW/NE/SE: Graminoid meadow with sparse occurrences of other species	•NW: Older scrub with Maple and Birch species, dense understory •SW/SE: Graminoid/ Goldenrod meadow •NE: Goldenrod meadow with mowed grass	n/a	n/a	•NW/SW: Natural scrub with naturalizing pasture behind •NE/SE: Band of Willow, and deciduous trees with graminoid understory
Banks/ Flooding Considerations	•Steep and high banks but relatively stable	•45° slope, relatively stable (minor erosion)	•NE and SE bank 45° slope, stable; W bank is stable	•10° slope on E bank leading to floodplain; 20° slope on NW (no floodplain)	•NW bank stable; E banks steep	•N side is floodplain; SW stable; NE has some eroding	n/a	•Roads occupy the broad floodplain	•W and E banks are steep (minor erosion)
Gradient/ Substrate/ Channel Morphology	•Very low gradient •100% pool (still water) •Fine substrates	•Low gradient •Dominated by pools (still water) •Fine substrates (cobbles present)	•Low gradient •100% pool (still water) •Shallow depths with silt-covered rock	•Medium gradient (S); low gradient (N) •100% pool (still water) (N) •Stone and silt substrate (S) •Fine substrates	•Medium gradient (S); medium/low gradient (N) •Silt-covered cobble and rubble substrates(N); less silt deposits (S)	•Medium/low gradient (u/s); low gradient (d/s) •100% pool (still water) •Rock (u/s), rock/slit (d/s)	n/a	n/a	•Medium/high gradient •Clean rock substrate (various sizes)
Water Clarity	Moderate turbidity	Moderate turbidity	Moderate/high turbidity	Low/moderate turbidity	Low/moderate turbidity	Low turbidity	n/a	Moderate/high turbidity	Low turbidity
Thermal Regime/ Timing Restrictions	•Migratory coldwater, resident coolwater and warmwater •In water work period: July 16 – September 14	•Migratory coldwater, resident coolwater and warmwater •In water work period: July 16 – September 14	•Coolwater and warmwater •Allowable in water work period: July 16 – March 14 (summer through to winter)	•Coolwater and warmwater •Allowable in water work period: July 16 – March 14 (summer through to winter)	•Coolwater and warmwater •Allowable in water work period: July 16 – March 14 (summer through to winter)	•Coolwater and warmwater •Allowable in water work period: July 16 – March 14 (summer through to winter)	n/a	n/a	•Migratory coldwater, resident coolwater and warmwater •Inn water work period: July 16 – September 14
Sensitivity	Low	Low	Low	Low	Medium	High	Low	n/a	High
Mitigation Measures	•Conduct in water work during appropriate timing window •Minimize duration of near water works •Two-tier approach to minimize probability of sediments reaching watercourse •Isolate abutment and pier using coffer dam to work in the dry	•Conduct in water work during appropriate timing window •Minimize duration of near water works •Two-tier approach to minimize sediments reaching watercourse •Isolate abutment and pier using coffer dam to work in the dry	•Minimize riparian removal •Conduct in water work during appropriate timing window •Minimize duration of near water works •Two-tier approach to minimize sediments reaching watercourse •Isolate abutment and pier using coffer dam to work in the dry	•Conduct in water work during appropriate timing window •Minimize duration of near water works •Two-tier approach to minimize sediments reaching watercourse •Isolate abutment and pier using coffer dam to work in the dry	•Minimize riparian removal •Conduct in water work during appropriate timing window •Minimize duration of near water works •Two-tier approach to minimize sediments reaching watercourse •Isolate abutment and pier using coffer dam to work in the dry	•Minimize riparian removal •Conduct in water work during appropriate timing window •Minimize duration of near water works •Two-tier approach to minimize sediments reaching watercourse •Isolate abutment and pier using coffer dam to work in the dry	n/a	n/a	•Minimize riparian removal •Conduct in water work during appropriate timing window •Minimize duration of near water works •Two-tier approach to minimize sediments reaching watercourse •Isolate abutment and pier using coffer dam to work in the dry
Short-term									
Long-term	•Consider westward migration of channel in placement of west abutment •If possible, space abutments out of active channel •Reduce footprint in the floodplain	•If possible, space abutments out of active channel •Reduce area footprint in the floodplain of the approach road	•Avoid W forest (Walnut trees present with potential for Butternut to occur) •If possible, space abutments out of active channel •Reduce footprint in the floodplain	•If possible, space abutments out of active channel •Reduce area footprint in the floodplain of the approach road	•If possible, space abutments out of active channel •Reduce area footprint in the floodplain of the approach road	•Avoid natural upstream side, expanding towards downstream (E) •If possible, space abutments out of active channel •Reduce footprint in the floodplain	n/a	n/a	•If possible, space abutments out of active channel •Reduce area footprint in the floodplain of the approach road
Considerations	•A new structure would be a net benefit if it restricts flood flows less than they are currently	•Less ecological impact by using existing road alignment •Increased flood-capacity will result in a net benefit to the river	•Good crossing location due to narrow floodplain width •Minimizing encroachment of forests with potential SAR will eliminate impact •Few piers would restore the river’s floodplain	•Reduce encroachment of approach roads into floodplain •Increase in the distance between abutments may be beneficial •Riparian tree planting is encouraged in this area	•Long-term benefit from the removal of the existing abutments and replacement with a larger span, increasing the capacity of flood flows	•Wide floodplain makes this difficult crossing location •Abutment and piers should be placed outside of the bankful width of the active channel •Reach downstream needs riparian tree planting	n/a	n/a	•Site may be more sensitive to placement of a pier in the water given the higher gradient and associated higher force of channel-forming flows

## **2.5.5 Archaeological Investigation**

### **(a) General**

The project study area is bisected by two major river systems, being the Teeswater and Saugeen Rivers. These waterways provided an essential transportation corridor for early inhabitants of the area, creating a high potential for the discovery of pre-contact and historic era archaeological resources within the study area. Given this potential, William R. Fitzgerald, Ph.D. was retained to conduct a Stage 1 assessment of the project study area as part of the Master Plan Class EA process. The purpose of the work was to evaluate the archaeological potential of the study area; determine if there are known sites present; and conclude whether a Stage 2 field assessment process is warranted prior to any proposed construction activity. The goal of the archaeological assessment process is to determine whether any proposed construction will impact known or potential archaeological resources and, if so, offer options for the mitigation of construction impacts.

### **(b) Stage 1 Assessment**

The Stage 1 archaeological assessment was carried out in February and March of 2012 for the project study area and the eight bridge sites being considered as part of the Master Plan review. The background review indicated that much of the area demonstrated potential for pre-contact and historic First Peoples sites and historic Euro-Canadian sites, due to the presence of the two major river systems as well as early transportation corridors which passed through the area. Follow-up reconnaissance demonstrated that although there has been some previous disturbance at each site associated with prior bridge and approach road construction, undisturbed lands located adjacent to the structures and approaches will require a Stage 2 survey if affected by the proposed construction.

The Stage 1 background study included a consideration of soils, topography and drainage for the study area, as well as a review of historic land use and settlement patterns. A field reconnaissance was also undertaken in order to document existing conditions. Although the precise nature of the proposed modifications at each bridge site were not known during completion of the Stage 1 Assessment, an additional review will be undertaken of each site once the final outcome for each structure is determined at the conclusion of the Master Plan process. Stage 3 investigations may be required if archaeological resources are discovered during the completion of Stage 2 assessments. A copy of the Stage 1 Archaeological Assessment is contained within Appendix 'E'.

### **3.0 CLASS EA MASTER PLAN PROCESS**

#### **3.1 Overview**

As discussed in Section 2.0 of this report, the County of Bruce currently owns and maintains five aging structures which span the Saugeen and Teeswater Rivers in south central Bruce County near the community of Paisley. The county-owned structures, as well as several municipally owned crossings, are located on local municipal roads and are situated in close physical proximity. As a group, they represent a significant potential capital expenditure to the county and local municipalities, should they all require replacement within the next 10 years. In order to address this situation the County of Bruce authorized BMROSS to undertake a Bridge Infrastructure Master Plan utilizing the Class Environmental Assessment planning process, to investigate potential outcomes associated with the structures.

The overall goal of the Master Planning process can be summarized as follows:

*To develop a long range Infrastructure Master Plan for five county-owned and one municipally-owned structure located in central Bruce County and to identify outcomes for each of the structures which will include replacement, rehabilitation or retirement. These recommendations will be considered in conjunction with other road infrastructure and transportation needs within the study area and will be implemented over a 20 year timeframe.*

The following sections of this report document the environmental assessment process conducted during the Master Planning process, as well as the identification of a preferred outcome for the Bridge Infrastructure Master Plan. The key components of the process are summarized below:

- A description of the identified transportation infrastructure deficiencies.
- Identification of practical options to resolve deficiencies in the long-term
- An evaluation of potential impacts associated with the identified alternatives
- Selection of a preferred infrastructure alternative.
- Identification of a conceptual implementation plan.
- Synopsis of issues related to the implementation of the infrastructure plan.

#### **3.2 Problem Identification**

Section 1.4 of this report indicates that the investigation followed Master Plan Approach #2, which addresses Phases 1 and 2 of the Class EA process and satisfies the requirements for Schedule 'A', 'A+', and 'B' screenings. Phase 1 of this process involves the identification of the problem, or problems, which need to be addressed. Given the structural deficiencies identified in conjunction with the Master Plan, the following problem statement has been developed to summarize issues central to this analysis:

*Five county-owned and one municipally-owned structure, located on local municipal roadways near the community of Paisley, are aging and in poor condition and will require replacement over the next 20 years.*



*These structures represent a significant capital commitment to the county which is unsustainable given that they do not form part of the county road network, are in close physical proximity, and experience relatively low volumes of traffic.*

### 3.3 Identification of Alternative Solutions

#### 3.3.1 General

At the start of the Master Plan process, a number of possible outcomes were considered for each of the structures being assessed through the study. The range of alternatives being reviewed could include the replacement, rehabilitation or retirement of each of the structures. The Gregg and Little Irwin Bridges were included in the Master Plan study due to their close physical proximity to the Dudgeon and Big Irwin bridges respectively. However, both bridges are currently in good condition and have few deficiencies and will therefore not require alteration in conjunction with the Master Plan study. However, these two structures will be impacted by the outcome which is ultimately selected for the adjacent crossing and roadway which currently connect the two crossings and may therefore have a bearing on future maintenance decisions associated with each of the crossings. A brief description of the work associated with each of the Master Plan outcomes is described in Table 3.1.

**Table 3.1**  
**Primary Components of the Identified Alternatives**

<b>Structural Options</b>	<b>Related Works</b>
Replacement	<ul style="list-style-type: none"> <li>- Replace the existing structure with a new concrete bridge designed in accordance with established standards of the latest edition of the Canadian Highway Bridge Design Code.</li> <li>- Reconstruct road approaches to accommodate the new bridge and to address existing approach road deficiencies.</li> <li>- Install rock rip rap erosion protection around piers and abutments adjacent to the channel to protect against scour.</li> </ul>
Rehabilitation	<ul style="list-style-type: none"> <li>- Replace all deteriorated components of structure with sympathetic components in accordance with established standards of the latest edition of the Canadian Highway Bridge Design Code.</li> </ul>
Retirement (Repair and Eventual Closure)	<ul style="list-style-type: none"> <li>- Replace significantly deteriorated components of existing structure with required components in accordance with established standards of the latest edition of the Canadian Highway Bridge Design Code in order to maintain the structure in a condition which is safe for posted load limits.</li> <li>- Establish timeline for eventual closure of the crossing.</li> <li>- Close crossing to vehicular traffic through installation of barricades and construction of cul-de-sacs.</li> <li>- Consider alternative uses for crossing such as pedestrian or recreational.</li> <li>- Remove bridge structure and salvage if possible.</li> <li>- Remove piers and abutments and associated road approaches.</li> <li>- Restore any disturbed sections of the river bank and channel.</li> </ul>

### **3.3.2 Steering Committee Meetings**

The project Steering Committee, which was formed to help guide study investigations, met on a regular basis during completion of the background studies to review the data and identify potential constraints which may affect study outcomes. Following completion of the background review, a Steering Committee meeting was held on August 15, 2012 to finalize the study alternatives and identify a preliminary preferred alternative to bring forward to the County Highways Committee for further evaluation. This section of the report examines the alternatives which were subsequently identified and the analysis of these options which assisted with the identification of a preferred option.

### **3.3.3 Guiding Principles**

With three possible outcomes identified for each of the bridges included in the Master Plan Study, the range of options available for consideration became unmanageable. In order to simplify the process and streamline the decision making process, the Steering Committee adopted a series of guiding principles to assist with the identification of alternatives. The following guiding principles were proposed by committee members. Accordingly, each option considered in conjunction with the Master Plan incorporated these guidelines:

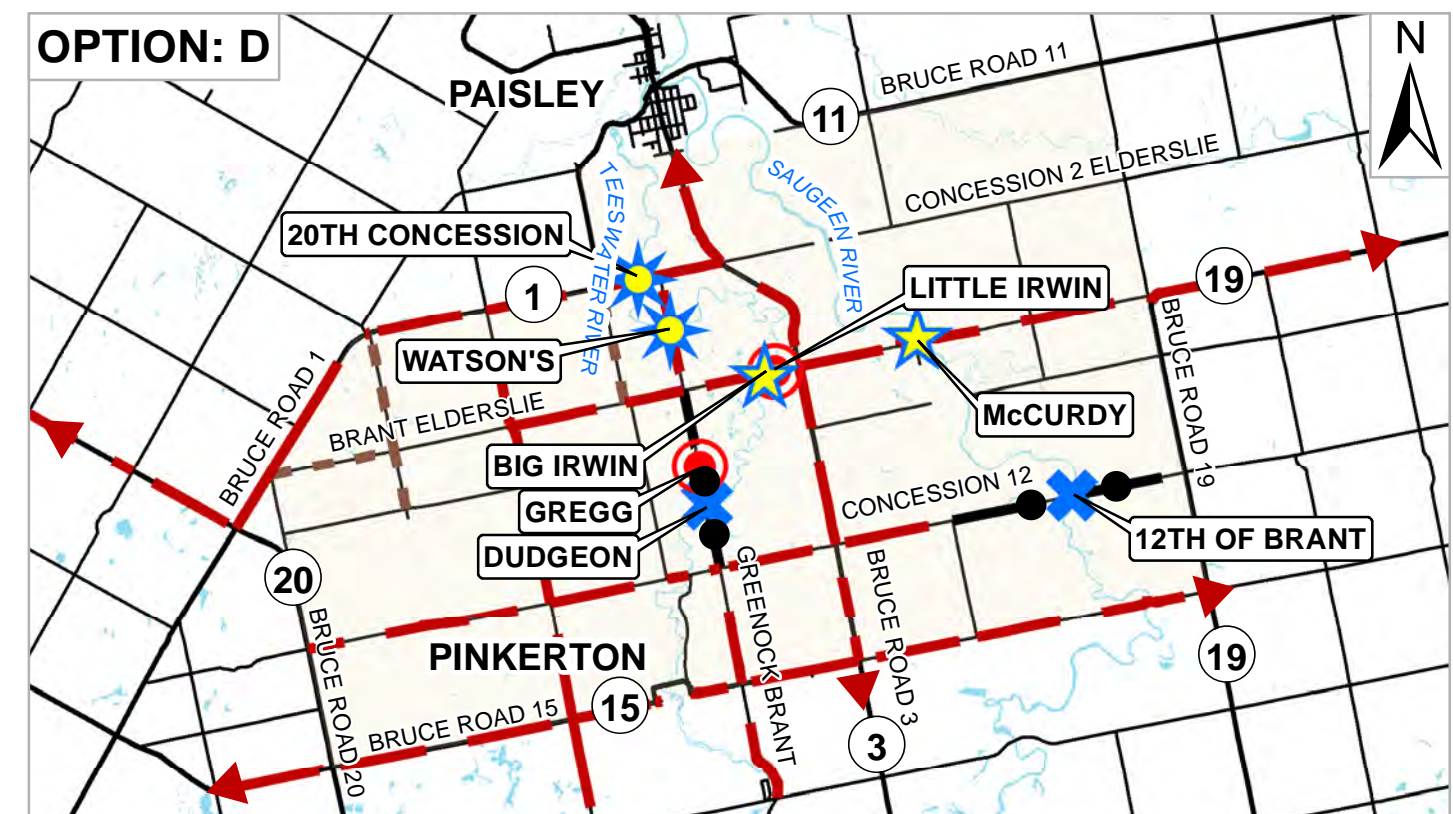
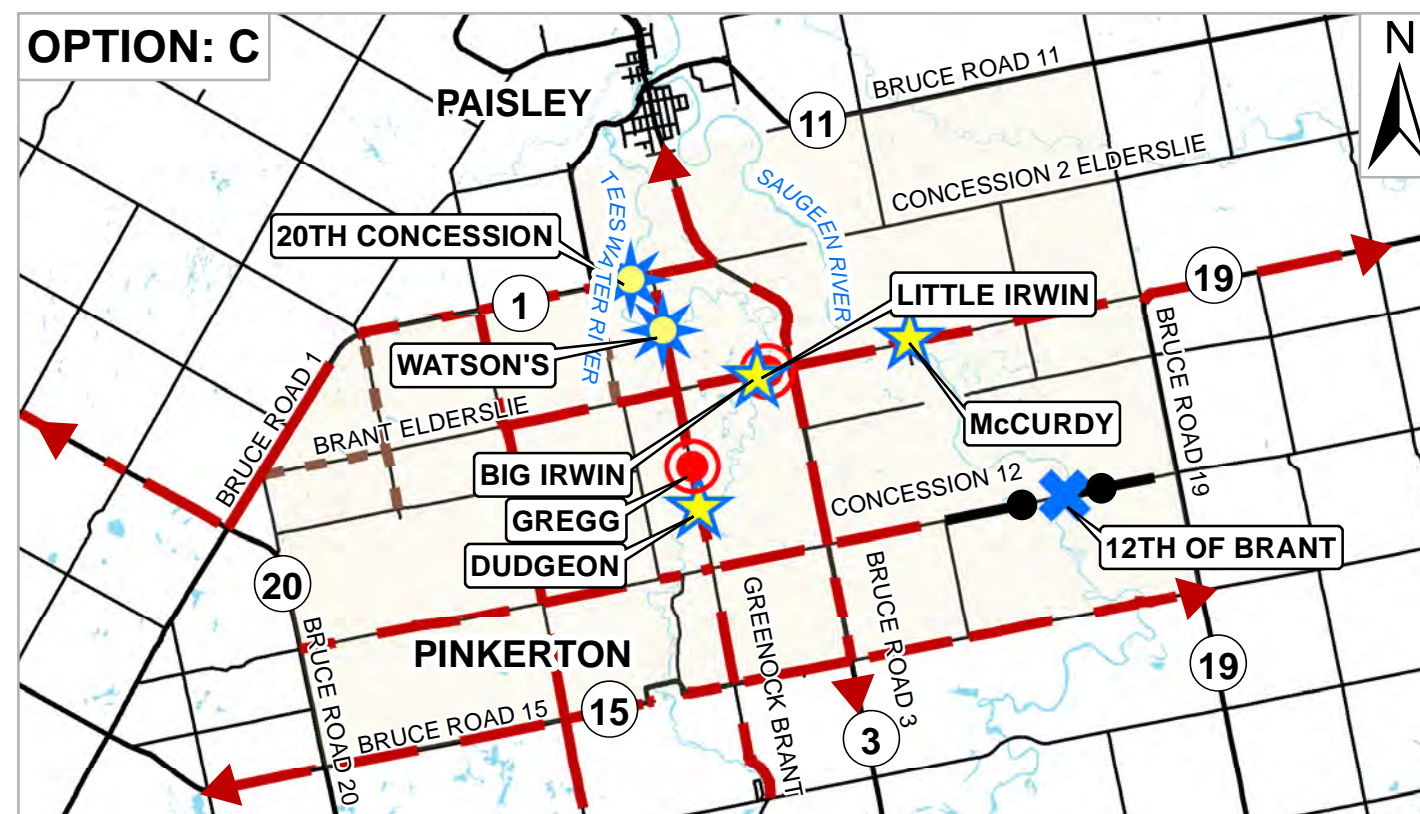
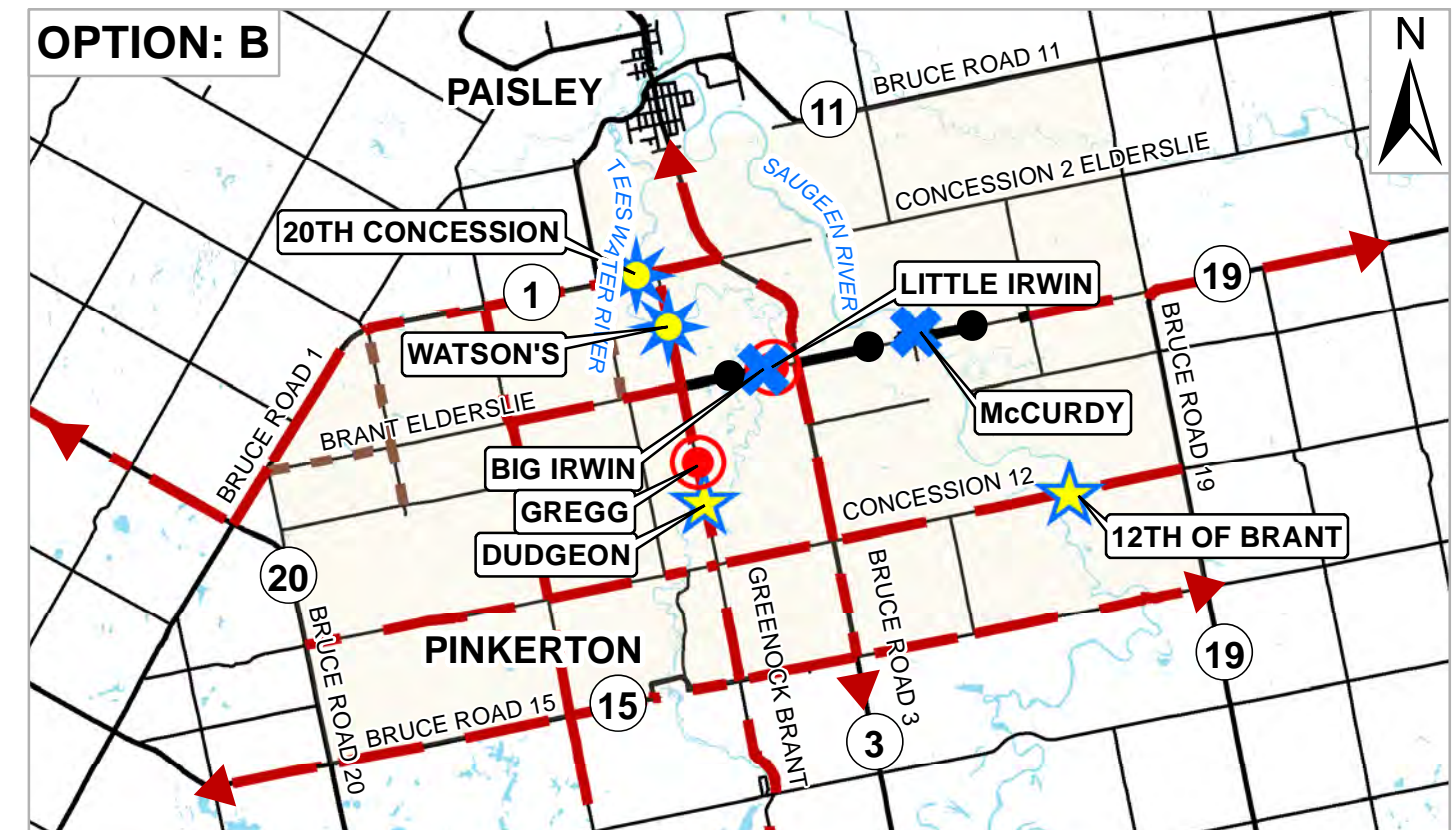
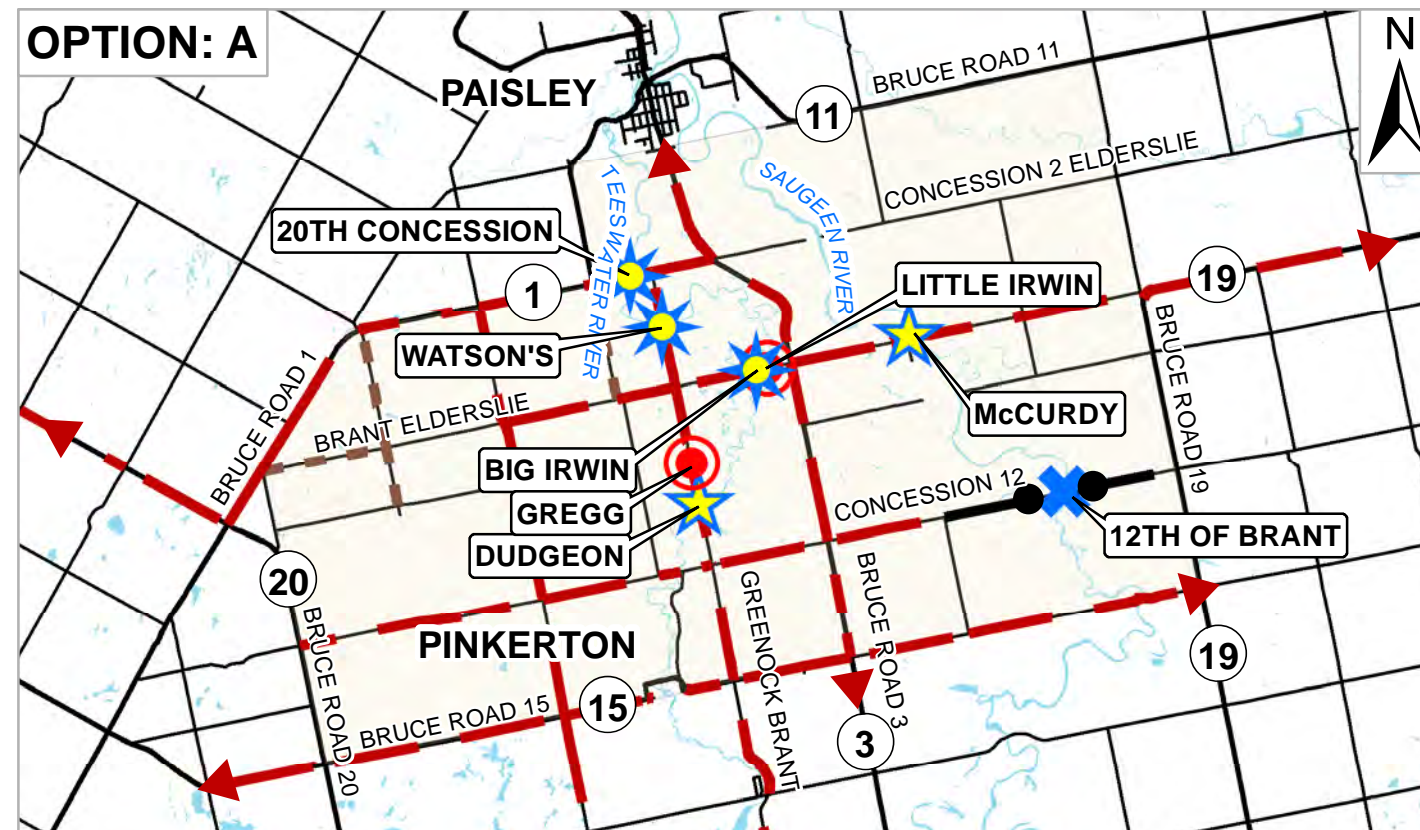
- i) Replace only one of the Saugeen River crossings (McCurdy and/or 12<sup>th</sup> of Brant).
- ii) Provide a full capacity crossing to access the central block of land bounded by C.R. 3, C.R. 1, C.R. 15 and Sideroad 5 Greenock.
- iii) Rehabilitate the 20<sup>th</sup> Concession Bridge.
- iv) Replace or close the Dudgeon Bridge (rehabilitation of the structure is not technically feasible).

### **3.3.4 Identification of Alternative Solutions**

Based upon the guiding principles described above, and input received from the Steering Committee members, seven potential options were initially identified for inclusion in the formal evaluation of alternatives process. The options identified a series of outcomes for the primary study bridges as well as the anticipated costs to complete the proposed works. These options, and the associated costs, are illustrated on Figures 3.1 and 3.2 and are summarized in Tables 3.2 – 3.4

The do nothing option, although not detailed below, is a consideration during any Master Plan Class EA process. This option would propose that no improvements or changes be made to address the identified problem. During the Master Plan planning and design process, this alternative may be implemented at any time prior to implementation of the preferred option. A decision to “do nothing” would typically be made when the costs of all other alternatives, both financial and environmental, significantly outweigh the benefits.





#### LEGEND

- |                    |                |                        |
|--------------------|----------------|------------------------|
| BRIDGE (NO CHANGE) | REHABILITATION | CORRIDOR               |
| EVENTUAL CLOSURE   | REPLACE        | CUL DE SAC             |
|                    |                | WINTER NON-MAINTENANCE |



BRUCE COUNTY INFRASTRUCTURE MASTER PLAN  
IMPLEMENTATION OPTIONS

OPTIONS: A - D

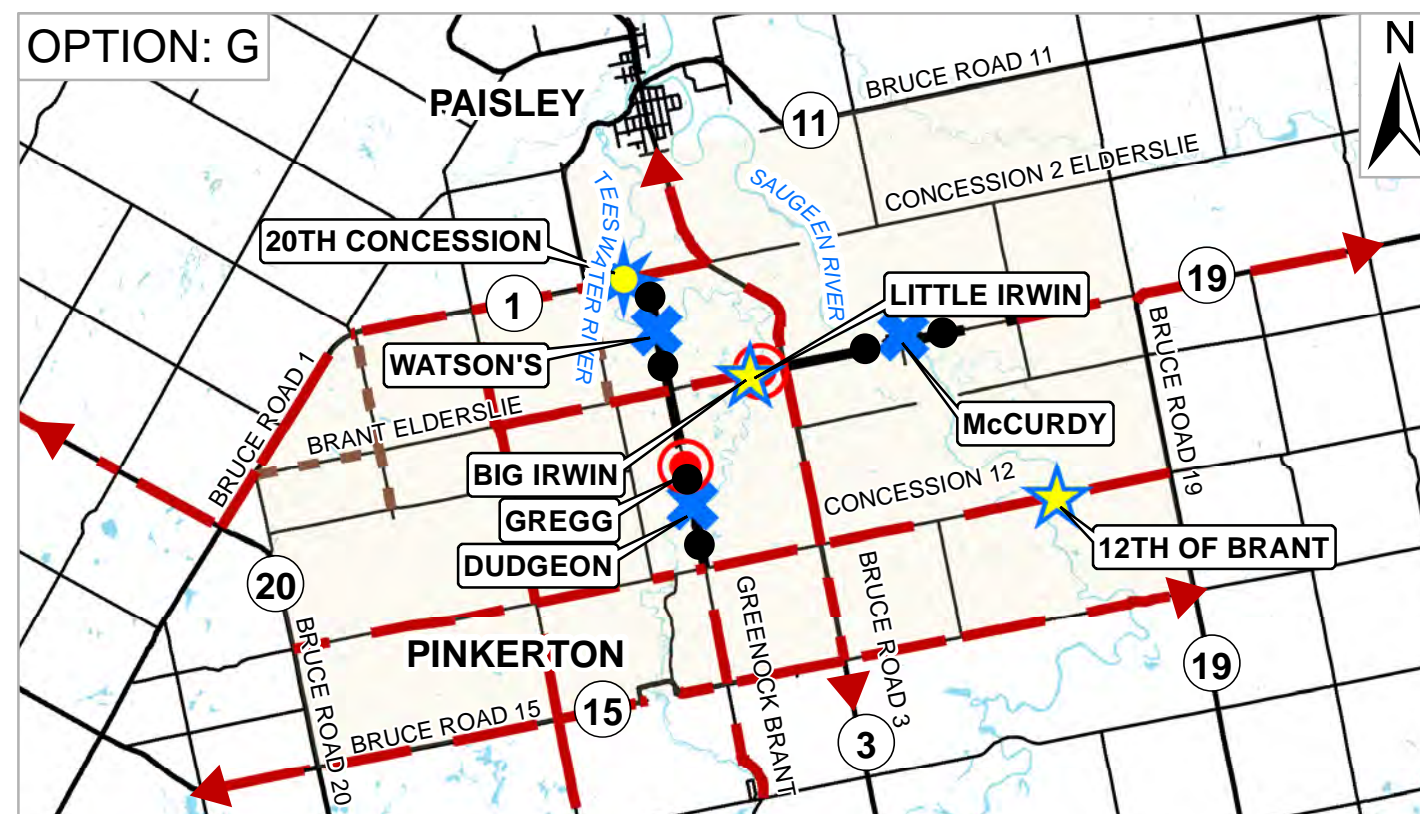
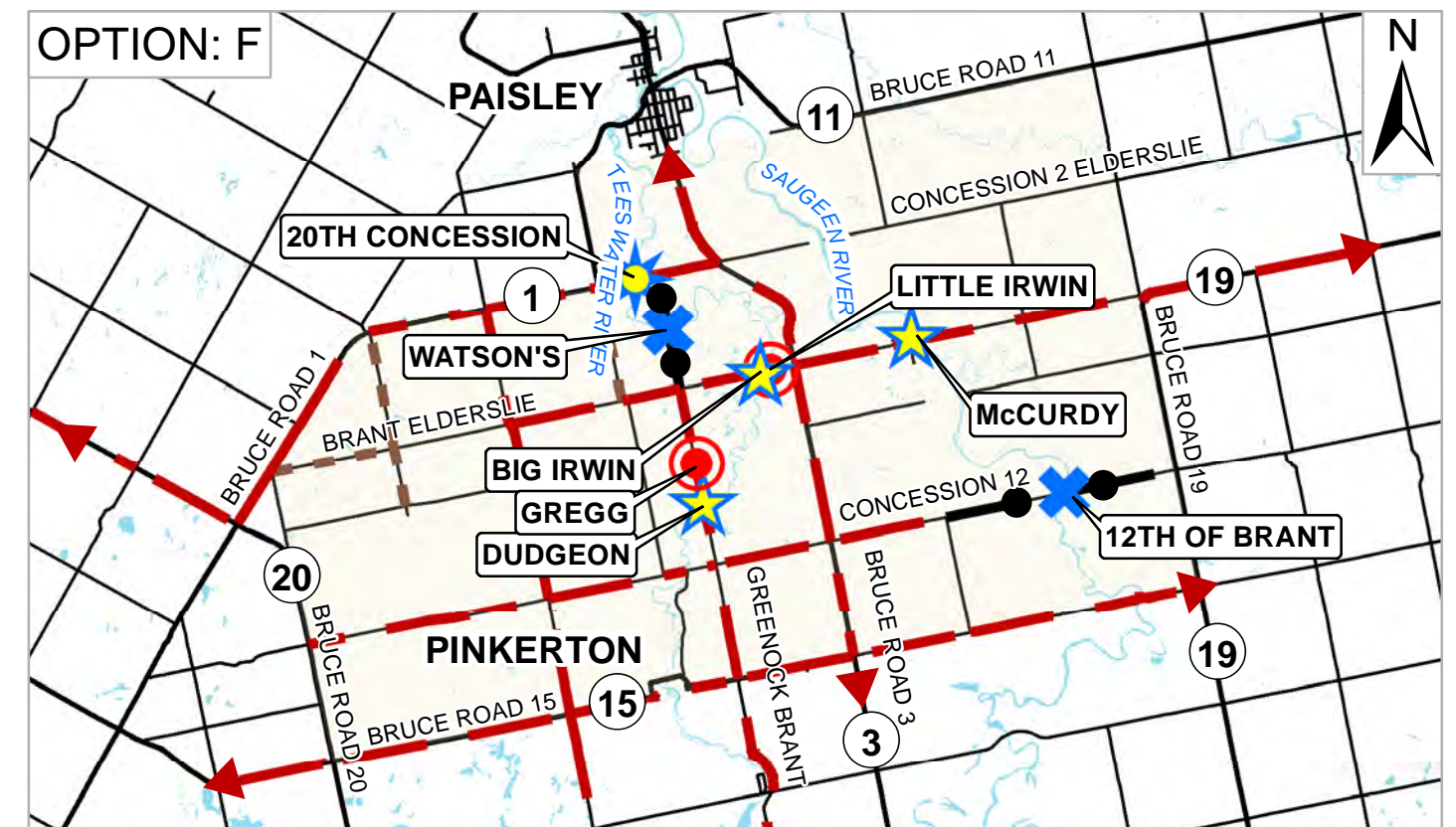
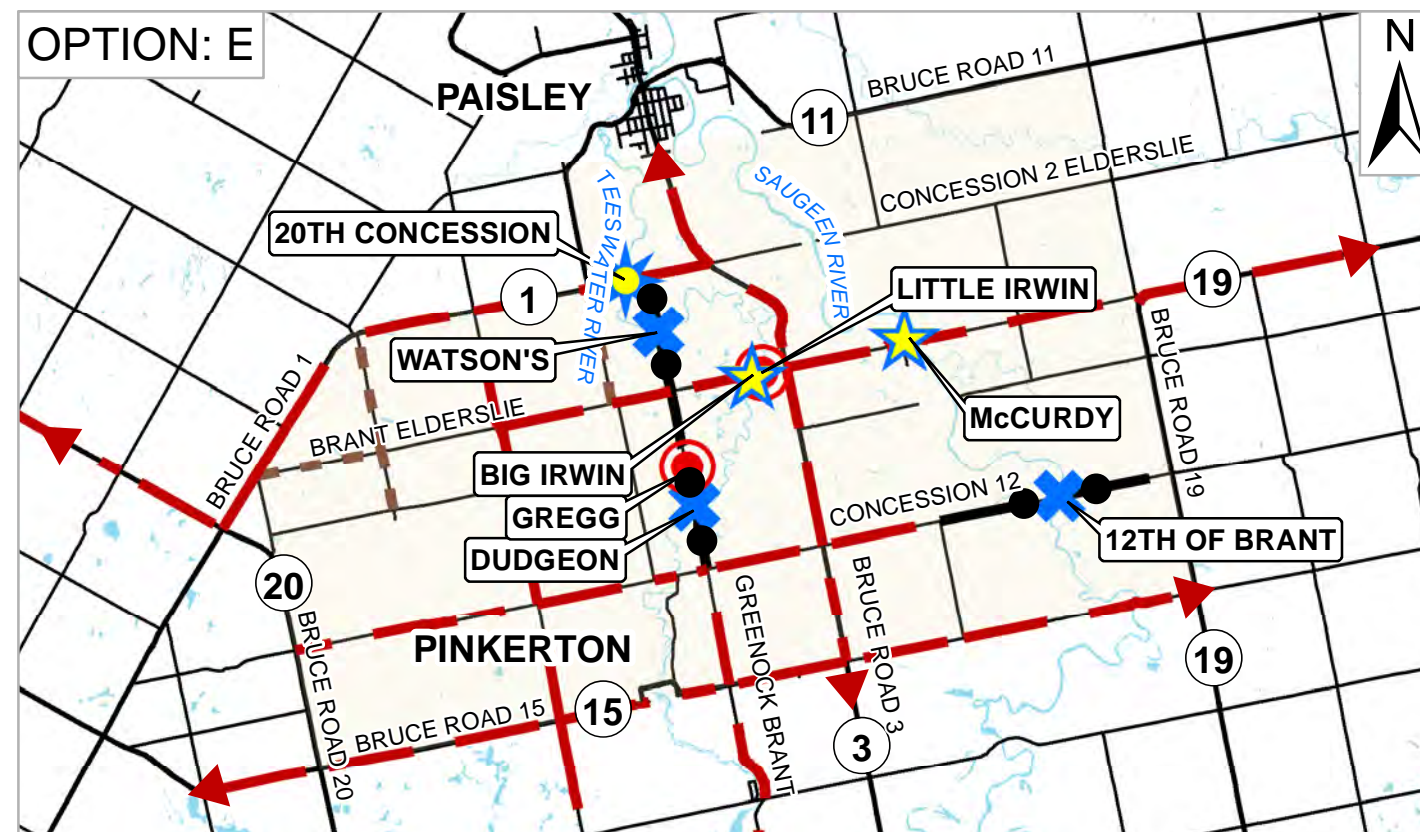
DATE  
OCT. 10, 2012

SCALE  
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PROJECT No.  
11101

FIGURE No.  
3.1





**LEGEND**

- |                    |                |                        |
|--------------------|----------------|------------------------|
| BRIDGE (NO CHANGE) | REHABILITATION | CORRIDOR               |
| EVENTUAL CLOSURE   | REPLACE        | CUL DE SAC             |
|                    |                | WINTER NON-MAINTENANCE |



BRUCE COUNTY INFRASTRUCTURE MASTER PLAN  
IMPLEMENTATION OPTIONS  
**OPTIONS: E - G**

DATE  
OCT. 10, 2012

SCALE  
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PROJECT No.  
11101

FIGURE No.  
3.2

**Table 3.2**  
**Preliminary Bridge Infrastructure Master Plan Options**

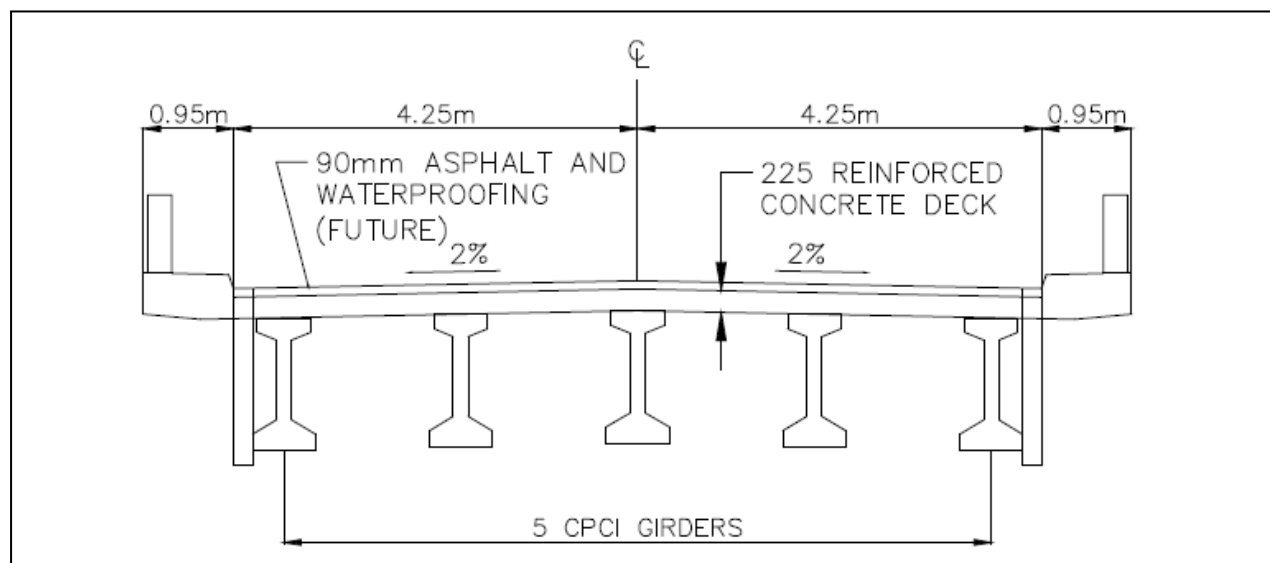
<b>Options</b>	<b>Replace</b>	<b>Rehabilitate</b>	<b>Retire</b>
<b>A</b>	Dudgeon/McCurdy	20 <sup>th</sup> Concession/ Watsons/ Big Irwin	12 <sup>th</sup> of Brant
<b>B</b>	Dudgeon/12 <sup>th</sup> of Brant	20 <sup>th</sup> Concession/ Watsons	McCurdy/ Big Irwin
<b>C</b>	Dudgeon/McCurdy/ Big Irwin	20 <sup>th</sup> Concession/ Watsons	12 <sup>th</sup> of Brant
<b>D</b>	Big Irwin/McCurdy	20 <sup>th</sup> Concession/ Watsons	Dudgeon/ 12 <sup>th</sup> of Brant
<b>E</b>	Big Irwin/McCurdy	20 <sup>th</sup> Concession	Watsons/ 12 <sup>th</sup> of Brant/ Dudgeon
<b>F</b>	Dudgeon/McCurdy/ Big Irwin	20 <sup>th</sup> Concession	Watsons/12 <sup>th</sup> of Brant
<b>G</b>	Big Irwin/12 <sup>th</sup> of Brant	20 <sup>th</sup> Concession	Watsons/ McCurdy Dudgeon

### 3.3.5 Engineering Review

#### (a) Design Considerations

In order to evaluate the potential impacts associated with each of the options being considered an engineering analysis was completed by BMROSS structural engineering staff. The evaluation included a review of each bridge site and associated road approaches to determine the size and configuration required for a new bridge crossing to be constructed at each location. Figure 3.3 illustrates the standard deck cross section to be used for the new structures.

