

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
 Collector Roads Return Frequency = 5 years
 Arterial Roads Return Frequency = 10 years



Manning 0.013

LOCATION			AREA (Ha)																FLOW							SEWER DATA										
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO			
Location	From Node	To Node	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	Conc. (min)	2 Year (mm/h)	5 Year (mm/h)	10 Year (mm/h)	100 Year (mm/h)	Q (l/s)	(actual)	(nominal)	(%)	(m)	(l/s)	(m/s)	LOW (min)	Q/Q full				
	101	102	0.14	0.69	0.27	0.27													0.00	0.00																
	102	103	0.49	0.69	0.94	1.21													0.00	0.00	10.53	74.85	104.19	122.14	178.56	21	600	600	CONC	0.15	26.5	237.8056	0.8411	0.5251	0.087	
To, Pipe 103 - 104						1.21													0.00	0.00	12.38															
	201	202	0.58	0.69	1.11	1.11													0.00	0.00	10.00	76.81	104.19	122.14	178.56	85	600	600	CONC	0.15	93.5	237.8056	0.8411	1.8528	0.359	
	202	204			0.00	1.11													0.00	0.00	11.85	70.35	95.33	111.70	163.23	78	675	675	CONC	0.12	10.0	291.1883	0.8137	0.2048	0.269	
To, Pipe 204 - 205						1.11													0.00	0.00	12.06															
Contribution From, Pipe 102 - 103						1.21													0.00	0.00	12.38															
	103	104	0.67	0.64	1.19	2.40	0.07	0.80	0.16	0.16									0.00	0.00	12.38	68.74	93.11	109.09	159.39	180	675	675	CONC	0.12	122.0	291.1883	0.8137	2.4988	0.616	
	104	105	0.74	0.64	1.32	3.72													0.00	0.00	14.88	62.06	83.95	98.32	143.58	244	675	675	CONC	0.12	123.0	291.1883	0.8137	2.5193	0.837	
	105	106	0.23	0.64	0.41	4.13													0.00	0.00	17.40	56.63	76.54	89.60	130.78	246	675	675	CONC	0.12	41.0	291.1883	0.8137	0.8398	0.843	
	106	107	0.17	0.64	0.30	4.43													0.00	0.00	18.24	55.05	74.38	87.06	127.06	255	750	750	CONC	0.12	26.5	385.6505	0.8729	0.5060	0.662	
	107	108	0.26	0.64	0.46	4.89													0.00	0.00	18.74	54.15	73.14	85.60	124.92	276	750	750	CONC	0.12	42.5	385.6505	0.8729	0.8114	0.716	
	108	110	0.10	0.64	0.18	5.07													0.00	0.00	19.55	52.76	71.25	83.38	121.66	279	750	750	CONC	0.12	22.5	385.6505	0.8729	0.4296	0.722	
To, Pipe 110 - 111						5.07													0.00	0.00	19.98															
Contribution From, Pipe 202 - 204						1.11													0.00	0.00	12.06															
Contribution From, Pipe 203 - 204						4.87													0.00	0.00	11.73															
	204	205	0.21	0.64	0.37	6.36													0.00	0.00	12.06	69.71	94.45	110.67	161.71	557	975	975	CONC	0.12	67.0	776.3236	1.0398	1.0739	0.717	
