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MASTER SERVICING STUDY
EAST URBAN COMMUNITY PHASE 3 AREA COMMUNITY DESIGN PLAN

RICHCRAFT HOMES

DEC 2020
DSEL 14-733

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SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION				COMM		INSTIT		PARK		C+I		INFILTRATION			PIPE												
STREET	FROM M.H.	TO M.H.	AREA (ha)	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL							
					AREA (ha)	POP.																	(FULL) (m/s)	(ACT.) (m/s)						
North West Sanitary Trunk																														
Trunk 1	1007A	1008A			0.00	0											1.57	2.58	2.58	0.85	2.42	58.00	200.00	0.65	26.44	0.09	0.84	0.52		
COMMERCIAL	1008A	1009A			0.00	0											1.57	0.00	2.58	0.85	2.42	86.50	250.00	0.25	29.73	0.08	0.61	0.37		
COMMERCIAL	1009A	1010A			0.00	0				1.29	3.87						2.35	1.29	3.87	1.28	3.63	86.50	250.00	0.25	29.73	0.12	0.61	0.41		
COMMERCIAL					0.00	0				0.22	4.09							0.22	4.09											
COMMERCIAL	1010A	1011A			0.00	0				1.63	5.72						3.48	1.63	5.72	1.89	5.37	39.50	300.00	0.20	43.25	0.12	0.61	0.00		
COMMERCIAL	1011A	1012A			0.00	0				0.99	6.71						4.08	0.99	6.71	2.21	6.29	99.50	375.00	0.15	67.91	0.09	0.61	0.38		
COMMERCIAL	1012A	1013A			0.00	0				1.41	8.12						4.93	1.41	8.12	2.68	7.61	117.00	375.00	0.15	67.91	0.11	0.61	0.40		
COMMERCIAL	1013A	1014A			0.00	0				1.41	9.53						5.79	1.41	9.53	3.14	8.93	112.00	375.00	0.15	67.91	0.13	0.61	0.41		
COMMERCIAL	1014A	1022A			0.00	0				1.54	11.07						6.73	1.54	11.07	3.65	10.38	83.50	375.00	0.15	67.91	0.15	0.61	0.44		
COMMERCIAL	1022A	1023A			0.00	0				7.02	18.09						10.99	7.02	18.09	5.97	16.96	96.50	375.00	0.15	67.91	0.25	0.61	0.51		
	1023A	1024A	0.65	66	0.65	66	3.63	0.78									10.99	0.65	18.74	6.18	17.95	81.00	450.00	0.12	98.76	0.18	0.62	0.47		
	1024A	1025A	0.20	21	0.85	87	3.61	1.02									10.99	0.20	18.94	6.25	18.26	79.00	450.00	0.12	98.76	0.18	0.62	0.47		
	1025A	1026A	0.13	14	0.98	101	3.59	1.18									10.99	0.13	19.07	6.29	18.46	51.00	450.00	0.12	98.76	0.19	0.62	0.48		
	1026A	1027A	0.20	21	1.18	122	3.58	1.42									10.99	0.20	19.27	6.36	18.77	74.00	450.00	0.12	98.76	0.19	0.62	0.48		
	1027A	1028A			1.18	122											10.99	0.00	19.27	6.36	17.35	11.00	450.00	0.12	98.76	0.18	0.62	0.47		
	1028A	1029A	0.40	41	1.58	163	3.54	1.87									10.99	0.40	19.67	6.49	19.35	100.00	450.00	0.12	98.76	0.20	0.62	0.48		
	1029A	1037A	0.60	61	2.18	224	3.50	2.54									10.99	0.60	20.27	6.69	20.22	94.00	450.00	0.12	98.76	0.20	0.62	0.48		
	1037A	1040A	3.30	334	5.48	558	3.36	6.08									10.99	3.30	23.57	7.78	24.85	79.00	450.00	0.12	98.76	0.25	0.62	0.51		
	1040A	1049A	1.45	147	6.93	705	3.31	7.56									10.99	1.45	25.02	8.26	26.81	79.00	450.00	0.12	98.76	0.27	0.62	0.52		
	1049A	1058A	4.50	455	11.43	1160	3.21	12.07									10.99	4.50	29.52	9.74	32.80	81.50	450.00	0.12	98.76	0.33	0.62	0.56		
PARK	1058A	1059A	5.80	586	17.23	1746	3.10	17.54			1.27	1.27	11.20	7.07	36.59	12.07	40.81	120.50	450.00	0.12	98.76	0.41	0.62	0.59						
	1059A	1090A	0.70	71	17.93	1817	3.09	18.20					11.20	0.70	37.29	12.31	41.71	123.00	450.00	0.12	98.76	0.42	0.62	0.59						
PARK, EXT FUT			4.30	620	22.23	2437			5.27	23.36			11.20	10.13	47.42															
	1090A	1095A	12.65	1278	34.88	3715	2.89	34.79			0.56	1.83	14.49	12.65	60.07	19.82	69.10	75.00	450.00	0.15	110.42	0.63	0.69	0.73						
Contribution from Trunk 2, MH 1094A-1095A					10.74	1478							4.64		15.38															
	1095A	1096A	0.50	51	46.12	5244	2.78	47.24					6.47	15.24	0.50	75.95	25.06	87.54	79.00	525.00	0.12	148.98	0.59	0.69	0.72					
	1096A	1107A	2.26	229	48.38	5473	2.77	49.13					6.47	15.24	2.26	78.21	25.81	90.18	86.50	525.00	0.10	136.00	0.66	0.63	0.67					
	1107A	1108A	4.24	429	52.62	5902	2.74	52.41					6.47	15.24	4.24	82.45	27.21	94.86	87.00	525.00	0.42	278.71	0.34	1.29	1.16					
PARK	1108A	1132A	0.06	8	52.68	5910	2.74	52.48			1.16	7.63	15.43	1.22	83.67	27.61	95.52	31.50	525.00	0.10	136.00	0.70	0.63	0.68						
CONTRIBUTION FROM EXTERNAL					0.96	144	53.64	6054	2.73	53.56	4.42	27.78			5.38	89.05														
			0.95	137	54.59	6191								0.95	90.00															
	1132A	1133A	9.80	990	64.39	7181	2.68	62.37					7.63	18.11	9.80	99.80	32.93	113.41	15.50	600.00	0.10	194.17	0.58	0.69	0.72					
	1133A	1A (B.O.)			64.39	7181	2.68	62.37					7.63	18.11	0.00	99.80	32.93	113.41	15.50	600.00	0.10	194.17	0.58	0.69	0.72					
To MH 1A By Other																														
Trunk 2																														
PARK	1203A	1204A	0.40	58	0.40	58						4.64	4.64	0.75	5.04	5.04	1.66	2.41	81.00	300.00	0.65	77.96	0.03	1.10	0.48					
	1204A	1205A	0.89	129	1.29	187	3.53	2.14					4.64	0.75	0.89	5.93	1.96	4.85	111.00	300.00	0.20	43.25	0.11	0.61	0.40					
	1205A	1206A	0.83	120	2.12	307	3.46	3.44					4.64	0.75	0.83	6.76	2.23	6.42	74.00	300.00	0.20	43.25	0.15	0.61	0.44					
	1206A	1207A	1.03	149	3.15	456	3.40	5.02					4.64	0.75	1.03	7.79	2.57	8.34	75.00	300.00	0.20	43.25	0.19	0.61	0.47					
	1207A	1208A			3.15	456							4.64	0.75	0.00	7.79	2.57	3.32	100.50	300.00	0.20	43.25	0.08	0.61	0.37					



DESIGN PARAMETERS Park Flow = 9300 L/ha/da Average Daily Flow = 280 l/p/day Comm/Inst Flow = 35000 L/ha/da Industrial Flow = 35000 L/ha/da Max Res. Peak Factor = 4.00 Commercial/Inst./Park Peak Factor = 1.50 Mixed Use Institutional = 35000.00 L/ha/da Institutional = 0.405 l/s/ha Harmon Correction Factor = 0.800 Industrial Peak Factor = as per MOE Graph Extraneous Flow = 0.330 L/s/ha Minimum Velocity = 0.600 m/s Manning's n = (Conc) 0.013 (Pvc) 0.013										Designed: R.B. Checked: K.M. Dwg. Reference:					PROJECT: Orleans EUC MUC LOCATION: City of Ottawa File Ref: 14-733 Date: October, 2019 Sheet No. 1 of 2				
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SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION				COMM		INSTIT		PARK		C+H		INFILTRATION			PIPE												
STREET	FROM M.H.	TO M.H.	AREA (ha)	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.					
					AREA (ha)	POP.																			(FULL) (m/s)	(ACT.) (m/s)				
	1208A	1209A	1.90	274	5.05	730	3.31	7.83		0.00					4.64	0.75	1.90	9.69	3.20	11.78	14.50	300.00	0.20	43.25	0.27	0.61	0.51			
	1209A	1210A			5.05	730				0.00					4.64	0.75	0.00	9.69	3.20	3.95	112.50	300.00	0.20	43.25	0.09	0.61	0.38			
	1210A	1211A			5.05	730				0.00					4.64	0.75	0.00	9.69	3.20	3.95	120.00	300.00	0.20	43.25	0.09	0.61	0.38			
	1211A	1212A	3.98	574	9.03	1304	3.18	13.44		0.00					4.64	0.75	3.98	13.67	4.51	18.70	43.50	300.00	0.20	43.25	0.43	0.61	0.59			
	1212A	1091A			9.03	1304				0.00					4.64	0.75	0.00	13.67	4.51	5.26	10.00	300.00	0.20	43.25	0.12	0.61	0.41			
	1091A	1093A	0.53	54	9.56	1358	3.17	13.95		0.00					4.64	0.75	0.53	14.20	4.69	19.39	33.00	300.00	0.20	43.25	0.45	0.61	0.59			
	1093A	1094A	0.64	65	10.20	1423	3.16	14.57		0.00					4.64	0.75	0.64	14.84	4.90	20.22	84.00	375.00	0.15	67.91	0.30	0.61	0.53			
	1094A	1095A	0.54	55	10.74	1478	3.15	15.09		0.00					4.64	0.75	0.54	15.38	5.08	20.92	84.50	375.00	0.15	67.91	0.31	0.61	0.54			
To Trunk 1, Pipe 1095A-1096A					10.74	1478				0.00					4.64			15.38												
North East Sanitary Trunk																														
External Commercial					0.00	0			10.40	10.40						10.40	10.40													
Mixed Use Block*			2.43	2531	2.43	2531	3.00	24.61	2.43	12.83					4.86	15.26														
	204A	205A			2.43	2531			3.45	16.28					3.45	18.71														
To Pipe 205A - 206A					2.43	2531			6.33	22.61			0.19	0.19	13.77	6.52	25.23	8.33	22.10	525.00	375.00	0.14	65.60	0.34	0.59	0.53				
To Pipe 205A - 206A					2.43	2531				22.61				0.19			25.23		22.10											
	201A	202A			0.00	0			5.67	5.67					3.45	5.67	5.67	1.87	5.32	266.00	200.00	0.32	18.55	0.29	0.59	0.51				
	202A	203A			0.00	0			0.00	5.67					3.45	0.00	5.67	1.87	5.32	176.00	250.00	0.24	29.13	0.18	0.59	0.44				
	203A	205A			0.00	0			10.44	16.11					9.79	10.44	16.11	5.32	15.11	292.50	250.00	0.24	29.13	0.52	0.59	0.60				
Contribution from Pipe 204A - 205A					2.43	2531				22.61			0.19			25.23														
	205A	206A			2.43	2531				38.72			0.19	23.56	0.00	41.34	13.64	37.20	150.50	375.00	0.20	78.41	0.47	0.71	0.70					
To Existing Vanguard Drive Sanitary					2.43	2531				38.72			0.19			41.34		37.20												
South West Sanitary Trunk																														
Mixed Use Block			3.66	528	3.66	528			3.66	3.66					2.22	7.32	7.32													
Mid-High Density Residential			15.19	1535	18.85	2063	3.06	20.46	4.32	7.98					4.85	19.51	26.83													
	301A	302A	2.28	329	21.13	2392	3.02	23.41		7.98			0.43	0.43	4.92	2.71	29.54	9.75	38.08	791.00	375.00	0.14	65.60	0.58	0.59	0.61				
To Sanitary By Others					21.13	2392				7.98				0.43			29.54		38.08											
Road			0.89	0	0.89	0									0.00	0.89	0.89	0.29	0.29	49.00	200.00	0.32	18.55	0.02	0.59	0.23				
To Existing Sanitary, Fern Casey Street					0.89	0				0.00					0.00				0.89		0.29									
Mid-High Density Residential			3.69	532	3.69	532	3.37	5.81		0.00					0.00	0.00	3.69	3.69	1.22	7.03	49.00	200.00	0.32	18.55	0.38	0.59	0.55			
To Existing Sanitary, Axis Way					3.69	532				0.00					0.00		3.69		7.03											
South East Sanitary Trunk																														
Existing Medium Density**			401A	402A	0.99	227	0.99	227	3.50	2.57		0.00	0.23	9.34	0.36	5.73	1.22	10.69	3.53	11.83	114.00	250.00	0.24	29.13	0.41	0.59	0.56			
To Existing Sanitary to Gerry Lalonde Drive					0.99	227				0.00				0.36			10.69		11.83											

*Note: Proposed population 2531 per background servicing study
 **Note: Existing population 227 per background servicing study

DESIGN PARAMETERS			
Park Flow =	9300	L/ha/da	0.108
Average Daily Flow =	280	l/p/day	
Comm/Inst Flow =	35000	L/ha/da	0.405
Industrial Flow =	35000	L/ha/da	0.405
Max Res. Peak Factor =	4.00		
Commercial/Inst./Park Peak Factor =	1.50	if ICI >20%	1.00 if ICI <20%
Mixed Use	35000.00	L/ha/da	
Institutional =	0.405	l/s/ha	
Harmon Correction Factor =	0.800		
Industrial Peak Factor = as per MOE Graph			
Extraneous Flow =	0.330	L/s/ha	
Minimum Velocity =	0.600	m/s	
Manning's n = (Conc)	0.013	(Pvc)	0.013

Designed:	R.B.	PROJECT	Orleans EUC MUC
Checked:	K.M.	K. MITIC 100122349 LOCATION:	City of Ottawa
Dwg. Reference:		14-733	Sheet No. 2
Date:	October, 2019		of 2



**GLOUCESTER AND CUMBERLAND
EAST URBAN COMMUNITY
EXPANSION AREA AND BILBERRY
CREEK INDUSTRIAL PARK
MASTER SERVICING UPDATE**

Prepared for:
City of Ottawa

File No. 163400602
November 2004
Updated June 2005
Updated October 2005
Updated July 2006

Prepared by:
Stantec Consulting Ltd.
1505 Laperriere Avenue
Ottawa, Ontario
K1Z 7T1



Stantec

a minimum road grade 0.5%. In areas where the grades are less than 0.5%, a dendritic system with a minimum grade of 0.1% between highpoints and a maximum ponding depth of 0.3m is required.

The major system catchment boundaries generally follow those of the minor system, with the exception of a short segment of the east-west collector within the OSBP that is forced to drain to Mer Bleue Road. Direction of the runoff from this segment of road to Pond 1 could either be done by providing sufficient storage in the ROW and directing the runoff through the minor system to Pond 1 or routing the runoff along Mer Bleue Road and through the HEPC to Pond 1. In general, the elevation of the road is 0 to 0.60m above existing ground and conforms to the recommendations of the geotechnical investigation ("Preliminary Geotechnical Investigation Proposed Orleans Business Park" (Golder, December 2005). The proposed road elevations and grades are shown on **DWG. GRP** in **Appendix O**.

5.1.3 Sanitary Sewers

The design criteria used in sizing the sanitary sewers are as follows:

- Minimum velocity – 0.6 m/s
- Maximum velocity – 3.0 m/s
- Average Commercial flow – 50,000 l/ha/d
- Commercial peaking factor – 1.5
- Infiltration/Inflow – 0.28 l/s/ha
- Minimum depth of cover of 2.5m

The routing of the sanitary trunk sewers is shown on **DWG. SAN4**, with local sanitary sewer details and supporting design calculations (i.e. sanitary design sheet and catchment area plan) provided in **Appendix O**.

The sanitary collection system includes two sanitary trunk sewers designed to direct all flows from the OSBP westwards to the FVT (fv07400) at the intersection of Page and Silver Birch. An allowance of 255L/s has been reserved in the FVT for the OSBP. The peak flows from the OSBP is 187L/s.

- Sanitary Trunk No. 1 services 88ha of the OSBP and ranges in size from 250mm to 600mm in diameter. Sanitary Trunk No. 1 ties into an obvert elevation of 82.85m at the FVT trunk at the intersection of Page and Silver Birch. The depth of cover above sanitary sewer (profile **SAN P1** in **Appendix O**) meets or exceeds the guideline of 2.5m.
- Sanitary Trunk No. 2 services 75ha of the OSBP. The sewer ranges in size from 250m to 450mm in diameter and connects to Sanitary Trunk No. 1 at MH 110. The depth of cover above sanitary sewer (profile **SAN P1** in **Appendix O**) meets or exceeds the guideline of 2.5m.

SANITARY SEWER CALCULATION SHEET



Manning's n = 0.013

LOCATION			RESIDENTIAL AREA AND POPULATION					COMM		INDUST		INST		C++I		INFILTRATION				SEWER DATA						SEWER DETAILS															
STREET	FROM M.H.	TO M.H.	AREA (ha)	# UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FACTOR (per MOE)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	LENGTH (m)	ACTUAL DIA. (m)	NOM. DIA. (mm)	SLOPE (%)	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	Q/Ccap (%)	US MH T/G (m)	DS MH T/G (m)	US		DS		Drop (m)	Frost Depth (m)					
	101	102				0.00	0	4.00	0.00	21.80	21.80			0.00			18.92	21.80	21.80	6.10	25.03	360	0.254	250	0.25%	31.02	0.61	81%	89.10	90.90	86.24	86.49	85.34	85.59			2.61	5.31			
	102	103				0.00	0	4.00	0.00	11.70	33.50			0.00			29.08	11.70	33.50	9.38	38.46	220	0.305	300	0.20%	45.11	0.62	85%	90.90	92.00	85.28	85.59	84.84	85.15			5.31	6.85			
	103	104				0.00	0	4.00	0.00	7.50	41.00			0.00			35.59	7.50	41.00	11.48	47.07	380	0.381	375	0.15%	70.84	0.62	86%	92.00	91.60	84.77	85.15	84.20	84.56			6.85	7.02			
	105	104				0.00	0	4.00	0.00	8.60	8.60			0.00			7.47	8.60	8.60	2.41	9.87	240	0.254	250	0.35%	36.70	0.72	27%	92.49	91.60	89.70	89.95	88.86	89.11	4.53	2.54	2.49				
	104	106				0.00	0	4.00	0.00	0.30	49.90			0.00			43.32	0.30	49.90	13.97	57.29	120	0.381	375	0.15%	70.84	0.62	81%	91.60	91.11	84.20	84.58	84.02	84.40			7.02	6.71			
	106	107				0.00	0	4.00	0.00	16.30	66.20			0.00			57.47	16.30	66.20	18.54	76.00	287	0.381	375	0.20%	81.79	0.72	93%	91.11	89.93	84.02	84.40	83.44	83.83			6.71	6.11			
	107	108				0.00	0	4.00	0.00	4.80	71.00			0.00			61.63	4.80	71.00	19.88	81.51	220	0.457	450	0.15%	115.19	0.70	71%	89.93	89.00	83.37	83.83	83.04	83.50			6.11	5.51			
	109	108A				0.00	0	4.00	0.00	9.70	9.70			0.00			8.42	9.70	9.70	2.72	11.14	210	0.254	250	0.50%	43.86	0.87	25%	90.40	89.17	87.46	87.72	86.41	86.67	1.87	2.59	2.51				
	108A	108				0.00	0	4.00	0.00	0.00	9.70			0.00			8.42	0.00	9.70	2.72	11.14	30	0.254	250	0.50%	43.86	0.87	25%	89.17	89.00	84.54	84.80	84.39	84.65	1.15	4.36	4.36				
	108	110				0.00	0	4.00	0.00	5.04	85.74			0.00			74.43	5.04	85.74	24.01	98.43	140	0.457	450	0.15%	115.19	0.70	85%	89.00	88.55	83.04	83.50	82.83	83.29			5.51	5.27			
	111	112				0.00	0	4.00	0.00	12.00	12.00			0.00			10.42	12.00	12.00	3.36	13.78	360	0.254	250	0.35%	36.70	0.72	38%	90.78	88.80	87.24	87.50	85.98	86.24			3.29	2.57			
	113	112				0.00	0	4.00	0.00	7.90	7.90			0.00			6.86	7.90	7.90	2.21	9.07	320	0.254	250	0.65%	50.01	0.99	18%	91.36	88.60	88.06	88.32	85.98	86.24			3.05	2.57			
	112	114				0.00	0	4.00	0.00	9.20	29.10			0.00			25.26	9.20	29.10	8.15	33.41	240	0.305	300	0.35%	59.68	0.82	56%	88.80	87.90	85.93	86.24	85.09	85.40			2.57	2.51			
	114	115				0.00	0	4.00	0.00	11.20	40.30			0.00			34.98	11.20	40.30	11.28	46.27	290	0.305	300	0.25%	50.44	0.69	92%	87.90	87.57	85.09	85.40	84.37	84.67			2.51	2.90			
	115	116				0.00	0	4.00	0.00	11.70	52.00			0.00			45.14	11.70	52.00	14.56	59.70	220	0.381	375	0.20%	81.79	0.72	73%	87.57	87.33	84.29	84.67	83.85	84.23			2.90	3.10			
	116	117				0.00	0	4.00	0.00	17.60	69.60			0.00			60.42	17.60	69.60	19.49	79.90	270	0.381	375	0.20%	81.79	0.72	98%	87.33	88.14	83.85	84.23	83.31	83.69			3.10	4.45			
	117	110				0.00	0	4.00	0.00	7.60	77.20			0.00			67.01	7.60	77.20	21.62	88.63	130	0.457	450	0.15%	115.19	0.70	77%	88.14	88.55	83.23	83.69	83.04	83.50	0.21	4.45	5.06				
	110	FVT				0.00	0	4.00	0.00	0.00	162.94			0.00			141.44	0.00	162.94	45.62	187.06	435	0.610	600	0.10%	202.55	0.69	92%	88.55	88.90	82.68	83.29	82.24	82.65			5.27	5.45			

DESIGN PARAMETERS				Designer: FW	PROJECT: Orleans South Business Park - Sanitary Trunk Alignment - Alternative 1	900mm FVT (Page & Silver Birch) 82.85	
Average Daily Flow =	350 l/p/day	Industrial Peak Factor =	as per MOE Graph	Checked: FW	LOCATION: City of Ottawa		
Comm/Inst Flow =	50000 L/ha/da	Extraneous Flow =	0.28 L/s/ha	Dwg. Reference:	File Ref.: 163400602	Date: 1-Mar-06	Sheet No. 1 of 1
Industrial Flow =	35000 L/ha/da	Minimum Velocity =	0.60 m/s				
Max Res. Peak Factor =	4.00	Maximum Velocity =	3.00 m/s				
Commercial / Inst peak Factor =	1.50	Manning's n =	0.013				
		Persons per Unit =	3.2 persons/unit				

**FOREST VALLEY TRUNK
AND ORLEANS
CUMBERLAND COLLECTOR
CAPACITY ANALYSIS**

634-00465

Prepared by:

Stantec Consulting Ltd.
400-1505 Laperriere Avenue
Ottawa ON K1Z 7T1

Prepared for:

City of Ottawa
111 Lisgar Street
4th Floor
Ottawa, ON K1P 1J1

October 2003



Stantec

Distribution:
City of Ottawa 2 copies
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FOREST VALLEY TRUNK AND ORLEANS CUMBERLAND COLLECTOR CAPACITY ANALYSIS

BUILDOUT DEVELOPMENT PROJECTIONS – POPULATION AND LAND USE

March 2003) in which 84ha of industrial area was converted to residential development.

The roadway area was estimated using the total Parkland/Roads area quoted in the “EUC Master Infrastructure Plan”. The total Roadway area was assumed to be 20% of the total Area less the Parkland. The Landfill area (18ha) mentioned in the master plan was assumed to be zoned Industrial for our analysis.

AREA F

Development within Chapel Hill South, south of Innes Rd. and west of Pagé Rd., is complete and consequently, development projections (population, dwelling count and land use areas) under Buildout conditions were assumed to be consistent with the 2001 census information provided by the City.

The lands east of Page Rd. (Orleans Industrial Park) included approximately 10.3ha of residential area, as scaled from available base mapping. Population and dwelling counts for this pocket of residential land was taken from the 2001 Census.

Land use details for the Orleans Industrial Park were taken from the “East Urban Community Sanitary and Storm Drainage Master Plan Update” (G&S, 1991). The master plan indicated there was 148ha of Industrial lands, from which the 10.3ha of existing residential was removed.

Land Use	Catchment		
	Area H (Chapel Hill)	Area F (Chapel Hill South & Orleans Industrial Park)	Area G (EUC)
Dwellings	1494	1303	10968
Population	4848	4130	35098
Residential (ha)	79	66	298
Industrial (ha)	1	138	0
Commercial (ha)	0	0	22
Institutional (ha)	6	0	21
Vacant (ha)	39	23	23
Road (ha)	29	51	90
Landfill (ha)			18
Parkland (ha)			74
Total Area	154	278	546
Notes	9	6,7,8	1,2,3,4,5

Notes:

1. City of Ottawa Projections (Fax, August 13, 2003)
2. “Forest Valley Sewage Pump Station, Forcemain and Fourth Line Gravity Sewer Functional Design Report” (Ainley, May 2000): Res-214ha, Ind.-80ha, Comm.-22ha, Instit.-21ha)

Stantec

27 October 2003

3.2

fww:\active\634_00465_forest_valley_ts_capacity\planning\report\rep_634_00465_ft&occ_capacity_analysis.doc

D8

5.0 FLOW CALCULATIONS

5.1 FOREST VALLEY TRUNK

Flows were calculated using the City of Ottawa's Orleans Cumberland Collector Hydraulic Grade Line (HGL) model (HGL_OC.xls). Previous master plans and servicing studies, which utilized the HGL model, discretized the FVT catchment into three sub-catchments. In an effort to assess the impact of higher development densities within the urban boundary and possible expansions outside of the urban boundary more discretized sub-catchments were used.

Previously the City had commissioned G.A Clark & Associates Limited to complete a desktop capacity assessment of the FVT for existing development within the Chapel Hill communities, both north and south of Innes Rd., as well as future development south of Innes Rd. This assessment assigned population and land areas to manholes (MH) fv02000 through fv06100 along the FVT, based on sewer connectivity, which runs along Forest Valley Dr. and Orleans Blvd. through the community of Chapel Hill North.

Area H projections (population, dwellings and land areas) outlined in **Table 3-1** were pro-rated using the breakdown provided in the G.A Clark spreadsheet model and projections assigned to the same MHs. In the absence of sewer connectivity details, the lands west of Pagé Rd were assigned to MH fv06900. The lands east of Pagé Rd (future Orleans Industrial Park) were assigned to MH fv07400. Area G, south of the Hydro Corridor, was assigned to MH fv08100. Refer to **Figure 5-1** for catchment contribution locations.

As discussed in **Section 4.0** wastewater flows were calculated within the Forest Valley Trunk, assuming Buildout projections, for the following conditions:

- Design parameters for existing and future development
- Monitored parameters for existing and future development
- Monitored parameters for existing development and design parameters for future development (*Pipe capacity verified assuming Cumulative population and land areas, as well as Cumulative flows.*)

Table 5-1 provides a summary of the wastewater flows under each of the conditions listed above and flags pipe lengths where the flow exceeds the theoretical pipe capacity. Refer to **Figure 5-1** for MH locations, catchment contributions and possible surcharge locations. **Figures 5-2, 5-3** and **5-4** provide an illustration of the level of surcharge expected in the FVT for each of the conditions.

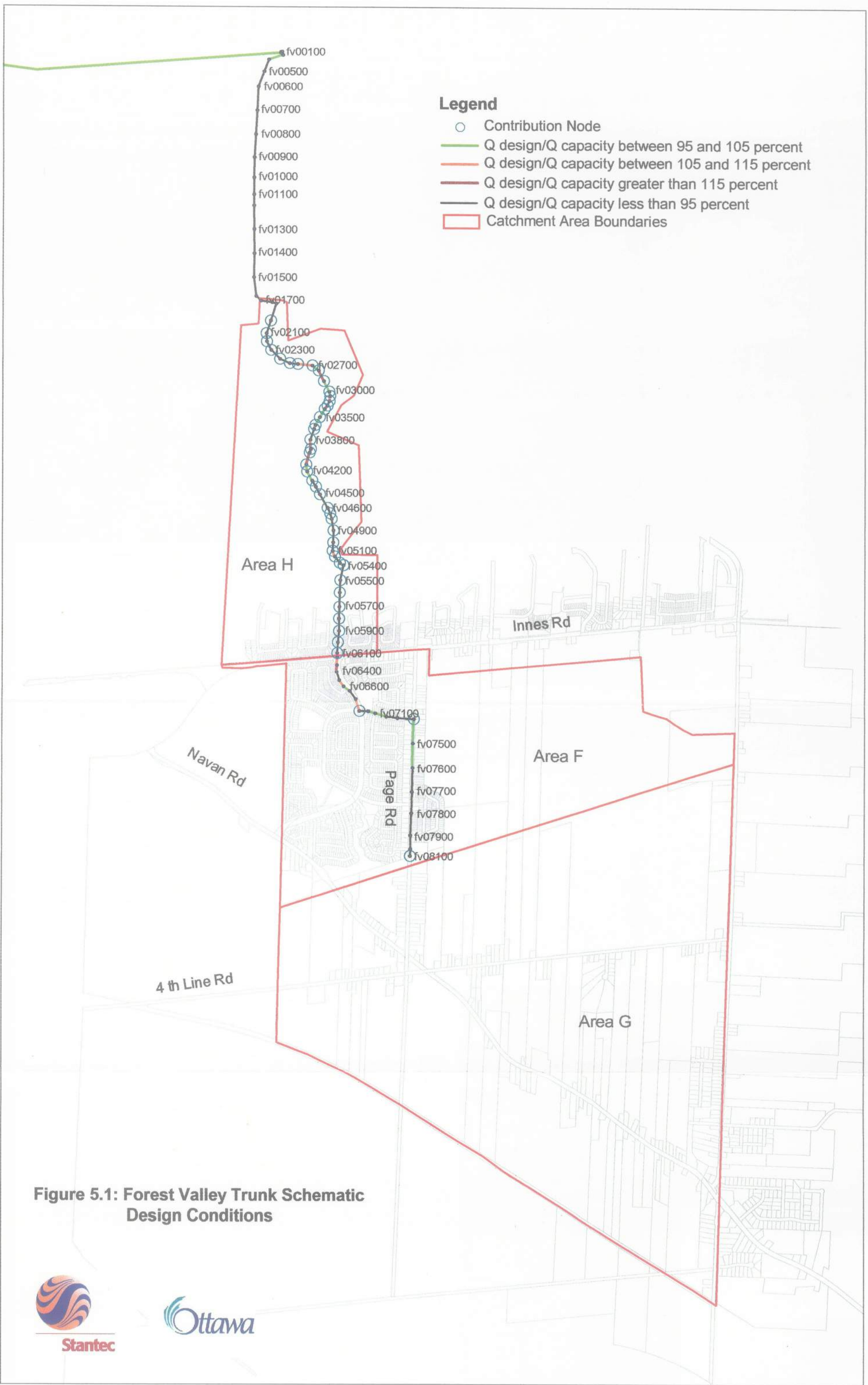
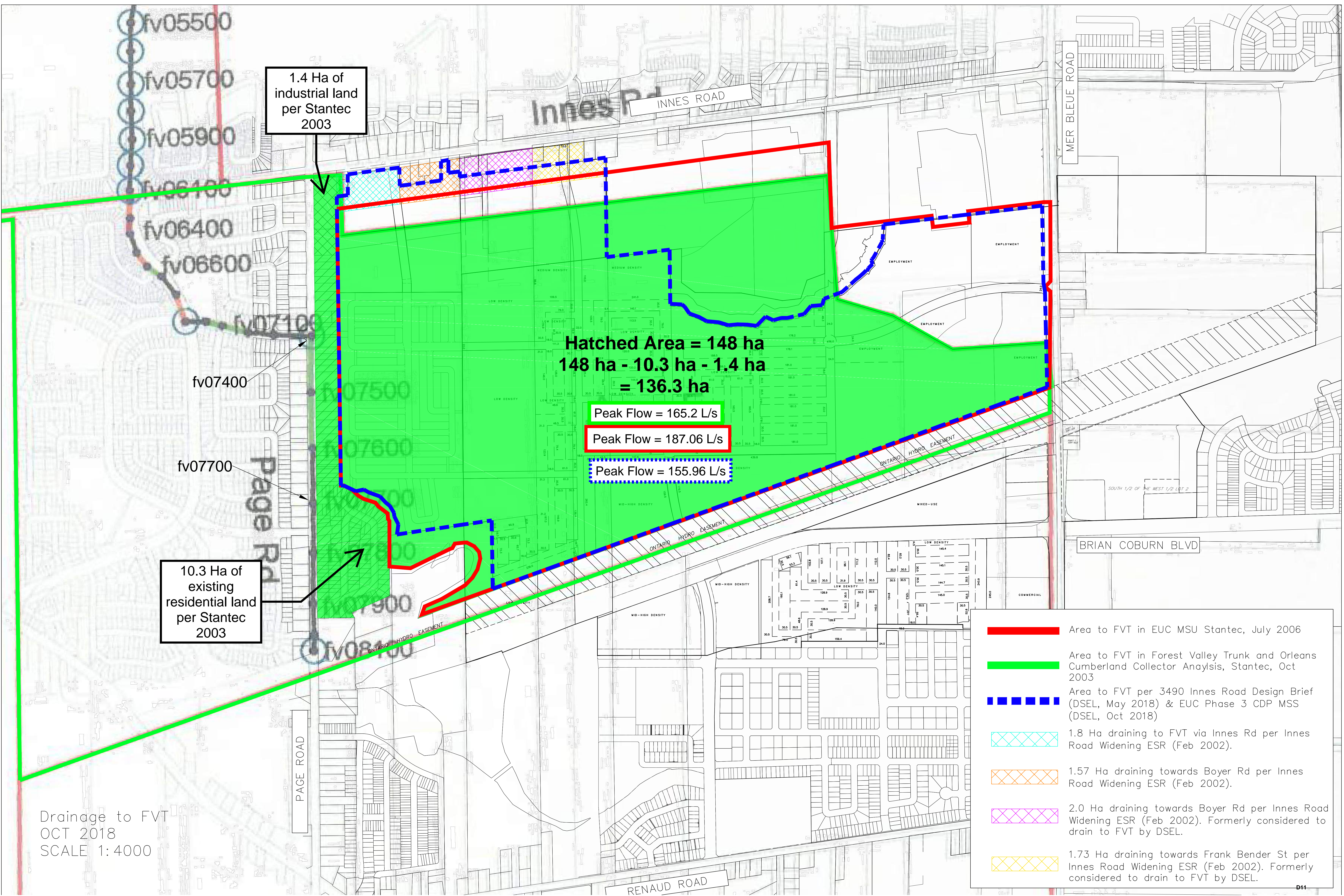


Figure 5.1: Forest Valley Trunk Schematic Design Conditions





1.4 Ha of industrial land per Stantec 2003

10.3 Ha of existing residential land per Stantec 2003

Hatched Area = 148 ha
 148 ha - 10.3 ha - 1.4 ha
 = 136.3 ha

Peak Flow = 165.2 L/s

Peak Flow = 187.06 L/s

Peak Flow = 155.96 L/s

Drainage to FVT
 OCT 2018
 SCALE 1: 4000

- █ Area to FVT in EUC MSU Stantec, July 2006
- █ Area to FVT in Forest Valley Trunk and Orleans Cumberland Collector Analysis, Stantec, Oct 2003
- █ Area to FVT per 3490 Innes Road Design Brief (DSEL, May 2018) & EUC Phase 3 CDP MSS (DSEL, Oct 2018)
- 1.8 Ha draining to FVT via Innes Rd per Innes Road Widening ESR (Feb 2002).
- 1.57 Ha draining towards Boyer Rd per Innes Road Widening ESR (Feb 2002).
- 2.0 Ha draining towards Boyer Rd per Innes Road Widening ESR (Feb 2002). Formerly considered to drain to FVT by DSEL.
- 1.73 Ha draining towards Frank Bender St per Innes Road Widening ESR (Feb 2002). Formerly considered to drain to FVT by DSEL.

