

APPENDIX 8

Excerpt from the Bolton Residential Expansion Area Options
by Peel Region, dated September 24, 2020;
Sanitary design calculations;



4.4.2.6 Option 3

Option 3 is located at the northwest corner of Humber Station Road and King Street. The ground elevations range between 265 m and 280 m.

Wastewater servicing of Option 3 requires an extension of the existing system towards the existing Coleraine Trunk Sewer, which presently conveys all of Bolton's wastewater flow to the lake-based system. Twinning of a section of the Coleraine Trunk sewer will be required. A high level analysis was performed on the ground elevation of the area and it was determined that it can be serviced by gravity in its entirety, therefore eliminating the need for a pumping station.

It is also important to note that the new infrastructure required minimizes the need to work through the urban core, thus lowering the potential for conflict with existing utilities and social impact.

The projects required as part of the wastewater servicing strategy for Option 3 are presented in Table 17.

TABLE 17 WASTEWATER PROJECTS FOR SERVICING OPTION 3

BRES ID	Description	Size/Capacity	Length (m)
Opt3 - WW1	New gravity sewer on King & Coleraine from Option 3 to ex. Coleraine Trunk Sewer south of rail	450 mm	2624
Opt3 - WW2	Twinning of Coleraine Trunk Sewer from south of rail to 700 m north of George Bolton Pkwy	525 mm	2908