**Figure 3.3**  
**Proposed Bridge Deck Cross-Section**



The evaluation also identified horizontal and vertical alignment deficiencies for the existing road approaches at each crossing as well as proposing a preliminary engineering design for each site. Table 3.3 summarizes existing deficiencies of note associated with each crossing and design considerations identified through the engineering review.

**Table 3.3**  
**Bruce County Infrastructure Master Plan:**  
**Engineering Design Considerations**

<b>Bridge Crossing</b>	<b>Approach Road Deficiencies</b>	<b>Potential Design Speed</b>	<b>Other Issues</b>	<b>Proposed Structure</b>
<b>Big Irwin</b>	Steep west approach (14.1%)	60 kph	Laneway immediately west of bridge.	Two span bridge 16 m/28 m same location.
<b>Dudgeon</b>	Steep south approach (10.8%)	80 kph	Three laneways at crest of south hill. Poor horizontal alignment.	Two span bridge 27 m/27 m located 30 m d/s from existing
<b>Watson</b>	Steep south approach (11.7%)	80 kph	Two laneways at crest of south hill.	Three span bridge 20 m/25 m/ 15 m in same location.
<b>20<sup>th</sup> Concession</b>	Steep west approach (8-10.4%)	60 kph	Significant road fill required to improve vertical alignment.	Three span bridge 16 m/23 m/16 m in same location.
<b>McCurdy</b>	Steep west approach (9.7%)	60 kph	Cut and fill required on west approach to address vertical alignment issues.	Three span bridge 26 m/ 32 m/26 m with two in-water piers in same location.
<b>12<sup>th</sup> of Brant</b>	Steep west approach ends at bridge (8.7%)	80 kph	Two lanes at crest of west hill limit vertical alignment options.	Four span bridge 20 m/30 m/30 m/20 m in same location.

#### **(b) Estimated Construction Costs**

In order to estimate construction costs associated with each of the options detailed above, costs for the rehabilitation, replacement or retirement of each of the various structures needed to be determined. Table 3.4 summarizes anticipated construction costs for each of these outcomes for the primary bridges. Replacement costs for each structure also include the cost of approach road reconstruction, as required, to achieve the anticipated posted speed limit at each crossing. Various design speeds were considered for each bridge in order to determine the preferred speed which best suited the design limitations of the existing municipal roadway and anticipated construction costs required to upgrade existing approaches. The preferred design speed for each structure is shown in the following tables. Bridge closure costs would include the construction of a cul-de-sac adjacent to each end of the bridge as well as costs associated with the eventual removal of the structure.



**Table 3.4**  
**Estimated Construction Costs:**

<b>Structure</b>	<b>Potential Design Speed</b>	<b>Replacement</b>	<b>Rehabilitation</b>	<b>Retirement</b>
<b>Big Irwin</b>	60 kph	\$ 1,903,000.00	\$ 530,000.00	\$ 100,000.00
<b>Dudgeon</b>	80 kph	\$ 2,287,400.00	N/A	\$ 100,000.00
<b>Watson</b>	80 kph	\$ 2,451,700.00	\$ 419,000.00	\$ 100,000.00
<b>20<sup>th</sup> Concession</b>	60 kph	\$ 2,509,000.00	\$ 416,000.00	\$ 100,000.00
<b>McCurdy</b>	60 kph	\$ 2,941,000.00	\$ 677,000.00	\$ 100,000.00
<b>12<sup>th</sup> of Brant</b>	80 kph	\$ 3,408,600.00	\$ 815,000.00	\$ 100,000.00
<b>Total</b>		\$ 15,500,700.00	\$ 2,857,000.00	\$ 600,000.00

**(c) Estimated Costs for Municipal Partners**

For County-owned structures located on local municipal roads, a portion of the costs detailed above would be paid by the local municipality. Typically, the County's responsibility would include the bridge structure and 30 metres of approaches on either side of the bridge. Any portion of the work that extends beyond 30 metres would be paid by the municipality having responsibility for that section of road. Where the roadway is a boundary road between two abutting municipalities, costs are split equally between the two municipal partners. Table 3.5 summarizes anticipated construction costs for each municipal partner for the seven study options.

**Table 3.5**  
**Estimated Construction Costs for Preliminary Bridge Infrastructure Options**

<b>Options</b>	<b>Bruce County</b>	<b>Arran-Elderslie</b>	<b>Brockton</b>	<b>Total</b>
<b>A</b>	\$ 5,457,800.00	\$ 197,000.00	\$ 1,038,600.00	\$ 6,693,400.00
<b>B</b>	\$ 5,320,400.00	-	\$ 1,410,600.00	\$ 6,731,000.00
<b>C</b>	\$ 6,545,000.00	\$ 339,900.00	\$ 1,181,500.00	\$ 8,066,400.00
<b>D</b>	\$ 4,738,200.00	\$ 339,900.00	\$ 755,900.00	\$ 5,879,000.00
<b>E</b>	\$ 4,464,200.00	\$ 339,900.00	\$ 755,900.00	\$ 5,560,000.00
<b>F</b>	\$ 6,226,000.00	\$ 339,900.00	\$ 1,181,500.00	\$ 7,747,400.00
<b>G</b>	\$ 4,756,800.00	\$ 142,900.00	\$ 1,127,900.00	\$ 6,027,600.00

**3.4 Evaluation of Alternatives**

**3.4.1 General Process**

Phase 2 of the Class EA process involves the evaluation of the defined alternatives and is conducted by examining the technical, economic, and environmental considerations associated with implementing any alternative. Mitigation measures that could lessen environmental impacts are also defined. A preferred solution or solutions is then selected. Several activities were incorporated into this assessment process, including a land use analysis, a site inspection, a review of expert technical opinion and consultation with affected stakeholders, and regulatory agencies.



### **3.4.2 Assessment Methodology**

#### **(a) Evaluation Method and Procedures**

The evaluation of alternatives process was carried out using a comparative assessment methodology designed to predict the nature and magnitude of environmental impacts resulting from each defined option and to assess the relative merits of the alternative solutions. The evaluation method involves these principal tasks:

- Identification of existing environmental conditions (baseline conditions, inventories).
- Assessment of existing land use activities, infrastructure, natural features and socio-economic characteristics (i.e., environmental scoping).
- Review of proposed alternatives and related works.
- Determination of the level of complexity required to complete the impact assessment.
- Identification of environmental components and sub-components that may be affected by the defined alternatives (i.e., define evaluation criteria).
- Prediction of environmental impacts (positive, negative) resulting from the construction and operation of the defined options.
- Identification and evaluation of measures to mitigate adverse effects.
- Selection of a preferred alternative following a comparative analysis of the relative merits of each option.

#### **(b) Public Consultation Program**

Public consultation is an integral component of the Class EA process. Public consultation allows for an exchange of information, which assists the proponent in making informed decisions during the evaluation of alternative solutions.

The Ministry of the Environment (MOE) has established protocols for the design of Class EA public consultation programs in order to facilitate effective, two-way communication during the process. In this respect, the Ministry prescribes that to achieve meaningful participation, Class EA consultation plans should adhere to these key principles:

- Initiate consultation activities early in the process to promote dialogue and information sharing.
- Ensure project information is disseminated adequately and effectively to affected property owners, stakeholders, review agencies and Aboriginal Communities (where appropriate).
- Create multiple opportunities to engage interested parties and to solicit input.
- Present the assessment process and the project in an open and transparent manner.
- Establish a systematic method to record, review and consider input received.
- Promptly acknowledge, and attempt to address, concerns raised.
- Clearly document input received through consultation.
- Identify outstanding concerns at the conclusion of the process.

At the outset of the Master Planning process, a consultation program was developed that was considered to be appropriate for the local environmental context and suitable for the nature of the problem and the scale of the proposed alternatives. The general elements of the program are as follows:

- Hold an initial public meeting to introduce the project to residents and identify potential issues or concern to be addressed through the Master Plan process.
- Distribute background information to government review agencies.
- Compile and review comments received.
- Present preliminary preferred alternative to lower-tier municipal partners and County Council to obtain feedback and support prior to seeking input from the general public.
- Prepare a draft Master Plan report documenting the study results and identifying the preliminary preferred alternative.
- Make the preliminary report available for public and agency/stakeholder review.
- Arrange for a second public meeting to present the preferred alternative and to solicit input on potential impacts from residents and agencies.
- Compile and review comments received.
- Finalize the Master Plan report based on input received following the second public meeting.
- Make the report available for public review.
- Issue a Notice of Completion; circulate to interested parties and review agencies.
- Document input received and outstanding concerns within the Master Plan.
- Attempt to address any outstanding issues.

### **3.4.3 Identification of Environmental Components and Sub-Components**

#### **(a) Environmental Features**

Section 3.3.3 of this report listed the alternative solutions that were identified to resolve the identified deficiencies. As part of the evaluation process, it is necessary to assess what effect each option may have on the environment and what measures can be taken to mitigate the identified impacts. The two main purposes of this exercise are to:

- Minimize or avoid adverse environmental effects associated with a project.
- Incorporate environmental factors into the decision-making process.

By definition, the EA Act generally separates the “environment” into five general elements:

- Natural environment.
- Social environment.
- Cultural environment.
- Economic environment.
- Technical environment.

The identified environmental elements can be further subdivided into specific components and sub-components, which have the potential to be adversely affected by the construction and/or operation of the alternative solutions. Table 3.6 summarizes the environmental components considered of relevance to this Class EA.

**Table 3.6**  
**Summary of Project-Related Environmental Considerations**

Element	Component	Sub-Component
Natural	Aquatic	<ul style="list-style-type: none"> <li>• Aquatic Resources</li> <li>• Fisheries</li> </ul>
	Atmosphere	<ul style="list-style-type: none"> <li>• Air Quality</li> <li>• Noise</li> </ul>
	Surface Water	<ul style="list-style-type: none"> <li>• Water Quality/ Quantity</li> </ul>
	Terrestrial	<ul style="list-style-type: none"> <li>• Amphibians &amp; Reptiles</li> <li>• Birds &amp; Mammals</li> <li>• Vegetation</li> </ul>
	Geologic	<ul style="list-style-type: none"> <li>• Physiographic Features and Soils</li> <li>• Drainage Characteristics</li> </ul>
Social	Neighbourhood	<ul style="list-style-type: none"> <li>• Disruption</li> <li>• Quality of Life</li> </ul>
	Community	<ul style="list-style-type: none"> <li>• Health and Safety</li> <li>• Recreational Activities</li> </ul>
Cultural	Heritage	<ul style="list-style-type: none"> <li>• Historical/ Cultural Resources</li> </ul>
Economic	Project Area	<ul style="list-style-type: none"> <li>• Capital and Operational Costs</li> <li>• Property Values</li> </ul>
	Community	<ul style="list-style-type: none"> <li>• Property Taxes</li> </ul>
Technical	Transportation	<ul style="list-style-type: none"> <li>• Traffic Patterns/ Volumes</li> <li>• Pedestrian/ Vehicular Safety</li> <li>• Accessibility</li> </ul>
	Infrastructure	<ul style="list-style-type: none"> <li>• Road Capacity/ Routes</li> <li>• Infrastructure Technologies</li> </ul>

## **(b) Impact Analysis**

The environmental effects of each project alternative on the identified environmental features are generally determined through an assessment of the following impact predictors (i.e., impact criteria):

- Nature (direct, indirect, cumulative).
- Magnitude (level of effect, loss of function).
- Location/ Extent (where effect occurs, number/ volume affected).
- Scale (localized or regional effects).
- Timing (seasonality of effects, immediate or delayed impacts).
- Duration (period of impact).
- Frequency (intermittent or continuous).
- Reversibility (extent of recovery, recovery time).
- Socio-economic and cultural context (characteristics of affected community).

For the purposes of this Master Plan Class EA process, criteria have been developed to predict the magnitude of environmental effects resulting from the implementation of a proposed alternative. Table 3.7 summarizes the impact criteria.

**Table 3.7**  
**Criteria for Impact Determination**

<b>Level of Effect</b>	<b>General Criteria</b>
High	Implementation of the project could threaten sustainability of feature and should be considered a management concern. Additional remediation, monitoring and research may be required to reduce impact potential.
Moderate	Implementation of the project could result in a resource decline below baseline, but impact levels should stabilize following project completion and into the foreseeable future. Additional management actions may be required for mitigation purposes.
Low	Implementation of the project could have a limited impact upon the resource during the lifespan of the project. Research, monitoring and/or recovery initiatives may be required for mitigation purposes.
Minimal/ Nil	Implementation of the project could impact upon the resource during the construction phase of the project but would have a negligible impact on the resource during the operational phase.

Given these criteria, the significance of adverse effects is predicated on these considerations:

- Impacts from a proposed alternative assessed as having a Moderate or High level of effect on a given feature would be considered significant.
- Impacts from a proposed alternative assessed as having a Minimal/ Nil to Low level of effect on a given feature would not be considered significant.

### **3.5 Environmental Effects Analysis**

The potential interactions between the identified alternatives and environmental features (Table 3.6) were examined as part of the evaluation of alternatives phase. The purpose of this analysis was to determine, in relative terms, the environmental effects of constructing and operating each identified option on the defined environmental components and sub-components (using the impact criteria described in Table 3.7). In this regard, the level of effect for the environmental interactions were rated as High, Moderate, Low and Minimal/ Nil. Potential mitigation measures were also considered as part of this evaluation.

Table 3.8 summarizes the outcome of the environmental effects analysis carried out for the seven Bridge Infrastructure Master Plan Options identified by the Steering Committee.

**Table 3.8**  
**Master Plan Options: Environmental Effects Analysis**

<b>Environmental Component</b>	<b>Option</b>	<b>Level of Effect</b>	<b>Impact Considerations (Implementation and Operational Activities)</b>
<b><u>Natural</u></b> <ul style="list-style-type: none"> <li>Aquatic</li> </ul>	(A)	Moderate	<ul style="list-style-type: none"> <li>Some impacts to aquatic habitat are anticipated as a result of construction-related activities, as in-stream work will required at both the Dudgeon and McCurdy crossings.</li> </ul>
	(B)	Moderate	<ul style="list-style-type: none"> <li>Some impacts to aquatic habitat are anticipated as a result of construction-related activities, as in-stream work will required at both the Dudgeon and 12<sup>th</sup> of Brant crossings.</li> </ul>
	(C)	Moderate to High	<ul style="list-style-type: none"> <li>Impacts to aquatic habitat are anticipated as a result of construction-related activities, as in-stream work will required at the Dudgeon, McCurdy and Big Irwin crossings.</li> </ul>
	(D)	Low to Moderate	<ul style="list-style-type: none"> <li>Some impacts to aquatic habitat are anticipated as a result of construction-related activities, as in-stream work will required at both the Big Irwin and McCurdy crossings.</li> </ul>
	(E)	Low to Moderate	<ul style="list-style-type: none"> <li>Some impacts to aquatic habitat are anticipated as a result of construction-related activities, as in-stream work will required at both the Big Irwin and McCurdy crossings.</li> </ul>
	(F)	Moderate to High	<ul style="list-style-type: none"> <li>Some impacts to aquatic habitat are anticipated as a result of construction-related activities, as in-stream work will required at both the Dudgeon, McCurdy and Big Irwin crossings.</li> </ul>
	(G)	Low to Moderate	<ul style="list-style-type: none"> <li>Some impacts to aquatic habitat are anticipated as a result of construction-related activities, as in-stream work will required at both the 12<sup>th</sup> of Brant and Big Irwin crossings.</li> </ul>
<ul style="list-style-type: none"> <li>Terrestrial</li> </ul>	(A)	Moderate	<ul style="list-style-type: none"> <li>Moderate impacts to terrestrial habitat are anticipated as a result of new Dudgeon Bridge alignment and wider footprint and approach road re-grading at McCurdy.</li> </ul>
	(B)	Moderate	<ul style="list-style-type: none"> <li>Moderate impacts to terrestrial habitat are anticipated as a result of new Dudgeon Bridge alignment and wider footprint and approach road re-grading at 12<sup>th</sup> of Brant.</li> </ul>
	(C)	Moderate to High	<ul style="list-style-type: none"> <li>Moderate impacts to terrestrial habitat are anticipated as a result of new Dudgeon Bridge alignment and wider footprint and approach road re-grading at McCurdy and Big Irwin.</li> </ul>
	(D)	Low to Moderate	<ul style="list-style-type: none"> <li>Some impacts to terrestrial habitat are anticipated as a result of the wider footprint and approach road re-grading at McCurdy and Big Irwin.</li> </ul>
	(E)	Low to Moderate	<ul style="list-style-type: none"> <li>Some impacts to terrestrial habitat are anticipated as a result of the wider footprint and approach road re-grading at McCurdy and Big Irwin.</li> </ul>

Environmental Component	Option	Level of Effect	Impact Considerations (Implementation and Operational Activities)
	(F)	Moderate to High	<ul style="list-style-type: none"> <li>Moderate impacts to terrestrial habitat are anticipated as a result of new Dudgeon Bridge alignment and wider footprint and approach road re-grading at McCurdy and Big Irwin.</li> </ul>
	(G)	Low to Moderate	<ul style="list-style-type: none"> <li>Some impacts to terrestrial habitat are anticipated as a result of the wider footprint and approach road re-grading at McCurdy and Big Irwin</li> </ul>
<b>Social</b> <ul style="list-style-type: none"> <li>Community</li> </ul>	(A)	Low	<ul style="list-style-type: none"> <li>Some impacts to traffic movement are anticipated during construction, however overall impact is relatively low given that only one crossing will be closed and a majority of the crossings will be either replaced or rehabilitated.</li> <li>Residents on the 12<sup>th</sup> Concession of Brant will have reduced accessibility following the closure of the 12<sup>th</sup> of Brant Bridge.</li> </ul>
	(B)	Moderate	<ul style="list-style-type: none"> <li>Some impacts to traffic movement are anticipated during construction but will be short lived. Crossings will be replaced with higher capacity structures resulting in improvements to the overall transportation network within the study area. .</li> <li>Impact is greatest to residents living on Brant Elderslie Road as both river crossings will be eventually closed.</li> </ul>
	(C)	Low	<ul style="list-style-type: none"> <li>Some impacts to traffic movement are anticipated during construction, however overall impact is relatively low given that only one crossing will be closed and a majority of the crossings will be either replaced or rehabilitated.</li> <li>Residents on the 12<sup>th</sup> Concession of Brant will have reduced accessibility following the closure of the 12<sup>th</sup> of Brant Bridge.</li> </ul>
	(D)	Moderate	<ul style="list-style-type: none"> <li>Some impacts to traffic movement are anticipated during construction but will be short lived. Crossings will be replaced with higher capacity structures resulting in improvements to the overall transportation network within the study area. .</li> <li>Impact is greatest to residents living on the 12<sup>th</sup> of Brant or adjacent to the Dudgeon Bridge as both river crossings will be eventually closed.</li> </ul>
	(E)	Moderate to High	<ul style="list-style-type: none"> <li>Some impacts to traffic movement are anticipated during construction but will be short lived. Crossings will be replaced with higher capacity structures resulting in improvements to the overall transportation network within the study area.</li> <li>Impact is greatest to residents living on Brant Elderslie Road as both river crossings will be eventually closed.</li> </ul>

Environmental Component	Option	Level of Effect	Impact Considerations (Implementation and Operational Activities)
	(F)	Moderate	<ul style="list-style-type: none"> <li>Some impacts to traffic movement are anticipated during construction but will be short lived. Crossings will be replaced with higher capacity structures resulting in improvements to the overall transportation network within the study area.</li> <li>Impact is greatest to residents living on the Greenock Brant Road as both river crossings will eventually be closed.</li> </ul>
	(G)	Moderate to High	<ul style="list-style-type: none"> <li>Some impacts to traffic movement are anticipated during construction but will be short lived. Crossings will be replaced with higher capacity structures resulting in improvements to the overall transportation network within the study area.</li> <li>Impact is greatest to residents living on the Greenock Brant Road and adjacent to the McCurdy bridge as all of these river crossings will be eventually closed.</li> </ul>
<b>Cultural</b> <ul style="list-style-type: none"> <li>Heritage</li> </ul>	(A)		<ul style="list-style-type: none"> <li>Moderate impacts to cultural heritage values are anticipated given that both the McCurdy and 12<sup>th</sup> of Brant bridges are being replaced or rehabilitated.</li> <li>Fewer impacts than other options as three of the structures are being rehabilitated.</li> </ul>
	(B)		<ul style="list-style-type: none"> <li>Moderate impacts to cultural heritage values are anticipated given that both the McCurdy and 12<sup>th</sup> of Brant bridges are being replaced or rehabilitated.</li> <li>Consideration should be given to retaining structures, once they are closed to vehicular traffic, for use as recreational or pedestrian crossings.</li> </ul>
	(C)		<ul style="list-style-type: none"> <li>Moderate impacts to cultural heritage values are anticipated given that both the McCurdy and 12<sup>th</sup> of Brant bridges are being replaced or rehabilitated.</li> <li>Consideration should be given to retaining structures, once they are closed to vehicular traffic, for use as recreational or pedestrian crossings.</li> </ul>
	(D)		<ul style="list-style-type: none"> <li>Moderate impacts to cultural heritage values are anticipated given that both the McCurdy and 12<sup>th</sup> of Brant bridges are being replaced or rehabilitated.</li> <li>Consideration should be given to retaining structures, once they are closed to vehicular traffic, for use as recreational or pedestrian crossings.</li> </ul>
	(E)		<ul style="list-style-type: none"> <li>Highest impact to cultural heritage values given that only one structure will be rehabilitated and three structures will be closed.</li> <li>Consideration should be given to retaining structures, once they are closed to vehicular traffic, for use as recreational or pedestrian crossings.</li> </ul>



Environmental Component	Option	Level of Effect	Impact Considerations (Implementation and Operational Activities)
	(F)		<ul style="list-style-type: none"> <li>Highest impact to cultural heritage values given that only one structure will be rehabilitated and three structures will be closed.</li> <li>Consideration should be given to retaining structures, once they are closed to vehicular traffic, for use as recreational or pedestrian crossings.</li> </ul>
	(G)		<ul style="list-style-type: none"> <li>Highest impact to cultural heritage values given that only one structure will be rehabilitated and three structures will be closed.</li> <li>Consideration should be given to retaining structures, once they are closed to vehicular traffic, for use as recreational or pedestrian crossings.</li> </ul>
<b>Economic</b> <ul style="list-style-type: none"> <li>Municipal</li> </ul>	(A)	Moderate	<ul style="list-style-type: none"> <li>Moderately expensive option for all partners.</li> </ul>
	(B)	Moderate	<ul style="list-style-type: none"> <li>Least expensive option for Arran-Elderslie, which results in higher costs for Brockton and the County.</li> </ul>
	(C)	Moderate to High	<ul style="list-style-type: none"> <li>One of the most expensive option for all partners. Potential impacts to County and local municipal infrastructure budgets.</li> <li>Projects would be implemented over multiple years to help defray costs.</li> </ul>
	(D)	Moderate	<ul style="list-style-type: none"> <li>One of the least expensive options for County and Brockton. Moderately expensive option for Arran-Elderslie.</li> </ul>
	(E)	Moderate	<ul style="list-style-type: none"> <li>One of the least expensive options for County and Brockton. Moderately expensive option for Arran-Elderslie.</li> </ul>
	(F)	Moderate to High	<ul style="list-style-type: none"> <li>One of the most expensive option for all partners. Potential impacts to County and local municipal infrastructure budgets.</li> <li>Projects would be implemented over multiple years to help defray costs.</li> </ul>
	(G)	Moderate	<ul style="list-style-type: none"> <li>One of the least expensive options for County and Arran-Elderslie. Moderately expensive option for Brockton.</li> </ul>
<b>Technical</b> <ul style="list-style-type: none"> <li>Transportation</li> </ul>	(A)	Low	<ul style="list-style-type: none"> <li>Fewer bridge closures with this option will minimize impacts to residents.</li> </ul>
	(B)	Moderate	<ul style="list-style-type: none"> <li>Closure of the Big Irwin and McCurdy bridges will impact residents living on the Brant-Elderslie Road.</li> </ul>
	(C)	Low	<ul style="list-style-type: none"> <li>Fewer bridge closures with this option will minimize impacts to residents.</li> </ul>
	(D)	Moderate	<ul style="list-style-type: none"> <li>Closure of 12<sup>th</sup> of Brant and Dudgeon Bridges will impact residents in the south portion of the study area.</li> </ul>

Environmental Component	Option	Level of Effect	Impact Considerations (Implementation and Operational Activities)
	(E)	High	<ul style="list-style-type: none"> <li>• Closure of three bridges will have a greater impact on residents and the overall transportation network.</li> </ul>
	(F)	Moderate	<ul style="list-style-type: none"> <li>• Closure of Watson's and 12<sup>th</sup> of Brant will impact residents located adjacent to these two structures.</li> </ul>
	(G)	High	<ul style="list-style-type: none"> <li>• Closure of three bridges will have a greater impact on residents and the overall transportation network.</li> </ul>

### 3.6 Preliminary Transportation Analysis

#### 3.6.1 Background

Paradigm Transportation Solutions Inc. were retained to conduct a transportation analysis on various outcomes associated with the Master Plan. Impacts, and benefits, to the existing transportation network, which will result from implementation of various Master Plan alternatives, were examined to identify those options which will have the biggest effect on existing residents located within the study area.

#### 3.6.2 Methodology

A variety of outcomes for the 6 primary bridges included in the study were selected by the Steering Committee formed in conjunction with the study. The options included combinations of bridge replacements, closures or rehabilitations. The options were then evaluated based on the following criteria in order to identify the preferred transportation alternative:

- Daily travel demand.
- Number of residents affected.
- Number of residents on a cul-de-sac.
- Travel distance.
- Available alternate routes.
- Emergency vehicle response time; and
- Agricultural equipment accessibility.

#### 3.6.3 Preliminary Results

Each option was scored on a value from 1 to 7 based on how it performed relative to the other options. The better an option performed, the higher value it received. The maximum score that an option could receive was 42. In the end, the option(s) with the highest overall score was determined to be the best in regards to the transportation network. Table 3.9 illustrates the results of the analysis which resulted in Options A & C receiving the highest scores.

**Table 3.9**  
**Preliminary Transportation Criteria Analysis Scoring**

<b>Transportation Criteria</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>
<b>Daily Travel Demand</b>	7	7	7	7	7	7	7
<b># of Residents Affected</b>	7	3	7	5	2	5	1
<b>Cul-de-sac Residents</b>	7	4	7	3	1	5	2
<b>Alternate Routes &amp; Travel Distance</b>	7	3	7	4	3	5	1
<b>Emergency Vehicles</b>	7	2	7	5	4	3	1
<b>Agricultural Accessibility</b>	7	3	7	5	2	4	1
<b>Total</b>	<b>42</b>	<b>22</b>	<b>42</b>	<b>29</b>	<b>19</b>	<b>29</b>	<b>13</b>

### **3.7 Preliminary Identification of a Preferred Solution**

As an outcome of the preliminary assessment of alternatives which is described in Section 3 of the report and summarized in Table 3.7, and the results of the traffic analysis, the steering committee indicated an initial preference for Option A and Option C to present to the County Highways Committee for additional input. The individual components of these two options are summarized below:

<b><u>Structure</u></b>	<b><u>Option A</u></b>	<b><u>Option C</u></b>
Concession 20 Bridge	Rehabilitate	Rehabilitate
Watson's Bridge	Rehabilitate	Rehabilitate
Big Irwin Bridge	Rehabilitate	Replace
Dudgeon Bridge	Replace	Replace
McCurdy Bridge	Replace	Replace
12 <sup>th</sup> of Brant Bridge	Eventually Close	Eventually Close

The only difference between the two options is the outcome associated with the Big Irwin Bridge. With Option A the Big Irwin is rehabilitated and with Option C the Big Irwin is replaced. Every other aspect of the two alternatives is exactly the same except for cost. Total estimated construction costs associated with Option A are \$6,693,400.00, while estimated construction costs for Option C are \$8,066,400.00.

#### **3.7.1 County Highways Committee – September 13<sup>th</sup>, 2012**

The Bruce County Highways Committee is a sub-committee of County Council which provides recommendations to County Council on matters related to County roadways and associated structures. Several members of this committee also sit on the project steering committee which was formed to help guide study investigations. Following the selection of Options A & C as the preliminary preferred Options, the information was presented the County Highways Committee on September 13, 2012 for their review and input.

Some committee members expressed concern over the anticipated closure of the 12<sup>th</sup> of Brant Bridge which was associated with Options A & C and asked that a timeline for the bridge be established with associated repairs to maximize the bridge's useful life. The committee also asked for a further review of the Dudgeon Bridge as well as information on the anticipated future ownership of each of the bridges. The Highway Committee Chair called for an additional meeting of Steering Committee meeting to be held to respond to these requests.

#### **3.7.2 Steering Committee Meeting – September 18<sup>th</sup>, 2012**

The project Steering Committee met again on September 18<sup>th</sup> to review the results of the September 13<sup>th</sup> Highway Committee's meeting and to discuss the additional information which was identified for review. This information is summarized below.

a) **Bridge Timeline and Repair Forecast**

**Table 3.10**  
**Bridge Timeline and Repair Forecast:**  
**Dudgeon & 12<sup>th</sup> of Brant Bridges**

<b><u>Dudgeon Bridge</u></b>			<b><u>12<sup>th</sup> of Brant Bridge</u></b>	
2014	Riprap north abutment	\$12,000	Repair concrete deck	\$22,000
2014	Repair north pier	\$18,000	Replace 6 deck beams	\$ 9,000
			Repair approach guiderail	\$ 3,000
2018	Overlay south decks	\$22,000	Replace 6 deck beams	\$ 9,000
2018	Repair concrete parapets	\$24,000	Repair corroded trusses	\$40,000
2022	Deck soffit patch repairs	\$20,000	Replace 6 deck beams	\$ 9,000
2022	Repair corroded trusses	\$15,000	Repair vehicle strike damage	\$18,000
2026			Close bridge to traffic	
2028	Close bridge to traffic			
Total		\$111,000		\$110,000

b) **Future Bridge Ownership**

**Table 3.11**  
**Future Anticipated Ownership of Study Area Bridges**

<b>Structure</b>	<b>Current Ownership</b>	<b>Proposed Modification</b>	<b>Proposed Ownership</b>
<b>Watson's</b>	County	Rehabilitation	County
<b>Big Irwin</b>	County	Rehab/Replace	County
<b>Little Irwin</b>	County	No Change	County
<b>Dudgeon</b>	County	Replace	Brockton
<b>Gregg</b>	County	No Change	Brockton
<b>McCurdy</b>	County	Replacement	County
<b>12<sup>th</sup> of Brant</b>	County	Retire	Brockton
<b>20<sup>th</sup> Concession</b>	Brockton	Rehabilitation	Brockton

c) **Analysis of Results**

The steering committee members reviewed the new data and concluded the following in regards to the new information:

- Questioned whether traffic volumes on the Greenock-Brant Road justify the estimated cost of approximately two million dollars to reconstruct the Dudgeon Bridge crossing.
- Regular repairs to the Dudgeon and 12<sup>th</sup> of Brant Bridges, estimated at \$100,000/bridge, would allow approximately 15 years of continued use for both structures.

The committee reexamined traffic volumes previously collected within the study area. It was apparent that volumes recorded along the east/west corridors currently exceed those along north/south routes. Traffic volumes recorded on the 12<sup>th</sup> Concession, which are illustrated on Figure 2.5a of the Paradigm traffic assessment (Appendix 'E') range between 105 – 268 vehicles per day (vpd) while volumes recorded along the Greenock-Brant Road, where the Dudgeon Bridge is located, range between 40 – 74 vpd.

Given this information, the committee proposed a new Option to be presented to the Highways Committee for consideration. The new alternative included the eventual closure of the Dudgeon Bridge and rehabilitation of the 12<sup>th</sup> of Brant, while leaving all other outcomes the same as Option C. The primary components of the new alternative, Option H, are outlined below.

### **Structure**

### **Option H**

Concession 20 Bridge	Rehabilitate
Watson's Bridge	Rehabilitate
Big Irwin Bridge	Replace
Dudgeon Bridge	Retire
McCurdy Bridge	Replace
12 <sup>th</sup> of Brant Bridge	Rehabilitate

### **c) Anticipated Costs**

**Table 3.12**  
**Estimated Costs and Timelines for Implementation of Option H**

<b>Year</b>	<b>Project</b>	<b>Bruce County</b>	<b>Arran-Elderslie</b>	<b>Brockton</b>	<b>Total</b>
2013	Watson's Rehab	\$419,000.00	-	-	\$419,000.00
2014	Rebuild Big Irwin	\$1,617,200.00	\$142,900.00	\$142,900.00	\$1,903,000.00
2015	Rehab 12 <sup>th</sup> of Brant	\$815,000.00	-	-	\$815,000.00
2015	Rebuild McCurdy	\$2,547,000.00	\$197,000.00	\$197,000.00	\$2,941,000.00
?	Close Dudgeon	\$100,000.00	-	-	\$100,000.00
?	Rehab 20 <sup>th</sup> Conc.	-	-	\$416,000.00	\$416,000.00
<b>Total</b>		<b>\$5,498,200.00</b>	<b>\$339,900.00</b>	<b>\$755,900.00</b>	<b>\$6,594,000.00</b>

### **c) Bruce County Highways Committee Meeting – September 20<sup>th</sup>, 2012**

The new alternative, Option H, was presented to the County Highways Committee at their September 20, 2012 meeting for input prior to being presented to the two lower-tier municipal councils for their review and comment. Upon further consideration of the costs and timelines for eventual closure of the Dudgeon and 12<sup>th</sup> of Brant bridges associated with this option, the committee recommended a slight revision to Option H which would propose the eventual closure of the 12<sup>th</sup> of Brant and Dudgeon bridges in approximately 15 years. During the intervening years the bridges would be evaluated on a regular basis and repairs undertaken in order to keep the structures open as long as possible and operating at a similar load limit to the current posting.

Table 3.12 illustrates the revised costs and timelines associated with the revised version of Option H.

**Table 3.13**  
**Estimated Construction Costs for Revised Option H**

<b>Year</b>	<b>Project</b>	<b>Bruce County</b>	<b>Arran-Elderslie</b>	<b>Brockton</b>	<b>Total</b>
2013	Watson's Rehab	\$419,000.00	-	-	\$419,000.00
2013	Repair 12 <sup>th</sup> of Brant	\$34,000.00	-	-	\$34,000.00
2013	Repair Dudgeon	\$30,000.00	-	-	\$30,000.00
2014	Rebuild Big Irwin	\$1,617,200.00	\$142,900.00	\$142,900.00	\$1,903,000.00
2015	Rebuild McCurdy	\$2,547,000.00	\$197,000.00	\$197,000.00	\$2,941,000.00
?	Rehab 20 <sup>th</sup> Conc.	-	-	\$416,000.00	\$416,000.00
Total		\$4,647,200.00	\$339,900.00	\$755,900.00	\$5,743,000.00

### **3.7.3 Presentation to Municipal Councils**

On September 24, 2012 the County Engineer attended the Brockton and Arran-Elderslie Municipal Councils to review the Master Plan process and seek input on the preliminary preferred alternative recently selected by the County Highway's Committee and Master Plan Steering Committee. Following a brief presentation on the Master Plan process, the following comments and questions were brought forward by the two councils:

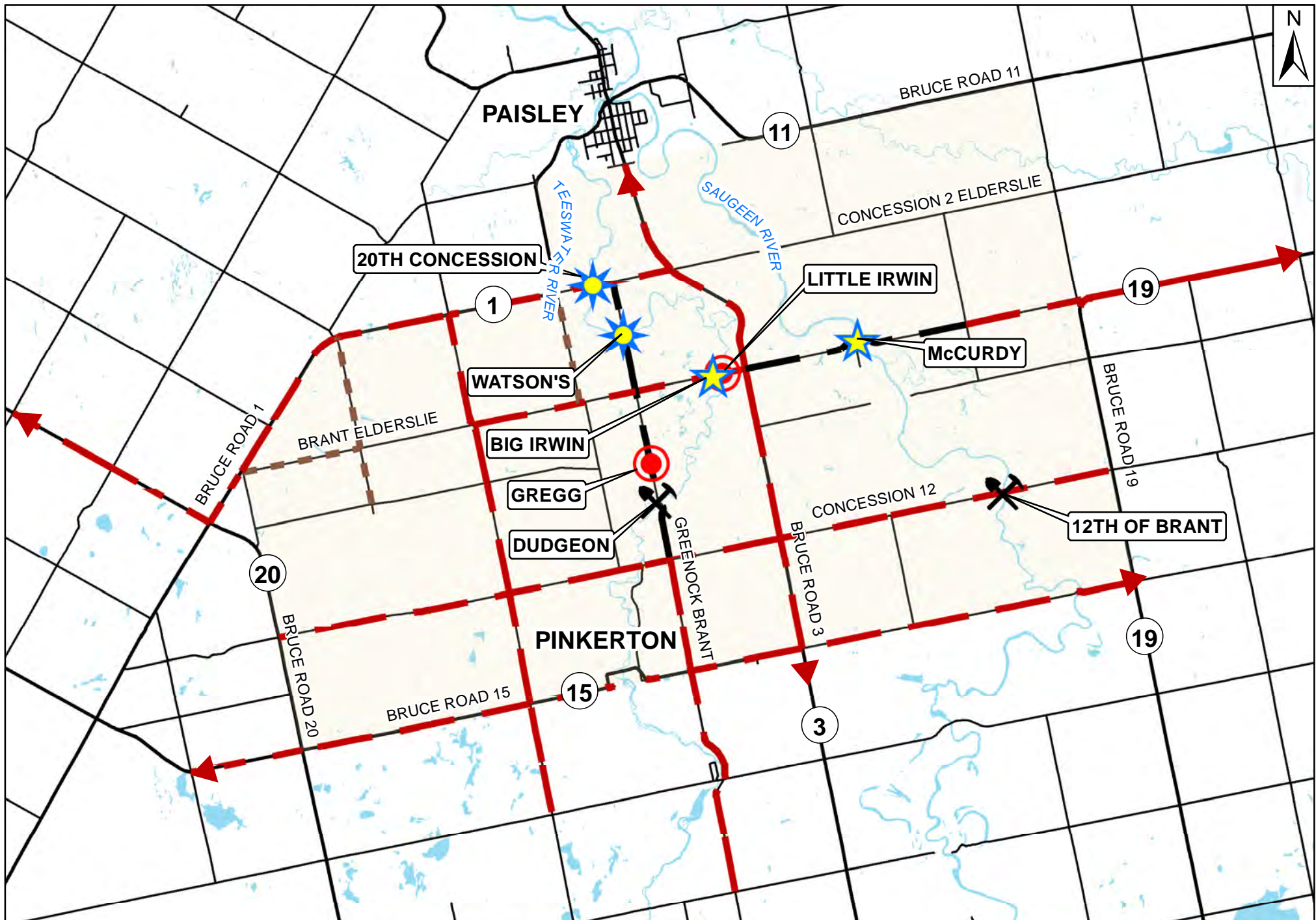
- Concern over the future ownership of the two bridges to be retired, given that no substantial improvements to the structures are proposed in conjunction with the Master Plan;
- Concerns over anticipated costs to Brockton and Arran-Elderslie that are associated with replacement of the McCurdy Bridge;
- Concern over repairs needed in the short-term to the 12<sup>th</sup> of Brant Bridge.

A copy of the meeting notes from the presentations are included within Appendix 'H'. Both councils agreed to move forward with revised Option H as the preliminary preferred option to be taken to the public for input at a public meeting to be held later this fall. Revised Option H is illustrated on Figure 3.4.








### **3.7.4 Revised Transportation Analysis**

After selection of revised Option H as the preliminary preferred alternative, a final version of the transportation analysis was requested from the traffic consultants which would include an analysis of the new option. This information will be examined, in conjunction with input received from the general public following the final public meeting, before confirming the selection of the preferred alternative and finalizing the Master Plan process. A copy of the revised Transportation Analysis is included within Appendix 'F'.





# LEGEND

-  BRIDGE (NO CHANGE)
-  REHABILITATION
-  REPAIR/EVENTUAL CLOSURE
-  REPLACE
-  CORRIDOR
-  CUL DE SAC
-  WINTER NON-MAINTENANCE



BRUCE COUNTY INFRASTRUCTURE  
MASTER PLAN  
IMPLEMENTATION OPTIONS

REVISED OPTION: H

DATE  
OCT. 10, 2012

PROJECT No.  
11101

SCALE  
1:89,000

FIGURE No.  
3.4

## **4.0 CONSULTATION PROGRAM**

### **4.1 Public Consultation**

The components of the public consultation program developed for this Class EA are briefly summarized in Section 3.4.2 and documented in more detail within this section. Copies of related correspondence are included within Appendix 'G'.

### **4.2 Notice of Study Initiation**

The County of Bruce issued a Notice of Study Initiation for the Master Plan on October 5, 2011. The notice introduced the purpose and intent of the Bridge Infrastructure Master Plan process, listed the structures that were being included in the assessment (illustrated via an attached key plan), and provided information on the time and location of the first Public Information Meeting. The Notice of Commencement was advertised in the October 5, 2011 and October 12, 2011 issues of the Walkerton Herald Times, the Shoreline Beacon, the Sun Times, the Kincardine News and the Paisley Advocate. The notice was also circulated to all property owners on a roadway connected to one of the affected structures. A copy of the initial notice is included in Appendix 'G' of this report.

### **4.3 October 19, 2011 Public Meeting**

A public meeting was arranged to introduce the Master Plan project to members of the general public as well as adjacent property owners, and to solicit their input on possible outcomes associated with the various structures being considered. The meeting was held Wednesday October 19, 2011 at the Community Center in Paisley, which is located immediately north of the project study area. The meeting included an open house component, a formal presentation, and a question and answer session.

The general purpose of the meeting was to provide audience members with the following:

- A summary of the Master Plan Class EA process.
- Results of Cultural Heritage Assessment completed by Golder Associates.
- Results of the Natural Environment Characterization Report completed by NRSL.
- A description of the bridge alternatives being considered by the Technical Steering Committee and Municipality, as well as other mitigation measures being considered;
- A brief summary of future actions needed to complete the process.

Approximately 42 residents and stakeholders attended the meeting. Notes can be found in Appendix 'G' along with a copy of the presentation material. Table 4.1 presents a summary of comments received as a result of the public meeting and other notification components of the initial phases of the Master Plan process.