SANITARY SEWER CALCULATION SHEET

LOCATION: **3490 Innes Road**
 FILE REF: **17-881**
 DATE: **4-Jul-18**

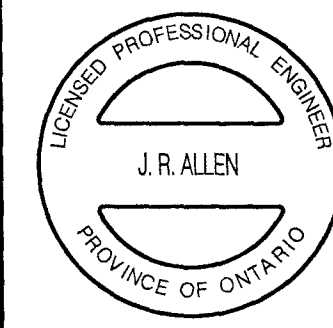
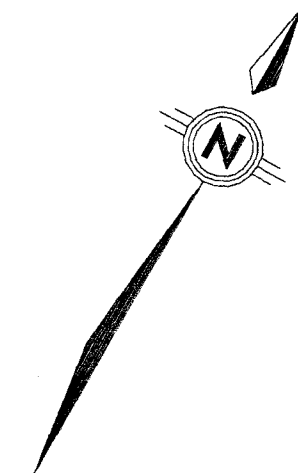
DESIGN PARAMETERS

Avg. Daily Flow Res.	350 L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0	Infiltration / Inflow	0.28 L/s/ha	
Avg. Daily Flow Com	50,000 L/ha/d	Peak Fact. Comm.	1.5	Min. Pipe Velocity	0.60 m/s full flowing
Park Flow	9,300 L/ha/d	Peak Fact. Instit.	1.5	Max. Pipe Velocity	3.00 m/s full flowing
Avg. Daily Flow Indu	35,000 L/ha/d	Peak Fact. Indust. = 2.3 per value used in MSS	Mannings N	0.013	



Location			Residential Area and Population								Commercial		Industrial		Park		Infiltration					
Area ID	Up	Down	Area	Number of Units				Pop.	Cumulative	Peak.	Q _{res}	Area	Accu.	Area	Accu.	Area	Accu.	Q _{C+I+I}	Total	Accu.	Infiltration	Total
				by type				Area	Pop.	Fact.	(L/s)	Area	Area	Area	Area	Area	Area	(L/s)	Area	Area	Flow	Flow
			(ha)	Singles	Semi's	Town's	Apt's		(ha)	(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)
FVT Orleans Business Park Allowance														136.30	136.30		127.0	136.300	136.300	38.164	165.16	
Based on information from the Forest Valley Trunk and Orleans Collector Capacity Analysis (Stantec, October 2003)																						





DELCAN

NO.	REVISIONS	BY	DATE

NOTE:
 The location of the utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned.
 The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage

**INNES ROAD WIDENING
 ORLEANS BLVD
 TO
 TENTH LINE ROAD**

**SANITARY SEWER DRAINAGE AREA PLAN
 OUTLET LOCATED AT
 BELCOURT ROAD**

R. G. HEWITT, P. ENG.
 Director Infrastructure Services

W. CLOUTHIER, P. ENG.
 Manager Construction Services

Dwn: PUH Chkd: JRA Des: PUH Chkd: JRA

Ottawa

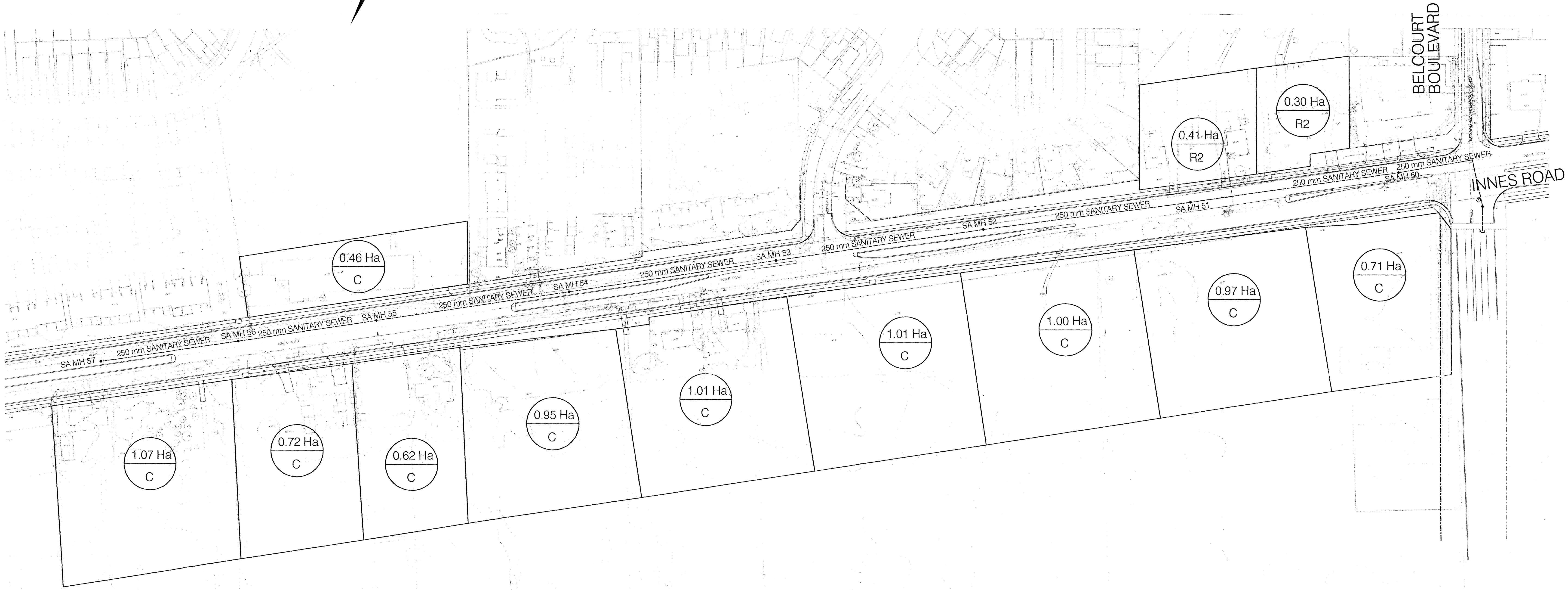
CONTRACT NO.
ISB03-5202

DIWG. NO.
R-ISB03-5202-SA 2

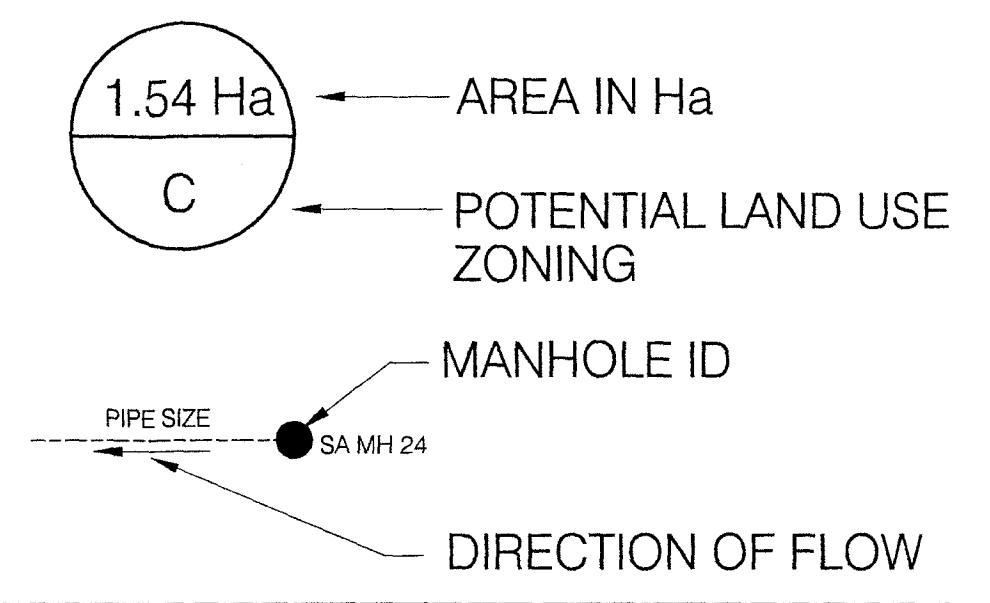
SHEET 1 OF 1

Date: MARCH 2004
 Scale: HORIZONTAL

0m 10 20 40



LEGEND



SERVICING REPORT

FOR

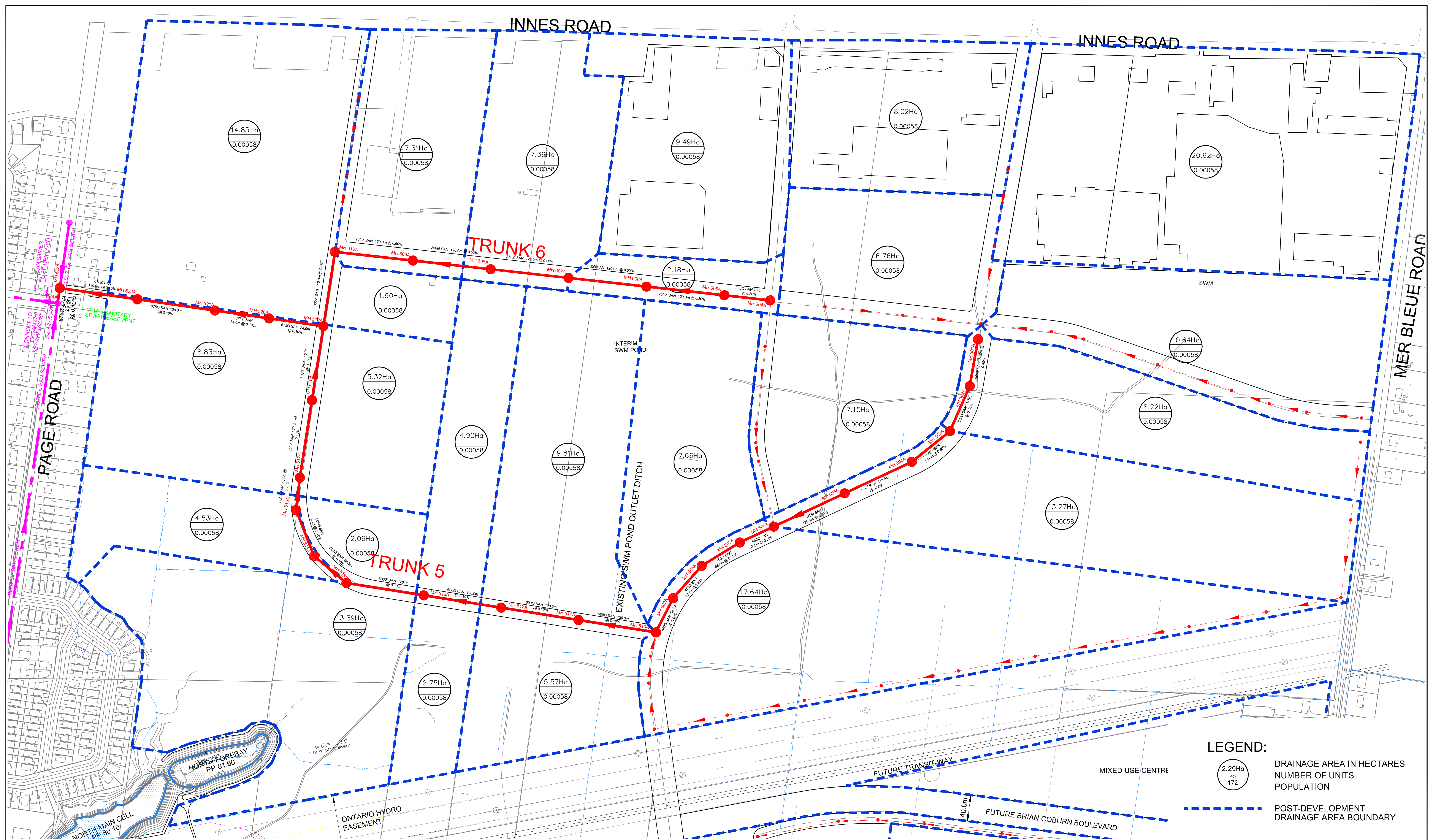
TRAILS EDGE AND ORLEANS BUSINESS PARK

MINTO DEVELOPMENTS INC. RICHCRAFT GROUP OF COMPANIES

CITY OF OTTAWA

PROJECT NO.: 10-459

**JULY 2017
REVISION 7
© DSEL**



LEGEND:

	2.29Ha 45 172	DRAINAGE AREA IN HECTARES NUMBER OF UNITS POPULATION
		POST-DEVELOPMENT DRAINAGE AREA BOUNDARY



120 Iber Road, Unit 203
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

ORLEANS BUSINESS PARK
CONCEPTUAL SANITARY DRAINAGE AREA

PROJECT No. :	10-459
SCALE:	1:3000
DATE:	FEBRUARY 2014
APPENDIX No.	H-2

SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION					COMM		INDUST		INSTIT		C+I	INFILTRATION			PIPE									
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	VEL.		
						AREA (ha)	POP.																		(FULL) (m/s)	(ACT.) (m/s)	
TRUNK 6		604A	605A							2.18	2.18					1.89	2.18	2.18	0.610	2.50	70.5	250	0.30	32.57	0.66	0.39	
		605A	606A								2.18					1.89	0.00	2.18	0.610	2.50	120.0	250	0.30	32.57	0.66	0.39	
		606A	607A								2.18					1.89	0.00	2.18	0.610	2.50	120.0	250	0.50	42.05	0.86	0.47	
		607A	608A							7.39	9.57					8.31	7.39	9.57	2.680	10.99	120.0	250	0.50	42.05	0.86	0.72	
		608A	609A								9.57					8.31	0.00	9.57	2.680	10.99	120.0	250	0.50	42.05	0.86	0.72	
		609A	610A							7.31	16.88					14.65	7.31	16.88	4.726	19.38	120.0	250	0.60	46.06	0.94	0.90	
										14.85	31.73					27.54	14.85	31.73									
		610A	519A							1.90	33.63					29.19	1.90	33.63	9.416	38.61	115.0	300	0.30	52.97	0.75	0.82	
To Trunk 5, Pipe 519A - 520A											33.63					29.19											
TRUNK 5																											
										6.76	6.76						6.76	6.76									
										8.22	14.98						8.22	14.98									
		501A	502A							10.64	25.62					22.24	10.64	25.62	7.174	29.41	73.0	300	0.40	61.16	0.87	0.86	
		502A	503A								25.62					22.24	0.00	25.62	7.174	29.41	75.5	300	0.40	61.16	0.87	0.86	
		503A	504A							13.27	38.89					33.76	13.27	38.89	10.889	44.65	75.5	375	0.30	96.03	0.87	0.85	
		504A	505A								38.89					33.76	0.00	38.89	10.889	44.65	113.5	375	0.30	96.03	0.87	0.85	
		505A	506A								38.89					33.76	0.00	38.89	10.889	44.65	120.0	375	0.30	96.03	0.87	0.85	
										7.15	46.04						7.15	46.04									
										17.64	63.68						17.64	63.68									
		506A	507A							7.66	71.34					61.93	7.66	71.34	19.975	81.91	57.5	450	0.20	127.50	0.80	0.85	
		507A	508A								71.34					61.93	0.00	71.34	19.975	81.91	68.5	450	0.20	127.50	0.80	0.85	
		508A	509A								71.34					61.93	0.00	71.34	19.975	81.91	66.0	450	0.20	127.50	0.80	0.85	
		509A	510A								71.34					61.93	0.00	71.34	19.975	81.91	58.5	450	0.20	127.50	0.80	0.85	
										5.57	76.91						5.57	76.91									
		510A	511A							9.81	86.72					75.28	9.81	86.72	24.282	99.56	120.0	600	0.10	194.17	0.69	0.69	
		511A	512A								86.72					75.28	0.00	86.72	24.282	99.56	120.0	600	0.10	194.17	0.69	0.69	
										4.90	91.62						4.90	91.62									
		512A	513A							2.75	94.37					81.92	2.75	94.37	26.424	108.34	120.0	600	0.10	194.17	0.69	0.71	
										2.06	96.43						2.06	96.43									
		513A	514A							13.39	109.82					95.33	13.39	109.82	30.750	126.08	120.0	600	0.10	194.17	0.69	0.73	
		514A	515A							4.53	114.35					99.26	4.53	114.35	32.018	131.28	64.5	600	0.10	194.17	0.69	0.74	
		515A	516A								114.35					99.26	0.00	114.35	32.018	131.28	75.5	600	0.10	194.17	0.69	0.74	
		516A	517A								114.35					99.26	0.00	114.35	32.018	131.28	50.0	600	0.10	194.17	0.69	0.74	
										8.83	123.18						8.83	123.18									
		517A	518A							5.32	128.50					111.55	5.32	128.50	35.980	147.53	120.0	600	0.10	194.17	0.69	0.76	
		518A	519A								128.50					111.55	0.00	128.50	35.980	147.53	115.0	600	0.10	194.17	0.69	0.76	
Contribution From Trunk 6, Pipe 614A - 515A										33.63	162.13						33.63	162.13									
		519A	520A								162.13					140.74	0.00	162.13	45.396	186.14	84.0	675	0.10	265.82	0.74	0.80	
		520A	521A								162.13					140.74	0.00	162.13	45.396	186.14	84.0	675	0.10	265.82	0.74	0.80	
		521A	522A								162.13					140.74	0.00	162.13	45.396	186.14	120.0	675	0.10	265.82	0.74	0.80	
		522A	523A								162.13					140.74	0.00	162.13	45.396	186.14	120.0	675	0.10	265.82	0.74	0.80	
		523A	524A								162.13					140.74	0.00	162.13	45.396	186.14	23.5	675	0.10	265.82	0.74	0.80	

DESIGN PARAMETERS										Designed: K.M.					PROJECT: TRAILS EDGE				
Average Daily Flow = 350 l/p/day										Checked: Z.L.					LOCATION: City of Ottawa				
Comm/Inst Flow = 50000 L/ha/da										Dwg. Reference: Sanitary Drainage Plan					File Ref: 10-459				
Industrial Flow = 35000 L/ha/da										MUC = 1.8					Date: February, 2014				
Max Res. Peak Factor = 4.00										Sheet No. 1 of 1									
Commercial/Inst peak Factor = 1.50																			
Institutional 0.58 l/s/ha																			
Industrial Peak Factor = as per MOE Graph																			
Extraneous Flow = 0.280																			
Minimum Velocity = 0.760 L/s/ha																			
Manning's n = 0.013 m/s																			
High Density coeff= 2.3																			
Med Density coeff= 2.7																			
Low Density coeff= 3.4																			

DESIGN BRIEF

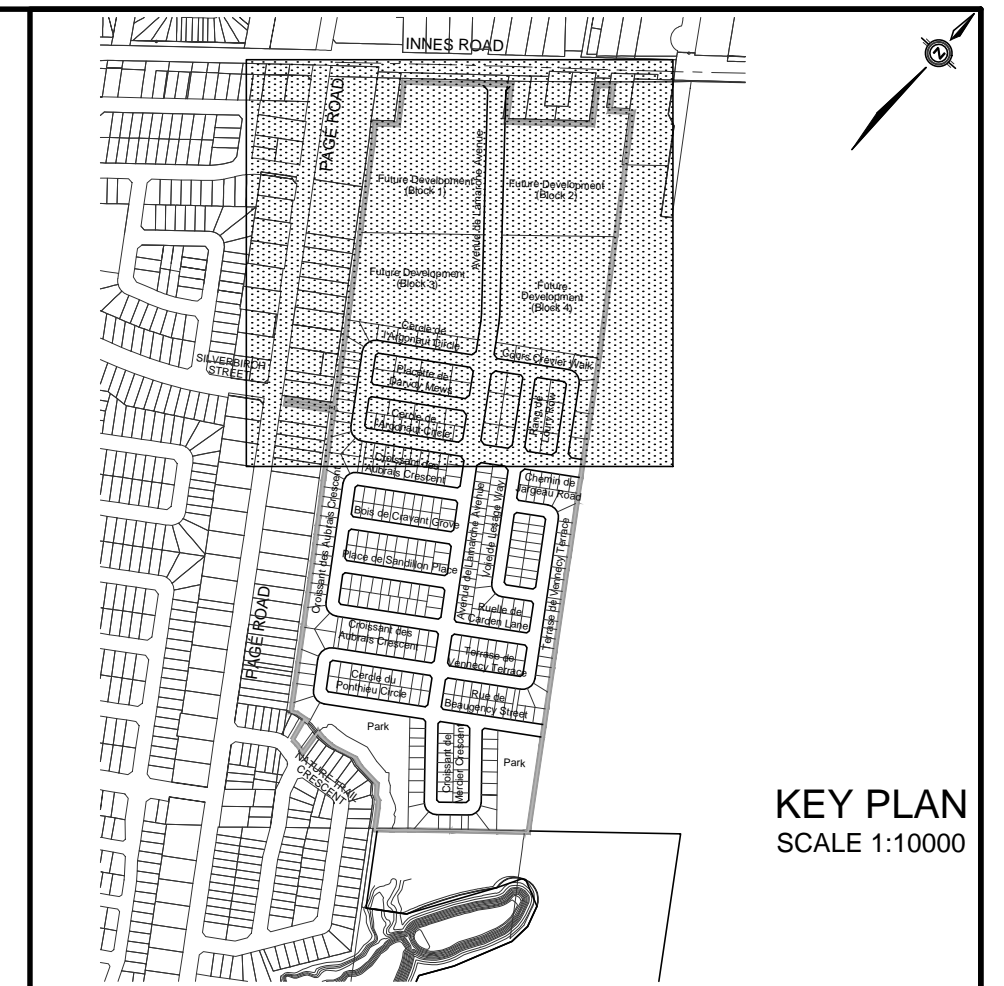
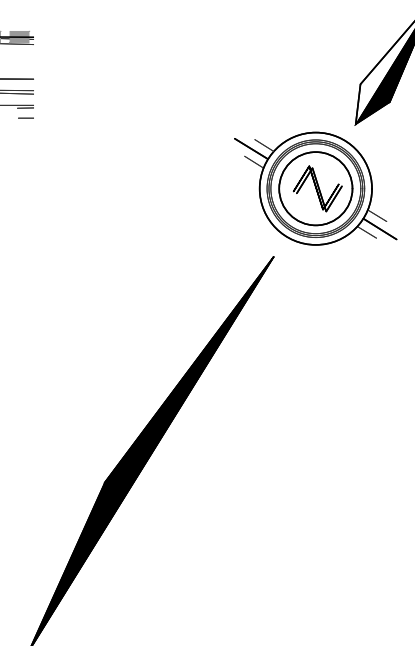
FOR

CAIVAN (ORLEANS VILLAGE) LIMITED
3490 INNES ROAD

CITY OF OTTAWA

PROJECT NO.: 15-881

MAY 2018 – VER 2
© DSEL



KEY PLAN
SCALE 1:10000

LEGEND

- SANITARY DRAINAGE BOUNDARY
- SANITARY SUB-DRAINAGE BOUNDARY
- SANITARY DRAINAGE BOUNDARY (OTHER PHASES)
- UPSTREAM MH TO DOWNSTREAM MH
- AREA IN HECTARES
- POPULATION
- UPSTREAM MH TO DOWNSTREAM MH
- AREA IN OTHER PHASES IN HECTARES
- POPULATION
- EXTERNAL AREA IN HECTARES
- EXTERNAL POPULATION
- DENSITY (PERSONS/HECTARE)
- EXTERNAL LAND USE
- MAINTENANCE HOLE
- CAP

TOPOGRAPHIC INFORMATION
TOPOGRAPHIC INFORMATION PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 16-10-116-00, SURVEYS DATED NOVEMBER 30, 2017.

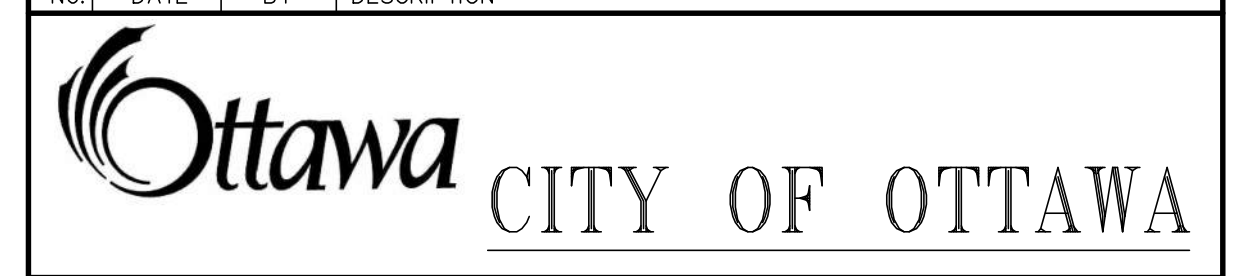
LEGAL INFORMATION
CALCULATED M-PLAN PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 16-10-116-00 (PHASE 1 & 2) DATED MARCH 08, 2018.

ISSUED FOR MOE APPROVAL 18-05-09

NOT FOR CONSTRUCTION

ELEVATION NOTE
ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM SITE BENCHMARK NCC CONTROL POINT 001196530229 HAVING A PUBLISHED ELEVATION OF 86.12m

No.	DATE	BY	DESCRIPTION
2.	18-05-09	M.Z.	ISSUED FOR MOE APPROVAL
1.	18-01-24	M.Z.	1st SUBMISSION



PROJECT No. 16-881

SANITARY DRAINAGE PLAN
© DSEL

CAIVAN (ORLEANS VILLAGE) LIMITED	ORLEANS VILLAGE
--	-----------------

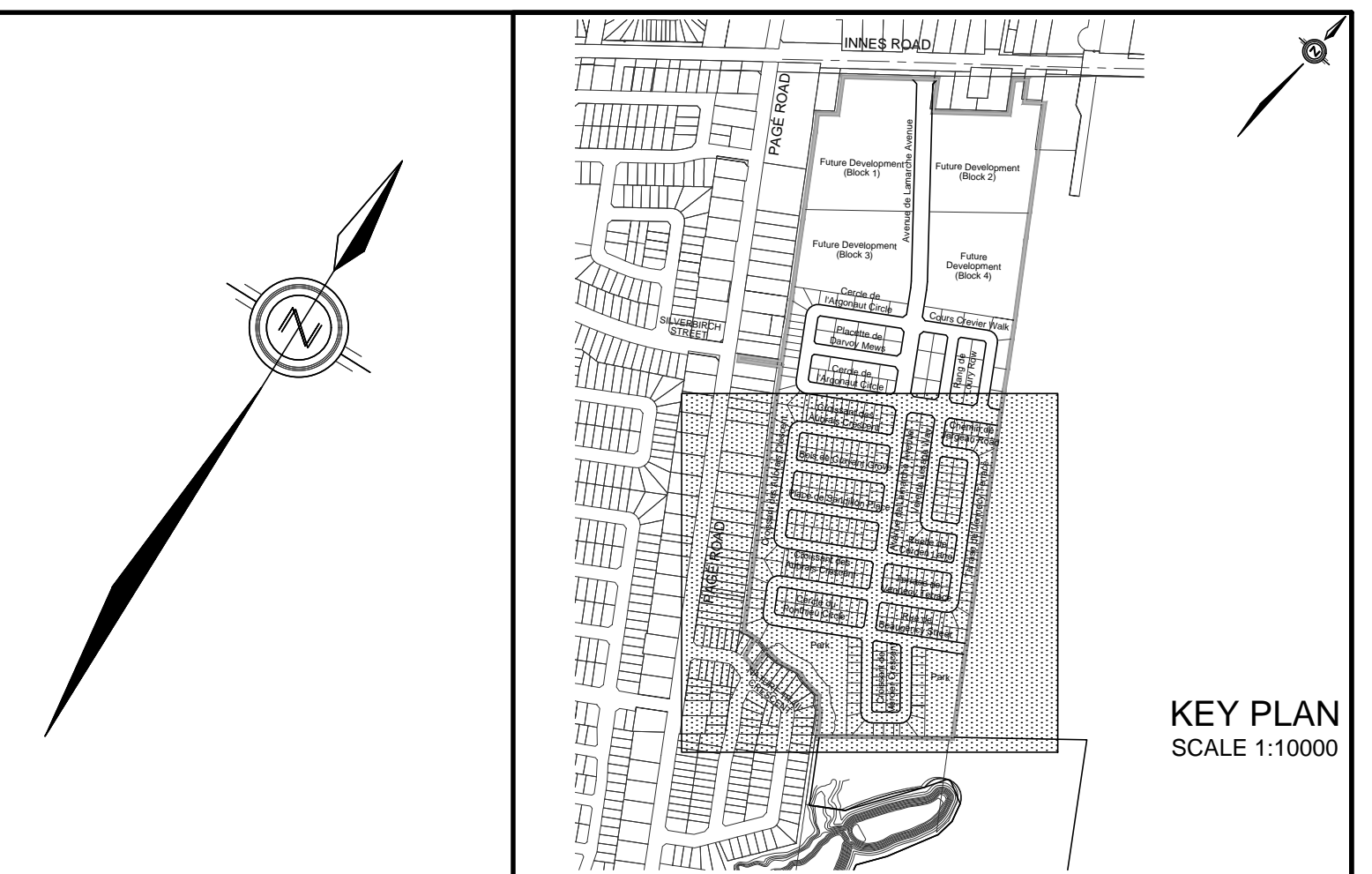
DSEL
david schaeffer engineering ltd

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9
Tel: (613) 836-8656
Fax: (613) 836-7183
www.DSEL.ca

DRAWN BY: M.Z./J.Y.	CHECKED BY: P.P.	DRAWING NO.	SHEET NO.
DESIGNED BY: P.P.	CHECKED BY: M.Z.		65
SCALE: 1:1000	DATE: JANUARY 2018		

EAST URBAN COMMUNITY
MIXED USE CENTRE
REFER TO
DAVID SCHAEFFER ENGINEERING LIMITED
PROJECT No. 14-723

CITY PLAN No. XXXXX
D07-16-16-0022
CITY FILE No.



LEGEND

- SANITARY DRAINAGE BOUNDARY
- SANITARY SUB-DRAINAGE BOUNDARY
- SANITARY DRAINAGE BOUNDARY (OTHER PHASES)
- UPSTREAM MH TO DOWNSTREAM MH
- AREA IN HECTARES
- POPULATION
- UPSTREAM MH TO DOWNSTREAM MH
- AREA IN OTHER PHASES IN HECTARES
- POPULATION
- EXTERNAL AREA IN HECTARES
- EXTERNAL POPULATION
- DENSITY (PERSONS/HECTARE)
- EXTERNAL LAND USE
- MAINTENANCE HOLE
- CAP

TOPOGRAPHIC INFORMATION
 TOPOGRAPHIC INFORMATION PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 16-10-116-00, SURVEYS DATED NOVEMBER 30, 2017.

LEGAL INFORMATION
 CALCULATED M-PLAN PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 16-10-116-00 (PHASE 1 & 2) DATED MARCH 08, 2018.

ISSUED FOR MOE APPROVAL 18-05-09

NOT FOR CONSTRUCTION

ELEVATION NOTE
 ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM SITE BENCHMARK NCC CONTROL POINT 001196530229 HAVING A PUBLISHED ELEVATION OF 86.12m

EAST URBAN COMMUNITY
 MIXED USE CENTRE
 REFER TO
 DAVID SCHAEFFER ENGINEERING LIMITED
 PROJECT No. 14-733

A=63.57	POP=6460
RESIDENTIAL	
A=53.65	
COMMERCIAL	
A=10.45	
PARK	

2.	18-05-09	M.Z.	ISSUED FOR MOE APPROVAL
1.	18-01-24	M.Z.	1st SUBMISSION
No.	DATE	BY	DESCRIPTION



PROJECT No. 16-881

PROFESSIONAL ENGINEER
 M. ZDRAVEVSKI
 100130902
 18-05-09
 PROVINCE OF ONTARIO

SANITARY DRAINAGE PLAN © DSEL

CAIVAN (ORLEANS VILLAGE) LIMITED

ORLEANS VILLAGE

DSEL
 david schaeffer engineering ltd

120 Iber Road, Unit 103
 Stoneyville, ON K2S 1E9
 Tel: (613) 836-8656
 Fax: (613) 836-7183
 www.DSEL.ca

DESIGNED BY: M.Z./J.Y. CHECKED BY: P.P. DRAWING NO. SHEET NO.
 DESIGNED BY: P.P. CHECKED BY: M.Z.
 SCALE: 1:1000 DATE: JANUARY 2018 **66**

CITY PLAN No. XXXXX
 D07-16-16-0022
 CITY FILE No.

SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION		RESIDENTIAL AREA AND POPULATION						PEAK		COMM		INSTIT		PARK		C+H	INFILTRATION			PIPE							
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.	
						AREA (ha)	POP.																			(FULL) (m/s)	(ACT.) (m/s)
Rang de Loury Row - 03																											
	200A	19A	0.42		44.00	0.42	44.00	3.66	0.52								0.42	0.42	0.14	0.66	77.50	200.00	0.90	31.12	0.02	0.99	0.39
To Street 9, Pipe 19A - 34A						0.42	44.00											0.42									
	200A	20A	0.18		17.00	0.18	17.00	3.71	0.20								0.18	0.18	0.06	0.26	40.50	200.00	0.65	26.44	0.01	0.84	0.27
To Street 7, Pipe 20A - 24A						0.18	17.00											0.18									
Cercle de l'Argonaut Circle - 12																											
	27A	26A	0.08		4.00	0.08	4.00	3.76	0.05								0.08	0.08	0.03	0.08	10.00	200.00	0.65	26.44	0.00	0.84	0.05
			0.05		4.00	0.13	8.00										0.05	0.13									
	26A	25A	0.41		44.00	0.54	52.00	3.65	0.62								0.41	0.54	0.18	0.80	71.00	200.00	0.65	26.44	0.03	0.84	0.37
	25A	24A	0.38		38.00	0.92	90.00	3.60	1.05								0.38	0.92	0.30	1.35	74.00	200.00	0.35	19.40	0.07	0.62	0.35
To Street 1, Pipe 24A - 21A						0.92	90.00											0.92									
	27A	29A	0.23		17.00	0.23	17.00	3.71	0.20								0.23	0.23	0.08	0.28	51.50	200.00	0.65	26.44	0.01	0.84	0.27
	29A	30A	0.26		14.00	0.49	31.00	3.68	0.37								0.26	0.49	0.16	0.53	51.50	200.00	0.60	25.41	0.02	0.81	0.32
	30A	31A	0.18		11.00	0.67	42.00	3.66	0.50								0.18	0.67	0.22	0.72	11.00	200.00	0.35	19.40	0.04	0.62	0.30
	31A	32A	0.38		34.00	1.05	76.00	3.62	0.89								0.38	1.05	0.35	1.24	65.50	200.00	0.35	19.40	0.06	0.62	0.34
	32A	34A	0.39		34.00	1.44	110.00	3.59	1.28								0.39	1.44	0.48	1.76	81.50	200.00	0.35	19.40	0.09	0.62	0.38
To Street 1, Pipe 34A - 35A						1.44	110.00											1.44									
Placette de Darvoy Mews - 13																											
	29A	28A	0.37		38.00	0.37	38.00	3.67	0.45								0.37	0.37	0.12	0.57	71.50	200.00	0.75	28.40	0.02	0.90	0.35
	28A	21A	0.42		44.00	0.79	82.00	3.61	0.96								0.42	0.79	0.26	1.22	80.50	200.00	0.35	19.40	0.06	0.62	0.34
To Street 1, Pipe 21A - 33A						0.79	82.00											0.79									
Croissant des Aubrais Crescent - 10																											
	8A	9A	0.55		41.00	0.55	41.00	3.67	0.49								0.55	0.55	0.18	0.67	75.00	200.00	0.65	26.44	0.03	0.84	0.37
	9A	35A	0.30		24.00	0.85	65.00	3.63	0.76								0.30	0.85	0.28	1.04	72.50	200.00	0.35	19.40	0.05	0.62	0.32
To Street 1, Pipe 35A - 36A						0.85	65.00											0.85									
	8A	7A	0.13		7.00	0.13	7.00	3.74	0.08								0.13	0.13	0.04	0.12	10.00	200.00	0.65	26.44	0.00	0.84	0.05
	7A	38A	0.23		14.00	0.36	21.00	3.70	0.25								0.23	0.36	0.12	0.37	51.50	200.00	0.35	19.40	0.02	0.62	0.24
To Street 3, Pipe 38A - 37A						0.36	21.00											0.36									
	38A	40A	0.25		17.00	0.25	17.00	3.71	0.20								0.25	0.25	0.08	0.28	59.00	200.00	0.65	26.44	0.01	0.84	0.27
	40A	41A	0.22		14.00	0.47	31.00	3.68	0.37								0.22	0.47	0.16	0.53	51.50	200.00	0.35	19.40	0.03	0.62	0.27
	41A	42A	0.14		7.00	0.61	38.00	3.67	0.45								0.14	0.61	0.20	0.65	10.00	200.00	0.35	19.40	0.03	0.62	0.27
	42A	43A	0.40		34.00	1.01	72.00	3.62	0.84								0.40	1.01	0.33	1.17	69.00	200.00	0.35	19.40	0.06	0.62	0.34
	43A	52A	0.36		31.00	1.37	103.00	3.59	1.20								0.36	1.37	0.45	1.65	78.00	200.00	0.35	19.40	0.09	0.62	0.38
To Street 1, Pipe 52A - 53A						1.37	103.00											1.37									
Bois de Cravant Grove - 14																											
Contribution From Street 4, Pipe 7A - 38A						0.36	21.00										0.36	0.36									
	38A	37A	0.39		34.00	0.75	55.00	3.64	0.65								0.39	0.75	0.25	0.90	69.50	200.00	0.35	19.40	0.05	0.62	0.32
	37A	36A	0.34		28.00	1.09	83.00	3.61	0.97								0.34	1.09	0.36	1.33	85.00	200.00	0.35	19.40	0.07	0.62	0.35
To Street 1, Pipe 36A - 44A						1.09	83.00											1.09									

DESIGN PARAMETERS										Designed: P.P.					PROJECT: Caivan Communities - Orleans Village												
Park Flow =	9300	L/ha/da	0.10764	I/s/ha	Industrial Peak Factor = as per MOE Graph					Checked: M.Z.					LOCATION: City of Ottawa												
Average Daily Flow =	280	l/p/day	Extraneous Flow = 0.330 L/s/ha					Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 68-70					File Ref: 16-881			Date: May, 2018			Sheet No. 1 of 4								
Comm/Inst Flow =	28000	L/ha/da	0.5787	I/s/ha	Minimum Velocity = 0.600 m/s																						
Industrial Flow =	35000	L/ha/da	0.40509	I/s/ha	Manning's n = (Conc) 0.013 (Pvc) 0.013																						
Max Res. Peak Factor =	4.00	Townhouse coeff= 2.7																									
Commercial/Inst./Park Peak Factor =	1.00	Single house coeff= 3.4																									
Institutional =	0.32	I/s/ha																									

SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION					COMM		INSTIT		PARK		C+H	INFILTRATION			PIPE												
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.				
						AREA (ha)	POP.																			(FULL) (m/s)	(ACT.) (m/s)			
Place de Sandillon Place - 11																														
	40A	39A	0.38		34.00	0.38	34.00	3.68	0.41								0.38	0.38	0.13	0.54	69.50	200.00	0.65	26.44	0.02	0.84	0.33			
	39A	44A	0.34		28.00	0.72	62.00	3.64	0.73								0.34	0.72	0.24	0.97	85.00	200.00	0.40	20.74	0.05	0.66	0.34			
To Street 1, Pipe 44A - 52A						0.72	62.00											0.72												
Cours Crevier Walk- 02																														
	18A	17A	0.07		6.00	0.07	6.00	3.75	0.07								0.07	0.07	0.02	0.09	10.00	200.00	0.65	26.44	0.00	0.84	0.05			
	17A	16A	0.65		65.00	0.72	71.00	3.63	0.84								0.65	0.72	0.24	1.08	111.50	200.00	0.35	19.40	0.06	0.62	0.34			
To Street 9, Pipe 16A - 19A						0.72	71.00											0.72												
	18A	20A	0.19		17.00	0.19	17.00	3.71	0.20								0.19	0.19	0.06	0.26	51.50	200.00	0.80	29.34	0.01	0.93	0.30			
Contribution From Street 8, Pipe 200A - 20A						0.18	17.00										0.18	0.37												
	20A	24A	0.20		17.00	0.57	51.00	3.65	0.60								0.20	0.57	0.19	0.79	62.50	200.00	0.45	22.00	0.04	0.70	0.34			
To Street 1, Pipe 24A - 21A						0.57	51.00											0.57												
Chemin de Jargeau Road - 04																														
	10A	16A	0.12		7.00	0.12	7.00	3.74	0.08								0.12	0.12	0.04	0.12	26.50	200.00	0.65	26.44	0.00	0.84	0.05			
Contribution From Street 7, Pipe 17A - 16A						0.72	71.00										0.72	0.84												
	16A	19A	0.23		14.00	1.07	92.00	3.60	1.07								0.23	1.07	0.35	1.42	58.50	200.00	0.35	19.40	0.07	0.62	0.35			
Contribution From Street 8, Pipe 200A - 19A						0.42	44.00										0.42	1.49												
	19A	34A	0.11		1.00	1.60	137.00	3.56	1.58								0.11	1.60	0.53	2.11	59.00	200.00	0.35	19.40	0.11	0.62	0.40			
To Street 1, Pipe 34A - 35A						1.60	137.00											1.60												
Voie de Lesage Way - 05																														
	190A	15A	0.21		14.00	0.21	14.00	3.72	0.17								0.21	0.21	0.07	0.24	42.50	200.00	0.65	26.44	0.01	0.84	0.27			
	15A	14A	0.60		55.00	0.81	69.00	3.63	0.81								0.60	0.81	0.27	1.08	106.50	200.00	0.35	19.40	0.06	0.62	0.34			
	14A	13A	0.13		7.00	0.94	76.00	3.62	0.89								0.13	0.94	0.31	1.20	11.50	200.00	0.35	19.40	0.06	0.62	0.34			
	13A	45A	0.16		11.00	1.10	87.00	3.61	1.02								0.16	1.10	0.36	1.38	49.00	200.00	0.35	19.40	0.07	0.62	0.35			
To Street 11, Pipe 45A - 47A						1.10	87.00											1.10												
Terrace de Vennecy Terrace - 06																														
	15A	11A	0.15		11.00	0.15	11.00	3.73	0.13								0.15	0.15	0.05	0.18	49.00	200.00	0.65	26.44	0.01	0.84	0.27			
	11A	12A	0.11		7.00	0.26	18.00	3.71	0.22								0.11	0.26	0.09	0.31	11.50	200.00	0.35	19.40	0.02	0.62	0.24			
	12A	45A	0.64		55.00	0.90	73.00	3.62	0.86								0.64	0.90	0.30	1.16	106.50	200.00	0.35	19.40	0.06	0.62	0.34			
Contribution From Street 10, Pipe 13A - 45A						1.10	87.00										1.10	2.00												
	45A	47A	0.43		31.00	2.43	191.00	3.52	2.18								0.43	2.43	0.80	2.98	111.00	250.00	0.30	32.57	0.09	0.66	0.41			
	47A	48A	0.12		7.00	2.55	198.00	3.52	2.26								0.12	2.55	0.84	3.10	10.50	250.00	0.30	32.57	0.10	0.66	0.42			
	48A	53A	0.59		55.00	3.14	253.00	3.49	2.86								0.59	3.14	1.04	3.90	108.50	250.00	0.30	32.57	0.12	0.66	0.44			
To Street 1, Pipe 53A - 55A						3.14	253.00											3.14												
Ruelle de Carden Lane - 07																														
	46A	52A	0.56		48.00	0.56	48.00	3.65	0.57								0.56	0.56	0.18	0.75	105.50	200.00	0.65	26.44	0.03	0.84	0.37			
To Street 1, Pipe 52A - 53A						0.56	48.00											0.56												
Croissant de Mercier Crescent- 09																														
	4A	5A	0.13		7.00	0.13	7.00	3.74	0.08								0.13	0.13	0.04	0.12	11.00	200.00	0.95	31.97	0.00	1.02	0.06			
	5A	6A	0.61		48.00	0.74	55.00	3.64	0.65								0.61	0.74	0.24	0.89	106.50	200.00	0.50	23.19	0.04	0.74	0.36			
To Street 2, Pipe 6A - 55A						0.74	55.00											0.74												

DESIGN PARAMETERS										Designed: P.P.										PROJECT: Caivan Communities - Orleans Village															
Park Flow = 9300 L/ha/da 0.10764 l/s/ha Average Daily Flow = 280 l/p/day Comm/Inst Flow = 28000 L/ha/da 0.5787 l/s/ha Industrial Flow = 35000 L/ha/da 0.40509 l/s/ha Max Res. Peak Factor = 4.00 Commercial/Inst./Park Peak Factor = 1.00 Institutional = 0.32 l/s/ha										Industrial Peak Factor = as per MOE Graph Extraneous Flow = 0.330 L/s/ha Minimum Velocity = 0.600 m/s Manning's n = (Conc) 0.013 (Pvc) 0.013 Townhouse coeff= 2.7 Single house coeff= 3.4										Checked: M.Z. LOCATION: City of Ottawa Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 68-70 File Ref: 16-881 Date: May, 2018								Sheet No. of 4 2							

SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION				COMM		INSTT		PARK		C+H	INFILTRATION			PIPE										
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.	
						AREA (ha)	POP.																			(FULL) (m/s)	(ACT.) (m/s)
	4A	3A	0.21		11.00	0.21	11.00	3.73	0.13							0.21	0.21	0.07	0.20	42.00	200.00	0.65	26.44	0.01	0.84	0.27	
	3A	2A	0.08		4.00	0.29	15.00	3.72	0.18	Areas Double Counted						0.08	0.29	0.10	0.28	10.50	200.00	0.35	19.40	0.01	0.62	0.20	
	2A	54A	0.60		51.00	0.89	66.00	3.63	0.78							0.60	0.89	0.29	1.07	100.50	200.00	0.35	19.40	0.06	0.62	0.34	
	54A	55A	0.05		4.00	0.94	70.00	3.63	0.82							0.05	0.94	0.31	1.13	13.50	200.00	0.35	19.40	0.06	0.62	0.34	
To Street 2, Pipe 55A - 58A						0.94	70.00										0.94										
Avenue de Lamarche Avenue - 01																											
			0.60		1.00	0.60	1.00			2.54	2.54					3.14	3.14										
			2.54		1222.00	3.14	1223.00			2.86	5.40					5.40	8.54										
	22A	230A	2.86		1376.00	6.00	2599.00	3.00	25.27	2.86	5.40				1.75	2.86	11.40	3.76	30.78	76.50	250.00	1.20	65.14	0.47	1.33	1.30	
	230A	23A	0.15		1.00	6.15	2600.00	3.00	25.28		5.40				1.75	0.15	11.55	3.81	30.84	63.50	250.00	0.85	54.83	0.56	1.12	1.15	
			0.13		1.00	6.28	2601.00				5.40					0.13	11.68										
			2.16		1039.00	8.44	3640.00				5.40					2.16	13.84										
	23A	24A	2.17		1044.00	10.61	4684.00	2.82	42.81		5.40				1.75	2.17	16.01	5.28	49.84	59.50	375.00	0.29	94.42	0.53	0.85	0.86	
Contribution From Street 7, Pipe 20A - 24A						0.57	51.00									0.57	16.58										
Contribution From Street 5, Pipe 25A - 24A						0.92	90.00									0.92	17.50										
	24A	21A	0.23		17.00	12.33	4842.00	2.81	44.09		5.40				1.75	0.23	17.73	5.85	51.69	58.50	375.00	0.30	96.03	0.54	0.87	0.89	
Contribution From Street 6, Pipe 28A - 21A						0.79	82.00									0.79	18.52										
	21A	33A	0.19		14.00	13.31	4938.00	2.80	44.81		5.40				1.75	0.19	18.71	6.17	52.73	42.50	375.00	0.20	78.41	0.67	0.71	0.76	
	33A	34A	0.03		1.00	13.34	4939.00	2.80	44.82		5.40				1.75	0.03	18.74	6.18	52.75	17.00	375.00	0.42	113.63	0.46	1.03	1.01	
Contribution From Street 9, Pipe 19A - 34A						1.60	137.00									1.60	20.34										
Contribution From Street 5, Pipe 32A - 34A						1.44	110.00									1.44	21.78										
	34A	35A	0.29		24.00	16.67	5210.00	2.78	46.94		5.40				1.75	0.29	22.07	7.28	55.97	59.00	375.00	0.20	78.41	0.71	0.71	0.77	
Contribution From Street 4, Pipe 9A - 35A						0.85	65.00									0.85	22.92										
	35A	36A	0.31		28.00	17.83	5303.00	2.78	47.78		5.40				1.75	0.31	23.23	7.67	57.20	58.50	375.00	0.20	78.41	0.73	0.71	0.77	
Contribution From Street 3, Pipe 37A - 36A						1.09	83.00									1.09	24.32										
	36A	44A	0.32		28.00	19.24	5414.00	2.77	48.60		5.40				1.75	0.32	24.64	8.13	58.48	58.50	375.00	0.20	78.41	0.75	0.71	0.78	
Contribution From Street 14, Pipe 39A - 44A						0.72	62.00									0.72	25.36										
	44A	52A	0.29		24.00	20.25	5500.00	2.77	49.37		5.40				1.75	0.29	25.65	8.46	59.58	58.50	450.00	0.15	110.42	0.54	0.69	0.70	
Contribution From Street 4, Pipe 43A - 52A						1.37	103.00									1.37	27.02										
Contribution From Street 12, Pipe 46A - 52A						0.56	48.00									0.56	27.58										
	52A	53A	0.09		1.00	22.27	5652.00	2.76	50.55		5.40				1.75	0.09	27.67	9.13	61.43	58.50	450.00	0.15	110.42	0.56	0.69	0.71	
Contribution From Street 11, Pipe 48A - 53A						3.14	253.00									3.14	30.81										
Contribution From Street 2, Pipe 51A - 53A						0.80	69.00									0.80	31.61										
	53A	55A	0.09		1.00	26.30	5975.00	2.74	53.06		5.40				1.75	0.09	31.70	10.46	65.27	61.50	450.00	0.15	110.42	0.59	0.69	0.72	
To Street 2, Pipe 55A - 58A						26.30	5975.00				5.40						31.70										
Cercle du Ponthieu Circle - 08																											
	50A	51A	0.25		21.00	0.25	21.00	3.70	0.25							0.25	0.25	0.08	0.33	41.50	200.00	0.70	27.44	0.01	0.87	0.28	
	51A	53A	0.55		48.00	0.80	69.00	3.63	0.81							0.55	0.80	0.26	1.07	98.50	200.00	0.55	24.32	0.04	0.77	0.37	
To Street 1, Pipe 53A - 55A						0.80	69.00										0.80										
	490A	49A	0.14		7.00	0.14	7.00	3.74	0.08							0.14	0.14	0.05	0.13	11.00	200.00	0.65	26.44	0.00	0.84	0.05	
	49A	57A	0.24		14.00	0.38	21.00	3.70	0.25							0.24	0.38	0.13	0.38	50.50	200.00	0.35	19.40	0.02	0.62	0.24	
	57A	58A	0.09		4.00	0.47	25.00	3.69	0.30							0.09	0.47	0.16	0.46	14.00	200.00	0.35	19.40	0.02	0.62	0.24	
To Nature Trail Crescent, Pipe 58A - 59A						0.47	25.00										0.47										

