
Appendix E

Storm Sewer Design Sheets

Existing Madoc Storm Sewer Calculation Sheet



STREET	MANHOLE		AREA No.	AREA Ha	CONTRIBUTING AREAS	RUNOFF DATA						PIPE DATA								
	From	To				C	AC	∑ AC	Tc (min.)	I (mm/hr)	Q (L/s)	Size (mm)	Slope (%)	Capacity (L/s)	Q/Q _{full}	Velocity (m/s)	Length (m)	Fall (m)	U/S Invert (m)	D/S Invert (m)
St. Lawrence St. E	STO-194	STO-87	A1	1.03	A1	0.68	0.696	0.696	20	45	87.94	375	0.40%	110.53	0.80	1.00	78	0.31	179.45	179.14
St. Lawrence St. E	STO-87	STO-88	A2	0.72	A1-A2	0.55	0.396	1.092	21.3	44	132.12	400	0.47%	142.28	0.93	1.13	70.7	0.33	179.11	178.78
St. Lawrence St. E	STO-88	STO-89	A3	1.05	A1-A3	0.47	0.493	1.585	22.3	42	185.43	400	3.08%	365.59	0.51	2.91	63.6	1.96	178.75	176.79
St. Lawrence St. E	STO-89	STO-90	A4	0.81	A1-A4	0.50	0.406	1.991	22.7	42	230.32	400	6.09%	514.11	0.45	4.09	104.2	6.35	176.78	170.43
St. Lawrence St. E	STO-90	STO-91	A5	0.96	A1-A5	0.60	0.579	2.569	23.1	41	293.44	400	3.57%	393.41	0.75	3.13	76.5	2.73	170.42	167.69
St. Lawrence St. E	STO-91	STO-93	A6	1.52	A1-A6	0.50	0.762	3.332	23.5	41	375.90	600	0.66%	500.25	0.75	1.77	91.9	0.61	167.5	166.89
St. Lawrence St. E	STO-93	STO-96	A7	0.94	A1-A7	0.64	0.601	3.933	24.4	40	432.64	675	0.49%	587.62	0.74	1.64	83.9	0.41	166.87	166.46
St. Lawrence St. E	STO-96	Ditch	A8-A11	4.35	A1-A8,A11	0.53	2.316	6.249	25.3	39	671.15	675	0.76%	733.88	0.91	2.05	87.9	0.67	166.46	165.79
Wellington St.	CB-187	CB-193	A9	3.1	A9	0.59	1.837	1.837	20.0	45	232.26	600	2.23%	917.32	0.25	3.24	56.9	1.27	168.64	167.37
Wellington St.	CB-193	Ditch	-	0	A9	0.00	0.000	1.837	20.3	45	229.91	600	0.72%	520.80	0.44	1.84	6.95	0.05	167.36	167.31
St. Lawrence St.	STO-96	Creek Outlet		24.74	A1-A12	0.62	15.415	15.415	28.3	36	2225.82	1350	0.29%	2895.88	0.77	2.02	468.79	1.38	166.46	165.08
Elgin St.	STO-48	STO-47	A10-A12	3.31	A1-A12	0.60	1.979	10.065	25.3	39	1776.51	600	0.10%	195.15	SURCHARGED	0.69	19.8	0.02	165.21	165.19
ROW	STO-47	STO-52	-	0	A1-A12	0.00	0.000	10.065	25.7	38	1762.43	650	0.89%	718.87	SURCHARGED	2.17	68.2	0.61	165.14	164.53
ROW	STO-52	STO-54	A13	5.13	A1-A13	0.65	3.325	13.390	26.3	38	2095.07	650	0.65%	610.76	SURCHARGED	1.84	133.2	0.86	164.53	163.67
ROW	STO-54	STO-55	-	0	A1-A13	0.00	0.000	13.390	27.5	36	2051.81	650	0.18%	322.65	SURCHARGED	0.97	33.3	0.06	163.67	163.61
Duncun St.	STO-432	STO-431	A32	2.11	A32	0.27	0.564	0.564	20.0	45	71.29	250	2.05%	85.14	0.84	1.73	16.1	-0.33	178.7	179.03
Duncun St.	STO-431	STO-104	A33	1.23	A32-A33	0.49	0.603	1.167	20.2	45	146.68	375	1.54%	217.93	0.67	1.97	106.8	1.65	178.59	176.94
ROW	STO-104	STO-457	-	0	A32-A33	0.00	0.000	1.167	21.1	44	142.26	375	1.33%	202.21	0.70	1.83	42.1	0.56	176.78	176.22
ROW	STO-104	STO-457	-	0	A32-A33	0.00	0.000	1.167	21.4	43	140.48	450	0.43%	186.38	0.75	1.17	58.5	0.25	176.13	175.88