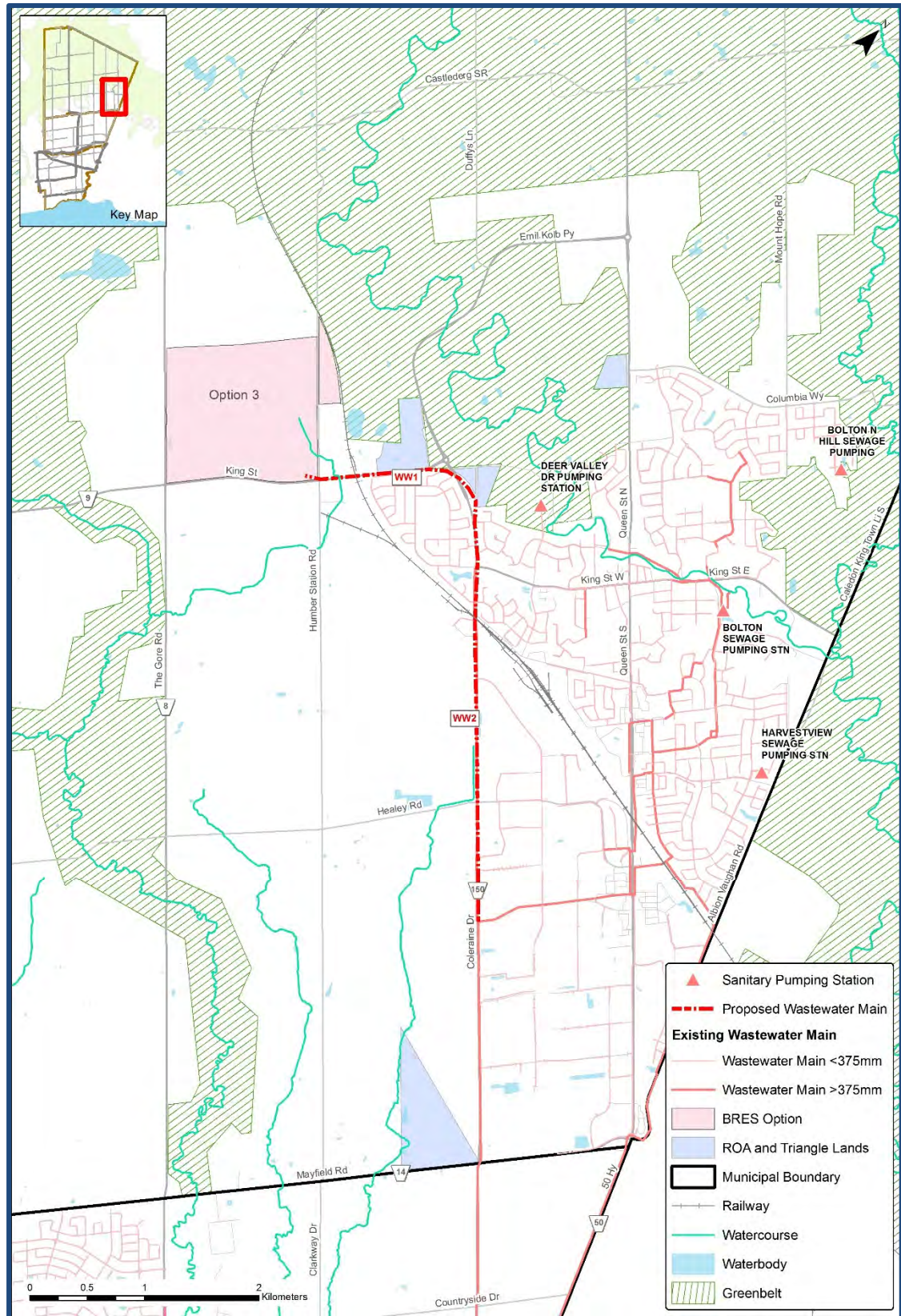


FIGURE 14 WASTEWATER SERVICING OPTION 3

4.4.2.7 Option 4

Option 4 is located at the southeast corner of King St. and The Gore Rd. Ground elevations range between 252 m and 262 m, with a topography allowing for a gravity system without any pumping requirements.

Option 4 can be serviced through a new wastewater gravity sewer on Humber Station Road to the future Holland extension, and then east on the Holland extension to Coleraine Drive. The first section of sewer will need to be more than 5 m deep, further downstream it can be shallower as it approaches Healey Road and the existing sewer on Coleraine. This Option also requires twinning of the Coleraine Trunk sewer to the extension of McEwan Drive.

This servicing strategy minimizes the need to work through the urban core, thus lowering the potential for conflict with existing utilities and social impact.

The projects required as part of the wastewater servicing strategy for Option 4 are presented in Table 18.

TABLE 18 WASTEWATER PROJECTS FOR SERVICING OPTION 4

BRES ID	Description	Size/Capacity	Length (m)
Opt4 - WW1	New gravity sewer on Humber Station Rd from 890 m north of Healey Rd to 790 m north of Healey Rd	450 mm	790
Opt4 - WW2	New gravity sewer on Holland Dr extension from Humber Station Rd to 690 m easterly	450 mm	690
Opt4 - WW3	New gravity sewer on Holland Dr extension from Coleraine Dr to 680 m westerly	450 mm	680
Opt4 - WW4	Twinning of Coleraine Trunk Sewer from Holland Dr extension to McEwan Dr	525 mm	2080

It is anticipated that the new infrastructure will require a few minor creek crossings along Humber Station Road and Healey Road.