	205	206	0.26	0.64	0.46	6.82													0.00	0.00	13.13	66.56	90.12	105.58	154.23	562	975	975	CONC	0.12	67.0	776.3236	1.0398	1.0739	0.724	
			0.37	0.64	0.66	7.48													0.00	0.00																
	206	207			0.00	7.48	2.56	0.40	2.85	4.05									0.00	0.00	14.21	63.71	86.22	100.98	147.48	825	1050	1050	CONC	0.15	95.5	1057.6053	1.2214	1.3032	0.780	
To, Pipe 207 - 208						7.48													0.00	0.00	15.51															
Contribution From, Pipe 208 - 209						8.33													0.00	0.00	17.40															
	209	210	0.66	0.64	1.17	9.51													0.00	0.00	17.40	56.63	76.53	89.59	130.77	848	1050	1050	CONC	0.15	92.0	1057.6053	1.2214	1.2554	0.802	
	210	211	0.04	0.64	0.07	9.58													0.00	0.00	18.66	54.30	73.35	85.85	125.28	817	1050	1050	CONC	0.15	12.0	1057.6053	1.2214	0.1637	0.772	
To 2, Pipe 211 - HW2						9.58													0.00	0.00	18.82															
					0.00	0.00	0.13	0.80	0.29	0.29									0.00	0.00																
	109	110	1.86	0.64	3.31	4.77													0.00	0.00	10.00	76.81	104.19	122.14	178.56	396	750	750	CONC	0.20	60.5	497.8726	1.1270	0.8947	0.796	
Contribution From, Pipe 108 - 110						5.07													0.00	0.00	19.98															
	110	111	0.06	0.64	0.11	9.94													0.00	0.00	19.98	52.06	70.29	82.25	120.01	549	825	825	CONC	0.20	18.0	641.9463	1.2009	0.2498	0.855	
	111	112	0.06	0.64	0.11	10.05													0.00	0.00	20.23	51.66	69.74	81.61	119.08	550	825	825	CONC	0.20	13.5	641.9463	1.2009	0.1874	0.857	
To 1, Pipe 112 - HW1						10.05													0.00	0.00	20.42															
Contribution From, Pipe 111 - 112						10.05													0.00	0.00	20.42															
	112	HW1			0.00	10.05													0.00	0.00	20.42	51.36	69.34	81.14	118.38	547	825	825	CONC	0.20	16.5	641.9463	1.2009	0.2290	0.852	
Contribution From, Pipe 210 - 211						9.58													0.00	0.00	18.82															
	211	HW2	0.63	0.64	1.12	10.70													0.00	0.00	18.82	54.01	72.95	85.39	124.61	873	1050	1050	CONC	0.15	16.5	1057.6053	1.2214	0.2252	0.826	
	301	302	0.19	0.64	0.34	0.34													0.00	0.00	10.00	76.81	104.19	122.14	178.56	26	450	450	CONC	0.20	29.0	127.5033	0.8017	0.6029	0.204	
To, Pipe 302 - 303						0.34													0.00	0.00	10.60															
	305	306	0.48	0.64	0.85	0.85													0.00	0.00	10.00	76.81	104.19	122.14	178.56	66	600	600	CONC	0.15	43.5	237.8056	0.8411	0.8620	0.276	
	306	307	0.46	0.67	0.86	1.71													0.00	0.00	10.86	73.65	99.85	117.03	171.05	126	675	675	CONC	0.12	74.0	291.1883	0.8137	1.5157	0.433	