Durham St. N	STO-450	STO-448	A16	2.07	A16	0.46	0.949	0.949	20.0	45	119.99	375	0.63%	139.18	0.86	1.26	39.2	0.247	172.709	172.462
Durham St. N	STO-448	CB-33	-	0	A16	0.00	0.000	0.949	20.5	45	117.86	450	0.20%	126.01	0.94	0.79	21.5	0.042	172.462	172.42
Durham St. N	CB-33	CB-31	A34	0.85	A16,A34	0.47	0.398	1.347	21.0	44	164.75	450	0.71%	239.98	0.69	1.51	24.7	0.175	172.391	172.216
Russel St.	STO-5	STO-6	A17	1.48	A17	0.62	0.911	2.258	20.0	45	285.45	525	0.96%	420.32	0.68	1.94	33.5	0.32	171.11	170.79
Russel St.	STO-6	STO-7	A18	1.25	A16-A18,A34	0.85	1.065	3.322	20.3	45	415.86	600	0.71%	517.91	0.80	1.83	50.6	0.36	170.58	170.22
Russel St.	STO-7	STO-441	A35	1.38	A16-A18,A34-A35	0.71	0.979	4.302	20.7	44	530.07	600	1.50%	752.27	0.70	2.66	96.6	1.45	170.18	168.73
Davidson St.	CB-209	CB-208	A19	2.58	A19	0.67	1.727	1.727	20.0	45	218.29	450	0.93%	275.55	0.79	1.73	36.4	0.34	168.52	168.18
Davidson St.	CB-208	CB-300	A36	0.48	A19,A36	0.62	0.298	2.025	20.4	45	252.89	600	0.18%	261.48	0.97	0.92	38.6	0.07	168.18	168.11
Davidson St.	CB-300	CB-204	-	0	A19,A36	0.00	0.000	2.025	21.0	44	247.01	600	0.23%	297.40	0.83	1.05	34.1	0.08	168.09	168.01
Davidson St.	CB-204	CB-202	-	0	A19,A36	0.00	0.000	2.025	21.6	43	242.68	675	0.10%	267.16	0.91	0.75	19.8	0.02	167.99	167.97
Davidson St.	CB-202	STO-438	A37	0.48	A19,A36-A37	0.73	0.353	2.377	22.0	43	280.94	675	10.27%	2693.62	0.10	7.53	14.9	1.53	167.97	166.44
St. Lawrence St. E	STO-438	STO-439	A20	1.78	A19-A20,A36-A37	0.76	1.350	3.727	22.1	42	439.99	675	0.30%	462.29	0.95	1.29	105.8	0.32	166.44	166.12
St. Lawrence St. E	STO-439	STO-444	A21	1.61	A19-A21,A36-A37	0.90	1.449	5.176	23.4	41	585.93	675	0.61%	657.73	0.89	1.84	83.3	0.51	166.09	165.58
St. Lawrence St. E	STO-444	STO-442	-	0	A19-A21,A36-A37	0.00	0.000	5.176	24.2	40	573.08	675	0.72%	712.61	0.80	1.99	9.74	0.07	165.58	165.51
ROW	STO-442	STO-443	-	0	A19-A21,A36-A37	0.00	0.000	5.176	24.3	40	571.73	675	3.14%	1489.64	0.38	4.16	12.1	0.38	165.46	165.08
St. Lawrence St. W	STO-10	STO-9	A38	1.31	A38	0.66	0.866	0.866	20.0	45	109.45	300	5.55%	227.75	0.48	3.22	108	5.991	173.978	167.987
St. Lawrence St. W	STO-9	CB-76	A39	0.23	A38-A39	0.90	0.207	1.073	20.6	45	133.03	450	3.94%	565.71	0.24	3.56	42.9	1.689	167.977	166.288
Elgin St.	STO-447	STO-44	A40	0.97	A40	0.79	0.771	0.771	20.0	45	97.47	300	2.55%	154.48	0.63	2.19	33.7	0.86	165.56	164.7
Elgin St.	STO-44	STO-436	-	0	A40	0.00	0.000	0.771	20.3	45	96.60	375	0.80%	157.04	0.62	1.42	70.8	0.568	164.68	164.112
Elgin St.	STO-47 (NEW)	STO-436	A13	5.13	A13	0.65	3.325	3.325	20.0	45	420.42	450	6.04%	700.51	0.60	4.40	21.7	1.31	165.21	163.9

				0		0.00															
Baldwin St.	STO-436	STO-139	A22	2.47	A40,A22	0.74	1.831	2.602	21.1	44	317.01	525	0.83%	391.69	0.81	1.81	21.7	0.18	163.86	163.68	