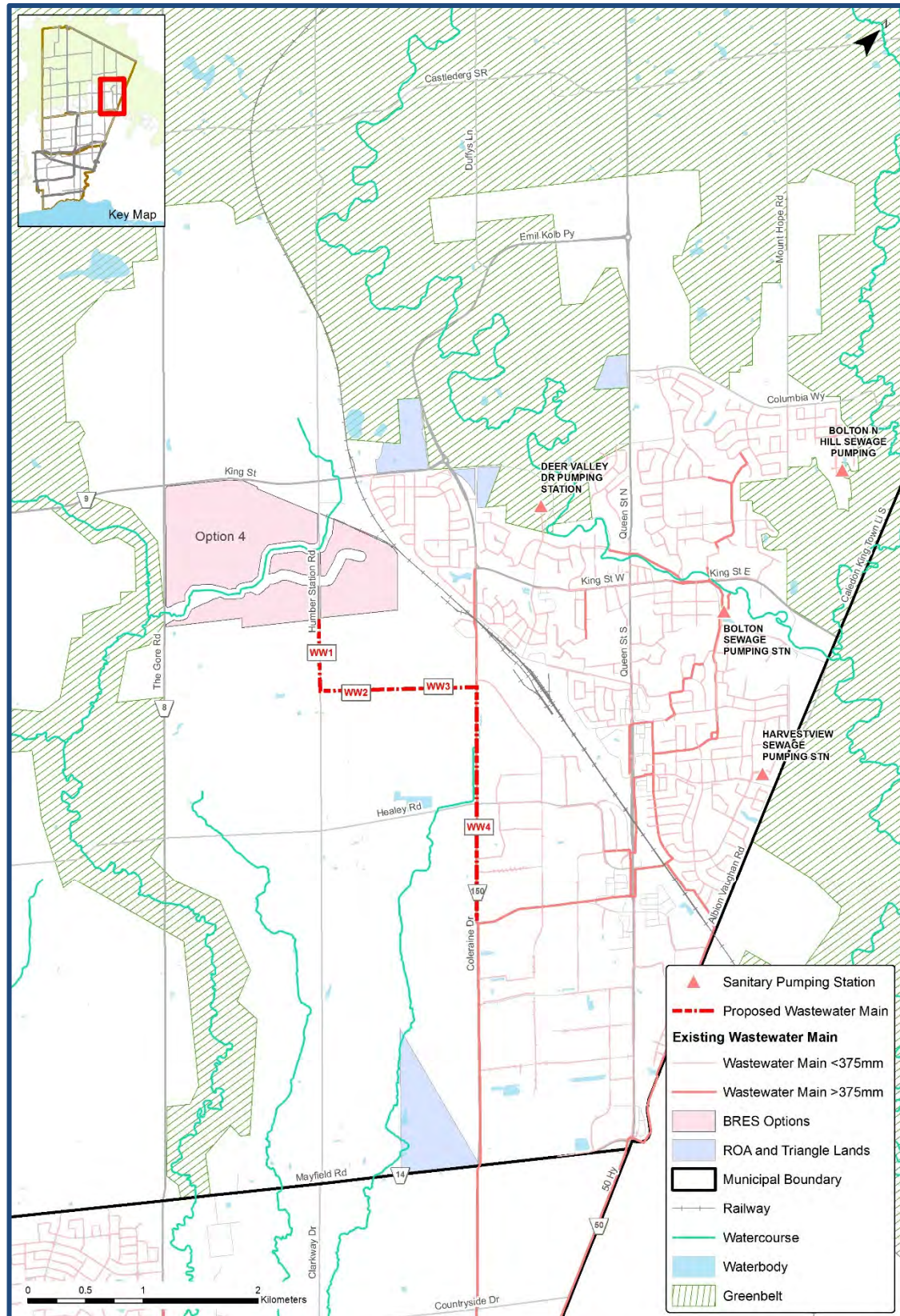


FIGURE 15 WASTEWATER SERVICING OPTION 4



SANITARY SEWER DESIGN SHEET

(INTERNAL SAN FLOWS ONLY)

Macville Argo

Region of Peel

PROJECT DETAILS

Project No: 15-458
Date: 22-Jan-21
Designed by: E.L.
Checked by: 0.0

DESIGN CRITERIA									
Min. Flow =	13	l/s	Avg. Domestic Flow = 302.8 l/c/d Infiltration = 0.200 l/s/ha Max. Peaking Factor = 4.00 Min. Peaking Factor= 1.50 Domestic Sewage flow for < 1000 ppl = 0.013m³ (Region of Peel Std. 2-5-2) Denotes Sanitary Drainage Area Outlet						
Min Diameter =	250	mm							
Mannings 'n' =	0.013								
Min. Velocity =	0.75	m/s							
Max. Velocity =	3.50	m/s							
Factor of Safety =	15	%	NOMINAL PIPE SIZE USED						