DESIGN PARAMETERS										Designed: P.P.					PROJECT: Caivan Communities - Orleans Village														
Industrial Peak Factor = as per MOE Graph										Checked: M.Z.					LOCATION: City of Ottawa														
Extraneous Flow = 0.330 L/s/ha										Dwg. Reference: Sanitary Drainage Plan, Dwg. No. 68-70					File Ref: 16-881					Date: May, 2018					Sheet No. 3 of 4				
Minimum Velocity = 0.600 m/s																													
Manning's n = (Conc) 0.013 (Pvc) 0.013																													
Townhouse coeff= 2.7																													
Single house coeff= 3.4																													

SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION				PEAK		COMM		INSTIT		PARK		C+H	INFILTRATION			PIPE								
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.	
						AREA (ha)	POP.																			(FULL) (m/s)	(ACT.) (m/s)
Rue de Beaugency Street - 08																											
	500A	501A	0.33		24.00	0.33	24.00	3.70	0.29					0.65	0.65	0.07	0.98	0.98	0.32	0.68	62.50	200.00	0.65	26.44	0.03	0.84	0.37
	501A	502A	0.19		14.00	0.52	38.00	3.67	0.45					0.65	0.65	0.07	0.19	1.17	0.39	0.91	78.50	200.00	0.35	19.40	0.05	0.62	0.32
	502A	55A				0.52	38.00	3.67	0.45					0.65	0.65	0.07	0.00	1.17	0.39	0.91	2.50	200.00	1.65	42.13	0.02	1.34	0.52
Cercle du Ponthieu Circle - 08																											
	503A	504A	0.25		17.00	0.25	17.00	3.71	0.20								0.25	0.25	0.08	0.28	57.50	200.00	0.65	26.44	0.01	0.84	0.27
	504A	505A	0.26		17.00	0.51	34.00	3.68	0.41					0.77	0.77	0.08	1.03	1.28	0.42	0.91	69.50	200.00	0.50	23.19	0.04	0.74	0.36
	505A	58A				0.51	34.00	3.68	0.41					0.77	0.77	0.08	0.00	1.28	0.42	0.91	3.00	200.00	1.00	32.80	0.03	1.04	0.46
To Nature Trail Crescent, Pipe 58A - 59A																											
	1A	6A	63.57		6462.00	63.57	6462.00	2.71	56.75	53.65	53.65			10.45	10.45	18.51	127.67	127.67	42.13	117.39	88.50	675.00	0.11	278.79	0.42	0.78	0.74
Contribution From Street 13, Pipe 5A - 6A																											
	6A	55A				0.74	55.00									0.74	128.41										
Contribution From Street 1, Pipe 53A - 55A																											
						26.30	5975.00				5.40					31.70	160.11										
Contribution From Street 13, Pipe 54A - 55A																											
						0.94	70.00									0.94	161.05										
	55A	58A				92.07	12600.00	2.48	101.27		59.05			11.10	20.33	0.00	161.05	53.15	174.75	143.00	675.00	0.11	278.79	0.63	0.78	0.83	
To Nature Trail Crescent, Pipe 58A - 59A																											
						92.07	12600.00				59.05			11.10		161.05											
Nature Trail Crescent - 20 Outlet																											
Contribution From Street 2, Pipe 505A - 58A																											
						0.51	34.00							0.77		1.28	1.28		0.00								
Contribution From Street 2, Pipe 55A - 58A																											
						92.07	12600.00				59.05			11.10		161.05	162.33		0.00								
Contribution From Street 2, Pipe 57A - 58A																											
						0.47	25.00									0.47	162.80										
	58A	59A	0.07	1.00		93.12	12660.00	2.48	101.75		59.05			11.87	20.41	0.07	162.87	53.75	175.91	48.00	675.00	0.11	278.79	0.63	0.78	0.83	
			0.01	1.00		93.13	12661.00				59.05			11.87		0.01	162.88										
	59A	60A	0.05	1.00		93.18	12662.00	2.48	101.76		59.05			11.87	20.41	0.05	162.93	53.77	175.94	33.00	675.00	0.11	278.79	0.63	0.78	0.83	
To Noblewood Way, Pipe 60A - 61A																											
						93.18	12662.00				59.05			11.87		162.93	162.93		0.00								
Noblewood Way - 21																											
Contribution From Nature Trail Crescent, Pipe 59A - 60A																											
			0.06	4.00		93.24	12666.00				59.05			11.87		0.06	162.99										
	60A	61A	1.47		82.00	94.71	12748.00	2.48	102.46		59.05			11.87	20.41	1.47	164.46	54.27	177.14	11.00	675.00	0.11	278.79	0.64	0.78	0.83	
	61A	62A	0.59		47.00	95.30	12795.00	2.48	102.83		59.05			11.87	20.41	0.59	165.05	54.47	177.71	73.50	675.00	0.11	278.79	0.64	0.78	0.83	

DESIGN PARAMETERS										Designed:		PROJECT:									
Park Flow =	9300	L/ha/da	0.10764	I/s/Ha							P.P.	Caivan Communities - Orleans Village									
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph																
Comm/Inst Flow =	28000	L/ha/da	0.5787	I/s/Ha	Extraneous Flow =	0.330	L/s/ha				Checked:	LOCATION: City of Ottawa									
Industrial Flow =	35000	L/ha/da	0.40509	I/s/Ha	Minimum Velocity =	0.600	m/s				M.Z.										
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013	(Pvc)	0.013													
Commercial/Inst./Park Peak Factor =	1.00				Townhouse coeff=	2.7															
Institutional =	0.32	I/s/Ha			Single house coeff=	3.4					Dwg. Reference:	Sanitary Drainage Plan, Dwgs. No. 68-70	File Ref:	16-881	Date:	May, 2018	Sheet No.	4	of	4	

SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION				COMM		INSTIT		PARK		C+I+I		INFILTRATION			PIPE										
STREET	FROM M.H.	TO M.H.	AREA (ha)	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.			
					AREA (ha)	POP.																			(FULL) (m/s)	(ACT.) (m/s)		
NW Quadrant to Nature Trail Crescent	1133A	1A (B.O.)			64.33	7168	2.68	62.26		35.83				7.63	23.00	0.00	107.79	35.57	120.83									
Per Sanitary Sewer Calculation Sheet - prepared by DSEL, October 2018					64.33	7168	2.68			35.83				7.63					120.83									
3490 Innes Rd. Future Dev. Blocks					4.33	1402	3.16	14.36	5.40	5.40				0.00	3.28	9.73	9.73	3.21	20.85									
Future Dev. Blocks taken at EUC Phase 3 CDP Mid-High Residential Density (144 pop/ha)																												
3490 Innes Road					19.75	1516	3.14	15.43	0.00	0.00			1.42	1.42	0.23	21.17	21.17	6.99	22.65									
Per Sanitary Sewer Calculation Sheet - Caivan Communities Orleans Village - prepared by DSEL, May 2018																												
Total to Existing Nature Trail Crescent sewer					88.41	10086	2.56	83.68	41.23	41.23			9.05	9.05	26.51	138.69	138.69	45.77	155.96									

DESIGN PARAMETERS										Designed:		PROJECT:					
Park Flow =	9300	L/ha/da	0.108	Harmon Correction Factor =	0.800			BK		Orleans EUC MUC							
Average Daily Flow =	280	l/p/day		Industrial Peak Factor = as per MOE Graph						LOCATION:							
Comm/Inst Flow =	35000	L/ha/da	0.405	Extraneous Flow =	0.330	L/s/ha				City of Ottawa							
Industrial Flow =	35000	L/ha/da	0.405	Minimum Velocity =	0.600	m/s				File Ref:		14-733	Date:	October, 2018	Sheet No.	1	
Max Res. Peak Factor =	4.00			Manning's n = (Conc)	0.013	(Pvc)	0.013			Dwg. Reference:						of	1
Commercial/Inst./Park Peak Factor =	1.50	if ICI >20%	1.00	if ICI <20%													
Mixed Use	28000.00	L/ha/da															
Institutional =	0.405	l/s/Ha															





July 5, 2018

David Schaeffer Engineering Limited

120 Iber Road, Unit 103
Ottawa, Ontario K2S 1E9

Attention: Laura Maxwell, B.Sc., M.Pl.

**Subject: Orleans Village Subdivision / Forest Valley Sanitary Trunk Sewer
Hydraulic Gradeline Analysis Test**

our file:883-10

As requested by your office, based on the provided information as described below, we have evaluated the potential impact of redirecting sanitary flow contributions from the Orleans Village subdivision and East Urban Community (EUC) development to an inflow point approximately 458 m upstream of that previously considered on the existing Forest Valley sanitary trunk sewer.

The impact of these proposed developments on the hydraulic gradeline in the Forest Valley trunk sewer was evaluated based on spreadsheet calculations for a range of scenarios in the October 2003 *Forest Valley Trunk and Orleans Cumberland Collector Capacity Analysis* by Stantec Consulting Ltd.. Refer to Attachment A for key excerpts from the report. We understand from DSEL that the contributions from the Orleans Village and EUC developments make up approximately 165.2 L/s of the inflow to node fv07400 at the intersection of Pagé Road and Silverbirch Street in the “Monitored & Design” flows scenario, with the remaining 15.8 L/s contributed by 1.4 ha of industrial land and 10.3 ha of existing residential land to the east of Pagé Road.

For comparison with the sanitary sewer hydraulic gradeline elevations, the October 2003 report estimated underside of footing elevations for lots connected to the sanitary sewer system as 3.3 m below the trunk sewer top of manhole elevations. Note that this assumption has not been carried forward in the present study, as it is unclear why the estimate is so much more conservative than typical approximations. For example, we understand from DSEL that standard low-rise residential underside of footing elevations are generally shallower than 1.8 m below the road centreline elevation. The impact of relocating sanitary flow contributions from the Orleans Village and EUC developments has instead been evaluated based on differences in hydraulic gradeline elevation and pipe surcharge, with the understanding that a survey may be undertaken if needed to confirm underside of footing elevations in areas where the trunk sewer is surcharged (i.e. the hydraulic gradeline is above the obvert of the pipe).

A model of the Forest Valley sanitary trunk sewer between fv08100 and fv00100 was created in XPSWMM for comparison with the “Monitored & Design” flows scenario from the October 2003 report. Refer to Attachment B for an XPSWMM model schematic. As presented in Table B-1 of Attachment B, the XPSWMM-simulated hydraulic gradeline elevations are between 3 cm and 70 cm lower than those presented in Table 5-1 of the October 2003 report (included in Attachment A), except at fv04200 where the XPSWMM hydraulic gradeline is 4 cm higher. The sanitary trunk sewer is not surcharged based on the XPSWMM analysis, with the exception of two pipes between fv04200 and fv04000, where the hydraulic gradeline is 3-4 cm above the pipe obverts.

The XPSWMM model was then modified based on direction from DSEL, wherein the 165.2 L/s sanitary flow contribution from the Orleans Village and EUC developments was redirected from fv07400 to an upstream inflow point at fv07700, at the north intersection of Nature Trail Crescent and Pagé Road. As a result of this relocation of inflow, the sanitary hydraulic gradeline elevations increase by up to 15.5 cm between fv08100 and fv7500, and are otherwise unaffected. The simulated hydraulic gradeline elevations are still between 3 cm and 70 cm lower than those

presented in Table 5-1 of the October 2003 report for this scenario, except at fv04200 where the XPSWMM hydraulic gradeline is 4 cm higher. Similarly, the sanitary trunk sewer pipes are still surcharged by 3-4 cm in two pipes between fv04200 and fv04000 under this scenario, and the hydraulic gradeline is otherwise contained below the obverts of the trunk sewer pipes.

Yours truly,

J.F. Sabourin and Associates Inc.



Laura Pipkins, P.Eng.

cc: J.F. Sabourin, M.Eng, P.Eng.

Director of Water Resources Projects

Attachment A: Excerpts from *Forest Valley Trunk and Orleans Cumberland Collector Capacity Analysis* (Stantec Consulting Ltd., October 2003)

Attachment B: XPSWMM Model Schematic; Pipe Data and Hydraulic Simulation Results

ATTACHMENT

A

*Excerpts from Forest Valley Trunk and
Orleans Cumberland Collector Capacity Analysis
(Stantec Consulting Ltd., October 2003)*

JFSA

Water Resources and
Environmental Consultants



J.F. Sabourin and Associates Inc.
Water Resources and
Environmental Consultants

Orleans Village Subdivision
Forest Valley Sanitary Trunk Sewer HGL Analysis Test

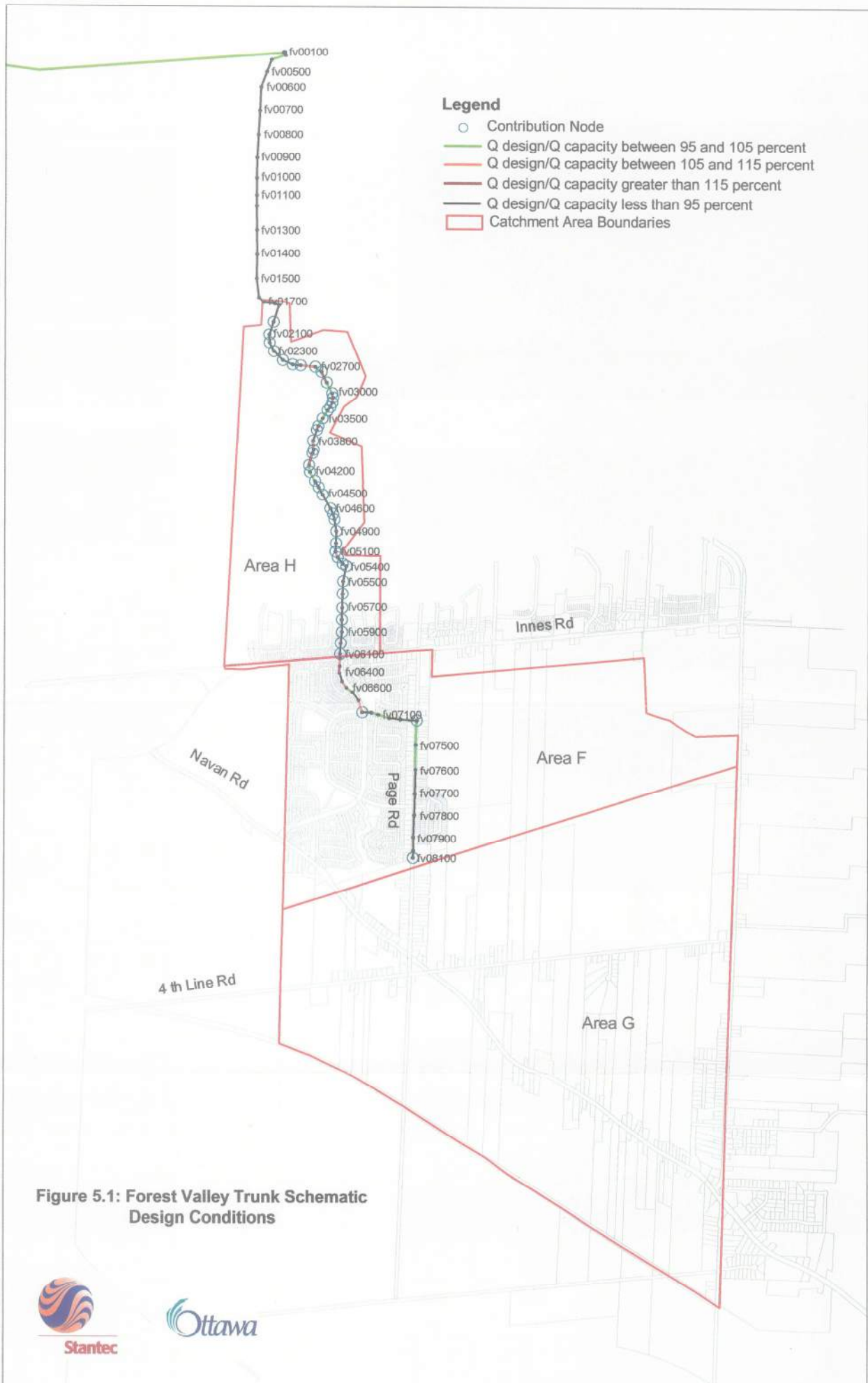


Figure 5.1: Forest Valley Trunk Schematic Design Conditions



TABLE 5-1
Summary of FVT Wastewater Flows and HGL

LEGEND

- Catchment Node
- Q/Qcap between 95% and 105%
- Q/Qcap between 105% and 115%
- Q/Qcap greater than 115%
- Q/Qcap greater than 95% and HGL is above basement elevation (OG-3.3m)

USMH	DSMH	LENGTH	USINV	USOBV	GROUND	USF Elev. (3.3m below OG)	Ccap Manning's (L/s)	Design				Monitored (300Lpcd, 0.50L/s/ha, K=0.60)				Monitored & Design			
								HGL (m)	Surcharge (m)	Q (L/s)	Q/Qc (%)	HGL (m)	Surcharge (m)	Q (L/s)	Q/Qc (%)	HGL (m)	Surcharge (m)	Q (L/s)	Q/Qc (%)
Forest Valley																			
fv00100	oc00400	-	44.8	45.7	52.0		7843	45.7	0.00	859	11%	45.7	0.00	739	9%				
fv00200	fv00100	8	46.1	47.0	52.0		6006	47.0	0.00	859	14%	47.0	0.00	739	12%	904	12%		
fv00300	fv00200	30	47.0	47.9	52.2		2831	47.9	0.00	859	30%	47.9	0.00	739	26%	904	32%		
fv00400	fv00300	123	47.7	48.6	52.5		830	48.6	0.01	859	103%	48.6	0.00	739	89%	904	103%		
fv00500	fv00400	203	48.1	49.1	53.1		1293	49.1	0.00	859	66%	49.1	0.00	739	57%	904	70%		
fv00600	fv00500	303	48.6	49.5	53.9		1163	49.5	0.00	859	74%	49.5	0.00	739	64%	904	78%		
fv00700	fv00600	463	49.0	49.9	54.1		1223	49.9	0.00	859	70%	49.9	0.00	739	60%	904	74%		
fv00800	fv00700	604	49.7	50.6	54.3		1208	50.6	0.00	859	71%	50.6	0.00	739	61%	904	75%		
fv00900	fv00800	763	50.3	51.2	54.6		1193	51.2	0.00	859	72%	51.2	0.00	739	62%	904	76%		
fv01000	fv00900	880	50.9	51.8	55.1		1178	51.8	0.00	859	73%	51.8	0.00	739	63%	904	77%		
fv01100	fv01000	984	51.4	52.4	56.4		1193	52.4	0.00	859	72%	52.4	0.00	739	62%	904	76%		
fv01200	fv01100	1,053	51.9	52.8	56.1		1461	52.8	0.00	859	59%	52.8	0.00	739	51%	904	62%		
fv01300	fv01200	1,202	52.3	53.2	59.5		1208	53.2	0.00	859	71%	53.2	0.00	739	61%	904	75%		
fv01400	fv01300	1,353	52.9	53.9	63.8		1208	53.9	0.00	859	71%	53.9	0.00	739	61%	904	75%		
fv01500	fv01400	1,503	53.6	54.5	63.8		1178	54.5	0.00	859	73%	54.5	0.00	739	63%	904	77%		
fv01600	fv01500	1,624	56.0	56.9	62.0		1178	56.9	0.00	859	73%	56.9	0.00	739	63%	904	77%		
fv01700	fv01600	1,663	58.1	59.0	63.2		1265	59.0	0.00	859	68%	59.0	0.00	739	58%	904	71%		
fv01800	fv01700	1,736	58.6	59.6	62.9		1033	59.6	0.00	859	83%	59.6	0.00	739	72%	904	88%		
fv01900	fv01800	1,764	59.0	60.0	63.2		1193	60.0	0.00	859	72%	60.0	0.00	739	62%	904	76%		
fv02000	fv01900	1,884	61.7	62.6	66.3	63.0	1987	62.6	0.00	859	43%	62.6	0.00	739	37%	904	45%		
fv02100	fv02000	1,969	64.7	65.6	70.4	67.1	1969	65.6	0.00	859	44%	65.6	0.00	739	38%	904	46%		
fv02200	fv02100	2,019	68.6	69.5	71.9	68.6	1951	69.5	0.00	858	44%	69.5	0.00	739	38%	904	46%		
fv02300	fv02200	2,079	69.6	70.7	73.3	70.0	1886	70.7	0.00	858	46%	70.7	0.00	739	39%	903	48%		
fv02400	fv02300	2,158	71.6	72.5	76.9	73.6	1951	72.5	0.00	858	44%	72.5	0.00	738	38%	903	46%		
fv02500	fv02400	2,225	74.6	75.6	80.3	77.0	2151	75.6	0.00	858	40%	75.6	0.00	738	34%	903	42%		
fv02500	fv02500	2,275	75.7	76.6	82.7	79.4	980	76.6	0.00	858	89%	76.6	0.00	738	75%	903	92%		
fv02700	fv02600	2,368	75.9	76.8	83.6	80.3	755	76.9	0.04	858	114%	76.8	0.00	738	98%	903	105%		
fv02800	fv02700	2,418	76.0	76.9	83.8	80.5	844	77.0	0.05	857	102%	76.9	0.00	737	87%	902	107%		
fv02900	fv02800	2,492	76.2	77.1	83.7	80.4	680	77.1	0.05	856	105%	77.0	0.04	735	108%	900	132%		
fv03000	fv02900	2,568	76.4	77.3	83.9	80.6	864	77.3	0.00	854	93%	77.3	0.00	733	85%	898	104%		
fv03100	fv03000	2,596	76.4	77.3	83.8	80.5	885	77.3	0.00	853	95%	77.3	0.00	733	83%	897	101%		
fv03200	fv03100	2,630	76.5	77.4	84.0	80.7	800	77.4	0.01	853	107%	77.4	0.00	732	91%	897	112%		
fv03300	fv03200	2,652	76.6	77.5	84.0	80.7	905	77.5	0.00	853	94%	77.5	0.00	732	81%	896	99%		
fv03400	fv03300	2,690	76.6	77.6	83.8	80.5	997	77.6	0.03	852	145%	77.6	0.01	731	122%	896	150%		
fv03500	fv03400	2,749	76.8	77.7	84.0	80.7	885	77.7	0.00	852	98%	77.7	0.00	730	83%	896	101%		
fv03600	fv03500	2,804	76.9	77.8	83.7	80.4	822	77.8	0.01	850	103%	77.8	0.00	728	89%	893	103%		
fv03700	fv03600	2,831	76.9	77.8	83.6	80.3	755	77.9	0.02	850	113%	77.8	0.00	728	97%	892	113%		
fv03800	fv03700	2,902	77.1	78.0	83.6	80.3	980	78.0	0.00	849	87%	78.0	0.00	727	74%	891	91%		
fv03900	fv03800	2,963	77.2	78.1	83.9	80.6	778	78.2	0.02	847	109%	78.1	0.00	725	93%	889	114%		
fv04000	fv03900	2,984	77.3	78.2	84.1	80.8	844	78.2	0.00	847	100%	78.2	0.00	725	86%	889	105%		
fv04100	fv04000	3,063	77.4	78.3	84.6	81.3	653	78.4	0.06	843	125%	78.3	0.02	720	110%	884	135%		
fv04200	fv04100	3,106	77.5	78.4	84.5	81.2	886	78.4	0.00	843	95%	78.4	0.00	720	81%	883	100%		
fv04300	fv04200	3,161	77.7	78.6	84.0	80.7	838	78.6	0.00	843	101%	78.6	0.00	720	86%	883	105%		
fv04400	fv04300	3,202	77.8	78.7	84.4	81.1	936	78.7	0.00	800	85%	78.7	0.00	669	71%	828	88%		
fv04500	fv04400	3,250	77.9	78.8	84.8	81.5	903	78.8	0.00	796	88%	78.8	0.00	664	73%	823	91%		
fv04600	fv04500	3,331	78.1	79.0	84.4	81.1	899	79.0	0.00	796	89%	79.0	0.00	663	74%	823	92%		
fv04700	fv04600	3,389	78.2	79.1	84.3	81.0	885	79.1	0.00	795	90%	79.1	0.00	663	75%	822	93%		
fv04800	fv04700	3,405	78.3	79.2	84.3	81.0	844	79.2	0.00	795	94%	79.2	0.00	663	79%	822	97%		
fv04900	fv04800	3,479	78.5	79.4	84.8	81.5	864	79.4	0.00	795	92%	79.4	0.00	662	77%	822	95%		
fv05000	fv04900	3,555	78.7	79.6	84.4	81.1	844	79.6	0.00	794	94%	79.6	0.00	661	78%	820	97%		

TABLE 5-1
Summary of FVT Wastewater Flows and HGL

LEGEND

- Catchment Node
- Q/Qcap between 95% and 105%
- Q/Qcap between 105% and 115%
- Q/Qcap greater than 115%
- Q/Qcap greater than 95% and HGL is above basement elevation (OG-3.3m)

USMH	DSMH	LENGTH	USINV	USOBV	GROUND	USF Elev. (3.3m below OG)	Qcap Manning's (L/s)	Design				Monitored (300Lpcd, 0.50L/s/ha, K=0.60)				Monitored & Design			
								HGL	Surcharge	Q	Q/Qc	HGL	Surcharge	Q	Q/Qc	HGL	Surcharge	Q	Q/Qc
								(m)	(m)	(L/s)	(%)	(m)	(m)	(L/s)	(%)	(m)	(m)	(L/s)	(%)
fv05100	fv05000	3.608	78.8	79.7	84.0	80.7	924	79.7	0.00	793	86%	79.7	0.00	661	71%	79.7	0.00	320	89%
fv05200	fv05100	3.648	78.9	79.8	84.3	81.0	731	79.8	0.01	793	109%	79.8	0.00	660	90%	79.8	0.02	319	112%
fv05300	fv05200	3.698	79.1	80.0	84.7	81.4	924	80.0	0.00	793	86%	80.0	0.00	660	71%	80.0	0.00	319	89%
fv05400	fv05300	3.724	79.1	80.0	85.5	82.2	822	80.0	0.00	792	96%	80.0	0.00	659	80%	80.0	0.00	319	100%
fv05500	fv05400	3.821	79.4	80.3	86.9	83.6	924	80.3	0.00	783	85%	80.3	0.00	649	70%	80.3	0.00	307	87%
fv05600	fv05500	3.888	79.6	80.5	87.9	84.6	844	80.5	0.00	783	93%	80.5	0.00	648	77%	80.5	0.00	307	95%
fv05700	fv05600	3.989	79.8	80.7	89.1	85.8	962	80.7	0.00	783	81%	80.7	0.00	648	67%	80.7	0.00	306	84%
fv05800	fv05700	4.063	80.0	80.9	89.0	85.7	864	80.9	0.00	773	89%	80.9	0.00	636	74%	80.9	0.00	294	92%
fv05900	fv05800	4.140	80.2	81.1	88.6	85.3	885	81.1	0.00	773	87%	81.1	0.00	636	72%	81.1	0.00	294	90%
fv05000	fv05900	4.210	80.3	81.2	88.6	85.3	885	81.2	0.00	773	87%	81.2	0.00	636	72%	81.2	0.00	293	90%
fv06100	fv06000	4.280	80.5	81.4	88.9	85.6	822	81.4	0.00	772	94%	81.4	0.00	636	77%	81.4	0.00	293	95%
fv06200	fv06100	4.306	80.5	81.4	88.8	85.5	864	81.4	0.00	772	89%	81.4	0.00	635	74%	81.4	0.00	293	92%
fv06300	fv06200	4.364	80.6	81.5	88.6	85.3	731	81.5	0.01	772	105%	81.5	0.00	635	87%	81.5	0.01	293	109%
fv06400	fv06300	4.397	80.6	81.5	88.5	85.2	653	81.6	0.02	772	113%	81.5	0.00	635	97%	81.6	0.02	293	121%
fv06500	fv06400	4.448	80.8	81.7	88.2	84.9	1016	81.7	0.00	772	76%	81.7	0.00	635	63%	81.7	0.00	293	78%
fv06600	fv06500	4.495	80.8	81.8	88.1	84.8	731	81.8	0.01	772	106%	81.8	0.00	635	87%	81.8	0.01	293	109%
fv06700	fv06600	4.544	80.9	81.8	87.8	84.5	778	81.8	0.00	772	93%	81.8	0.00	635	82%	81.9	0.02	293	102%
fv06800	fv06700	4.609	81.1	82.0	87.7	84.4	885	82.0	0.00	772	87%	82.0	0.00	635	72%	82.0	0.00	293	90%
fv06900	fv06800	4.688	81.2	82.1	87.0	83.7	706	82.1	0.02	772	109%	82.1	0.00	635	90%	82.2	0.03	293	112%
fv07000	fv06900	4.744	81.3	82.3	87.3	84.0	800	82.3	0.00	714	89%	82.3	0.00	561	70%	82.3	0.00	274	89%
fv07100	fv07000	4.791	81.4	82.4	87.6	84.3	680	82.4	0.01	714	105%	82.4	0.00	561	83%	82.4	0.01	274	105%
fv07200	fv07100	4.863	81.6	82.5	87.5	84.2	731	82.5	0.00	714	98%	82.5	0.00	561	77%	82.5	0.00	274	98%
fv07300	fv07200	4.934	81.8	82.7	87.8	84.5	1016	82.7	0.00	714	70%	82.7	0.00	561	55%	82.7	0.00	274	70%
fv07400	fv07300	5.037	81.9	82.9	88.0	84.7	1790	82.9	0.00	714	40%	82.9	0.00	561	31%	82.9	0.00	274	40%
fv07500	fv07400	5.189	82.224	83.138	87.8	84.5	706	83.1	0.00	533	76%	83.1	0.00	458	65%	83.1	0.00	533	76%
fv07600	fv07500	5.342	82.450	83.364	87.7	84.4	731	83.4	0.00	533	73%	83.4	0.00	458	63%	83.4	0.00	533	73%
fv07700	fv07600	5.495	82.608	83.522	87.8	84.5	597	83.5	0.00	533	89%	83.5	0.00	458	77%	83.5	0.00	533	89%
fv07800	fv07700	5.627	82.751	83.665	87.6	84.3	626	83.7	0.00	533	85%	83.7	0.00	458	73%	83.7	0.00	533	85%
fv07900	fv07800	5.766	82.877	83.791	87.1	83.8	1790	83.8	0.00	533	30%	83.8	0.00	458	26%	83.8	0.00	533	30%
fv08000	fv07900	5.852	82.965	83.879	86.4	83.1	1790	83.9	0.00	533	30%	83.9	0.00	458	26%	83.9	0.00	533	30%
fv08100	fv08000	5.897	83.011	83.925	86.0	82.7	597	83.9	0.00	533	89%	83.9	0.00	458	77%	83.9	0.00	533	89%

SANITARY SEWER CHARACTERISTICS

Street	Manhole ID		Invert Elevation (m)				Ground Elevation (m)		Length (m)	Diameter (mm)	Slope (%)
	U/S	D/S	U/S		D/S		U/S	D/S			
Vanguard Drive	700	800	81.675	(E)	81.603	(W)	88.38	88.7	36	525	0.20
Tenth Line Road	800	Plug	81.550	(S)	81.51	(N)	88.70	-	20	525	0.20
Page Road	fv08100	fv08000	83.011	(N)	82.965	(N)	86.00	86.40	45	900	0.10
Page Road	fv08000	fv07900	82.965	(N)	82.877	(S)	86.40	87.10	86	900	0.10
Page Road	fv07900	fv07800	82.877	(N)	82.751	(S)	87.10	87.60	139	900	0.09
Page Road	fv07800	fv07700	82.751	(N)	82.608	(S)	87.60	87.80	132	900	0.11
Page Road	fv07700	fv07600	82.608	(N)	82.45	(S)	87.80	87.70	153	900	0.10
Page Road	fv07600	fv07500	82.45	(N)	82.224	(N)	87.70	87.80	153	900	0.15
Page Road	fv07500	fv07400	82.224	(N)	81.9	(S)	87.80	88.00	152	900	0.21
Silverbich	fv07400	fv07300	81.9	(W)	81.8	(E)	88.00	87.80	103	900	0.10
Silverbich	fv07300	fv07200	81.8	(W)	81.6	(E)	87.80	87.50	71	900	0.28
Silverbich	fv07200	fv07100	81.6	(W)	81.4	(E)	87.50	87.60	72	900	0.28
Silverbich	fv07100	fv07000	81.4	(W)	81.3	(E)	87.60	87.30	47	900	0.21
Silverbich	fv07000	fv06900	81.3	(W)	81.2	(E)	87.30	87.00	56	900	0.18
Orleans Blvd.	fv06900	fv06800	81.2	(N)	81.1	(S)	87.00	87.70	79	900	0.12
Orleans Blvd.	fvo6800	fvo6700	81.1	(N)	80.95	(S)	87.7	87.8	65	900	0.31
Orleans Blvd.	fv06700	fv06600	80.9	(N)	80.8	(S)	87.80	88.10	49	900	0.20
Orleans Blvd.	fv06600	fv06500	80.8	(N)	80.8	(S)	88.10	88.2	47	900	0.00
Orleans Blvd.	fv06500	fv06400	80.8	(N)	80.6	(S)	88.20	88.50	51	900	0.39
Orleans Blvd.	fv06400	fv06300	80.6	(N)	80.6	(N)	88.50	88.60	43	900	0.00
Orleans Blvd.	fv06300	fv06200	80.6	(N)	80.5	(S)	88.60	88.80	48	900	0.21
Orleans Blvd.	fv06200	fv06100	80.5	(N)	80.5	(S)	88.8	88.9	26	900	0.00
Orleans Blvd.	fv06100	fv06000	80.5	(N)	80.3	(S)	88.9	88.6	70	900	0.29
	4	5	82.06	(W)	81.62	(E)	87.50	87.60	310	375	0.14
	5	6	81.62	(W)	81.21	(E)	87.60	87.50	295	375	0.14
	6	7	81.13	(W)	81.01	(E)	87.50	87.50	115	450	0.11
	7	8	81.01	(W)	80.75	(E)	87.50	86.90	235	450	0.11
	8	9	80.37	(S)	80.20	(N)	86.90	87.00	170	525	0.10
	9	10	80.20	(S)	79.92	(N)	87.00	87.00	275	525	0.10
	10	11	79.92	(W)	79.52	(E)	87.00	85.50	405	525	0.10
	11	12	79.44	(W)	79.21	(N)	85.50	83.90	230	600	0.100
	LOCAL PS 2	25C					82.00	86.00	300		
	LOCAL PS 1	25C					81.00	86.00	340		
	25B	25A	80.62	(W)	80.21	(E)	86.50	86.50	295	375	0.14

ATTACHMENT

B

XPSWMM Model Schematic

Pipe Data and Hydraulic Simulation Results

JFSA

Water Resources and
Environmental Consultants



Figure B-1: XPSWMM MODEL SCHEMATIC

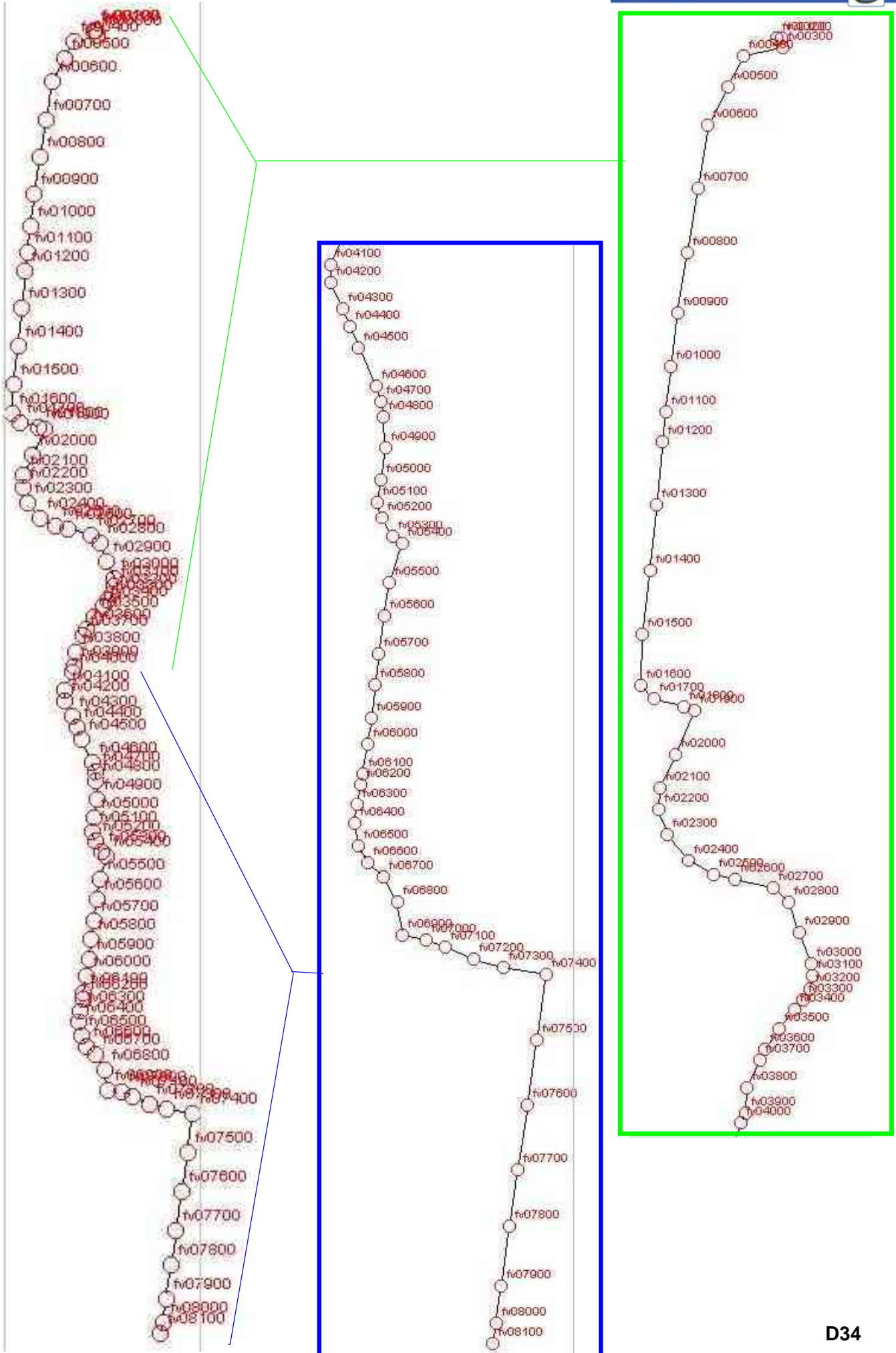


Table B-1: Pipe Data and Hydraulic Simulation Results for the Sanitary Trunk Sewer (Monitored & Design Scenario, Original Flows)