**Table 4.1**  
**Summary of Public Comments:**  
**Notice of Commencement and First Public Meeting**

<b>Agency/Individual</b>	<b>Comments/ Concerns</b>	<b>Response/Action Taken</b>
Resident R.R. # 1 Paisley Oct. 31, 2011 (via email)	<ul style="list-style-type: none"> <li>- Build replacement for McCurdy one Sideroad north on Conc. 2A of Elderslie.</li> <li>- Approaches to river are superior to town line and roads on either side of river are much better.</li> </ul>	- Information noted and filed
Resident Brant-Eld. Townline Nov 3, 2011 (correspondence via e-mail)	<ul style="list-style-type: none"> <li>- Recently purchased 60 Acre farm SW of Big Irwin Bridge and plan to start orchard and vineyard</li> <li>- Require direct access to Bruce Road 3.</li> <li>- Husband works for Health Centre and needs quick access to hospital for emergencies.</li> <li>- Cost and impact of turnaround on neighbour and their use of road if bridge closed.</li> <li>- Impact on future bus route for kids.</li> </ul>	- Clarified some of the comments made and then filed information.
Resident Sideroad 5 Greenock Nov. 4, 2011 (via email)	<ul style="list-style-type: none"> <li>- Wants to ensure that winter travelling conditions are considered in study.</li> <li>- C.R. 1 north from Conc. 20 is notoriously bad for whiteouts and drifting snow. The Concession 20 bridge provides an alternate route to C.R. 3</li> <li>- Consider alternate routes people may take due to winter conditions</li> </ul>	- Comments noted and filed
Resident Bruce Rd. 1 Nov. 7, 2011 (comment sheet)	<ul style="list-style-type: none"> <li>- Lived in area all their lives. Concerned with potential closure of the Brockton Bridge on Concession 20.</li> <li>- Road is used extensively in winter when C.R. 1 cannot be travelled due to winter storm conditions.</li> <li>- Bridges need to be restored or repaired, not closed.</li> <li>- Advertise next meeting in the Brockton Buzz.</li> </ul>	- Comments noted and filed
Resident Conc. 18 Nov. 8, 2011 (comment sheet)	<ul style="list-style-type: none"> <li>- Lives adjacent to "No Winter Maintenance Road". Only access to Paisley is Watson's or Big Irwin.</li> <li>- Fire/Emergency Response is of primary concern to this ratepayer.</li> </ul>	- Comments noted and filed.
Resident Bruce Rd. 1 Nov 28, 2011 (via mail)	<ul style="list-style-type: none"> <li>- Leave Bridge on Conc. 20; many people use this bridge, especially in the winter as a safer route into Paisley.</li> <li>- New bridge with road built up and widened is the answer.</li> <li>- A bigger sign to Paisley is needed, many people miss the turnoff.</li> </ul>	- Comments noted and filed
Resident, Bruce Rd. 1 Nov 28, 2011 (via mail)	<ul style="list-style-type: none"> <li>- Works in Walkerton and uses Bridge on Concession 20 to avoid winter conditions on other roads in the area</li> </ul>	- Comments noted and filed
Resident, Bruce Rd 1 Nov 28, 2011 (via mail)	<ul style="list-style-type: none"> <li>- Uses the road that Concession 20 Bridge is on to go to Walkerton.</li> </ul>	- Comments noted and filed

#### 4.4 Review Agency and Stakeholder Circulation

Input into the Class EA process was solicited from government review agencies and identified stakeholders by way of direct mail correspondence. Agencies and organizations that might have an interest in the project were sent an information package detailing the purpose of the Master Plan process, a description of the affected bridges and a general location plan of the project study area. Photographs of the 8 bridges were also incorporated into the location plan. The package was circulated to 21 separate review agencies and stakeholder groups on September 22, 2011. These parties were asked to comment on the project on or before October 28, 2011. Federal and provincial agencies responsible for Aboriginal affairs were also circulated details on the Class EA and were requested to advise if Aboriginal communities may be potentially impacted by this project.

Appendix 'H' contains a copy of the information circulated to the review agencies and stakeholder groups, as well as a list of those parties requested to comment on this project. The appendix also includes a copy of the request to the Aboriginal agencies and a list of the specific agencies solicited for input. Formal written correspondence from the review agencies is also provided. Table 4.2 summarizes the comments received.

**Table 4.2**  
**Summary of Review Agency and Stakeholder Comments:**  
**Notice of Commencement Phase**

<b>Review Agency</b>	<b>Summary of Comments</b>	<b>Action Taken</b>
SVCA November 3, 2011 (via email)	<ul style="list-style-type: none"> <li>- Ont. Reg 169/06 applies to the Teeswater and Saugeen Rivers as well as tributaries of these rivers. Approval from SVCA will be required</li> <li>- Flooding impacts associated with bridge replacements will be examined. Potential increases in backwater flood elevations will be examined closely and will require analysis.</li> <li>- Impacts to fish habitat will be reviewed to determine if DFO authorization required. Timing window for in-water work is July 15 – Sept. 15 for both rivers</li> <li>- Two aquatic SAR potentially present. NRSI Report should be sent to SVCA for review.</li> <li>- Sediment and erosion control required. Enhanced protection may be required if proposed works will aggravate bank erosion.</li> </ul>	- Forwarded to Project Engineer and County.
Rob Bonderud Paisley Fire Chief Nov. 4, 2011 (via email)	<ul style="list-style-type: none"> <li>- Emergency response times will be affected by possible bridge closures.</li> <li>- Winter road closures could exacerbate response times in conjunction with bridge closures.</li> <li>- Need to consider response times for all the possible bridge closures.</li> <li>- McCurdy would have the biggest impact on response times as there is no crossing of the Saugeen on 2A or the 14<sup>th</sup> Concession.</li> </ul>	- Asked for clarification on which bridges fire vehicles can safely cross at present.

<b>Review Agency</b>	<b>Summary of Comments</b>	<b>Action Taken</b>
Doug Smith Director of Emergency Services/Chief of EMS County of Bruce Nov. 4, 2011 (via email)	<ul style="list-style-type: none"> <li>- Concur with response from Paisley Fire Chief that any bridge closures could affect their response time.</li> <li>- Paisley responds from one location, so they are most affected.</li> <li>- County EMS can respond from Chesley, Walkerton or Port Elgin, depending on who has the fastest response time, so they may not be affected by individual bridge closures.</li> </ul>	- Comments noted and filed.
Brenda Campbell Transportation Systems Administrator Student Transportation Service Consortium of Grey-Bruce (via email)	<ul style="list-style-type: none"> <li>- Currently 2 bus routes cross some of the bridges included in the study.</li> <li>- Routes 88 and 297 would be affected.</li> <li>- Big and Little Irwin and McCurdy are only bridges not currently used (bus route maps attached).</li> </ul>	- Comments forwarded to County and Transportation Consultant for analysis.
Sam Martin Mennonite Community (via Vernon Weppler)	<ul style="list-style-type: none"> <li>- Concerned with future closure of McCurdy Bridge as this would impact their ability to travel</li> </ul>	- Comments forwarded to County
Paul Bradley Kincardine OPP Jan 6, 2012 (via email)	<ul style="list-style-type: none"> <li>- No record of incidents with any of the bridges included in the study</li> </ul>	- Comments noted
Rob Bonderud Paisley Fire Chief Jan 7, 2012 (via email)	<ul style="list-style-type: none"> <li>- GVRW of their response vehicles is as follows: <ul style="list-style-type: none"> <li>- Rescue: 20, 680 lbs</li> <li>- Tanker: 16, 793</li> <li>- Pumper: 36, 220</li> </ul> </li> <li>- At these weights, Big Irwin and 12<sup>th</sup> of Brant should not be traversed</li> </ul>	- Comments noted and filed

## 4.5 First Nations Consultation

### i) Background Review

There are no known Aboriginal communities or reserves in the immediate vicinity of the subject lands. However, as directed by the MOE in their correspondence dated December 5, 2006, a number of federal and provincial agencies were contacted at the start of the Master Plan process to determine if there was an aboriginal interest in the project study area. Responses were received from two branches of Indian & Northern Affairs Canada advising of new consultation procedures which provided various sources to assist the proponent in identifying the appropriate aboriginal communities for consultation. Utilizing this process, four aboriginal communities were identified in conjunction with this project as follows: Chippewas of Saugeen First Nation, Chippewas of Nawash Unceded First Nation, Historic Saugeen Métis, and Great Lakes Métis Council

## ii) Initial Consultation Phase

Responses were received from the Historic Saugeen Métis (HSM) and the Saugeen Ojibway Nation (SON). SON represents two Aboriginal Communities being the Chippewas of Saugeen First Nation and the Chippewas of Nawash Unceded First Nation. Information packages detailing study investigations were prepared and circulated to both Aboriginal Communities for review and comment. A summary of comments received are included below.

**Table 4.3**  
**Summary of First Nations Consultation:**  
**Initial Consultation Phase**

<b>Aboriginal Community</b>	<b>Summary of Comments</b>	<b>Action Taken</b>
Doran Ritchie, SON Feb 21, 2012 (via phone)	<ul style="list-style-type: none"> <li>- Concerned with potential impact of the project on native fish and plant species.</li> <li>- Would provide more comments as the project evolved.</li> </ul>	<ul style="list-style-type: none"> <li>- Forwarded copies of Natural Environment Report and Stage 1 Archaeology Report</li> </ul>
Lands and Resources Consultation Coordinator - HSM March 23, 2012 (via email)	<ul style="list-style-type: none"> <li>- Have an interest in the Natural Environment report and Archaeological report completed in conjunction with the Master Plan.</li> </ul>	<ul style="list-style-type: none"> <li>- Copies of both reports forwarded to HSM for their review.</li> </ul>
Doran Ritchie, SON June 29, 2012 (via phone)	<ul style="list-style-type: none"> <li>- Questioned status of Master Plan</li> <li>- Thought better approach for them was to identify concerns associated with individual structures.</li> <li>- Asked for copies of OSIM reports for each bridge.</li> </ul>	<ul style="list-style-type: none"> <li>- Sent copies of OSIM reports for their information.</li> </ul>
Doran Ritchie, SON Sept. 26, 2012 (via phone)	<ul style="list-style-type: none"> <li>- Asked after status of Master Plan and selection of the preliminary preferred.</li> <li>- Said he would be unavailable for most of October but would like to select a date to meet to discuss impacts associated with Option H.</li> <li>- Asked if October 26<sup>th</sup> would work for a meeting date. Suggested meeting in Chesley as this was central for most attendees.</li> </ul>	<ul style="list-style-type: none"> <li>- Confirmed that October 26 would work for a meeting date.</li> </ul>

## iii) October 26, 2012 Meeting with SON

Following selection of the preliminary preferred Master Plan Option, a meeting was arranged with SON representatives to review the components of this option and provide additional input on potential impacts associated with future implementation. A fisheries biologist from Natural Resources Solutions Inc. also attended the meeting to provide technical input on potential impacts to fish and aquatic habitat. The meeting was attended by SON and SON's consultants specializing in fisheries and terrestrial habitats, representatives from the County of Bruce, BMROSS and NRSI.

During the meeting a process was discussed for moving forward with the consultation process. SON agreed to provide estimates, supplied by their specialists, for a background review of the Big Irwin and McCurdy Bridge sites, which were the first bridge replacement projects associated with the Master Plan, which would then be considered by the County of Bruce. A copy of the meeting notes are contained within Appendix 'H'.

#### **iv) Master Plan Completion Phase**

To facilitate the final design of the Big Irwin and McCurdy Bridges, detailed aquatic and terrestrial habitat assessments will be required at each bridge site. Estimates for the completion of aquatic and terrestrial reviews of the Big Irwin and McCurdy Bridge sites by the SON's specialists were forwarded to the County of Bruce in early 2013. The work plans and cost estimates were examined by County staff and reviewed by representatives of Natural Resource Solution Inc. (NRSI) to ensure that the scope of their assessments were adequate to address current federal and provincial guidelines regarding species at risk as well as other sensitive features.

In April 2013, the County of Bruce retained the services of SON's terrestrial specialist to complete the on-site investigations at both the Big Irwin and McCurdy Bridge sites in order to identify potential aboriginal sensitivities present within terrestrial and aquatic habitats potentially impacted by the proposed Master Plan projects. Representatives from the Saugeen Ojibway Nation may also be present at the sites during the field reviews to ensure that any aboriginal sensitivities that may be present are identified. Copies of correspondence related to this outcome are included within Appendix 'H'.

#### **4.6 November 21, 2012 Public Meeting**

A second public meeting was scheduled for the fall of 2012 to review the results of the Master Plan process and present the preliminary preferred alternative selected in conjunction with the plan to members of the general public as well as adjacent property owners. The meeting was held on Wednesday November 21, 2012 at the Paisley Community Center and included an open house component, a formal presentation, and a question and answer session. The general purpose of the meeting was to provide audience members with the following:

- A summary of the Master Plan Class EA process.
- A description of the various bridge alternatives which were considered by the Steering Committee during the review of alternatives phase of the Master Plan.
- A description of the preliminary preferred alternative as well as anticipated costs associated with the implementation of individual projects.
- A brief summary of future actions needed to complete the process.

Approximately 40 residents and stakeholders attended the meeting. Notes can be found in Appendix 'G' along with a copy of the presentation material. Table 4.3 presents a summary of comments received as a result of the public meeting and other notification components of the final phase of the Master Plan process.



**Table 4.4**  
**Summary of Review Agency and Stakeholder Comments:**  
**Second Public Meeting Phase**

<b>Review Agency</b>	<b>Summary of Comments</b>	<b>Action Taken</b>
Steve Lustig Transportation and Purchasing Consortium Oct 17, 2012 (via email)	<ul style="list-style-type: none"> <li>- Wanted to know the difference between a repair and a rehabilitation.</li> <li>- Wondered if bridges to be closed would be provided with a large turnaround capable of accommodating a plow or 42 foot school bus.</li> </ul>	<ul style="list-style-type: none"> <li>- Provided a formal response to his questions.</li> </ul>
Stu Andrew MNR Oct 22, 2012 (via email)	<ul style="list-style-type: none"> <li>- Received letter regarding Master Plan</li> <li>- Asked if SVCA was involved in review of the project</li> <li>- Advised that they would not get directly involved in review as long as SVCA was providing comments.</li> </ul>	<ul style="list-style-type: none"> <li>- Confirmed that SVCA had provided input.</li> </ul>
Bill Armstrong MOE Nov. 9, 2012	<ul style="list-style-type: none"> <li>- Reviewed draft Master Plan and found it to be thorough, well documented and well presented.</li> <li>- Suggested that the First Nations section should include a statement regarding their concerns/ interests as well any outcomes associated with the consultation efforts.</li> </ul>	<ul style="list-style-type: none"> <li>- Comments noted and filed.</li> </ul>
SVCA November 12, 2012 (via mail)	<ul style="list-style-type: none"> <li>- Comments previously provided regarding the Master Plan still apply.</li> <li>- Once information related to individual bridge projects is ready, please forward to their office for review.</li> </ul>	<ul style="list-style-type: none"> <li>- Comments forwarded to Engineer and County.</li> </ul>
Rob Bonderud Paisley Fire Chief Nov. 20, 2012 (via email)	<ul style="list-style-type: none"> <li>- Unable to attend the public meeting.</li> <li>- If bridges are to be closed, their response times to affected properties will be increased.</li> <li>- Please keep them apprised of the outcome.</li> </ul>	
Secretary/Treasurer Bruce & Grey F OA Nov. 20, 2012 (via email)	<ul style="list-style-type: none"> <li>- Thought that some of their members will be in attendance at the meeting.</li> <li>- Thinks plan looks fabulous.</li> <li>- Great job of creating a plan that doesn't immediately close any bridges.</li> </ul>	<ul style="list-style-type: none"> <li>- Comments noted and filed.</li> </ul>
Co-owner Cowan Canoe & Kayak Livery Nov. 21, 2012 (comment sheet)	<ul style="list-style-type: none"> <li>- Suggested that improved parking and river access be provided at the McCurdy and 12<sup>th</sup> of Brant crossings in conjunction with the project.</li> <li>- Provided additional general comments on canoe access points along the Saugeen River.</li> </ul>	<ul style="list-style-type: none"> <li>- Comments forwarded to Bruce County Tourism Dept.</li> </ul>
Residents R.R.#1 Paisley Dec. 3, 2012 (via email)	<ul style="list-style-type: none"> <li>- Public Meeting presentations showed that a lot of thought and analysis went into the selection of alternatives and final recommendations.</li> <li>- While no one wants their bridge to close, thought preferred alternative was a fair compromise.</li> <li>- Good to see that 12<sup>th</sup> of Brant and Dugeon will be repaired and kept open as long as possible.</li> <li>- Suggested that cul-de-sacs be built in advance of bridge closings due to reduced load postings.</li> <li>- Would like to see improved river access point at McCurdy, similar to that constructed at the Nagg's.</li> </ul>	<ul style="list-style-type: none"> <li>- Comments noted and filed.</li> </ul>

## **5.0 EVALUATION OF THE PRELIMINARY PREFERRED ALTERNATIVE**

### **5.1 Framework of Analysis**

Following the selection of revised Option H as the preliminary preferred alternative, a study framework was developed to further evaluate the potential impacts of implementing this Master Plan option. The purpose of this review was to assess the environmental interactions resulting from the construction and operation of the preferred alternative and to determine if the identified interactions would generate potential environmental impacts. The assessment of the preferred alternatives incorporated these activities:

- Assessment of the construction and operational requirements of the proposed works.
- Consultation with the public, stakeholder groups and government agencies.
- Prediction of the environmental interactions between the proposed works and the identified environmental components.
- Identification of specific environmental features that may be impacted, in a significant adverse manner, by the proposed works.
- Evaluation of the potential impacts of the project on the specific environmental features, including residual effects following mitigation.

The following sections of the report summarize the findings of the evaluation process.

### **5.2 Identification of Potential Impacts**

#### **5.2.1 General**

In reviewing the various assessment criteria identified in Section 3.4 of this report and additional comments provided during the public consultation program, a number of specific environmental elements were identified which could be adversely affected by the implementation of the preferred Master Plan alternative. Potential impacts can be classified into two general categories; (1) construction related impacts, being impacts that are generally short term in nature and generally related to physical alterations at the bridge sites, and (2) long term impacts, which are generally related to implementation of the preferred option and typically affect cultural and social aspects of the environment.

The table below outlines the potential impacts of specific components of bridge construction on the identified environmental elements. Specific mitigation measures for the identified impacts are discussed in the following sections. The table identifies impacts directly related to bridge reconstruction and rehabilitation which are generally short-term in nature and of limited duration. Impacts of a greater magnitude and duration (traffic volume, cultural, social impacts) are also reviewed in the following section.

**Table 5.1**  
**Construction Related Environmental Effects**

	Environmental Components	Geology and Hydrology Resources	Aquatic Resources	Significant Environmental Features	Cultural Heritage Resources	Social Environment	Economic Environment	Technical Environment
	Key Project Works and Activities							
<b>1</b>	<b>Construction Component</b>							
	Contractor Mobilization to the site	○	○	○	○	●	○	○
	Establishment of Temporary Storage Areas	○	●	○	○	●	○	○
	Site Clearing	○	●	○	●	○	○	○
	Installation of Sediment Control Devices	○	●	○	○	○	○	○
	Traffic Control Plan Implementation	○	○	○	○	●	○	○
	Excavation	●	●	○	●	●	○	●
	Removal of Existing Structure	○	●	○	●	○	○	○
	Dewatering	●	●	○	○	●	○	●
	Construction of Bridge Abutments & Piers	●	●	○	●	●	○	●
	Reconstruction of Approach Roads	○	○	○	●	●	○	●
	Grading	○	●	○	○	●	○	○
	Site Restoration (seeding/topsoil)	○	○	○	○	○	○	○

● Potential for adverse effect

○ No adverse effect expected

## 5.3 Impact Assessment and Mitigation

### 5.3.1 Potential Adverse Impacts

Based upon the findings of the environmental effects analysis (Table 3.7) and the environmental interactions analysis (Table 5.1), the preliminary preferred option has the potential to adversely impact upon a number of specific environmental features. They are as follows:

- Traffic Movement/Accessibility
- Aquatic Habitat and Fisheries
- Economics
- Cultural Heritage Values

The potential impacts to each identified feature are described in this section of the report and measures to mitigate the impacts are also presented. As noted above, potential impacts have been categorized as either short term or long term and reviewed accordingly. The selection of mitigation measures was based upon consideration of three broad approaches to mitigation; avoidance, minimization of adverse effects and compensation.

### **5.3.2 Traffic Movement – Short Term**

During construction of various components of the preferred alternative, access across bridge structures under construction will be limited or closed completely. Where a crossing is being replaced, traffic will be detoured onto adjacent local roads until the new crossing is complete. Bridges scheduled for rehabilitation may also be closed for some periods, although restrictions will typically be of a shorter duration. For all potential road and bridge closures, appropriate signage would be provided prior to the road closure and throughout the construction period.

The overall impact of these anticipated short term closures is expected to be minor in nature, considering the minimal traffic volume evident at the various bridge sites and the availability of suitable detour routes in the vicinity of the crossings. Ultimately, each affected crossing will be replaced with an improved river crossing with fewer capacity restrictions.

### **5.3.3 Traffic Movement – Long Term**

#### **(a) Traffic Volume**

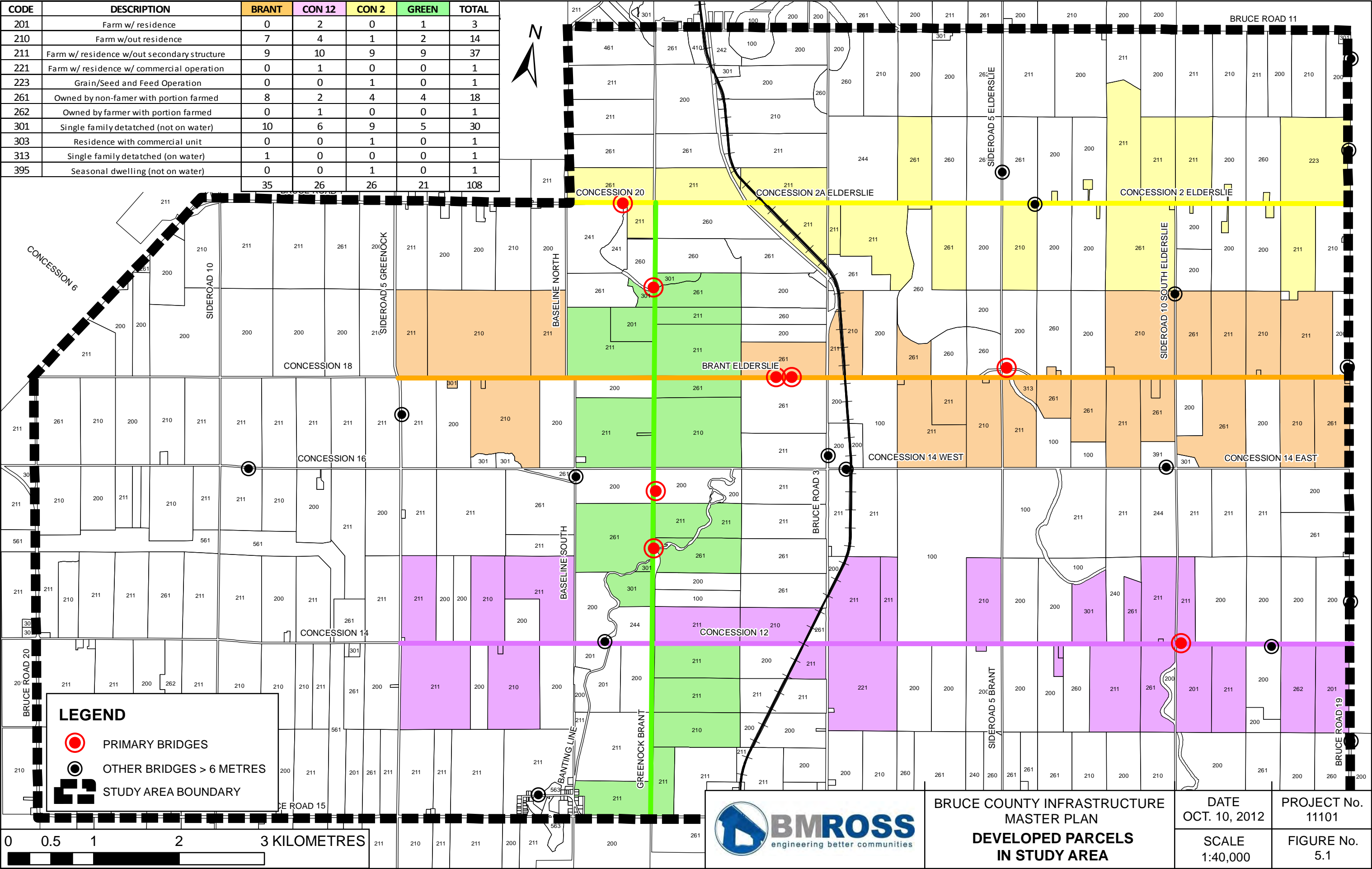
All of the primary bridges which comprise the Bridge Infrastructure Master Plan study are single lane steel truss bridges with restricted load capacities. Upon completion of the project, those bridges that are scheduled for replacement will be designed to accommodate 2 lanes of traffic and have no load restrictions. Although none of the structures are currently located on primary transportation corridors, the improvements to the bridge crossings and approach roads may result in increased traffic volumes along the affected stretch of road over the long term. Given the close proximity of numerous county roads adjacent to the study area, it is not anticipated that traffic volumes will increase substantially as a result of the proposed upgrades.

#### **(b) Bridge Closures**

At the outset of the Bridge Infrastructure Master Plan process, the possibility that some of the structures under consideration may ultimately be closed permanently to vehicular traffic was presented as a possible Master Plan outcome. Due to the close physical proximity of the subject bridges, and the relatively low traffic volumes experienced in the study area, it is not anticipated that the proposed closures will have a significant impact on the regional transportation network.

As part of the Master Plan investigation, property data was examined along the affected road corridors in order to quantify the number of properties potentially impacted by a future road closure. Developed properties located on each corridor were highlighted, while vacant or forested lands were not. This information is illustrated on Figure 5.1 (attached) and was also utilized during the traffic analysis. The data indicates that the Brant-Elderslie corridor has the greatest number of developed properties, while the Greenock-Brant corridor has the least.

CODE	DESCRIPTION	BRANT	CON 12	CON 2	GREEN	TOTAL
201	Farm w/ residence	0	2	0	1	3
210	Farm w/out residence	7	4	1	2	14
211	Farm w/ residence w/out secondary structure	9	10	9	9	37
221	Farm w/ residence w/ commercial operation	0	1	0	0	1
223	Grain/Seed and Feed Operation	0	0	1	0	1
261	Owned by non-famer with portion farmed	8	2	4	4	18
262	Owned by farmer with portion farmed	0	1	0	0	1
301	Single family detached (not on water)	10	6	9	5	30
303	Residence with commercial unit	0	0	1	0	1
313	Single family detached (on water)	1	0	0	0	1
395	Seasonal dwelling (not on water)	0	0	1	0	1
		35	26	26	21	108



BRUCE COUNTY INFRASTRUCTURE  
MASTER PLAN  
**DEVELOPED PARCELS  
IN STUDY AREA**

DATE  
OCT. 10, 2012  
SCALE  
1:40,000

PROJECT No.  
11101  
FIGURE No.  
5.1

Although the proposed road closures are reinforced by this data as well as the recorded traffic volumes referenced earlier in this report, some impacts will be unavoidable. Residents living in close proximity to the bridges or on a connecting road link will experience the greatest impacts to long term travel times and accessibility. The impact will be greater on east/west travel corridors because there are fewer crossings of the Saugeen River, requiring longer detours. As noted above, consideration was given to the length of detours and the number of properties potentially affected by a proposed closure, when considering the various bridge replacement and closure options. The preferred option which was ultimately selected was felt to result in few long term impacts to local transportation routing when evaluated in conjunction with other environmental factors such as economics, cultural heritage values, and environmental affects.

To mitigate impacts associated with future bridge retirements, the County of Bruce has committed to undertaking repairs at the Dudgeon and 12<sup>th</sup> of Brant Bridges in order to keep the crossings open to vehicular traffic as long as possible. Repairs will initially be completed during the 2013 construction season and then continue on a four year schedule until the deterioration reaches a point where the structure must be closed to traffic. Turnarounds will be constructed in advance of the bridge closures to provide residents with a suitable location to turn their vehicles around. Construction of the 12<sup>th</sup> of Brant turnarounds are scheduled for spring of 2013 in advance of the proposed bridge repairs, which will require a temporary closure of the crossing for several weeks.

#### **5.3.4 Aquatic Habitat**

##### **(a) Bridge Construction**

Implementation of the preferred alternative will involve the construction of two new bridges. These new bridge crossings include the McCurdy located on the Saugeen River and the Big Irwin crossing on the Teeswater River. It is anticipated that both crossings will require construction of new pier(s) within the river channel resulting in a loss of fish habitat at that location. For each of the bridge replacement options being considered, the extent of in-stream work required will result in temporary disruption to the channel during construction of the in-water pier and removal of the former structure. To minimize the extent of impacts, detailed aquatic habitat assessments will be conducted prior to construction to identify critical habitat features at each of the bridge sites and to assist with the development of a work plan which will avoid impact to these areas and ensure impacts are minimized as much as possible. All in-water construction will be timed to occur during periods of low flow, during approved timing windows established by the Ministry of Natural Resources in consultation with the Saugeen Valley Conservation Authority. Upon completion of the proposed works, the river bed and any adjacent habitat disturbed in conjunction with the construction will be restored to pre-existing conditions. Should it be determined that a harmful alteration, disruption or destruction (HADD) of fish habitat will occur as a result of the works, an authorization from the Federal Department of Fisheries and Oceans (DFO) may be required.

### **(b) Approach Road Reconstruction**

In conjunction with bridge reconstruction activities, approach roads on either side of the bridges will also require reconstruction in order to match wider bridge decks and address existing horizontal and vertical deficiencies. If occurring in close proximity to the channel, this may create the potential for sediment runoff into the watercourse. To minimize the extent of potential impacts, detailed erosion and sediment control plans will be established in order to isolate the work area from the channel during construction. Sediment control measures will be monitored during the entire construction period and maintained until the project is complete to ensure they continue to work effectively. All disturbed areas will be restored following construction with a suitable seed mixture.

### **(c) Species at Risk (SAR)**

The Natural Environment Characterization Report identified a number of SAR potentially present within the project work area. Should any of these species be identified during subsequent surveys or during construction activities, representatives from the Ministry of Natural Resources will be contacted immediately. Two aquatic species at risk, the pugnose shiner and rainbow mussel, were identified by the Saugeen Valley Conservation Authority as potentially being present with the Teeswater and Saugeen River systems, respectively. As noted above, additional investigations will be undertaken at each of the bridge sites being replaced, prior to construction, to determine if these, or other SAR species, will be potentially impacted by the proposed construction.

### **5.3.5 Terrestrial Habitat**

As discussed in Section 2.5, a preliminary terrestrial habitat assessment was completed at each of the bridge sites to identify the presence of any significant or sensitive species which would potentially be impacted by proposed bridge reconstruction. Although no terrestrial features of significance were identified as being present during the field review, a more detailed analysis of anticipated terrestrial impacts at McCurdy and Big Irwin will be undertaken in conjunction with the aquatic surveys discussed above. The assessments will confirm the absence of sensitive terrestrial plants or communities which may be impacted by construction and also screen for the presence of plant species which may be importance to aboriginal communities.

### **5.3.6 Economic Impacts**

Implementation of the preferred Master Plan components is anticipated to cost between six and seven million dollars in total to the County and its two municipal partners. This represents a significant financial burden. Several measures have been identified which could mitigate the potential economic impacts of the proposed works. They are as follows:

- **Project Phasing.** The Infrastructure Master Plan is intended to be implemented over the next 20 years. This will allow the County and local municipalities an opportunity to finance the project over an extended period and plan in advance for future capital expenditures.



- **Grant Programs.** The federal and provincial governments routinely introduce grant programs to assist smaller communities with the construction of infrastructure projects, such as the Canada-Ontario Municipal Rural Infrastructure Fund (COMRIF) initiative. The County of Bruce or the Municipality's of Brockton and Arran-Elderslie may be able to access future funding programs to subsidize the capital works costs of the Infrastructure Master Plan or individual components of the project.
- **Capital Works Financing.** The study partners could apply for debt financing through the Ontario Strategic Infrastructure Financing Authority (OSIFA) loan program (coordinated by Infrastructure Ontario). OSIFA provides long-term, low-interest financing to municipalities for capital infrastructure projects.

### **5.3.7 Cultural Heritage Resources**

#### **(a) Structural Heritage**

The cultural heritage assessment completed by Golder Associates identified the heritage values associated with each of the subject bridges. The McCurdy and 12<sup>th</sup> of Brant Bridges rated the highest with scores of 75 each. Although both of these structures have local and even regional value from a heritage perspective, neither of the structures was identified as being provincially rare and have not been designated for preservation by local municipal or county councils. The McCurdy Bridge is proposed for replacement as part of the preliminary preferred option while the 12<sup>th</sup> of Brant structure will be eventually closed to vehicular traffic and then ultimately removed. A detailed heritage assessment will be completed for each of the structures being significantly altered as part of Master Plan implementation. Heritage recommendations forthcoming from the reports will be considered during the detailed engineering design stage.

#### **(b) Archaeological Resources**

The Stage 1 Archaeological Assessment indicated that Stage 2 field work would need to be completed for each structure where the proposed work would result in the alteration of previously undisturbed native soils. Accordingly, Stage 2 assessments will be required for the Big Irwin and McCurdy Bridges to ensure that buried cultural resources are not disturbed in conjunction with the proposed construction. Copies of the reports can be found within Appendix 'E' (Archaeological Report) and Appendix 'F' (Cultural Heritage Assessment).

#### **(c) Aboriginal Cultural Heritage**

As noted in Section 5.3.5 above, detailed site assessments being completed at the Big Irwin and McCurdy Bridge sites in support of the detailed design stage for these structures, will include screening for terrestrial and aquatic species of importance to aboriginal communities. Consultants who are familiar with aboriginal sensitivities have been retained to examine areas adjacent to the bridge sites potentially impacted by construction and identify any species present which may be of importance to these communities.

### **5.3.8 Impacts to Navigation**

The Saugeen River serves as a popular route for recreational water craft (canoes/kayaks) with a river access point currently present on the west river bank at McCurdy's Bridge. This access point will not be accessible during construction but will be reconstructed in conjunction with the proposed bridge reconstruction project. Navigable openings will be maintained at all times during construction and warning signs will be placed up and downstream of the crossings to warn of construction. A formal authorization will also be obtained from Transport Canada pursuant to the Navigable Waters Protection Act.

## **6.0 CONCLUSIONS AND PROJECT IMPLEMENTATION**

### **6.1 Master Plan Study Conclusion**

Based upon the findings of the environmental impact evaluation and input received from agencies, stakeholders and the general public following the final public meeting, no significant impacts were identified with revised Option H that could not be adequately mitigated. In this regard, implementation of the proposed Master Plan projects appears to be appropriate for the study area and should not result in significant adverse environmental effects (particularly if the mitigation measures are incorporated into the construction plan). The merits of this option were also seen to substantially outweigh those identified for the other alternative solutions considered during the Master Plan process.

### **6.2 Selection of a Preferred Alternative**

Given the foregoing, Revised Option H was selected as the preferred solution to the identified problem. This option was presented to, and supported by, the County Highways Committee at their April 18, 2013 meeting. The works associated with the preferred alternative are illustrated on Figure 3.4.

### **6.3 Approvals**

Implementation of Master Plan projects will be subject to the receipt of all necessary approvals. Following a review of existing legislation, it was determined that two formal approvals will be required to permit construction of the proposed works. This section of the report identifies the applicable legislation and summarizes the intent of the associated approval process.

#### **a) Conservation Authorities Act**

Implementation of the preferred option involves construction on lands regulated by the Saugeen Valley Conservation Authority (SVCA). In accordance with the Conservation Authorities Act, applications will be submitted to the SVCA for approval prior to construction. Hydrology reports will also be prepared and submitted in support of the proposals. The application will define measures to protect sensitive lands during construction in order to minimize the negative impacts of the project on the natural features of the area. Site restoration and post-construction enhancements to disturbed areas will also be presented.

**b) Federal Fisheries Act**

The works associated with the preferred alternative may be subject to the federal *Fisheries Act*. In accordance with established procedure, the SVCA will review the project on behalf of the Department of Fisheries and Oceans (DFO) to determine if bridge construction activities may result in a harmful alteration, disruption or destruction (HADD) of fish habitat. If it is determined that the project has the potential to result in a HADD, a compensation plan will be required before the DFO issues authorization for the project to proceed.

**c) Navigable Waters Protection Act**

The Saugeen and Teeswater Rivers are classified as navigable waterways and will therefore be subject to the Navigable Waters Protection Act (NWPA). In accordance with the NWPA requirements applications will be submitted to Transport Canada in order to obtain approval for the proposed works. The application will set out the measures proposed to minimize the effects of the project on waterway access and safety. Transport Canada may require additional measures be incorporated into the construction plan as part of the approvals process.

**d) Ontario Heritage Act**

As recommended in conjunction with the Cultural Heritage Assessments completed by Golder Associates, detailed Structural Heritage Assessments may be required for those structures being significantly altered in conjunction with the Master Plan.

**e) Stage 2 Archaeological Assessments**

Part VI of the Ontario Heritage Act establishes guidelines for archaeological assessments. In accordance with these guidelines and recommendations forthcoming from the Stage 1 Archaeological Assessment, Stage 2 assessments will be required for those projects that will result in disturbances to previously undisturbed native soils in the vicinity of the bridge sites.

**f) Ministry of Natural Resources**

The Ministry of Natural Resources administers approvals subject to the Lakes and Rivers Improvement Act, the Endangered Species Act and the Public Lands Act. Portions of the proposed bridge reconstruction activities may be subject to one or more of these pieces of legislation. Consultation with the Ministry will occur during the detailed design stage for the Big Irwin and McCurdy Bridges to ensure that all necessary permitting and approval documentation is obtained prior to construction.

## **6.4 Implementation Timeline**

Projects identified for implementation through the Master Plan process have been categorized into a general implementation timeline, based primarily upon the state of deterioration of each of the bridges and resources available to implement each component of the plan.

Table 6.1 illustrates the anticipated timeline for implementation of each of the individual projects included as a component of the Master Plan.

**Table 6.1**  
**Implementation Timeline:**  
**Preferred Master Plan Alternative – Revised Option H**

<b>Year</b>	<b>Master Plan Project Component</b>	<b>Class EA Schedule</b>
2013	Repairs to 12 <sup>th</sup> of Brant & Dudgeon Bridges	A
2013	Rehabilitation of Watson's Bridge	A+
2014	Construction of new Bridge at Big Irwin	B
2014	Finalize Schedule 'C' EA for McCurdy Replacement	
2015	Construct new Bridge at McCurdy	C
2026-2028	Close 12 <sup>th</sup> of Brant and Dudgeon to Vehicular Traffic	A+
?	Rehabilitate 20 <sup>th</sup> Concession Bridge	A+
?	Remove 12 <sup>th</sup> of Brant and Dudgeon Trusses	B

The timeline proposed above is based upon the current condition of the bridges and anticipated county and municipal funding. It will be important to monitor the condition of the bridges over the implementation phase of the Master Plan and make adjustments when necessary to address changing conditions which may affect public safety.

## 6.5 Anticipated Costs

The Master Plan will be implemented over a 15-20 year time frame with project costs shared between the County of Bruce and the two municipal partners, Arran-Elderslie and Brockton. Table 6.2 illustrates anticipated costs to each project partner over the implementation timeline.

**Table 6.2**  
**Anticipated Project Costs**

<b>Year</b>	<b>Project</b>	<b>Bruce County</b>	<b>Arran-Elderslie</b>	<b>Brockton</b>	<b>Total</b>
2013	Watson's Rehab	\$ 419,000.00	-	-	\$ 419,000.00
2013	Dudgeon/12 <sup>th</sup> of Brant Repairs	\$ 64,000.00	-	-	\$ 64,000.00
2014	Rebuild Big Irwin	\$ 1,617,200.00	\$ 142,900.00	\$ 142,900.00	\$ 1,903,000.00
2015	Rebuild McCurdy	\$ 2,547,000.00	\$ 197,000.00	\$ 197,000.00	\$ 2,941,000.00
2018	Dudgeon/12 <sup>th</sup> of Brant Repairs	\$ 95,000.00	-	-	\$ 95,000.00
2022	Dudgeon/12 <sup>th</sup> of Brant Repairs	\$ 62,000.00	-	-	\$ 62,000.00
?	Rehab 20 <sup>th</sup> Concession	-	-	\$ 416,000.00	\$ 416,000.00
2026-2028	Retire Dudgeon & 12 <sup>th</sup> of Brant	\$ 200,000.00	-	-	\$ 200,000.00
Total		\$ 5,004,200.00	\$ 339,900.00	\$ 755,900.00	\$ 6,100,000.00

## **6.6 Recommendations**

The following represent the key study recommendations developed following the evaluation of alternatives phase of the Master Planning process:

1. Revised Option H be implemented as the preferred long-term strategy to address deficiencies associated with a series of county-owned bridges located on local municipal roads in central Bruce County.
2. Implementation of the Master Plan will require additional investigations to evaluate the potential environmental impacts of specific projects considered Schedule 'C' activities under the terms of the Class EA document (refer to Table 6.1). Schedule 'A+' and 'B' projects have been approved through the Master Plan process.
3. Implementation of the Master Plan should be conducted with reference to the project phasing strategy detailed in section 6.0 of this report.
4. Impact mitigation measures discussed in Section 5.0 of this report should be incorporated into the detailed construction plans for each proposed activity, as appropriate.
5. The Master Plan should be reviewed on a regular basis to evaluate the accuracy of key assumptions (e.g., rate of deterioration/availability of funding) and to confirm the suitability of the implementation sequence. The Master Plan should be modified, as required, to address changes to the environmental setting and local bridge conditions.

## **6.7 Class EA Requirements**

### **6.7.1 Master Plan Approval**

The Bruce County Bridge Infrastructure Master Plan prepared for central Bruce County was developed following an approved Master Planning process, as set out by the Class EA document. The Master Planning process incorporated the completion of Phases 1 and 2 of the Class EA process. The Master Plan will be approved for implementation subject to successful completion of the Class EA Master Plan Process.

### **6.7.2 Additional Class EA Investigations**

#### **(a) Schedule C Activities**

As an outcome of this assessment, a series of projects have been identified to implement the Master Plan. These projects are classified as Schedule 'A', A+, 'B' or 'C' activities under the terms of the Class EA document. Schedule 'A', 'A+', and 'B' activities have been assessed in conjunction with the current Master Plan process and do not require additional Class EA review prior to implementation. However additional environmental assessment will be required prior to replacement of the McCurdy Bridge, as this project is a Schedule 'C' activity.

Table 6.1 summarizes the proposed activities and the Class EA Schedule associated with implementation of specific phases of the Master Plan.

**(b) Schedule B Activities**

Detailed engineering drawings will not be completed for Schedule ‘B’ activities until the proposed activity is scheduled for implementation (refer to Section 6.3). To provide project stakeholders with an opportunity to review the detailed designs proposed for these structures, preliminary engineering drawings will be posted on the Bruce County website in advance of construction. Adjacent property owners will be advised through a direct mail-out that the drawings have been posted for review. This would apply to reconstruction of the Big Irwin Bridge as well as removal of the 12<sup>th</sup> of Brant and Dudgeon Bridge structures.

**(c) Schedule A+ Activities**

Schedule ‘A+’ activities are pre-approved but require some form of public notification prior to implementation. For ‘A+’ activities identified in conjunction with the Master Plan, a Notice will be mailed to adjacent property owners in advance of construction advising of the timing for the work and providing general details on the proposed works. This would apply to rehabilitation of the Watson’s and Concession 20 bridges as well as closure of the 12<sup>th</sup> of Brant and Brant-Greenock roads to vehicular traffic.

### **6.7.3 Requirements for Master Plan Completion**

The following activities are required in order to complete the formal Class EA Master Plan process:

- Issue a Notice of Study Completion for the Master Plan which will also service as a Notice of Completion for Schedule B projects.
- Make Master Plan Report available for public review in conjunction with publication of the Notice of Study Completion.
- Obtain feedback from public, stakeholders and agencies.
- Make the revised Master Plan report available for public/agency review.
- Address outstanding issues resulting from the Notice of Completion.
- Advise the County and the Ministry of the Environment (MOE) when the Master Plan process is complete.

### **6.7.4 Final Public Consultation**

A Notice of Study Completion was recently circulated to local residents, stakeholders and government review agencies. The notice identified the preferred Master Plan alternatives and provided the process for appeal of the Schedule B and C activities approved in conjunction with the process (i.e., a Part II Order request to the Minister of the Environment prior to the conclusion of the review period) if there are unresolved environmental issues.

The following summarizes the distribution of the notice.