Definitions:
 Q = 2.78 AIR, where
 Q = Peak Flow in Litres per second (L/s)
 A = Areas in hectares (ha)
 I = Rainfall Intensity (mm/h)
 R = Runoff Coefficient

Notes:
 1) Ottawa Rainfall-Intensity Curve
 2) Min. Velocity = 0.80 m/s

Designed:	WL	PROJECT:	BARRHAVEN CONSERVANCY WEST		
Checked:	WL	LOCATION:	City of Ottawa		
Dwg. Reference:		File Ref:	20-1226	Date:	14 Mar 2024
				Sheet No.:	SHEET 1 OF 5

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)



Local Roads Return Frequency = 2 years
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Manning 0.013

LOCATION			AREA (Ha)																FLOW							SEWER DATA											
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO				
Location	From Node	To Node	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	Conc. (min)	2 Year (mm/h)	5 Year (mm/h)	10 Year (mm/h)	100 Year (mm/h)	Q (l/s)	(actual)	(nominal)	(%)	(m)	(l/s)	(m/s)	LOW (min)	Q/Q full					
	307	308	0.44	0.67	0.82	2.53			0.00	0.00			0.00	0.00			0.00	0.00	12.38	68.74	93.11	109.10	159.40	174	675	675	CONC	0.12	74.0	291.1883	0.8137	1.5157	0.597				
To 7, Pipe 308 - 309						2.53				0.00				0.00				0.00	13.89																		
Contribution From , Pipe 302 - 303						1.85				0.00				0.00				0.00	13.17																		
	303	304	0.11	0.69	0.21	2.06			0.00	0.00			0.00	0.00			0.00	0.00	13.17	66.46	89.98	105.41	153.99	137	675	675	CONC	0.12	60.0	291.1883	0.8137	1.2289	0.471				
	304	308	1.00	0.69	1.92	3.98			0.00	0.00			0.00	0.00			0.00	0.00	14.40	63.23	85.55	100.20	146.34	252	675	675	CONC	0.15	61.5	325.5584	0.9098	1.1267	0.773				
To 7, Pipe 308 - 309						3.98				0.00				0.00				0.00	15.52																		
	401	402	0.12	0.64	0.21	2.21			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	16	300	300	PVC	0.35	22.0	57.2089	0.8093	0.4530	0.287				
	402	403	0.04	0.64	0.07	2.28			0.00	0.00			0.00	0.00			0.00	0.00	10.45	75.11	101.86	119.39	174.52	21	375	375	PVC	0.30	6.0	96.0323	0.8695	1.0150	0.223				
	403	404	0.21	0.67	0.39	2.68			0.00	0.00			0.00	0.00			0.00	0.00	10.57	74.69	101.29	118.72	173.53	50	450	450	CONC	0.20	48.5	127.5033	0.8017	1.0083	0.396				
	404	405	0.80	0.67	1.49	2.17			0.00	0.00			0.00	0.00			0.00	0.00	11.58	71.24	96.54	113.13	165.33	154	525	525	CONC	0.20	60.0	192.3297	0.8885	1.1255	0.802				
	405	406	0.25	0.64	0.44	2.61			0.00	0.00			0.00	0.00			0.00	0.00	12.70	67.78	91.80	107.55	157.13	177	600	600	CONC	0.15	48.5	237.8056	0.8411	0.9611	0.744				
To , Pipe 406 - 407						2.61				0.00				0.00				0.00	13.66																		
Contribution From , Pipe 301 - 302						0.34				0.00				0.00				0.00	10.60																		
	302	303	0.79	0.69	1.52	1.85			0.00	0.00			0.00	0.00			0.00	0.00	10.60	74.56	101.11	118.51	173.23	138	600	600	CONC	0.15	129.5	237.8056	0.8411	2.5662	0.581				
To , Pipe 303 - 304						1.85				0.00				0.00				0.00	13.17																		
7																																					
Contribution From , Pipe 304 - 308						3.98				0.00				0.00				0.00	15.52																		
Contribution From , Pipe 307 - 308						2.53				0.00				0.00				0.00	13.89																		