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m³/s)	Peak Pipe Flow (m³/s)	Peak / Design Flow	Surcharge U/S (1) (m)	Max. U/S HGL (m)	Max. D/S HGL (m)	Freeboard U/S HGL and MH Cover (2) (m)	Compare to 2003 HGL Results (m)	
																		U/S HGL (3) (m)	Difference (m)
fv08100	fv08000	83.011	82.965	900	45.0	0.1	0.013	86.000	86.400	0.900	0.572	0.533	0.9	-0.217	83.694	83.647	2.306	83.9	-0.206
fv08000	fv07900	82.965	82.877	900	86.0	0.1	0.013	86.400	87.100	0.900	0.572	0.533	0.9	-0.218	83.647	83.558	2.753	83.9	-0.253
fv07900	fv07800	82.877	82.751	900	139.0	0.1	0.013	87.100	87.600	0.854	0.543	0.533	1.0	-0.219	83.558	83.407	3.542	83.8	-0.242
fv07800	fv07700	82.751	82.608	900	132.0	0.1	0.013	87.600	87.800	0.944	0.600	0.533	0.9	-0.244	83.407	83.255	4.193	83.7	-0.293
fv07700	fv07600	82.608	82.450	900	153.0	0.1	0.013	87.800	87.700	0.900	0.572	0.533	0.9	-0.253	83.255	83.063	4.545	83.5	-0.245
fv07600	fv07500	82.450	82.224	900	153.0	0.2	0.013	87.700	87.800	1.102	0.701	0.533	0.8	-0.287	83.063	82.867	4.637	83.4	-0.337
fv07500	fv07400	82.224	81.900	900	152.0	0.2	0.013	87.800	88.000	1.304	0.830	0.533	0.6	-0.257	82.867	82.637	4.933	83.1	-0.233
fv07400	fv07300	81.900	81.800	900	103.0	0.1	0.013	88.000	87.800	0.900	0.572	0.714	1.2	-0.163	82.637	82.442	5.363	82.9	-0.263
fv07300	fv07200	81.800	81.600	900	71.0	0.3	0.013	87.800	87.500	1.506	0.958	0.714	0.7	-0.258	82.442	82.306	5.358	82.7	-0.258
fv07200	fv07100	81.600	81.400	900	72.0	0.3	0.013	87.500	87.600	1.506	0.958	0.714	0.7	-0.194	82.306	82.201	5.194	82.5	-0.194
fv07100	fv07000	81.400	81.300	900	47.0	0.2	0.013	87.600	87.300	1.304	0.830	0.714	0.9	-0.099	82.201	82.133	5.399	82.4	-0.199
fv07000	fv06900	81.300	81.200	900	56.0	0.2	0.013	87.300	87.000	1.207	0.768	0.714	0.9	-0.067	82.133	81.994	5.167	82.3	-0.167
fv06900	fv06800	81.200	81.100	900	79.0	0.1	0.013	87.000	87.700	0.986	0.627	0.793	1.3	-0.106	81.994	81.834	5.006	82.2	-0.206
fv06800	fv06700	81.100	80.900	900	65.0	0.3	0.013	87.700	87.800	1.584	1.008	0.793	0.8	-0.166	81.834	81.713	5.866	82.0	-0.166
fv06700	fv06600	80.900	80.800	900	49.0	0.2	0.013	87.800	88.100	1.273	0.810	0.793	1.0	-0.087	81.713	81.621	6.087	81.9	-0.187
fv06600	fv06500	80.800	80.800	900	47.0	0.0	0.013	88.100	88.200	0.090	0.060	0.793	13.2	-0.079	81.621	81.515	6.479	81.8	-0.179
fv06500	fv06400	80.800	80.600	900	51.0	0.4	0.013	88.200	88.500	1.777	1.131	0.793	0.7	-0.185	81.515	81.422	6.685	81.7	-0.185
fv06400	fv06300	80.600	80.600	900	43.0	0.0	0.013	88.500	88.600	0.090	0.060	0.793	13.2	-0.078	81.422	81.335	7.078	81.6	-0.178
fv06300	fv06200	80.600	80.500	900	48.0	0.2	0.013	88.600	88.800	1.304	0.830	0.793	1.0	-0.165	81.335	81.241	7.265	81.5	-0.165
fv06200	fv06100	80.500	80.500	900	26.0	0.0	0.013	88.800	88.900	0.090	0.060	0.793	13.2	-0.159	81.241	81.174	7.559	81.4	-0.159
fv06100	fv06000	80.500	80.300	900	70.0	0.3	0.013	88.900	88.600	1.520	0.970	0.793	0.8	-0.226	81.174	81.023	7.726	81.4	-0.226
fv06000	fv05900	80.300	80.200	900	70.0	0.1	0.013	88.600	88.600	1.080	0.680	0.793	1.2	-0.177	81.023	80.858	7.577	81.2	-0.177
fv05900	fv05800	80.200	80.000	900	77.0	0.3	0.013	88.600	89.000	1.450	0.920	0.794	0.9	-0.242	80.858	80.669	7.742	81.1	-0.242
fv05800	fv05700	80.000	79.800	900	74.0	0.3	0.013	89.000	89.100	1.480	0.940	0.794	0.8	-0.231	80.669	80.500	8.331	80.9	-0.231
fv05700	fv05600	79.800	79.600	900	91.0	0.2	0.013	89.100	87.900	1.330	0.850	0.806	0.9	-0.200	80.500	80.296	8.600	80.7	-0.200
fv05600	fv05500	79.600	79.400	900	77.0	0.3	0.013	87.900	86.900	1.450	0.920	0.807	0.9	-0.204	80.296	80.126	7.604	80.5	-0.204
fv05500	fv05400	79.400	79.100	900	97.0	0.3	0.013	86.900	85.500	1.580	1.010	0.807	0.8	-0.174	80.126	79.840	6.774	80.3	-0.174
fv05400	fv05300	79.100	79.100	900	26.0	0.0	0.013	85.500	84.700	0.090	0.060	0.819	13.7	-0.160	79.840	79.744	5.660	80.0	-0.160
fv05300	fv05200	79.100	78.900	900	52.0	0.4	0.013	84.700	84.300	1.760	1.120	0.819	0.7	-0.256	79.744	79.615	4.956	80.0	-0.256
fv05200	fv05100	78.900	78.800	900	38.0	0.3	0.013	84.300	84.000	1.460	0.930	0.819	0.9	-0.185	79.615	79.513	4.685	79.8	-0.185
fv05100	fv05000	78.800	78.700	900	53.0	0.2	0.013	84.000	84.400	1.240	0.790	0.820	1.0	-0.187	79.513	79.383	4.487	79.7	-0.187
fv05000	fv04900	78.700	78.500	900	76.0	0.3	0.013	84.400	84.800	1.460	0.930	0.820	0.9	-0.217	79.383	79.198	5.017	79.6	-0.217
fv04900	fv04800	78.500	78.300	900	74.0	0.3	0.013	84.800	84.300	1.480	0.940	0.822	0.9	-0.202	79.198	79.033	5.602	79.4	-0.202
fv04800	fv04700	78.300	78.200	900	36.0	0.3	0.013	84.300	84.300	1.500	0.950	0.822	0.9	-0.167	79.033	78.956	5.267	79.2	-0.167
fv04700	fv04600	78.200	78.100	900	38.0	0.3	0.013	84.300	84.400	1.460	0.930	0.822	0.9	-0.144	78.956	78.882	5.344	79.1	-0.144
fv04600	fv04500	78.100	77.900	900	81.0	0.3	0.013	84.400	84.800	1.410	0.900	0.823	0.9	-0.118	78.882	78.735	5.518	79.0	-0.118
fv04500	fv04400	77.900	77.800	900	48.0	0.2	0.013	84.800	84.400	1.300	0.830	0.823	1.0	-0.065	78.735	78.648	6.065	78.8	-0.065
fv04400	fv04300	77.800	77.700	900	41.0	0.2	0.013	84.400	84.000	1.410	0.890	0.828	0.9	-0.052	78.648	78.572	5.752	78.7	-0.052
fv04300	fv04200	77.700	77.500	900	55.0	0.4	0.013	84.000	84.500	1.720	1.090	0.883	0.8	-0.028	78.572	78.443	5.428	78.6	-0.028
fv04200	fv04100	77.500	77.400	900	43.0	0.2	0.013	84.500	84.600	1.370	0.870	0.883	1.0	0.043	78.443	78.329	6.057	78.4	0.043
fv04100	fv04000	77.400	77.300	900	79.0	0.1	0.013	84.600	84.100	1.010	0.640	0.884	1.4	0.029	78.329	78.140	6.271	78.4	-0.071
fv04000	fv03900	77.300	77.200	900	21.0	0.5	0.013	84.100	83.900	1.960	1.250	0.889	0.7	-0.060	78.140	78.088	5.960	78.2	-0.060
fv03900	fv03800	77.200	77.100	900	61.0	0.2	0.013	83.900	83.600	1.150	0.730	0.889	1.2	-0.012	78.088	77.934	5.812	78.2	-0.112
fv03800	fv03700	77.100	76.900	900	71.0	0.3	0.013	83.600	83.600	1.510	0.960	0.891	0.9	-0.066	77.934	77.781	5.666	78.0	-0.066
fv03700	fv03600	76.900	76.900	900	27.0	0.0	0.013	83.600	83.700	0.090	0.060	0.892	14.9	-0.019	77.781	77.709	5.819	77.9	-0.119
fv03600	fv03500	76.900	76.800	900	55.0	0.2	0.013	83.700	84.000	1.210	0.770	0.893	1.2	-0.091	77.709	77.583	5.991	77.9	-0.191
fv03500	fv03400	76.800	76.600	900	59.0	0.3	0.013	84.000	83.800	1.660	1.050	0.895	0.9	-0.117	77.583	77.458	6.417	77.7	-0.117

Table B-1: Pipe Data and Hydraulic Simulation Results for the Sanitary Trunk Sewer (Monitored & Design Scenario, Original Flows)

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m ³ /s)	Peak Pipe Flow (m ³ /s)	Peak / Design Flow	Surcharge U/S (1) (m)	Max. U/S HGL (m)	Max. D/S HGL (m)	Freeboard U/S HGL and MH Cover (2) (m)	Compare to 2003 HGL Results (m)	
																		U/S HGL (3) (m)	Difference (m)
fv03400	fv03300	76.600	76.600	900	28.0	0.0	0.013	83.800	84.000	0.090	0.060	0.895	14.9	-0.042	77.458	77.385	6.342	77.6	-0.142
fv03300	fv03200	76.600	76.500	900	32.0	0.3	0.013	84.000	84.000	1.590	1.010	0.896	0.9	-0.115	77.385	77.304	6.615	77.5	-0.115
fv03200	fv03100	76.500	76.400	900	34.0	0.3	0.013	84.000	83.800	1.540	0.980	0.897	0.9	-0.096	77.304	77.219	6.696	77.5	-0.196
fv03100	fv03000	76.400	76.400	900	28.0	0.0	0.013	83.800	83.900	0.090	0.060	0.897	15.0	-0.081	77.219	77.135	6.581	77.4	-0.181
fv03000	fv02900	76.400	76.200	900	76.0	0.3	0.013	83.900	83.700	1.460	0.930	0.898	1.0	-0.165	77.135	76.947	6.765	77.3	-0.165
fv02900	fv02800	76.200	76.000	900	74.0	0.3	0.013	83.700	83.800	1.480	0.940	0.900	1.0	-0.153	76.947	76.747	6.753	77.2	-0.253
fv02800	fv02700	76.000	75.900	900	50.0	0.2	0.013	83.800	83.600	1.270	0.810	0.902	1.1	-0.153	76.747	76.571	7.053	77.0	-0.253
fv02700	fv02600	75.900	75.700	900	93.0	0.2	0.013	83.600	82.700	1.320	0.840	0.903	1.1	-0.229	76.571	76.088	7.029	76.9	-0.329
fv02600	fv02500	75.700	74.600	900	50.0	2.2	0.013	82.700	80.300	4.220	2.690	0.903	0.3	-0.512	76.088	74.897	6.612	76.6	-0.512
fv02500	fv02400	74.600	71.600	900	67.0	4.5	0.013	80.300	76.900	6.020	3.830	0.903	0.2	-0.603	74.897	71.957	5.403	75.6	-0.703
fv02400	fv02300	71.600	69.800	900	79.0	2.3	0.013	76.900	73.300	4.300	2.730	0.903	0.3	-0.543	71.957	70.221	4.943	72.5	-0.543
fv02300	fv02200	69.800	68.600	900	60.0	2.0	0.013	73.300	71.900	4.020	2.560	0.903	0.4	-0.479	70.221	68.858	3.079	70.7	-0.479
fv02200	fv02100	68.600	64.700	900	50.0	7.8	0.013	71.900	70.400	7.950	5.060	0.904	0.2	-0.642	68.858	65.017	3.042	69.5	-0.642
fv02100	fv02000	64.700	61.700	900	85.0	3.5	0.013	70.400	66.300	5.350	3.400	0.904	0.3	-0.583	65.017	62.084	5.383	65.6	-0.583
fv02000	fv01900	61.700	59.000	900	120.0	2.3	0.013	66.300	63.200	4.270	2.720	0.904	0.3	-0.516	62.084	59.445	4.216	62.6	-0.516
fv01900	fv01800	59.000	58.600	900	28.0	1.4	0.013	63.200	62.900	3.400	2.160	0.904	0.4	-0.455	59.445	59.161	3.755	60.0	-0.555
fv01800	fv01700	58.600	58.100	900	73.0	0.7	0.013	62.900	63.200	2.360	1.500	0.904	0.6	-0.339	59.161	58.393	3.739	59.6	-0.439
fv01700	fv01600	58.100	56.000	900	39.0	5.4	0.013	63.200	62.000	6.600	4.200	0.904	0.2	-0.607	58.393	56.370	4.807	59.0	-0.607
fv01600	fv01500	56.000	53.600	900	121.0	2.0	0.013	62.000	63.800	4.010	2.550	0.904	0.4	-0.530	56.370	54.177	5.630	56.9	-0.530
fv01500	fv01400	53.600	52.900	900	150.0	0.5	0.013	63.800	63.800	1.940	1.240	0.904	0.7	-0.323	54.177	53.520	9.623	54.5	-0.323
fv01400	fv01300	52.900	52.300	900	151.0	0.4	0.013	63.800	59.500	1.790	1.140	0.904	0.8	-0.280	53.520	52.995	10.280	53.9	-0.380
fv01300	fv01200	52.300	51.900	900	149.0	0.3	0.013	59.500	58.100	1.470	0.940	0.904	1.0	-0.205	52.995	52.411	6.505	53.2	-0.205
fv01200	fv01100	51.900	51.400	900	69.0	0.7	0.013	58.100	56.400	2.420	1.540	0.904	0.6	-0.389	52.411	51.969	5.689	52.8	-0.389
fv01100	fv01000	51.400	50.900	900	104.0	0.5	0.013	56.400	55.100	1.970	1.260	0.904	0.7	-0.331	51.969	51.476	4.431	52.4	-0.431
fv01000	fv00900	50.900	50.300	900	127.0	0.5	0.013	55.100	54.600	1.960	1.240	0.904	0.7	-0.324	51.476	50.905	3.624	51.8	-0.324
fv00900	fv00800	50.300	49.700	900	149.0	0.4	0.013	54.600	54.300	1.810	1.150	0.904	0.8	-0.295	50.905	50.289	3.695	51.2	-0.295
fv00800	fv00700	49.700	49.000	900	151.0	0.5	0.013	54.300	54.100	1.940	1.230	0.904	0.7	-0.311	50.289	49.705	4.011	50.6	-0.311
fv00700	fv00600	49.000	48.600	900	150.0	0.3	0.013	54.100	53.900	1.470	0.930	0.904	1.0	-0.195	49.705	49.168	4.395	49.9	-0.195
fv00600	fv00500	48.600	48.100	900	100.0	0.5	0.013	53.900	53.100	2.010	1.280	0.904	0.7	-0.332	49.168	48.712	4.732	49.5	-0.332
fv00500	fv00400	48.100	47.700	900	80.0	0.5	0.013	53.100	52.500	2.010	1.280	0.904	0.7	-0.288	48.712	48.270	4.388	49.1	-0.388
fv00400	fv00300	47.700	47.000	900	93.0	0.8	0.013	52.500	52.200	2.470	1.570	0.904	0.6	-0.330	48.270	47.548	4.230	48.6	-0.330
fv00300	fv00200	47.000	46.100	900	22.0	4.1	0.013	52.200	52.000	5.760	3.660	0.904	0.2	-0.352	47.548	46.356	4.652	47.9	-0.352
fv00200	fv00100	46.100	44.800	900	8.0	16.3	0.013	52.000	52.000	11.470	7.300	0.904	0.1	-0.644	46.356	45.700	5.644	47.0	-0.644

Note: (1) A negative surcharge implies that the pipe is not flowing full.

(2) Freeboard between upstream hydraulic gradeline elevation and upstream manhole cover elevation.

(3) HGL elevations at U/S MH for "Monitored & Design" scenario as reported in Table 5-1 of the *Forest Valley Trunk and Orleans Cumberland Collector Capacity Analysis* (Stantec Consulting Ltd., October 2003).

Table B-2: Pipe Data and Hydraulic Simulation Results for the Sanitary Trunk Sewer (Monitored & Design Scenario, 165.2 L/s Redirected from fv07400 to fv07700)

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m³/s)	Peak Pipe Flow (m³/s)	Peak / Design Flow	Surcharge U/S (1) (m)	Max. U/S HGL (m)	Max. D/S HGL (m)	Freeboard U/S HGL and MH Cover (2) (m)	Compare to 2003 HGL Results (m)	
																		U/S HGL (3) (m)	Difference (m)
fv08100	fv08000	83.011	82.965	900	45.0	0.1	0.013	86.000	86.400	0.900	0.572	0.533	0.9	-0.166	83.745	83.705	2.255	83.9	-0.155
fv08000	fv07900	82.965	82.877	900	86.0	0.1	0.013	86.400	87.100	0.900	0.572	0.533	0.9	-0.160	83.705	83.631	2.695	83.9	-0.195
fv07900	fv07800	82.877	82.751	900	139.0	0.1	0.013	87.100	87.600	0.854	0.543	0.533	1.0	-0.146	83.631	83.515	3.469	83.8	-0.169
fv07800	fv07700	82.751	82.608	900	132.0	0.1	0.013	87.600	87.800	0.944	0.600	0.533	0.9	-0.136	83.515	83.410	4.085	83.7	-0.185
fv07700	fv07600	82.608	82.450	900	153.0	0.1	0.013	87.800	87.700	0.900	0.572	0.698	1.2	-0.098	83.410	83.194	4.390	83.5	-0.090
fv07600	fv07500	82.450	82.224	900	153.0	0.2	0.013	87.700	87.800	1.102	0.701	0.698	1.0	-0.156	83.194	82.968	4.506	83.4	-0.206
fv07500	fv07400	82.224	81.900	900	152.0	0.2	0.013	87.800	88.000	1.304	0.830	0.698	0.8	-0.156	82.968	82.637	4.832	83.1	-0.132
fv07400	fv07300	81.900	81.800	900	103.0	0.1	0.013	88.000	87.800	0.900	0.572	0.714	1.2	-0.163	82.637	82.442	5.363	82.9	-0.263
fv07300	fv07200	81.800	81.600	900	71.0	0.3	0.013	87.800	87.500	1.506	0.958	0.714	0.7	-0.258	82.442	82.306	5.358	82.7	-0.258
fv07200	fv07100	81.600	81.400	900	72.0	0.3	0.013	87.500	87.600	1.506	0.958	0.714	0.7	-0.194	82.306	82.201	5.194	82.5	-0.194
fv07100	fv07000	81.400	81.300	900	47.0	0.2	0.013	87.600	87.300	1.304	0.830	0.714	0.9	-0.099	82.201	82.133	5.399	82.4	-0.199
fv07000	fv06900	81.300	81.200	900	56.0	0.2	0.013	87.300	87.000	1.207	0.768	0.714	0.9	-0.067	82.133	81.994	5.167	82.3	-0.167
fv06900	fv06800	81.200	81.100	900	79.0	0.1	0.013	87.000	87.700	0.986	0.627	0.793	1.3	-0.106	81.994	81.834	5.006	82.2	-0.206
fv06800	fv06700	81.100	80.900	900	65.0	0.3	0.013	87.700	87.800	1.584	1.008	0.793	0.8	-0.166	81.834	81.713	5.866	82.0	-0.166
fv06700	fv06600	80.900	80.800	900	49.0	0.2	0.013	87.800	88.100	1.273	0.810	0.793	1.0	-0.087	81.713	81.621	6.087	81.9	-0.187
fv06600	fv06500	80.800	80.800	900	47.0	0.0	0.013	88.100	88.200	0.090	0.060	0.793	13.2	-0.079	81.621	81.515	6.479	81.8	-0.179
fv06500	fv06400	80.800	80.600	900	51.0	0.4	0.013	88.200	88.500	1.777	1.131	0.793	0.7	-0.185	81.515	81.422	6.685	81.7	-0.185
fv06400	fv06300	80.600	80.600	900	43.0	0.0	0.013	88.500	88.600	0.090	0.060	0.793	13.2	-0.078	81.422	81.335	7.078	81.6	-0.178
fv06300	fv06200	80.600	80.500	900	48.0	0.2	0.013	88.600	88.800	1.304	0.830	0.793	1.0	-0.165	81.335	81.241	7.265	81.5	-0.165
fv06200	fv06100	80.500	80.500	900	26.0	0.0	0.013	88.800	88.900	0.090	0.060	0.793	13.2	-0.159	81.241	81.174	7.559	81.4	-0.159
fv06100	fv06000	80.500	80.300	900	70.0	0.3	0.013	88.900	88.600	1.520	0.970	0.793	0.8	-0.226	81.174	81.023	7.726	81.4	-0.226
fv06000	fv05900	80.300	80.200	900	70.0	0.1	0.013	88.600	88.600	1.080	0.680	0.793	1.2	-0.177	81.023	80.858	7.577	81.2	-0.177
fv05900	fv05800	80.200	80.000	900	77.0	0.3	0.013	88.600	89.000	1.450	0.920	0.794	0.9	-0.242	80.858	80.669	7.742	81.1	-0.242
fv05800	fv05700	80.000	79.800	900	74.0	0.3	0.013	89.000	89.100	1.480	0.940	0.794	0.8	-0.231	80.669	80.500	8.331	80.9	-0.231
fv05700	fv05600	79.800	79.600	900	91.0	0.2	0.013	89.100	87.900	1.330	0.850	0.806	0.9	-0.200	80.500	80.296	8.600	80.7	-0.200
fv05600	fv05500	79.600	79.400	900	77.0	0.3	0.013	87.900	86.900	1.450	0.920	0.807	0.9	-0.204	80.296	80.126	7.604	80.5	-0.204
fv05500	fv05400	79.400	79.100	900	97.0	0.3	0.013	86.900	85.500	1.580	1.010	0.807	0.8	-0.174	80.126	79.840	6.774	80.3	-0.174
fv05400	fv05300	79.100	79.100	900	26.0	0.0	0.013	85.500	84.700	0.090	0.060	0.819	13.7	-0.160	79.840	79.744	5.660	80.0	-0.160
fv05300	fv05200	79.100	78.900	900	52.0	0.4	0.013	84.700	84.300	1.760	1.120	0.819	0.7	-0.256	79.744	79.615	4.956	80.0	-0.256
fv05200	fv05100	78.900	78.800	900	38.0	0.3	0.013	84.300	84.000	1.460	0.930	0.819	0.9	-0.185	79.615	79.513	4.685	79.8	-0.185
fv05100	fv05000	78.800	78.700	900	53.0	0.2	0.013	84.000	84.400	1.240	0.790	0.820	1.0	-0.187	79.513	79.383	4.487	79.7	-0.187
fv05000	fv04900	78.700	78.500	900	76.0	0.3	0.013	84.400	84.800	1.460	0.930	0.820	0.9	-0.217	79.383	79.198	5.017	79.6	-0.217
fv04900	fv04800	78.500	78.300	900	74.0	0.3	0.013	84.800	84.300	1.480	0.940	0.822	0.9	-0.202	79.198	79.033	5.602	79.4	-0.202
fv04800	fv04700	78.300	78.200	900	36.0	0.3	0.013	84.300	84.300	1.500	0.950	0.822	0.9	-0.167	79.033	78.956	5.267	79.2	-0.167
fv04700	fv04600	78.200	78.100	900	38.0	0.3	0.013	84.300	84.400	1.460	0.930	0.822	0.9	-0.144	78.956	78.882	5.344	79.1	-0.144
fv04600	fv04500	78.100	77.900	900	81.0	0.3	0.013	84.400	84.800	1.410	0.900	0.823	0.9	-0.118	78.882	78.735	5.518	79.0	-0.118
fv04500	fv04400	77.900	77.800	900	48.0	0.2	0.013	84.800	84.400	1.300	0.830	0.823	1.0	-0.065	78.735	78.648	6.065	78.8	-0.065
fv04400	fv04300	77.800	77.700	900	41.0	0.2	0.013	84.400	84.000	1.410	0.890	0.828	0.9	-0.052	78.648	78.572	5.752	78.7	-0.052
fv04300	fv04200	77.700	77.500	900	55.0	0.4	0.013	84.000	84.500	1.720	1.090	0.883	0.8	-0.028	78.572	78.443	5.428	78.6	-0.028
fv04200	fv04100	77.500	77.400	900	43.0	0.2	0.013	84.500	84.600	1.370	0.870	0.883	1.0	0.043	78.443	78.329	6.057	78.4	0.043
fv04100	fv04000	77.400	77.300	900	79.0	0.1	0.013	84.600	84.100	1.010	0.640	0.884	1.4	0.029	78.329	78.140	6.271	78.4	-0.071
fv04000	fv03900	77.300	77.200	900	21.0	0.5	0.013	84.100	83.900	1.960	1.250	0.889	0.7	-0.060	78.140	78.088	5.960	78.2	-0.060
fv03900	fv03800	77.200	77.100	900	61.0	0.2	0.013	83.900	83.600	1.150	0.730	0.889	1.2	-0.012	78.088	77.934	5.812	78.2	-0.112
fv03800	fv03700	77.100	76.900	900	71.0	0.3	0.013	83.600	83.600	1.510	0.960	0.891	0.9	-0.066	77.934	77.781	5.666	78.0	-0.066
fv03700	fv03600	76.900	76.900	900	27.0	0.0	0.013	83.600	83.700	0.090	0.060	0.892	14.9	-0.019	77.781	77.709	5.819	77.9	-0.119
fv03600	fv03500	76.900	76.800	900	55.0	0.2	0.013	83.700	84.000	1.210	0.770	0.893	1.2	-0.091	77.709	77.583	5.991	77.9	-0.191
fv03500	fv03400	76.800	76.600	900	59.0	0.3	0.013	84.000	83.800	1.660	1.050	0.895	0.9	-0.117	77.583	77.458	6.417	77.7	-0.117

Table B-2: Pipe Data and Hydraulic Simulation Results for the Sanitary Trunk Sewer (Monitored & Design Scenario, 165.2 L/s Redirected from fv07400 to fv07700)

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m ³ /s)	Peak Pipe Flow (m ³ /s)	Peak / Design Flow	Surcharge U/S (1) (m)	Max. U/S HGL (m)	Max. D/S HGL (m)	Freeboard U/S HGL and MH Cover (2) (m)	Compare to 2003 HGL Results (m)	
																		U/S HGL (3) (m)	Difference (m)
fv03400	fv03300	76.600	76.600	900	28.0	0.0	0.013	83.800	84.000	0.090	0.060	0.895	14.9	-0.042	77.458	77.385	6.342	77.6	-0.142
fv03300	fv03200	76.600	76.500	900	32.0	0.3	0.013	84.000	84.000	1.590	1.010	0.896	0.9	-0.115	77.385	77.304	6.615	77.5	-0.115
fv03200	fv03100	76.500	76.400	900	34.0	0.3	0.013	84.000	83.800	1.540	0.980	0.897	0.9	-0.096	77.304	77.219	6.696	77.5	-0.196
fv03100	fv03000	76.400	76.400	900	28.0	0.0	0.013	83.800	83.900	0.090	0.060	0.897	15.0	-0.081	77.219	77.135	6.581	77.4	-0.181
fv03000	fv02900	76.400	76.200	900	76.0	0.3	0.013	83.900	83.700	1.460	0.930	0.898	1.0	-0.165	77.135	76.947	6.765	77.3	-0.165
fv02900	fv02800	76.200	76.000	900	74.0	0.3	0.013	83.700	83.800	1.480	0.940	0.900	1.0	-0.153	76.947	76.747	6.753	77.2	-0.253
fv02800	fv02700	76.000	75.900	900	50.0	0.2	0.013	83.800	83.600	1.270	0.810	0.902	1.1	-0.153	76.747	76.571	7.053	77.0	-0.253
fv02700	fv02600	75.900	75.700	900	93.0	0.2	0.013	83.600	82.700	1.320	0.840	0.903	1.1	-0.229	76.571	76.088	7.029	76.9	-0.329
fv02600	fv02500	75.700	74.600	900	50.0	2.2	0.013	82.700	80.300	4.220	2.690	0.903	0.3	-0.512	76.088	74.897	6.612	76.6	-0.512
fv02500	fv02400	74.600	71.600	900	67.0	4.5	0.013	80.300	76.900	6.020	3.830	0.903	0.2	-0.603	74.897	71.957	5.403	75.6	-0.703
fv02400	fv02300	71.600	69.800	900	79.0	2.3	0.013	76.900	73.300	4.300	2.730	0.903	0.3	-0.543	71.957	70.221	4.943	72.5	-0.543
fv02300	fv02200	69.800	68.600	900	60.0	2.0	0.013	73.300	71.900	4.020	2.560	0.903	0.4	-0.479	70.221	68.858	3.079	70.7	-0.479
fv02200	fv02100	68.600	64.700	900	50.0	7.8	0.013	71.900	70.400	7.950	5.060	0.904	0.2	-0.642	68.858	65.017	3.042	69.5	-0.642
fv02100	fv02000	64.700	61.700	900	85.0	3.5	0.013	70.400	66.300	5.350	3.400	0.904	0.3	-0.583	65.017	62.084	5.383	65.6	-0.583
fv02000	fv01900	61.700	59.000	900	120.0	2.3	0.013	66.300	63.200	4.270	2.720	0.904	0.3	-0.516	62.084	59.445	4.216	62.6	-0.516
fv01900	fv01800	59.000	58.600	900	28.0	1.4	0.013	63.200	62.900	3.400	2.160	0.904	0.4	-0.455	59.445	59.161	3.755	60.0	-0.555
fv01800	fv01700	58.600	58.100	900	73.0	0.7	0.013	62.900	63.200	2.360	1.500	0.904	0.6	-0.339	59.161	58.393	3.739	59.6	-0.439
fv01700	fv01600	58.100	56.000	900	39.0	5.4	0.013	63.200	62.000	6.600	4.200	0.904	0.2	-0.607	58.393	56.370	4.807	59.0	-0.607
fv01600	fv01500	56.000	53.600	900	121.0	2.0	0.013	62.000	63.800	4.010	2.550	0.904	0.4	-0.530	56.370	54.177	5.630	56.9	-0.530
fv01500	fv01400	53.600	52.900	900	150.0	0.5	0.013	63.800	63.800	1.940	1.240	0.904	0.7	-0.323	54.177	53.520	9.623	54.5	-0.323
fv01400	fv01300	52.900	52.300	900	151.0	0.4	0.013	63.800	59.500	1.790	1.140	0.904	0.8	-0.280	53.520	52.995	10.280	53.9	-0.380
fv01300	fv01200	52.300	51.900	900	149.0	0.3	0.013	59.500	58.100	1.470	0.940	0.904	1.0	-0.205	52.995	52.411	6.505	53.2	-0.205
fv01200	fv01100	51.900	51.400	900	69.0	0.7	0.013	58.100	56.400	2.420	1.540	0.904	0.6	-0.389	52.411	51.969	5.689	52.8	-0.389
fv01100	fv01000	51.400	50.900	900	104.0	0.5	0.013	56.400	55.100	1.970	1.260	0.904	0.7	-0.331	51.969	51.476	4.431	52.4	-0.431
fv01000	fv00900	50.900	50.300	900	127.0	0.5	0.013	55.100	54.600	1.960	1.240	0.904	0.7	-0.324	51.476	50.905	3.624	51.8	-0.324
fv00900	fv00800	50.300	49.700	900	149.0	0.4	0.013	54.600	54.300	1.810	1.150	0.904	0.8	-0.295	50.905	50.289	3.695	51.2	-0.295
fv00800	fv00700	49.700	49.000	900	151.0	0.5	0.013	54.300	54.100	1.940	1.230	0.904	0.7	-0.311	50.289	49.705	4.011	50.6	-0.311
fv00700	fv00600	49.000	48.600	900	150.0	0.3	0.013	54.100	53.900	1.470	0.930	0.904	1.0	-0.195	49.705	49.168	4.395	49.9	-0.195
fv00600	fv00500	48.600	48.100	900	100.0	0.5	0.013	53.900	53.100	2.010	1.280	0.904	0.7	-0.332	49.168	48.712	4.732	49.5	-0.332
fv00500	fv00400	48.100	47.700	900	80.0	0.5	0.013	53.100	52.500	2.010	1.280	0.904	0.7	-0.288	48.712	48.270	4.388	49.1	-0.388
fv00400	fv00300	47.700	47.000	900	93.0	0.8	0.013	52.500	52.200	2.470	1.570	0.904	0.6	-0.330	48.270	47.548	4.230	48.6	-0.330
fv00300	fv00200	47.000	46.100	900	22.0	4.1	0.013	52.200	52.000	5.760	3.660	0.904	0.2	-0.352	47.548	46.356	4.652	47.9	-0.352
fv00200	fv00100	46.100	44.800	900	8.0	16.3	0.013	52.000	52.000	11.470	7.300	0.904	0.1	-0.644	46.356	45.700	5.644	47.0	-0.644

Note: (1) A negative surcharge implies that the pipe is not flowing full.

(2) Freeboard between upstream hydraulic gradeline elevation and upstream manhole cover elevation.

(3) HGL elevations at U/S MH for "Monitored & Design" scenario as reported in Table 5-1 of the *Forest Valley Trunk and Orleans Cumberland Collector Capacity Analysis* (Stantec Consulting Ltd., October 2003).

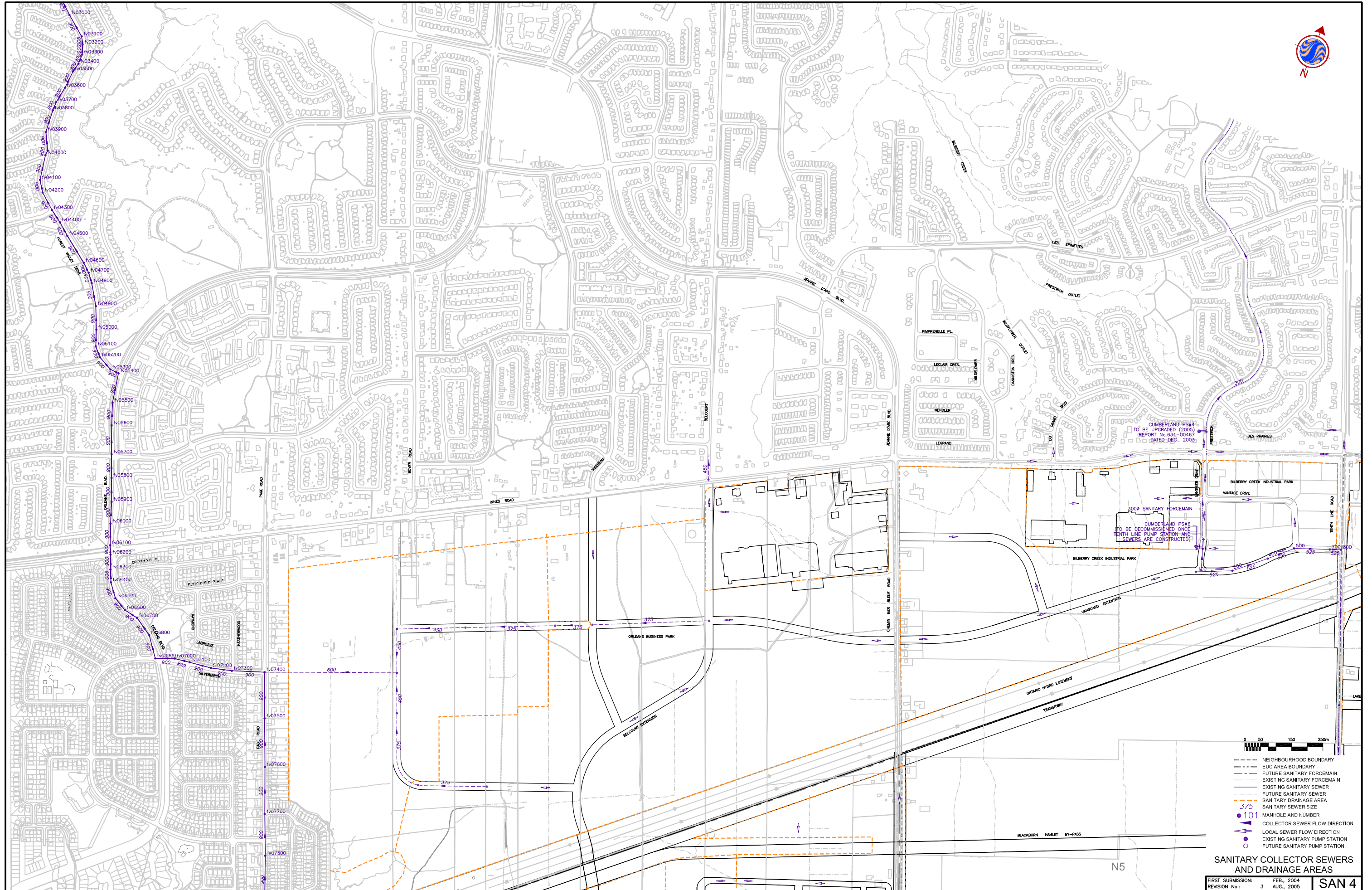
**GLOUCESTER AND CUMBERLAND
EAST URBAN COMMUNITY
EXPANSION AREA AND BILBERRY
CREEK INDUSTRIAL PARK
MASTER SERVICING UPDATE**

Prepared for:
City of Ottawa

File No. 163400602
November 2004
Updated June 2005
Updated October 2005
Updated July 2006

Prepared by:
Stantec Consulting Ltd.
1505 Laperriere Avenue
Ottawa, Ontario
K1Z 7T1





- NEIGHBOURHOOD BOUNDARY
- EUC AREA BOUNDARY
- FUTURE SANITARY FORCEMAIN
- EXISTING SANITARY FORCEMAIN
- EXISTING SANITARY SEWER
- FUTURE SANITARY SEWER
- SANITARY DRAINAGE AREA
- SANITARY SEWER SIZE
- 375 MANHOLE AND NUMBER
- 101 MANHOLE AND NUMBER
- COLLECTOR SEWER FLOW DIRECTION
- LOCAL SEWER FLOW DIRECTION
- EXISTING SANITARY PUMP STATION
- FUTURE SANITARY PUMP STATION

SANITARY COLLECTOR SEWERS AND DRAINAGE AREAS

FIRST SUBMISSION: FEB., 2004
 REVISION No.: 3 AUG., 2005

SAN 4

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Transmittal



Stantec

Stantec Consulting Ltd.
1505 Laperriere Avenue
Ottawa ON K1Z 7T1
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To:	Joe Mojsej	From:	Brett Byce, P.Eng.
Company:	City of Ottawa	<input type="checkbox"/>	For Your Information
Address:	City of Ottawa	<input type="checkbox"/>	For Your Approval
	100 Constellation Crescent	<input checked="" type="checkbox"/>	For Your Review
	6th Floor	<input type="checkbox"/>	As Requested
	Ottawa, ON		
	K2G 6J8		
Phone:	(613) 580-2424 x16203		
Date:	June 27, 2005		
File:	634-00429		
Delivery:	Courier		

**Reference: Tenth Line Pump Station and Dual Forcemains
Preliminary Design Report and Emergency Overflow Memo**

Please find enclosed six (6) copies of the Tenth Line Pump Station Preliminary Design Report. The emergency overflow technical memorandum is included in the report as Appendix B.

Should you have any questions or comments, please do not hesitate to contact me.

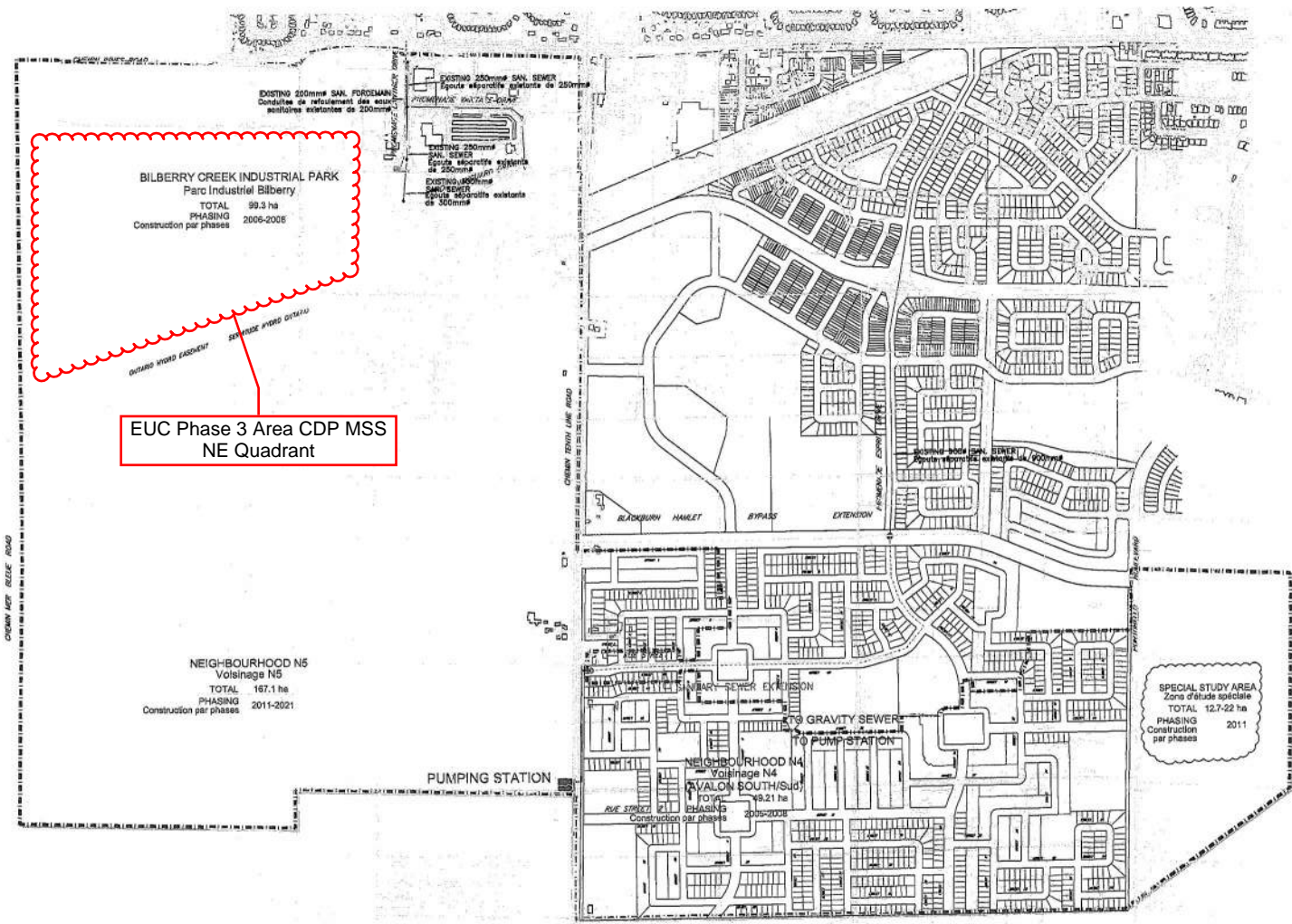
STANTEC CONSULTING LTD.