---

Contents:	Identification of preferred Master Plan solution, key project components
Issued:	April 24, 2013
Placed In:	Walkerton Herald Times, the Shoreline Beacon, the Sun Times, the Kincardine News and the Paisley Advocate. (April 24 and May 1, 2013)
Distributed To:	21 review agencies, adjacent property owners.

The 30-day review period for the Notice will conclude on May 24, 2013.

## **7.0 SUMMARY**

This report documents the Master Plan process which was conducted by the County of Bruce to resolve the deficiencies identified with a cluster of county-owned bridges located on local municipal roadways in central Bruce County.

The Master Plan process included an extensive background review of the study area in order to characterize and identify potential impacts associated with the natural, cultural and built environments. Specialized studies were conducted in each of these areas including a Natural Environment Characterization Report, a Stage 1 Archaeological Assessment, a Structural Heritage Impact Assessment and a Transportation Analysis. In order to involve the general public and adjacent property owners in the process, two public meetings were held during the course of the Master Plan process to seek input on the proposed outcomes. Agencies and stakeholders were also engaged through a direct mail-out. The outcome of the Master Plan process, which identified a preferred implementation option for each structure included in the study, being to replace, rehabilitate or eventually close the crossing, was reached following a detailed analysis of a range of potential Master Plan options.

The Bridge Infrastructure Plan developed through the Master Planning process will require the construction of major infrastructure works (e.g., new bridge construction, bridge rehabilitation, bridge closures and reconstruction of approach roads), and will be implemented over a fifteen to twenty year time frame. The Master Plan sets out a series of recommendations for project implementation, including a proposed timeline for construction and anticipated capital costs for each of the project partners. Replacement of the McCurdy Bridge will require additional Class EA investigation prior to completion. All other projects identified in conjunction with the Master Plan have been reviewed in conjunction with the Class EA process and are therefore pre-approved.



All of which is respectfully submitted.

B. M. ROSS AND ASSOCIATES LIMITED



Per

A handwritten signature in blue ink, appearing to read "Andrew Ross".

Andrew Ross, P. Eng.  
Project Manager



Per

A handwritten signature in blue ink, appearing to read "Kelly Vader".

Kelly Vader, RPP, MCIP  
Environmental Planner

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January 2012

## HERITAGE EVALUATION OF EIGHT BRIDGES

### Bridge Infrastructure Master Plan Municipalities of Arran-Elderslie and Brockton Bruce County, Ontario

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DRAFT REPORT



**Report Number:** 11-1136-0050-R01

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## HERITAGE EVALUATION OF EIGHT BRIDGES BRIDGE INFRASTRUCTURE MASTER PLAN

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## HERITAGE EVALUATION OF EIGHT BRIDGES BRIDGE INFRASTRUCTURE MASTER PLAN

### 1.0 STUDY PURPOSE AND METHOD

The County of Bruce is currently preparing a Bridge Infrastructure Master Plan to evaluate the future infrastructure requirements for eight bridges located in the Municipalities of Arran-Elderslie and Brockton (Table 1). The purpose of this Master Plan is to identify key planning issues associated with these structures prior to undertaking site specific environmental assessments. B. M. Ross was retained by the County to act as project engineers.

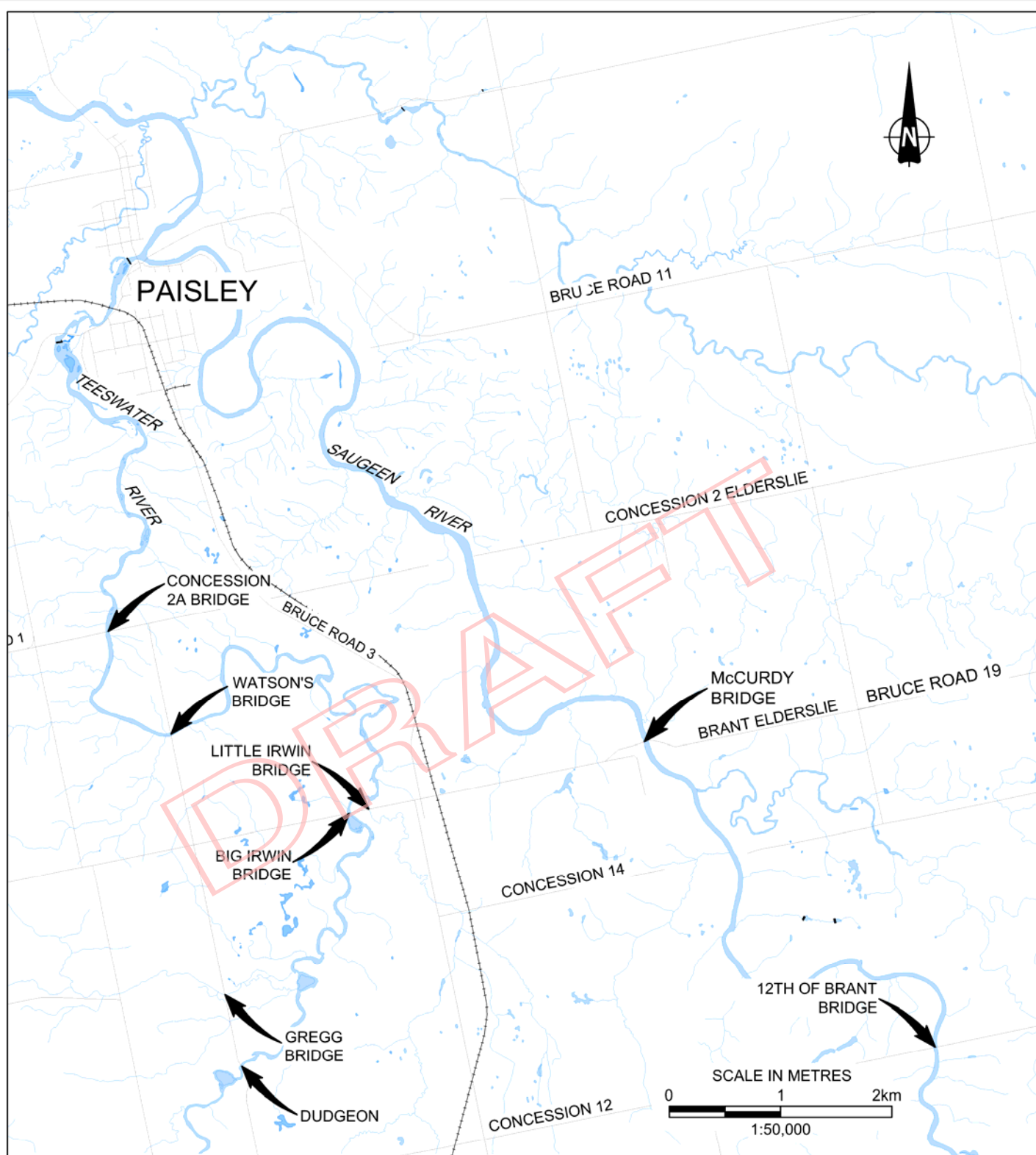
Golder Associates Ltd. (Golder) was retained by B.M. Ross to prepare the cultural heritage component of this Master Plan. Golder undertook a review of heritage planning issues associated with historic bridges and conducted a preliminary heritage assessment of the eight bridges. A site overview was provided to Golder by Andrew Ross, P. Eng., Senior Engineer with B.M. Ross on August 31<sup>st</sup>, 2011. Site visits were conducted by Christopher Andreae, Ph.D., Associate and Senior Built Heritage Specialist with Golder and Meaghan Rivard, M.A., Cultural Heritage Specialist with Golder on August 31<sup>st</sup> and September 1<sup>st</sup>, 2011. Limited research was undertaken during the same time period at the Archives in the Bruce County Museum and Cultural Centre and the Highways Administration Office in the Bruce County Administration Building.

Section Two of this report provides a brief historical context for bridge development in Ontario. Section Three examines the planning context for heritage bridge replacements and renewals. Section Four provides brief descriptions and evaluations of cultural heritage value for the eight bridges using both the *Ontario Heritage Bridge Guidelines* scoring and the *Ontario Heritage Act Regulation 9/06* criteria.

**Table 1: Location of Study Area Bridges**

Map #	Bridge Name	Type	River	Road
1	Concession 2A Bridge	Pony Truss	Teeswater	Concession 20
2	Watson's Bridge	Through Truss	Teeswater	Greenock-Elderslie Road
3	Big Irwin Bridge	Through Truss	Teeswater	Brant-Elderslie Road
4	Little Irwin Bridge	Concrete Rigid Frame	Teeswater	Arran-Elderslie/Brockton Townline
5	McCurdy's Bridge	Through Truss	Saugeen	Greenock-Brant Road
6	Gregg Bridge	Concrete Rigid Frame	Teeswater	Greenock-Brant Road
7	Dudgeon Bridge	Concrete/Lattice Truss	Teeswater	Greenock-Brant Road
8	12 <sup>th</sup> Concession Bridge	Through Truss	Saugeen	Concession 12






## REFERENCE

PLAN BASED ON CANMAP STREETFILES V2008.4.

## NOTES

THIS DRAWING IS SCHEMATIC ONLY AND IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

ALL LOCATIONS ARE APPROXIMATE ONLY.

PROJECT		EVALUATION OF CULTURAL HERITAGE BRIDGE INFRASTRUCTURE MASTER PLAN BRUCE COUNTY, ONTARIO			
TITLE		STUDY AREA MAP			
 <b>Golder Associates</b> LONDON, ONTARIO		PROJECT No. 11-1136-0050		FILE No. 1111360050-R02001	
		CADD	AMG/DCH	Jan. 6/11	SCALE AS SHOWN
		CHECK			REV. 0
					<b>FIGURE 1</b>



### 2.0 HISTORICAL CONTEXT

Public highway bridges can be owned by either a municipality (county, township, etc) or the province. Bridge ownership is dictated by the *Municipal Act*. Seven of the eight bridges in this study are owned by the County of Bruce while one is township owned. Bridges over water courses that formed boundaries between townships were always assumed by the County. However, arguments began in the early 19<sup>th</sup> century – sometimes acrimonious – over the responsibility for building and maintaining bridges over rivers located entirely within a township. The 1866 *Municipal Institutions Act* stated that county councils were responsible for all bridges over 200 feet long within the county. An 1871 amendment to the *Act* increased this length to a remarkable 500 feet. Building such large structures was far beyond most townships financial resources. Needless to say, large bridges were relatively rare to the detriment of efficient road travel. The few major bridges constructed in this era were built by the provincial government. Fortunately, at least for townships, by 1883 the defining length of bridges had been reduced to 100 feet.

The responsibility for bridge financing became an issue again in the early 20<sup>th</sup> century. This time it was driven by the cost for building stronger bridges – not longer ones. The economic value to rural communities of good roads, and by extension good bridges, was becoming evident. Nineteenth-century wooden bridges could not carry the weight of heavier wagon and farm equipment coming into use. By the First World War, motor vehicles were becoming increasingly common and the provincial government began to provide grant programs and technical advice on bridge building. At the same time, counties began to create county-wide road networks by assuming the ownership of key township roads and bridges. Of the eight bridges examined in this report, the Concession 2A Bridge is the only township owned bridge; the other seven are county structures.

The technical evolution of bridge designs ran parallel to the economic need for good roads. In southern Ontario most 19<sup>th</sup> century bridges were built of timber. Very short ones were beam structures; longer spans employed simple trusses, such as King and Queen Post trusses. A few iron truss bridges were built in the 1870s-1880s but were generally too costly to be widely used. Inexpensive steel trusses came into use in the 1890s and the designs were commonly used into the 1930s. The Warren pony truss (See Concession 2A Bridge – Section 4.1) was a work-horse design for short span, low traffic situations. The Pratt through truss (See Watson's Bridge – Section 4.2; Big Irwin Bridge – Section 4.3) and the Warren truss dominated the early 20<sup>th</sup> century. Somewhat less common was the double-intersection Warren truss (See 12<sup>th</sup> of Brant Bridge – Section 4.8). Unusual trusses were used for special bridging needs such as requiring a long single span (See McCurdy's Bridge – Section 4.5). Due to the demand for steel trusses, several specialized, local bridge companies came into existence including the Hamilton Bridge Works (Section 4.2), Sarnia Bridge Company (Section 4.3) and the Hunter Bridge and Boiler Company, Kincardine (Section 4.8).

Instead of building new bridges, structures were sometimes recycled as an inexpensive alternative to new construction. The two-span 12<sup>th</sup> of Brant Bridge (1949, see Section 4.8) is remarkable in that neither span was originally designed for that location. One came from a crossing in Southampton while the second came from a field after the Saugeen River changed its course and left the bridge on dry land. The most intriguing structure is the Dudgeon Bridge (See Section 4.7). It was originally constructed as a concrete bridge but the centre portion was subsequently destroyed. This middle section was replaced with a very uncommon steel-lattice truss design – possible recycled from an obsolete railway bridge.



Concrete began to be accepted as a bridge material by the 1920s. The Dudgeon Bridge is an early example of its use. In the 1930s the concrete rigid frame became one of the most widely used designs. The Little Irwin Bridge (1953, see Section 4.4) and the Gregg Bridge (1965, see Section 4.6) are later examples of this design. Concrete is the most common bridging material used today in southern Ontario and employed in a variety of designs including rigid frame and as a composite in pre-stressed and post-tensioned concrete beams.

Overall, the eight bridges included in this study represent social, political and economic changes within Bruce County over the last century. The lightly-built Concession 2A Bridge suggests that the road has always been a lightly-travelled, municipal road. Conversely, the immense McCurdy's bridge is indicative of either an important road or the technological challenge of bridging the wide Saugeen River with a single span, or both. The recycled spans of the 12<sup>th</sup> of Brant Bridge suggest a parsimonious, cash-strapped, or practical, County council decision.

All eight bridges contribute to the landscape character of the area and the four steel through trusses are particularly visible. These steel truss designs will never be built again. When these are removed, a distinctive visual part of rural county will disappear – just as railway stations and one-room schools have in the past, and churches are today.

DRAFT



### 3.0 PLANNING CONTEXT

#### 3.1 Introduction

Several provincial *Acts* and regulations govern the safe design and maintenance of bridges, but none contain provisions specific to the conservation of historic bridges. The *Ontario Heritage Act* and associated regulations, however, do provide methods for the evaluation and protection of provincial heritage resources which include bridges. As well, various Canadian and American agencies have developed “best-practice” guidelines for the evaluation and conservation of historic bridges. The following reviews the principal planning related material.

#### 3.2 Relevant Legislation

##### 3.2.1 Ministry of Tourism and Culture

The Ministry of Tourism and Culture administers the *Ontario Heritage Act* and is the reviewing Ministry for heritage matters identified in environmental assessments (See Section 3.2.3). The provisions of the *Act* place the responsibility for most matters of heritage conservation at the municipal level. For the purposes of historic bridges, the most relevant part of the *Act* is the ability of a municipality to designate, under Part IV Section 29 of the *Act*, a property as having cultural value or interest. Designation provides protection for a historic resource from inappropriate modification or demolition. The *Act*, under Part IV Section 27 (1.2), also permits a municipality to list a property as having cultural value or interest. This status does not provide any formal protection to the property but listing does “flag” the property as having potential cultural heritage value or interest.

*Regulation 9/06* of the *Ontario Heritage Act* provides a framework for the evaluation of cultural heritage significance (See Section 3.3.2). If a bridge is determined to have cultural heritage value, the municipality can designate or list the feature. In exceptional cases, the Province may determine that a resource is of provincial significance. In this case, a separate *Regulation 10/06* is used to establish cultural heritage value. It appears unlikely the eight bridges within this study will be of provincial heritage value. None of the bridges in Bruce County appear to have provincial significance.

As described in Section 3.2.2 the Ministry maintains the Ontario Heritage Bridge List of historic bridges.



### 3.2.2 Ministry of Transportation

The Ministry of Transportation is responsible for the design and maintenance standards of public highway bridges in Ontario through the authority of the *Public Transportation and Highway Improvement Act*. *Ontario Regulation 104/97 Standards for Bridges* applies to all provincial bridges. Most relevant is that the design, construction and rehabilitation of a bridge must conform to the standards set out in the *Canadian Highway Design Code*. The *Highway Bridge Design Code*, Clause 1.4.2.8 acknowledges the aesthetic value of bridges and their cultural value within a landscape with the statement that:

*"In the design and the rehabilitation of structures, consideration shall be given to the appearance of the finished structure and its compatibility with the surroundings. Wherever possible, the appearance of a structure shall be such that it will be generally perceived as an enhancement to its surroundings."*

In 1983 the Ministry of Transportation (then the Ministry of Transportation and Communications) and the Ministry of Tourism and Culture (then the Ministry of Citizenship and Culture) jointly introduced the *Ontario Heritage Bridge Program*. A primary objective of the *Bridge Program* was to develop a planning process for the allocation of funding from both Ministries for the conservation of historic bridges. The Program included a set of *Guidelines* specifically for determining the cultural heritage value or interest of bridges. The *Program* also established the *Ontario Heritage Bridge List* to include all of the bridges identified at the time as having cultural heritage value or interest. The *List* included bridges from both provincial and lower and upper-tier municipalities. During the 1990s many of the regulatory functions of the Ministry of Transportation pertaining to bridge design were downloaded to the municipal level. Similarly funding allocated specifically for heritage bridges ended. Today listing a bridge on the *Heritage Bridge List* is purely honorific but the list is still maintained by the Ministry of Tourism and Culture.

The 1983 *Ontario Heritage Bridge Program* evaluation system continues to be used by the Ministry of Transportation as a planning tool for bridge maintenance and replacement. In 2008 the evaluation system was revised and renamed the *Ontario Heritage Bridge Guidelines for Provincially Owned Bridges* to conform to *Regulation 9/06* which had come into effect three years earlier.

### 3.2.3 Ministry of the Environment

The Ministry of the Environment is responsible for implementing the *Ontario Environmental Assessment Act*. The *Act* defines heritage resources as part of the environment by way of definition in the *Act* Part I Section 1 (1) which states that:

*"environment" means . . . (c) the social, economic and cultural conditions that influence the life of humans or a community, (d) any building, structure, machine or other device or thing made by humans.*



Bridges are covered by the *Class Environmental Assessment Process for Transportation Facilities* as Class B (major improvements, over 2.7 m, to existing provincial transportation facilities) and Class C (minor improvements, under 2.7 m, to existing provincial transportation facilities). The Class EA process acknowledges the importance of cultural heritage. Where a bridge is known to be listed, its status must be considered in the environmental assessment process. The term “listed” seems to pertain to the Ontario Heritage Bridge List.

### 3.2.4 Ministry of Municipal Affairs and Housing

The Ministry of Municipal Affairs and Housing is responsible for several areas of legislation that may affect bridge design, including: the *Provincial Policy Statement* and the *Municipal Act*.

The *Provincial Policy Statement* provides policy direction on matters of provincial interest related to land use planning and development. As a key part of Ontario's policy-led planning system, the *Provincial Policy Statement* sets the policy foundation for regulating the development and use of land that will enhance the quality of life for the citizens of Ontario. The policies of the *Provincial Policy Statement* may be complemented by provincial plans or by locally-generated policies regarding matters of municipal interest. Policy Section 2.6.1 is quite specific with regards to historic conservation by stating that:

*Significant built heritage resources and significant cultural heritage landscapes shall be conserved.*

### 3.2.5 County of Bruce Official Plan

The primary mechanism for implementing the *Provincial Policy Statement* is through provisions contained in municipal Official Plans as required by the *Municipal Act*. Section 4.10 *Heritage* in the County Of Bruce Official Plan provides a framework for the conservation of historic resources within the County. Section 4.10.1 *Objectives* states the following:

- i) *County Council encourages the identification, acquisition, restoration and conservation of the historical, cultural, architectural and archaeological assets of the County.*
- ii) *In accordance with the Ontario Heritage Act, the County encourages Local Councils to support the creation of Local Architectural Conservation Advisory Committees to inventory and designate buildings, sites and districts of historical, cultural or architectural merit.*





### 3.3 Evaluation of Heritage Significance

#### 3.3.1 Introduction

Two approaches are used in Ontario for evaluating the heritage significance of a bridge. The criteria for evaluation are the same but the methods of applying the criteria are different. *Ontario Regulation 9/06* of the *Ontario Heritage Act* is the only set of criteria with legislative authority. The Ministry of Tourism and Culture requires the use of these criteria when assessing any potential historic structure, including bridges, in Ontario. The *Ontario Heritage Bridge Guidelines* prepared by the Ministry of Transportation is based on *Regulation 9/06* but is used primarily by the Ministry of Transportation for internal planning

For the purpose of identifying potential heritage resources, Ontario has adopted a “40-year rule” by which any feature more than 40 years old is evaluated to determine if it has cultural heritage significance. Any resource constructed more recently is deemed in most – but not all – cases not to have potential heritage significance.

#### 3.3.2 Ontario Heritage Act Regulation 9/06

Regulation 9/06 of the *Ontario Heritage Act* was prepared to provide *criteria for determining cultural heritage value or interest* (Table 2). In order to have planning value, the actual evaluation of the structure should include a description of character defining features that identify the physical attributes of the bridge that make it historically significant. In order to be designated under Section 29 of the *Ontario Heritage Act*, a property must have cultural heritage value or interest in one or more of the following criteria:

**Table 2: Ontario Heritage Act Regulation 9/06 Evaluation Criteria**

Criteria	Description
<b>Design or Physical Value</b>	Is a rare, unique, representative or early example of a style, type, expression, material or construction method
	Displays a high degree of craftsmanship or artistic merit,
	Demonstrates a high degree of technical or scientific achievement
<b>Historical or Associative Value</b>	Has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community
	Yields, or has the potential to yield, information that contributes to an understanding of a community or culture,
	Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community
<b>Contextual Value</b>	Is important in defining, maintaining or supporting the character of an area
	Is physically, functionally, visually or historically linked to its surroundings
	Is a landmark





### 3.3.3 Ontario Ministry of Transportation Heritage Bridge Guidelines

The overall structure of the *Heritage Bridge Guidelines* evaluation criteria is similar to *Regulation 9/06* however the wording has been revised to pertain specifically to bridges. The intent of the *Guidelines* is to enable a non-specialist to undertake the evaluation. The distinctive feature of the *Guidelines* is its scoring system (See Table 3). A bridge scoring more than 60 (out of a possible 100) is eligible for listing on the *Ontario Heritage Bridge List*. When the *Bridge Guidelines* were prepared in 1983, a score of 60 or more made a bridge a potential candidate for provincial funding but this is not longer the case. In 2011 the Ministry of Transportation still uses the bridge scoring criteria as a management tool in planning the rehabilitation or replacement of its bridges. It could not be determined if any municipalities use the scoring system as a bridge planning tool today.

## 3.4 Conservation Planning for Heritage Bridges

### 3.4.1 Introduction

Any plan to conserve a heritage bridge must be based on sound historical analysis, an understanding of the reasons for the proposed undertaking, assessment of potential impacts and financing sources. Proposed technical options should consider cultural heritage value as a critical part of the decision making process. The *Ontario Heritage Bridge Program* follows a prescriptive approach to conservation planning. The *Historic Bridge Management Plan* of the New York State Department of Transportation embodies a much more discretionary approach.

Flexibility in developing conservation plans is very important. Steel trusses, for example, present special challenges. They are typically the oldest surviving bridges in a community and are often structurally obsolete; members have rusted, fastenings have failed, accidents have damaged trusses. Even when structural conditions are adequate, such bridges may be functionally obsolete due to restricted vertical clearance and/or load restrictions.

### 3.4.2 Ontario Ministry of Transportation *Heritage Bridge Program*

The *Ontario Heritage Bridge Program* conservation options outlined in Table 4 are ranked from minimum to maximum according to level or degree of physical intervention. The options are ranked on the well established conservation principle that rehabilitation is always preferable to replacement.



## HERITAGE EVALUATION OF EIGHT BRIDGES BRIDGE INFRASTRUCTURE MASTER PLAN

**Table 3: Ontario Heritage Bridge Guidelines Evaluation and Scoring Criteria**

Criteria		Score	Comment
Design/Physical Value	Functional Design:	20	High degree of technical or scientific achievement and is one of a kind/prototype or exemplary for its kind
		16	High degree of technical or scientific achievement and five or fewer survive in a region
		12	Fewer than five survive within a region
		0	Little technical or scientific value perspective; many built, many remain
	Visual Appeal:	20	High degree of craftsmanship or stylistic merit; well proportioned; modifications are sympathetic
		12	Well proportioned and general massing is appropriate to landscape
		4	Structure has only one or two noteworthy features
		0	No noteworthy features
	Materials:	10	Provincially rare/unusual (stone, wrought iron)
		8	Regionally rare/unusual (timber, riveted steel)
		5	Unusual combination of materials
		0	Common materials
Contextual Value	Landmark:	15	Physically prominent and primary symbol in the area; 'gateway structure'
		9	Locally significant and perceived by community as having symbolic value rather than purely visual or aesthetic value
		3	Familiar structure in the context of the area
		0	No prominence
	Character Contribution:	10	Defines area character; great municipal importance in establishing or protecting this character
		6	Contributes to area character
		0	Character contribution minimal
Historic/Associative Value	Designer/Construction Firm:	15	Innovative work or ideas of known influential or prolific companies having major impacts on development of a community or other professional groups
		9	Representative of a company, engineer or builder directly responsible for a large number of structures which have resulted in standards forms and construction practices
		3	Known but undetermined contribution
		0	Unknown
	Associated with Historical Theme, Person or Event:	10	Direct or close association with theme, person or event highly significant in understanding the cultural history of the nation, province, municipality or area
		6	Close association with local theme or event
		0	Little or no association with theme or event



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Table 4: *Ontario Heritage Bridge Guidelines Conservation Options*

MTO Ranking	Option	Description
1	Retain In Service	Retain bridge with no major modifications undertaken
2		Restore missing/deteriorated bridge elements
3		Retain bridge with sympathetic modification
4		Retain bridge with sympathetically designed new structure in proximity to provide added traffic capacity
5	Retain for Other Uses	Adapt bridge for new use as pedestrian walkways, cycle paths, scenic viewing, etc.
6		Retain bridge as a heritage monument for viewing purposes only
7	Relocation	Relocate structure to new location for continued or adaptive reuse
8	Removal and Replacement	Replace structure with a sympathetically designed structure and: a) Salvage bridge elements/members of bridge for incorporation into new structure or for future conservation work or display; b) Undertake full recording and documentation of existing structure

### 3.4.3 New York Department of Transportation *Historic Bridge Management Plan*

The *Historic Bridge Management Plan* (2002) prepared by the New York State Department of Transportation provides an alternative approach to planning the rehabilitation or replacement of historic bridges (Figure 2). Unlike the Ontario Heritage Bridge Program, this approach assumes that the heritage value of the bridge has been established prior to any engineering evaluation being conducted. This presumes that a State or County wide inventory had been prepared pro-actively. Thus, a technical evaluation can have due regard for the historic resource as part of the analysis. The rest of the planning process follows a decision tree by which heritage and technical concerns are addressed simultaneously.

### 3.4.4 Parks Canada *Standards and Guidelines for the Conservation of Historic Places in Canada*

Ontario has adopted the Parks Canada *Standards and Guidelines for the Conservation of Historic Places in Canada* as the best-practice approach to conservation planning in the province. Section 4.4 provides guidelines for engineering works including bridges.



### 3.4.5 Contextual Value of Bridges

Determining the contextual value, or cultural landscape significance, of a bridge is a requirement of both *Regulation 9/06* and the *Ontario Heritage Bridge Guidelines*. According to the scoring used in the *Bridge Guidelines*, up to 25 percent of the cultural heritage value of a bridge can be due to its context.

The natural landscape can profoundly effect bridge design. The Saugeen River is prone to spring flooding and heavy ice flows. The single span McCurdy's bridge (Section 4.6) over the Saugeen is a much heavier and taller structure than the two span 12<sup>th</sup> of Brant Bridge (Section 4.9) located down stream. As a result, McCurdy's is a much more prominent landmark.

The evolution of the road patterns of Bruce County has affected the contextual value of its bridges. Bruce County – as with all other counties – was surveyed in the early 19<sup>th</sup> century without regards to the natural topography. Hence, roads sometimes crossed rivers at sharp angles or at the base of steep hills. Whenever possible, as in the case of McCurdy's Bridge (Section 4.6) roads were realigned from the historic road allowances to avoid difficult and expense site conditions for new bridges. Often road approaches were built on earthworks over flood plains, or cuttings were made in valley walls to reduce approach grades.

In the broader landscape, a bridge may be a prominent visual feature in a flat area with open fields, or insignificant when in a valley or a tree cluster. Some bridge designs, such as the concrete rigid frame Little Irwin Bridge (Section 4.5) and Gregg Bridge (Section 4.7) can be almost invisible in the landscape apart from their railings.

In considering the context of a bridge, views both of the bridge and from the bridge should be acknowledged. This is an important consideration if a replacement bridge is built in proximity to the existing bridge (See Table 4, MTO Ranking 4). In such cases, the new structure should not visually overwhelm the historic bridge.

Steel truss bridges are often viewed as having cultural heritage value within a community. The angular form of the truss rising above the deck conveys a sense of age and visual interest that sometimes forms a landmark in the community. The 1885 Balls Bridge in Huron County is a notable example of a bridge as a local landmark. The bridge was rehabilitated in 2008 rather than removed because of the great cultural value with which the local community regarded the structure.

### 3.4.6 Design of Replacement Bridges

Even when a bridge has been determined to have high cultural heritage value, replacement may still be necessary. The safety of the existing structure may be compromised such that rehabilitation is not a practical option. In other situations rehabilitation or upgrading the existing structure may not be able to achieve modern traffic/load requirements. In some cases, the cost of rehabilitation may be considered prohibitive when compared to replacement.

Bridge replacement is not a mitigation option. Option 8 in Table 4 was not included in the original 1983 *Heritage Bridge Program* and added only with the 2008 *Guidelines*. According to the *Guidelines*, bridge replacement is a



form of mitigation when the new structure replicates the appearance of the heritage bridge in the new design. It can also be used when a new bridge is designed in a manner sympathetic to the design qualities of the original bridge and its setting.

However, there is no intrinsic reason why a replacement structure should have the design qualities of the original bridge. For example, if a historic “landmark bridge” has to be replaced, the new structure should also be a “landmark”. It could well be designed using modern structural methods and materials. As discussed in Section Two of this report, bridge design over time has been based on the available materials, changes in engineering design, and the specific economics of individual bridge crossings. There is considerable literature on the best approaches to bridge design. The Ministry of Transportation *Aesthetic Guidelines for Bridges* discusses the best practices for new bridge design in Ontario and an extensive bibliography on the aesthetics of bridge design.

### 3.5 Summary

The advantage of using the *Ontario Heritage Bridge Guidelines* instead of *Regulation 9/06* in bridge evaluations is that it provides bridge-specific description that guide the compiler through the steps of assessing a bridge. Similarly, the numeric scoring provides an absolute quantitative measure of significance whereas *Regulation 9/06* provides a qualitative measure. The rating of cultural heritage value is thus more easily understood by the layman.

However, the *Ontario Heritage Bridge Guidelines* have several drawbacks. Primarily, the numeric system does not provide a description of the features that give a bridge its cultural heritage value or interest. Moreover, the scoring system has not been updated since the program began almost 30 years ago.

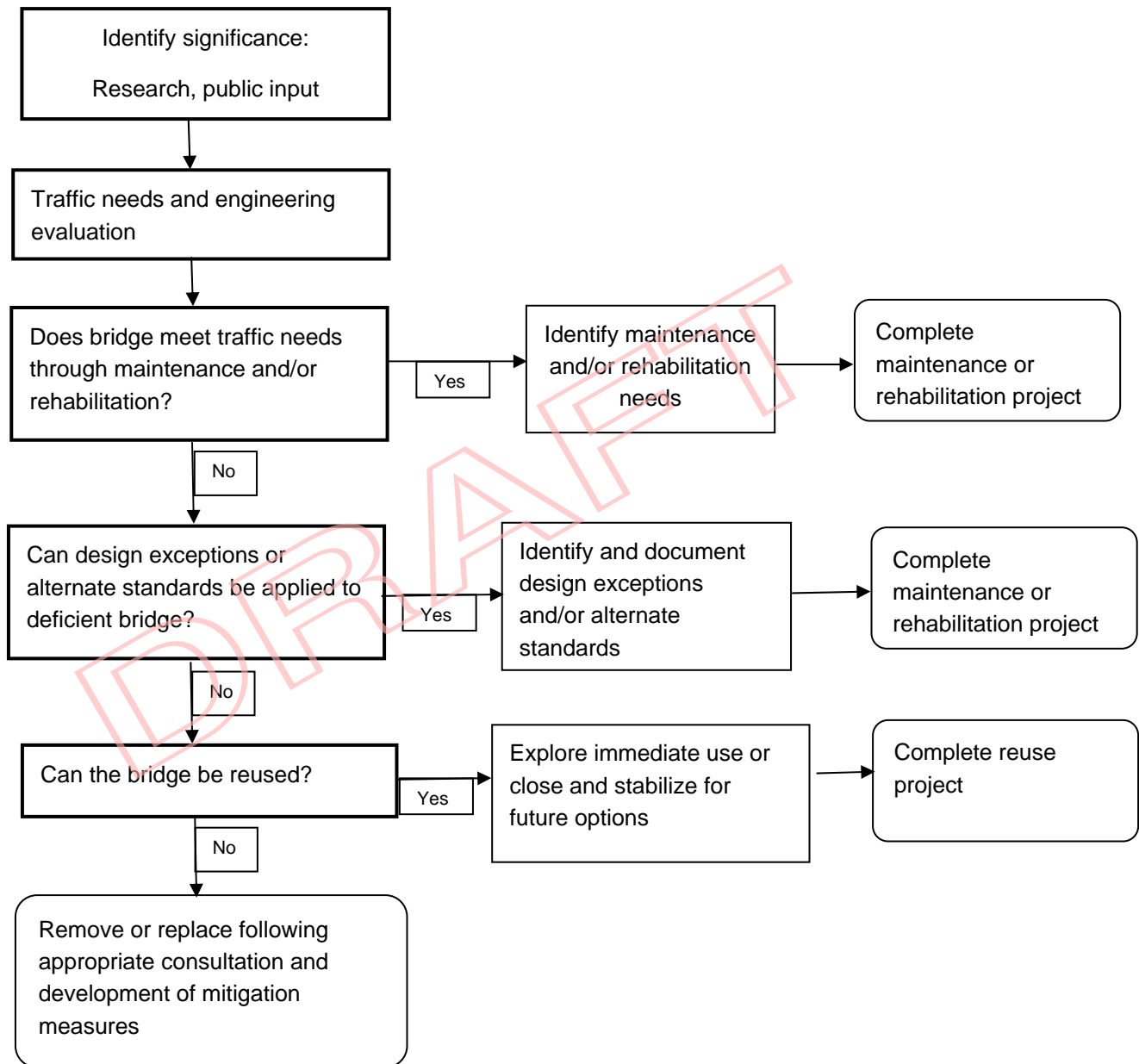
If designation or listing under the *Ontario Heritage Act* is anticipated, then the structure must be evaluated according to *Regulation 9/06*. This provides the most accurate determination of cultural heritage value or interest according to provincially accepted criteria. This is the legislative framework within which government bodies have the authority to protect heritage features of cultural heritage value or interest.

Nonetheless, the discretionary conservation approaches of the *Standards and Guidelines for the Conservation of Historic Places in Canada* and the New York State *Historic Bridge Management Plan* allow for greater flexibility in developing an approach than does the *Ontario Heritage Bridge Guidelines*. This encourages a proactive and multi-faceted approach to conservation prior to the design of a replacement.



## HERITAGE EVALUATION OF EIGHT BRIDGES BRIDGE INFRASTRUCTURE MASTER PLAN

Figure 2: Decision Making Process Flow for Bridge Rehabilitation/Replacement





### 4.0 SITE EVALUATIONS OF EIGHT BRIDGES

#### 4.1 Purpose

The two previous sections provide a historical and planning context for evaluating the cultural heritage value of bridges in Ontario. This Section Four applies these concepts to the eight bridges requiring specific assessment. The evaluation table for each bridge provides evaluations using both the *Ontario Heritage Bridge Guidelines* scoring and *Regulation 9/06*. These bridge evaluations are not Heritage Impact Assessments as defined in Section 3.3.1 of this report but provide enough information to provide a preliminary assessment.

#### 4.2 Concession 2A Bridge

The Concession 2A Bridge carries Concession 20 over the Teeswater River in the Municipality of Brockton (Figure 1). Concession 2A becomes Concession 20 A at the intersection with Greenock-Elderslie Road roughly 500 m east of the bridge site.

The structure is a Warren pony truss (Plate 1). It sits on concrete abutments with wingwalls that extend into earth embankments on a roughly 30° skew. The deck, although modern, is constructed with timber. Historical plans and/or drawings were not identified.

The bridge is located within a steeply sloped valley which causes the approaches to the bridge to be quite prominent. From the west, the approach is particularly steep as the roadway ascends directly from the bridge deck (Plate 2). The east approach is gentler although the roadway is much more rolling.

**Table 5: Concession 2A Bridge Evaluation**

Criteria	Ontario Heritage Bridge Program		Ontario Heritage Act <i>Regulation 9/06</i>
	Maximum Score	Score	<i>Heritage Attributes of Cultural Heritage Value or Interest</i>
Design/Physical Value	50	40	Warren pony truss representative of early 20 <sup>th</sup> century bridge construction for short span light traffic areas; rare survivor in Bruce County due to widespread replacement as a result of age; use of riveted steel common early 20 <sup>th</sup> century material but is rare survivor today.
Contextual Value	25	10	Size and scale of pony truss indicative of rural nature of surrounding community; location and short span within a steep valley supports character of Teeswater River.
Historical Association	25	0	None identified; further research needed to identify builder, date of construction, settlement history, etc.
<b>Total</b>	<b>100</b>	<b>50</b>	





## HERITAGE EVALUATION OF EIGHT BRIDGES BRIDGE INFRASTRUCTURE MASTER PLAN



*Plate 1: Concession 2A Bridge looking northwest.*



*Plate 2: Concession 2A Bridge looking west.*



#### 4.3 Watson's Bridge

Watson's Bridge carries the Greenock-Elderslie Road across the Teeswater River between Concession 20 (Concession 2A Elserslie Road) and Brant-Elderslie Road. The Greenock-Elderslie Road divides the Municipalities of Arran-Elderslie and Brockton.

The structure is a Pratt through truss with lattice railings and concrete abutments and deck (Plate 3). It has a 112 ft span and has been sensitively maintained. The Hamilton Bridge Works Co. Ltd. constructed the bridge beginning in 1924. Construction required the removal of the previous structure.

The roadway approaching the bridge from the north is constructed on an earth embankment with relatively deep ditches. It is moderately sloped. From the south, a rolling roadway with a more steep approach meets the deck (Plate 4).

Table 6: Watson's Bridge Evaluation

Criteria	Ontario Heritage Bridge Program		Ontario Heritage Act <i>Regulation 9/06</i>
	Maximum Score	Score	Heritage Attributes of Cultural Heritage Value or Interest
Design/Physical Value	50	45	Pratt through truss common design in early 20 <sup>th</sup> century; design increasingly rare in Bruce County due to replacement as result of age; use of riveted steel common early 20 <sup>th</sup> century material but is rare survivor today; much of original design has been retained through ongoing maintenance.
Contextual Value	25	15	Prominent truss design makes it a landmark in surrounding landscape.
Historical Association	25	10	The Hamilton Bridge Works Co. was a prolific bridge builder in 20 <sup>th</sup> century Ontario; further research needed to identify settlement history.
<b>Total</b>	<b>100</b>	<b>70</b>	



## HERITAGE EVALUATION OF EIGHT BRIDGES BRIDGE INFRASTRUCTURE MASTER PLAN



*Plate 3: Watson's Bridge looking southeast*



*Plate 4: Watson's Bridge looking south*





### 4.4 Big Irwin Bridge

The Big Irwin Bridge spans the Teeswater River along Brant-Elderslie Road which represents the township line dividing the Municipalities of Arran-Elderslie and Brockton. The bridge is located between Greenock-Brant Road and Bruce County Road 3.

The single span Pratt through truss structure has been well maintained throughout its lifetime. Most recently, damaged members were rebuilt with modern steel posts and steel highway guard rails were added on both sides (Plate 5). However, the bridge appears to sit on the original concrete abutments. It was constructed in 1924 by the Sarnia Bridge Company Ltd. to replace an earlier structure.

Approaching the structure from the west, the roadway is moderately sloped although the immediate approach is less steep than others within the region. The east approach to the bridge is quite flat given the rolling topography surrounding the structure (Plate 6).

The bridge is aligned with the Little Irwin Bridge located roughly 160 m to the east along Brant-Elderslie Road.

**Table 7: Big Irwin Bridge Evaluation**

Criteria	Ontario Heritage Bridge Program		Ontario Heritage Act <i>Regulation 9/06</i>
	Maximum Score	Score	Heritage Attributes of Cultural Heritage Value or Interest
Design/Physical Value	50	40	Pratt through truss was common design in early 20 <sup>th</sup> century; design increasingly rare in Bruce County due to replacement as result of age; use of riveted steel common early 20 <sup>th</sup> century material but is rare survivor today; much of original design retained through ongoing maintenance.
Contextual Value	25	15	Prominent truss design makes it a landmark in surrounding landscape.
Historical Association	25	10	Sarnia Bride Company Ltd. was a prominent bridge builder in early 20 <sup>th</sup> century; further research needed to identify settlement history.
<b>Total</b>	<b>100</b>	<b>65</b>	



## HERITAGE EVALUATION OF EIGHT BRIDGES BRIDGE INFRASTRUCTURE MASTER PLAN



*Plate 5: Big Irwin Bridge looking southeast.*



*Plate 6: Big Irwin Bridge looking east*



### 4.5 Little Irwin Bridge

The Little Irwin Bridge spans a tributary of the Teeswater River along the townline between the Municipalities of Arran-Elderslie and Brockton. It is located roughly 200 m east of the Big Irwin Bridge.

The bridge is a single span, concrete rigid frame structure (Plate 7). It is typical of mid-20<sup>th</sup> century construction throughout the region. Very few modifications have occurred aside from general maintenance. The structure was constructed by King Brothers Construction in 1953.

The approach to the structure is relatively flat given the surrounding topography (Plate 8). While the roadway is constructed on an earth embankment, there appears to be minimal slope in the direct vicinity of the structure.

**Table 8: Little Irwin Bridge Evaluation**

Criteria	Ontario Heritage Bridge Program		Ontario Heritage Act <i>Regulation 9/06</i>
	Maximum Score	Score	<i>Heritage Attributes of Cultural Heritage Value or Interest</i>
Design/Physical Value	50	10	Bridge determined not to have design or physical value.
Contextual	25	5	Historically liked with surrounding context, specifically Big Irwin Bridge to west.
Historical Association	25	5	Built by King Brothers Construction; further research needed regarding King Brothers Construction and settlement patterns.
<b>Total</b>	<b>100</b>	<b>20</b>	



## HERITAGE EVALUATION OF EIGHT BRIDGES BRIDGE INFRASTRUCTURE MASTER PLAN



*Plate 7: Little Irwin Bridge looking northeast*



*Plate 8: Little Irwin Bridge looking east.*





#### 4.6 McCurdy's Bridge

McCurdy's Bridge is located on the townline between the Municipalities of Arran-Elderslie and Brockton. The bridge carries Brant-Elderslie Road across the Saugeen River between Bruce County Road 3 and Side Road 10 South Elderslie. The roadway deviates from the Brant-Elderslie road right-of-way just west of Side Road 5 North. Due to the topography and the steep valley of the Saugeen River, the road was diverted in the 19<sup>th</sup> century.

The Pennsylvania Truss is a rare design. It contains rare sub-struts and very deep trusses with long inclined end posts at relatively low angles (Plate 9). Intricately designed, construction was completed in 1913. McCurdy's Bridge replaced an earlier structure of an unknown design built in 1885. It is assumed that the river had been previously bridged at this location prior to the 1885 bridge.

The approach to the structure from the west is curved and very steep. Therefore the bridge is not visible from a distance down the roadway on the west. From the east, the roadway curves to the south at the same rate as it did from the west side. However, the slope is less steep than on the west side (Plate 10). Although structural maintenance has been performed on the bridge, it remains largely unmodified given its age.