	308	309			0.00	6.51			0.00	0.00			0.00	0.00			0.00	0.00	15.52	60.56	81.90	95.90	140.03	394	750	750	CONC	0.20	17.5	497.8726	1.1270	0.2588	0.792				
	309	310			0.00	6.51			0.00	0.00			0.00	0.00			0.00	0.00	15.78	59.98	81.11	94.97	138.67	391	825	825	CONC	0.12	21.0	497.2495	0.9302	0.3763	0.786				
	310	314	1.84	0.80	4.09	10.61			0.00	0.00			0.00	0.00			0.00	0.00	16.16	59.16	79.99	93.66	136.74	627	975	975	CONC	0.12	64.5	776.3236	1.0398	1.0339	0.808				
Contribution From , Pipe 313 - 314						0.00			0.00	1.78			0.00	0.00				0.00	13.38																		
	314	315			0.00	10.61			0.00	1.78			0.00	0.00			0.00	0.00	17.19	57.03	77.08	90.24	131.72	742	1050	1050	CONC	0.12	117.5	945.9510	1.0924	1.7926	0.784				
	315	316			0.00	10.61			0.00	1.78			0.00	0.00			0.00	0.00	18.99	53.72	72.56	84.92	123.92	699	1050	1050	CONC	0.12	9.0	945.9510	1.0924	0.1373	0.739				
	316	317	2.16	0.80	4.80	15.41			0.00	1.78			0.00	0.00			0.00	0.00	19.12	53.49	72.24	84.54	123.37	953	1200	1200	CONC	0.12	73.5	1350.5598	1.1942	1.0258	0.705				
To , Pipe 317 - 318						15.41				1.78				0.00				0.00	20.15																		
	203	204	2.19	0.80	4.87	4.87	0.41	0.80	0.91	0.91			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	469	900	900	CONC	0.12	102.5	627.1102	0.9858	1.7330	0.748				
To , Pipe 204 - 205						4.87				0.91				0.00				0.00	11.73																		
	412	413			0.00	0.00	0.54	0.69	1.04	1.04			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	108	600	600	CONC	0.15	60.0	237.8056	0.8411	1.1890	0.454				
To , Pipe 413 - 414						0.00				1.04				0.00				0.00	11.19																		
	601	602			0.00	0.00	0.18	0.80	0.40	0.40			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	42	675	675	CONC	0.12	33.0	291.1883	0.8137	0.6759	0.143				
To , Pipe 602 - 603						0.00				0.40				0.00				0.00	10.68																		
	501	502			0.00	0.00	0.44	0.69	0.84	0.84			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	88	675	675	CONC	0.12	74.0	291.1883	0.8137	1.5157	0.302				
	502	503			0.00	0.00	0.41	0.69	0.79	1.63			0.00	0.00			0.00	0.00	11.52	71.44	96.82	113.45	165.80	158	675	675	CONC	0.12	73.5	291.1883	0.8137	1.5054	0.542				
To , Pipe 503 - 504						0.00				1.63				0.00				0.00	13.02																		
	311	312			0.00	0.00	0.36	0.80	0.80	0.80			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	83	600	600	CONC	0.15	78.0	237.8056	0.8411	1.5457	0.351				
	312	313			0.00	0.00	0.25	0.80	0.56	1.36			0.00	0.00			0.00	0.00	11.55	71.34	96.68	113.30	165.56	131	600	600	CONC	0.15	78.0	237.8056	0.8411	1.5457	0.552				
	313	314			0.00	0.00	0.19	0.80	0.42	1.78			0.00	0.00			0.00	0.00	13.09	66.67	90.28	105.76	154.50	161	675	675	CONC	0.12	14.0	291.1883	0.8137	0.2867	0.552				
To 7, Pipe 314 - 315						0.00				1.78				0.00				0.00	13.38																		
	508	509	0.67	0.69	1.29	1.29			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	235	675	675	CONC	0.12	54.0	291.1883	0.8137	1.1060	0.808				
To , Pipe 509 - 510						3.06				0.00				0.00				0.00	11.11																		
	321	322	0.14	0.64	0.25	2.25			0.00	0.00			0.00	0.00																							