Baldwin St.	STO-139	STO-137	-	0	A40,A22	0.00	0.000	2.602	21.3	44	314.93	525	1.46%	518.88	0.61	2.40	31.6	0.46	163.65	163.19	
Baldwin St.	STO-137	STO-135	A23	2.08	A40,A22-A23	0.41	0.848	3.450	21.5	43	414.61	600	0.90%	582.33	0.71	2.06	37.8	0.34	163.19	162.85	
Baldwin St.	STO-135	STO-40	A41	0.48	A40-A41,A22-A23	0.79	0.381	3.831	21.8	43	455.83	750	0.17%	465.19	0.98	1.05	63	0.11	162.85	162.74	
Baldwin St.	STO-40	STO-440	A24-425, A42	2.54	A24-425, A42	0.63	1.603	5.434	22.8	41	626.70	750	0.52%	805.23	0.78	1.82	351.71	1.84	162.74	160.9	
St. Lawrence St. W	CB-92	CB-93	A43	0.31	A43	0.60	0.187	0.187	20.0	45	23.60	350	0.42%	94.31	0.25	0.98	59.8	0.25	173.26	173.01	
St. Lawrence St. W	CB-93	CB-94	A44	0.39	A43-A44	0.58	0.226	0.413	21.0	44	50.42	350	0.34%	85.24	0.59	0.89	102.5	0.35	172.99	172.64	
St. Lawrence St. W	CB-94	CB-95	A45	0.83	A43-A45	0.60	0.501	0.914	22.9	41	105.00	400	0.90%	197.63	0.53	1.57	85.5	0.77	172.61	171.84	
St. Lawrence St. W	CB-95	CB-96	-	0	A43-A45	0.00	0.000	0.914	23.9	40	102.19	400	1.11%	219.52	0.47	1.75	24.3	0.27	171.57	171.3	
St. Lawrence St. W	CB-96	STO-11	A29	0.73	A43-A45,A29	0.60	0.437	1.351	24.1	40	149.98	400	0.58%	159.03	0.94	1.27	92.6	0.54	171.21	170.67	
St. Lawrence St. W	STO-11	STO-112	A31	1.57	A43-A45,A29,A31	0.52	0.823	2.174	25.3	39	233.22	450	0.80%	255.26	0.91	1.60	76.1	0.61	170.64	170.03	
St. Lawrence St. W	STO-112	STO-113	A30	1.05	A43-A45,A29-A31	0.53	0.559	2.733	26.1	38	286.93	525	0.94%	416.06	0.69	1.92	101.5	0.95	170.03	169.08	
Livingstone Ave. W	CB-18	CB-116	A46	0.68	A46	0.76	0.520	0.520	20.0	45	65.70	300	0.84%	88.61	0.74	1.25	13.1	0.11	167.78	167.67	
Livingstone Ave. W	CB-116	CB-115	A47	0.19	A46-A47	0.68	0.130	0.650	20.2	45	81.65	300	0.74%	83.15	0.98	1.18	28.4	0.21	167.67	167.46	
Livingstone Ave. W	CB-115	STO-403	-	0	A46-A47	0.00	0.000	0.650	20.6	45	80.53	300	5.76%	232.02	0.35	3.28	63.4	3.65	167.46	163.81	
Durham St. S	CB-15	CB-14	A26	0.77	A26	0.56	0.428	0.428	20.0	45	54.17	300	4.35%	201.65	0.27	2.85	54.5	2.37	165.89	163.52	
Durham St. S	CB-14	CB-11	A48	0.48	A26,A48	0.53	0.253	0.681	20.3	45	85.16	300	3.71%	186.34	0.46	2.64	54.4	2.02	163.51	161.49	
Durham St. S	CB-11	STO-440	A49	0.4	A26,A48-A49	0.63	0.250	0.931	20.7	44	115.08	350	3.01%	252.89	0.46	2.63	17.2	0.517	161.48	160.963	
Durham St. S	STO-440	STO-434	-	0	A26,A48-A49	0.00	0.000	0.931	20.8	44	114.65	500	0.99%	376.37	0.30	1.92	15.4	0.153	160.963	160.81	
ROW	CB-3	CB-4	A50	2.2	A50	0.61	1.331	1.331	20.0	45	168.31	450	0.55%	212.13	0.79	1.33	22.4	0.124	161.375	161.251	
ROW	CB-4	CB-5	-	0	A50	0.00	0.000	1.331	20.3	45	166.68	450	1.13%	302.83	0.55	1.90	5.85	-0.066	161.251	161.317	
ROW	CB-5	STO-434	-	0	A50	0.00	0.000	1.331	20.3	45	166.39	450	12.25%	997.81	0.17	6.27	1.69	0.207	161.317	161.11	