Denotes Sanitary
Drainage Area Outlet

STREET	FROM MH	TO MH	RESIDENTIAL							COMMERCIAL/INDUSTRIAL/INSTITUTIONAL							FLOW CALCULATIONS							PIPE DATA						
			AREA (ha)	ACC. AREA (ha)	UNITS (#)	DENSITY (P/ha)	DENSITY (P/unit)	POP	ACCUM. RES. POP.	AREA (ha)	ACC. AREA (ha)	EQUIV. POP. (p/ha)	FLOW RATE (l/s/ha)	EQUIV. POP.	ACCUM. EQUIV. POP.	INFILTRATION (l/s)	TOTAL ACCUM. POP.	PEAKING FACTOR	RES. FLOW (l/s)	MIN. RES. FLOW (l/s)	COMM. FLOW (l/s)	ACCUM. COMM. FLOW (l/s)	TOTAL FLOW (l/s)	SLOPE (%)	PIPE DIA (mm)	FULL FLOW CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)	PERCENT FULL (%)	
STREET P	MH302A	EX MH1A	7.30	7.30		50		365	365							1.5	365	4.00	5.1	13.0			14.5	0.50	250	42.0	0.86	0.75	34%	
KING STREET	EX MH1A	EX MH1B	0.00	7.30	0	0	0	0	365	0.00	0.00	0	0.000	0	0	1.5	365	4.00	5.1	13.0	0.0	0.0	14.5	0.30	250	32.6	0.66	0.62	44%	
KING STREET	EX MH1B	EX MH2B		7.30				365								1.5	365	4.00	5.1	13.0			14.5	0.30	250	32.6	0.66	0.62	44%	
KING STREET	EX MH2B	EX MH2A		7.30				365								1.5	365	4.00	5.1	13.0			14.5	0.30	250	32.6	0.66	0.62	44%	
STREET B2	MH100A	MH101A	1.00	1.00		50		50	50							0.2	50	4.00	0.7	13.0			13.2	1.00	250	59.5	1.21	0.96	22%	
STREET B2	MH101A	MH102A	10.20	11.20		50		510	560							2.2	560	3.95	7.7	13.0			15.2	1.00	250	59.5	1.21	1.01	26%	
STREET B2	MH130A	MH102A	3.70	3.70		50		185	185							0.7	185	4.00	2.6	13.0			13.7	0.50	250	42.0	0.86	0.75	33%	
STREET B2	MH102A	MH104A	11.90	26.80		155		1843	2588							5.4	2588	3.50	31.7	31.7			37.1	1.00	250	59.5	1.21	1.25	62%	
STREET B2	MH104A	MH106A	11.90	38.70		50		595	3183							7.7	3183	3.42	38.2	38.2			45.9	1.00	250	59.5	1.21	1.32	77%	
STREET C	MH106A	MH107A	2.20	40.90		50		110	3293							8.2	3293	3.41	39.3	39.3			47.5	1.00	250	59.5	1.21	1.33	80%	
STREET A	MH107A	MH108A	3.30	44.20		150		497	3790							8.8	3790	3.35	44.6	44.6			53.4	1.00	300	96.7	1.37	1.38	55%	
STREET A	MH108A	MH109A	6.30	50.50		50		315	4105							10.1	4105	3.32	47.8	47.8			57.9	1.00	300	96.7	1.37	1.41	60%	
STREET B	MH109A	MH110A	4.10	54.60		25		103	4208							10.9	4208	3.31	48.9	48.9			59.8	0.50	375	124.0	1.12	1.08	48%	
STREET ZC	MH110A	MH111A	1.10	55.70					4208							11.1	4208	3.31	48.9	48.9			60.0	0.50	375	124.0	1.12	1.08	48%	
STREET ZC	MH111A	EX MH2A	0.00	55.70	0	0	0	0	4208	0.00	0.00	0	0.000	0	0	11.1	4208	3.31	48.9	48.9	0.0	0.0	60.0	0.50	375	124.0	1.12	1.08	48%	
KING STREET	EX MH2A	EX MH3A		63.00				11	4584							12.6	4584	3.28	52.7	52.7			65.3	0.30	375	96.0	0.87	0.91	68%	