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**Attachment: Tenth Line Pump Station Preliminary Design Report (FINAL),
including the Emergency Overflow Tech Memo as Appendix B (6
copies)**

mp w:\active\634_00429_tenth_line_ps\preliminary\report\preliminary design\tm_final_rpt_fm_mgp_20050627.doc



**EUC Phase 3 Area CDP MSS
NE Quadrant**

BILBERRY CREEK INDUSTRIAL PARK
Parc Industriel Bilberry
TOTAL 99.3 ha
PHASING 2006-2006
Construction par phases

NEIGHBOURHOOD N5
Voisinage N5
TOTAL 167.1 ha
PHASING 2011-2021
Construction par phases

NEIGHBOURHOOD N4
Voisinage N4
TOTAL 49.21 ha
PHASING 2005-2008
Construction par phases

SPECIAL STUDY AREA
Zone d'étude spéciale
TOTAL 12.7-22 ha
PHASING 2011
Construction par phases

C:\active\654_00429_tenth_line_ps\design\drawing\Design Report\05-06-02\FIG-2-1-05-06-02.dwg
2005-06-03 07:29AM By: ecolberry

November, 2004
1634-00429

ORIGINAL SHEET - ISO A3



- URBAN BOUNDARY CITY OF OTTAWA OFFICIAL PLAN, JANUARY 2003
- - - - - TENTH LINE PUMPING STATION SANITARY CATCHMENT BOUNDARIES

- TENTH LINE PUMPING STATION LOCATION
- - - - - SANITARY SEWER ALIGNMENT
- FORCEMAIN ALIGNMENT
- CUMBERLAND 6 PUMPING STATION (INTERIM)

Client/Project
CITY OF OTTAWA
TENTH LINE PUMPING STATION
AND TWIN SANITARY FORCEMAINS
Figure No.
2-1
Title
AREA PLAN

TENTH LINE PUMPING STATION DESIGN PHASED WASTEWATER FLOW CALCULATIONS												
DESIGN YEAR: 2014	UNITS	AREA (ha)	POP	DESIGN (L/s)			MONITORED (L/s)					
	GFA (sq.m.)			AVG W/O I/I	PEAK FACTOR	PEAK W/ I/I	AVG DWF W/O I/I	AVG DWF	PK DWF	TYP. WWF	ANN. WWF	RARE WWF
						Res 350Lcpd K=1 35000L/ha/d 6.491A ^{-0.1911} (A>400ha =1.5, 0.28L/s/ha)	Res 300Lcpd ICI 20000L/ha/d	Res 300Lcpd ICI 20000L/ha/d	Res 300Lcpd K=0.6 ICI 20000L/ha/d ICI PF=1	Res 300Lcpd K=0.6 ICI 20000L/ha/d ICI PF=1	Res 300Lcpd K=0.6 ICI 20000L/ha/d ICI PF=1	Res 300Lcpd K=0.6 ICI 20000L/ha/d ICI PF=1
NEIGHBOURHOOD N4												
Residential		82.27	5939	24.1	3.17	99.4	20.6	27.2	54.1	68.1	72.2	88.7
Senior Block		0	0									
Single Dwelling		82.27	5939									
Rowhouses		0	0									
Terrace Homes		0	0									
Institutional		5.59	0	3.23	1.5	6.4	1.3	1.7	1.7	2.7	3.0	4.1
Commercial		3.09	0	1.79	1.5	3.5	0.7	1.0	1.0	1.5	1.6	2.3
Industrial		0	0	0	4.0	0	0	0.0	0	0	0	0
Sub-totals		90.95	5939	29.1		109.4	22.6	29.9	56.8	72.3	76.8	95.0
BILBERRY CREEK IND. PARK												
Commercial		0	0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Industrial		83.29	0	33.7	2.8	117.4	19.3	25.9	25.9	40.1	44.3	60.9
Sub-totals		83.29	0	33.74		117.4	19.3	25.9	25.9	40.1	44.3	60.9
NEIGHBOURHOOD N5												
Residential		0	0	0.0	4.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Senior Block												
Single Dwelling												
Rowhouses												
Terrace Homes												
Institutional		0	0	0.00	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial		0	0	0.00	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Industrial		162.18	0	65.7	2.5	206.7	37.5	50.52	50.5	78.1	86.2	118.6
Sub-totals		162.18	0	65.7		206.7	37.5	50.5	50.5	78.1	86.2	118.6
SPECIAL AREA												
Residential		10.07	453	1.8	4.00	10.2	1.6	2.4	5.2	6.9	7.4	9.4
Single Dwelling	101											
Rowhouses	100	10.07	453									
Institutional		8	0	4.63	1.5	9.2	1.9	2.5	2.5	3.9	4.3	5.9
Sub-totals		18.07	453	6.46		19.3	3.4	4.9	7.7	10.8	11.7	15.3
EUC TOTAL												
Residential		92.34	6392	25.9	3.14	107.3	22.2	29.6	58.1	73.8	78.5	96.9
Institutional		13.59	0	7.86	1.5	15.6	3.1	4.2	4.2	6.5	7.2	9.9
Commercial		3.09	0	1.8	1.5	3.5	0.7	1.0	1.0	1.5	1.6	2.3
Industrial		245.47	0	99.4	2.30	297.4	56.8	76.5	76.5	118.2	130.5	179.6
Sub-totals		354.5	6392	135.0		423.9	82.9	111.2	139.8	200.1	217.8	288.7

(MONITORED = Upper End Parameters - Residential Peaked Corrected Harmon - ICI average)

Note:

- 1) Special Area City of Ottawa Projections indicate total area between 12.7-22ha, with residential being between 4.7-14ha. The flows assume a residential land area of 14ha and a density of 3.2pers/ha.
- 2) ICI Peak Factor is 1.0 and assumes non-coincident residential and ICI peaks.

SANITARY SEWER CALCULATION SHEET

LOCATION: **EUC MSS**
 FILE REF: **14-733**
 DATE: **4-Oct-18**

DESIGN PARAMETERS

Avg. Daily Flow Res.	350 L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0	Infiltration / Inflow	0.28 L/s/ha	
Avg. Daily Flow Com	50,000 L/ha/d	Peak Fact. Comm.	1.5	Min. Pipe Velocity	0.60 m/s full flowing
Park Flow	9,300 L/ha/d	Peak Fact. Instit.	1.5	Max. Pipe Velocity	3.00 m/s full flowing
Avg. Daily Flow Indu:	35,000 L/ha/d	Peak Fact. Indust. = 2.8*		Mannings N	0.013



Location			Residential Area and Population								Commercial		Industrial		Park		Infiltration					
Area ID	Up	Down	Area	Number of Units				Pop.	Cumulative	Peak.	Q _{res}	Area	Accu.	Area	Accu.	Area	Accu.	Q _{C+I+I}	Total	Accu.	Infiltration	Total
				by type				Area	Pop.	Fact.									Area	Area	Flow	Flow
			(ha)	Singles	Semi's	Town's	Apt's		(ha)		(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	
EUC MSS NE Qudrant													41.34**	41.34			46.9	41.340	41.340	11.575	58.47	

Based on infromation from the Tenth Line Pump Station and Dual Forcemains Preliminary Design Report and Emergency Overflow Memo (Stantec, June 27, 2005)

*Per the Tenth Line Pump Station and Dual Forcemains Preliminary Design Report and Emergency Overflow Memo (Stantec, June 27, 2005)

** Area of EUC Phase 3 CDP MSS North East Quadrant



**Site Servicing and Stormwater
Management Report –
Orleans II Draft Plan of
Subdivision**

Project # 160401419



Prepared for:
Innes Shopping Centres Limited

Prepared by:
Stantec Consulting Ltd.

April 12, 2018

SITE SERVICING AND STORMWATER MANAGEMENT REPORT – ORLEANS II DRAFT PLAN OF SUBDIVISION

Wastewater Servicing
April 12, 2018

4.0 WASTEWATER SERVICING

4.1 BACKGROUND

The subdivision will be serviced by an existing 375mm diameter sanitary sewer located at the southeast corner of the lands in an existing easement within the future Vanguard Drive extension. The sewer directs flow to an existing 525mm diameter sanitary sewer at the intersection of Lanthier Drive and Vanguard Drive, and ultimately to the Tenth Line Road pumping station. A 250mm sewer was previously installed through blocks 2 and 4 of the proposed subdivision to service earlier phases of the Orleans II site plan development (see **Drawing SA-1**). It is proposed to make a new connection to the 375mm sewer and extend the sanitary sewer along the proposed municipal roadways within the subdivision to the existing sanitary manhole (Ex. SAN 14) immediately north of the subdivision lands. The new sewer will provide a sanitary outlet for all of the proposed subdivision blocks. Once the new sanitary sewer has been commissioned, the existing 250mm sewer running through blocks 2 and 4 will be abandoned. The subdivision lands and proposed land uses form part of the previously approved drainage area to the existing Tenth Line Road Pump Station.

For detailed information regarding the wastewater servicing and pump station improvements for the area, please refer to the *Gloucester and Cumberland East Urban Community Expansion Area and Bilberry Creek Industrial Park Master Servicing Update* (Stantec, July 2006).

4.2 DESIGN CRITERIA

It is assumed that areas zoned Arterial Mainstreet may comprise of low-mid rise apartment dwellings that will provide the bulk of domestic sanitary sewer contribution for the development. As such, development blocks within this zoning blanket have been considered to contain 200 typical apartment units per hectare of land as a conservative value (based on an intermediate value between low density and medium density apartments within Table 4.1 of the 2004 version of the Sewer Design Guidelines).

Future tributary areas to the 375mm sanitary main forming the remainder of the Bilberry Creek Industrial Park (BCIP) have been assessed as entirely light industrial area with the exception of lands attributed to the future Vanguard Drive extension ROW.

As outlined in the recently updated City of Ottawa Sewer Design Guidelines and the MOECC's Design Guidelines for Sewage Works, the following criteria were used to calculate estimated wastewater flow rates and to size the sanitary sewers:

- Minimum Velocity – 0.6 m/s (0.8 m/s for upstream sections)

SITE SERVICING AND STORMWATER MANAGEMENT REPORT – ORLEANS II DRAFT PLAN OF SUBDIVISION

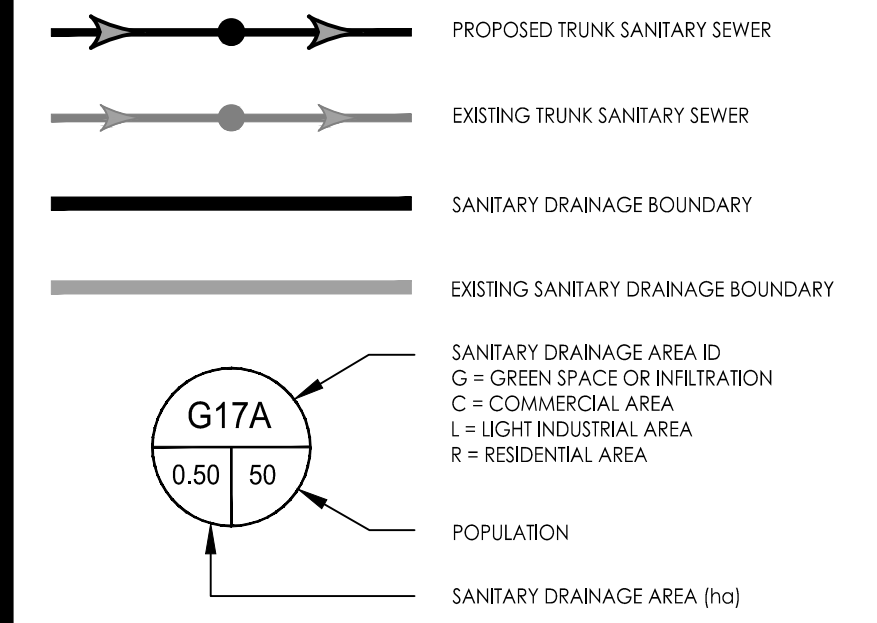
Wastewater Servicing
April 12, 2018

- Maximum Velocity – 3.0 m/s
- Manning roughness coefficient for all smooth wall pipes – 0.013
- Minimum size – 200mm dia. for residential areas, 250mm for commercial areas
- Average Wastewater Generation – 28,000L/ha/day (Commercial)
- Average Wastewater Generation – 35,000L/ha/day (Light Industrial)
- Average Wastewater Generation – 280 L/pers/day (Residential)
- Peak Factor – 1.5 (Commercial >20% of development)
- Peak Factor – per Harmon's equation and correction factor of 0.8 (Residential)
- Peak Factor – per Sewer Design Guidelines Appendix 4-B (Industrial)
- Average Apartment Unit Density – 1.8ppu
- Extraneous Flow Allowance – 0.33 l/s/ha
- Manhole Spacing – 120 m
- Minimum Cover – 2.5m

4.3 PROPOSED SERVICING

The proposed site will be serviced by gravity sewers which will direct the wastewater flows (approx. 66.9 L/s with allowance for infiltration) to the existing 375mm diameter sanitary sewer at the northeast corner of the subdivision. The proposed drainage pattern is detailed on **Drawing SA-1**. A sanitary sewer design sheet for the proposed and existing downstream sewers is included in **Appendix B.1**. External downstream sewers and flow contributions have been input based on the Overall Sanitary Drainage Area Plan for the Tenth Line Road Pump Station as prepared by David Schaeffer Engineering Ltd. to incorporate additional urban expansion area to the pump station. Full port backwater valves are to be installed on all sanitary services within the site to prevent any potential surcharge from the downstream sanitary sewer from impacting developments within the proposed property.

Legend



Notes

1	ISSUED FOR DRAFT PLAN OF SUBDIVISION	DT	KS	18.04.11
Revision		By	Appd.	YY.MM.DD

File Name:	160401242-DB	DT	KS	DT	18.04.09
		Dim.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
INNES SHOPPING CENTRES LIMITED

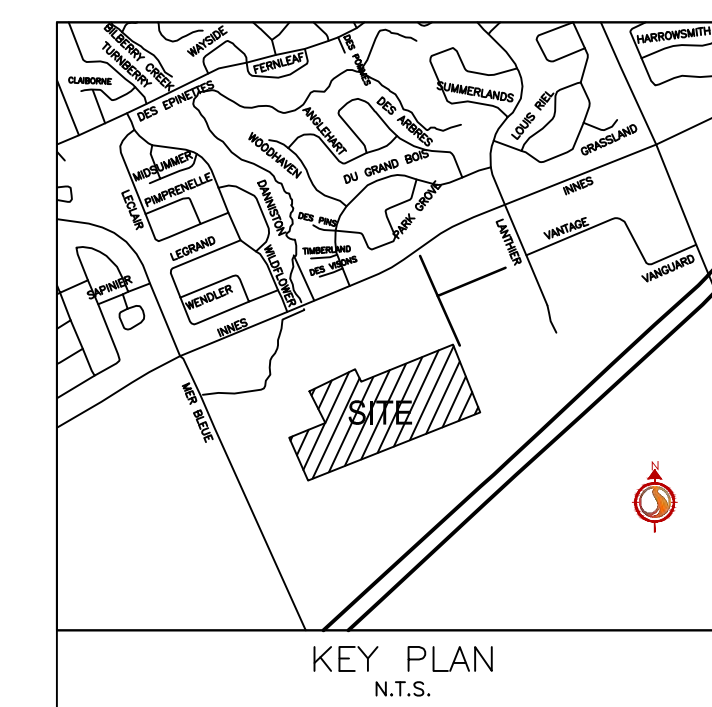
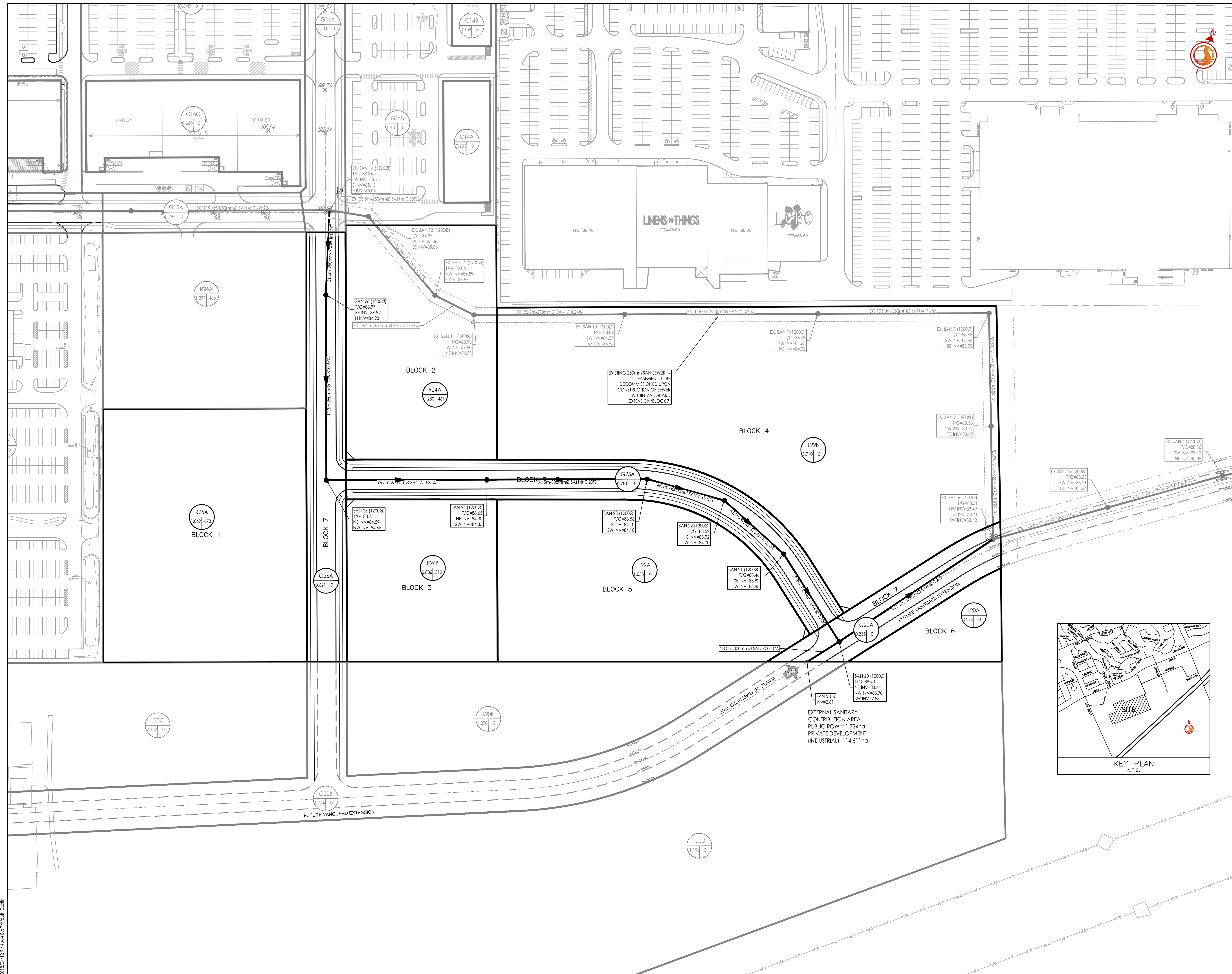
ORLEANS II
DRAFT PLAN OF SUBDIVISION
Ottawa, ON

Title

OVERALL SANITARY SEWER LAYOUT

Project No.	Scale	0	10	30	50m
160401419	1:1000				
Drawing No.	Sheet	Revision			

SA-1 1 of 4 1





SUBDIVISION:
Orleans II Draft Plan of Subdivision
 DATE: 12/4/2018
 REVISION: 1
 DESIGNED BY: DT
 CHECKED BY: KS

SANITARY SEWER DESIGN SHEET
 (City of Ottawa)
 FILE NUMBER: 160401419

DESIGN PARAMETERS			
MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	280 l/p/day
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	28,000 l/ha/day
PEAKING FACTOR (INDUSTRIAL):	Varies	INDUSTRIAL (HEAVY)	55,000 l/ha/day
PEAKING FACTOR (ICI >20%):	1.5	INDUSTRIAL (LIGHT)	35,000 l/ha/day
PERSONS / SINGLE	3.4	INSTITUTIONAL	28,000 l/ha/day
PERSONS / TOWNHOME	2.7	INFILTRATION	0.33 l/s/ha
PERSONS / APARTMENT	1.8	MINIMUM VELOCITY	0.60 m/s
		MAXIMUM VELOCITY	3.00 m/s
		MANNINGS n	0.013
		BEDDING CLASS	B
		MINIMUM COVER	2.50 m
		HARMON CORRECTION FACTOR	0.8

LOCATION	AREA ID NUMBER	FROM M.H.	TO M.H.	RESIDENTIAL AREA AND POPULATION						COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+H	INFILTRATION			TOTAL FLOW (l/s)	PIPE											
				AREA (ha)	SINGLE	UNITS TOWN	APT	POP.	CUMULATIVE AREA (ha)	POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)		ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)		PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	LENGTH (m)	DIA (mm)	MATERIAL	CLASS	SLOPE (%)	CAP. (FULL) (l/s)	CAP. V PEAK FLOW (%)	VEL. (FULL) (m/s)
E16A, C16A-G, G16A-C	G15A	16	15	0.00	0	0	0	0	0.00	0	3.80	0.0	0.00	5.85	5.85	0.00	0.00	0.00	0.00	4.10	4.10	2.8	9.95	9.95	3.3	6.1	90.6	250	PVC	SDR 35	0.26	31.2	19.63%	0.63	0.41	
	G14A-B, C14A-D	15	14	0.00	0	0	0	0	0.00	0	3.80	0.0	0.00	5.85	5.85	0.00	0.00	0.00	0.00	0.29	4.38	2.8	0.29	10.23	3.4	6.2	119.4	250	PVC	SDR 35	0.27	31.4	19.82%	0.63	0.41	
	G26A, R26A	14	26	0.00	0	0	0	0	0.00	0	3.80	0.0	0.41	6.26	0.00	0.00	0.00	0.00	0.00	1.92	6.31	3.0	2.33	12.56	4.1	7.2	51.0	250	PVC	SDR 35	0.25	30.3	23.71%	0.61	0.42	
	R24A, R24B	26	25	1.30	0	0	259	466	1.30	466	3.39	5.1	0.00	6.26	0.00	0.00	0.00	0.00	0.00	0.62	6.93	3.0	1.92	14.48	4.8	12.9	111.3	250	PVC	SDR 35	0.25	30.3	42.70%	0.61	0.50	
	L22A, L22B	25	24	1.87	0	0	374	673	3.17	1139	3.21	11.9	0.00	6.26	0.00	0.00	0.00	0.00	0.00	0.78	7.71	3.0	2.65	17.13	5.7	20.5	96.5	250	PVC	SDR 35	0.25	30.3	67.78%	0.61	0.57	
		24	23	2.17	0	0	433	779	5.33	1919	3.08	19.2	0.00	6.26	0.00	0.00	0.00	0.00	0.00	0.00	7.71	3.0	2.17	19.30	6.4	28.6	96.5	300	PVC	SDR 35	0.20	42.9	66.51%	0.61	0.57	
		23	22	0.00	0	0	0	0	5.33	1919	3.08	19.2	0.00	6.26	0.00	0.00	0.00	0.00	0.00	0.00	7.71	3.0	0.00	19.30	6.4	28.6	48.1	300	PVC	SDR 35	0.20	42.9	66.51%	0.61	0.57	
		22	21	0.00	0	0	0	0	5.33	1919	3.08	19.2	0.00	6.26	5.27	5.27	0.00	0.00	0.00	0.00	7.71	13.7	5.27	24.56	8.1	41.0	48.1	375	PVC	SDR 35	0.20	72.6	56.43%	0.69	0.61	
		21	20	0.00	0	0	0	0	5.33	1919	3.08	19.2	0.00	6.26	0.00	0.00	0.00	0.00	0.00	0.00	7.71	13.7	0.00	24.56	8.1	41.0	62.3	375	PVC	SDR 35	0.20	72.6	56.43%	0.69	0.61	
		L20B, L20C, G20B, L20D	STUB	20	0.00	0	0	0	0.00	0	3.80	0.0	0.00	0.00	14.61	14.61	0.00	0.00	0.00	0.00	1.72	1.72	23.7	16.33	16.33	5.4	29.1	23.0	300	PVC	SDR 35	0.20	42.9	67.69%	0.61	0.57
	L20A, G20A	20	6	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	6.26	0.27	20.15	0.00	0.00	0.00	0.00	0.35	9.79	34.1	0.62	41.52	13.7	66.9	111.1	375	PVC	SDR 35	0.20	72.6	92.17%	0.69	0.71	
		6	5	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	6.26	0.00	20.15	0.00	0.00	0.00	0.00	9.79	34.1	0.00	41.52	13.7	66.9	71.6	375	PVC	SDR 35	0.21	74.3	90.10%	0.70	0.72		
		5	4	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	6.26	0.00	20.15	0.00	0.00	0.00	0.00	9.79	34.1	0.00	41.52	13.7	66.9	61.8	375	PVC	SDR 35	0.23	77.3	86.61%	0.73	0.74		
		4	3	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	6.26	0.00	20.15	0.00	0.00	0.00	0.00	9.79	34.1	0.00	41.52	13.7	66.9	61.7	375	PVC	SDR 35	0.18	68.5	97.65%	0.65	0.68		
		3	2	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	6.26	0.00	20.15	0.00	0.00	0.00	0.00	9.79	34.1	0.00	41.52	13.7	66.9	7.2	375	PVC	SDR 35	0.28	85.4	78.31%	0.81	0.79		
		2	1	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	6.26	0.00	20.15	0.00	0.00	0.00	0.00	9.79	34.1	0.00	41.52	13.7	66.9											
BCIP	MHVG2	1	MHVG2	0.00	0	0	0	5.33	1919	3.08	19.2	29.98	36.24	12.68	32.82	0.00	0.00	0.00	0.00	9.79	62.8	42.66	84.18	27.8	109.7	115.0	525	CONCRETE	-	0.19	197.6	55.53%	0.88	0.78		
	MHVG3	MHVG2	MHVG3	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	36.24	0.00	32.82	0.00	0.00	0.00	0.00	9.79	62.8	0.00	84.18	27.8	109.7	120.0	525	CONCRETE	-	0.20	202.8	54.12%	0.91	0.80		
	MHVG4	MHVG3	MHVG4	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	36.24	0.00	32.82	0.00	0.00	0.00	0.00	9.79	62.8	0.00	84.18	27.8	109.7	90.0	525	CONCRETE	-	0.20	202.8	54.12%	0.91	0.80		
	MHVG5	MHVG4	MHVG5	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	36.24	0.00	32.82	0.00	0.00	0.00	0.00	9.79	62.8	0.00	84.18	27.8	109.7	115.0	525	CONCRETE	-	0.20	202.8	54.12%	0.91	0.80		
	MH EX1	MH EX1	MH EX1	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	36.24	0.00	32.82	0.00	0.00	0.00	0.00	9.79	62.8	0.00	84.18	27.8	109.7	36.0	525	CONCRETE	-	0.22	212.7	51.60%	0.95	0.82		
	MH1	MH1	MH1	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	36.24	0.00	32.82	0.00	0.00	0.00	0.00	9.79	62.8	0.00	84.18	27.8	109.7	92.0	525	CONCRETE	-	0.09	136.0	80.68%	0.61	0.60		
	MH2	MH2	MH2	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	36.24	0.00	32.82	0.00	0.00	0.00	0.00	9.79	62.8	0.00	84.18	27.8	109.7	135.0	525	CONCRETE	-	0.18	192.4	57.05%	0.86	0.76		
	MH3	MH3	MH3	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	36.24	0.00	32.82	0.00	0.00	0.00	0.00	9.79	62.8	0.00	84.18	27.8	109.7	120.0	525	CONCRETE	-	0.20	202.8	54.12%	0.91	0.80		
	MH4	MH4	MH4	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	36.24	0.00	32.82	0.00	0.00	0.00	0.00	9.79	62.8	0.00	84.18	27.8	109.7	120.0	525	CONCRETE	-	0.20	202.8	54.12%	0.91	0.80		
	MH5	MH5	MH5	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	36.24	0.00	32.82	0.00	0.00	0.00	0.00	9.79	62.8	0.00	84.18	27.8	109.7	120.0	525	CONCRETE	-	0.20	202.8	54.12%	0.91	0.80		
	MH6	MH6	MH6	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	36.24	0.00	32.82	0.00	0.00	0.00	0.00	9.79	62.8	0.00	84.18	27.8	109.7	120.0	525	CONCRETE	-	0.20	202.8	54.12%	0.91	0.80		
	MH7	MH7	MH7	0.00	0	0	0	5.33	1919	3.08	19.2	0.00	36.24	0.00	32.82	0.00	0.00	0.00	0.00	9.79	62.8	0.00	84.18	27.8	109.7	63.0	525	CONCRETE	-	0.29	244.2	44.95%	1.09	0.91		
MH8	MH8	MH8	51.51	0	0	0	4070	56.84	5989	2.74	53.1	14.97	51.21	0.00	32.82	0.00	0.00	0.00	1.67	11.46	70.1	68.15	152.33	50.3	173.5	29.6	600	CONCRETE	-	0.20	289.5	59.92%	0.99	0.89		
MH9	MH9	MH9	0.00	0	0	0	56.84	5989	2.74	53.1	0.00	51.21	0.00	32.82	0.00	0.00	0.00	0.00	11.46	70.1	0.00	152.33	50.3	173.5	105.0	600	CONCRETE	-	0.20	289.5	59.92%	0.99	0.89			
MH10	MH10A	MH10A	0.00	0	0	0	56.84	5989	2.74	53.1	0.00	51.21	0.00	32.82	0.00	0.00	0.00	0.00	11.46	70.1	0.00	152.33	50.3	173.5	18.0	600	CONCRETE	-	0.22	303.6	57.14%	1.04	0.93			
MH10A	MH10B	MH10B	0.00	0	0	0	56.84	5989	2.74	53.1	0.00	51.21	0.00	32.82	0.00	0.00	0.00	0.00	11.46	70.1	0.00	152.33	50.3	173.5	71.0	600	CONCRETE	-	0.20	289.5	59.92%					

Braden Kaminski

From: Bougadis, John <John.Bougadis@ottawa.ca>
Sent: Wednesday, July 4, 2018 11:35 AM
To: Laura Maxwell
Cc: Braden Kaminski
Subject: FW: EUC MUC CDP - Residual Sanitary Sewer Capacity

Hi Laura,

Existing design flows and pipe capacities at four locations have been provided below. The design flows does not include future flow allowances (the MSS will have that info).

Please let me know if you have any questions.

Thanks

John
X14990

From: Ahmad, Shohan
Sent: Wednesday, July 04, 2018 11:29 AM
To: Bougadis, John <John.Bougadis@ottawa.ca>
Subject: RE: EUC MUC CDP - Residual Sanitary Sewer Capacity

Hi John,

Please refer to the design flows below from the updated EUC model. The trunk level model includes pipes that are greater than and equal to 450mm. Please refer to the figures below for point locations.

100 year design peak flows and pipe capacities are:

Point A: SAN00520
Design Flow = 52.9 L/s
Pipe Capacity = 587 L/s

Point B: SAN00517
Design Flow = 52.9 L/s
Pipe Capacity = 528 L/s

Point F : SAN48923
Design Flow = 19.5 L/s
Pipe Capacity = 195 L/s

Point Innes RD & Frank Bender St : SAN21081
Design Flow = 18.6 L/s
Pipe Capacity = 132 L/s

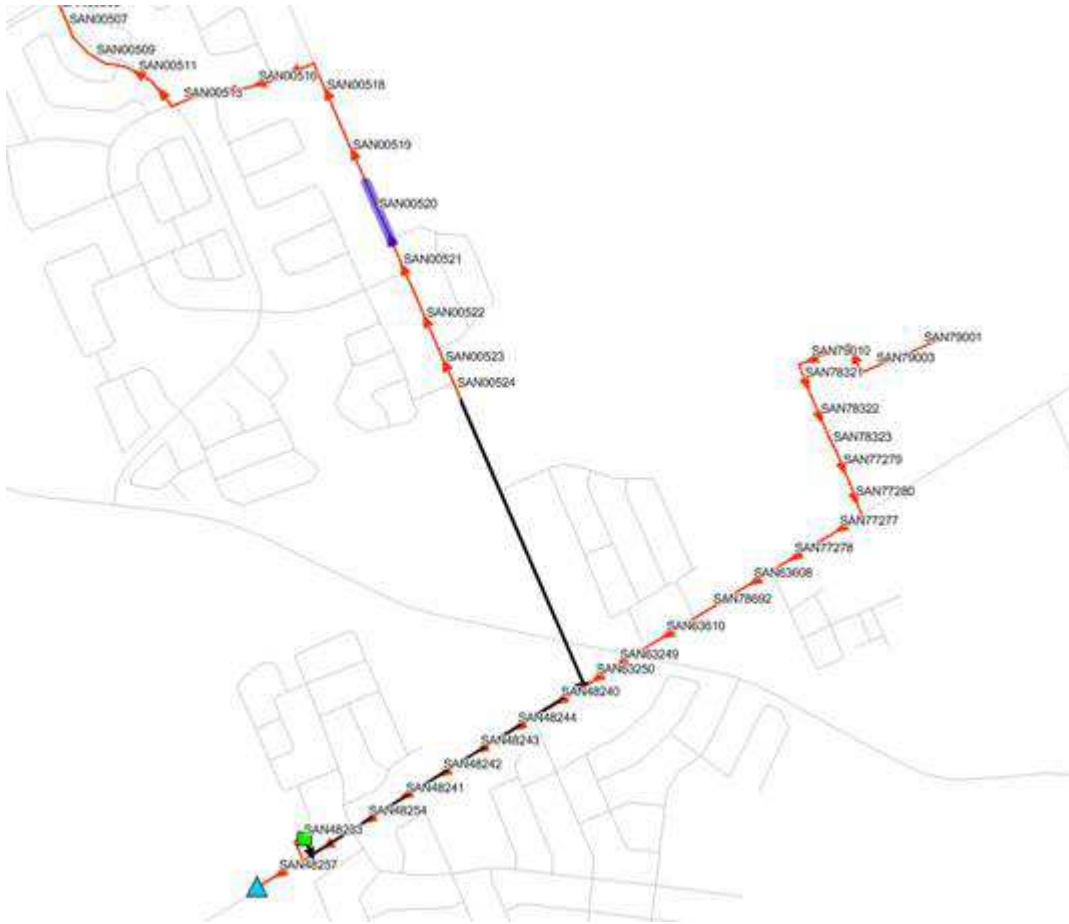
Cheers
Shohan

Shohan Ahmad, Ph.D., P.Eng., M.CSCE
Project Manager
Asset Management Branch – Infrastructure Planning
City of Ottawa - Planning, Infrastructure and Economic Development
110 Laurier Avenue West, 3th Floor, Ottawa, ON K1P 1J1
(613) 580-2424 ext. 22625
Shohan.ahmad@ottawa.ca

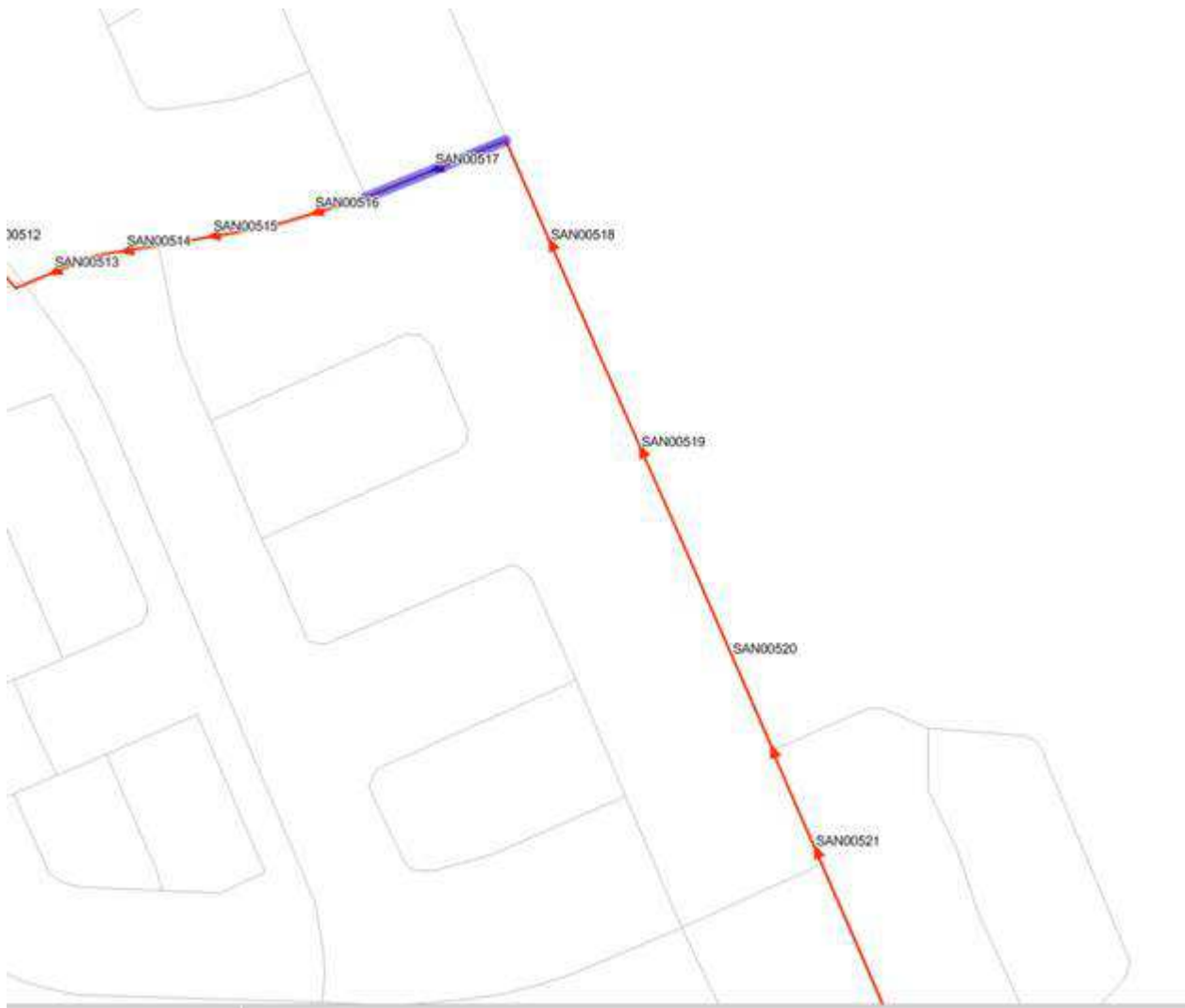
EUC Pipe network shown below:



Point A : SAN00520 highlighted below:



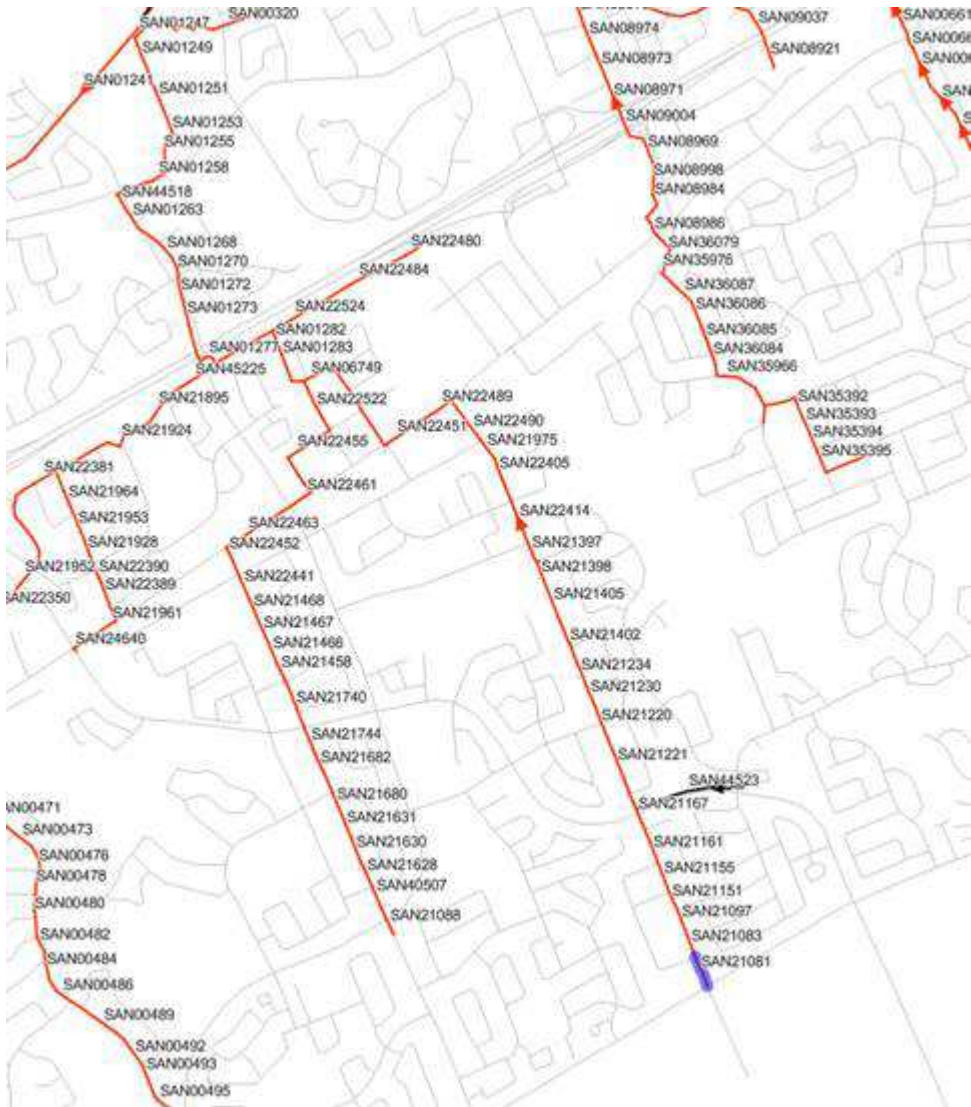
Point B : SAN00517 highlighted below:



Point F : SAN48923 highlighted below:



Point Innes RD & Frank Bender St intersection: SAN21081 highlighted below:



From: Bougadis, John
Sent: Tuesday, July 03, 2018 12:42 PM
To: Ahmad, Shohan <Shohan.Ahmad@ottawa.ca>
Subject: FW: EUC MUC CDP - Residual Sanitary Sewer Capacity

Have a look at this. I am sure we can provide 100 year flows at points A and B. Other locations may require the original design sheets that I would expect DSEL to find and comment on.