Table 9: McCurdy's Bridge Evaluation

Criteria	Ontario Heritage Bridge Program		Ontario Heritage Act Regulation 9/06
	Maximum Score	Score	Heritage Attributes of Cultural Heritage Value or Interest
Design/Physical Value	50	50	Pennsylvania Truss design originally used for long span railway bridges; use as roadway bridge began in the 1880s in the United States; design technically advanced and used only over long spans; extremely rare survivor of this design in Bruce County and possibly province (further research needed); use of riveted steel common early 20 <sup>th</sup> century material but rare survivor today.
Contextual Value	25	20	Prominent location in steep valley combined with extensive truss design makes it well-known landmark; has become associated with rural community and recreational usage of Saugeen River.
Historical Association	25	5	Pennsylvania Truss design suggest association with historic flooding; further research needed to identify builder, settlement history, etc.
<b>Total</b>	<b>100</b>	<b>75</b>	



*Plate 9: McCurdy's Bridge facing northeast.*



*Plate 10: McCurdy's Bridge facing west*

## 4.7 Gregg Bridge



## HERITAGE EVALUATION OF EIGHT BRIDGES BRIDGE INFRASTRUCTURE MASTER PLAN

The Gregg Bridge is located between the Municipalities of Brockton and Arran-Elderslie. It carries the Greenock-Brant Road across the Teeswater River and is located between Watson's Bridge and Dudgeon Bridge on the south side of Concession 18.

The Gregg Bridge is a concrete, rigid frame, single span structure roughly 12 m (40 ft) in length with modern steel highway guard rails and posts (Plate 11). It was constructed in 1965 and is representative of bridge design typical of the era and region. It appears to have replaced two 28 ft span steel beam bridges which had concrete floors. Plans were to replace it with the Pollock Bridge trusses in 1962 although at some point it was decided to construct a new structure. Leonard Seeley & Sons Ltd. constructed the structure between 1966 and 1967.

The roadway approaching the bridge sits on earth embankments with relatively steep ditches (Plate 12). Although the bridge span is 40ft in length, the flow of the tributary of the Teeswater River which runs below the bridge appears to have declined substantially in more recent years. This waterway was prone to high waters and shows evidence of substantial flooding.

**Table 10: Gregg Bridge Evaluation**

Criteria	Ontario Heritage Bridge Program		Ontario Heritage Act <i>Regulation 9/06</i>
	Maximum Score	Score	<i>Heritage Attributes of Cultural Heritage Value or Interest</i>
Design/Physical Value	50	10	Bridge determined not to have design or physical value or interest.
Contextual Value	25	0	Bridge determined not to have contextual value or interest.
Historical Association	25	10	Local builder, Leonard Seeley & Sons Ltd. constructed bridge; length of bridge associated with historic flooding of Teeswater River; further research needed regarding Leonard Seeley & Sons Ltd. and settlement patterns.
<b>Total</b>	<b>100</b>	<b>20</b>	





## HERITAGE EVALUATION OF EIGHT BRIDGES BRIDGE INFRASTRUCTURE MASTER PLAN



*Plate 11: Gregg Bridge looking southwest*



*Plate 12: Gregg Bridge looking north.*



### 4.8 Dudgeon Bridge

Located between the Municipalities of Brockton and Arran-Elderslie, Dudgeon Bridge carries Greenock-Brant Road across the Teeswater River. The Dudgeon Bridge is located south of the Gregg Bridge.

The Dudgeon Bridge contains two distinct structure types (Plate 13). The earlier, two span, concrete structure was constructed across the Teeswater River flood plain. It appears to be either a concrete beam or concrete slab structure, although this was not field verified. It is clear in the original design plans that the second span was added late in the design phase in order to accommodate high flood waters. The concrete portion was constructed by Hugh Watt and Thomas French Pearse in 1920.

A steel truss with a latticework design spans the waterway (Plate 13). The superstructure sits on the original south concrete abutment and the second pier of the concrete structure. The 1920 design plans show the presence of a truss structure different from the current structure. Although a later addition, it is likely that the steel structure was constructed in the 19<sup>th</sup> century as the latticework design was a common railway bridge design in the 1880s. Repurposed for use on a roadway rather than railway, it replaced the original structure at an unknown date.

The roadway curves slightly at the bridge (Plate 14), likely due to the challenging topography surrounding the two branches of the Teeswater River. As a result, when approaching from the south, the bridge is completely hidden from view. From the north side, the roadway veers to the east so that the bridge crosses the Teeswater River so as to minimize the skew of the bridge.

**Table 11: Dungeon Bridge Evaluation**

Criteria	Ontario Heritage Bridge Program		Ontario Heritage Act Regulation 9/06
	Maximum Score	Score	Heritage Attributes of Cultural Heritage Value or Interest
Design/Physical Value	50	30	Design incorporates two structural types when combined are unique in surrounding townships in Bruce County; latticework structure common in railway construction but rare in roadway use; riveted steel common early 20 <sup>th</sup> century material but rare survivor today.
Contextual Value	25	5	Due to location in valley, truss is prominent visual feature in the landscape.
Historical Association	25	15	Original concrete structure constructed by Hugh Watt and Thomas French Pearse; design featuring additional span associated with historic flooding; further research needed regarding steel truss replacement, Watt and Pearse and settlement patterns.
<b>Total</b>	<b>100</b>	<b>50</b>	





## HERITAGE EVALUATION OF EIGHT BRIDGES BRIDGE INFRASTRUCTURE MASTER PLAN



*Plate 13: Dudgeon Bridge looking northeast.*



*Plate 14: Dudgeon Bridge looking north.*



### 4.9 12<sup>th</sup> of Brant Bridge

The 12<sup>th</sup> Concession Bridge is located between Side Road 15 South Elderslie and Bruce County Road 3 in the Municipality of Brockton. It carries Concession 12 across the Saugeen River. A detailed history, analysis and a detailed evaluation of the structure can be found in the *Heritage Impact Assessment of the 12<sup>th</sup> Concession Bridge* undertaken in 2007 by Historica Research Ltd.

The 12th Concession Bridge consists of two early 20th century, distinctive highway bridge types (Plate 15) – the widely used Pratt Truss bridges and the much rarer double-intersection Warren truss. The two replacement spans were reused from the abandoned 6th Concession Brant Bridge over the Saugeen and the former Denny's Bridge in Southampton. Both bridges had fallen into disuse and were relocated following the destruction of the original bridge as a result of flooding. The east (land) span provides additional channel capacity when the river is in flood and the west span crosses the waterway. The Ontario Bridge Company undertook both the concrete work and the relocation efforts in 1949.

The Saugeen River cuts through a shallow, board valley where the 12th Concession road crosses the River. The road crosses the river at right-angles. The river is subject to large variations in flow. The bridge approaches are built on earth embankments in order to raise the structure above the spring flood level. The east, shorter structure (Plate 16) is a dry span built over the flood plain to provide for relief flow in times of heavy flooding.

The bridge was evaluated as a single unit rather than individual structures or spans.

**Table 12: 12th of Brant Bridge Evaluation**

Criteria	Ontario Heritage Bridge Program		Ontario Heritage Act Regulation 9/06
	Maximum Score	Score	Heritage Attributes of Cultural Heritage Value or Interest
Design/Physical Value	50	45	Pratt Truss bridge design is rare survivor of common in 20 <sup>th</sup> century bridge design; double-intersection Warren truss rare survivor of uncommon bridge design; both technically advanced designs; use of riveted steel common early 20 <sup>th</sup> century material but is rare survivor today; reuse of bridges common in flood prone areas.
Contextual Value	25	20	Prominent location in steep valley and extensive truss design with wide span make it a landmark; combination of bridge designs historically link bridge to surrounding area.
Historical Association	25	10	Constructed by Ontario Bridge Company active throughout 20 <sup>th</sup> century; relocation of second span associated with historic Saugeen River floods.
<b>Total</b>	<b>100</b>	<b>75</b>	





## HERITAGE EVALUATION OF EIGHT BRIDGES BRIDGE INFRASTRUCTURE MASTER PLAN



*Plate 15: 12th of Brant Bridge looking south east.*



*Plate 16: 12th of Brant Bridge looking east.*



## 5.0 CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusions

The Heritage Evaluation Process used in the County of Bruce's Bridge Infrastructure Master Plan will enable the County to evaluate the cultural heritage impacts of bridge replacement or rehabilitation. The proactive approach will enable the County to use best-practice methods for bridge conservation. This approach will enable capital budgets to be developed and create alternative conservation schemes designed on a county-wide basis rather than reacting on a bridge-by-bridge basis. Too often, the heritage value of bridges is considered so late in the planning process, that it cannot influence changes in other design parameters.

The preliminary inventory of this study was limited to eight bridges – seven County owned and one municipally owned – more than 40 years of age. Six of the bridges are steel trusses and according to B.M. Ross they represent the largest group of this design remaining in the county. The other two are concrete. Ideally, the experience gained in evaluating these bridges can be applied to the rest of the County.

This report was prepared to develop an approach to include heritage issues within a master planning process for bridge infrastructure needs for these eight bridges. The intent of this process was to provide a proactive approach to identifying historic bridges and integrating the results into traffic infrastructure needs in the County.

### 5.2 Recommendations

#### 5.2.1 Eight Bridges in this Report

- List as per Section 3.2.1 those County bridges in a heritage register maintained by the County that are determined to be eligible for listing under the *Ontario Heritage Act*, Section 27.
- Prepare heritage impact assessments and conservation plans for each listed bridge. The conservation plan should identify maintenance strategies for a reasonable time period (ten to twenty years) and if replacement is intended, develop a replacement strategy appropriate for the location.
- Designate as per Section 3.2.1 exceptionally important bridges under the *Ontario Heritage Act*, Section 29.



### 5.2.2 Other County Bridges

- Inventory all County bridges over 40 years of age and evaluate their cultural heritage value or interest using *Ontario Regulation 9/06*.
- List as per Section 3.2.1 the bridges eligible for listing under the *Ontario Heritage Act*, Section 27, in a heritage register maintained by the County.
- Prepare heritage impact assessments and conservation plans for each listed bridge. The conservation plan should identify maintenance strategies for a reasonable time period (ten to twenty years) and if replacement is intended, develop a replacement strategy appropriate for the location.
- Designate as per Section 3.2.1 exceptionally important bridges under the *Ontario Heritage Act*, Section 29.

DRAFT



### 6.0 FURTHER INFORMATION

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#### The Friends of Balls Bridge

- n.d. Website available online at [http://ballsbridgeontario.com/main\\_new](http://ballsbridgeontario.com/main_new).



### 7.0 CLOSURE

We trust that this report meets your current needs. If you have any questions, or if we may be of further assistance, please contact the undersigned.

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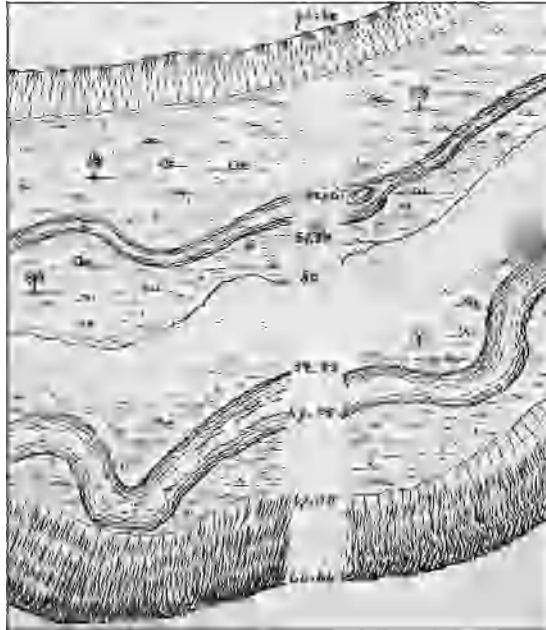
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Ministry of Tourism, Culture and Sport Stage 1  
Archaeological Assessment:

Central Bruce County Bridge Infrastructure Master Plan  
Townships of Greenock, Brant, and Elderslie  
Municipalities of Brockton and Arran-Elderslie  
Bruce County



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**April 20, 2012**

Final Report



# Ministry of Tourism, Culture and Sport Stage 1 Archaeological Assessment

## Central Bruce County Bridge Infrastructure Master Plan Townships of Greenock, Brant, and Elderslie Municipalities of Brockton and Arran-Elderslie Bruce County

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### EXECUTIVE SUMMARY

As part of the central Bruce County Bridge Infrastructure Master Plan, six bridge locations along the Saugeen and Teeswater rivers in the Bruce County municipalities of Brockton and Arran-Elderslie – Concession 20, Watson's, Dudgeon, 12<sup>th</sup> of Brant, McCurdy and Big Irwin, are being considered for repair, rehabilitation, relocation, or retirement.

Based on landscape, archaeological, and historical evidence presented in this Ministry of Tourism, Culture and Sport (MTCS) Stage 1 archaeological assessment, potential exists that Native and Euro-Canadian cultural heritage (archaeological) resources may be present along the river banks, flood plains, valley floors, and elevated river valley edges of the Saugeen and Teeswater rivers. MTCS Stage 2 archaeological assessments (property investigations) must be undertaken of all areas undisturbed by previous bridge and road construction that may be altered by: 1. bridge reconstruction or realignment; and 2. approach road modifications – be it widening or realignment, by either cutting or filling.

Initially, lands within proposed development areas that have not been disturbed by previous bridge and approach road construction must be identified as part of any future MTCS Stage 2 assessment. Then, appropriate archaeological investigative methodologies must be employed in those undisturbed areas to search for intact near-surface and deeply-buried archaeological resources.

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## Acknowledgements

The following individuals facilitated the completion of this study. Their various contributions have been greatly appreciated:

- Tarah Mahoney and Robert von Bitter [Ministry of Tourism, Culture and Sport (Toronto)]
- Stewart Morton [Hydro One Inc. (Toronto)]
- Kelly Vader [B.M. Ross and Associates Limited (Goderich)]
- Lauren Workman [Office of the Surveyor General, Ministry of Natural Resources (Peterborough)]

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## **1.0 Introduction**

The Ministry of Tourism, Culture and Sport (MTCS) divides the archaeological process as it relates to land use planning and development into four stages (MTC 2011):

### ***Stage 1 (Evaluation of Archaeological Potential)***

*Using landscape, archaeological, and historical information from the subject property and surrounding area, known and potential heritage resources within the subject property are identified and, where resources or potential exists, appropriate field investigative strategies are recommended.*

### ***Stage 2 (Property Assessment)***

*The field investigation is intended to provide an inventory of all archaeological sites within the subject property. If no cultural sites are located or if discovered sites are deemed not to be significant, development can proceed. Any archaeological site found during Stage 2 that is deemed to be culturally significant must, however, be subjected to a Stage 3 assessment.*

### ***Stage 3 (Site-Specific Assessment)***

*The purpose of a Stage 3 investigation is to obtain more detailed information about a site's size, structure, cultural affiliation, and artifact density. The results of the Stage 3 assessment are used to determine the site's heritage value. In instances where a site is not considered to be culturally significant, no additional archaeological investigation will be required. For sites considered to have a high level of heritage significance, a Stage 4 mitigative strategy must be developed.*

### ***Stage 4 (Mitigation of Development Impacts)***

*In development situations there are two options when dealing with archaeological sites that are considered to be culturally significant: the site can be protected by re-designing a development project or, if avoidance is not possible, the site must be completely excavated.*

This report presents the results of an MTCS Stage 1 evaluation of the potential for the presence of intact archaeological resources at six bridge locations in the Municipalities of Brockton (Brant Township and Greenock Township) and Arran-Elderslie (Elderslie Township), Bruce County (Maps 1-2). Recommendations for Stage 2 archaeological assessments at the Concession 20, Watson's, Dudgeon, 12<sup>th</sup> of Brant, McCurdy, and Big Irwin bridges and their immediate environs are provided.

The report conforms to content and style requirements of MTCS's *Standards and Guidelines for Consultant Archaeologists* (MTC 2011) -- including the placement of maps and images at the end of the report instead of at relevant places within the body of the report. Apologies to the reader.

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## **2.0 Project (Development) Context**

The County of Bruce's Bridge Infrastructure Master Plan is a multidisciplinary assessment of eight central Bruce County bridge locations. One component is the evaluation of the potential for the presence of Native and Euro-Canadian archaeological resources – eg., habitation, resource-procurement, ritual and burial sites, at the six bridge locations where there may be modifications to existing bridges and approaches (Concession 20, Watson's, Dudgeon, 12<sup>th</sup> of Brant, McCurdy, and Big Irwin) or where new crossings and approaches may be established (Dudgeon and McCurdy).

The bridges are situated along publicly-accessible town line and concession roads within the Municipalities of Brockton (Brant Township and Greenock Township) and Arran-Elderslie (Elderslie Township), Bruce County.

This Stage 1 archaeological assessment has been conducted for project engineers B.M. Ross and Associates Limited under archaeological consulting licence P097 issued by MTCS to Dr. William R. Fitzgerald in accordance with Part VI of the *Ontario Heritage Act* (Ontario 1990) – PIF # P097-058-2012 was assigned to this project by MTCS's Archaeology Licensing Coordinator on February 24, 2012.

## **3.0 Stage 1 Assessment: Evaluation of Archaeological Potential**

Generally, a Stage 1 evaluation of archaeological potential is based on: 1. archaeological context (i.e., landscape features and recorded archaeological sites within a study area and immediate vicinity); and 2. historical context (eg., an overview of the area's 19<sup>th</sup> and early-20<sup>th</sup> century Native and Euro-Canadian history derived, in part, from Crown treaties, provincial land surveyors' field notes and plans, township papers, census returns, county directories, and land registry records).

A more immediate and critical contributor for this Stage 1 assessment is the implementation of MTCS's optional property inspection (MTC 2011:15-16). It provides visual input about landscape and current conditions that can assist in the formulation of assessment strategies.

### **3.1 Archaeological Context**

MTCS defines landscape, resource, and cultural criteria that are to be considered when evaluating a property's archaeological potential (MTC 2011:17-18). Criteria relevant to this bridge master plan that indicate the potential for the existence of archaeological resources include:

1. proximity to primary water sources [eg., rivers];
2. presence of elevated topography [eg., river valley edges];
3. resource areas [eg., food, medicinal plants toolstone];
4. area of early Euro-Canadian settlement [eg., pioneer homesteads,

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schools, churches, cemeteries, mills, docks]; and

5. proximity to early historical transportation route [eg., roads, bridges].

Section 1.3 of MTCS's archaeological standards and guidelines declares that areas where archaeological potential has been identified, a Stage 2 archaeological assessment (property investigation) must be undertaken (MTC 2011:15).

Section 1.4.1 provides specifics – no areas within 300 metres of water sources, within 100 metres of early historic transportation routes, that possess of elevated topography, or contain natural resources can be exempted from Stage 2 archaeological assessment (property investigation)(MTC 2011:20-21), except where it can be demonstrated that landscape alterations would have destroyed archaeological resources (MTC 2011:18-19).

New bridge placements and road widenings or realignments into previously undisturbed areas must be assessed by Stage 2 property investigation.

It can, however, be accepted that the construction of the existing bridge and road footprints severely altered the original landscape, eliminating archaeological potential in these specific areas. For bridges whose structures will only be rehabilitated, the Central Bruce Bridge Infrastructure Master Plan bridge engineer has indicated that disturbances to adjacent landscapes would not extend further than three metres beyond the limits of existing wing walls, footings, or abutments (Kelly Vader, personal communication April 18, 2012). It can also be assumed that these peripheral areas would have been impacted when the original support structures were installed.

### **3.1.1 Landscape Features**

With the Central Bruce Bridge Infrastructure Master Plan being restricted to river crossings and their immediate approaches, the most critical and obvious landscape features to be considered when evaluating the potential for past cultural activity are the rivers – the Saugeen and Teeswater, and their valleys.

The Saugeen watershed covers an area of 4053km<sup>2</sup> – the main branch of the Saugeen River winds for 185km from its source near Dundalk to its mouth at Southampton on Lake Huron (Chapman and Putnam 1973:131). In places the Saugeen and its main tributaries – including the Teeswater [first known as the *Ah-shushki-sebi* or Muddy/Mud River (Brough 1850a)], flow through deep and broad valleys that were initially formed as the Laurentide ice sheet began its final, albeit spasmodic northward retreat from southern Ontario by 13,500 BC (Cowan and Pinch 1986; Lewis et al 2008:129; Sharpe and Edwards 1979).

Serving not only as an extensive transportation network that links vast tracts of the interior and Lake Huron, the rivers are a reliable and abundant source of food. Throughout the second half of the 19<sup>th</sup> century and into the 20<sup>th</sup> century, accounts abound of the Native and Euro-Canadian use of these waterways (The Paisley Advocate August 20, 1885, April 25, 1895, May 2, 1895; Robertson 1906:53-54, 59, 362, 383, 384, 490-492). As reported in the August 20, 1885 edition of *The Paisley Advocate*:



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*The Saugeen is still used as a sort of highway by the Indians, and occasionally a few specimens of the 'noble red man' with his birch bark may be seen paddling through town. On Tuesday morning a couple of them passed through on their way to the reserve near the mouth of the river, and the outlook for an enjoyable sail might incite the envy of most of their white brethren.*

As well, the immense and resource-rich Greenock Swamp that is drained by the Teeswater River continued to be used as a fall and winter hunting ground by the Saugeen Ojibway following the surrender of 1836 (cf., Brough 1850a; Johnston 1852:8-11).

Undoubtedly these waterways had served as transportation corridors and locations where fish were caught and other foodstuffs hunted and collected during the millennia prior to written records. Physical evidence of these activities – in the form of archaeological sites, should be abundant along the rivers' banks and within their valleys.

The May 2, 1895 edition of *The Paisley Advocate* described a scene just north of the Concession 20 bridge that likely would have taken place on countless occasions along the Saugeen River and its tributaries once the area became permanently ice-free about 13,000 thousand years ago:

*A large colony of Indians have taken possession of the "Forty Acres" just over the Willow Creek bridge and are busy making baskets, bows and arrows, rustic tables and chairs, axe handles, etc. The band numbers about twenty, and have been there about a month.*

*The little encampment in the woods and between the hills on Willow Creek is in a most delightful situation admirably adapted for their purposes. When the trees are illuminated by the blaze of the camp fires the effect produced as the firelight flickers and dances in the branches, on the water in the foreground and on the sombre wigwam and lighter tent in the rear is weird and charming and rouses the aboriginal instincts that lurk in almost every breast.*

### **3.1.2 Registered Archaeological Sites**

As of March 14, 2012, no Native or Euro-Canadian archaeological sites had been registered within MTCS's Ontario Archaeological Sites Database (OASD) within a two-kilometre radius of any of the bridges (Robert von Bitter, personal communication: March 14, 2012).

However, during the Stage 2 archaeological assessment of Hydro One Inc.'s Bruce to Milton Transmission Corridor Project three archaeological sites were located within the general study area (Map 3): 1. a ca. 3500-2500 BC Middle Archaic period campsite – Location 9 (BbHh-5), located atop the valley edge of the Teeswater River approximately 400 metres east of the Dudgeon Bridge; 2. a ca. 1500-500 BC Late Archaic/Early Woodland findspot – Location 8 (BbHh-4), located along a tributary of the Teeswater River approximately 1.9 kilometres east of the Dudgeon Bridge; and 3. a mid-19<sup>th</sup> to early-20<sup>th</sup> century Euro-Canadian homestead – Location 7 (BbHh-3), located along the 10<sup>th</sup> Concession of Brant, approximately 2.25 kilometres south of the 12<sup>th</sup> of Brant Bridge (Golder and Associates Ltd. 2009:48-54, Tile 16; 2010a: Tile

16, 2010b:91-94). None appear to have been entered within the OASD.

Also, there are significant registered archaeological sites along the Saugeen River downstream from the project area – eg., Thede and Donaldson, dating to the ca. 400 BC to AD 700 Middle Woodland period (cf., Finlayson 1977; Spence et al 1990). As noted above, into the 20<sup>th</sup> century, the Saugeen and Teeswater rivers continued to serve as inland transportation corridors and their valleys as sites for habitation and other cultural activities for Natives and Euro-Canadians alike.

The paucity of currently registered archaeological sites should not be considered as an indication of the extent of cultural activity within the Saugeen watershed following the final retreat of the Laurentide Ice Sheet about 13,000 years ago. Instead, it is a reflection of the lack of systematic archaeological investigation.

### 3.2 Historical Context

The study area is located within the Sauking (Saugeen Ojibway) Indian hunting territory south of the Bruce Peninsula that was surrendered to the “Great Father” (William IV) under the terms of Treaty No. 45½ on August 9, 1836 (Canada 1891:113)(Map 4).

Treaty No. 45½'s configuration is a byproduct of earlier historical events. What would eventually be defined as the southeast corner of Saugeen Ojibway hunting territory – the current intersection of Highway 6 and Wellington Road 109/Highway 9, had been established within Treaty No. 3 between the Mississauga and the Crown on December 7, 1792 as the endpoint of a 50-mile survey transect originating at the outlet of Burlington Bay into Lake Ontario (Canada 1891:5-7). This reference point was subsequently used in all major southern Ontario treaties of the late-18<sup>th</sup> and early-19<sup>th</sup> centuries.

On October 17, 1818, Treaty No. 18 conveyed a 1.592 million-acre tract of Chippewa lands within the northern section of the Home District to the Crown (George III)(Canada 1891:47). The treaty area's western limit was defined by a line projecting northward ( 15'W) from the 1792 50-mile endpoint – now beginning as County Road 14, to Vail's Point on Georgian Bay. This line, by default, would later serve as Treaty o. 45½'s eastern limit.

On April 26, 1825, Treaty No. 27½ surrendered and conveyed another substantial section of Chippawa territory to the Crown (George IV)(Canada 1891:65-67). This time the future intersection of Highway 6 and Highway 9/Wellington Road 109 served as the treaty area's northeast corner of reference -- the northern limit of the surrender stretched westward ( 5W) from the 1792 50-mile endpoint to a point on Lake Huron 10¾ miles north of the mouth of the William FitzWilliam Owen's Red River. By 1 2 it was known as the Menesetunk River – today it is the Maitland River. This line would in 1836 serve, also by default, as the southern boundary of Saugeen Ojibway territory.

**NOTE:** *Today, the Saugeen Ojibway Nation claim their traditional territory extends southward into Treaty 27½ lands to include the entirety of the Maitland River watershed and eastward into Treaty 18 lands as far as the main branch of the Nottawasaga River.*

With the colonial government's desire to expedite the opening of the newly-acquired Treaty 45½ lands – the "Queen's Bush", for Euro-Canadian settlement and commerce, routes were initially scouted for roads that would link Oakville and Toronto to the head of Owen's Sound (Sydenham) on Georgian Bay (Map 5).

The first was a route surveyed in 1837 by Charles Rankin that would serve as the northern extension of the Oakville-Owen's Sound Road between the northwest corner of Wellington County's Garafraxa Township – the aforementioned 1792 "50-mile endpoint", and the east side of the head of Owen's Sound (Rankin 137, 141). In 140 and 141 John McDonald formalized Rankin's route and established 50-acre free land grants on either side of it to entice settlers and as means to open the road (McDonald 1840a, 1840b, 1842a, 1842b). This route became more popularly known as the Garafraxa Road – today it is the stretch of Highway 6 between Arthur and Owen Sound.

Another colonisation road was ordered in 1848 to link Hurontario Street in Nottawasaga Township (Simcoe County) and the mouth of the Penetangore River on Lake Huron (Robertson 1906:529)(Map 5). This east-west road crossed the north-south Garafraxa Road at the reserve for the future town of Durham (Gibson 1849) – hence the road's name. Allan Park Brough surveyed the western section of the Durham Road – between Garafraxa Road and the mouth of the Penetangore, between 1848 and 1850 (Brough 1849, 1850a). As with the Garafraxa Road, 50-acre free land grants were offered along sections of the Durham Road that passed through the future townships of Bentinck, Brant, Greenock, Kinloss, and Kincardine. Two town reserves were set aside by Brough along the western section of the Durham Road: Penetangore at the road's western terminus (present-day Kincardine); the other straddling the Brant-Greenock town line (never established). Today the western section of the Durham Road is better known as Grey/Bruce Road 4 between Durham and Walkerton and Highway 9 between Walkerton and Kincardine.

With the completion of the survey of the Durham Road, the lands on either side of the road and its free grants – and further into the interior, began in 1850 to be divided into townships and farm lots. Included amongst these are the townships that are part of the Central Bruce Bridge Infrastructure Master Plan: Brant, Elderslie, and Greenock.

Labelled on his 149 plan of the western section of the Durham Road was a "*proposed road to the Saugeen*" (Brough 149)(Map 6). As originally planned, the Saugeen Road was to be the northern extension of the Elora Road that had its origin just north of Guelph in Elora. It entered Bruce County at its southeast corner and passed diagonally (northwesterly) through Carrick Township to the corner where the four townships of Carrick, Culross, Brant, and Greenock join. From this intersection it was to turn northward following the boundaries between Brant and Greenock townships – perpendicularly crossing the Durham Road and passing through Brough's eastern town reserve, and further north the Elderslie-Saugeen town line until it reached the Saugeen River. Its ultimate end point was to be the town reserve at the mouth of the Saugeen River on Lake Huron (the future site of Southampton)(Map 5).

Between June 16 and July 27, 1850, Allan Park Brough completed the survey of the remainder of Brant Township (Brough 1850b, 1850c; Quinsey 1997:64)(Map 7).

As part of his April 7 to August 26, 1851 survey of Saugeen Township, Alexander Vidal established a range of lots on either side of the proposed route of the Saugeen and Elora

Road in Elderslie and Greenock townships (Quinsey 1997:219; Vidal 1851)(Map 8). Robert Walsh surveyed the remaining areas of Greenock Township between May 26 and October 6, 1851 (Quinsey 1997:221; Walsh 1852a, 1852b)(Map 9). Between May 15 and November 3, 1851, George McPhillips surveyed the remainder of Elderslie Township (McPhillips 1852a, 1852b; Quinsey 1997:160).

The surveyors who laid out Brant, Greenock, and Elderslie townships must have reported to the Commissioner of Crown Lands the challenges of constructing the Saugheen and Elora Road along the town lines of the townships in the vicinity of the confluence of the Teeswater and Saugheen Rivers. On July 14, 1851 – likely due to the meandering of the Teeswater River and large number of crossings that would have to be constructed, George McPhillips was instructed to:

*...mark out a line for a road from the rear of Brant to the Saugheen River in Elderslie,...selecting the best site for bridges over the Mud River and River Saugheen, and making the necessary sinuosities to avoid hills and swamps (Robertson 1906:369).*

McPhillip's Saugheen and Elora Road deviation through Elderslie Township – now part of Bruce Road 3, avoided river crossings until it reached the confluence of the Teeswater and Saugheen rivers at the town reserve of Paisley (Map 10). Not only did the route of the Saugheen and Elora Road deviate eastward from the Greenock-Elderslie town line, within Brant Township its route was shifted eastward from the Greenock-Brant town line to the road right-of-way along the east side of Brant Concession B (Map 7).

To facilitate the movement of settlers into Elderslie Township, tenders for the opening of the Concession B Saugheen and Elora Road through Brant Township were requested on July 14, 1851 – the route was cleared that year (Robertson 1906:52-53).

With the completion of the township surveys and the opening of the Durham Road and Saugheen and Elora Road, notification of the sale of Bruce County School Lands – which included Brant and Elderslie townships, was issued on July 30, 1852 (Robertson 1906:535-536). Greenock Township lots became available for purchase as part of the “Big Land Sale” beginning on September 27, 1854 (Robertson 1906:536-537).

Amongst a series of roads recommended for opening by the Minister of Agriculture in 1853 were the Saugheen and Elora Road and a road along the Brant-Elderslie and Bentinck-Sullivan town lines that would connect the Saugheen and Elora Road with the Garafraxa Road (Highway 6) at the present site of Dornoch (Map 5). As of September 30, 1854, both roads were scheduled to be open to travel on January 1, 1855 (Robertson 1906:64-66).

Today, Brough and Vidal's originally-proposed route of the Saugheen and Elora Road is a series of town lines of varying quality whose northern end is Greenock Township's Concession 20 Road – the road having never been pushed through to the town reserve of Paisley. Watson's and Dudgeon bridges are located along this original route; the Concession 20 Bridge lies to its immediate west in Greenock Township (Maps 7-10).

The Big Irwin Bridge crosses the Teeswater River along the Brant-Elderslie town line between the proposed and ultimate Saugheen and Elora roads. The McCurdy and 12<sup>th</sup> of Brant bridges

cross the Saugeen River along the Brant-Elderslie town line and Brant Township's Concession 12 Road, respectively (Maps 7 and 10).

While river crossings initially were to be situated within the roads' right-of-ways, two of the crossings in the study area – Dudgeon and McCurdy, had to deviate slightly from the straight-line survey transects to accommodate landscape features. The 1880 plans of Brant and Elderslie depict the pronounced deviation of the McCurdy Bridge into Elderslie Township (Belden 1880)(Maps 11-12).

A detailed architectural and historical report of the individual bridges has been produced as part of the Central Bruce Bridge Infrastructure Master Plan (Golder and Associates Ltd. 2012).

### **3.3 Analysis and Conclusions**

Archaeological and historical evidence reveals that the rivers and valleys of the Teeswater and Saugeen rivers have served as travel corridors for Native groups for millennia and Euro-Canadians since the mid-19<sup>th</sup> century. Not unexpectedly, the potential is high that cultural heritage resources – eg., habitation, resource-procurement, ritual and burial sites, exist in the areas between the rivers' banks and their valley edges. Active archaeological sites could potentially date from the first appearance of Paleo-Indian bands into the sub-arctic landscape of this part of the province about 11,000 years ago (Ellis and Deller 1990:39) up until and – as historically documented, following the appearance of Euro-Canadian surveyors and settlers after the Saugeen Ojibway surrender of August 9, 1836.

### **3.4 Field Methods: Property Inspection**

As presented in Section 3.1, MTCS Stage 2 archaeological assessments (property investigations) would be required at the six bridge locations if: 1. modifications to existing bridges and approaches (Concession 20, Watson's, Dudgeon, 12<sup>th</sup> of Brant, McCurdy, and Big Irwin) would impact landscapes previously undisturbed by initial bridge and approach construction, or 2. where new crossings and approaches may be established (Dudgeon and McCurdy).

An MTCS optional Stage 1 property inspection of those localities on March 1 and March 22, 2012 provided visual input about landscape and current conditions that can assist in the formulation of Stage 2 assessment strategies.

#### **3.4.1 Concession 20 Bridge** (Images 1-4)

Both the steep western approach and more gentle eastern approach to the Concession 20 Bridge cut through the valley edge of the Teeswater River. Concrete footings and fill – likely from those cuts, has raised the elevation of the river banks where the bridge crosses. If widening of the approaches or improvement of bridge footings – either by cutting or filling, extend beyond the current limits into undisturbed valley edges and terraces or river banks, potentially impacted wooded areas and meadows must be rigorously shovel test-pitted. Especial attention must be paid to the slumping/eroding bank on the northwest side of the bridge.

**3.4.2 Watson's Bridge** (Images 5-7)

Currently the Teeswater River flows along the pronounced southern edge of the river valley. The northern approach to Watson's Bridge runs across the floor along an elevated roadway (Greenock-Elderslie town line). The bridge is located at the base of the valley edge through which its steep southern approach cuts.

If fill is added to widen the northern approach, the meadow to the east and the agricultural field to the west will have to be assessed – either by shovel test-pitting or pedestrian survey if the areas are ploughable. If the southern approach is widened, any wooded areas, meadows, or manicured lawns atop and below the valley edge that might be impacted by cutting to the east and west must be shovel test-pitted.

**3.4.3 Dudgeon Bridge** (Images 8-11)

Here also the Teeswater River flows along the pronounced southern edge of the broad river valley. The development plan is to relocate the Dudgeon Bridge 30 metres to the east and realign both approaches – all proposed activities will cause major landscape alterations.

Substantial infilling across the current agricultural field will presumably be required to elevate the new northern approach across the valley floor. Before any capping occurs that area will have to be ploughed and its weathered surface be inspected for cultural material by pedestrian survey.

The eroding northern river bank will also require visual inspection – the narrow wetland on the southern side of the river is unlikely to possess archaeological potential. The new southern approach will cut through the steep valley edge – the wooded area atop the valley will have to be shovel test-pitted and the adjacent agricultural field will have to be ploughed, weathered, and visually inspected.

**3.4.4 12<sup>th</sup> of Brant Bridge** (Images 12-15)

The Saugeen River valley at the 12<sup>th</sup> of Brant Bridge is narrow but deep. The western approach cuts through a steep slope whose grade has been reduced by infilling towards and along the river bank. While the valley slope is less pronounced on the east side of the river, the horizontal extent of fill is greater due to a low, wet area that extends eastward from the river.

If the approaches are widened outside of the current roadway – especially the western approach, shovel test-pitting will have to be undertaken in undisturbed areas where the valley edges will be cut through or the valley bottom infilled. Both banks of the river are currently eroding – if the current bridge footings are to be repaired or rehabilitated, bank areas undisturbed by previous bridge construction must be examined.

**3.4.5 McCurdy Bridge** (Images 16-21; Maps 11-12)

Currently the McCurdy Bridge and its approaches deviate from the Brant-Elderslie town line northward into Elderslie Township. Two options have been proposed for upgrading this Saugeen River crossing: the preferred being the improvement of the current route; the other to establish a new crossing along the unopened Brant-Elderslie road allowance.

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The western approach to the existing bridge cuts deeply through the steep valley edge. The eastern approach through the valley floor runs along a greatly elevated road bed. Both river banks are eroding. If either of the approaches requires widening by cutting or filling or the bridge's footings will be modified, appropriate MTCS Stage 2 assessment of areas undisturbed by past bridge and road construction will have to be undertaken. On the west side of the river, cutting back either approach road slope further into the valley top would require bush areas to be shovel test-pitted and agricultural fields to be ploughed and their surfaces inspected. On the east side, low-lying wooded and scrub areas agricultural fields would have to be similarly investigated. The eroding river banks would need to be subjected to particular scrutiny.

If, however, a new McCurdy Bridge and approaches were to be established to the south along the Brant-Elderslie town line, extensive landscape modification would be required and, concomitantly, potential impacts to archaeological resources would be greatly increased. The western approach would pass/cut through a flat agricultural field and wooded valley crest and steep slope. The eastern approach – currently wooded, would presumably have to be substantially infilled as is the present eastern approach. All areas along this route would have to be thoroughly investigated using appropriate Stage 2 assessment techniques – included might be areas between the new town line route and the existing Elderslie deviation.

#### **3.4.6 Big Irwin Bridge (Images 22-24)**

The eastern approach to the Big Irwin Bridge crosses the broad valley floor of the Teeswater River along an elevated roadway that includes the Little Irwin Bridge. The river flows – and the Big Irwin Bridge is located, at the base of the valley's steep western slope. The western approach cuts through the valley edge.

If the eastern approach is to be widened by infilling, the meadows on either side of the existing roadway will have to shovel test-pitted. Any widening of the western approach will require shovel test-pitting in scrub areas and surface inspection of ploughed agricultural fields alongside currently unmodified sections of the valley edge.

## **4.0 Summary and Recommendations**

As part of the central Bruce County Bridge Infrastructure Master Plan, six bridge locations along the Saugeen and Teeswater rivers in the Bruce County municipalities of Brockton and Arran-Elderslie – Concession 20, Watson's, Dudgeon, 12<sup>th</sup> of Brant, McCurdy and Big Irwin, are being considered for repair, rehabilitation, relocation, or retirement.

Based on landscape, archaeological, and historical evidence presented in this Ministry of Tourism, Culture and Sport (MTCS) Stage 1 archaeological assessment, potential exists that Native and Euro-Canadian cultural heritage (archaeological) resources may be present along the river banks, flood plains, valley floors, and elevated river valley edges of the Saugeen and Teeswater rivers. MTCS Stage 2 archaeological assessments (property investigations) must be undertaken of all areas undisturbed by previous bridge and road construction that may be altered by: 1. bridge reconstruction or realignment; and 2. approach road modifications – be it widening or realignment, by either cutting or filling.

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Initially, lands within proposed development areas that have not been disturbed by previous bridge and approach road construction must be identified as part of the Stage 2 assessment. Then, appropriate archaeological investigative methodologies must be employed in those undisturbed areas – as outlined and described in Section 3.4, to search for intact near-surface and deeply-buried archaeological resources.

It is requested that the Ministry of Tourism, Culture and Sport issue a letter concurring with the following recommendations:

1. conduct MTCS Stage 2 archaeological assessments (property investigations) of the Concession 20, Watson's, Dudgeon, 12<sup>th</sup> of Bruce, McCurdy, and Big Irwin bridge locations and approaches if improvement or route modification would impact previously undisturbed landscape; and
2. accept this report into the Ontario Public Register of Archaeology Reports.

## **5.0 Advice on Compliance with Legislation**

Section 7.5.9 of the *Standards and Guidelines for Consultant Archaeologists* requires that the following information be provided for the benefit of the proponent and approval authority in the land use planning and development process (MTC 2011:126-127).

1. This report is submitted to the Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c. 0.18. 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 Ministry of Tourism, Culture and Sport, 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

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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 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries and the Ministry of Consumer Services.

