

Appendix D:
Channel Analysis

Wignell Watershed Channel Capacities

Wignell, Port Colborne and Michener Drains (organized by SWMM model junctions, see Appendix B)

Contributing Catchments	From (Up)	To (Dn)	Model Channel ID	Crossing ID	Data Source	Description	Model Length	5 Yr Model Design U, cms	Proposed Design Grade line				Proposed Design Channel				Prop. Capacity Q, cms	velocity, V m/s	Fr	Settling Length	Disp. Length	r	Area, a	Perim., p					
									u/s STN	u/s INV	d/s STN	d/s INV	Length, m	Side Slope	Avg. Manning n	Slope									TW	R _n			
						ROW North Side Swale			182.86	3364.5	182.4	388	0.4	1.5	0.75	0.030	0.001186	2.65	0.368456757	0.675	0.590	0.287	1.144	3.104					
Port Colborne Drain	PC1			PC-CS-007	Amec OG Survey, 2013	culvert crossing Babion		0.65	3364.5	182.4	3350	182.35	14.5	0.4	1.5	0.75	0.030	0.0034	2.65	0.368456757	1.151	1.006	0.489	1.144	3.104				
	PC2			PC-CS-006	Amec OG Survey, 2013	culvert crossing 2nd Concession		0.947	3350	182.35	3346	182.32	4	0.6	1.5	0.75	0.030	0.0075	2.85	0.391551452	1.999	1.545	0.732	1.294	3.304				
					Proposed East Side relocated culvert			0.947	3346	182.32	3331	182.28	15	0.6	1.5	0.75	0.030	0.0027	2.85	0.391551452	1.192	0.921	0.437	1.294	3.304				
	PC1, PC2	J21	J88	Link-07	2018	Proposed East side channel	302	0.947	3331	182.22	3077	181.5956	254	0.6	1.5	0.75	0.030	0.0025	2.85	0.391551452	1.144	0.885	0.419	1.294	3.304				
						Prop. Sediment Basin @ 3+300							10	4	1.5	1.25	0.030	0.0025	7.75	0.409286891		0.911		97.7	6.67	2.50	2.375	5.803	
	PC4-QE1	J19	J88			no info	Pump & discharge piping																						
	PC11	J88	J18	Link-08		No survey - NPCA 1m only	x-sect @ 3+200	500	1.23	3047	181.2468	2571.82	179.98	475.18	0.6	1.5	1.2	0.030	0.0027	4.2	0.584574358	3.465	1.203	0.464		2.880	4.927		
	PC3-QW1	J20	J18			no info	Pump & discharge piping																						
	PC10	J18	J17	Link-11	PC-CS-005	NPCA 1m only	x-sect 2+200	640	1.301	2557.44	179.98	1952.07	178.17	605.37	0.6	1.5	1.2	0.030	0.0030	4.2	0.584574358	3.670	1.274	0.491		2.880	4.927		
							Prop. Sediment Basin @ 2+400						18	6	1.5	1.7	0.030	0.0030	11.1	0.432538388		1.042		191.6	18.00	3.00	3.375	7.803	
PC9, PC5	J17	J16	Link-12	PC-CS-004	CofPC as Constructed Survey, 2017	x-sect -1+450, from CofPC survey	860	1.578	1927.93	178.17	1072.54	176.1	855.4	0.6	1.5	1.2	0.030	0.0024	4.2	0.584574358	3.302	1.146	0.442		2.880	4.927			
				PC-CS-003	Amec OG Survey, 2013	Prop. Sediment Basin @ 1+050						15	8	1.5	1.7	0.030	0.0024	13.1	0.446302166		0.958		143.6	14.88	1.88	4.375	9.803		
PC8	J16	J15	Link-13	PC-CS-002	CofPC as Constructed Survey, 2017	x-sect 0+900 from CofPC survey	580	1.956	1064.16	176.1	507.22	175.44	556.9	0.6	1.5	1.2	0.030	0.0012	4.2	0.584574358	2.310	0.802	0.309		2.880	4.927			
PC7, PC6	J15	J14	Link-14	PC-CS-001	CofPC as Constructed Survey, 2017	x-sect 0+300 from CofPC survey	600	2.243	489.33	175.44	6.61	174.63	482.7	1.2	1.5	1.2	0.030	0.0017	4.8	0.651387819	3.694	1.026	0.378		3.600	5.527			
									0	174.63	-113	174.38	113	1.2	1.5	1.2	0.030	0.0022	4.8	0.651387819	4.241	1.178	0.434		3.600	5.527			
PC Branch #1	PC9				CofPC survey Dec 18, 2016 CofPC survey Dec 18, 2017 CofPC survey Dec 18, 2018	200m for clearing and re-grading existing channel to remain as is. new outlet to PC Drain with berm and abandoned old channel to remain for floodway.		0.490	683	180.25	483	179.86	200.0	0.4	2	0.7	0.030	0.0019	3.2	0.356890447	0.933	0.741	0.377		1.260	3.530			
									483	179.86	141	178.5	342.0	0.2	2	1.2	0.030	0.0040	5	0.560489465	4.458	1.429	0.578		3.120	5.567			