Thanks

John
X14990

From: Laura Maxwell <LMaxwell@dsel.ca>
Sent: Tuesday, July 03, 2018 12:04 PM
To: Bougadis, John <John.Bougadis@ottawa.ca>
Cc: Braden Kaminski <BKaminski@dsel.ca>
Subject: EUC MUC CDP - Residual Sanitary Sewer Capacity

Hi John,

Further to our phone call last week, could you please see if the City has any modelling information regarding residual sanitary capacity within existing sewers surrounding the EUC MUC study area?

We're looking to see if there is any information that would supplement the information we've gathered from previous studies.

The outlets of interest are shown in the attached markup.

Please note that node IDs have been included based on information from previous studies and as-built information we have on file.

Any residual capacity information for any or all of the identified sewers would be greatly appreciated.

Thanks in advance,

Laura Maxwell, B.Sc.(Civil Eng), M.Pl.
Client Project Manager

DSEL

david schaeffer engineering ltd.

phone: (613) 836-0856 ext. 527

cell: (613) 293-8750

email: lmaxwell@DSEL.ca

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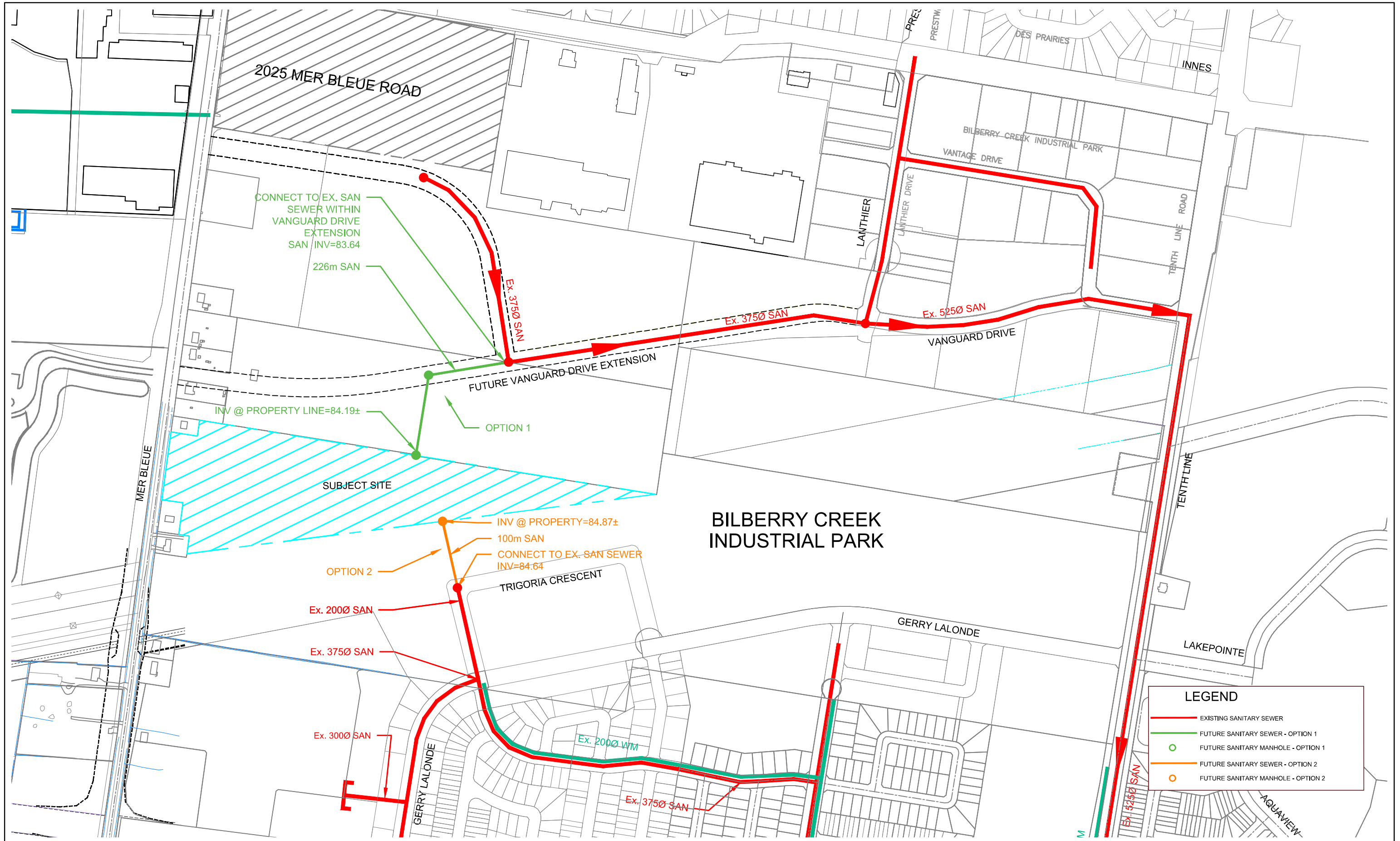
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SERVICING OPTIONS REPORT
FOR
BLACKSHEEP DEVELOPMENTS
2159 MER-BLEUE ROAD

CITY OF OTTAWA

PROJECT NO.: 17-934

DECEMBER 2017 – REV 2
© DSEL



**CONCEPTUAL SANITARY SERVICING
 BLACKSHEEP DEVELOPMENTS - MER BLEUE**

z:\projects\17-934_blacksheep_mer-bleue\p_design\b2_drawings\b2-5_sketches and figures\2017-11-28_servicing-options-fig\2017-11-28_934_ex_servicing_dsel.dwg

**GLOUCESTER AND CUMBERLAND
EAST URBAN COMMUNITY
EXPANSION AREA AND BILBERRY
CREEK INDUSTRIAL PARK
MASTER SERVICING UPDATE**

Prepared for:
City of Ottawa

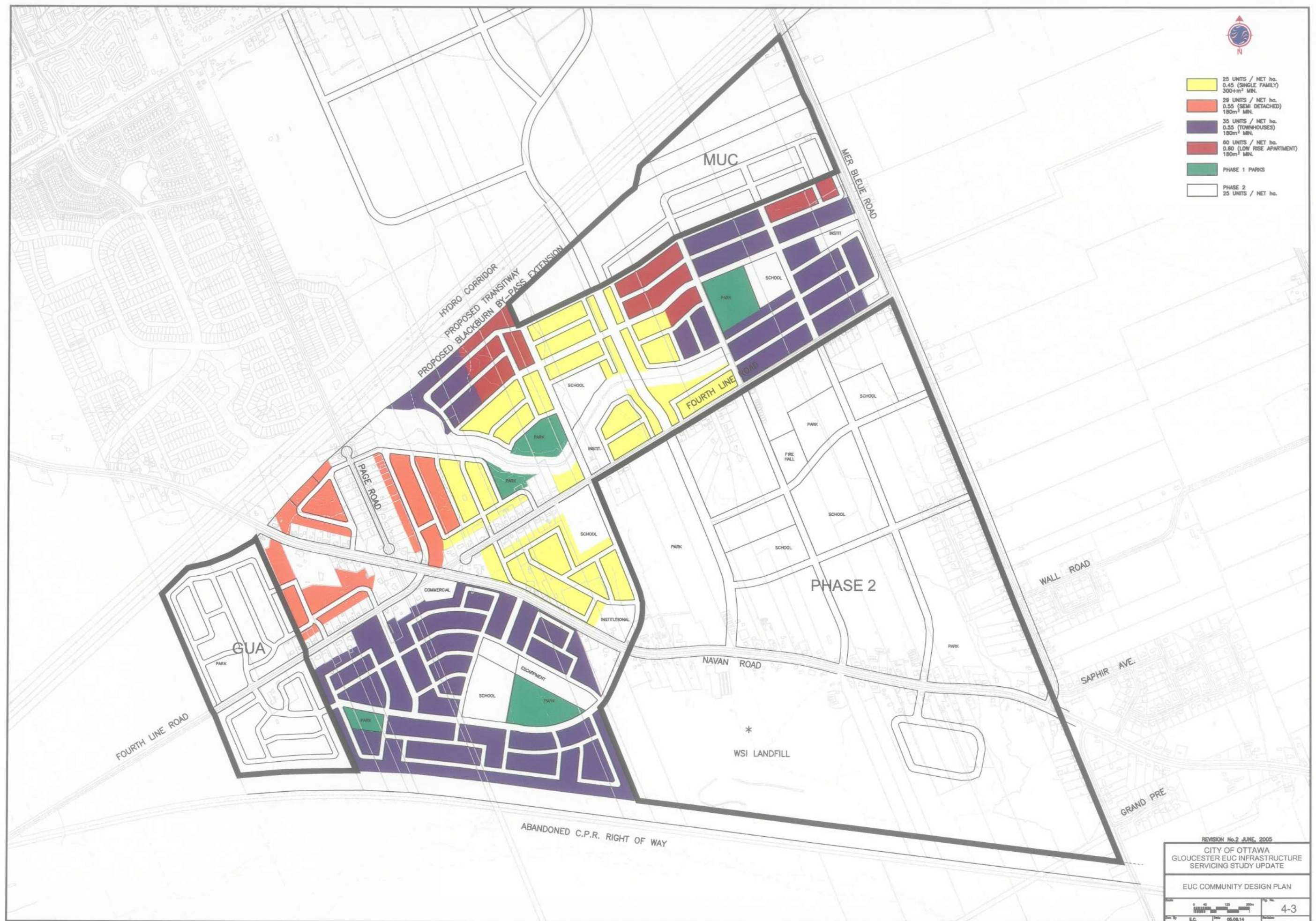
File No. 163400602
November 2004
Updated June 2005
Updated October 2005
Updated July 2006

Prepared by:
Stantec Consulting Ltd.
1505 Laperriere Avenue
Ottawa, Ontario
K1Z 7T1





- 25 UNITS / NET ha.
0.45 (SINGLE FAMILY)
300+m² MIN.
- 28 UNITS / NET ha.
0.55 (SEMI DETACHED)
180m² MIN.
- 35 UNITS / NET ha.
0.55 (TOWNHOUSES)
180m² MIN.
- 60 UNITS / NET ha.
0.80 (LOW RISE APARTMENT)
180m² MIN.
- PHASE 1 PARKS
- PHASE 2
25 UNITS / NET ha.



REVISION No.2 JUNE, 2005
CITY OF OTTAWA
GLOUCESTER EUC INFRASTRUCTURE
SERVICING STUDY UPDATE

EUC COMMUNITY DESIGN PLAN

4-3

E.C. 09.06.14

**Table 4-2
 EUC Development Projections**

	Development Density							
	Low	Low/Med	Med	High	MUC	GUA	Exist	Total
Area (ha)	90	12	56	10	29	21	60	278
Number of Units	2249	358	1953	603	748	512	256	6679
Population Density (pers/unit)	3.2	3.2	2.4	1.9	1.9	3.14	3.2	-
Population	7196	1146	4687	1146	1421	1607	819	18022

4.1.3 Storm Drainage

4.1.3.1 Stormwater Management

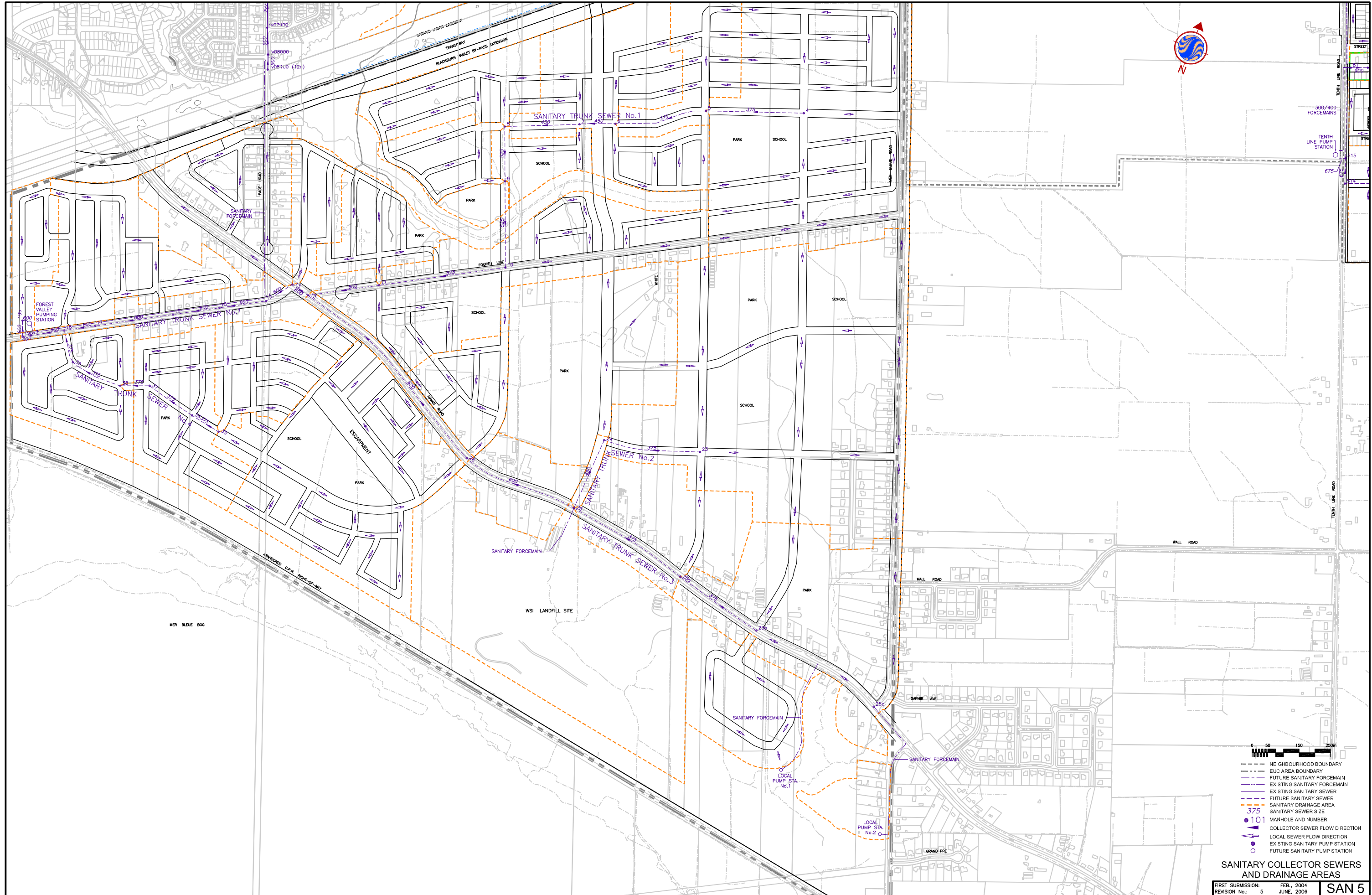
As per the 1992 MDP and 2000 addendum, three extended detention SWM facilities are required within the EUC (identified as Pond 1, Pond 2 and Pond 3).

The Mud Creek ravine upstream of Page Road was identified as the location of Pond 1. This facility will service the future development lands north of Fourth Line Road and east of Page Road. It will also include a portion of the McKinnons Creek watershed, which will be diverted to this facility.

Pond 2 is proposed in the existing channel outletting to Mer Bleue upstream of Bear Brook in the southeast corner of the site and is recommended to service the lands south of Fourth Line Road, which currently drain naturally to Mer Bleue Road.

The low-lying agricultural area tributary to Mud Creek in the southwest corner of the site between Fourth Line Road and the CPR ROW is the recommended location for Pond 3 to service the lands south of the HEPC, west of Page Road, south of the Fourth Line Road and west of the WSI landfill. As a result of an extension of the development boundary further south towards the CPR ROW, the redesign of Pond 3 was commissioned, with the completion date anticipated for late 2005.

The recommended SWM pond locations and tributary catchment areas are illustrated in **Figure 4-4**. The ponds were sized to provide quantity control, water quality treatment and downstream erosion protection. **Table 4-3** lists the elevations within the SWM ponds constraining the design of the minor system.



- NEIGHBOURHOOD BOUNDARY
- EUC AREA BOUNDARY
- FUTURE SANITARY FORCE MAIN
- EXISTING SANITARY FORCE MAIN
- EXISTING SANITARY SEWER
- FUTURE SANITARY SEWER
- SANITARY DRAINAGE AREA
- SANITARY SEWER SIZE
- 375 MANHOLE AND NUMBER
- 101 MANHOLE AND NUMBER
- ▶ COLLECTOR SEWER FLOW DIRECTION
- ▶ LOCAL SEWER FLOW DIRECTION
- EXISTING SANITARY PUMP STATION
- FUTURE SANITARY PUMP STATION

SANITARY COLLECTOR SEWERS AND DRAINAGE AREAS

FIRST SUBMISSION: FEB., 2004
 REVISION No.: 5 JUNE, 2006

SAN 5

STREET	LOCATION		RESIDENTIAL AREA AND POPULATION						COMM			INDUST		INST		C+I		PEAK FLOW				PIPE														
	FROM M.H.	TO M.H.	AREA (ha)	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT	PEAK FLOW (L/s)	AREA (ha)	ACCU AREA (ha)	AREA (ha)	ACCU AREA (ha)	PEAK FACTOR (per MOE)	AREA (ha)	ACCU AREA (ha)	PEAK FLOW (L/s)	TOTAL AREA (ha)	ACCU AREA (ha)	INFILT. FLOW (L/s)	TOTAL FLOW (L/s)	LENGTH (m)	DIAMETER		SLOPE (%)	CAP. (FULL) (L/s)	Q/Cap (%)	VEL. (FULL) (m/s)	Upstream OG (m)	Downstream OG (m)	Upstream Invert (m)	Upstream Obvert (m)	Downstream Invert (m)	Downstream Obvert (m)	Drop Structure (m)	US Frost Depth (m)	DS Frost Depth (m)
	38A	38	3.00	174	3.00	174	4.00	2.32				0.00			0.00	0.00	3.00	3.00	0.84	3.66	160	200	203.2	0.32	19.35	18.9%	0.60	72.00	76.00	68.50	68.70	67.98	68.19		3.30	7.81
	38	39	3.40	182	59.44	3116	3.43	43.27			1.30	0.00			2.80	3.56	3.40	63.54	17.79	64.82	170	375	381.0	0.22	85.79	75.3%	0.75	76.00	72.00	64.44	64.82	64.07	64.45		11.18	7.55
	39	18	6.20	341	65.64	3457	3.39	47.46			1.30	0.00			2.80	3.56	6.20	69.74	19.53	70.55	165	375	381.0	0.22	85.79	82.2%	0.75	72.00	73.00	64.07	64.45	63.84	64.22		7.55	8.78
	50	51	8.20	555	8.20	555	3.95	8.88			0.00	0.00			0.00	0.00	8.20	8.20	2.30	11.17	80	200	203.2	0.50	24.19	46.2%	0.75	74.00	74.00	69.00	69.20	68.70	68.90		4.80	5.10
	51	52	4.10	235	12.30	790	3.86	12.36			0.00	0.00			0.00	0.00	4.10	12.30	3.44	15.81	140	200	203.2	0.67	28.00	56.4%	0.86	74.00	72.80	66.55	68.75	67.81	67.81	0.15	5.25	4.99
	52	18	4.70	174	17.00	964	3.81	14.88			0.00	0.00			0.00	0.00	4.70	17.00	4.76	19.64	70	250	254.0	0.32	35.09	56.0%	0.69	72.80	73.00	67.56	67.61	67.33	67.59		4.99	5.41
	18	19	0.00	0	411.90	17696	2.71	193.98			2.74	11.40			26.55	25.43	0.00	452.59	126.73	346.13	110	600	609.6	0.50	452.92	76.4%	1.55	73.00	71.50	63.61	64.22	63.06	63.67		8.78	7.83
	19	19A	0.00	0	411.90	17696	2.71	193.98			2.74	11.40	4.15		26.55	44.59	0.00	452.59	126.73	365.30	25	600	609.6	0.50	452.92	80.7%	1.55	71.50	71.00	63.06	63.67	62.93	63.54		7.83	7.46
	19A	19B	0.40	0	412.30	17696	2.71	193.98			2.74	11.40	4.15		26.55	44.59	0.40	452.99	126.84	365.41	51	600	609.6	0.50	452.92	80.7%	1.55	71.00	71.00	62.87	63.48	62.62	63.23	0.06	7.52	7.77
	60	19B	5.90	326	5.90	326	4.00	5.26			0.00	0.00			0.00	0.00	5.90	5.90	1.65	6.93	120	200	203.2	0.32	19.35	35.8%	0.60	71.00	71.00	68.30	68.50	67.91	68.12		2.50	2.88
	19B	FVPS	0.00	0	418.20	18022	2.70	196.97			2.74	11.40	4.15		26.55	44.59	0.00	458.89	128.49	370.05	24	600	609.6	0.50	452.92	81.7%	1.55	71.00	71.50	62.56	63.17	62.44	63.05	0.06	7.83	8.45

DESIGN PARAMETERS Residential Flow = 350 Lpd Commercial/Institutional Flow = 50000 L/ha/d Industrial Flow = 35000 L/ha/d Maximum Residential Peak Factor = 4.00 Minimum Residential Peak Factor = 2.00 Commercial/Institutional Peak Factor = 1.50 Industrial Peak Factor = as per MOE Graph Extraneous Flow = 0.28 L/s/ha Minimum Velocity = 0.76 m/s Mannings n = 0.013 Harmon Peak Factor = $1+14(4+(P/1000)^{1/2})^K$, where K= 1	Low Density (LD)/Existing = 3.2 ppu Low/Medium Density (LMD) = 3.2 ppu Medium Density (MD) = 2.4 ppu High Density (HD) = 1.9 ppu MUC = 1.9 ppu GUA = 3.1 ppu (Telephone Conversation with Selma Hassan Sept. 10/2004 - Based on development applications - 361 Singles @ 3.2pers/unit and 164 Singles @ 3 pers/unit)	Designed: B.D	PROJECT: Gloucester EUC Infrastructure Servicing Study Update		
		Checked: F.W	LOCATION: City of Ottawa		
		Dwg. Reference: SAN	File Ref.: 1634-00493	Date: Mar-05	Sheet No.

SANITARY SEWER CALCULATION SHEET

LOCATION: EUC MSS
 FILE REF: 14-733
 DATE: 4-Oct-18

DESIGN PARAMETERS

Avg. Daily Flow Res. 350 L/p/d
 Avg. Daily Flow Comr 50,000 L/ha/d
 Park Flow 9,300 L/ha/d
 Avg. Daily Flow Indus 35,000 L/ha/d

Peak Fact. Res. Per Harmons: Min = 2.0, Max =4.0
 Peak Fact. Comm. 1.5
 Peak Fact. Instit. 1.5
 Peak Fact. Indust. as per MOE Graph

Infiltration / Inflow 0.28 L/s/ha
 Min. Pipe Velocity 0.60 m/s full flowing
 Max. Pipe Velocity 3.00 m/s full flowing
 Mannings N 0.013



Location			Residential Area and Population								Commercial			Institutional		Industrial		Infiltration				Pipe Data								
Area ID	Up	Down	Area	Number of Units				Pop.	Cumulative	Peak	Q _{res}	Area	Accu.	Area	Accu.	Area	Accu.	Q _{CHL}	Total	Accu.	Infiltration	Total	DIA	Slope	Length	A _{hydraulic}	R	Velocity	Q _{cap}	Q / Q full
			(ha)	Singles	Semi's	Town's	Apt's	Area	Pop.	Fact.	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	Flow	Flow	(mm)	(%)	(m)	(m ²)	(m)	(m/s)	(L/s)	(-)	
MUC Area per MSU			29.000					1421.0	29.000	1421.0	3.70	21.28		0.00		0.00	0.0	29.000	29.000	8.120	29.40									



SERVICING REPORT

FOR

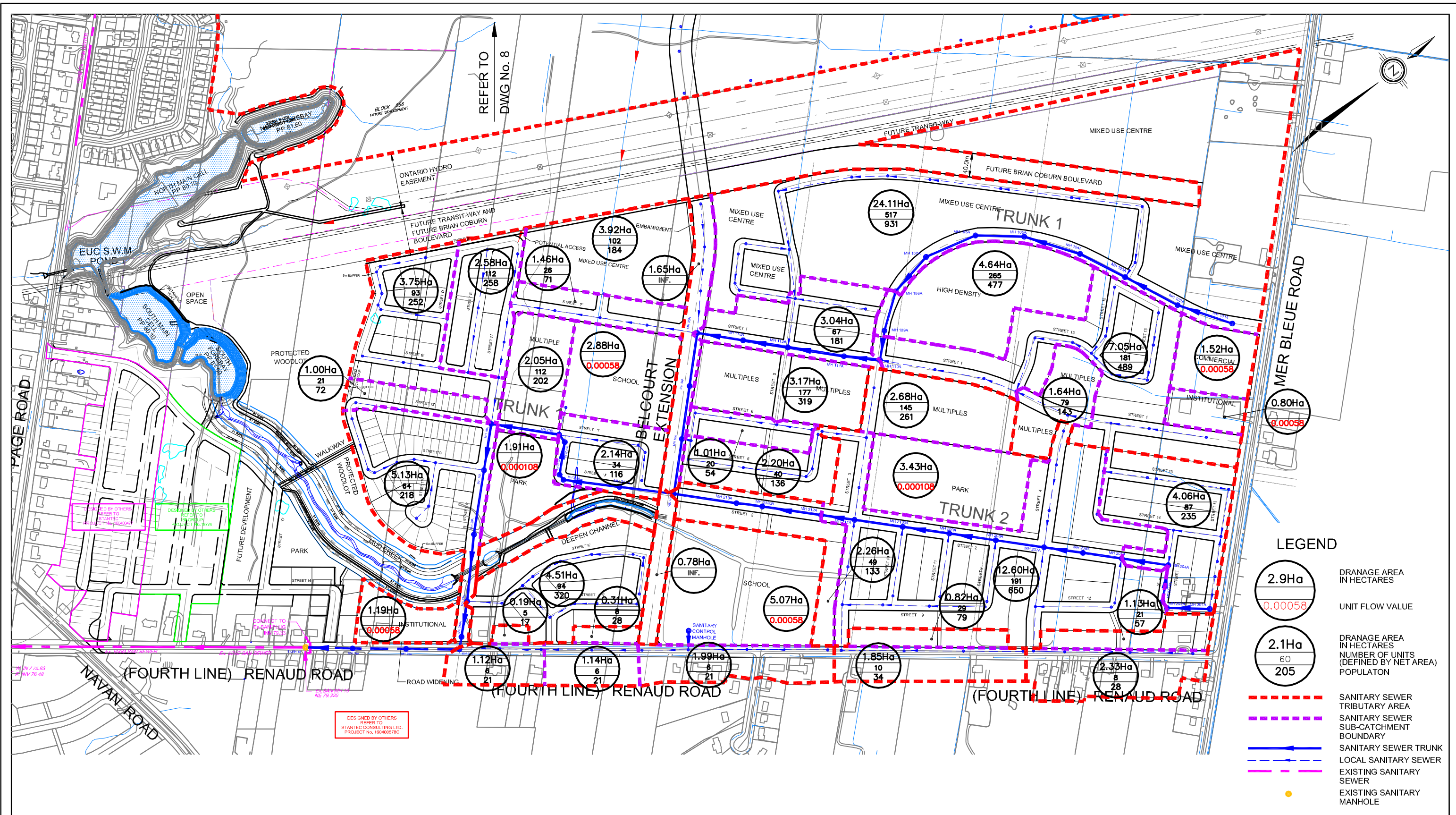
TRAILS EDGE AND ORLEANS BUSINESS PARK

MINTO DEVELOPMENTS INC. RICHCRAFT GROUP OF COMPANIES

CITY OF OTTAWA

PROJECT NO.: 10-459

**JULY 2017
REVISION 7
© DSEL**



LEGEND

	2.9Ha	DRANGE AREA IN HECTARES
	0.00058	UNIT FLOW VALUE
	2.1Ha	DRANGE AREA IN HECTARES
	60	NUMBER OF UNITS (DEFINED BY NET AREA)
	205	POPULATION
		SANITARY SEWER TRIBUTARY AREA
		SANITARY SEWER SUB-CATCHMENT BOUNDARY
		SANITARY SEWER TRUNK
		LOCAL SANITARY SEWER
		EXISTING SANITARY SEWER
		EXISTING SANITARY MANHOLE



120 Iber Road, Unit 203
 Stittsville, ON K2S 1E9
 TEL: (613) 836-0856
 FAX: (613) 836-7183
 www.DSEL.ca

TRAILS EDGE

CONCEPTUAL SANITARY SERVICING

DATE:	FEBRUARY 2014
SCALE:	1:6000
PROJECT No.:	10-459
FIGURE	7

SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION								COMM		INDUST		INSTIT		C+I+I	INFILTRATION			PIPE									
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS Low Density	UNITS Medium Density	UNITS High Density	UNITS MUC	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	VEL.		
									AREA (ha)	POP.																		(FULL) (m/s)	(ACT.) (m/s)	
TRUNK 2																														
	201A	202A	0.66		12			33	0.66	33	4.00	0.53							0.00	0.66	0.66	0.185	0.72	72.0	200.000	0.50	23.19	0.74	0.33	
	202A	203A	0.46	10				34	1.12	67	4.00	1.09							0.00	0.46	1.12	0.314	1.40	13.0	200.000	0.50	23.19	0.74	0.41	
	203A	204A	0.00					0	1.12	67	4.00	1.09							0.00	0.00	1.12	0.314	1.40	62.0	200.000	0.50	23.19	0.74	0.41	
	204A	205A	1.08	22				75	2.20	142	4.00	2.30							0.00	1.08	2.20	0.616	2.92							
			3.40		75			203	5.60	345	4.00	5.59							0.00	3.40	5.60	1.568	7.16	79.0	200.000	0.50	23.19	0.74	0.65	
	205A	206A	1.18	16				55	6.78	400	4.00	6.48							0.00	1.18	6.78	1.898	8.38	66.0	200.000	0.50	23.19	0.74	0.68	
	206A	207A	0.00					0	6.78	400	4.00	6.48							0.00	0.00	6.78	1.898	8.38	66.0	200.000	0.50	23.19	0.74	0.68	
	207A	208A	2.33	8				28	9.11	428	4.00	6.94							0.00	2.33	9.11	2.551	9.49							
			1.13		21			57	10.24	485	3.98	7.82							0.00	1.13	10.24	2.867	10.69							
			3.56	56				191	13.80	676	3.90	10.68							0.00	3.56	13.80	3.864	14.54	82.0	200.000	0.50	23.19	0.74	0.78	
	208A	209A	1.11	17				58	14.91	734	3.88	11.54							0.00	1.11	14.91	4.175	15.72	79.0	200.000	0.50	23.19	0.74	0.79	
	209A	210A	1.06	16				55	15.97	789	3.86	12.34							0.00	1.06	15.97	4.472	16.81	79.0	250.000	0.30	32.57	0.66	0.66	
	210A	211A	1.14	17				58	17.11	847	3.85	13.21							0.00	1.14	17.11	4.791	18.00	82.0	250.000	0.30	32.57	0.66	0.68	
Park																		3.430	3.43	0.37	3.43	20.54	5.751							
			1.85	10				34	18.96	881	3.84	13.70							3.43	0.37	1.85	22.39	6.269	20.34						
			0.82		29			79	19.78	960	3.81	14.82							3.43	0.37	0.82	23.21	6.499	21.69						
			0.70		24			65	20.48	1025	3.79	15.74							3.43	0.37	0.70	23.91	6.695	22.81						
			3.01	37				126	23.49	1151	3.76	17.53							3.43	0.37	3.01	26.92	7.538	25.44						
	211A	212A	2.68				145	261	26.17	1412	3.70	21.16							3.43	0.37	2.68	29.60	8.288	29.82	56.5	300.000	0.20	43.25	0.61	0.66
	212A	2120A	0.91		14			38	27.08	1450	3.69	21.67							3.43	0.37	0.91	30.51	8.543	30.58	100.0	300.000	0.20	43.25	0.61	0.66
	2120A	213	0.00					0	27.08	1450	3.69	21.67							3.43	0.37	0.00	30.51	8.543	30.58	44.0	300.000	0.20	43.25	0.61	0.66
	213A	59A	0.65		11			30	27.73	1480	3.68	22.06							3.43	0.37	0.65	31.16	8.725	31.16	106.0	300.000	0.20	43.25	0.61	0.66
To Trunk 1 , Pipe 59A - 214A									27.73	1480								3.43												
TRUNK 1																														
	101A	102A	13.13				277	499	13.13	499	3.98	8.05							0.00	13.13	13.13	3.676	11.73	97.0	200.000	0.50	23.19	0.74	0.74	
	102A	103A	0.00					0	13.13	499	3.98	8.05							0.00	0.00	13.13	3.676	11.73	100.0	200.000	0.40	20.74	0.66	0.68	
	103A	104A	1.75				50	90	14.88	589	3.94	9.40							0.00	1.75	14.88	4.166	13.57	85.0	250.000	0.30	32.57	0.66	0.63	
	104A	105A	0.00					0	14.88	589	3.94	9.40							0.00	0.00	14.88	4.166	13.57	98.5	250.000	0.30	32.57	0.66	0.63	
	105A	106A	2.66				56	101	17.54	690	3.90	10.90							0.00	2.66	17.54	4.911	15.81	82.0	250.000	0.30	32.57	0.66	0.65	
	106A	107A	0.00					0	17.54	690	3.90	10.90							0.00	0.00	17.54	4.911	15.81	90.5	250.000	0.30	32.57	0.66	0.65	
	107A	108A	0.00					0	17.54	690	3.90	10.90							0.00	0.00	17.54	4.911	15.81	77.0	250.000	0.30	32.57	0.66	0.65	
	108A	109A	4.64				265	477	22.18	1167	3.76	17.78							0.00	4.64	22.18	6.210	23.99	68.5	250.000	0.35	35.18	0.72	0.77	
	109A	110A	0.09					0	22.27	1167	3.76	17.78							0.00	0.09	22.27	6.236	24.02	50.0	250.000	0.35	35.18	0.72	0.77	
Commercial													1.520	1.520					1.32	1.52	23.79	6.661								
Institutional														1.52					0.800	0.800	2.02	0.80	24.59	6.885						
			1.64				79	143	23.91	1310	3.72	19.74							0.800	2.02	1.64	26.23	7.344	29.10						
			6.96		181			489	30.87	1799	3.62	26.38							0.800	2.02	6.96	33.19	9.293	37.69						
	110A	111A	0.76		14			38	31.63	1837	3.61	26.86							0.800	2.02	0.76	33.95	9.506	38.39	61.0	300.000	0.30	52.97	0.75	0.82
	111A	112A	0.00					0	31.63	1837	3.61	26.86							0.800	2.02	0.00	33.95	9.506	38.39	95.5	300.000	0.30	52.97	0.75	0.82

DESIGN PARAMETERS												Designed: K.M.						PROJECT: TRAILS EDGE FSR - SUBMISSION 5									
Park Average Flow = 9300 L/ha/da												Industrial Peak Factor = as per MOE Graph						City of Ottawa									
Average Daily Flow = 350 l/p/day												Extraneous Flow = 0.280						Date: February, 2014									
Comm/Inst Flow = 50000 L/ha/da												Minimum Velocity = 0.760 L/s/ha						Sheet No. 1 of 2									
Industrial Flow = 35000 L/ha/da												Manning's n = 0.013 m/s						File Ref: 10-459									
Max Res. Peak Factor = 4.00												High Density coeff= 2.3						Dwg. Reference: Sanitary Drainage Plan									
Commercial/Inst peak Factor = 1.50												Med Density coeff= 2.7															
Institutional 0.58 l/s/ha												Low Density coeff= 3.4															

SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION									COMM		INDUST		INSTIT		C+I	INFILTRATION			PIPE									
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS Low Density	UNITS Medium Density	UNITS High Density	UNITS MUC	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	VEL.			
									AREA (ha)	POP.																		(FULL) (m/s)	(ACT.) (m/s)		
			6.57				134	242	38.20	2079	3.57	30.07		1.52				0.800	2.02	6.57	40.52										
	112A	113A	2.28		53			144	40.48	2223	3.55	31.97		1.52				0.800	2.02	2.28	42.80	11.984	45.97	76.0	375.000	0.20	78.41	0.71	0.74		
	113A	35A	0.00					0	40.48	2223	3.55	31.97		1.52				0.800	2.02	0.00	42.80	11.984	45.97	78.0	375.000	0.20	78.41	0.71	0.74		
	35A	54A	1.65					0	42.13	2223	3.55	31.97		1.52				0.800	2.02	1.65	44.45	12.446	46.44	90.0	375.000	0.20	78.41	0.71	0.74		
	54A	55A	3.17				177	319	45.30	2542	3.50	36.04		1.52				0.800	2.02	3.17	47.62	13.334	51.39	90.0	375.000	0.25	87.67	0.79	0.82		
			1.01		20			54	46.31	2596	3.50	36.81		1.52				0.800	2.02	1.01	48.63	13.616	52.45								
	55A	59A	2.20	40				136	48.51	2732	3.48	38.51		1.52				0.800	2.02	2.20	50.83	14.232	54.76	93.0	375.000	0.25	87.67	0.79	0.83		
Contribution From Trunk 2, Pipe 213A - 59A			27.73					1480	76.24	4212	3.31	56.48		1.52		3.43		4.23	2.38	31.16	81.99	22.957	81.82								
			0.78					0	77.02	4212	3.31	56.48		1.52				4.23	2.38	0.78	82.77	23.176	82.04								
	59A	214A	2.14	34				116	79.16	4328	3.30	57.86		1.52				4.23	2.38	2.14	84.91	23.775	84.02	92.5	450.000	0.20	127.50	0.80	0.85		
	214A	215A	0.00					0	79.16	4328	3.30	57.86		1.52				4.23	2.38	0.00	84.91	23.775	84.02	95.0	450.000	0.20	127.50	0.80	0.85		
	215A	216A	0.00					0	79.16	4328	3.30	57.86		1.52				4.23	2.38	0.00	84.91	23.775	84.02	11.0	450.000	0.20	127.50	0.80	0.85		
	216A	217A	0.00					0	79.16	4328	3.30	57.86		1.52				4.23	2.38	0.00	84.91	23.775	84.02	55.5	450.000	0.20	127.50	0.80	0.85		
	217A	218A	0.00					0	79.16	4328	3.30	57.86		1.52				4.23	2.38	0.00	84.91	23.775	84.02	16.0	450.000	0.20	127.50	0.80	0.85		
School Park														1.52		2.880		7.11	4.88	2.88	87.79	24.581									
														1.52		1.910		9.02	5.09	1.91	89.70	25.116									
	218A	18A	2.05				112	202	81.21	4530	3.28	60.19		1.52				9.02	5.09	2.05	91.75	25.690	90.97	115.5	450.000	0.20	127.50	0.80	0.87		
			3.92				102	184	85.13	4714	3.27	62.44		1.52				9.02	5.09	3.92	95.67	26.788	94.32								
			1.46		26			71	86.59	4785	3.26	63.19		1.52				9.02	5.09	1.46	97.13	27.196	95.48								
			2.58			112		258	89.17	5043	3.24	66.19		1.52				9.02	5.09	2.58	99.71	27.919	99.20								
			3.75		93			252	92.92	5295	3.22	69.07		1.52				9.02	5.09	3.75	103.46	28.969	103.13								
	18A	19A	1.00	21				72	93.92	5367	3.22	70.01		1.52				9.02	5.09	1.00	104.46	29.249	104.35	79.0	525.000	0.10	136.00	0.63	0.69		
	19A	20A	5.13	64				218	99.05	5585	3.20	72.40		1.52				9.02	5.09	5.13	109.59	30.685	108.18	109.0	525.000	0.10	136.00	0.63	0.70		
	20A	21A	0.00					0	99.05	5585	3.20	72.40		1.52				9.02	5.09	0.00	109.59	30.685	108.18	113.0	525.000	0.10	136.00	0.63	0.70		
Institutional														1.52		1.190		10.21	6.12	1.19	110.78	31.018									
	21A	210A	4.51	94				320	103.56	5905	3.18	76.07		1.52				10.21	6.12	4.51	115.29	32.281	114.47	60.5	525.000	0.10	136.00	0.63	0.71		
	210A	22A	0.00					0	103.56	5905	3.18	76.07		1.52				10.21	6.12	0.00	115.29	32.281	114.47	21.5	525.000	0.10	136.00	0.63	0.71		
School														1.52		5.070		15.28	10.52	5.07	120.36	33.701									
			0.31	8				28	103.87	5933	3.18	76.43		1.52				15.28	10.52	0.31	120.67	33.788	120.74								
			1.14	6				21	105.01	5954	3.17	76.46		1.52				15.28	10.52	1.14	121.81	34.107	121.09								
			1.99	6				21	107.00	5975	3.17	76.73		1.52				15.28	10.52	1.99	123.80	34.664	121.91								
			0.19	5				17	107.19	5992	3.17	76.95		1.52				15.28	10.52	0.19	123.99	34.717	122.19								
	22A	23A	1.12	6				21	108.31	6013	3.17	77.22		1.52				15.28	10.52	1.12	125.11	35.031	122.77	90.0	525.000	0.10	136.00	0.63	0.71		
	23A	24A	0.00					0	108.31	6013	3.17	77.22		1.52				15.28	10.52	0.00	125.11	35.031	122.77	90.0	525.000	0.10	136.00	0.63	0.71		
	24A	Ex. PLUG	0.00					0	108.31	6013	3.17	77.22		1.52				15.28	10.52	0.00	125.11	35.031	122.77	79.0	525.000	0.10	136.00	0.63	0.71		
To Ex. Sewer Within Renaud Road									108.31	6013				1.52				15.28			125.11		122.77								

DESIGN PARAMETERS												Designed: K.M.				PROJECT: TRAILS EDGE FSR - SUBMISSION 5											
Park Average Flow = 9300 L/ha/da Average Daily Flow = 350 l/p/day Comm/Inst Flow = 50000 L/ha/da Industrial Flow = 35000 L/ha/da Max Res. Peak Factor = 4.00 Commercial/Inst peak Factor = 1.50 Institutional = 0.58												Industrial Peak Factor = as per MOE Graph Extraneous Flow = 0.280 Minimum Velocity = 0.760 L/s/ha Manning's n = 0.013 m/s High Density coeff= 2.3 Med Density coeff= 2.7 Low Density house coeff= 3.4				LOCATION: City of Ottawa Date: February, 2014											
												Checked: Z.L.				Dwg. Reference: Sanitary Drainage Plan											
												Dwg. Reference: Sanitary Drainage Plan				File Ref: 10-459				Date: February, 2014				Sheet No. 2 of 2			



REPORT
PROJECT: 31855-5.2.2

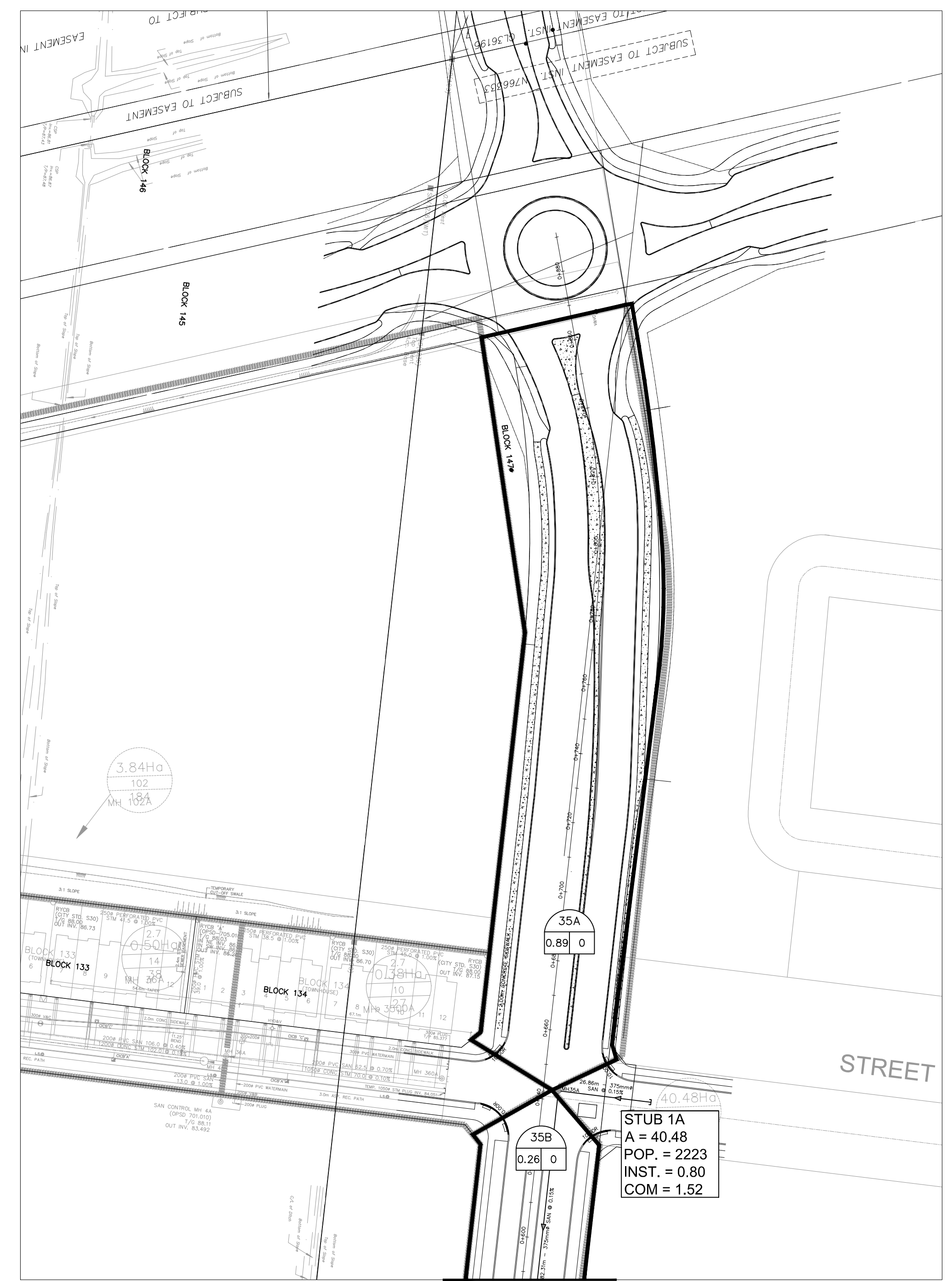
DESIGN BRIEF

MINTO TRAILSEDGE PHASE II



Prepared for MINTO COMMUNITIES INC.
by IBI GROUP
REVISED FEB 2015
REVISED MAY 2015

J:\31855-TrailSedge\09 Drawings\Sheet\01 SANITARY DRAINAGE AREA PLAN.Plot Scale: 1:25.4 Printed At: 2/13/2015 7:51 AM User: shenue



LEGEND:

112	AREA NUMBER
0.10 3.4	POPULATION
	AREA IN HECTARES
204	AREA NUMBER
1.2 INST	NON RESIDENTIAL USE
	INST - INSTITUTION
	COM - COMMERCIAL
	AREA IN HECTARES
A = 51.69	EXTERNAL FLOW
POP. = 3748	AREA Ha
INST. = 2.88	POPULATION
COM = 1.61	INSTITUTION AREA
	COMMERCIAL AREA

RESIDENTIAL POP

- 3.4 PPU SINGLE
- 2.7 PPU TOWNS / SEMI
- 65 PPHa VACANT LANDS

COMMERCIAL 50 000 l/ha/d

INSTITUTION 50 000 l/ha/d

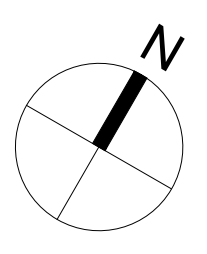
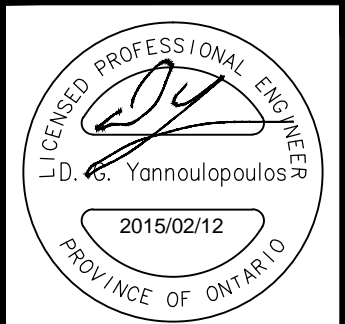
INFILTRATION ALLOWANCE 0.28l/s/ha

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8	REVISED PER CITY COMMENTS	DGY	15:02:12
7	REVISED PER CITY COMMENTS	DGY	15:01:26
6	REVISED PER CITY COMMENTS	DGY	14:11:07
5	REVISED PER CITY COMMENTS	DGY	14:09:16
4	REVISED PER CITY COMMENTS	DGY	14:07:28
3	REVISED PER NEW LEGAL	DGY	14:04:02
2	REVISED PER MASTER SERVING STUDY	DGY	14:03:24
1	ISSUED FOR CITY REVIEW	DGY	13:02:01



IBI GROUP
 333 Preston Street
 Tower 1, Suite 400
 Ottawa, Ontario
 Canada K1S 5N4
 Tel (613)225-1311
 Fax (613)225-9868

Project Title
TRAILSEDGE II
1578051 ONTARIO INC.