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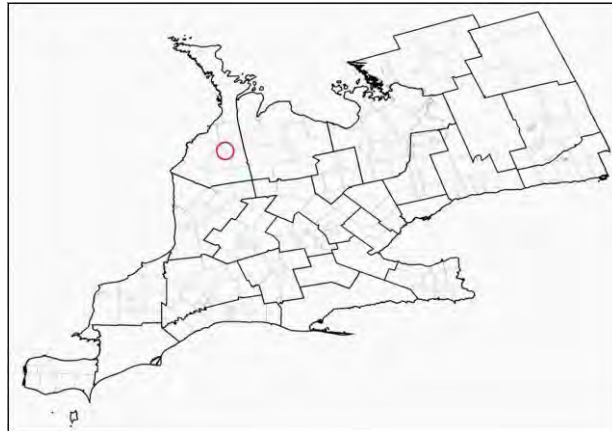
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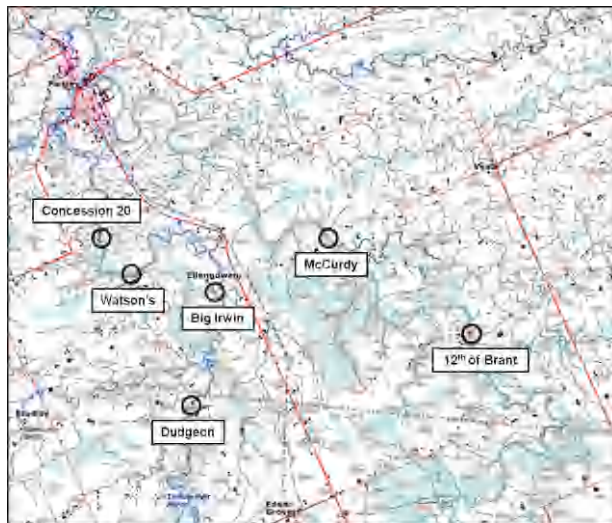
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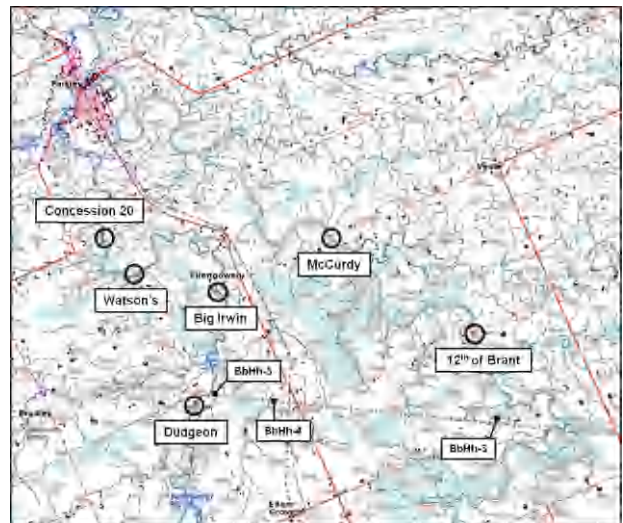
## 7.0 Maps



**Map 1.** Study area location



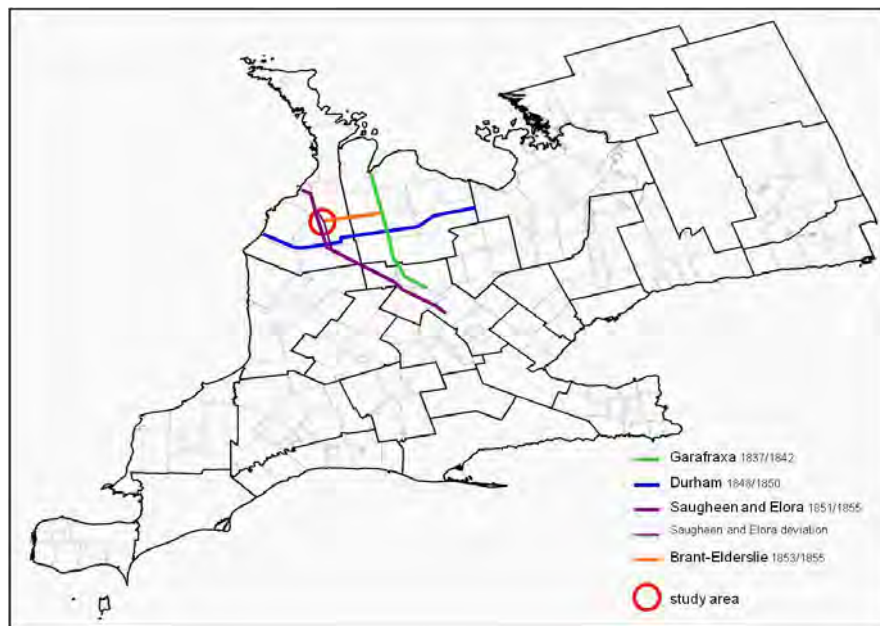
**Map 2.** Stage 1 archaeological assessment bridge locations



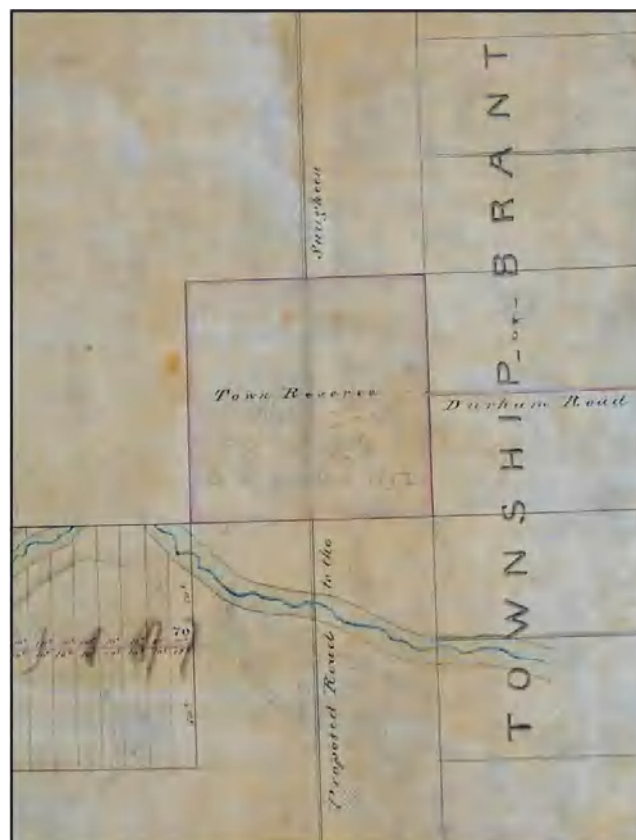
**Map 3.** Bridge locations and registered archaeological sites



**Map 4.** Nineteenth century treaty areas

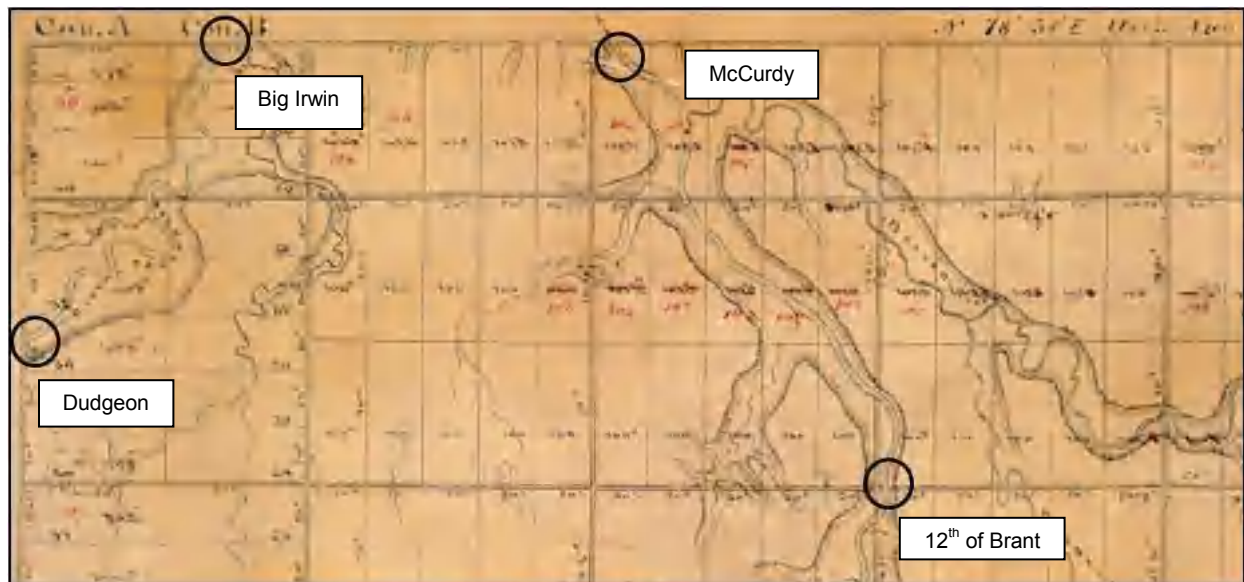


**Map 5.** Colonisation roads

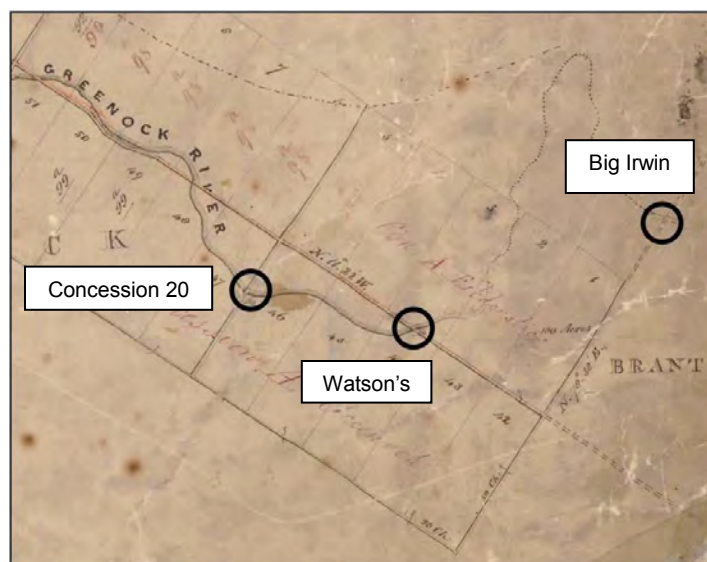


**Map 6.** Section of western segment of Durham Road  
(Brough 1849)

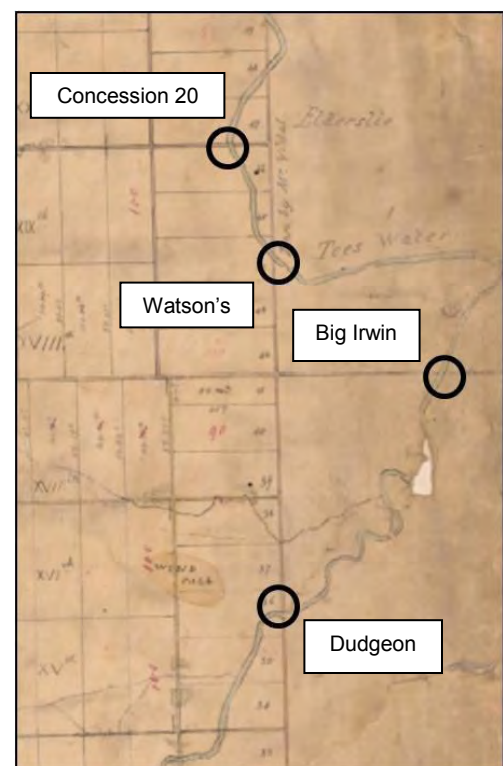




**Map 7.** Section of Brant Township (Brough 1850b)

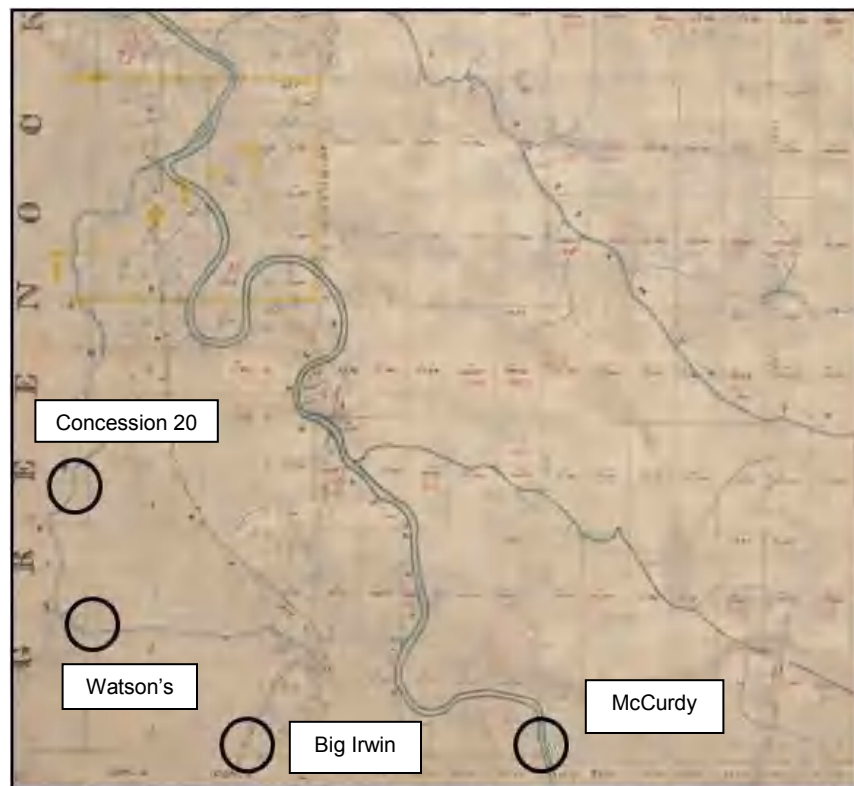


**Map 8.** Sections of Saugeen, Elderslie and Greenock Townships (Vidal 1851)

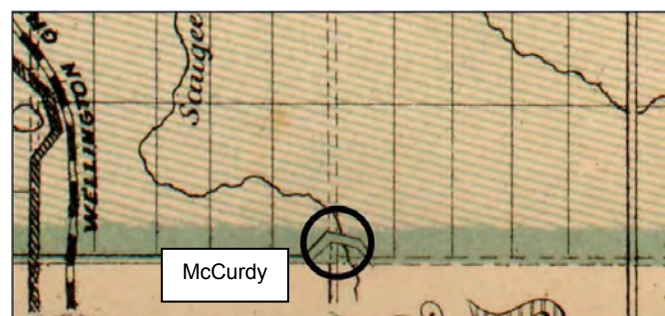


**Map 9.** Section of Greenock Township (Walsh 1852a)

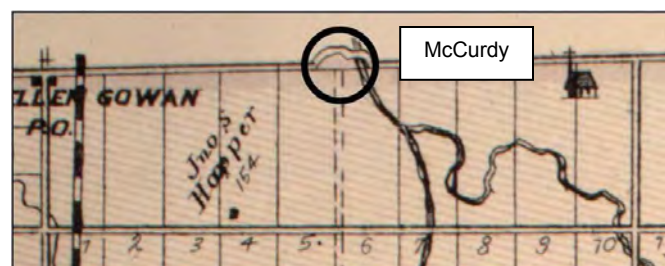




**Map 10.** Section of Elderslie Township (McPhillips 1851a)



**Map 11.** Section of Elderslie Township (Belden 1880)



**Map 12.** Section of Brant Township (Belden 1880)

## 8.0 Images



**Image 1.** Aerial view of Concession 20 Bridge [with directions of Images 2-4]



**Image 2.** Cut western approach to Concession 20 Bridge



**Image 3.** Elevated eastern approach to Concession 20 Bridge



**Image 4.** Eroding west bank of Teeswater River



**Image 5.** Aerial view of Watson's Bridge [with directions of Images 6-7]



**Image 6.** Elevated northern approach to Watson's Bridge



**Image 7.** Cut southern approach to Watson's Bridge





**Image 8.** Aerial view of Dudgeon Bridge and proposed realignment [with directions of Images 9-11]



**Image 9.** Elevated northern approach to Dudgeon Bridge



**Image 10.** North bank of Teeswater River



**Image 11.** Deviated cut southern approach to Dudgeon Bridge



**Image 12.** Aerial view of 12<sup>th</sup> of Brant Bridge [with directions of Images 13-15]



**Image 13.** Cut and elevated eastern approach to 12<sup>th</sup> of Brant Bridge



**Image 14.** Cut western approach to 12<sup>th</sup> of Brant Bridge



**Image 15.** West bank Saugeen River





**Image 16.** Aerial view of McCurdy Bridge and proposed realignment [with directions of Images 17-21]



**Image 17.** Eastern approach to McCurdy Bridge and original road allowance



**Image 18.** Elevated eastern approach to McCurdy Bridge



**Image 19.** Saugeen River crossing area of original road allowance



**Image 20.** Cut western approach to McCurdy Bridge



**Image 21.** Proposed western approach along original road allowance



**Image 22.** Aerial view of Big Irwin Bridge [with directions of Images 23-24]



**Image 23.** Elevated eastern approach to Big Irwin Bridge



**Image 24.** Cut western approach to Big Irwin Bridge



**APPENDIX F:**  
**INITIAL CONSULTATION (PIC NO.1): EASELS – JUNE 4, 2018**

# GREENOCK BRIDGE No.0011

## MUNICIPALITY OF BROCKTON

### Municipal Class Environmental Assessment Schedule 'B' Phase 2 Consultation

June 4, 2018: 6:00 to 7:00 pm



## ISSUES IDENTIFIED

1. Aging bridge is in poor condition.
2. Municipality has been advised that major bridge works should be completed in the short-term to avoid bridge closure.
3. Bridge experiences relatively low volumes of traffic.
4. Bridge is considered to have Cultural Heritage Value.



# PROJECT STATEMENT

Inspection Reports for the aging Greenock Bridge No.0011 note advanced deterioration of the super-structure and sub-structure to a point where the bridge may no longer be able to fulfill its intended function and, therefore, consideration should be given to addressing a long term solution.



Warren Steel Pony Truss Bridge (Single Span of 30.9 meters).



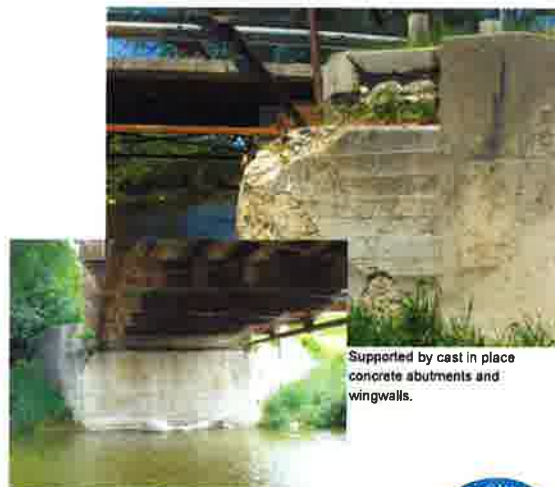
Sleep Approaches to the Bridge.



Steel floor beams and stringers supporting a wood deck.



Built by the Hamilton Bridge Company.




Supported by cast in place concrete abutments and wingwalls.

# ALTERNATIVES

## 1. Do Nothing:

- \* Would not address the identified problem.
- \* Complete bridge closure would likely occur within 5-years.

## 2. Rehabilitate the Existing Structure:

- \* Would extend the useful life of the bridge.
- \* Short-Term Costs: Repair  Replace.
- \* Would result in a greater number of bridge closures at different stages (i.e. load-postings and repairs).

## 3. Replace the Existing Structure:

- \* Useful Life-Span of Bridge: Repair  Replace
- \* Provides opportunity for improvements to transportation systems.
- \* Overall impact would be influenced by several factors. Therefore, three bridge replacement options are considered:
  - Option 1: Single Span & Single Lane
  - Option 2: Single Span & Two Lane
  - Option 3: Multiple Span

## 4. Bridge Removal:

- \* In consideration of the relatively small volume of traffic and the long bridge span, this alternative considers the costs of maintaining the bridge relative to the benefits.
- \* Bridge removal would require road closure with turn-around opportunities on each side.

# PRELIMINARY EVALUATION OF ALTERNATIVES

Preliminary impact assessment for each alternative completed by providing a relative ranking of the Alternatives:

Relative Ranking System (Least Favoured to Most Favoured)



ENVIRONMENT	ALTERNATIVE						
	1	2	3			4	
	DO NOTHING	REPAIR	REPLACE			REMOVE	
			Option 1 Single Span Single Lane	Option 2 Single Span Two Lane	Option 3 Multiple Span		
Natural Environment	Avoidance is more favourable than activity, for example:  i) Alteration to fish habitat (i.e. centre pier or footing)  ii) Effect on site hydraulics (i.e. flow constriction or increased fill in floodplain)	6	4	3	2	1	5
Social Environment	A greater number of uses (i.e. local, commuter, agricultural, emergency) is considered more favourable.	2	3	4	6	5	1
Cultural Environment	The bridge retains cultural heritage value. Impacts become greater as bridge alterations become more pronounced.	6	5	4	3	2	1
Technical Environment	Considers road and bridge design parameters, floodplain impact, constructability and sustainability.	1	3	4	5	2	6
Economic Environment	Considers relative construction costs and longer-term operating and maintenance costs.	1	4	5	3	2	6
OVERALL		16	19	20	19	12	19

# PRELIMINARY RECOMMENDED SOLUTION

## HIGHEST RANKING

### Bridge Replacement: Option 1 (Single Span & Single Lane)

## RUNNER'S UP

Alternative 2: Bridge Repair

Alternative 3: Bridge Replacement (Option 2)

Alternative 4: Bridge Removal

**Therefore, comments received during the consultation process will provide important feedback to further inform the ultimate Preferred Solution.**

## KEY CONSIDERATIONS

CONSIDERATIONS	ALTERNATIVES		
	(2) REPAIR	(3) REPLACE	(4) REMOVE
<b>Budget Implications:</b>			
Short-Term	↔ (Moderate)	↓ (High)	↑ (Low)
Maintenance/Ongoing	↓ (High)	↑ (Low)	- Nil -
<b>Bridge Usage:</b>			
Local Vehicular Traffic	↑	↑	↓
Emergency	↓	↑	↓
Large and/or Agricultural	↓	↑	↓
<b>Estimated Useful Lifespan of Bridge:</b>			
10 to 30 Years	↑	↑	Not Applicable
30 to 75 Years	↓	↑	Not Applicable

**HOW IMPORTANT TO YOU ARE EACH OF THESE FACTORS?**



# NEXT STEPS

## ENVIRONMENTAL ASSESSMENT: PROCESS AND TIMELINE

### PHASES 1 and 2

- ☑ a) Publish *Notice of Project Initiation* May 17, 2018
- ☑ b) Circulate Project File (Version1) May 17, 2018
- ☑ c) Hold Public Information Centre (*PIC No.1*) June 4, 2018
- d) Public, Stakeholder and Agency Comment Period June 22, 2018
- e) Incorporate comments and new information received into the Project File and update the *Recommended Solution*. July/August 2018
- f) Municipal Council Selection of *Preferred Solution* (Completes Phase 2). Summer/Fall 2018

*\* Assuming Recommended Solution is Selected by Council:*

- g) Circulate the *Notice of Completion* for Schedule B EA Process. Fall 2018
- h) 30-Day Public Review Period Fall 2018
- i) If no Part II Order Request is received, the EA Process is completed and the project may proceed (i.e. design, approvals, construction). Fall 2018 and Spring-Fall 2019

### - YOUR INPUT IS IMPORTANT -

Comment Sheets are Available at this Public Information Centre (PIC)  
Comments may also be provided by E-mail.

Comments will be received by the Project Team until:

**June 22th, 2018**

*\*With the exception of personal information, all comments will become part of the public record of the study\**





**APPENDIX G:**  
**PUBLIC AND AGENCY COMMENTS (JUNE TO DECEMBER 2018)**

## SUMMARY OF PUBLIC COMMENTS RECEIVED FOLLOWING PIC No. 1 (June 2018)

No.	Date	Comments (recorded sic erat scriptum)
1	6-Jun-18	<p>Who Am I?  I am Greg Hutton  - President &amp; owner of Lloyd Hutton Transport Limited, a 3rd Generation trucking company since 1945  - Owner of Hutton Land &amp; Cattle, farming 1000 acres within 5 miles of the bridge on both sides</p> <p>It is my opinion the bridge should not be removed, it must be repaired or replaced. It provides a favoured transit link from Bruce County road #1 to Bruce Road #3  - Bruce Road #1 from Conc 20 to Conc 22 is a very treacherous road in the winter time with high banks and snow blowing in. Limited visibility due to blowing snow. The bridge is a much favoured route by commuters in the winter time, due to this, to get to County road #3. I have spoken with my staff regarding their route of choice to get to work and they have confirmed that they chose this route both summer and winter. They also added that they see others use this road when driving to work.</p> <p>- I farm and own land on both sides of the bridge and use it many times each day travelling from farm to farm.</p> <p>- As this is at the outside perimeter of our municipality and viewed as low traffic does not mean it can just be avoided and not properly funded to be replaced.</p> <p>- I believe in heritage and preserving our history, but when the bridge was built many years ago the vehicles and traffic were quite different than today. I believe the best option would be to lift out the old bridge and have it displayed at the Grey -Bruce museum with other historical items or moved to Paisley and set up as a walking bridge. Then replace the bridge with a new up-to-date one to accommodate today's vehicles and equipment.</p> <p>- This infrastructure was considered in a different era and the world today is a much different place. This is an opportunity to make an investment <u>today</u> in something that will benefit us and the future generations for many decades.</p> <p>I respectfully ask that my thoughts are considered, rural Ontario requirements should be considered just as important as in town requirements. This bridge is very important to the area where it was built and the requirements are just as important today as when it was originally built.</p> <p>Thank you for your consideration to my concerns!</p>
2	8-Jun-18	<p>Back a few months, a one-lane bridge was approved and passed by Council. By Discussion in 1985-1986 about this very bridge - at that time a 90-70 Grant on bridges - County Road 1 at the notherly end is very bad in winter time - a lot of drivers use that bridge in winter. We have been paying taxes for 60+ years now we require a new bridge. It is a wonder there has not been a bad accident on this road.</p> <p>I as a resident of Greenock DO NOT want this road <u>closed</u> and please listen Council.</p>

## SUMMARY OF PUBLIC COMMENTS RECEIVED FOLLOWING PIC No. 1 (June 2018)

No.	Date	Comments (recorded sic erat scriptum)
3	11-Jun-18	<p>I attended the public meeting on Monday June 4 in Cargil. It was informative and there was good conversation. Following are comments I would like to submit.</p> <p>Subject: Comments</p> <p>I believe Greenock Bridge No.0011 is important should not be removed. I would like to add some points that did not seem to appear on the presentation June 4.</p> <ol style="list-style-type: none"> <li>1. Paisley only has one bridge going north/south and if it is not available it is already a long detour - which does affect emergency services. Timing is important. If this bridge is removed, the detour would be even greater.</li> <li>2. In the winter, snow storms on County Road 1 from the top of the hill in Paisley until it meets Concession 20 cause severely reduced visibility. Some people use Con 2A/20 and this bridge as an alternate route. Also because many roads are closed (not maintained) in the winter, closing yet another bridge/road makes it even more difficult for alternate routes and emergency access.</li> <li>3. In the spring, if there is extensive flooding at the mill, this road/bridge is used as an alternate route.</li> <li>4. I would advocate for a 2-lane bridge, then perhaps some of the large farm machinery would not have to go through town (maybe even some trucks). If both of the approaches were also improved, it is likely more people would use it. I know people are intimidated with a single-lane bridge between two hills, one that is particularly steep. When the trees are in full leaf, overhanging branches also reduce visibility. So if one is approaching from County Road 1, there is a steep hill and a single lane bridge at the bottom and they can't see what lies beyond, I don't doubt there are those who turn around. These are factors that affect usage of the bridge.</li> </ol> <p>Before my retirement, I used that bridge at least twice / day to get to/from work. I still use it quite often.</p> <p>I understand that bridges are aging and expensive to replace and this region has many due to multiple rivers and streams we are blessed to have in this area, but we have to be prudent about how many access routes are removed from service and how it affects the safety of our communities. We already have many roads that are dead ends, closed or not maintained in the winter.</p> <p>Thank you,</p>
4	18-Jun-18	<p>Our property that we live in has 7 acres roughly that is on the other side of the Teeswater River. We use this bridge as a way of accessing that piece of bush. We use that property for wood. If the bridge is taken out it makes the trip over to there a long trek by tractor.</p> <p>We also use this bridge in the winter quite often when weather is bad. Between our house &amp; the Convent Centre is a very rough section to travel through because of very little visibility to nil.</p>
5	18-Jun-18	<p>Crossing this bridge gives me access to the back of Lot 48 Con A. This bridge is a alternative route to town in the winter.</p>
6	18-Jun-18	<p>My concern is if you close that bridge it is an alternate route out to Bruce County Road 3 in the winter time. If there is a wind from the west Bruce Road 1 is not safe if going to Paisley. Also it is an alternate route for emergency vehicles to come in to Bruce Road 1 from Bruce Road 3.</p>
7	22-Jun-18	<p>I am writing in regards to the aging bridge (11) located on Concession 20(2A) in Greenock.</p> <p>I am the owner of ..... and have land on both sides of the Teeswater river. Therefore the decision impacting this bridge will greatly affect myself as well as the surrounding neighbours, farmers, friends.</p> <p>That being said after listening to the presentation given to us on June 4th in Cargill my feedback would be either complete the replacement with a new 2-lane bridge that would be up to proper (Including looking at the challenge of the slope of the road) specifications OR to go with <b>option D</b> and close the bridge permanently.</p>

## Drea Nelson - GM BluePlan

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**Subject:** FW: 212328 - Notice of Project Initiation & Project File - Sch. B EA Greenock Structure No.0011

**From:** Kevin Schimus [<mailto:kschimus@uniongas.com>]

**Sent:** Thursday, May 17, 2018 9:33 AM

**To:** Melissa Zammit - GM BluePlan; John Slocombe - GM BluePlan; John Strader ([jstrader@brockton.ca](mailto:jstrader@brockton.ca))

**Cc:** [swatson@brockton.ca](mailto:swatson@brockton.ca); [sjohnson@brockton.ca](mailto:sjohnson@brockton.ca)

**Subject:** RE: 212328 - Notice of Project Initiation & Project File - Sch. B EA Greenock Structure No.0011

Good morning,

Thank you for notice of project.

Union Gas does not have any infrastructure in this area. No comments or concerns. Union Gas can be removed from project distribution list going forward.

Regards,

**Kevin Schimus**

**Project Manager**

Union Gas Limited | An Enbridge Company

Tel: 519-885-7400 ext 5067506 | Cell: 519-635-9488

603 Kumpf Drive | Waterloo, Ontario N2V 1K3

[kschimus@uniongas.com](mailto:kschimus@uniongas.com) | [uniongas.com](http://uniongas.com)

---

**From:** Melissa Zammit - GM BluePlan [<mailto:Melissa.Zammit@gmblueplan.ca>]

**Sent:** May 17, 2018 8:46 AM

**To:** John Slocombe - GM BluePlan; John Strader ([jstrader@brockton.ca](mailto:jstrader@brockton.ca))

**Cc:** [swatson@brockton.ca](mailto:swatson@brockton.ca); [sjohnson@brockton.ca](mailto:sjohnson@brockton.ca)

**Subject:** [External] 212328 - Notice of Project Initiation & Project File - Sch. B EA Greenock Structure No.0011

Good Morning,

Please find attached Notice of Project Initiation for the Schedule "B" Municipal Class Environmental Assessment for Greenock Structure No. 0011, located within the Municipality of Brockton.

The Schedule "B" Environmental Assessment Project File is available for viewing can be accessed/saved by clicking on the link below. This link will be valid for 14 days.

[https://sendafile.gmblueplan.ca/uploads/05-17-18\\_084117\\_212328 - Sch B EA Project File - Greenock Bridge No. 0011 - May 2018.pdf](https://sendafile.gmblueplan.ca/uploads/05-17-18_084117_212328_-_Sch_B_EA_Project_File_-_Greenock_Bridge_No._0011_-_May_2018.pdf)

The Municipality of Brockton has the Project File posted on their website for viewing purposes as well.

Please contact John Strader (Municipality of Brockton) and/or John Slocombe (GM BluePlan Engineering) at the addresses listed on the Notice of Project Initiation, with any questions or comments regarding this project.

Best Regards,

**Melissa Zammit**

Administrative Assistant

**GM BluePlan Engineering Limited**

1260-2<sup>nd</sup> Avenue East | Owen Sound ON N4K 2J3

t: 519.376.1805 ext. 2238

[melissa.zammit@gmblueplan.ca](mailto:melissa.zammit@gmblueplan.ca) | [www.gmblueplan.ca](http://www.gmblueplan.ca)



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## **John Slocombe - GM BluePlan**

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**From:** Lands and Resources Consultation Coordinator <saugeenmetisadmin@bmts.com>  
**Sent:** Friday, May 18, 2018 1:32 PM  
**To:** jstrader@brockton.ca; John Slocombe - GM BluePlan  
**Subject:** Greenock Bridge No. 0011 Concession 20 Brockton - Schedule B Municipal Class Environmental Assessment

Your File: GMBP 212328

Our File: Bruce County-Bridge Infrastructure Master Plan(Project)

Good Afternoon Mr. Strader and Mr. Slocombe,

Historic Saugeen Metis acknowledge receiving Mr. Strader's letter of May 11, 2018 regarding Schedule B-Environmental Assessment for Bridge No. 11 Greenock.

We have been able to view additional information and background studies made available on the Municipality of Brockton website.

The Historic Saugeen Metis (HSM) Lands, Resources, and Consultation Department has reviewed the relevant documents and have no objection or opposition to the proposed development, land re-designation, rezoning, land severance, Official plan and/or Zoning By-law Amendments.

I trust this may be helpful.

Regards,

**George Govier**

Co-ordinator Lands, Resources, and Consultation

Historic Saugeen Metis  
204 High Street  
Southampton, Ontario  
N0H 2L0  
Direct Line (519) 483-4001  
Fax (519) 483-4002  
Email [saugeenmetisadmin@bmts.com](mailto:saugeenmetisadmin@bmts.com)

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May 28, 2018

Municipality of Brockton  
100 Scott St. Box 68  
Walkerton, ON N0G 2V0

Attention: John Strader

**Re: Class EA for the Greenock Bridge (Concession 20)**

Dear John Strader:

This letter acknowledges this ministry's receipt of the Notice of Commencement for the above noted project.

It is this ministry's understanding that the Municipality of Brockton is initiating a Class EA process to examine options for potential repair or replacement of the Greenock Bridge located on Concession 20, south of the community of Paisley.

As you know, the Class Environmental Assessment (Class EA) planning process includes consultation with interested stakeholders, evaluation of alternatives, assessment of the effects of the proposed works and identification of measures to mitigate any adverse impacts. In addition to consultation with public agencies and the general public, consultation with Aboriginal communities is required.

**Aboriginal Consultation**

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

Your proposed project may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. Where the Crown's duty to consult is triggered in relation to your proposed project, **the MOECC is delegating the procedural aspects of rights-based consultation to you through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information you have provided to date and the Crown's preliminary assessment you are required to consult with the following communities who have been identified as potentially affected by your proposed project:



Saugeen First Nation	Saugeen Ojibway Nation Environment Office 25 Maadookii Road Neyaashiinigmiing, ON N0H 2T0 519-534-5507 Doran Ritchie Infrastructure Planning Coordinator <a href="mailto:d.ritchie@saugeenojibwaynation.ca">d.ritchie@saugeenojibwaynation.ca</a> <b>(Please send hard copy to Doran Ritchie)</b>	Saugeen First Nation 6493 Highway 21 R.R.#1 Southampton, ON N0H 2L0 519-797-2781 Chief Lester Anoquot <a href="mailto:lanoquot@saugeenfirstnation.ca">lanoquot@saugeenfirstnation.ca</a> <b>(Email copy to Chief Anoquot)</b>
Chippewas of Nawash Unceded First Nation		Chippewas of Nawash Unceded First Nation R.R.#5 Warton, ON N0H 2T0 519-534-1689 Chief Gregory Nadjiwon <a href="mailto:chiefsdesk@nawash.ca">chiefsdesk@nawash.ca</a> <b>(Email copy to Chief Nadjiwon)</b>
Historic Saugeen Metis	Historic Saugeen Metis 204 High Street, Box 1492 Southampton, ON N0H 2L0 President, Archie Indoe <u>Other Contact:</u> George Govier Consultation Coordinator 519-483-4000 <a href="mailto:saugeenmetisadmin@bmts.com">saugeenmetisadmin@bmts.com</a>	
Great Lakes Metis Council	Great Lakes Metis Council 380 9th Street East Owen Sound, ON N4K 1P1 519-370-0435 Other Contact: James Wagar, Consultation Assessment Coordinator <a href="mailto:jamesw@metisnation.org">jamesw@metisnation.org</a> and <a href="mailto:consultations@metisnation.org">consultations@metisnation.org</a> <b>(Please send email copies to email addresses listed above)</b>	

Steps that you may need to take in relation to Aboriginal consultation for your proposed project are outlined in the “Code of Practice for Consultation in Ontario’s Environmental Assessment Process” which can be found at the following link:

<https://www.ontario.ca/document/consultation-ontarios-environmental-assessment-process>

Additional information related to Ontario’s Environmental Assessment Act is available online at: [www.ontario.ca/environmentalassessments](http://www.ontario.ca/environmentalassessments).

You must contact the Director of Environmental Approvals Branch under the following circumstances subsequent to initial discussions with the communities identified by MOECC:

- aboriginal or treaty rights impacts are identified to you by the communities;
- you have reason to believe that your proposed project may adversely affect an aboriginal or treaty right;
- consultation has reached an impasse;
- a Part II Order request or elevation request is expected.

The Director of the Environmental Approvals Branch can be notified either by email with the subject line “Potential Duty to Consult” to [MOECCpermissions@ontario.ca](mailto:MOECCpermissions@ontario.ca) or by mail or fax at the address provided below:

<b>Email:</b>	<a href="mailto:MOECCpermissions@ontario.ca">MOECCpermissions@ontario.ca</a> Subject: Potential Duty to Consult
<b>Fax:</b>	416-314-8452
<b>Address:</b>	Environmental Approvals Branch 135 St. Clair Avenue West, 1 <sup>st</sup> Floor Toronto, ON, M4V 1P5

The MOECC will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role you will be asked to play in them.

### **Source Water Protection**

As per the recent amendments to the Municipal Engineers Association (MEA) Class Environmental Assessment parent document approved October 2015, proponents undertaking a Municipal Class EA project must identify early in the process whether a project is occurring within a source water protection vulnerable area. This must be clearly documented in a Project File report or ESR. If the project is occurring in a vulnerable area, then there may be policies in the local Source Protection Plan (SPP) that need to be addressed (requirements under the Clean Water Act). The proponent should contact and consult with the appropriate Conservation Authority/Source Protection Authority (CA/SPA) to discuss potential considerations and policies in the SPP that apply to the project.

Please include a section in the report on Source Water Protection. Specifically, it should discuss whether or not the project is located in a vulnerable area or changes or creates new vulnerable areas, and provide applicable details about the area. If located in a vulnerable area, proponents should document whether any project activities are a prescribed drinking water threat and thus pose a risk to drinking water (this should be consulted on with the appropriate CA/SPA). Where an activity poses a risk to drinking water, the proponent must document and discuss in the Project File Report/ESR how the project adheres to or has regard to applicable policies in the local SPP. If creating or changing a vulnerable area, proponents should document whether any existing uses or activities may potentially be affected by the implementation of source protection policies. This section should then be used to inform and should be reflected in other sections of the report, such as the identification of net positive/ negative effects of alternatives, mitigation measures, evaluation of alternatives etc. As a note, even if the project activities in a vulnerable area are deemed not to be a drinking water risk, there may be other policies that apply and so consultation with the local CA/SPA is important.

### **Climate Change**

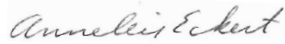
The Municipality is strongly encouraged to include climate change in this EA. Climate change should be considered in the context of mitigation and the context of adaptation. The Ministry has recently released a guidance document to support proponents in including climate change in environmental assessments. The guide can be found online: <https://www.ontario.ca/page/considering-climate-change-environmental-assessment-process>. It should be noted that Climatic Features is identified in Appendix 2 of the Municipal Class EA page 2-7 (2015).

## Conclusion

Thank you for the opportunity to comment on this project. Please keep this office fully informed of the status of this project as it proceeds through the Class EA process.

Please send all future correspondence with respect to this project to my attention, as I am this ministry's one window contact for this project: Anneleis Eckert, Regional Environmental Planner / Regional EA Coordinator at the address below; email address: [anneleis.eckert@ontario.ca](mailto:anneleis.eckert@ontario.ca) ; telephone number: 519-873-5115.

Yours truly,



Anneleis Eckert  
Regional Environmental Planner / Regional EA Coordinator  
Ministry of Environment and Climate Change  
733 Exeter Road  
London ON, N6E 1L3  
519-873-5115

Copy:  
John Slocombe, GM BluePlan Engineering  
Rick Chappell, MOECC

## Drea Nelson - GM BluePlan

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**From:** Drea Nelson - GM BluePlan  
**Sent:** Monday, December 17, 2018 10:19 AM  
**To:** 'Karla.Barboza@ontario.ca'  
**Cc:** John Slocombe - GM BluePlan; Brent Willis - GM BluePlan; John Strader  
**Subject:** Status of Bridge projects [MTCS Files 0007027, 0007028 and 7268]  
**Attachments:** 1 - 212328 - Notice of Project Initiation - Sch B EA Bridge No. 11 Greenock - May 17, 2018.pdf

Karla,

Jack Turner, from our Guelph office, forwarded your email regarding the status of three bridge projects being overseen by GM BluePlan (Owen Sound office). With respect to Orchardville Bridge and Riversdale Bridge No.0002, several background studies were requisitioned in advance of issuing the Notice of Project Initiation in order to better inform the EA Process. A Notice of Project Initiation has not yet been issued for these two bridge projects.

The EA Process for Bridge No.11 was initiated in May 2018. The Notice of Project Initiation is attached. As part of the Notice the public was invited to an Information Session (i.e. MCEA - Discretionary Public Consultation). For this particular bridge project, this initial public consultation provided an opportunity to discuss the problem and/or opportunities specific to those potentially affected parties (i.e. nearby property owners) at an early stage and provided the Municipality and GMBP an opportunity to identify other factors that may be considered in the selection of a Preliminary Recommended Solution. The initial Schedule 'B' Environmental Assessment Project File (May 2018) is available for viewing can be accessed/saved by clicking on the link below. This link will be valid for 18 days.

[https://sendafile.gmbblueplan.ca/uploads/12-14-18\\_152517\\_212328 - Sch B EA Project File - Greenock Bridge No. 0011 - May 2018.pdf](https://sendafile.gmbblueplan.ca/uploads/12-14-18_152517_212328_-_Sch_B_EA_Project_File_-_Greenock_Bridge_No._0011_-_May_2018.pdf)

The Municipality of Brockton also has the initial Project File posted on their website for viewing purposes as well.

At this time, the Project File is being updated. It is anticipated that a Notice of Project Update (MCEA Phase 2 – Mandatory Consultation) for Bridge No.11 will be issued to the public, agencies and first nations groups in early to mid January. This Notice will include an invitation to a presentation to Council, currently scheduled for January 22, 2019. The presentation will include a review of the EA assessment process, an inventory of the environments, a review and assessment of the alternative solutions considered and the presentation of a *Preliminary Recommended Solution*. Subject to Council direction, the Notice of Project Update will also include information pertaining to the project timing, including when the updated Project File will be posted on the Municipality's website (i.e. after the Council meeting) and the public and agency comment period.

With the circulation of the Notice of Project Update, and the updated Project File, the public, agencies and first nations groups will be invited to provide comments regarding the *Preliminary Recommended Solution*. The public comments received, after the follow-up consultation period, and the agency and stakeholder feedback provided, will be incorporated into the review and assessment of a *Recommended Preferred Solution*, for consideration and acceptance by Council, prior to issuing the Notice of Completion for the project process.

Please let me know if you have any further questions at this time,

Andrea

**Andrea Nelson, M.Sc.**  
Senior Hydrogeologist

**GM BluePlan Engineering Limited**

1260-2<sup>nd</sup> Avenue East | Owen Sound ON N4K 2J3

t: 519.376.1805 ext. 2219 | c: 519.372.4678

[andrea.nelson@gmblueplan.ca](mailto:andrea.nelson@gmblueplan.ca) | [www.gmblueplan.ca](http://www.gmblueplan.ca)



---

**From:** Barboza, Karla (MTCS) <[Karla.Barboza@ontario.ca](mailto:Karla.Barboza@ontario.ca)>

**Sent:** Thursday, December 13, 2018 3:15 PM

**To:** Jack Turner - GM BluePlan <[Jack.Turner@gmblueplan.ca](mailto:Jack.Turner@gmblueplan.ca)>

**Cc:** Livingstone, Kimberly (MTCS) <[Kimberly.Livingstone@ontario.ca](mailto:Kimberly.Livingstone@ontario.ca)>; Kirzati, Katherine (MTCS) <[Katherine.Kirzati@ontario.ca](mailto:Katherine.Kirzati@ontario.ca)>

**Subject:** Status of Bridge projects [MTCS Files 0007027, 0007028 and 7268]

Hi Jack,

I hope you're doing well. We received some Cultural Heritage Evaluation Reports for bridges and it seems that they were commissioned by your company. We haven't received any EA notices related to:

- South Orchardville Bridge, Grey County
- Bridge Street (Bridge 0002) Riversdale, municipality of Brockton
- Greenock Bridge No. 0011, municipality of Brockton

Would it be possible to give us a status of update of the environmental assessment process for each of the projects?

Thanks,  
Karla

**Karla Barboza MCIP, RPP, CAHP** | (A) Team Lead, Heritage

Ministry of Tourism, Culture and Sport

Culture Division | Programs and Services Branch | Heritage Planning Unit

T. 416.314.7120 | fax: 416.212.1802 | Email: [karla.barboza@ontario.ca](mailto:karla.barboza@ontario.ca)

## Drea Nelson - GM BluePlan

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**From:** John Slocombe - GM BluePlan  
**Sent:** Monday, June 11, 2018 10:35 AM  
**To:** Kerri Meier (kmeier@brucecounty.on.ca)  
**Cc:** John Strader (jstrader@brockton.ca); Drea Nelson - GM BluePlan; Sarah Johnson; Sonya Watson  
**Subject:** 212328 - Greenock Bridge 11 - Paisley  
**Attachments:** 212328 - Fig-tr-Fig.1-Site Location -RLH.pdf

Kerri,

The Municipality of Brockton is undertaking a Schedule B EA process toward addressing the aging Greenock Bridge 11 south of Paisley, where shown on the attached Site Location Map. At a recent PIC, we heard several comments / concerns from the public regarding poor winter visibility on Bruce Road 1, just north of Concession 20, where the road is cut through a hill. This issue is relevant to Bridge 11, since Concession 20 is then used by local residents to access Bruce Road 3, which apparently does not suffer the same winter visibility issues. Please advise if the County has any planned initiatives to address winter visibility issues on Bruce Road 1 in this area. Thanks.