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Location	From Node	To Node	AREA (Ha)																FLOW										SEWER DATA					
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO	
			AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	Conc. (min)	2 Year (mm/h)	5 Year (mm/h)	10 Year (mm/h)	100 Year (mm/h)	Q (l/s)	(actual)	(nominal)	(%)	(m)	(l/s)	(m/s)	LOW (min)	Q/Q full		
	322	323	0.13	0.64	0.23	0.48					0.00	0.00			0.00	0.00	10.54	74.81	101.45	118.91	173.81	36	300	300	PVC	0.35	31.0	57.2089	0.8093	0.6384	0.628			
	323	324			0.00	0.48				0.00	0.00			0.00	0.00	11.17	72.57	98.38	115.29	168.50	35	375	375	PVC	0.30	10.0	96.0323	0.8695	0.1917	0.363				
To , Pipe 324 - 325						0.48					0.00				0.00		11.37																	
Contribution From , Pipe 206 - 207						7.48						4.05				0.00	15.51																	
	207	208	0.26	0.64	0.46	7.94					0.00	4.05			0.00	0.00	15.51	60.59	81.95	95.96	140.12	813	1050	1050	CONC	0.12	65.5	945.9510	1.0924	0.9993	0.859			
	208	209	0.22	0.64	0.39	8.33					0.00	4.05			0.00	0.00	16.51	58.42	78.98	92.47	135.00	806	1050	1050	CONC	0.12	58.5	945.9510	1.0924	0.8925	0.853			
To , Pipe 209 - 210						8.33						4.05				0.00	17.40																	
Contribution From , Pipe 506 - 507						2.01						2.54				0.00	16.57																	
	507	509	0.71	0.69	1.36	3.37					0.00	2.54			0.00	0.00	16.57	58.29	78.79	92.25	134.68	397	900	900	CONC	0.12	83.5	627.1102	0.9858	1.4118	0.633			
To , Pipe 509 - 510						3.37						2.54				0.00	17.99																	
Contribution From 7, Pipe 316 - 317						15.41						1.78				0.00	20.15																	
	317	318	0.12	0.80	0.27	15.68					0.00	1.78			0.00	0.00	20.15	51.79	69.93	81.83	119.39	936	1200	1200	CONC	0.12	23.0	1350.5598	1.1942	0.3210	0.693			
To , Pipe 318 - 319						15.68						1.78				0.00	20.47																	
Contribution From , Pipe 323 - 324						0.48						0.00				0.00	11.37																	
	324	325	0.26	0.64	0.46	0.94					0.00	0.00			0.00	0.00	11.37	71.93	97.49	114.25	166.97	68	450	450	CONC	0.20	61.0	127.5033	0.8017	1.2682	0.532			
	325	326	0.45	0.64	0.80	1.74					0.00	0.00			0.00	0.00	12.63	67.98	92.07	107.87	157.60	119	525	525	CONC	0.20	10.5	192.3297	0.8885	0.1970	0.616			
	326	327	0.02	0.64	0.04	1.78					0.00	0.00			0.00	0.00	12.83	67.41	91.29	106.95	156.25	120	600	600	CONC	0.15	13.0	237.8056	0.8411	0.2576	0.504			
	327	328	0.03	0.64	0.05	1.83					0.00	0.00			0.00	0.00	13.09	66.68	90.29	105.77	154.52	122	675	675	CONC	0.12	23.5	291.1883	0.8137	0.4813	0.420			
To 3, Pipe 328 - HW3						1.83						0.00				0.00	13.57																	
Contribution From , Pipe 317 - 318						15.68						1.78				0.00	20.47																	
	318	319	0.46	0.64	0.82	16.49					0.00	1.78			0.00	0.00	20.47	51.29	69.24	81.02	118.20	969	1200	1200	CONC	0.12	79.5	1350.5598	1.1942	1.1096	0.718			