Drawing Title
SANITARY DRAINAGE
AREA PLAN

Scale
 1 : 1000

Design	R.M.	Date	FEB 2014
Drawn	E.H.	Checked	D.G.Y.
Project No.	31855	Drawing No.	501

D07-16-107-0018PH3



IBI Group
400-333 Preston Street
Ottawa, Ontario
K1S 5N4

SANITARY SEWER DESIGN SHEET

PROJECT: TRAILS EDGE II
LOCATION: CITY OF OTTAWA
CLIENT: MINTO COMMUNITIES INC.

LOCATION			RESIDENTIAL								ICI AREAS				INFILTRATION ALLOWANCE			TOTAL FLOW	PROPOSED SEWER DESIGN										
STREET	AREA #	FROM	TO	UNIT TYPES				Area (Ha)	POPULATION		CUMULATIVE FLOW		AREA (ha)				Pk. Flow (L/s)	Incr. Area (Ha)	Cum. Area (Ha)	Flow (L/s)	(L/s)	Capacity (L/s)	Pipe Size (mm)	Length (m)	Slope (%)	Vel (Full) (m/s)	Avail. Cap.		
		MH	MH	SF	SD	TH	APT		IND	CUM	Peaking Factor	Peak Flow (L/s)	INSTITUTION IND	CUM	COMMERCIAL IND	CUM											L/s	L/s	L/s
Stub 1A	Stub 1A	MH35A						40.48	2223.0	2223.0	3.55	31.97	0.80	0.80	1.52	1.52	2.01	42.80	42.80	11.98	45.97	70.84	375	26.86	0.15	0.62	24.87	35.11	
Axis Street		MH35A	Stub W					0.00	0.0	0.0	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.63	200	32.31	0.70	0.88	28.63	100.00		
Belcourt Boulevard	35A, 35B	MH35A	MH54A					1.15	0.0	2223.0	3.55	31.97	0.00	0.80	0.00	1.52	2.01	1.15	43.95	12.31	46.29	70.84	375	82.31	0.15	0.62	24.55	34.66	
Belcourt Boulevard	54	MH54A	MH55A					0.24	0.0	2223.0	3.55	31.97	0.00	0.80	0.00	1.52	2.01	0.24	44.19	12.37	46.36	70.84	375	76.74	0.15	0.62	24.48	34.56	
	Stub 1B	Stub 1B	MH55A					6.38	509.0	509.0	3.97	8.19	0.00	0.00	0.00	0.00	6.38	6.38	1.79	9.98	50.44	300	15.90	0.25	0.69	40.46	80.22		
Belcourt Boulevard	55	MH55A	MH55C					0.21	0.0	2732.0	3.48	38.48	0.00	0.80	0.00	1.52	2.01	0.21	50.78	14.22	54.71	70.84	375	68.67	0.15	0.62	16.13	22.77	
Belcourt Boulevard	55C	MH55C	MH56A					0.15	0.0	2732.0	3.48	38.48	0.00	0.80	0.00	1.52	2.01	0.15	50.93	14.26	54.75	70.84	375	52.59	0.15	0.62	16.09	22.71	
		Trunk 2	MH56A					27.73	1480.0	1480.0	3.68	22.09	3.43	3.43		0.00	2.98	31.16	31.16	8.72	33.79	50.44	300	24.10	0.25	0.69	16.65	33.01	
Locust Ridge	56, 56B, 56C	MH56A	MH 101A						0.0	4212.0	3.31	56.53	0.00	4.23		1.52	4.99	0.92	82.86	23.20	84.72	103.03	450	57.60	0.12	0.63	18.31	17.77	
Yellow Birch Street	112A	MH 112A	MH 101A						17.0	17.0	4.00	0.28	0.00	0.00		0.00	0.00	0.28	0.28	0.08	0.36	34.22	200	66.00	1.00	1.06	33.86	98.95	
Locust Ridge	101	MH 101A	MH102A						13.6	4242.6	3.31	56.89	0.00	4.23		1.52	4.99	0.39	83.53	23.39	85.27	103.03	450	63.27	0.12	0.63	17.76	17.24	
Locust Ridge	102	MH102A	MH 103A						17.0	4259.6	3.31	57.09	0.00	4.23		1.52	4.99	0.58	84.11	23.55	85.63	103.03	450	61.68	0.12	0.63	17.40	16.89	
Locust Ridge	103	MH 103A	MH 104A						0.0	4259.6	3.31	57.09	0.00	4.23		1.52	4.99	0.02	84.13	23.56	85.64	103.03	450	11.48	0.12	0.63	17.39	16.88	
Locust Ridge	104	MH 104A	MH 105A						0.0	4259.6	3.31	57.09	0.00	4.23		1.52	4.99	0.08	84.21	23.58	85.66	103.03	450	65.88	0.12	0.63	17.37	16.86	
Yellow Birch Street	112B	MH 112A	MH 113A						6.8	6.8	4.00	0.11	0.00	0.00		0.00	0.00	0.18	0.18	0.05	0.16	27.59	200	11.39	0.65	0.85	27.43	99.42	
Yellow Birch Street	113	MH 113A	MH 114A						34.0	40.8	4.00	0.66	0.00	0.00		0.00	0.00	0.42	0.60	0.17	0.83	24.19	200	57.72	0.50	0.75	23.36	96.58	
Yellow Birch Street	114	MH 114A	MH 105A						40.8	81.6	4.00	1.32	0.00	0.00		0.00	0.00	0.53	1.10	0.32	1.64	24.19	200	66.44	0.50	0.75	22.55	93.24	
Yellow Birch Street	105	MH 105A	MH 106A						0.0	4341.2	3.30	58.06	0.00	4.23		0.00	1.52	4.99	0.10	85.44	23.92	86.97	103.03	450	62.56	0.12	0.63	16.06	15.58
Yellow Birch Street	106	MH 106A	STUB						0.0	4341.2	3.30	58.06	0.00	4.23		0.00	1.52	4.99	0.11	85.55	23.95	87.01	103.03	450	48.05	0.12	0.63	16.02	15.55
Refer to DSEL Detail Design for Sanitary Sewer between MH 204A and Stub on Yellow Birch Street																													
Compass Street		MH 204A	MH 205A						0.0	5396.8	3.21	70.27	0.00	4.23		1.52	4.99	0.18	105.60	29.57	104.83	148.80	525	75.68	0.11	0.67	43.97	29.55	
Enclave Walk	301	MH 301A	MH 303A						57.8	57.8	4.00	0.94	0.00	0.00		0.00	0.00	0.82	0.82	0.23	1.17	27.59	200	114.47	0.65	0.85	26.42	95.76	
Enclave Walk	303	MH 303A	MH 304A						3.4	61.2	4.00	0.99	0.00	0.00		0.00	0.00	0.10	0.92	0.26	1.25	24.19	200	38.40	0.50	0.75	22.94	94.84	
Pin Cherry Grove	409	MH 314A	MH 304A						23.8	23.8	4.00	0.39	0.00	0.00		0.00	0.00	0.33	0.33	0.09	0.48	27.59	200	39.96	0.65	0.85	27.11	98.25	
Pin Cherry Grove	304	MH 304A	MH 305A						30.6	115.6	4.00	1.87	0.00	0.00		0.00	0.00	0.42	1.67	0.47	2.34	20.24	200	72.34	0.35	0.62	17.90	88.45	
Enclave Walk	307	MH 307A	MH 308A						20.4	20.4	4.00	0.33	0.00	0.00		0.00	0.00	0.31	0.31	0.09	0.42	27.59	200	65.34	0.65	0.85	27.17	98.49	
Enclave Walk	308	MH 308A	MH 309A						3.4	23.8	4.00	0.39	0.00	0.00		0.00	0.00	0.09	0.40	0.11	0.50	27.59	200	11.33	0.65	0.85	27.09	98.18	
Enclave Walk	309	MH 309A	MH 310A						10.2	34.0	4.00	0.55	0.00	0.00		0.00	0.00	0.31	0.71	0.20	0.75	20.24	200	31.99	0.35	0.62	19.49	96.30	
Enclave Walk	310	MH 310A	MH 311A						13.6	47.6	4.00	0.77	0.00	0.00		0.00	0.00	0.32	1.03	0.29	1.06	20.24	200	30.19	0.35	0.62	19.18	94.77	
Enclave Walk	311	MH 311A	MH 312A						47.6	95.2	4.00	1.54	0.00	0.00		0.00	0.00	1.00	2.03	0.57	2.11	20.24	200	81.91	0.35	0.62	18.13	89.58	
Enclave Walk	312	MH 312A	MH 313A						17.0	112.2	4.00	1.82	0.00	0.00		0.00	0.00	0.32	2.35	0.66	2.48	20.24	200	42.02	0.35	0.62	17.76	87.76	
Enclave Walk	313	MH 313A	MH 305A						6.8	119.0	4.00	1.93	0.00	0.00		0.00	0.00	0.20	2.55	0.71	2.64	20.24	200	28.42	0.35	0.62	17.60	86.94	
Enclave Walk	305	MH 305A	MH 306A						13.6	248.2	4.00	4.02	0.00	0.00		0.00	0.00	0.37	4.59	1.29	5.31	21.64	200	45.01	0.40	0.67	16.33	75.48	
Enclave Walk	306A,306B	MH 306A	MH 205A					0.12	21.4	269.6	4.00	4.37	0.00	0.00		0.00	0.00	0.47	5.06	1.42	5.79	21.64	200	65.82	0.40	0.67	15.85	73.26	
Institutional Block 249	206	MH 206A	MH 205A						0.0	0.0	4.00	0.00	0.79	0.79		0.00	0.69	0.63	0.63	0.18	0.86	24.19	200	14.50	0.50	0.75	23.33	96.44	
Compass Street		MH 205A	MH 411A						0.0	5666.4	3.19	73.32	0.00	5.02		1.52	5.68	0.18	111.47	31.21	110.21	148.80	525	81.85	0.11	0.67	38.59	25.94	
School Block	STUB 2B	MH 406A	MH 408A						0.0	0.0	4.00	0.00	0.00	0.00	5.07	5.07	4.40	5.07	5.07	1.42	5.82	34.22	200	11.93	1.00	1.06	28.40	82.99	
Renaud Road	STUB 2A, 408A-N	MH408A	MH 409A					1.79	153.8	153.8	4.00	2.49	0.00	0.00		5.07	4.40	2.35	7.42	2.08	8.97	21.64	200	120.00	0.40	0.67	12.67	58.56	
Renaud Road	409A-C	MH 409A	MH 410A					0.34	45.9	199.7	4.00	3.24	0.00	0.00		5.07	4.40	0.86	8.28	2.32	9.96	21.64	200	120.00	0.40	0.67	11.68	53.98	
Renaud Road	410A-C	MH 410A	MH 411A					1.08	90.6	290.3	4.00	4.70	0.00	0.00		5.07	4.40	1.39	9.67	2.71	11.81	21.64	200	120.00	0.40	0.67	9.83	45.43	
EXISTING NDC SCHOOL BLOCK	411C	EX MH	MH 411B						0.0	0.0	4.00	0.00	1.98	1.98		0.00	1.72	1.98	1.98	0.55	2.27	48.39	200	16.68	2.00	1.49	46.12	95.30	
EXISTING NDC SCHOOL BLOCK		MH 411B	MH 411A						3.4	3.4	4.00	0.06	2.98	2.98		0.00	2.59	0.00	1.98	0.55	3.20	48.39	200	14.35	2.00	1.49	45.19	93.38	
Renaud Road	412C	MH411A	MH413A						0.0	5960.1	3.17	76.62	0.00	2.98		5.07	6.99	0.29	123.41	34.55	118.16	202.56	600	120.76	0.10	0.69	84.4		

Trails Edge East – Functional Servicing Report

Project #160401250



Prepared for:
Richcraft Group of Companies

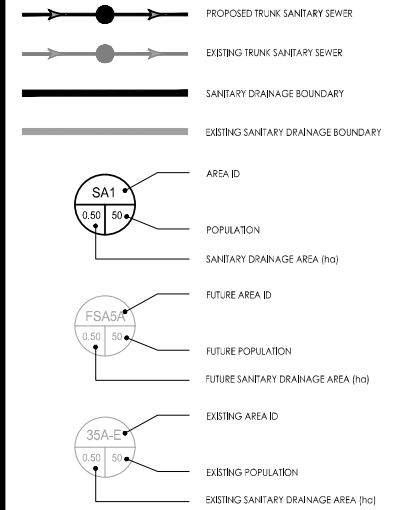
Prepared by:
Stantec Consulting Ltd.

August 11, 2017

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Legend



Notes

2	DRAFT PLAN APPROVAL 2ND SUBMISSION	DT	SG	17.08.11
1	DRAFT PLAN APPROVAL 1ST SUBMISSION	MJS	SG	16.11.02

Revision By Appd. YY.MM.DD

File Name:	160401250.MSS	MJS	SG	MJS	16.10.06
		Dwn.	Chkd.	Dign.	YY.MM.DD

Permit-Seal



Client/Project

RITCHCRAFT GROUP OF COMPANIES
2280 ST. LAURENT BLVD
OTTAWA, ON, K1G 4K1
TRAILSEGE EAST SUBDIVISION

Title

OVERALL SANITARY SEWER SYSTEM

Project No.
160401250

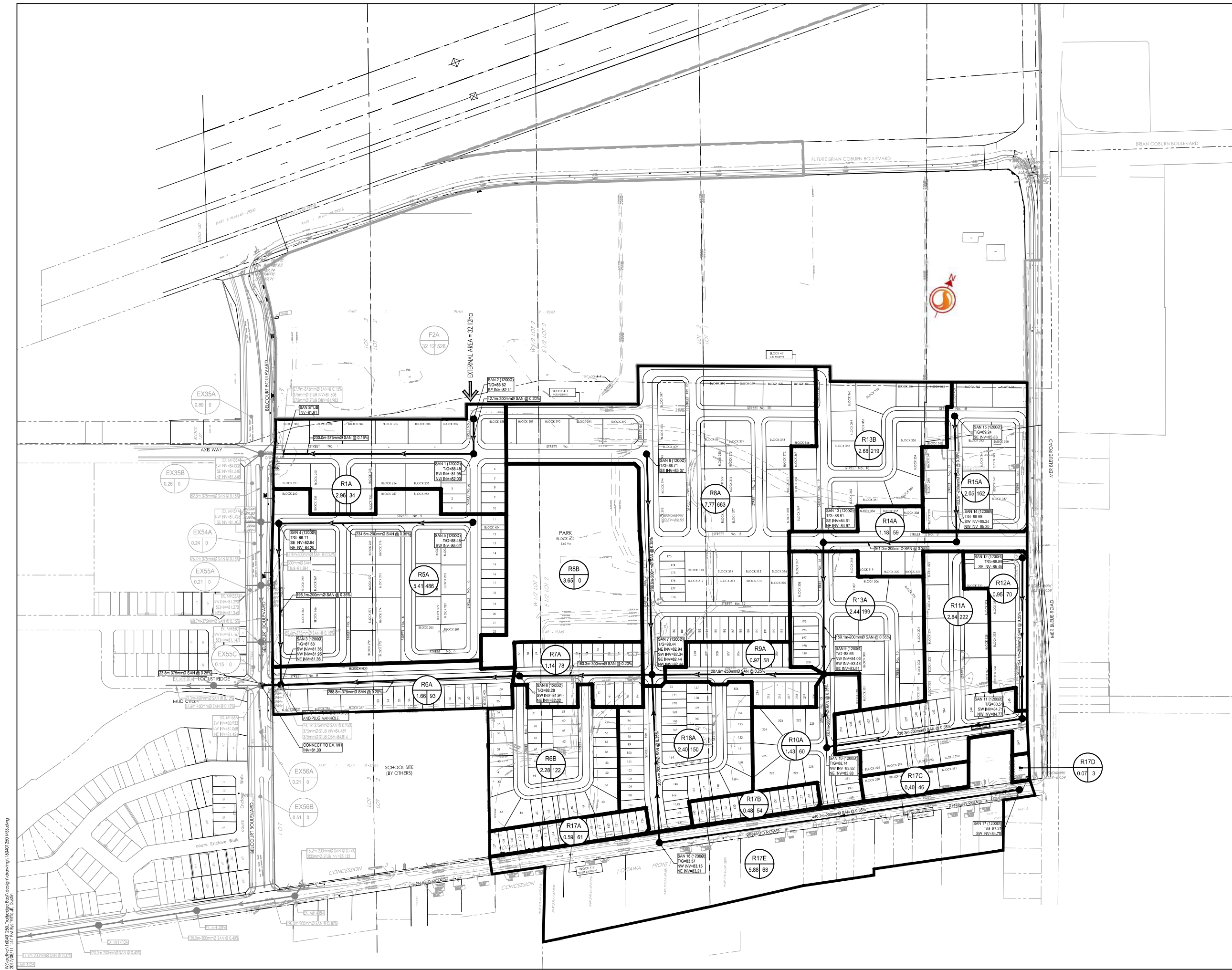
Scale
1:2000

Drawing No.

Sheet 2 of 5
Revision

SAN-1

D74 2



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 2017/08/11 10:47:17 AM



SUBDIVISION:
Trailside East

DATE: 25/7/2017
REVISION: 2
DESIGNED BY: MJS
CHECKED BY: DT

**SANITARY SEWER
DESIGN SHEET**
(City of Ottawa)

FILE NUMBER: 160401250

DESIGN PARAMETERS			
MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	350 l/p/day
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	50,000 l/ha/day
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000 l/ha/day
PEAKING FACTOR (COMM., INST.):	1.5	INDUSTRIAL (LIGHT)	35,000 l/ha/day
PERSONS / SINGLE	3.4	INSTITUTIONAL	50,000 l/ha/day
PERSONS / TOWNHOME	2.7	INFILTRATION	0.28 l/s/ha
PERSONS / APARTMENT	1.8		
		MINIMUM VELOCITY	0.60 m/s
		MAXIMUM VELOCITY	3.00 m/s
		MANNINGS n	0.013
		BEDDING CLASS	B
		MINIMUM COVER	2.50 m

LOCATION		RESIDENTIAL AREA AND POPULATION										COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+H	INFILTRATION			TOTAL	PIPE									
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (ha)	SINGLE	UNITS TOWN	APT	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	FLOW (l/s)	LENGTH (m)	DIA (mm)	MATERIAL	CLASS	SLOPE (%)	CAP. (FULL) (l/s)	CAP. V PEAK FLOW (%)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)	
North Sewer System																																				
F2A	2	1	32.12	0	0	0	1526	32.12	1526	3.67	22.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.12	32.12	9.0	31.7	42.1	300	PVC	SDR 35	0.20	42.9	73.84%	0.61	0.59
R1A	1	N STUB	2.96	10	79	0	247	35.08	1773	3.63	26.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.96	35.08	9.8	35.9	230.0	375	PVC	SDR 35	0.15	62.9	57.06%	0.60	0.53	
South Sewer System																																				
R5A	5	4	5.41	12	165	0	486	5.41	486	3.98	7.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.41	5.41	1.5	9.4	234.6	200	PVC	SDR 35	0.35	19.8	47.29%	0.62	0.52	
	4	3	0.00	0	0	0	0	5.41	486	3.98	7.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.41	5.41	1.5	9.4	195.1	200	PVC	SDR 35	0.35	19.8	47.29%	0.62	0.52
R15A	15	14	2.05	0	60	0	162	2.05	162	4.00	2.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.05	2.05	0.6	3.2	152.9	200	PVC	SDR 35	0.35	19.8	16.18%	0.62	0.38	
R14A	14	13	1.18	0	22	0	59	3.23	221	4.00	3.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	3.23	0.9	4.5	161.0	200	PVC	SDR 35	0.35	19.8	22.71%	0.62	0.42	
R13B, R13A	13	9	5.12	6	147	0	417	8.35	639	3.92	10.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.12	8.35	2.3	12.5	159.1	200	PVC	SDR 35	0.35	19.8	63.06%	0.62	0.57	
R12A	12	11	0.95	0	26	0	70	0.95	70	4.00	1.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.95	0.3	1.4	194.1	200	PVC	SDR 35	0.35	19.8	7.09%	0.62	0.30	
R11A	11	10	2.84	16	62	0	222	3.79	292	4.00	4.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.84	3.79	1.1	5.8	238.3	200	PVC	SDR 35	0.35	19.8	29.28%	0.62	0.45	
R10A	10	9	1.43	13	6	0	60	5.22	352	4.00	5.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43	5.22	1.5	7.2	88.4	200	PVC	SDR 35	0.35	19.8	36.26%	0.62	0.48	
R9A	9	7	0.97	17	0	0	58	14.54	1049	3.79	16.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	14.54	4.1	20.2	207.9	250	PVC	SDR 35	0.25	30.3	66.50%	0.61	0.57	
R7D, R17E, R17A, R17B, R17C	17	16	7.41	55	17	0	233	7.41	233	4.00	3.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.41	7.41	2.1	5.8	440.2	200	PVC	SDR 35	0.35	19.8	29.57%	0.62	0.45	
R16A	16	7	2.40	44	0	0	150	9.81	383	4.00	6.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.40	9.81	2.7	8.9	203.4	200	PVC	SDR 35	0.35	19.8	45.22%	0.62	0.52	
R8A, R8B	8	7	7.77	25	214	0	663	7.77	663	3.91	10.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.43	11.43	3.2	13.7	266.6	200	PVC	SDR 35	0.35	19.8	69.22%	0.62	0.59	
R7A	7	6	1.14	23	0	0	78	33.26	2172	3.56	31.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.14	36.92	10.3	41.6	160.3	300	PVC	SDR 35	0.20	42.9	96.98%	0.61	0.63	
R6B, R6A	6	3	3.95	49	18	0	215	37.21	2388	3.52	34.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.95	40.86	11.4	45.5	288.8	375	PVC	SDR 35	0.20	72.6	62.73%	0.69	0.63	
	3	56A	0.00	0	0	0	0	42.62	2874	3.46	40.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.27	13.0	53.2	23.8	375	PVC	SDR 35	0.25	81.2	65.57%	0.77	0.72	
Existing Sewers																																				
EX35A, EX35B	EX.MH35A	EX.MH54	1.15	0	0	0	0	36.23	1773	3.63	26.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.15	36.23	10.1	36.2	82.3	375	PVC	SDR 35	0.15	67.9	53.30%	0.61	0.54	
EX54A	EX.MH54	EX.MH55A	0.24	0	0	0	0	36.47	1773	3.63	26.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	36.47	10.2	36.3	76.7	375	PVC	SDR 35	0.15	67.9	53.40%	0.61	0.54	
EX55A	EX.MH55A	EX.MH55C	0.21	0	0	0	0	36.68	1773	3.63	26.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	36.68	10.3	36.3	68.7	375	PVC	SDR 35	0.15	67.9	53.48%	0.61	0.54	
EX55C	EX.MH55C	EX.MH56A	0.15	0	0	0	0	36.83	1773	3.63	26.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	36.83	10.3	36.4	52.6	375	PVC	SDR 35	0.15	67.9	53.54%	0.61	0.54	
EX56A, EX56B	EX.MH56A	EX.MH101A	0.72	0	0	0	0	80.17	4647	3.27	61.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.65	0.00	0.72	83.82	23.5	85.1	57.6	450	CONCRETE	100-D	0.12	104.1	81.74%	0.63	0.63	



Trails Edge East Phase 1

Servicing and Stormwater Management
Report

Project # 160401250

August 23, 2018

Prepared for:

Richcraft Group of Companies

Prepared by:

Stantec Consulting Ltd.



SUBDIVISION:
TrailsEdge East
 DATE: 8/23/2018
 REVISION: 2
 DESIGNED BY: MJS/SG
 CHECKED BY: DT/AML

**SANITARY SEWER
 DESIGN SHEET**
 (City of Ottawa)
 FILE NUMBER: 160401250

DESIGN PARAMETERS			
MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	280 l/p/day
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	28,000 l/ha/day
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000 l/ha/day
PEAKING FACTOR (ICI >20%):	1.5	INDUSTRIAL (LIGHT)	35,000 l/ha/day
PERSONS / SINGLE	3.4	INSTITUTIONAL	28,000 l/ha/day
PERSONS / TOWNHOME	2.7	INFILTRATION	0.33 l/s/ha
PERSONS / APARTMENT	1.8		
MINIMUM VELOCITY	0.60 m/s		
MAXIMUM VELOCITY	3.00 m/s		
MANNINGS n	0.013		
BEDDING CLASS	B		
MINIMUM COVER	2.50 m		
HARMON CORRECTION FACTOR	0.8		

Missing 0.23 ha area (14 pop) per sanitary drainage drawing

LOCATION			RESIDENTIAL AREA AND POPULATION									COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+H	INFILTRATION			TOTAL	PIPE									
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (ha)	SINGLE	UNITS TOWN	APT	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	FLOW (l/s)	LENGTH (m)	DIA (mm)	MATERIAL	CLASS	SLOPE (%)	CAP. (FULL) (l/s)	CAP. V. PEAK FLOW (%)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)	
R106B	106	105	0.28	0	12	0	32	0.28	32	3.68	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.28	0.1	0.5	85.6	200	PVC	SDR 35	0.50	23.6	2.03%	0.74	0.24
R105A	105	104	0.03	0	0	0	0.31	32	3.68	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.31	0.1	0.5	10.5	200	PVC	SDR 35	0.50	23.6	2.07%	0.74	0.26	
FUTURE MUC2	Stub	104	29.23	0	0	0	1526	29.23	1526	3.14	15.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.23	29.23	9.6	25.2	20.4	375	PVC	SDR 35	0.15	62.9	40.04%	0.60	0.47	
	104	103	0.00	0	0	0	29.54	1558	3.13	15.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.54	9.7	25.6	41.8	375	PVC	SDR 35	0.15	62.9	40.69%	0.60	0.48	
R107B	107	103	0.41	0	12	0	32	0.41	32	3.68	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.41	0.1	0.5	93.6	200	PVC	SDR 35	0.50	23.6	2.21%	0.74	0.26	
R103A	103	102	0.51	0	10	0	27	30.47	1618	3.12	16.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	30.47	10.1	26.4	84.7	375	PVC	SDR 35	0.15	62.9	42.05%	0.60	0.48	
R102A FUTURE MUC1	102	101	3.11	0	5	0	152	33.58	1769	3.10	17.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.11	33.58	11.1	28.9	85.9	375	PVC	SDR 35	0.15	62.9	45.92%	0.60	0.49	
R101A	101	100	0.46	0	0	0	34.04	1769	3.10	17.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	34.04	11.2	29.0	61.9	375	PVC	SDR 35	0.30	88.9	32.64%	0.84	0.63	
Future Renaud Road	Stub	237	4.94	0	0	0	231	4.94	231	3.50	2.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.94	4.94	1.6	4.3	42.0	200	PVC	SDR 35	0.35	19.8	21.49%	0.62	0.41	
C242A	242	241	0.99	12	0	0	41	0.99	41	3.67	0.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.99	0.3	0.8	104.0	200	PVC	SDR 35	0.65	27.0	3.01%	0.85	0.32	
C241A	241	237	1.45	18	0	0	61	2.44	102	3.59	1.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.45	2.44	0.8	2.0	104.0	200	PVC	SDR 35	0.35	19.8	10.07%	0.62	0.33	
R237A-D	237	236	0.25	4	0	0	14	7.63	347	3.44	3.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	7.63	2.5	6.4	54.7	200	PVC	SDR 35	0.35	19.8	32.27%	0.62	0.47	
R236A	236	235	0.24	5	0	0	17	7.87	364	3.43	4.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	7.87	2.6	6.6	26.9	200	PVC	SDR 35	0.35	19.8	33.58%	0.62	0.47	
R235A	235	206	0.86	17	0	0	58	8.73	421	3.41	4.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.86	8.73	2.9	7.5	120.0	200	PVC	SDR 35	0.35	19.8	38.10%	0.62	0.49	
Phase 2	Stub	218	3.84	38	47	0	256	3.84	256	3.49	2.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.84	3.84	1.3	4.2	19.0	200	PVC	SDR 35	0.50	23.6	17.59%	0.74	0.47	
R107A	107	225	0.43	0	14	0	38	0.43	38	3.67	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.43	0.1	0.6	120.0	200	PVC	SDR 35	0.50	23.6	2.50%	0.74	0.27	
R227A	227	226	0.14	0	5	0	14	0.14	14	3.72	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.14	0.0	0.2	32.0	200	PVC	SDR 35	1.00	33.4	0.62%	1.05	0.26	
R106A	106	226	0.36	0	14	0	38	0.36	38	3.67	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.36	0.1	0.6	120.0	200	PVC	SDR 35	0.50	23.6	2.41%	0.74	0.26	
R226A	226	225	0.18	0	6	0	16	0.68	68	3.63	0.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.68	0.2	1.0	49.3	200	PVC	SDR 35	0.50	23.6	4.31%	0.74	0.31	
R225A	225	224	0.42	0	14	0	38	1.53	143	3.56	1.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	1.53	0.5	2.2	110.5	200	PVC	SDR 35	0.75	29.0	7.44%	0.91	0.44	
Phases 2, 3	Stub	224	10.13	13	279	0	798	10.13	798	3.29	8.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.13	10.13	3.3	11.8	17.8	200	PVC	SDR 35	0.50	23.6	50.09%	0.74	0.64	
G224A	Stub	224	0.00	0	0	0	0	0.00	0	3.80	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.22	2.22	0.7	0.7	18.0	200	PVC	SDR 35	1.10	35.1	2.09%	1.10	0.38		
R224A	224	218	0.35	5	0	0	17	12.01	958	3.25	10.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	14.23	4.7	14.8	79.8	200	PVC	SDR 35	0.50	23.6	62.52%	0.74	0.68	
R218A	218	206	0.16	0	0	0	0	16.01	1214	3.20	12.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	18.23	6.0	18.6	79.0	250	PVC	SDR 35	0.50	42.9	43.35%	0.86	0.71	
R206A	206	205	0.53	11	0	0	37	30.21	1904	3.08	19.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	32.43	10.7	29.7	81.0	300	PVC	SDR 35	0.30	52.6	56.50%	0.75	0.66	
R232B	232	233	0.17	1	0	0	3	0.17	3	3.76	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.17	0.1	0.1	9.5	200	PVC	SDR 35	0.50	23.6	0.42%	0.74	0.16	
R233A	233	234	0.49	9	0	0	31	0.67	34	3.68	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.67	0.2	0.6	68.0	200	PVC	SDR 35	0.50	23.6	2.65%	0.74	0.27	
R234A	234	205	0.25	4	0	0	14	0.92	48	3.66	0.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.92	0.3	0.9	58.0	200	PVC	SDR 35	1.05	34.3	2.53%	1.08	0.39	
R205A	205	204	0.55	11	0	0	37	31.68	1989	3.07	19.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	33.90	11.2	31.0	79.0	300	PVC	SDR 35	0.30	52.6	58.89%	0.75	0.67	
R232A	232	231	0.33	5	0	0	17	0.33	17	3.71	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.33	0.1	0.3	64.4	200	PVC	SDR 35	0.50	23.6	1.33%	0.74	0.21	
R231A	231	230	0.23	1	0	0	3	0.56	20	3.70	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.56	0.2	0.4	11.8	200	PVC	SDR 35	0.50	23.6	1.82%	0.74	0.24	
R230A	230	2																																		



SUBDIVISION:
TrailsEdge East

DATE: 8/23/2018
REVISION: 2
DESIGNED BY: MJS/SG
CHECKED BY: DT/AML

**SANITARY SEWER
DESIGN SHEET**
(City of Ottawa)

FILE NUMBER: 160401250

DESIGN PARAMETERS			
MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	280 l/p/day
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	28,000 l/ha/day
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000 l/ha/day
PEAKING FACTOR (ICI >20%):	1.5	INDUSTRIAL (LIGHT)	35,000 l/ha/day
PERSONS / SINGLE	3.4	INSTITUTIONAL	28,000 l/ha/day
PERSONS / TOWNHOME	2.7	INFILTRATION	0.33 l/s/ha
PERSONS / APARTMENT	1.8		
		MINIMUM VELOCITY	0.60 m/s
		MAXIMUM VELOCITY	3.00 m/s
		MANNINGS n	0.013
		BEDDING CLASS	B
		MINIMUM COVER	2.50 m
		HARMON CORRECTION FACTOR	0.8

LOCATION			RESIDENTIAL AREA AND POPULATION								COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+H	INFILTRATION			TOTAL	PIPE										
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (ha)	SINGLE	UNITS TOWN	APT	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	FLOW (l/s)	LENGTH (m)	DIA (mm)	MATERIAL	CLASS	SLOPE (%)	CAP. (FULL) (l/s)	CAP. V PEAK FLOW (%)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)	
R215A	215	214	0.69	0	24	0	65	0.69	65	3.63	0.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.69	0.2	1.0	90.5	200	PVC	SDR 35	0.50	23.6	4.18%	0.74	0.31
R214A	214	209	0.59	0	22	0	59	1.28	124	3.57	1.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	1.28	0.4	1.9	82.5	200	PVC	SDR 35	0.50	23.6	7.87%	0.74	0.37
R209A	209	208	0.27	0	6	0	16	2.69	232	3.50	2.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	2.69	0.9	3.5	79.0	200	PVC	SDR 35	0.70	28.0	12.58%	0.88	0.50
R239A	239	217	0.80	16	0	0	54	0.80	54	3.65	0.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.80	0.3	0.9	95.6	200	PVC	SDR 35	0.50	23.6	3.83%	0.74	0.29
R217A	217	216	0.68	9	6	0	47	1.48	101	3.59	1.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	1.48	0.5	1.7	103.4	200	PVC	SDR 35	0.50	23.6	7.05%	0.74	0.36
R221A	221	220	0.63	7	10	0	51	0.63	51	3.65	0.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.63	0.2	0.8	83.6	200	PVC	SDR 35	0.50	23.6	3.42%	0.74	0.29
R220A	220	216	0.65	7	12	0	56	1.28	107	3.59	1.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.65	1.28	0.4	1.7	90.3	200	PVC	SDR 35	1.00	33.4	4.98%	1.05	0.46
R216A	216	208	0.25	0	6	0	16	3.01	224	3.50	2.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	3.01	1.0	3.5	79.0	200	PVC	SDR 35	0.40	21.1	16.74%	0.67	0.41
R223A	223	222	0.61	0	22	0	59	0.61	59	3.64	0.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.61	0.2	0.9	81.6	200	PVC	SDR 35	0.50	23.6	3.81%	0.74	0.29
R222A	222	208	0.67	0	24	0	65	1.28	124	3.57	1.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	1.28	0.4	1.9	91.2	200	PVC	SDR 35	0.85	30.8	6.03%	0.97	0.44
R208A	208	202	0.54	0	17	0	46	7.51	627	3.34	6.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	7.51	2.5	9.3	83.7	200	PVC	SDR 35	0.40	21.1	43.78%	0.67	0.55
R202A	202	201	0.86	10	12	0	66	42.36	2823	2.97	27.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.86	44.58	14.7	41.9	120.0	300	PVC	SDR 35	0.30	52.6	79.67%	0.75	0.74
R201A	201	200	0.38	4	6	0	30	42.74	2853	2.97	27.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	44.96	14.8	42.3	30.4	300	PVC	SDR 35	0.30	52.7	80.19%	0.75	0.74
	200	56	0.00	0	0	0	0	42.74	2853	2.97	27.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.96	14.8	42.3	24.1	300	PVC	SDR 35	0.35	56.7	74.59%	0.81	0.77
																												300								

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Legend

- PROPOSED SANITARY SEWER
- SANITARY DRAINAGE AREA ID#
- POPULATION
- SANITARY DRAINAGE AREA ha.
- SANITARY DRAINAGE AREA ho.