STREET X2	MH1A	MH2A	2.20	2.20		50		110	110							0.4	110	4.00	1.5	13.0			13.4	0.50	250	42.0	0.86	0.75	32%	
ELEMENTARY SCHOOL	SCHOOL	MH20A								2.10	2.10	285.71		600	600	0.4	600	3.93	8.3	13.0			13.4	0.50	250	42.0	0.86	0.75	32%	
STREET E	MH20A	MH2A	4.70	4.70		50		235	235		2.10				600	1.4	835	3.85	11.3	13.0			14.4	0.50	250	42.0	0.86	0.75	34%	
STREET E	MH15A	MH2A	2.10	2.10		50		105	105							0.4	105	4.00	1.5	13.0			13.4	0.50	250	42.0	0.86	0.75	32%	
STREET X2	MH2A	MH3A	0.50	9.50		123		62	512		2.10				600	2.3	1112	3.77	14.7	14.7			17.0	0.40	250	37.6	0.77	0.74	45%	
STREET AL	MH30A	MH3A	2.70	2.70		342		923	923							0.5	923	3.82	12.4	13.0			13.5	0.50	250	42.0	0.86	0.75	32%	
STREET X2	MH3A	MH4A	0.20	12.40		123		25	1460		2.10				600	2.9	2060	3.58	25.8	25.8			28.7	0.40	250	37.6	0.77	0.84	76%	
STREET AF WEST	MH40A	MH4A	5.70	5.70		70		399	399							1.1	399	4.00	5.6	13.0			14.1	0.50	250	42.0	0.86	0.75	34%	
STREET X	MH4A	MH5A	13.70	31.80		225		3088	4947		2.10				600	6.8	5547	3.20	62.3	62.3			69.0	0.40	375	110.9	1.00	1.03	62%	
STREET X	MH5A	MH6A	0.20	32.00		70		14	4961		2.10				600	6.8	5561	3.20	62.4	62.4			69.2	0.40	375	110.9	1.00	1.03	62%	
STREET O	MH50A	MH6A	3.90	3.90		357		1391	1391							0.8	1391	3.70	18.1	18.1			18.8	0.50	250	42.0	0.86	0.82	45%	
STREET X	MH6A	MH7A	5.00	40.90		50		250	6602		2.10				600	8.6	7202	3.09	78.1	78.1			86.7	0.40	375	110.9	1.00	1.09	78%	
STREET C	MH60A	MH7A	5.00	5.00		172		861	861							1.0	861	3.84	11.6	13.0			14.0	0.50	250	42.0	0.86	0.75	33%	
STREET C	MH70A	MH7A	1.50	1.50		50		75	75							0.3	75	4.00	1.1	13.0			13.3	0.50	250	42.0	0.86	0.75	32%	
STREET X	MH7A	MH8A	6.00	53.40		50		300	7838		2.10				600	11.1	8438	3.03	89.5	89.5			100.6	0.40	450	180.3	1.13	1.15	56%	
STREET X	MH8A	MH9A	5.30	58.70		50		265	8103		2.10				600	12.2	8703	3.01	91.9	91.9			104.1	0.40	450	180.3	1.13	1.15	58%	
STREET X	MH9A	MH10A	0.20	58.90					8103		2.10				600	12.2	8703	3.01	91.9	91.9			104.1	0.40	450	180.3	1.13	1.15	58%	
SCHOOL, COMMERCIAL	MH10A	EX MH3A	0.00	58.90	0	0	0	0	8103	8.70	10.80	191.38	0.000	1665	2265	13.9	10368	2.94	106.8	106.8	0.0	0.0	120.7	0.50	450	201.6	1.27	1.31	60%	
KING STREET	EX MH3A	EX MH4A		121.90					12687		10.80				2265	26.5	14952	2.78	145.7	145.7			172.2	0.30	525	235.6	1.09	1.16	73%	
KING STREET	EX MH4A	EX MH5A		121.90					12687		10.80				2265	26.5	14952	2.78	145.7	145.7			172.2	0.30	525	235.6	1.09	1.16	73%	