	319	320	0.06	0.64	0.11	16.60					0.00	1.78			0.00	0.00	21.58	49.62	66.96	78.35	114.29	943	1200	1200	CONC	0.12	14.0	1350.5598	1.1942	0.1954	0.698			
	320	328	0.03	0.64	0.05	16.65					0.00	1.78			0.00	0.00	21.78	49.34	66.58	77.90	113.63	940	1200	1200	CONC	0.12	23.5	1350.5598	1.1942	0.3280	0.696			
To 3, Pipe 328 - HW3						16.65						1.78				0.00	22.10																	
Contribution From , Pipe 320 - 328						16.65						1.78				0.00	22.10																	
Contribution From , Pipe 327 - 328						1.83						0.00				0.00	13.57																	
	328	HW3			0.00	18.49					0.00	1.78			0.00	0.00	22.10	48.88	65.95	77.16	112.54	1021	1200	1200	CONC	0.12	16.5	1350.5598	1.1942	0.2303	0.756			
Contribution From , Pipe 405 - 406						2.61						0.00				0.00	13.66																	
	406	407	0.55	0.64	0.98	3.59					0.00	0.00			0.00	0.00	13.66	65.11	88.14	103.24	150.81	234	675	675	CONC	0.12	66.0	291.1883	0.8137	1.3518	0.803			
	407	408	0.47	0.64	0.84	4.43					0.00	0.00			0.00	0.00	15.01	61.73	83.51	97.80	142.81	273	750	750	CONC	0.12	72.0	385.6505	0.8729	1.3747	0.708			
	408	409	1.06	0.80	2.36	8.18					0.00	0.00			0.00	0.00	16.39	58.67	79.32	92.87	135.59	480	900	900	CONC	0.12	63.5	627.1102	0.9858	1.0736	0.765			
	409	410	0.56	0.80	1.25	10.17	0.25	0.80			0.56	0.56			0.00	0.00	17.46	56.51	76.36	89.39	130.48	617	975	975	CONC	0.12	122.0	776.3236	1.0398	1.9555	0.795			
To , Pipe 410 - 411						10.17						0.56				0.00	19.42																	
Contribution From , Pipe 409 - 410						10.17						0.56				0.00	19.42																	
	410	411	0.40	0.64	0.71	10.89					0.00	0.56			0.00	0.00	19.42	52.99	71.55	83.74	122.19	617	975	975	CONC	0.12	52.5	776.3236	1.0398	0.8415	0.794			
To , Pipe 411 - 418						10.89						0.56				0.00	20.26																	
Contribution From , Pipe 412 - 413						0.00						1.04				0.00	11.19																	
	413	414	0.37	0.69	0.71	0.71	0.28	0.69			0.54	1.57			0.00	0.00	11.19	72.52	98.31	115.21	168.37	206	675	675	CONC	0.12	73.5	291.1883	0.8137	1.5054	0.708			
	414	415	0.40	0.69	0.77	1.48					0.00	1.57			0.00	0.00	12.69	67.81	91.83	107.59	157.18	245	675	675	CONC	0.12	82.0	291.1883	0.8137	1.6795	0.840			
	415	416	1.33	0.69	2.55	4.03					0.00	1.57			0.00	0.00	14.37	63.29	85.64	100.30	146.48	390	675	675	CONC	0.30	46.5	460.4091	1.2866	0.6024	0.846			
	416	417	0.19	0.64	0.34	4.37					0.00	1.57			0.00	0.00	14.98	61.82	83.63	97.94	143.03	401	750	750	CONC	0.20	16.5	497.8726	1.1270	0.2440	0.806			
	417	418	0.05	0.64	0.09	4.46					0.00	1.57			0.00	0.00	15.22	61.25	82.85	97.02	141.68	403	825	825	CONC	0.12	11.5	497.2495	0.9302	0.2060	0.811			
To 4, Pipe 418 - HW4						4.46						1.57				0.00	15.43																	