Durham St. S	STO-434	CB-6	A52	0.49	A26,A48-A50,A52	0.87	0.424	2.687	20.8	44	330.79	675	0.28%	441.86	0.75	1.23	30.4	0.084	160.79	160.706	
Durham St. S	CB-122	CB-119	A27	0.63	A27	0.70	0.443	0.443	20.0	45	55.99	300	11.19%	323.42	0.17	4.58	45.2	5.056	169.723	164.667	
Durham St. S	CB-119	CB-6	A51	0.65	A27,A51	0.52	0.335	0.778	20.2	45	97.83	300	3.52%	181.53	0.54	2.57	112.4	3.961	164.667	160.706	
Durham St. S	CB-6	CB-8	-	0	A27,A51	0.00	0.000	3.465	22.8	41	399.59	825	0.10%	446.03	0.90	0.83	7.25	0.007	160.686	160.679	
ROW	CB-8	STO-445	A28	2.1	A26-A28,A48-A52	0.62	1.307	4.772	22.8	41	550.33	825	0.34%	832.27	0.66	1.56	105.6	0.355	160.659	160.304	
ROW	STO-445	STO-446	-	0	A26-A28,A48-A52	0.00	0.000	4.772	23.9	40	532.03	825	0.94%	1392.03	0.38	2.60	31.9	0.3	160.304	160.004	
Durham St. S	CB-123	CB-125	A53	0.64	A53	0.62	0.399	0.399	20.0	45	50.39	300	5.36%	223.84	0.23	3.17	65.6	3.515	167.19	163.675	
Durham St. S	CB-125	CB-128	A54	0.28	A53-A54	0.72	0.202	0.601	20.3	45	75.02	300	4.02%	193.85	0.39	2.74	64.1	2.576	163.665	161.089	
Durham St. S	CB-128	STO-435	A55	0.47	A53-A55	0.60	0.283	0.884	20.7	44	108.95	300	2.06%	138.85	0.78	1.96	43.7	0.901	161.079	160.178	
Durham St. S	STO-435	CB-129	A56	0.58	A53-A56	0.49	0.282	1.166	21.1	44	141.96	375	1.27%	197.67	0.72	1.79	16.6	0.211	160.138	159.927	
Durham St. S	CB-129	STO-12	-	0	A53-A56	0.00	0.000	1.166	21.3	44	141.24	375	3.85%	344.01	0.41	3.11	23.3	0.897	159.907	159.01	
Dancon Ave.	STO-137	STO-131	A58	0.6	A58	0.63	0.378	0.378	20.0	45	47.76	350	0.31%	81.00	0.59	0.84	97.3	0.3	161.198	160.898	
Rollins St.	STO-131	STO-124	A57	0.63	A57-A58	0.69	0.435	0.812	21.9	43	96.31	600	0.17%	250.67	0.38	0.89	40.2	0.067	160.858	160.791	
Rollins St.	STO-122	STO-124	A59	1.41	A59	0.60	0.853	0.853	20.0	45	107.84	525	0.13%	156.94	0.69	0.72	41.3	0.055	160.366	160.311	
ROW	STO-124	STO-123	-	0	A57-A59	0	0.000	0.812	21.9	43	192.63	600	1.46%	740.74	0.26	2.62	2.13	-0.031	160.301	160.332	
ROW	STO-123	STO-128	A60-A61	0.5	A57-A61	0.55	0.273	0.273	21.9	43	128.72	600	0.36%	366.56	0.35	1.30	66.5	0.237	160.322	160.085	
ROW	STO-128	STO-127	-	0	A57-A61	0.00	0.000	0.273	22.8	42	127.87	600	0.23%	293.44	0.44	1.04	16.2	0.037	160.085	160.048	
DESIGN PARAMETERS						Designed By:					PROJECT:										
Mannings n 0.013						Prabhkaran Singh Cheema					MADOC WATER, WASTEWATER AND STORMWATER MASTER PLAN										
i= A*T^B						Checked By:					LOCATION:										
						Matthew Morkem, P.Eng					MADOC, ON, CANADA										
Intensity parameters for Madoc		2-yr	5-yr	10-yr	25-yr	50-yr	Dwg. Reference:					Project Number:			Date:			Sheet Number:			
A=		21.1	28	32.5	38.2	42.4															

B=	-0.699	-0.699	-0.699	-0.699	-0.699	Figure 20	32508	2024-05-22	1
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