**John Slocombe, P.Eng.**  
Branch Manager, Vice President

**GM BluePlan Engineering Limited**  
1260-2<sup>nd</sup> Avenue East | Owen Sound ON N4K 2J3  
t: 519.376.1805 ext. 2204 | c: 519.372.4600  
[john.slocombe@gmblueplan.ca](mailto:john.slocombe@gmblueplan.ca) | [www.gmblueplan.ca](http://www.gmblueplan.ca)



212328  
Greenock Bridge No. 0011  
Schedule B EA



SCALE - N.T.S.  
OCTOBER 2017

## **SITE LOCATION MAP**

Lot 46/47, Concession A  
Former Township of Greenock  
Municipality of Brockton

Figure No. 1





## Drea Nelson - GM BluePlan

---

**From:** Kerri Meier <kmeier@brucecounty.on.ca>  
**Sent:** Monday, June 18, 2018 10:54 AM  
**To:** John Slocombe - GM BluePlan  
**Cc:** John Strader (jstrader@brockton.ca); Drea Nelson - GM BluePlan; Sarah Johnson; Sonya Watson  
**Subject:** RE: 212328 - Greenock Bridge 11 - Paisley

John,

The County does not have any planned initiatives to address winter visibility on Bruce Road 1 between Concession 20 and the west limits of Paisley. In 2013, the County recycled and paved Bruce Road 1 from Bruce Road 20 to the Starkvale Cemetery.

Please let me know if you have require any further information.

Thanks, Kerri

**Kerri Meier**  
Environmental Coordinator  
Transportation & Environmental Services  
Corporation of the County of Bruce

519-881-2400 ext 307  
[www.brucecounty.on.ca](http://www.brucecounty.on.ca)



---

**From:** John Slocombe - GM BluePlan [mailto:John.Slocombe@gmblueplan.ca]  
**Sent:** Monday, June 11, 2018 10:35 AM  
**To:** Kerri Meier <kmeier@brucecounty.on.ca>  
**Cc:** John Strader (jstrader@brockton.ca) <jstrader@brockton.ca>; Drea Nelson - GM BluePlan <Drea.Nelson@gmblueplan.ca>; Sarah Johnson <SJohnson@brockton.ca>; Sonya Watson <swatson@brockton.ca>  
**Subject:** 212328 - Greenock Bridge 11 - Paisley

Kerri,

The Municipality of Brockton is undertaking a Schedule B EA process toward addressing the aging Greenock Bridge 11 south of Paisley, where shown on the attached Site Location Map.

At a recent PIC, we heard several comments / concerns from the public regarding poor winter visibility on Bruce Road 1, just north of Concession 20, where the road is cut through a hill.

This issue is relevant to Bridge 11, since Concession 20 is then used by local residents to access Bruce Road 3, which apparently does not suffer the same winter visibility issues.

Please advise if the County has any planned initiatives to address winter visibility issues on Bruce Road 1 in this area. Thanks.

**John Slocombe, P.Eng.**

Branch Manager, Vice President

**GM BluePlan Engineering Limited**

1260-2<sup>nd</sup> Avenue East | Owen Sound ON N4K 2J3

t: 519.376.1805 ext. 2204 | c: 519.372.4600

[john.slocombe@gmblueplan.ca](mailto:john.slocombe@gmblueplan.ca) | [www.gmblueplan.ca](http://www.gmblueplan.ca)



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SENT BY EMAIL

September 26, 2018

To the Council for the Corporation of the County of Bruce

Attention: Christine MacDonald, Acting CAO

RE: Bridge 11 - County Roads 3 and 1

On September 10, 2018, Council for the Municipality of Brockton approved the attached Report regarding Bridge 11 in the former Township of Greenock, and authorized staff to pursue the jurisdictional exchange outlined below. The resolution passed by Council for the Municipality of Brockton has been attached for your records.

The Municipality of Brockton is proposing that the County of Bruce assume jurisdiction over Bridge 11 and the sections of Concession 2A Elderslie and Concession 20 Greenock necessary to maintain the link between County Roads 3 and 1, and the Municipalities of Brockton and Arran-Elderslie would assume proportional jurisdiction over sections of Bruce Road 1 between Concession 20 and the community of Paisley. We have attached a map of the area for ease of reference. We understand an assessment of this request will be required and we appreciate the County's consideration for the benefit of Bruce County residents.

I look forward to hearing from you in the future.

Sincerely,

Sonya Watson, CAO  
Municipality of Brockton

# The Corporation of the Municipality of Brockton

Number: 18-18- 302

Session: September 10, 2018

Moved By: Bill Bell

Seconded By: Christoph A. Oberle

## 8.4 Approve Report PW2018-20 – Greenock Bridge 11 - Proposed Exchange Involving the County of Bruce and Municipality of Arran-Elderslie and Approves Request to be forwarded to County of Bruce for Roads and Bridge Jurisdictional Exchange Investigation

That the Council of the Municipality of Brockton hereby approves Report PW2018-20 - Greenock Bridge No.11 - Proposed Exchange Involving the County of Bruce and Municipality of Arran-Elderslie, prepared by Murray Clarke, Acting Director of Operations and in so doing approves a request being forwarded to the County of Bruce that a roads and bridge jurisdictional exchange be investigated as follows:

1. The County of Bruce assume those portions of Concession 2A Elderslie / Concession 20 linking Bruce Roads 3 and 1, including Greenock Bridge No. 11 and,
2. Brockton and Arran-Elderslie assume proportional sections of Bruce Road 1 between Concession 20 and Paisley.

Member of Council	Yea	Nay
Adams, Steve		
Bell, Bill		
Gieruszak, Dan		
Inglis, David		
Leifso, Dean		
Oberle, Chris		
Peabody, Chris		
Totals		

Carried

Defeated

Ken Campbell



# Corporation of the Municipality of Brockton

## Report to Council

**Report Title:** Greenock Bridge No.11 - Proposed Exchange Involving the County of Bruce and Municipality of Arran-Elderslie

**Prepared By:** Murray Clarke, Acting Director of Operations

**Department:** Public Works

**Date:** September 5, 2018

**Report Number:** PW2018-20 **File Number:** C11PW, T11

**Attachments:** [Proposed Road Ownership Transfer Map](#)

---

### Recommendation:

That the Council of the Municipality of Brockton hereby approves Report PW2018-20 - Greenock Bridge No.11 - Proposed Exchange Involving the County of Bruce and Municipality of Arran-Elderslie, prepared by Murray Clarke, Acting Director of Operations and in so doing approves a request being forwarded to the County of Bruce that a roads and bridge jurisdictional exchange be investigated as follows:

1. The County of Bruce assume those portions of Concession 2A Elderslie / Concession 20 linking Bruce Roads 3 and 1, including Greenock Bridge No. 11 and,
2. Brockton and Arran-Elderslie assume proportional sections of Bruce Road 1 between Concession 20 and Paisley.

### Report:

#### Background:

A Schedule "B" Environmental Assessment regarding Greenock Structure No. 11 conducted by GM BluePlan Engineering, as authorized by Council on March 26, 2018, was completed in May 2018. A subsequent Public Information Meeting was held June 4, 2018 at the Cargill Community Centre. Based on the 2016 bridge inspection report the structure is in poor condition, and it was recommended that the municipality close or perform a major rehabilitation on the bridge within one year. Council has previously discussed the range of options for the structure including major repair, or replace with a single or two-lane bridge, costs for which range from \$1.2 million to \$2.5 million.

Over the past months, discussions among staff and the consulting team have included the strategic value of the subject section of Concession 20 as a direct link between County Roads 3 and 1. This view was reinforced by several participants at the June 4, 2018 Public Information Centre. The conversations then moved to the notion of an exchange with the County: the subject section of Concession 20 would be transferred to the County,

including the bridge, linking their two roads, with the Municipality of Brockton and the Municipality of Arran-Elderslie assuming proportionate sections of County Road 1 from Concession 20 to Paisley.

On August 27, 2018 a meeting on this matter was held at the County offices, with the County Engineer, Warden Eagleson, Brockton Mayor David Inglis, Chief Administrative Officer Sonya Watson, and Roads Supervisor John Strader. The meeting concluded with the suggestion that Brockton make a formal request to the County to present the proposal as outlined in this report.

**Analysis:**

The proposed roads jurisdictional exchange would be a logical consideration even if there was not a concern with the condition of Bridge No. 11 and likely would have arisen in time. However, the poor condition of the structure suggests that the matter should be pursued immediately.

To reinforce the merit of the proposal, it has been endorsed by Brockton’s engineering team.

**Sustainability Checklist:**

What aspect of the Brockton Sustainable Strategic Plan does the content/recommendations in this report help advance? (More detail is available in the Sustainability Checklist on file and appended to this report.)

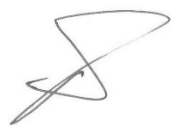
- |   |     |
|---|-----|
| • Do the recommendations help move the Municipality closer to its Vision? | N/A |
| • Do the recommendations contribute to achieving Cultural Vibrancy?       | N/A |
| • Do the recommendations contribute to achieving Economic Prosperity?     | Yes |
| • Do the recommendations contribute to Environmental Integrity?           | Yes |
| • Do the recommendations contribute to the Social Equity?                 | N/A |

**Financial Impacts/Source of Funding:**

- Do the recommendations represent a sound financial investment from a sustainability perspective? Yes

If the three Councils agree to move forward with the exchange, a detailed analysis would be undertaken to understand the operating and capital implications of the road sections to be relinquished and those to be assumed by each of the parties.

**Reviewed By:**



CFO

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**Respectfully Submitted by:**



Murray Clarke, Acting Director of Operations

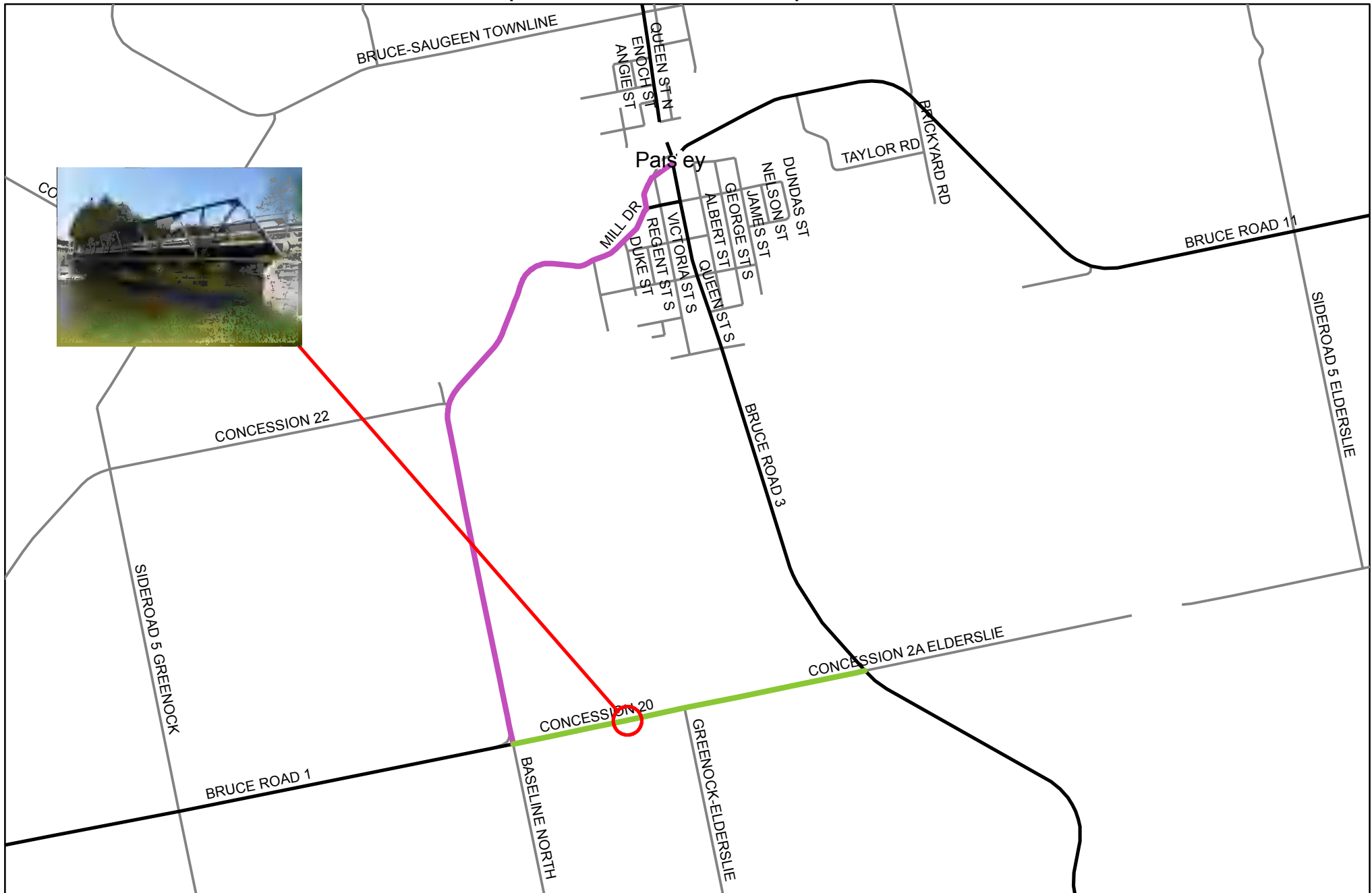
**Reviewed By:**



**CAO**



# Proposed Road Ownership Transfer



## Proposed Transfers



November 21, 2018

Municipality of Brockton  
P.O. Box 68  
100 Scott Street  
Walkerton, ON N0G 2V0

Attention: Sonya Watson, CAO

**Re: Bridge 11 - County Roads 3 and 1**

Please find this response to your letter dated September 26, 2018. The issue of exchange of jurisdiction of the Bridge 11, Concession 2A Elderslie Road, and Concession 20 Greenock, Bruce County Road 1 was brought the Bruce County Transportation and Environment Services Committee (report is attached). The Committee did not support this particular exchange.

During the discussion at Committee it was suggested that a decision to exchange a road or bridge jurisdiction should be part of a larger assessment that would consider other roads and bridges that could benefit from an exchange in jurisdiction. There is currently no plan to conduct an assessment to rationalize the County's road and bridge network but it will be considered in the 2019 business planning and budget process that is currently underway.

If you would like to discuss a venture to conduct a more comprehensive assessment, please do not hesitate to contact me.

Regards,

Miguel Pelletier  
Director of Transportation

MP:lb  
Encl.

cc. Municipality of Arran-Elderslie, Clerk/Administrator Peggy Rouse  
County of Bruce Acting CAO. Marianne Nero  
County of Bruce Clerk, Donna Van Wyck  
County of Bruce Director Planning and Economic Development, Kara Van Myall



## Committee Report

**To:** Warden Paul Eagleson  
Members of the Transportation and Environmental Services  
Committee

**From:** Miguel Pelletier  
Director

**Date:** November 15, 2018

**Re:** Municipality of Brockton Correspondence - Bridge 11 -  
County Roads 3 and 1

---

### Recommendation:

That the County of Bruce assume jurisdiction over Bridge 11 and the sections of Concession 2A Elderslie and Concession 20 Greenock necessary to maintain the link between County Roads 3 and 1; and,

That the Municipalities of Brockton and Arran-Elderslie would assume proportional jurisdiction over sections of Bruce Road 1 between Concession 20 and the community of Paisley and of the Starks bridge.

### Background:

On September 26, 2018, the Municipality of Brockton sent a letter authorizing their staff to pursue the following exchange in jurisdiction of Roads and Bridges with Bruce County and the Municipality of Arran-Elderslie. The proposal is that County of Bruce assume jurisdiction over Bridge 11 and the sections of Concession 2A Elderslie and Concession 20 Greenock necessary to maintain the link between County Roads 3 and 1, and the Municipalities of Brockton and Arran-Elderslie would assume proportional jurisdiction over sections of Bruce Road 1 between Concession 20 and the community of Paisley.

In 2003-2004, a thorough County Road Designation Study was carried out to review the jurisdiction of roads. At that time neither of the Municipality of Brockton or Arran Elderslie proposed the subject exchange in road jurisdiction. The study used an Ontario Good Roads Association protocol to evaluate and rank roads with the following 12 weighted criteria:

1. Urban Center Connector - 3
2. Kings' Highway/Upper Tier Connector - 2
3. Heavy Industry Service -2
4. Barrier Service - 1



5. Resort Criterion - 1
6. Urban Cell Service - 0
7. Urban Arterial Extension - 3
8. Rural Cell Service - 0
9. Traffic Speed - 1
10. Road Surface - 0.5
11. Traffic Volume - 0.5
12. Right of Way - 1

The scoring protocol was applied to the Concession 20/2A road segment and it did not score higher than the current County Road 1 segment. However, this is just a tool to help prioritize road jurisdictions and not a unique consideration to reject or accept the proposal.

Recent daily traffic count on County Road 1 is 925 and the current traffic count on Concession Road 20 is 150. Normally the higher traffic roads in an area fall under County jurisdiction to connect communities.

In 2013, a Bridge Infrastructure Master Plan for Central Bruce County was undertaken, approved and is still being implemented. The plan was developed with the participation of both the municipalities of Brockton and Arran-Elderslie and a wide range of factors were considered (infrastructure condition, traffic, environmental assessment, emergency services, public consultation, ...). The plan recommended that the Greenock Bridge 11 (referred as Concession 20 Bridge in the study) remain under the jurisdiction of the Municipality of Brockton and required rehabilitation of approximately \$400,000 in the near future.

If the County was to accept the section of Concession Road 20/2A and the Greenock Bridge 11 as is, a minimum of \$ 2,000,000 would be needed to bring the road (\$850,000) and bridge (\$1,200,000) to a County standard with a very good condition rating in the next two years. However, a bridge replacement is likely to be called for as the bridge is 98 years and past the regular 75 year lifespan of a bridge. The incurred cost could go up to \$3,250,000. Therefore, it appears reasonable that the County ask for the bridge and road section be brought up to County standard and to a very good condition before accepting responsibility.

The County Road 1 section that would be exchanged is currently rated as good and is not scheduled for any major work in the next five years. The County has been pursuing to divest itself of bridges that are on Municipal roads. In this case Starks bridge is on proposed section of County Road 1 that would be exchanged. The exchange should include Starks bridge to one or both municipalities. This bridge was scheduled for \$170,000 repair work in 2018 but was deferred to 2019 in order to divert resources to the Chesley bridge replacement. The repair work would be completed before the bridge was handed over and would raise the Bridge condition index from the current 72. The bridge is 48 years old and expected to last at least another 27 years.



There is an imbalance where the Municipalities would take over assets that are in much better condition than the ones that would go to the County.

From an operations perspective, it does not appear that there would be significant savings to the County from the exchange.

**Interdepartmental Consultation:**

Not applicable.

**Link to Strategic Goals and Elements:**

None identified.

**Approved by:**

Kelley Coulter  
Chief Administrative Officer

**APPENDIX H:**  
**PRESENTATION TO COUNCIL (PIC NO.2): JANUARY 22, 2019**



# **BRIDGE No.11 (GREENOCK)**

## **Schedule 'B' EA: Phase 2**

Presentation to Council

Preliminary Recommended Solution

Municipality of Brockton

January 22, 2019



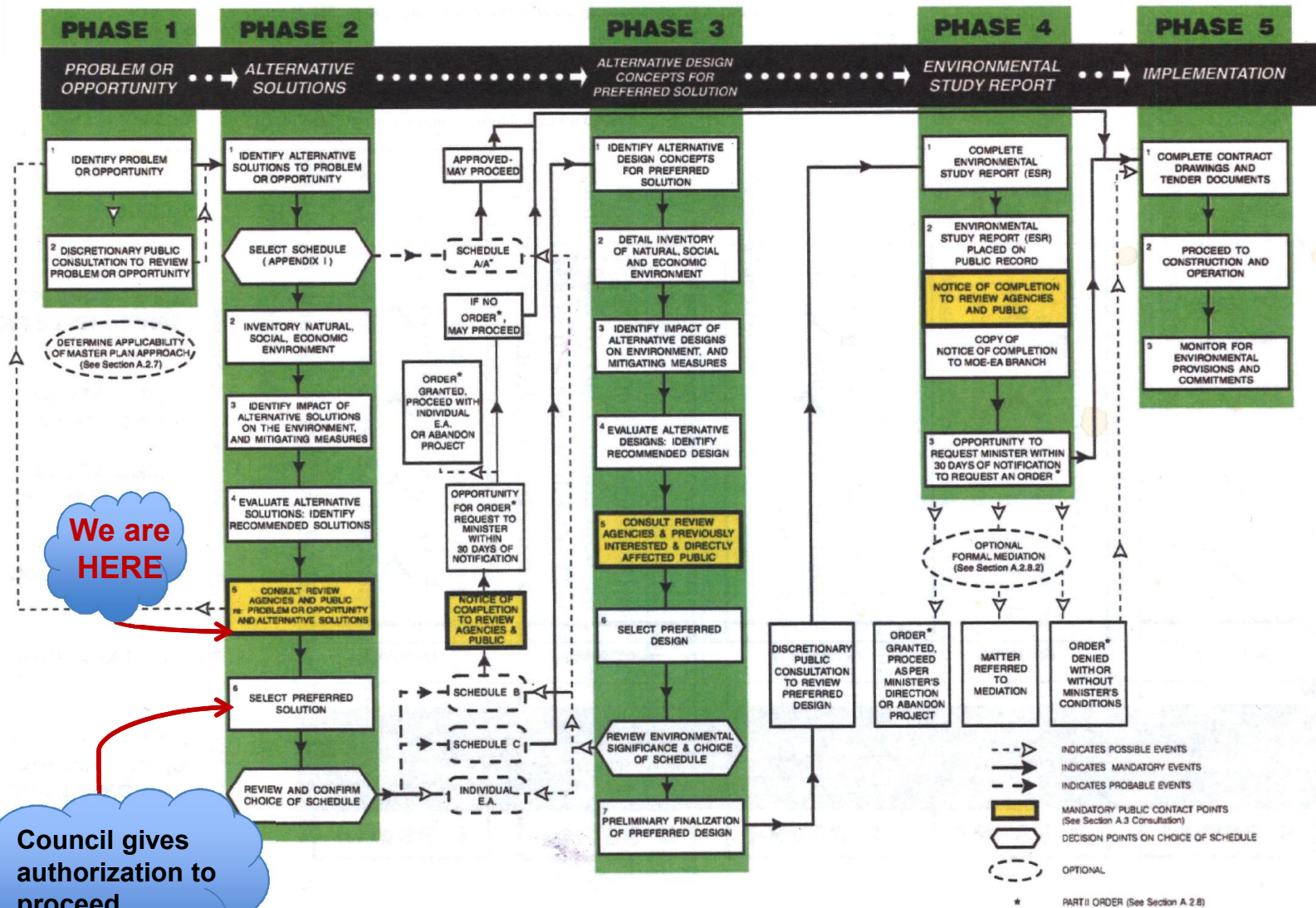


# AGENDA

1. Overview of Municipal Class EA Process.
2. Problem Definition.
3. Initial Consultation: Summary of Comments.
4. Overview of Alternative Solutions Considered.
5. Evaluation and Assessment of Alternative Solutions.
6. Preliminary Recommended Solution.
7. Next Steps (EA Process and Timeline).

## EXHIBIT A.2 MUNICIPAL CLASS EA PLANNING AND DESIGN PROCESS

**NOTE:** This flow chart is to be read in conjunction with Part A of the Municipal Class EA



# PROJECT STATEMENT

Inspection Reports for the aging Bridge No.11 note advanced deterioration of the superstructure and substructure to a point where the bridge may no longer be able to fulfill its intended function and, therefore, consideration should be given to addressing a long-term solution with consideration also to address the deficient road approaches.





# BACKGROUND



## Bridge:

- Poor condition.
- Low traffic volume, estimated to be  $\pm 150$  vehicles per day.
- Retains cultural heritage value.

## Concession Road 20/2A:

- Narrow gravel road.
- Steep road approaches do not meet any design criteria, which reduces driver safety.
- Load postings: large emergency vehicles not permitted.
- Speed limit = 30 km/hr

# INITIAL PUBLIC CONSULTATION

May 17, 2018: Notice of Project Initiation issued to the public, First Nations groups and various agencies.

June 4, 2018: PIC No.1 presented the initial findings and requested public and agency feedback to help further inform the process.

Alternative Solutions Presented included:

1. Do Nothing;
2. Bridge Rehabilitation;
3. Various Bridge Replacement Options that did not simultaneously address the road profile deficiencies; and
4. Bridge Removal.

Initial assessment of alternatives considered that bridge rehabilitation, removal and replacement with a single-span structure were all potential alternatives.

# PUBLIC FEEDBACK: General Summary

Concerns outlined during the information session and in the seven (7) comments received included:

1. Steep road approaches and resulting visibility constraints.
2. Operational challenges due to steep approaches (i.e. snow removal).
3. Accessibility to property parcels owned on either side of the river.
4. Concession Road 20/2A 'links' Bruce Roads 1 and 3. Rationale to maintain this link included the following:
  - ❑ Bruce Road 1 to Paisley is treacherous in the winter, particularly on windy days.
  - ❑ Emergency vehicle usage and added travel time.
  - ❑ Travel distance and time associated with alternate routes.
  - ❑ Pending Paisley bridge replacement. Without Bridge No.11 alternate route would be 'onerous'.

The majority of respondents cited bridge replacement with a two-lane structure as their preferred option.

One respondent stated:

*'complete replacement with a new 2-lane bridge that would be up to proper (including looking at the challenge of the slope of the road) specifications OR close the bridge permanently'.*

# CONSULTATION: BRUCE COUNTY



Following the initial consultation period, additional requests specific to issues identified were pursued with the County, as follows:

- The County has no planned initiatives to address winter visibility on Bruce Road 1, between Concession 20 and Paisley.
- Additional consultation with Bruce County was sought to confirm the 'strategic value' of Concession 20/2A as a direct link between County Roads 1 & 3, as considered in the Master Plan.
- In cooperation with Arran-Elderslie, an exchange in jurisdiction of Concession 20/2A, between Bruce Road 1 and 3 (including Bridge No.11) for Bruce Road 1 into Paisley was proposed. Bruce County did not support the exchange.
- County considered it reasonable to request that the bridge and road section be brought up to County Standards before accepting responsibility.



# ALTERNATIVE SOLUTIONS

## ALTERNATIVE 1: Do Nothing

## ALTERNATIVE 2: Bridge Rehabilitation

- ❑ Complete repairs to the 'deficient' elements of the structure to maintain its functionality as a single-lane vehicular bridge and extend its useful life.
- ❑ Would not address the noted deficiencies with the approach road profiles.

## ALTERNATIVE 3: Bridge Replacement

- ❑ Complete removal and replacement with a structure that meets the Standards/Design Code.
- ❑ Would need to address the noted deficiencies with the approach road profiles.
- ❑ Replacement options consider multiple variables starting with the physical geometry of the bridge required to achieve its intended function while simultaneously addressing the issue of the steep road approaches.

## ALTERNATIVE 4: Bridge Removal

- ❑ Bridge would be removed.
- ❑ Turn-around opportunities would be provided on both sides (cul-de sacs).
- ❑ River banks would be restored to a more natural condition.

# BRIDGE REPLACEMENT OPTIONS

The existing bridge and road approaches do not meet any design criteria, which reduces driver safety.

The posted speed limit is currently 30 km/hr.

## TAC Geometric Design Guide:

- ❑ States that '*a design speed of 80 km/hr and a posted speed of 80km/hr is the normal practice for rural municipal roads*'.
- ❑ Provides design classification for Rural, Local and Undivided (RLU) roads with a minimum design speed of 50 km/hr.
- ❑ Encourages 'Operating Speed Uniformity'.

Updated bridge replacement options also consider correcting the road approaches to an appropriate design standard.

# BRIDGE REPLACEMENT OPTIONS

Road design options considered to address the steep road approaches include, but are not limited to, the following:

- i. Lowering the elevation at the top of the slope(s) (i.e. cutting the banks);
- ii. Raising the surface grade along the river banks by adding fill within the floodplain; or
- iii. Raising the surface grade of the bridge along the river banks without adding fill within the floodplain (i.e. increased bridge span).

Bridge replacement options that simultaneously address the issue of the steep road approaches included the following:

OPTION	Design Speed	# of Lanes	Bridge Span	Grade (Elevation)	Design Option
A	<50 km/hr	Single lane	Single	Same as existing	Cut Banks
B	50 km/hr	Two-lane	Single	Same as Existing	Cut Banks
C	50 km/hr	Two-lane	Single	Raised to $\pm 231$ masl	Infilling
D	50 km/hr	Two-lane	Multiple	Raised to $\pm 231$ masl	Cut Banks

Note: 80 km/hr design speed is unlikely to be financially, if even technically, achievable due to significant earth works.

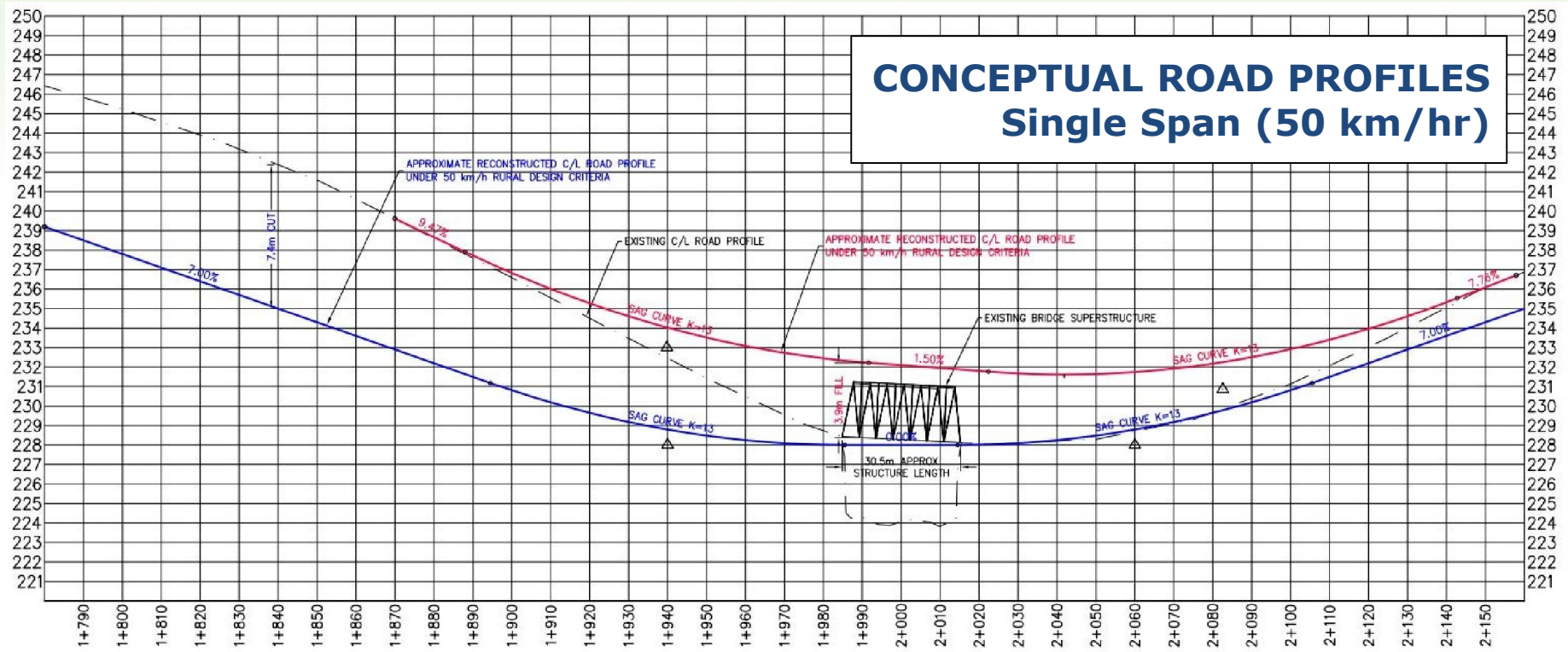
# BRIDGE REPLACEMENT: Option A

## Single-lane, single-span structure

- ❑ Geometric profile of bridge would be similar to existing.
- ❑ Structure would not meet Design Standards.
- ❑ Posted speed limit on approach roads of less than 50 km/hr is considered sub-standard.
- ❑ Estimated cost to replace bridge with a single-lane structure of \$1.0M would only be marginally lower than replacement with a two-lane structure\*.

-Not Supported-

# BRIDGE REPLACEMENT: Options B and C



## Maintain Bridge at Existing Grade:

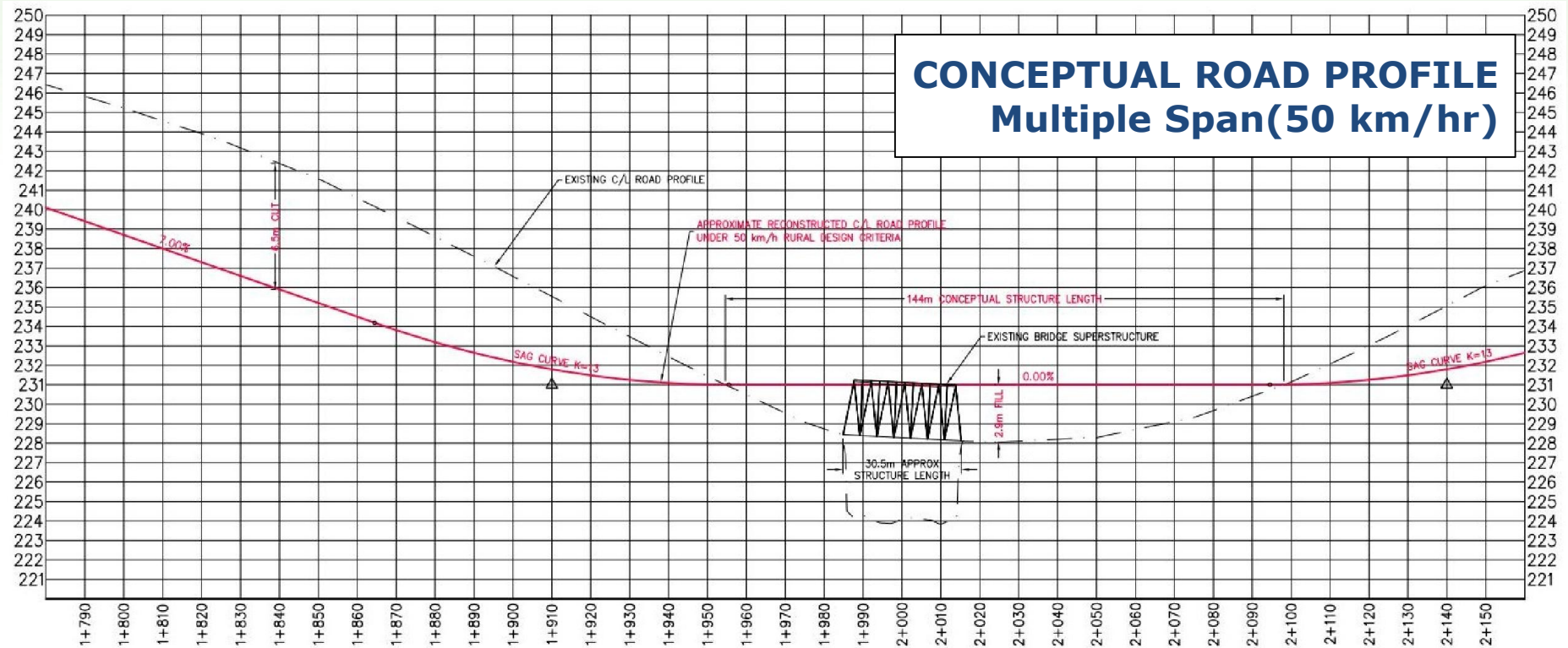
- ❑ Greater than 7 meter cut to the west.
- ❑ An estimated 1-2 meter cut to the east.
- ❑ Would require a wider Right-of-Way (i.e. property acquisition).

## Raise Elevation to Intersect Road Profile:

- ❑ Would require up to an estimated 4 meters of infilling on both sides of the river.
- ❑ Would require a wider Right-of-Way.
- ❑ Would require additional floodline mapping and approval from the SVCA.

Cost for replacement with a two-lane single span bridge  
is estimated to be \$1.07M\*

# BRIDGE REPLACEMENT: Option D



## Implications:

- ❑ Would require significant earth works on the east and west approaches to achieve geometric design standards (6.5 meters to the west and greater than 4 meters to the east).
- ❑ Would require a wider Right-of-Way (i.e. property acquisition).
- ❑ Would have limited encroachment on the Teeswater River.
- ❑ Complexity of bridge construction, and costs, increases with bridge length.

Cost for replacement with a multi-span structure is estimated to be \$4M\*

# BRIDGE REPLACEMENT

## Preliminary Favoured Option

A two-lane single-span structure, at an elevation that would balance cut and fill volumes and maintain the existing bridge span, is the favoured bridge replacement option.

This was carried forward into the overall assessment of alternatives.

### COST ESTIMATES\*

1. Cost estimates provided are for bridge replacement alone.
2. Improvements along approach roads are estimated to be greater than \$1.5M.
3. Estimates do not include property severance and land acquisition costs.

Therefore, it is estimated that cost for replacement with a single-span structure and the road improvements would be greater than \$3M.



# ASSESSMENT OF ALTERNATIVES

## TECHNICAL 'ENVIRONMENT'

DESCRIPTION	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
	REHABILITATION	REPLACEMENT	REMOVAL
DESIGN STANDARDS			
Bridge Geometry	One-lane	Two-lane	<ul style="list-style-type: none"><li>Would eliminate requirement to meet Standards/Code.</li><li>Limited road improvements, such as Cul-de Sacs.</li></ul>
Load Postings	Maintained to Reduced	None	
Road Approaches & Improvements	Would remain deficient.	Could be corrected to appropriate Standard.	
Speed Limit	30km/hr (Existing)	50km/hr <sup>(1)</sup>	
OTHER CONSIDERATIONS			
Longevity of Solution	On-going restoration & eventual replacement.	Would provide a long-term solution to the road deficiencies and structural issues noted.	
Complexity of Construction (Bridge/Road)	Repairs may involve unique & difficult construction practices.	Major earth works required to address road approaches.	Bridge removal and road improvement efforts would be simple.
EA Process <sup>(2)</sup>	Schedule 'B' (<2.4M)	Schedule 'C' (>2.4 M)	Schedule 'B' (<2.4M)
OVERALL	1	2	3 (Favoured)

1. With direction from the Road Authority (i.e. the Municipality), road approaches could be designed to a reduced Standard/Code for 50 km/hr. This would still require extensive modification.
2. Bridge No.11 was found to have Cultural Heritage Value, therefore a Schedule 'B' or 'C' process is likely required. A Schedule 'C' process would be applied to projects estimated to cost greater than \$2.4M.

# ASSESSMENT OF ALTERNATIVES

## CULTURAL 'ENVIRONMENT'

DESCRIPTION	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
	REHABILITATION	REPLACEMENT	REMOVAL
<b>Archaeological</b>	Study area does not retain Archaeological potential.	Additional assessment required to address area impacted by road improvements.	Study area does not retain Archaeological potential.
<b>Cultural</b>	Retaining the bridge and restoring the missing/deteriorated elements is preferred.	Replacement with a 'sympathetically' designed structure may be considered.	Mitigation for bridge removal may include placing a commemorative plaque.
<b>TOTAL</b>	<b>3 (Favoured)</b>	<b>1</b>	<b>2</b>



# ASSESSMENT OF ALTERNATIVES

## NATURAL 'ENVIRONMENT'

DESCRIPTION	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
	REHABILITATION	REPLACEMENT	REMOVAL
<b>Flood Elevation</b>	1. Elevation of existing bridge deck is in the range of 228.1 to 228.5 masl 2. 100-year flood water surface elevation = 228.86 masl 3. Regional flood water surface elevation = 229.97 masl		
	Existing bridge deck is subject to flooding during Regional and 100-year flood events.	<ul style="list-style-type: none"> <li>A bridge deck below 230 masl will experience flooding.</li> <li>Infilling may cause backwater effects.</li> </ul>	Potential for river encroachment would be eliminated.
<b>Aquatic Habitat and Fish Passage</b> (i.e. river flow and channel processes)	Minimal: Bridge remains in-situ	Infilling would result in a permanent alteration to river flow and fish habitat	Impacts would be eliminated. Potential for improvement.
<b>Natural Heritage</b> (i.e. vegetation, wildlife, SAR)	No significant long-term negative impacts.	Impacts proportional to area effected. Road and bridge works would impacts the large area.	<ul style="list-style-type: none"> <li>No significant long-term impacts.</li> <li>River banks could be re-naturalized.</li> </ul>
<b>OVERALL</b>	<b>2</b>	<b>1</b>	<b>3 (Favoured)</b>

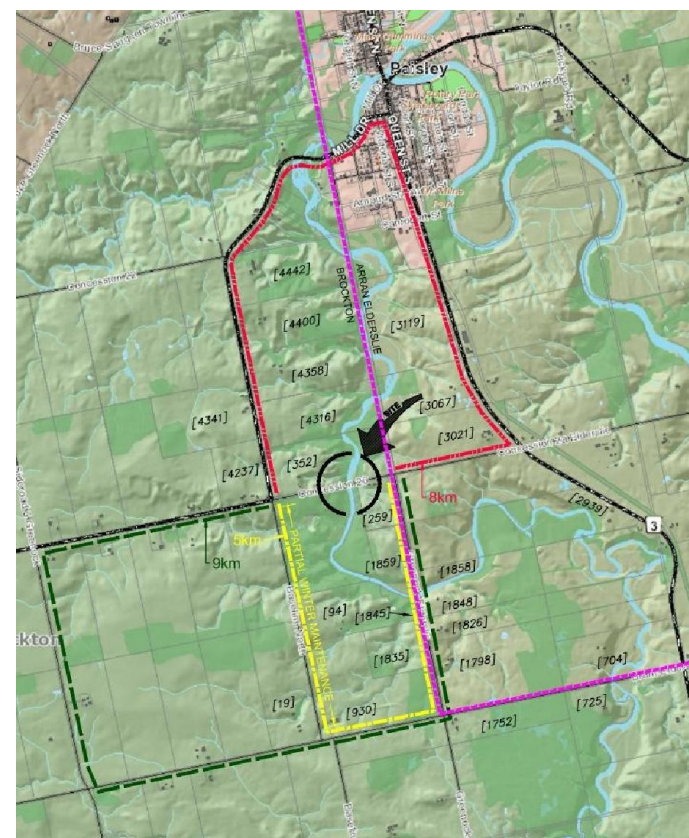
1. SAR = Species at Risk.
2. masl = meters above sea level.
3. Flood water surface elevations obtained from the 'Existing Conditions Flood Study (GMBP, April 2018).