SANITARY SEWER DESIGN SHEET

(INTERNAL SAN FLOWS ONLY)

Macville Argo

Region of Peel

PROJECT DETAILS

Project No: 15-458
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Designed by: E.L.
Checked by: 0.0

DESIGN CRITERIA									
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Mannings 'n' =	0.013								
Min. Velocity =	0.75	m/s							
Max. Velocity =	3.50	m/s							
Factor of Safety =	15	%							
			Avg. Domestic Flow =	302.8	l/c/d				
			Infiltration =	0.200	l/s/ha				
			Max. Peaking Factor =	4.00					
			Min. Peaking Factor =	1.50					
			Domestic Sewage flow for < 1000 ppl = 0.013m ³						
			(Region of Peel Std. 2-5-2)						
NOMINAL PIPE SIZE USED									

Denotes Sanitary
Drainage Area Outlet

STREET	FROM MH	TO MH	RESIDENTIAL							COMMERCIAL/INDUSTRIAL/INSTITUTIONAL						FLOW CALCULATIONS								PIPE DATA					
			AREA (ha)	ACC. AREA (ha)	UNITS (#)	DENISTY (P/ha)	DENSITY (P/unit)	POP	ACCUM. RES. POP.	AREA (ha)	ACC. AREA (ha)	EQUIV. POP. (p/ha)	FLOW RATE (l/s/ha)	EQUIV. POP.	ACCUM. EQUIV. POP.	INFILTRATION (l/s)	TOTAL ACCUM. POP.	PEAKING FACTOR	RES. FLOW (l/s)	MIN. RES. FLOW (l/s)	COMM. FLOW (l/s)	ACCUM. COMM. FLOW (l/s)	TOTAL FLOW (l/s)	SLOPE (%)	PIPE DIA (mm)	FULL FLOW CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)	PERCENT FULL (%)
HUMBER STATION RD	MH200A	MH201A	11.10	11.10		334		3713	3713							2.2	3713	3.36	43.8	43.8			46.0	0.50	300	68.4	0.97	1.02	67%
HUMBER STATION RD	MH201A	MH202A	4.80	15.90		360		1728	5441							3.2	5441	3.21	61.2	61.2			64.4	0.50	375	124.0	1.12	1.11	52%
HUMBER STATION RD	MH202A	MH203A	5.30	21.20		328		1740	7181							4.2	7181	3.10	77.9	77.9			82.2	0.50	375	124.0	1.12	1.18	66%
HUMBER STATION RD	MH203A	MH204A	3.60	24.80		381		1370	8551							5.0	8551	3.02	90.6	90.6			95.5	0.50	375	124.0	1.12	1.22	77%
HUMBER STATION RD	MH204A	MH205A	6.50	31.30		125		812	9363							6.3	9363	2.98	97.9	97.9			104.1	0.50	375	124.0	1.12	1.23	84%
HUMBER STATION RD	MH205A	EX MH5A	0.00	31.30	0	0	0	0	9363	5.10	5.10	50	0.000	255	255	7.3	9618	2.97	100.2	100.2	0.0	0.0	107.4	0.40	450	180.3	1.13	1.17	60%
HUMBER STATION RD	EX MH5A	EX MHA	0.00	153.20	0	0	0	0	22050	0.00	15.90	0	0.000	0	2520	33.8	24570	2.56	220.7	220.7	0.0	0.0	254.5	0.30	600	336.3	1.19	1.30	76%
HUMBER STATION RD	EX MHA	EX MHB	68.00	221.20		60		4080	26130		15.90				2520	47.4	28650	2.50	250.7	250.7			298.1	0.30	675	460.4	1.29	1.35	65%
HUMBER STATION RD	EX MHB	EX MHC	97.00	318.20		60		5820	31950		15.90				2520	66.8	34470	2.42	292.1	292.1			359.0	0.30	675	460.4	1.29	1.40	78%
HOLLAND DRIVE	EX MHC	EX MHD	110.00	428.20		60		6600	38550		15.90				2520	88.8	41070	2.35	337.5	337.5			426.4	0.30	750	609.8	1.38	1.48	70%
HOLLAND DRIVE	EX MHD	EX MHE	43.00	471.20		60		2580	41130		15.90				2520	97.4	43650	2.32	354.9	354.9			452.3	0.30	750	609.8	1.38	1.48	74%
COLERAINE DRIVE	EX MHE	EX MHF		471.20					41130		15.90				2520	97.4	43650	2.32	354.9	354.9			452.3	0.30	750	609.8	1.38	1.48	74%
COLERAINE DRIVE	EX MHF	EX MHG		471.20					41130		15.90				2520	97.4	43650	2.32	354.9	354.9			452.3	0.30	750	609.8	1.38	1.48	74%
COLERAINE DRIVE	EX MHG	EX MHH		471.20					41130		15.90				2520	97.4	43650	2.32	354.9	354.9			452.3	0.25	750	556.6	1.26	1.39	81%
COLERAINE DRIVE	EX MHH	EX MH38		471.20					41130		15.90				2520	97.4	43650	2.32	354.9	354.9			452.3	0.25	750	556.6	1.26	1.39	81%