Definitions:
 Q = 2.78 AIR, where
 Q = Peak Flow in Litres per second (L/s)
 A = Areas in hectares (ha)
 I = Rainfall Intensity (mm/h)
 R = Runoff Coefficient

Notes:
 1) Ottawa Rainfall-Intensity Curve
 2) Min. Velocity = 0.80 m/s

Designed:	WL	PROJECT:	BARRHAVEN CONSERVANCY WEST		
Checked:	WL	LOCATION:	City of Ottawa		
Dwg. Reference:		File Ref:	20-1226	Date:	14 Mar 2024
				Sheet No.	SHEET 3 OF 5

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
 Collector Roads Return Frequency = 5 years
 Arterial Roads Return Frequency = 10 years



Manning 0.013

LOCATION			AREA (Ha)																FLOW							SEWER DATA											
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO				
Location	From Node	To Node	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	AREA (Ha)	R	Indiv. 2.78 AC	Accum. 2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)	(%)	(m)	(l/s)	(m/s)	LOW (min)	Q/Q full					
Contribution From , Pipe 410 - 411					10.89				0.56					0.00				0.00	20.26																		
	411	418	1.14	0.64	2.03	12.91			0.00	0.56				0.00				0.00	20.26	51.62	69.69	81.55	118.98	705	1050	1050	CONC	0.12	115.5	945.9510	1.0924	1.7621	0.746				
To 4, Pipe 418 - HW4						12.91				0.56				0.00				0.00	22.02																		
Contribution From , Pipe 502 - 503					0.00				1.63					0.00				0.00	13.02																		
			0.10	0.45	0.13	0.13			0.00	1.63				0.00				0.00	13.02																		
					0.00	0.13	0.23	0.80	0.51	2.14				0.00				0.00	13.02																		
					0.00	0.13	0.36	0.40	0.40	2.54				0.00				0.00	13.02																		
	503	504	0.36	0.69	0.69	0.82			0.00	2.54				0.00				0.00	13.02	66.87	90.55	106.08	154.97	285	750	750	CONC	0.15	111.0	431.1703	0.9760	1.8956	0.660				
To , Pipe 504 - 505						0.82				2.54				0.00				0.00	14.92																		
Contribution From , Pipe 503 - 504					0.82				2.54					0.00				0.00	14.92																		
	504	505	0.29	0.69	0.56	1.37			0.00	2.54				0.00				0.00	14.92	61.96	83.83	98.17	143.36	298	825	825	CONC	0.12	31.0	497.2495	0.9302	0.5554	0.600				
	505	506	0.13	0.64	0.23	1.60			0.00	2.54				0.00				0.00	15.47	60.68	82.06	96.09	140.31	306	825	825	CONC	0.12	5.0	497.2495	0.9302	0.0896	0.615				
	506	507	0.23	0.64	0.41	2.01			0.00	2.54				0.00				0.00	15.56	60.47	81.79	95.77	139.84	330	825	825	CONC	0.12	56.5	497.2495	0.9302	1.0123	0.663				
To , Pipe 507 - 509						2.01				2.54				0.00				0.00	16.57																		
Contribution From , Pipe 507 - 509					3.37				2.54					0.00				0.00	17.99																		
Contribution From , Pipe 508 - 509					3.06				2.54					0.00				0.00	11.11																		
	509	510	0.51	0.64	0.91	7.35			0.00	2.54				0.00				0.00	17.99	55.51	75.01	87.80	128.15	599	975	975	CONC	0.12	106.5	776.3236	1.0398	1.7071	0.771				
	510	511	0.14	0.64	0.25	7.60			0.00	2.54				0.00				0.00	19.69	52.53	70.93	83.01	121.12	579	975	975	CONC	0.12	12.0	776.3236	1.0398	0.1923	0.746				
	511	512	0.09	0.64	0.16	7.76			0.00	2.54				0.00				0.00	19.89	52.22	70.50	82.51	120.39	584	975	975	CONC	0.12	22.5	776.3236	1.0398	0.3607	0.753				