									141	178.5	0	178.25	141.0	0.5	1.5	1.2	0.03	0.0018	4.1	0.571823813	2.669	0.967	0.376		2.760	4.827			
Wignell	W1	J22	J23	Link-15	W-CS-004	EWA+CofPC RTK GPS, 2018		1.036	6691.2	181.5	6682	181.44	9.2	0.6	1.5	0.75	0.03	0.0065	2.85	0.391551452	1.864	1.441	0.683		1.294	3.304			
	W2	J23	J24	Link-16	W-CS-005	Amec OG Survey, 2013	x-sections very different just 50m apart.	840	1.358	6682	181.44	5744	180.42	938.0	0.8	1.5	1	0.03	0.0011	3.8	0.522068603	1.639	0.713	0.293		2.300	4.406		
							Prop. Sediment Basin @ 6+670						10	4	1.5	1.5	0.030	0.0011	8.5	1.615606149	1.639	0.175		116.9	6.23	2.50	9.375	5.803	
	WB2			C15		EWA+CofPC RTK GPS, 2018		0.22	407	181.35	0	180.7138	407.0	0.6	1.5	0.35	0.03	0.001563	1.65	0.211472645	0.184	0.468	0.306		0.394	1.862			
	W7	J24	J25	Link-17		No survey - NPCA 1m only	x-sect from 4+800 to 5+800	1250	1.78	5744	180.4241	5100	179.3	644.0	1.6	2	1.15	0.03	0.001745	6.2	0.665138519	4.759	1.061	0.398		4.485	6.743		
										5100	179.3	4726.3	178.31	373.7	1.6	2	1.15	0.03	0.002649	6.2	0.665138519	5.863	1.307	0.491		4.485	6.743		
							Prop. Sediment Basin @ 4+740						30	12	1.5	2	0.030	0.0026	18	1.991407927	5.863	0.195		221.0	30.66	2.50	30.000	15.065	
	W6	J25	J26	Link-18	W-CS-008	EWA+CofPC RTK GPS, 2018	x-sect from 4+200 to 4+600	522.47	2.321	4700	178.3	4148	177.25	552.0	1.8	2	1.15	0.03	0.001902	6.4	0.679105523	5.296	1.123	0.418		4.715	6.943		
	W5	J26	J27	Link-19	W-CS-006	EWA+CofPC RTK GPS, 2019	x-sect from 3+900 to 4+100	313.77	2.519	4138	177.22	3834	176.58	304.0	0.6	1.5	0.75	0.03	0.002105	2.85	0.391551452	1.059	0.819	0.388		1.294	3.304		
	W4	J27	J28	Link-20	W-CS-003	EWA+CofPC RTK GPS, 2020	x-sect from 3+200 to 3+800	618.63	2.857	3811	176.57	3464	175.99	347.0	0.6	1.5	0.75	0.03	0.001671	2.85	0.391551452	0.944	0.729	0.346		1.294	3.304		
	W3		J28							3464	175.99	3146	175.52	318.0	0.6	1.5	0.75	0.03	0.001478	2.85	0.391551452	0.887	0.686	0.325		1.294	3.304		
		J87	J28	Link-33	CS-119	EWA+CofPC RTK GPS, 2020	Killaly St Crossing - 450mm	254.29	0.437	226	177.56	0	176.35	226.0	0.3	1.5	0.35	0.03	0.005354	1.35	0.184865907	0.229	0.791	0.546		0.289	1.562		
	W3	J28	J29	Link-21	W-CS-007	EWA+CofPC RTK GPS, 2020	from 2+900 to 3+100	289.09	3.354	3134	175.52	2851	175.11	283.0	1.8	1.5	1.25	0.03	0.001449	5.55	0.728364414	4.718	1.027	0.361		4.594	6.307		
							Prop. Sediment Basin @ 3+100						20	12	1.5	2	0.030	0.0014	18	2.040238473	4.718	0.157		161.9	19.38	1.67	30.000	14.704	
	WB1	J86	J29	Link-34	CS-120	EWA+CofPC RTK GPS, 2020	Killaly St Crossing - 900mm	278.16	0.752	200	175.65	0	175.43	200.0	0.6	1.5	0.75	0.03	0.0011	2.85	0.391551452	0.765	0.592	0.280		1.294	3.304		
	W8	J29	J30	Link-22		Amec OG Survey, 2013	x-sect - 2+400	567	4.025	2851	175.11	2444	174.36	407.0	1.8	1.5	1.25	0.03	0.001843	5.55	0.728364414	5.321	1.158	0.407		4.594	6.307		
									2444	174.5	2115	174.36	329.0	2.2	1.5	1.25	0.03	0.000426	5.95	0.759474617	2.916	0.572	0.198		5.094	6.707			
W9	J30	J14	Link-23	W-CS-010	Amec OG Survey, 2013		40.77	4.357	2115	174.36	2055	174.351	60.0	2.4	1.5	1.25	0.03	0.0001500	6.15	0.77367846	1.839	0.344	0.118		5.344	6.907			
				W-CS-001	Amec OG Survey, 2013																								
	J14	J13	Link-25		Amec OG Survey, 2013		98.5	6.697	2055	174.351	1956	174.336	99.0	8.5	2	1.25	0.03	0.0001515	13.5	0.975857641	5.551	0.404	0.128		13.750	14.090			
Bower	B1	J6	J13	Link-26			25	0.19																					
Wignell		J13	J12	Link-27		Amec OG Survey, 2013		6.286	1956	174.12																			
Wignell	W10	J12	J8	Link-28	W-BS-002	Amec OG Survey, 2013		6.359	2113	174.36	0	174.04	2113.0	8.5	2	1.25	0.03	0.000151	13.5	0.975857641	5.549	0.404	0.128		13.750	14.090			