# ASSESSMENT OF ALTERNATIVES

## SOCIAL 'ENVIRONMENT': Traffic Movements

ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
REHABILITATION	REPLACEMENT	REMOVAL
1. Impact to Local Residents		
Would maintain local traffic movements and ease of access to adjacent and nearby properties.		<ul style="list-style-type: none"><li>▪ Travel to adjacent and nearby properties may take longer.</li><li>▪ A limited number of properties would be directly affected.</li></ul>
A single lane structure would maintain existing condition.	A two-lane structure would improve upon the existing condition.	
2. Regional Transportation Network		
Would maintain a river crossing along Concession 20/2A, between Bruce Roads 1 and 3. However, based on the low traffic volumes, this east-west connection is not considered to be part of the regional road network.		<ul style="list-style-type: none"><li>▪ Traffic volumes are ± 150 vehicles/day.</li><li>▪ Although not quantified, would not likely have a significant impact.</li></ul>

## Alternate Routes:



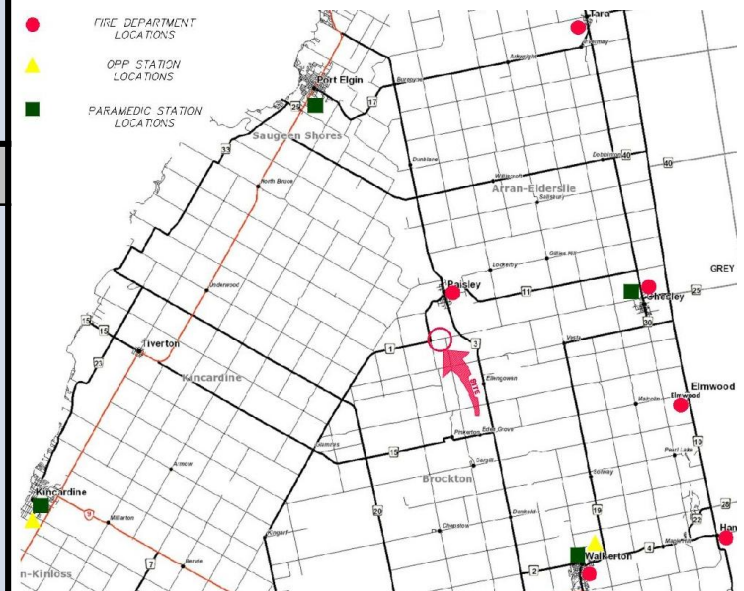


# ASSESSMENT OF ALTERNATIVES

## SOCIAL 'ENVIRONMENT': Safety and Emergency Access

ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
REHABILITATION	REPLACEMENT	REMOVAL
<b>3. Safety</b>		
Does not address the sub-standard road design and visibility constraints.	Bridge and road profile may be designed to Standards/Design Code.	Removal would address the safety concerns noted.
<b>4. Emergency Vehicle Access</b>		
<ul style="list-style-type: none"> <li>Likely to remain inaccessible to larger emergency vehicles.</li> <li>Speed limit of 30km/hr increases travel time.</li> </ul>	<ul style="list-style-type: none"> <li>Would permit use by all emergency vehicles.</li> <li>Speed limit of 50km/hr would still impact travel time.</li> </ul>	Based on the location of the emergency services, Conc. 20/2A does not provide for significantly reduced travel times.
<b>OVERALL</b>		
<b>1</b>	<b>3 (Favoured)</b>	<b>2</b>

### Emergency Services:



# ASSESSMENT OF ALTERNATIVES

## ECONOMIC 'ENVIRONMENT'

DESCRIPTION (Cost Estimates)	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
	REHABILITATION	REPLACEMENT	REMOVAL
<b>Bridge</b>	Option 1: \$360K (+\$680K) Option 2: \$770K (+\$370K)	\$1.07M	\$150K to \$200K
<b>Road Works</b>	None	Greater than \$1.5M	Less than \$100K
<b>Land Acquisition</b>	None	Greater than \$500K	None
<b>Bridge 'Life Cycle'</b>	\$\$\$	\$	⊖
<b>TOTAL</b>	<b>\$1.0M to \$1.2M</b> (not incl. 'life cycle' costs)	<b>Greater than \$3M</b>	<b>\$200K to \$300K</b>

'Life Cycle' costs consider future costs such as maintenance, major rehabilitation, restoration, component or element replacement and/or eventual bridge replacement.

1. Bridge rehabilitation costs are similar to bridge replacement (not including road works) and do not include for the eventual bridge replacement.
2. Provincial Funding:
  - ❑ Bridge rehabilitation would not likely receive funding.
  - ❑ Bridge replacement would be dependent upon significant provincial funding to proceed.

**In consideration of both capital and future 'life cycle' costs,  
bridge removal is the least costly alternative.**

# PRELIMINARY RECOMMENDED SOLUTION

## EVALUATION OF ALTERNATIVES:



	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
ENVIRONMENT	REHABILITATION	REPLACEMENT	REMOVAL
Technical	1	2	3
Cultural	3	1	2
Natural	2	1	3
Social	1	3	2
Economic	1	2	3
<b>OVERALL</b>	<b>8</b>	<b>9</b>	<b>13</b>

### Notes:

1. Based on preliminary assessment of bridge replacement options a single span two-lane structure, at or above existing grade, is considered under Alternative 3.
2. Evaluation is based on Table 4B provided in the Project File (Version 2: January 22, 2019).

**BRIDGE REMOVAL IS THE  
PRELIMINARY RECOMMENDED SOLUTION**



# COUNCIL DECISION

## ALTERNATIVE:

With the direction of Council as the Road Authority, a road profile based on a reduced design speed of 50 km/hr could be considered in greater detail. This would trigger a Schedule 'C' EA Process, which would require a detailed review of the design alternatives.

At minimum, this would include the following:

- i. Additional topographic survey to include/identify lands that would be affected by the cut/fill.
- ii. Determination of a road profile which would balance cut/fill volumes and maintain the existing bridge span.
- iii. In consultation with the SVCA, assessment of impacts to the floodplain due to infilling.
- iv. Additional Archaeological Assessment.
- v. Additional Environmental Impact Assessment.
- vi. Completion of Phases 3 and 4 if the EA process including a detailed review of alternative designs, additional consultation, and preparation of an Environmental Study Report (ESR).

# NEXT STEPS

- ❑ Receive Comments from Public, First Nations, and Agencies until February 15, 2019.
- ❑ Compile and assess comments received.
- ❑ Update Project File and recommend a *Preferred Solution* to Council.
- ❑ Council Endorsement of *Preferred Solution* (or otherwise).
- ❑ Finalize Project File.
- ❑ Advertise Notice of Completion.
- ❑ 30-day Public Review Period to satisfy Part II Order Request Period.
- ❑ Proceed to tender and construction.

# Your Feedback is Important

Please provide any comments you have by completing a comment sheet or by submitting comments via mail, phone, fax, or email to the Project Team members below:

Please Provide  
Comments by  
**February 15,  
2019**

## **Municipality of Brockton**

Mr. John Strader, CRS-I,

### Mailing Address & Contact Info:

100 Scott Street, Box 68  
Walkerton, ON, N0G 2V0  
Tel: (519) 881-2223  
jstrader@brockton.ca  
[www.brockton.ca](http://www.brockton.ca)

## **GM BluePlan Engineering Limited**

Mr. John Slocombe, P.Eng., Project Manager

### Contact Information:

1260 - 2<sup>nd</sup> Avenue East, Unit 1  
Owen Sound, ON N4K 2J3  
Tel: (519) 376-1805  
John.Slocombe@gmblueplan.ca  
[www.gmblueplan.ca](http://www.gmblueplan.ca)

# Thank You!

Your involvement is essential to the successful completion of this project.  
We welcome your comments.

**APPENDIX I:  
PUBLIC AND AGENCY COMMENTS (2019)**

## SUMMARY OF PUBLIC COMMENTS RECEIVED FOLLOWING PIC No. 2 (January 2019)

No.	Date	Comments <i>(recorded sic erat scriptum)</i>
1	29-Jan-19	Phone call to inform GMBP that building a new bridge as per the previous Council decision is preferred. Also, recommended that printed copies of the presentation be brought to the PIC for people to refer to as not everyone has internet access.
2	15-Feb-19	<p>We attended the public information meeting in Council Chambers on January 22, 2019.</p> <p>Following are comments we would like to submit.</p> <p>We were disappointed to learn that the Preliminary Recommended Solution was Option 4 to close the bridge.</p> <p>It was stated that the volume is about 150 vehicles/day. However, it must be understood that the volume is related to the size of the bridge (one lane) and that it is at the bottom of 2 hills (both steep), reducing visibility and the bridge has weight restrictions. Also it is too narrow for most of the farm equipment used today. If the bridge was 2 lanes and had better approaches, I'm quite sure it would be used more often.</p> <p>It is understood that the replacement of a bridge and accompanying road work is expensive, but it is concerning that rural infrastructure is constantly on the cutting block. Closing another road access makes it more difficult for alternative routes and emergency access. This potentially affects the safety of our communities.</p> <p>Thank you,</p>
3	19-Feb-19	<p>Hello again I (still) hope all is well and that sometime in the near future here we can have council make some sort of decision as to what they're going to do about Bridge 11.</p> <p>Sorry I am a few days late and I hope my feedback can still be accepted in the thought process.</p> <p>I was sitting on the bridge the other day for about 10-15 minutes just watching the river flow by and did have to say it is a very scenic stretch of water that provides a great pathway for everything nature has to offer into Paisley. With that being said the drive back up the hill heading west was difficult in slippery weather due to the steep embankment and after hearing the discussion on Jan 22/19 I could only imagine the amount of (any) earth excavation required is going to be expensive.</p> <p>Personally I still have not changed my opinion about the possible outcome of the bridge; That is either complete the replacement with a new 2-lane single span bridge that would be up to proper specifications as well as ensuring safe approaches from both directions OR to go with option D and close the bridge permanently with cul-de sacs on both roads.</p> <p>I also would not like to have my land impacted at all if possible (knowing any option will probably impact it) and thought it was interesting reading the estimate of approx. \$500k for land acquisition as well as hearing a councillor challenge one of the proposals in reference to the cost of the land acquisition.</p> <p>Please let me know if you require anything else going forward.</p> <p>I appreciate you two taking the time to read these emails and factor in some of my input.</p> <p>Thanks,</p>
4	17-Apr-19	<p>Hope all is well!</p> <p>Whats the latest update on the bridge? Has the Municipality set anymore upcoming dates? Nothing has come out from there end as far as I know.</p> <p>Thanks,</p> <p><i>[May 1, 2019 email response informing correspondent of Council meeting on May 28, 2019]</i></p>

## Drea Nelson - GM BluePlan

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**Subject:** FW: 212328 Bridge No.11 (Greenock): Notice of Project Update and Presentation to Council (Jan 22, 2019)

---

**From:** Mott, Ken (MNRF) <ken.mott@ontario.ca>

**Sent:** Wednesday, January 23, 2019 11:35 AM

**To:** Drea Nelson - GM BluePlan <Drea.Nelson@gmblueplan.ca>

**Subject:** RE: 212328 Bridge No.11 (Greenock): Notice of Project Update and Presentation to Council (Jan 22, 2019)

Thanks Andrea;

I don't believe we have any additional SAR information at this time beyond that which we already provided.

Regards  
Ken

---

### **Ken Mott**

District Planner | Midhurst District | Ministry of Natural Resources and Forestry | Bruce, Grey, Simcoe and Dufferin Counties

(705) 725-7546 | (705) 725-7584 | [ken.mott@ontario.ca](mailto:ken.mott@ontario.ca) |

---

**From:** Drea Nelson - GM BluePlan <Drea.Nelson@gmblueplan.ca>

**Sent:** January-23-19 9:32 AM

**To:** Mott, Ken (MNRF) <ken.mott@ontario.ca>

**Cc:** John Slocombe - GM BluePlan <John.Slocombe@gmblueplan.ca>; Brent Willis - GM BluePlan <Brent.Willis@gmblueplan.ca>

**Subject:** RE: 212328 Bridge No.11 (Greenock): Notice of Project Update and Presentation to Council (Jan 22, 2019)

Ken,

Thanks for your feedback and information, it is much appreciated. Aboud and Associates completed a Scoped EIS for this project. This included a review of the SAR (page 10 of the attached report), which included an information request to the MNRF (MNRF response is attached).

If there is any new SAR information, could you please provide it to us.

Regards,  
Andrea

**Andrea Nelson, M.Sc.**  
Senior Hydrogeologist

### **GM BluePlan Engineering Limited**

1260-2<sup>nd</sup> Avenue East | Owen Sound ON N4K 2J3

t: 519.376.1805 ext. 2219 | c: 519.372.4678

[andrea.nelson@gmblueplan.ca](mailto:andrea.nelson@gmblueplan.ca) | [www.gmblueplan.ca](http://www.gmblueplan.ca)



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**From:** Mott, Ken (MNRF) <[ken.mott@ontario.ca](mailto:ken.mott@ontario.ca)>

**Sent:** Wednesday, January 23, 2019 9:02 AM

**To:** Drea Nelson - GM BluePlan <[Drea.Nelson@gmblueplan.ca](mailto:Drea.Nelson@gmblueplan.ca)>

**Subject:** RE: 212328 Bridge No.11 (Greenock): Notice of Project Update and Presentation to Council (Jan 22, 2019)

Hi Andrea;

You can send me any EA notices in Bruce County to be circulated to MNRF. I can direct you elsewhere in other counties (our office covers Bruce, Grey, Dufferin and Simcoe). FYI our biologist has identified a number of Species At Risk concerns in this area that I can send you, depending on the type of works that the project requires.

For data requests or Species at Risk info you can email [midhurstinfo@ontario.ca](mailto:midhurstinfo@ontario.ca).

Regards,  
Ken

---

**Ken Mott**

District Planner | Midhurst District | Ministry of Natural Resources and Forestry | Bruce, Grey, Simcoe and Dufferin Counties

(705) 725-7546 | (705) 725-7584 | [ken.mott@ontario.ca](mailto:ken.mott@ontario.ca) |

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**From:** Drea Nelson - GM BluePlan <[Drea.Nelson@gmblueplan.ca](mailto:Drea.Nelson@gmblueplan.ca)>

**Sent:** January-22-19 4:52 PM

**To:** Mott, Ken (MNRF) <[ken.mott@ontario.ca](mailto:ken.mott@ontario.ca)>

**Cc:** John Slocombe - GM BluePlan <[John.Slocombe@gmblueplan.ca](mailto:John.Slocombe@gmblueplan.ca)>

**Subject:** RE: 212328 Bridge No.11 (Greenock): Notice of Project Update and Presentation to Council (Jan 22, 2019)

Ken,

Thanks for letting me know. I have updated the contact information.

We have been retained to complete the Environmental Assessment (EA) process for various projects. Are you the contact for Bridge No.11 (Greenock) alone or can I consider you the MNRF contact for all EA Project Notices?

Regards,  
Andrea

**Andrea Nelson, M.Sc.**

Senior Hydrogeologist

**GM BluePlan Engineering Limited**

1260-2<sup>nd</sup> Avenue East | Owen Sound ON N4K 2J3

t: 519.376.1805 ext. 2219 | c: 519.372.4678

[andrea.nelson@gmblueplan.ca](mailto:andrea.nelson@gmblueplan.ca) | [www.gmblueplan.ca](http://www.gmblueplan.ca)



---

**From:** Mott, Ken (MNRF) <[ken.mott@ontario.ca](mailto:ken.mott@ontario.ca)>

**Sent:** Friday, January 18, 2019 10:16 AM

**To:** Drea Nelson - GM BluePlan <[Drea.Nelson@gmblueplan.ca](mailto:Drea.Nelson@gmblueplan.ca)>

**Cc:** [jstrader@brockton.ca](mailto:jstrader@brockton.ca); Brent Willis - GM BluePlan <[Brent.Willis@gmblueplan.ca](mailto:Brent.Willis@gmblueplan.ca)>; John Slocombe - GM BluePlan



<[John.Slocombe@gmblueplan.ca](mailto:John.Slocombe@gmblueplan.ca)>; Dodge, Kathy (MNRF) <[kathy.dodge@ontario.ca](mailto:kathy.dodge@ontario.ca)>

**Subject:** FW: 212328 Bridge No.11 (Greenock): Notice of Project Update and Presentation to Council (Jan 22, 2019)

Hi Andrea;

With respect to the project noted above can I ask you to replace Craig Todd with my contact information (found below) for all MNRF correspondence?

MNRF would like to be circulated as the project moves forward. If you need any assistance gathering information or guidance doing Species At Risk screenings please let me know and I can help as needed.

Thanks for your attention to this.

Ken Mott

---

**Ken Mott**

District Planner | Midhurst District | Ministry of Natural Resources and Forestry | Bruce, Grey, Simcoe and Dufferin Counties

(705) 725-7546 | (705) 725-7584 | [ken.mott@ontario.ca](mailto:ken.mott@ontario.ca) |

---

**From:** Drea Nelson - GM BluePlan <[Drea.Nelson@gmblueplan.ca](mailto:Drea.Nelson@gmblueplan.ca)>

**Sent:** Tuesday, January 08, 2019 11:40 AM

**To:** John Strader <[jstrader@brockton.ca](mailto:jstrader@brockton.ca)>

**Cc:** Brent Willis - GM BluePlan <[Brent.Willis@gmblueplan.ca](mailto:Brent.Willis@gmblueplan.ca)>; John Slocombe - GM BluePlan <[John.Slocombe@gmblueplan.ca](mailto:John.Slocombe@gmblueplan.ca)>

**Subject:** 212328 Bridge No.11 (Greenock): Notice of Project Update and Presentation to Council (Jan 22, 2019)

Good Afternoon,

Please find attached a *Notice of Project Update* for the Schedule 'B' Municipal Class Environmental Assessment for Brockton Bridge No.11 (Greenock), located south of Paisley on Concession Road 20 within the Municipality of Brockton. The Notice includes an invitation to a presentation to Council, scheduled for January 22, 2019.

The EA Process for Bridge No.11 was initiated in May 2018. With the circulation of the *Notice of Project Update* and the updated Project File, which will be posted on the Municipality's website following the presentation, the public, agencies and first nations groups are invited to provide comments regarding the *Preliminary Recommended Solution*. The public comments received, and agency feedback provided, will be incorporated into the review and assessment of a *Recommended Preferred Solution*, for consideration and acceptance by Council, prior to issuing the Notice of Completion for the project process.

Please contact John Strader (Municipality of Brockton) and/or John Slocombe (GM BluePlan Engineering) at the addresses listed on the attached *Notice of Project Update*, with any questions or comments regarding this project.

Best Regards,  
Andrea Nelson

**Andrea Nelson, M.Sc.**

Senior Hydrogeologist

**GM BluePlan Engineering Limited**

1260-2<sup>nd</sup> Avenue East | Owen Sound ON N4K 2J3

t: 519.376.1805 ext. 2219 | c: 519.372.4678

[andrea.nelson@gmblueplan.ca](mailto:andrea.nelson@gmblueplan.ca) | [www.gmblueplan.ca](http://www.gmblueplan.ca)

**From:** Drea Nelson - GM BluePlan  
**Sent:** Mon, 8 Apr 2019 16:06:45 -0400  
**To:** Kirzati, Katherine (MTCS); Barboza, Karla (MTCS)  
**Cc:** John Slocombe - GM BluePlan; John Strader  
**Subject:** RE: 0007027 -Brockton Bridge 11 (Greenock) - Heritage Committee Confirmation of Review  
**Attachments:** Minutes April 1, 2019 Heritage Committee Meeting.pdf, Request for Review.pdf

Katherine,

Further to the discussions with John Slocombe (GBMP) on February 14, 2019, please find attached the minutes of the Brockton Heritage and Library Committee Minutes from April 1, 2019, which summarize the review and discussions pertaining to Bridge 11. These have been signed by the chairman of the Brockton Heritage Committee and will be approved and adopted at the next meeting. In addition, confirmation that the Brockton Municipal Heritage Committee (i) has reviewed the Cultural Heritage Evaluation Report (CHER/HIA); (ii) supports the sub-consultants conclusions with respect to the cultural heritage value assigned to Bridge No.11 (Greenock); and (iii) supports the findings of the Schedule 'B' Environmental Assessment Report (last updated January 2019), which identified the removal of the existing bridge as the Preliminary Recommended Solution, is also attached. This has been initiated by the Chair of the Committee.

It is our understanding that the MTCS would like to provide comment on Bridge 11. Can you please give us an indication of the expected amount of time the MTCS will require to review this file and provide comment.

Please contact either myself or John if you have any questions.

Regards,  
Andrea

**Andrea Nelson, M.Sc.**  
Senior Hydrogeologist

**GM BluePlan Engineering Limited**  
1260-2<sup>nd</sup> Avenue East | Owen Sound ON N4K 2J3  
t: 519 376 1805 ext. 2219 | c: 519 372 4678  
andrea.nelson@gmblueplan.ca | www.gmblueplan.ca



**From:** John Slocombe - GM BluePlan  
**Sent:** Thursday, February 14, 2019 9:15 AM  
**To:** Kirzati, Katherine (MTCS) <katherine.kirzati@ontario.ca>; Barboza, Karla (MTCS) <karla.barboza@ontario.ca>  
**Cc:** Drea Nelson - GM BluePlan <Drea.Nelson@gmblueplan.ca>  
**Subject:** RE: 0007027 -Brockton Bridge 11 (Greenock) -comments on PFR

Katherine,  
For context, attached is the presentation to Council we did for this bridge on January 22, 2019, which summarizes the information in the Project File.

**John Slocombe, P.Eng.**  
Branch Manager, Vice President

**GM BluePlan Engineering Limited**  
1260-2<sup>nd</sup> Avenue East | Owen Sound ON N4K 2J3  
t: 519 376 1805 ext. 2204 | c: 519 372 4600  
john.slocombe@gmblueplan.ca | www.gmblueplan.ca



**From:** Kirzati, Katherine (MTCS) [mailto:Katherine.Kirzati@ontario.ca]  
**Sent:** Wednesday, February 13, 2019 1:49 PM  
**To:** John Slocombe - GM BluePlan; Barboza, Karla (MTCS)  
**Cc:** Drea Nelson - GM BluePlan  
**Subject:** RE: 0007027 -Brockton Bridge 11 (Greenock) -comments on PFR

Perfect. Do you want me to send you a meeting invitation, or just book your own calendar?

Katherine

**From:** John Slocombe - GM BluePlan <John.Slocombe@gmblueplan.ca>  
**Sent:** February-13-19 1:42 PM  
**To:** Kirzati, Katherine (MTCS) <Katherine.Kirzati@ontario.ca>; Barboza, Karla (MTCS) <Karla.Barboza@ontario.ca>

**Cc:** Drea Nelson - GM BluePlan <Drea.Nelson@gmblueplan.ca>  
**Subject:** Re: 0007027 -Brockton Bridge 11 (Greenock) -comments on PFR

Ok with me

John Slocombe, P.Eng.  
Branch Manager, Vice President

GM BluePlan Engineering Limited  
1260-2nd Avenue East | Owen Sound ON N4K 2J3  
t: 519.376.1805 ext. 2204 | c: 519.372.4600  
[john.slocombe@gmblueplan.ca](mailto:john.slocombe@gmblueplan.ca) | [www.gmblueplan.ca](http://www.gmblueplan.ca)

----- Original message -----

**From:** "Kirzati, Katherine (MTCS)" <Katherine.Kirzati@ontario.ca>  
**Date:** 2019-02-13 1:30 PM (GMT-05:00)  
**To:** John Slocombe - GM BluePlan <John.Slocombe@gmblueplan.ca>, "Barboza, Karla (MTCS)" <Karla.Barboza@ontario.ca>  
**Cc:** Drea Nelson - GM BluePlan <Drea.Nelson@gmblueplan.ca>  
**Subject:** RE: 0007027 -Brockton Bridge 11 (Greenock) -comments on PFR

Thank you, John. Is 9:30 ok? I'll slot in half an hour, just to be safe.

Katherine

---

**From:** John Slocombe - GM BluePlan <John.Slocombe@gmblueplan.ca>  
**Sent:** February-13-19 1:24 PM  
**To:** Kirzati, Katherine (MTCS) <Katherine.Kirzati@ontario.ca>; Barboza, Karla (MTCS) <Karla.Barboza@ontario.ca>  
**Cc:** Drea Nelson - GM BluePlan <Drea.Nelson@gmblueplan.ca>  
**Subject:** RE: 0007027 -Brockton Bridge 11 (Greenock) -comments on PFR

Katherine,  
I can be available tomorrow AM or any time Friday, at the land line below.

John Slocombe, P.Eng.  
Branch Manager, Vice President

GM BluePlan Engineering Limited  
1260-2nd Avenue East | Owen Sound ON N4K 2J3  
t: 519.376.1805 ext. 2204 | c: 519.372.4600  
[john.slocombe@gmblueplan.ca](mailto:john.slocombe@gmblueplan.ca) | [www.gmblueplan.ca](http://www.gmblueplan.ca)

----- Original message -----

**From:** "Kirzati, Katherine (MTCS)" <Katherine.Kirzati@ontario.ca>  
**Date:** 2019-02-13 1:19 PM (GMT-05:00)  
**To:** Jack Turner - GM BluePlan <Jack.Turner@gmblueplan.ca>, "Barboza, Karla (MTCS)" <Karla.Barboza@ontario.ca>  
**Cc:** Drea Nelson - GM BluePlan <Drea.Nelson@gmblueplan.ca>, John Slocombe - GM BluePlan <John.Slocombe@gmblueplan.ca>  
**Subject:** RE: 0007027 -Brockton Bridge 11 (Greenock) -comments on PFR

Thank you, Jack.

My apologies to everyone for misdirecting my query.

Regards, Katherine

---

**From:** Jack Turner - GM BluePlan <Jack.Turner@gmblueplan.ca>  
**Sent:** February-13-19 1:13 PM  
**To:** Kirzati, Katherine (MTCS) <Katherine.Kirzati@ontario.ca>; Barboza, Karla (MTCS) <Karla.Barboza@ontario.ca>  
**Cc:** Drea Nelson - GM BluePlan <Drea.Nelson@gmblueplan.ca>; John Slocombe - GM BluePlan <John.Slocombe@gmblueplan.ca>  
**Subject:** RE: 0007027 -Brockton Bridge 11 (Greenock) -comments on PFR

Katherine,

I'm not sure how I became associated with this project as I am not the contact for it. I believe this project is being delivered out of our Owen Sound office. As this is obviously time sensitive, I have copied two of my colleagues on this email that may know more about the project.

I am the PM for other EA's regarding bridge projects currently ongoing in the Region of Waterloo/Township of Woolwich area; however, none of them have reached the notice of study completion stage.

Please let us know if you have any questions.

Regards,

**Jack Turner, P.Eng.**  
Project Manager, Partner

**GM BluePlan Engineering Limited**  
650 Woodlawn Road West Block C, Unit 2 | Guelph ON N1K 1B8  
t: 519 824 8150 ext 1237 | c: 226 755 0292  
jack.turner@gmblueplan.ca | www.gmblueplan.ca



**From:** Kirzati, Katherine (MTCS) <Katherine.Kirzati@ontario.ca>  
**Sent:** Wednesday, February 13, 2019 12:09 PM  
**To:** Jack Turner - GM BluePlan <Jack.Turner@gmblueplan.ca>; Barboza, Karla (MTCS) <Karla.Barboza@ontario.ca>  
**Subject:** 0007027 -Brockton Bridge 11 (Greenock) -comments on PFR

Hello Jack:

This file has been assigned to me and I'd like to set up a telephone meeting to discuss some general items in the Project File Report.

I know that a deadline is approaching with respect to providing comments and wonder if you're available tomorrow or Fri. My colleague Karla Barboza will join me. If this is too short notice, would an extension be possible for submitting comments pending a conversation?

Thanks, Katherine

Katherine Kirzati  
Heritage Planner  
Programs and Services Branch  
Ministry of Tourism, Culture and Sport  
401 Bay St, Suite 1700  
Toronto, ON M7A 2R9  
416-314-7643  
katherine.kirzati@ontario.ca

---

**N O T I C E** - This message from GM BluePlan Engineering Limited is intended only for the use of the individual or entity to which it is addressed and may contain information which is privileged, confidential or proprietary. Internet communications cannot be guaranteed to be secure or error-free as information could be intercepted, corrupted, lost, arrive late or contain viruses. By communicating with us via e-mail, you accept such risks. When addressed to our clients, any information, drawings, opinions or advice (collectively, "information") contained in this e-mail is subject to the terms and conditions expressed in the governing agreements. Where no such agreement exists, the recipient shall neither rely upon nor disclose to others, such information without our written consent. Unless otherwise agreed, we do not assume any liability with respect to the accuracy or completeness of the information set out in this e-mail. If you have received this message in error, please notify us immediately by return e-mail and delete the message from your computer systems.

## **Brockton Heritage and Library Committee Minutes**

Monday, April 1, 2019

**Location:** Brockton Municipal Office (100 Scott Street, Walkerton)

**Time:** 4:30 p.m.

### **Attendance:**

**(Quorum: 9/12)**

Darlene Bohnert, Committee Member	Absent
Lynda Breig, Committee Member	Present
Ted Cobean, Chair	Present
Fiona Hamilton, Clerk (Acting Recording Secretary)	Present
Sarah Johnson, Committee Secretary (Non-Voting)	Absent
Barb Kerry, Committee Member	Present
Denise Lagundzin, Committee Member	Present
Dean Leifso, Councillor	Present
Eric McDougall, Parks, Recreation and Facilities Manager (Non-Voting)	Present
Ron McKinnon, Committee Member	Present
Alishia Oberle, Committee Member	Absent
Joe Reichenbach, Committee Member	Absent
Tanya Tilson, Committee Member	Absent
Frank Weiler, Committee Member	Absent
Murray Wells, Committee Member	Present
Tracey Knapp, Librarian (Non-Voting)	Present

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### **1. Call to Order**

Chair Ted Cobean called the meeting to order at 4:37 p.m. Fiona Hamilton, Clerk acted as Recording Secretary for the meeting.

The committee introduced themselves.

### **2. Acceptance of Agenda**

Motion: Moved by Ron McKinnon                      Seconded by Lynda Breig  
That the amended agenda from the April 1, 2019 Brockton Heritage Committee meeting be approved.  
Carried.

### **3. Disclosure of Pecuniary Interest and the General Nature Thereof**

None.

### **4. Delegations**

None.

### **5. Approval of Minutes**

Motion: Moved by Denise Lagundzin                      Seconded by Ron McKinnon  
That the minutes of the March 4, 2019 meeting of the Brockton Heritage Committee be approved.  
Carried.

### **6. Business Arising From the Minutes**

Chair Ted Cobean informed the Committee that there was now an update to Item 10.3 – Walkerton Downtown Photo Murals. Dean Leifso then informed the Committee that he had confirmed that there was \$28,626.00 currently in the Heritage Reserve Fund available for acquisitions, etc. and

**10.3 Walkerton Downtown Photo Murals**

Chair Ted Cobean informed the Committee that one of the large Downtown Photo Murals had been removed in sections. A new location for the Downtown Photo Mural was being considered, but the large size of the mural limited the number of suitable locations.

Dean Leifso informed the Committee that Council had directed that the Downtown Improvement funds be budgeted to the Community Improvement Community for sidewalk repairs as these funds would be leveraged to receive additional money through the Spruce the Bruce grant.

**10.4 Armoury Building**

- **Lease Agreement with G.R.O.W rooted in love Maternity Home**

Fiona Hamilton, Recording Secretary informed the Committee that the Lease Agreement with G.R.O.W rooted in love Maternity Home had not yet been finalized, but was anticipated to be an item to be considered by Council of the Municipality of Brockton at the Council Meeting on April 9, 2019.

**10.5 Bridge 11 Greenock**

Fiona Hamilton, Acting Recording Secretary provided the Committee with an overview of the Engineer's Presentation regarding Bridge 11 (Greenock) and the Preliminary Preferred Solution. The Committee then reviewed the Cultural Heritage Evaluation Report and Preliminary Heritage Impact Assessment for Bridge 11 (Greenock) that was prepared by Scarlett Janusas Archaeology Inc. (the "CHER/HIA") and noted that there were a fair number of bridges in Bruce County and Brockton with similar architectural features.

The Committee then discussed the mitigation measures that were proposed in the CHER/HIA and noted that the Committee would recommend having the plate that indicated the name of the builder removed and placed with a commemorative plaque at the site. The Committee decided it was not necessary to include displays of the architectural drawings given the number of similar bridges in the area.

Motion:            Moved by Dean Leifso            Seconded by Barb Kerry

That the Municipality of Brockton Heritage Committee has reviewed the CHER/HIA (revised September 2018) and supports the conclusions with respect to the cultural heritage value assigned to Bridge No. 11 (Greenock) and support the findings of the Schedule "B" Environmental Assessment (last updated in January 2019), which identified the removal of the existing bridge as the Preliminary Recommended Solution,

And further that the Municipality of Brockton Heritage Committee supports the mitigation measures proposed in the CHER/HIA, with the amendment that the plate indicating the name of the builder be removed if possible and stipulating that a simple commemorative plaque replace the proposed architectural drawings.

Carried.

**11. New Business**

**11.1 Projects for 2019**

**12. Adjournment**

Motion: Moved by Dean Leifso                      Seconded by Denise Lagundzin  
That the Heritage Committee meeting be adjourned at 6:30 p.m.  
Carried.

**Next Brockton Heritage Committee Meeting**

**Date:** Monday, May 6, 2019 at 4:30 p.m.

**Location:** Brockton Meeting Room, Municipal Office

*E. J. Cohan*  
*Chairman*  
*Brockton Heritage Committee*



## **BACKGROUND**

GM BluePlan Engineering Limited (GMBP) was retained by the Municipality of Brockton to undertake a planning process toward addressing the deteriorated condition of Bridge No.11 (Greenock), located south of Paisley on Concession Road 20. The Municipal Engineers Association, in cooperation with the Ministry of the Environment, Conservation and Parks (MECP), has developed a Municipal Class Environmental Assessment (EA) process to assist in planning projects of this nature.





The Municipal Class EA outlines a comprehensive planning process that provides a rational approach to consider the advantages and disadvantages of various alternatives on several 'environments' in order to determine a *Preferred Solution* to address an identified problem (or opportunity). The assessment process is to include consideration for the technical, social, natural heritage, cultural and economic implications and potential mitigation measures. The process also involves consultation with various government agencies, directly affected stakeholders and the public. Based on recent feedback from the Ministry of Culture, Tourism and Sport (MTCS) regarding the Cultural Heritage Evaluation Report which was prepared as part of the background documentation for the process, the Brockton Municipal Heritage Committee is being requested to provide more specific review and comment at this time.

## **REQUEST FOR REVIEW AND COMMENT**

As part of the EA Process, the Brockton Municipal Heritage Committee is being requested to review and provide comment on the Cultural Heritage Evaluation Report and Preliminary Heritage Impact Assessment for Bridge No.11, prepared by Scarlett Janusas Archaeology Inc (July 20, 2017, revised September 12, 2018), herein referred to as the CHER/HIA. A copy of the report is enclosed, and a summary of the findings provided below.

The findings of the CHER/HIA helped to inform the cultural heritage 'environment' of the alternatives considered for the Bridge No.11 EA Process, including bridge replacement, rehabilitation or removal. A link to the updated Project File (Revision 2) for Bridge No.11, dated January 22, 2019, is provided on the Municipality's website (<https://www.brockton.ca/en/our-services/bridge-11-project.aspx>) and a copy of the Presentation to Council prepared by GM BluePlan Engineering dated January 22, 2019 is enclosed. The presentation provides a summary of the evaluation and assessment of the alternatives considered.

The MTCS has requested the Brockton Municipal Heritage Committee to comment on the following:

-  ☒ The Brockton Municipal Heritage Committee has reviewed the CHER/HIA (revised September 2018).
-  ☒ The Brockton Municipal Heritage Committee supports (or otherwise) the conclusions with respect to the cultural heritage value assigned to Bridge No.11.
-  ☒ The Brockton Heritage Committee supports (or otherwise) the findings of the Schedule 'B' Environmental Assessment (last updated in Jan 2019), which identified the removal of the existing bridge as the *Preliminary Recommended Solution*.
-  ☒ The Brockton Municipal Heritage Committee supports (or otherwise) the mitigation measures proposed in the CHER/HIA (summarized below).

## **SUMMARY OF FINDINGS AND RECOMMENDATIONS (CHER/HIA)**

Cultural Heritage assessments are required as part of the EA planning process which necessitates 'the conservation of features of significant architectural, cultural, historical, archeological or scientific interest'. The CHER/HIA was completed to inform the cultural heritage aspects of the Bridge No.11 EA. A summary of the findings is provided below.

### **Report Findings**

Based on a search of the of the municipal, provincial and federal registers, Bridge No.11 is not designated as being a property of cultural heritage value or interest. However, to determine the potential cultural heritage value of Bridge No.11 the "Criteria for Determining Cultural Heritage Value or Interest" set out in Ontario Regulation 9/06 under the Ontario Heritage Act (OHA), as amended in 2005, were used. The CHER identified that the bridge may meet three of the cultural heritage assessment. Input from the local Heritage Committee is being sought to gauge the degree of local interest in these elements:

#### **Design or Physical Value:**

The bridge is representative of an early style of a single-span Warren pony through truss bridge. At this time there are reportedly 125 listed Warren Pony truss bridges in Ontario. Heritage attributes specific to the subject bridge identified included the following:

- i. Cast in place concrete abutments;
- ii. Single span, metal Warren pony truss bridge with 8-panel design;
- iii. Rivet-connected skeletal framework, including diagonal steel members, horizontal bracing, and outriggers (perpendicular support).
- iv. Timber deck beams; and
- v. Hamilton Bridge Works plaques.

#### **Historical or Associative Value:**

- The bridge demonstrates the work or ideas of a builder (or designer/engineer) that may be significant to the community and/or Province. It was built by the Hamilton Bridge Works company, which supplied the steel and designs for many bridges in Ontario.
- The bridge has direct associations with an agricultural/rural theme that may be significant to the community and was an important part of local transportation routes.

#### **Contextual Value**

- The bridge contributes to the landscape character of the area and is visually linked to the surrounding countryside.
- The bridge serves as a conduit linking the areas on either side of the Teeswater River.

The CHER concluded that *"the bridge has been evaluated as having cultural heritage value and interest"*.

We request that the Brockton Municipal Heritage Committee review these findings and provide concurrence or other commentary.

### **Proposed Mitigation Measures**

A preliminary Heritage Impact Assessment (HIA) was also included in the CHER, better to inform the alternatives considered in the EA process. In consideration of the *Ontario Heritage Bridge Guidelines Conservation Options*, the mitigation options that could be considered for the Recommended Preferred Solution, to remove the bridge, included the following:

- i. Commemorative actions (i.e. plaque or monument);
- ii. Completion of architectural drawings (where none available or where major changes to the structure have been made); and/or
- iii. Salvage elements for new structure, conservation/displays (latter could include heritage parks, museums etc.).

We request that the Brockton Municipal Heritage Committee consider these measures and provide concurrence, or other commentary.

### **RELEVANT DOCUMENTATION**

1. Copy of the Cultural Heritage Evaluation Report and Preliminary Heritage Impact Assessment (HIA) for Bridge No.11, prepared by Scarlett Janusas Archaeology Inc.
2. Copy of the Presentation to Council prepared by GM BluePlan Engineering, dated January 22, 2019.
3. A link to the Bridge No.11 Project File can be found on the Municipality's website. The most recent Project File for Bridge No.11 is dated January 22, 2019.

<https://www.brockton.ca/en/our-services/bridge-11-project.aspx>

## Drea Nelson - GM BluePlan

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**From:** Kirzati, Katherine (MTCS) <Katherine.Kirzati@ontario.ca>  
**Sent:** Monday, April 15, 2019 12:36 PM  
**To:** John Slocombe - GM BluePlan; Drea Nelson - GM BluePlan  
**Cc:** Barboza, Karla (MTCS)  
**Subject:** 0007027 -Brockton Bridge 11 -MTCS Comments on CHER/HIA  
**Attachments:** 0007027 -Brockton -Bridge 11 -MTCS Comment Table.docx

Hi John and Andrea:

Thank you for taking the time on Fri Apr 12 to discuss the heritage documentation for the Brockton Bridge 11 project. Below are the highlights (let me know if I've missed anything):

- the purpose of a Cultural Heritage Evaluation Report (CHER) is to outline the existing conditions with respect to cultural heritage resources by determining if any exist within or adjacent to the study area
- it should include both known and potential heritage resources and in this instance would involve the bridge itself
- all identified resources are to be assessed against Ontario Regulation 9/06, illustrating which properties contain cultural heritage value or interest
- the purpose of a Heritage Impact Assessment (HIA) is to determine whether the proposed project would have any negative impacts to the cultural heritage resources that were identified in the CHER
- it should outline each proposed option/alternative, describe the potential impact and recommend the appropriate mitigation measure
- ideally, the HIA is a separate document, building on the findings of the CHER and the EA reports
- both documents should include a section on community engagement, particularly with the municipal heritage committee. This can be presented as a summary describing:
  - the groups and individuals that were engaged
  - how and when community engagement was undertaken
  - whether community engagement was combined with another land use process, such as Planning Act application/approvals
  - the results of the engagement, including responses, comments or concerns expressed and how they were considered (the documents provided in the email of 08 Apr 2019 can be attached as an appendix)

At this point, since considerable work has already been undertaken for the CHER component, it's now a matter of addressing the outstanding comments, which are provided as an attached table. This can be submitted as an addendum, illustrating how the issues have been addressed.

As to the HIA, a more extensive piece is required to address the potential impacts and mitigations. I found some CHERs and HIAs online that would serve as good examples. I'll send them via our large file service, as this email becomes too large with all these attachments.

I hope this helps. Do contact me if you need further assistance or have any additional questions.

Regards, Katherine

Katherine Kirzati  
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Programs and Services Branch  
Ministry of Tourism, Culture and Sport  
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MTCS Comments on the Cultural Heritage Evaluation and Preliminary Cultural Heritage Impact Assessment, prepared by Scarlett Janusas Archaeology Inc., dated July 20, 2017, revised September 12, 2018

Section	Item	MTCS Comments	GMBP Response
Report Title	Title and Report Contents	MTCS received the CHER/HIA prior to the Notice of Commencement being issued for this project. As such, the inclusion of a heritage impact assessment, no matter how preliminary, is considered premature as it cannot speak to the possible alternatives that would be outlined in an Environmental Study Report or Project File Report.	
Table 2	Historical or Associative Value sub-criterion i	Elaborate on the types of associations the bridge has with the community and how these associations meet this criterion.  This comment holds for Section 6.2.2.	
	sub-criterion ii	Elaborate on how the bridge yields, or has the potential to yield, information to understanding the community or culture.	
	Contextual Value sub-criterion iii	Explain why the bridge is not considered a landmark but is noted as such in the Analysis column.	
6.2.3	Terminology	Clarify the sentence "...it's former function to serve as a conduit across the Teeswater River..." (is it no longer used as a crossing).	

08 May 2019

Email Only

Andrea Nelson  
GM BluePlan Engineering Limited  
1260-2nd Avenue East, Unit 1  
Owen Sound, ON N4K 2J3  
[drea.nelson@gmblueplan.ca](mailto:drea.nelson@gmblueplan.ca)

**MTCS File : 0007027**  
**GMBP File : 212328**  
**Proponent : Municipality of Brockton**  
**Subject : Review of Cultural Heritage Evaluation Report Addendum**  
**Project : Replacement of the Brockton Bridge 11 (Greenock)**  
**Location : Concession Road 20, Between Lots 46 and 47, Concession A, Geographic Township of Greenock, Municipality of Brockton**

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Dear Ms. Nelson:

Thank you for providing the addendum to the Cultural Heritage Evaluation Report/ Heritage Impact Assessment (CHER/HIA), dated 01 May 2019, for the above-noted project. This addendum was prepared in response to our discussion on 12 April 2019 and an email from MTCS on 15 April 2019, which included a comment table.

In reviewing the addendum, MTCS is satisfied that its comments have been addressed, due diligence has been undertaken in consulting with the Municipal Heritage Committee for its position on the matter and the addendum is to be attached to the final Project File Report

As such, MTCS has no further comments on this project.

Regards,

Katherine Kirzati  
Heritage Planner  
[katherine.kirzati@ontario.ca](mailto:katherine.kirzati@ontario.ca)

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. MTCS makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MTCS be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

Please notify MTCS if archaeological resources are impacted by EA project work. All activities impacting archaeological resources must cease immediately, and a licensed archaeologist is required to carry out an archaeological assessment in accordance with the *Ontario Heritage Act* and the *Standards and Guidelines for Consultant Archaeologists*.

If human remains are encountered, all activities must cease immediately and the local police as well as the Registrar, Burials of the Ministry of Government and Consumer Services (416-326-8800) must be contacted. In situations where human remains are associated with archaeological resources, MTCS should also be notified to ensure that the site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act*.



**APPENDIX J:**  
**STAFF REPORT (MAY 28, 2019)**