To , Pipe 512 - HW5						7.76				2.54				0.00				0.00	20.25																		
Contribution From , Pipe 511 - 512					7.76				2.54					0.00				0.00	20.25																		
	512	HW5	0.02	0.64	0.04	7.79			0.00	2.54				0.00				0.00	20.25	51.64	69.72	81.58	119.03	644	975	975	CONC	0.15	39.0	867.9562	1.1625	0.5591	0.742				
Contribution From , Pipe 601 - 602					0.00				0.40					0.00				0.00	10.68																		
	602	603	0.96	0.90	2.40	2.40	0.44	0.80	0.98	1.38				0.00				0.00	10.68	74.30	100.75	118.09	172.61	317	750	750	CONC	0.12	112.5	385.6505	0.8729	2.1479	0.823				
			0.14	0.80	0.31	2.71			0.00	1.38				0.00				0.00	12.82	67.43	91.32	106.98	156.30	562	975	975	CONC	0.12	83.0	776.3236	1.0398	1.3304	0.724				
	603	604	1.69	0.80	3.76	6.47			0.00	1.38				0.00				0.00	12.82	67.43	91.32	106.98	156.30	562	975	975	CONC	0.12	83.0	776.3236	1.0398	1.3304	0.724				
			0.44	0.69	0.84	7.32			0.00	1.38				0.00				0.00	14.15	63.84	86.39	101.19	147.79	695	975	975	CONC	0.15	76.5	867.9562	1.1625	1.0968	0.801				
	604	605	0.77	0.80	1.71	9.03			0.00	1.38				0.00				0.00	15.25	61.18	82.75	96.91	141.51	698	975	975	CONC	0.15	76.5	867.9562	1.1625	1.0968	0.804				
	605	611	0.27	0.69	0.52	9.55			0.00	1.38				0.00				0.00	15.29	61.18	82.75	96.91	141.51	698	975	975	CONC	0.15	76.5	867.9562	1.1625	1.0968	0.804				
Contribution From , Pipe 610 - 611					3.87				0.00					0.00				0.00	15.29																		
	611	612	0.05	0.80	0.11	13.53			0.00	1.38				0.00				0.00	16.35	58.76	79.44	93.01	135.79	905	975	975	CONC	0.25	29.5	1120.5266	1.5008	0.3276	0.807				
To 6, Pipe 612 - HW6						13.53				1.38				0.00				0.00	16.68																		
	606	607	0.84	0.69	1.61	1.61			0.00	0.00				0.00				0.00	10.00	76.81	104.19	122.14	178.56	124	600	600	CONC	0.15	114.0	237.8056	0.8411	2.2590	0.520				
	607	608	0.08	0.69	0.15	1.76			0.00	0.00				0.00				0.00	12.26	69.10	93.60	109.67	160.25	122	675	675	CONC	0.12	55.0	291.1883	0.8137	1.1265	0.419				
	608	609	0.03	0.69	0.06	1.82			0.00	0.00				0.00				0.00	13.39	65.86	89.16	104.45	152.57	120	675	675	CONC	0.12	16.0	291.1883	0.8137	0.3277	0.412				
	609	610	0.06	0.69	0.12	1.94			0.00	0.00				0.00				0.00	13.71	64.98	87.96	103.03	150.49	126	675	675	CONC	0.12	16.0	291.1883	0.8137	0.3277	0.432				
To , Pipe 610 - 611						1.94				0.00				0.00				0.00	14.04																		
Contribution From , Pipe 609 - 610					1.94				0.00					0.00				0.00	14.04																		
	610	611	1.01	0.69	1.94	3.87			0.00	0.00				0.00				0.00	14.04	64.13	86.79	101.65	148.47	248	675	675	CONC	0.12	61.0	291.1883	0.8137	1.2494	0.853				
To , Pipe 611 - 612						3.87				0.00				0.00				0.00	15.29																		

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 R = Runoff Coefficient

Notes:
 1) Ottawa Rainfall-Intensity Curve
 2) Min. Velocity = 0.80 m/s

Designed:	WL	PROJECT:	BARRHAVEN CONSERVANCY WEST		
Checked:	WL	LOCATION:	City of Ottawa		
Dwg. Reference:		File Ref:	20-1226	Date:	14 Mar 2024
				Sheet No.:	SHEET 4 OF 5