	Contributing Catchments	From (Up)	To (Dn)	Model Channel ID	Crossing ID	Data Source	Description	model length	5 Yr model Design U, cms	Proposed Design Grade line				Proposed Design Channel						Prop. Capacity Q, cms	velocity, V m/s	Fr	Setting Length	Disp. Length	r	Area, a	Perim., p		
										u/s STN	u/s INV	d/s STN	d/s INV	Length, m	Side Slope	Avg. Depth	Manning n	Slope	TW									R _n	
Michener	M1	J1	J7	Link-01	M-CS-001	NPCA 1m only	1+600, long grass swale / row crops	455	0.101	1715.65	176.360	1286	175.640	429.65	0.4	1.5	1.00	0.03	0.0017	3.4	0.4743417	1.577	0.830	0.355			1.900	4.006	
	M2	J2	J7	Link-02	CS-101	NPCA 1m only	Michener Branch #2	352	0.719	345	176.3767	0	176.0461	345	0.4	1.5	0.85	0.03	0.0010	2.95	0.410928035	0.812	0.570	0.262			1.424	3.465	
		J7	J3	Link-04		NPCA 1m only	1+100, row crop channel	533	0.831	1280	175.640	700	175.150	580	1	1.5	1.00	0.03	0.0008	4	0.542823182	1.612	0.645	0.260			2.500	4.606	
					M-BS-001	Amec OG Survey, 2013																							
					M-BS-002	Amec OG Survey, 2013																							
	M3	J3	J4	Link-05	M-BS-003	Amec OG Survey, 2013	through golf course - 0+500	510	0.773	700	175.15	400	174.75	300	0.6	1.5	1.00	0.03	0.0013	3.6	0.499340006	1.609	0.766	0.320			2.100	4.206	
					M-BS-004	Amec OG Survey, 2013				400	174.75	215	174.59	185	0.8	1.5	1.00	0.03	0.0009	3.8	0.522068603	1.462	0.636	0.261			2.300	4.406	
	M4	J4	J5	Link-06		NPCA 1m only	Grass channel south of course; 0+300	230	0.811	215	174.59	15	174.47	200	1	1.5	1.00	0.03	0.0006	4	0.542823182	1.358	0.543	0.219			2.500	4.606	
					SEDIMENT	NPCA 1m only							8	2	1.5	1.4	0.030	0.0006	6.2	0.302130557		0.368		134.6	2.85	4	1.040	3.442	
	M5	J5	J8	Link-29		NPCA 1m only	many trees overgrowth, 0+050	12	0.844	15	174.47	0	174.46	15	1	1.5	1	0.03	0.0007	4	0.542823182	1.432	0.573	0.231			2.500	4.606	
Michener Branch #1	1			CS-121	EWA/CofPC Nov/Dec 2018 Survey - equivalent Tile Diameter= 300mm	Tile Pipe run from Lakeshore Rd. East to M-Branch #1 confluence CB		0.070	130	175.75	20	175.45	110	0	1.5	0.35	0.03	0.0027	1.05	0.145608802	0.089	0.482	0.368			0.184	1.262		
	1b				EWA/CofPC Nov/Dec 2018 Survey - equivalent Tile Diameter= 250mm	Tile pipe run from Lorraine Rd. a to M-Branch #1 confluence CB		0.031	292	175.75	178	175.45	114	0	1.5	0.25	0.03	0.0026	0.75	0.104006287	0.035	0.378	0.342			0.094	0.901		
	1				EWA/CofPC Nov/Dec 2018 Survey	open channel - outlet to Michener		0.180	178	175.27	0	174.833	178	0.4	1.5	0.35	0.03	0.0025	1.45	0.194802114	0.180	0.555	0.375			0.324	1.662		
Wignell to outlet	W11	J8	J9	Link-30	W-BS-001			13.58	7.067																				
				C27									0	0	1.5	0.25	0.03	#DIV/0!	0.75	0.104006287	#DIV/0!	#DIV/0!	#DIV/0!			0.094	0.901		
				W-GS-001		1 gate open; square channel																							
		J9	J11	Link-31				29.342	7.067					0	0	1.5	0.25	0.03	#DIV/0!	0.75	0.104006287	#DIV/0!	#DIV/0!	#DIV/0!			0.094	0.901	
	J11	J10	Link-32				231.24	7.066					0	0	1.5	0.25	0.03	#DIV/0!	0.75	0.104006287	#DIV/0!	#DIV/0!	#DIV/0!			0.094	0.901		