Notes

Revision	By	Appd.	Y.M.M.D.D
2	MJS	DT	18.08.23
1	MJS	DT	18.05.30
0	MJS	DT	18.03.06

File Name: 160401250 SA.DWG
 Date: 18.08.23
 Design: MJS
 Check: JP
 Drawn: MJS
 Appd: DT

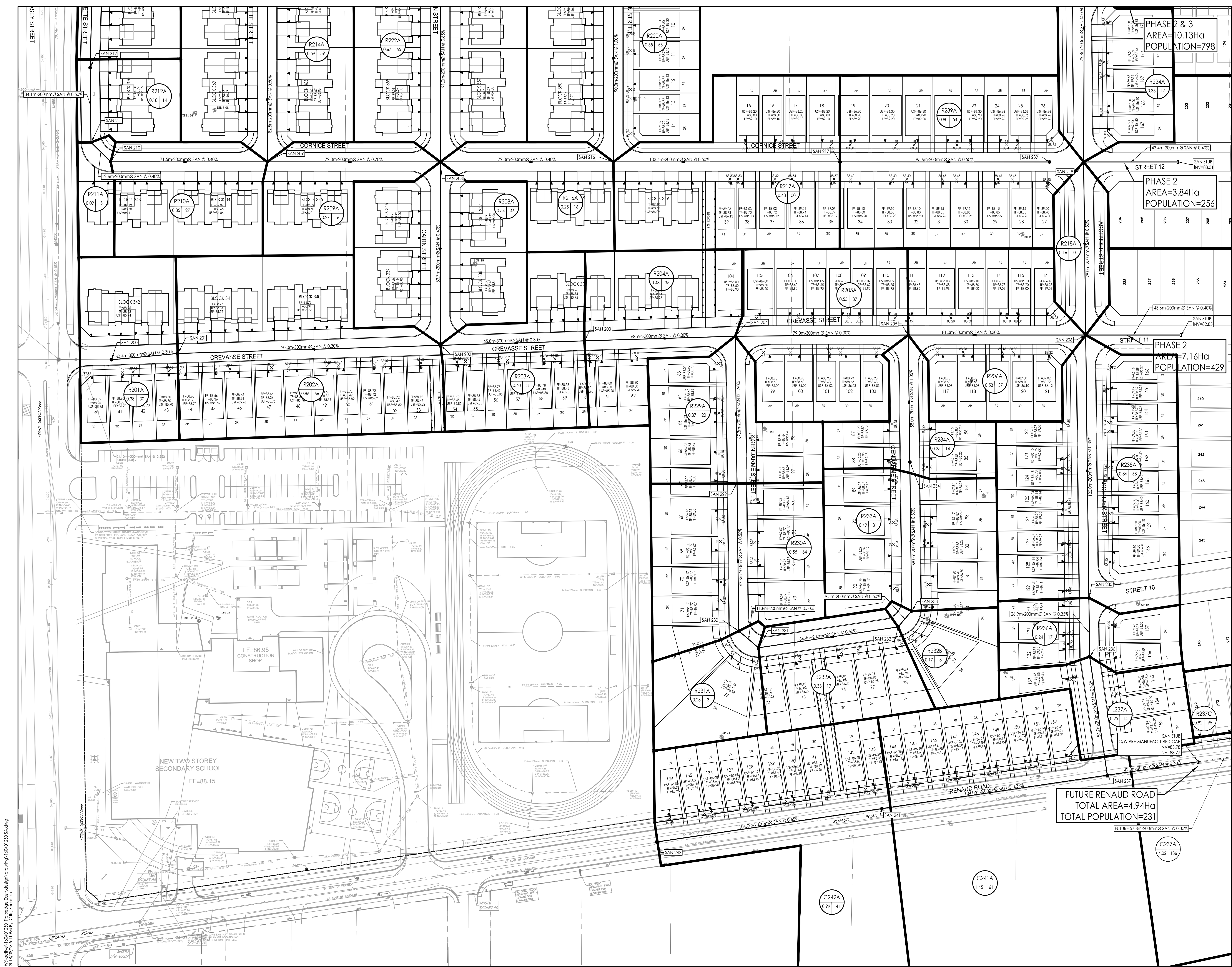
Permit Seal

Client/Project
RICHCRAFT GROUP OF COMPANIES
 2280 ST. LAURENT BLVD
 OTTAWA, ON, K1G 4K1

TRAILSEDGE EAST SUBDIVISION
 OTTAWA, ON, CANADA

Title
SANITARY DRAINAGE PLAN

Project No. 160401250
 Scale 1:750
 Drawing No. SA-2
 Sheet 43 of 44
 Revision 3



W:\active\160401250_Trailsedge East (design drawing) 160401250 SA.dwg
 20180823 11:11 AM by: Chk. Stantec

SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION				COMM		INSTIT		PARK		C+I+I	INFILTRATION			PIPE							
STREET	FROM M.H.	TO M.H.	AREA (ha)	POP.	CUMULATIVE		PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL.	
					AREA (ha)	POP.																	(FULL) (m/s)	(ACT.) (m/s)
South West Sanitary Trunk																								
Mixed Use Block			3.66	528	3.66	528			3.66	3.66			2.22	7.32	7.32									
Mid-High Density Residential			15.19	1535	18.85	2063	3.06	20.46	4.32	7.98			4.85	19.51	26.83									
	301A	302A	2.28	329	21.13	2392	3.02	23.41		7.98			0.43	0.43	4.92	2.71	29.54	9.75	38.08					
To Sanitary By Others					21.13	2392				7.98			0.43			29.54		38.08						
TrailsEdge East per Santec, Aug 2018			1.92	105	23.05	2497	3.01	24.36		7.98			0.43	4.92	1.92	31.46	10.38	39.66						
Total to MH35A					23.05	2497				7.98			0.43			31.46		39.66						

DESIGN PARAMETERS										Designed:		PROJECT:									
Park Flow =	9300	L/ha/da	0.108	Harmon Correction Factor =	0.800	BK		Orleans EUC MUC													
Average Daily Flow =	280	l/p/day		Industrial Peak Factor =	as per MOE Graph	Checked:		City of Ottawa													
Comm/Inst Flow =	35000	L/ha/da	0.405	Extraneous Flow =	0.330 L/s/ha	Dwg. Reference:		File Ref:		14-733	Date:		October, 2018	Sheet No.		1					
Industrial Flow =	35000	L/ha/da	0.405	Minimum Velocity =	0.600 m/s									of		1					
Max Res. Peak Factor =	4.00			Manning's n =	(Conc) 0.013 (Pvc) 0.013																
Commercial/Inst./Park Peak Factor =	1.50	if ICI >20%	1.00	if ICI <20%																	
Mixed Use	28000.00	L/ha/da																			
Institutional =	0.405	l/s/ha																			



DESIGN BRIEF

FOR THE

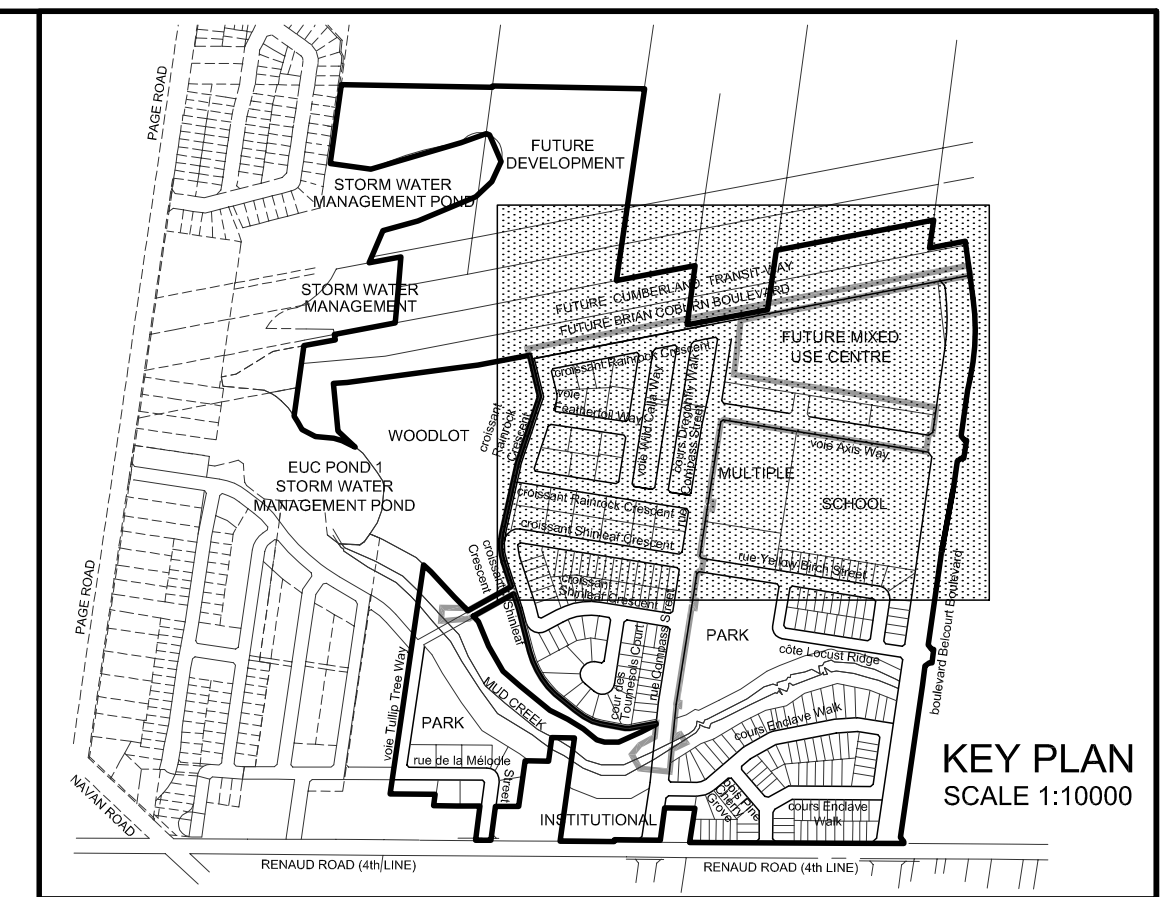
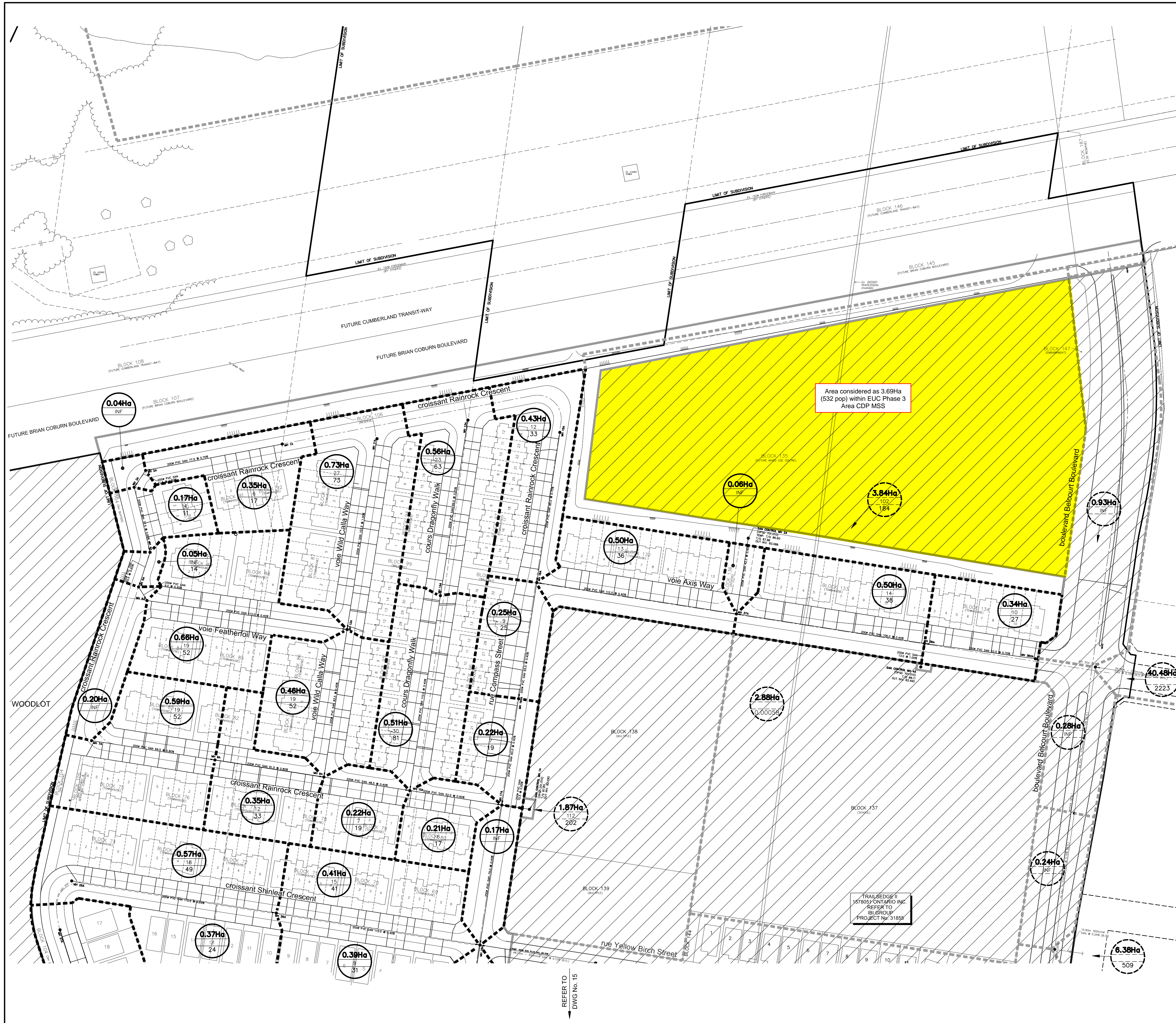
TRAILS EDGE WEST

RICHCRAFT GROUP OF COMPANIES

CITY OF OTTAWA

PROJECT NO.: 12-612

JANUARY 26, 2015
REVISION 3, 3RD SUBMISSION
© DSEL



- LEGEND**
- 0.82Ha
23
62 DRAINAGE AREA IN HECTARES
NUMBER OF UNITS
POPULATION (3.4 PERSON PER UNIT FOR SINGLE HOUSE)
(2.7 PERSON PER UNIT FOR TOWNHOUSE)
 - 10.37Ha
260
884 DRAINAGE AREA IN OTHER PHASES IN HECTARES
NUMBER OF UNITS
POPULATION (3.4 PERSON PER UNIT)
(2.7 PERSON PER UNIT FOR TOWNHOUSE)
 - SANITARY MANHOLE
 - SANITARY MANHOLE IN OTHER PHASES
 - SANITARY SINGLE HOUSE CONNECTION
 - SANITARY SEWER TRIBUTARY BOUNDARY
 - - - SANITARY SEWER TRIBUTARY SUB-CATCHMENT BOUNDARY
 - PHASE LINE
 - ▨ WORKS TO BE COMPLETED BY OTHERS AND OTHER PHASES

TOPOGRAPHIC INFORMATION
 TOPOGRAPHIC INFORMATION PROVIDED BY STANTEC GEOMATICS LIMITED,
 FILE No. 161611903-111, SURVEY DATED AUGUST 2, 2012.

LEGAL INFORMATION
 CALCULATED M-PLAN PROVIDED BY STANTEC GEOMATICS LIMITED,
 JOB No. 161613137-132, RECEIVED ON OCTOBER 30, 2014.
 PRE-SERVICING RE-SUBMISSION 15-01-26

ELEVATION NOTE ELEVATION = 86.708 m

ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM NATIONAL CAPITAL COMMISSION No. 019680227, HAVING AN ELEVATION OF 86.708 m.

No.	BY	DATE	DESCRIPTION	BY
6	Z.L.	15-01-26	PRE-SERVICING RE-SUBMISSION	
5	Z.L.	15-01-15	PRE-SERVICING SUBMISSION	
4	Z.L.	14-10-16	3rd SUBMISSION	
3	Z.L.	14-09-11	2nd SUBMISSION	
2	Z.L.	14-05-16	1st RE-SUBMISSION	
1	Z.L.	12-09-14	1st SUBMISSION	

Ottawa CITY OF OTTAWA

PROJECT No. 12-612

SANITARY DRAINAGE PLAN © DSEL

RICHCRAFT GROUP OF COMPANIES

TRAILS EDGE WEST

DSEL
david schaeffer engineering ltd

120 Ibor Road, Unit 203
Stittsville, ON K2S 1E9
Tel: (613) 836-0556
Fax: (613) 836-7183
www.DSEL.ca

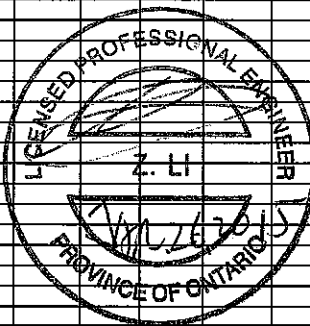
DRAWN BY: M.Z./J.Y.	CHECKED BY: K.M.	DRAWING NO.	SHEET NO.
DESIGNED BY: K.M.	CHECKED BY: Z.L.		14
SCALE: 1:1000	DATE: SEPTEMBER 2012		

SANITARY SEWER CALCULATION SHEET



Manning's n=0.013

STREET	LOCATION		RESIDENTIAL AREA AND POPULATION					PEAK FACT.	PEAK FLOW (l/s)	COMM		INDUST		INSTIT		C+I PEAK FLOW (l/s)	INFILTRATION			PIPE						
	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.			AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)		TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)
Block 136 (Access)																										
Contribution From Block 135 (Fut. Mixed Use Centre)			3.84	102	184	3.84	184										3.84	3.84								
Cont 2A		37A	0.06			3.90	184	4.00	2.98							0.06	3.90	1.092	4.07	42.5	200	0.40	20.74	0.20	0.65	0.51
To voie Axis Way , Pipe 37A - 38A																										
voie Axis Way																										
360A		36A	0.34	10	27	0.34	27	4.00	0.44							0.34	0.34	0.095	0.54	62.5	200	0.70	27.44	0.02	0.87	0.34
Contribution From BLOCK 137 (SCHOOL), Pipe Cont. MH 4A - 36A																										
36A		37A	0.50	14	38	0.84	65	4.00	1.05				2.88	2.88	2.50	0.50	3.72	1.042	2.09	106.0	200	0.40	20.74	0.10	0.66	0.42
Contribution From BLOCK 135 (ACCESS), Pipe 102A - 37A																										
37A		16A	0.50	13	36	5.24	285	4.00	4.62							0.50	8.12	2.274	6.89	112.5	200	0.40	20.74	0.33	0.66	0.59
To rue Compass Street , Pipe 16A - 160A																										
cours Dragonfly Walk																										
13A		14A	0.56	23	63	0.56	63	4.00	1.02							0.56	0.56	0.157	1.18	99.0	200	0.70	27.44	0.04	0.87	0.43
14A		10A	0.51	30	81	1.07	144	4.00	2.33							0.51	1.07	0.300	2.63	110.0	200	0.40	20.74	0.13	0.66	0.45
To croissant Rainrock Crescent , Pipe 10A - 17A																										
croissant Rainrock Crescent																										
15A		16A	0.43	12	33	0.43	33	4.00	0.53							0.43	0.43	0.120	0.65	85.0	200	0.70	27.44	0.02	0.87	0.36
To rue Compass Street , Pipe 16A - 160A																										
1A		2A	0.35	6	17	0.35	17	4.00	0.28							0.35	0.35	0.098	0.38	77.5	200	0.70	27.44	0.01	0.87	0.30
2A		3A	0.04			0.39	17	4.00	0.28							0.04	0.39	0.109	0.39	11.5	200	0.50	23.19	0.02	0.74	0.28
3A		4A	0.17	4	11	0.56	28	4.00	0.45							0.17	0.56	0.157	0.61	37.5	200	0.60	25.41	0.02	0.81	0.34
4A		5A	0.05			0.61	28	4.00	0.45							0.05	0.61	0.171	0.62	20.5	200	0.60	25.41	0.02	0.81	0.34
To voie Featherfoil Way , Pipe 5A - 6A																										
7A		8A	0.59	19	52	0.59	52	4.00	0.84							0.59	0.59	0.165	1.01	69.5	200	0.80	29.34	0.03	0.93	0.43
8A		9A	0.35	12	33	0.94	85	4.00	1.38							0.35	0.94	0.263	1.64	61.5	200	0.80	29.34	0.06	0.93	0.50
Contribution From voie Wild Calla Way, Pipe 12A - 9A																										
8A		10A	0.22	7	19	3.72	298	4.00	4.83							0.22	3.72	1.042	5.87	48.5	200	0.40	20.74	0.28	0.66	0.56
Contribution From cours Dragonfly Walk, Pipe 14A - 10A																										
10A		17A	0.21	6	17	1.07	144									0.21	5.00	1.400	1.40	52.0	200	0.90	31.12	0.04	0.99	0.49
To rue Compass Street , Pipe 17A - 18A																										
voie Featherfoil Way																										
Contribution From croissant Rainrock Crescent, Pipe 4A - 5A																										
5A		6A	0.20			0.81	28	4.00	0.45							0.20	0.81	0.227	0.68	9.0	200	0.40	20.74	0.03	0.66	0.30
6A		12A	0.56	15	41	1.37	69	4.00	1.12							0.56	1.37	0.384	1.50	113.0	200	0.40	20.74	0.07	0.66	0.38
To voie Wild Calla Way , Pipe 12A - 9A																										
voie Wild Calla Way																										
11A		12A	0.73	27	73	0.73	73	4.00	1.18							0.73	0.73	0.204	1.38	107.5	200	1.00	32.80	0.04	1.04	0.50



DESIGN PARAMETERS Average Daily Flow = 350 l/p/day Commercial/Institution Flow = 50000 L/ha/da Industrial Flow = 35000 L/ha/da Max Res. Peak Factor = 4.00 Commercial/Institution peak Factor = 1.50 Park Average Flow = 9300 L/ha/da Industrial Peak Factor = as per MOE Graph Extraneous Flow = 0.280 L/s/ha Minimum Velocity = 0.60 m/s Manning's n = 0.013 Townhouse coeff = 2.7 Single house coeff = 3.4										Designed: K.M. Checked: Z.L. Dwg. Reference: Sanitary Drainage Plan, Dwg. No. 14, 15, & 16					PROJECT: TRAILS EDGE WEST LOCATION: City of Ottawa File Ref: 12-612 Date: January, 2015 Sheet No. 1 of 2				
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SANITARY SEWER CALCULATION SHEET

CLIENT:
 LOCATION: **14-733-South West Quadrant**
 FILE REF:
 DATE: **22-Jun-18**

DESIGN PARAMETERS

Avg. Daily Flow Res.	350 L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0	Infiltration / Inflow	0.28 L/s/ha	
Avg. Daily Flow Comm	50,000 L/ha/d	Peak Fact. Comm.	1.5	Min. Pipe Velocity	0.60 m/s full flowing
Avg. Daily Flow Instit.	50,000 L/ha/d	Peak Fact. Instit.	1.5	Max. Pipe Velocity	3.00 m/s full flowing
Avg. Daily Flow Indust.	35,000 L/ha/d	Peak Fact. Indust. per MOE graph	Mannings N	0.013	

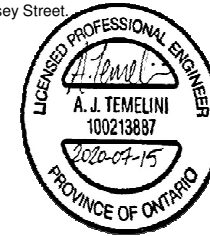


Location			Residential Area and Population										Commercial		Institutional		Park		Infiltration				Pipe Data				
Area ID	Up	Down	Area	Number of Units				Pop.	Cumulative	Peak.	Q _{res}	Area	Accu.	Area	Accu.	Area	Accu.	Q _{C+I+I}	Total	Accu.	Infiltration	Total	DIA	Slope	Length	Q _{cap}	Q / Q full
			(ha)	Singles	Semi's	Town's	Apt's		(ha)	Pop.	(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(L/s)	(-)	
DSEL Trails Edge West*	160A	17A	5.990**					710***	5.990	710.0	3.89	11.19		0.00	2.88	2.88	2.5	8.870	8.870	2.484	16.17	200	0.40	60.0	20.7	0.78	
Constraining point of downstream sewer network.																											

* Analysis done at constraining segment of downstream sewer network (ie smallest amount of residual flow (in L/s) available).

** 6.14 ha from Trails Edge West design sheet subtracted by the 0.15 ha to account for the difference in area between the Trails Edge West and EUC Phase 3 Area CDP MSS assumptions for the portion of the SW quadrant west of Fern Casey Street.

*** 362 pop from Trails Edge West design sheet combined with an additional 348 pop to account for the difference in population between the Trails Edge West and EUC Phase 3 Area CDP MSS assumptions for the portion of the SW quadrant west of Fern Casey Street.



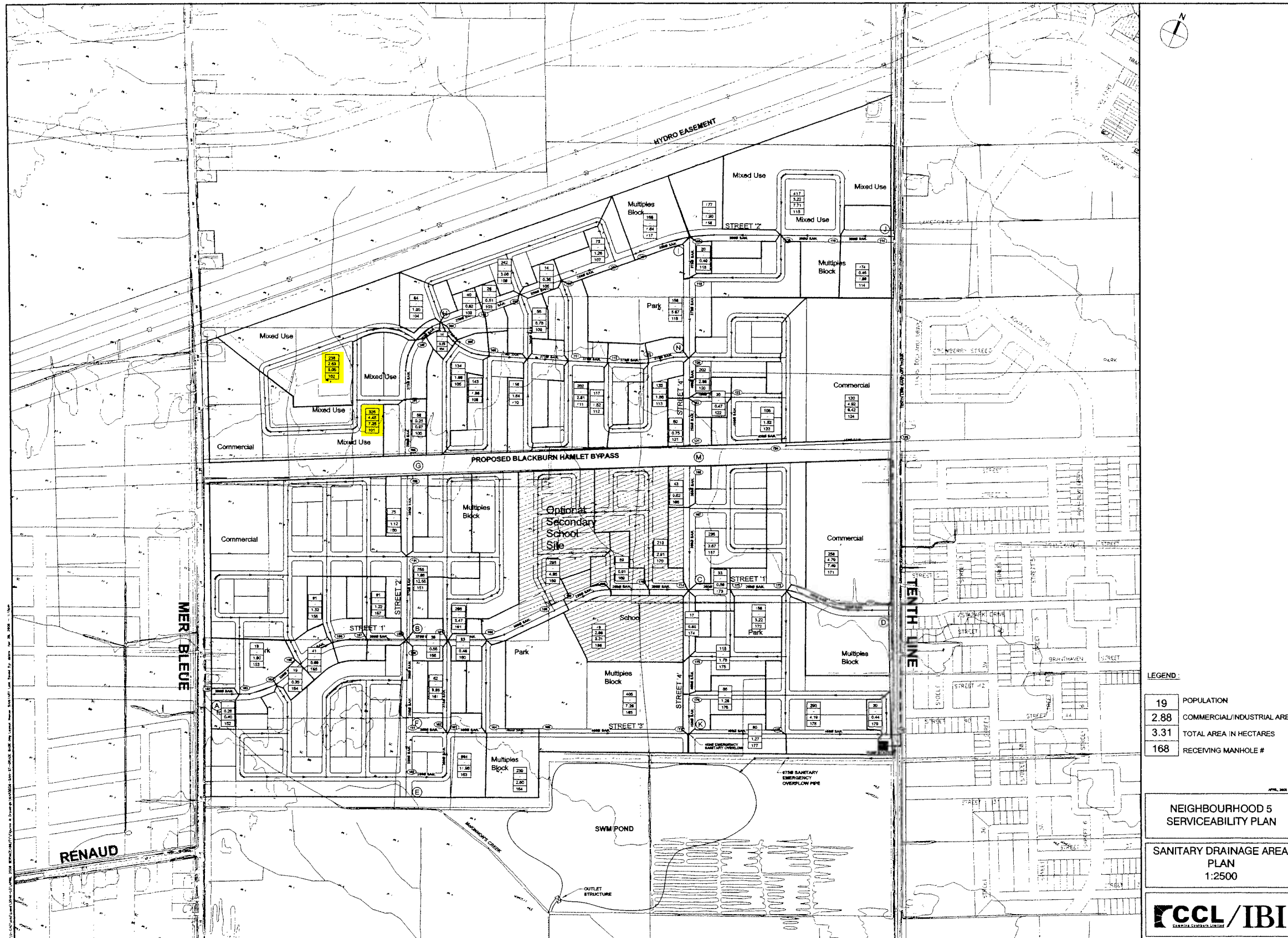


MER BLEUE COMMUNITY DESIGN PLAN INFRASTRUCTURE SERVICING STUDY

Prepared for
C. FLEMING DEVELOPMENTS, TAGGART REALTY,
AND MINTO DEVELOPMENTS

3546-LD
APRIL, 2006





LOCATION			INDIVIDUAL								CUM. RES. FLOW			CUM. COM. & INST. FLOW			INFILTRATION			TOTAL	PROPOSED SEWER						AREA
STREET	FROM MH	TO MH	RES AREA (Ha)	POP	MIXED AREA (Ha)	POP	MULTI AREA (Ha)	POP	TOTAL POP	COMM INST	POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (Ha)	PEAK FACT.	PEAK FLOW (l/s)	INCR. AREA (Ha)	CUM. AREA (Ha)	FLOW (l/s)	DESIGN FLOW (l/s)	CAP. l/s	PIPE (mm)	LGTH. (m)	SLOPE %	VEL. (full) m/s	AVAIL. CAP. (%)	AREA ID
G - H	100	101	0.34	33.5	0.09	24.3			57.8	0.25	57.8	4.00	0.95	0.25	1.50	0.22	0.97	0.97	0.27	1.44	39.22	250	105.1	0.40	0.77	96.33%	20,64d
	101	102	0.38	37.5	1.07	288.9			326.4	4.45	384.2	4.00	6.30	4.70	1.50	4.09	7.25	8.22	2.30	12.69	70.80	375	125.5	0.15	0.62	82.07%	20, 64a,64c,64d,64e,l
	102	104			0.88	237.6			237.6	2.63	621.8	3.92	10.00	7.33	1.50	6.38	5.05	13.27	3.72	20.10	70.80	375	64.2	0.15	0.62	71.62%	64b,64f
I - H	103	104	0.41	40.4					40.4		40.4	4.00	0.66		1.50		0.62	0.62	0.17	0.84	62.02	250	85.9	1.00	1.22	98.65%	2,3
H - N	104	105	0.99	97.6					97.6		759.8	3.87	12.07	7.33	1.50	6.38	1.25	15.14	4.24	22.68	70.80	375	58.4	0.15	0.62	67.96%	1,2,20
	105	106	1.36	134.1					134.1		893.9	3.83	14.04	7.33	1.50	6.38	1.88	17.02	4.77	25.18	70.80	375	62.2	0.15	0.62	64.43%	3,19,20
	106	110	1.45	143.0					143.0		1036.9	3.79	16.11	7.33	1.50	6.38	1.98	19.00	5.32	27.81	70.80	375	80.6	0.15	0.62	60.72%	3,18,19
H - I	103	109	0.28	27.6					27.6		27.6	4.00	0.45		1.50		0.51	0.51	0.14	0.60	62.02	250	83.0	1.00	1.22	99.04%	2,3
I - H	107	108	0.74	73.0					73.0		73.0	4.00	1.20		1.50		1.26	1.26	0.35	1.55	39.22	250	114.4	0.40	0.77	96.05%	1,7
	108	109	0.14	13.8					13.8		86.8	4.00	1.42		1.50		0.38	1.64	0.46	1.88	39.22	250	85.6	0.40	0.77	95.20%	7
	109	110	3.01	296.8					296.8		411.2	4.00	6.74		1.50		3.86	6.01	1.68	8.43	55.24	300	125.0	0.30	0.76	84.75%	1,2,3,4,7
H - N	110	111	1.20	118.3					118.3		1566.4	3.67	23.54	7.33	1.50	6.38	1.64	26.65	7.46	37.38	70.80	375	80.6	0.15	0.62	47.20%	4,17,18
	111	112	2.05	202.1					202.1		1768.5	3.63	26.30	7.33	1.50	6.38	2.81	29.46	8.25	40.92	70.80	375	80.8	0.15	0.62	42.20%	4,5,6,14,17
	112	113	1.19	117.3					117.3		1885.8	3.61	27.88	7.33	1.50	6.38	1.52	30.98	8.67	42.93	70.80	375	80.3	0.15	0.62	39.37%	6,14,15
	113	120	1.35	133.1					133.1		2019.0	3.58	29.66	7.33	1.50	6.38	1.86	32.84	9.20	45.23	70.80	375	85.5	0.15	0.62	36.12%	6,14,15
H - I	117	118					1.36	165.2	165.2		165.2	4.00	2.71		1.50		1.64	1.64	0.46	3.17	55.48	250	114.6	0.80	1.10	94.29%	A
J - I	114	115			0.15	40.5	1.10	133.7	174.2	0.45	174.2	4.00	2.86	0.45	1.50	0.39	1.89	1.89	0.53	3.78	55.24	300	100.2	0.30	0.76	93.16%	65c,N
	115	116			1.10	297.0	0.99	120.3	417.3	3.32	591.4	3.94	9.54	3.77	1.50	3.28	7.71	9.60	2.69	15.51	55.24	300	117.3	0.30	0.76	71.92%	65a,65b,65c,N
	116	118	0.32	31.6			1.20	145.8	177.4		768.8	3.87	12.20	3.77	1.50	3.28	1.90	11.50	3.22	18.70	55.24	300	183.2	0.30	0.76	66.14%	66,A
I - N	118	119	0.20	19.7					19.7		953.7	3.81	14.91	3.77	1.50	3.28	0.40	13.54	3.79	21.98	81.86	375	81.9	0.20	0.72	73.15%	66
	119	120	1.71	168.6					168.6		1122.4	3.77	17.33	3.77	1.50	3.28	5.67	19.21	5.38	25.99	81.86	375	160.0	0.20	0.72	68.25%	9,66,67,L
N - M	120	122	2.05	202.1					202.1		3343.4	3.40	46.63	11.10	1.50	9.66	2.98	55.03	15.41	71.70	105.24	450	80.5	0.125	0.64	31.87%	9,10,11,14
M - N	121	122	0.61	60.1					60.1		60.1	4.00	0.99		1.50		0.75	0.75	0.21	1.20	39.22	250	95.3	0.40	0.77	96.95%	13,14
	122	123	0.30	29.6					29.6		3433.2	3.39	47.75	11.10	1.50	9.66	0.47	56.25	15.75	73.15	105.24	450	100.0	0.125	0.64	30.49%	11,13
	123	124	1.06	104.5					104.5		3537.7	3.38	49.03	11.10	1.50	9.66	1.52	57.77	16.18	74.87	105.24	450	80.0	0.125	0.64	28.86%	11,12,13
	124	125	1.22	120.3					120.3	4.92	3658.0	3.37	50.51	16.02	1.50	13.94	6.42	64.19	17.97	82.42	105.24	450	85.0	0.125	0.64	21.68%	9,11,F

Average daily residential flow = 350 l/cap/day
 Residential peaking factor = $1+(14/(4+P^{0.5}))$, where P = population in thousands
 Commercial, Office and School average daily flow = 50,000 l/ha/day
 Commercial, Office and School peaking factor = 1.5
 Extraneous flow = 0.28 l/s/ha

RESIDENTIAL POPULATION DENSITIES

Residential = 29 units/net hectare with 3.4 persons/unit = 98.6 persons/net hectare
 Mixed Use = 100 units/net hectare with 2.7 persons/unit = 270 persons/net hectare
 Multiple = 45 units/net hectare with 2.7 persons/unit = 121.5 persons/net hectare

LOCATION			INDIVIDUAL								CUM. RES. FLOW			CUM. COM. & INST. FLOW			INFILTRATION			TOTAL DESIGN FLOW (l/s)	PROPOSED SEWER					AREA ID	
STREET	FROM MH	TO MH	RES AREA (Ha)	POP	MIXED AREA (Ha)	POP	MULTI AREA (Ha)	POP	TOTAL POP	COMM INST	POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (Ha)	PEAK FACT.	PEAK FLOW (l/s)	INCR. AREA (Ha)	CUM. AREA (Ha)	FLOW (l/s)		CAP. l/s	PIPE (mm)	LGTH. (m)	SLOPE %	VEL. (full) m/s		AVAIL. CAP. (%)
G - B	150	151	0.76	74.9					74.9		74.9	4.00	1.23		1.50		1.12	1.12	0.31	1.54	55.24	300	158.6	0.30	0.76	97.21%	26,27
	151	158	6.88	678.4			0.63	76.5	754.9	1.68	829.8	3.85	13.10	1.68	1.50	1.46	12.55	13.67	3.83	18.39	70.80	375	166.4	0.15	0.62	74.02%	8,16,23,24,25,26,27,28,29,32,33,34,46,47,B,H
A - B	152	153								0.28				0.28	1.50	0.24	0.40	0.40	0.11	0.36	43.88	250	51.0	0.50	0.87	99.19%	J
	153	154	0.19	18.7					18.7		18.7	4.00	0.31	0.28	1.50	0.24	1.80	2.20	0.62	1.17	39.22	250	77.0	0.40	0.77	97.02%	48,M
	154	155	0.19	18.7					18.7		37.5	4.00	0.61	0.28	1.50	0.24	0.35	2.55	0.71	1.57	55.24	300	65.4	0.30	0.76	97.15%	22
	155	156	0.42	41.4					41.4		78.9	4.00	1.29	0.28	1.50	0.24	0.69	3.24	0.91	2.44	55.24	300	78.0	0.30	0.76	95.57%	22,29
	156	157	0.92	90.7					90.7		169.6	4.00	2.78	0.28	1.50	0.24	1.32	4.56	1.28	4.30	55.24	300	65.8	0.30	0.76	92.21%	8,22,29
	157	158	0.82	80.9					80.9		250.4	4.00	4.11	0.28	1.50	0.24	1.22	5.78	1.62	5.97	55.24	300	82.3	0.30	0.76	89.19%	8,16,22
B - C	158	161	0.40	39.4					39.4		1119.7	3.77	17.30	1.96	1.50	1.71	0.55	20.00	5.60	24.60	70.80	375	82.3	0.15	0.62	65.25%	30,32
C - B	159	160	2.99	294.8					294.8		294.8	4.00	4.83		1.50		4.55	4.55	1.27	6.11	39.22	250	148.2	0.40	0.77	84.42%	34,35,36,37,45,45a
	160	161	0.33	32.5					32.5		327.4	4.00	5.37		1.50		0.46	5.01	1.40	6.77	39.22	250	78.5	0.40	0.77	82.73%	34,49
	161	163	2.55	251.4			0.63	76.5	328.0		1775.1	3.63	26.39	1.96	1.50	1.71	4.40	29.41	8.23	36.33	70.80	375	185.0	0.15	0.62	48.69%	30,32,33,34,49,B
F - K	163	164	7.73	762.2			0.84	102.1	864.2		2639.3	3.49	37.76	1.96	1.50	1.71	11.98	41.39	11.59	51.05	105.24	450	78.5	0.125	0.64	51.49%	21,22,30,48,49,50,51,52,53,54,55,D
	164	165	0.80	78.9			1.32	160.4	239.3		2878.6	3.46	40.81	1.96	1.50	1.71	2.60	43.99	12.32	54.83	105.24	450	106.8	0.125	0.64	47.90%	58,49,D,O
	165	177	0.87	85.8			2.63	319.5	405.3		3283.9	3.41	45.90	1.96	1.50	1.71	7.26	51.25	14.35	61.95	105.24	450	301.4	0.125	0.64	41.13%	31,58,C
M - C	166	167	0.44	43.4					43.4		43.4	4.00	0.71		1.50		0.62	0.62	0.17	0.89	39.22	250	81.1	0.40	0.77	97.74%	39,40
	167	174	2.39	235.7					235.7		279.0	4.00	4.58		1.50		3.67	4.29	1.20	5.78	55.24	300	162.3	0.30	0.76	89.54%	39,40,41,42,43
B - C	168	169	0.19	18.7					18.7	2.88	18.7	4.00	0.31	2.88	1.50	2.51	3.31	3.31	0.93	3.74	39.22	250	75.4	0.40	0.77	90.46%	45a,K
	169	170	0.60	59.2					59.2		77.9	4.00	1.28	2.88	1.50	2.51	0.91	4.22	1.18	4.96	39.22	250	78.5	0.40	0.77	87.34%	45,45a
	170	174	2.16	213.0					213.0		290.9	4.00	4.77	2.88	1.50	2.51	2.91	7.13	2.00	9.27	76.01	250	82.3	1.50	1.50	87.80%	37,38,39,40
D - C	171	172					2.13	258.8	258.8	4.79	258.8	4.00	4.24	4.79	1.50	4.17	7.49	7.49	2.10	10.51	39.22	250	181.0	0.40	0.77	73.21%	E,G
	172	173	1.60	157.8					157.8		416.6	4.00	6.83	4.79	1.50	4.17	3.22	10.71	3.00	14.00	39.22	250	111.9	0.40	0.77	64.31%	41,42,43,44,P
	173	174	0.33	32.5					32.5		449.1	4.00	7.36	4.79	1.50	4.17	0.59	11.30	3.16	14.69	55.24	300	82.2	0.30	0.76	73.40%	43,59
C - K	174	175	0.17	16.8					16.8		1035.8	3.79	16.10	7.67	1.50	6.67	0.50	23.22	6.50	29.27	105.24	450	135.2	0.125	0.64	72.19%	59
	175	176	1.17	115.4					115.4		1151.1	3.76	17.74	7.67	1.50	6.67	1.78	25.00	7.00	31.42	105.24	450	77.5	0.125	0.64	70.15%	57,59,60
	176	177	0.89	87.8					87.8		1238.9	3.74	18.99	7.67	1.50	6.67	1.28	26.28	7.36	33.02	105.24	450	76.9	0.125	0.64	68.62%	56,60
K - L	177	178	0.91	89.7					89.7		4612.5	3.28	61.98	9.63	1.50	8.38	1.27	78.80	22.06	92.42	105.24	450	193.7	0.125	0.64	12.18%	56,63
	178	179	3.14	309.6					309.6		4922.1	3.25	65.61	9.63	1.50	8.38	4.63	83.43	23.36	97.35	105.24	450	215.0	0.125	0.64	7.49%	56,60,61,62,63

Average daily residential flow = 350 l/cap/day
 Residential peaking factor = $1+(14/(4+P^{0.5}))$, where P = population in thousands
 Commercial, Office and School average daily flow = 50,000 l/ha/day
 Commercial, Office and School peaking factor = 1.5
 Extraneous flow = 0.28 l/s/ha

RESIDENTIAL POPULATION DENSITIES

Residential = 29 units/net hectare with 3.4 persons/unit = 98.6 persons/net hectare
 Mixed Use = 100 units/net hectare with 2.7 persons/unit = 270 persons/net hectare
 Multiple = 45 units/net hectare with 2.7 persons/unit = 121.5 persons/net hectare

SANITARY SEWER CALCULATION SHEET

CLIENT:
 LOCATION:
 FILE REF: **14-733-SE Quadrant**
 DATE: **22-Jun-18**

DESIGN PARAMETERS

Avg. Daily Flow Res.	350 L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0	Infiltration / Inflow	0.28 L/s/ha	
Avg. Daily Flow Comm	50,000 L/ha/d	Peak Fact. Comm.	1.5	Min. Pipe Velocity	0.60 m/s full flowing
Avg. Daily Flow Instit.	50,000 L/ha/d	Peak Fact. Instit.	1.5	Max. Pipe Velocity	3.00 m/s full flowing
Avg. Daily Flow Indust.	35,000 L/ha/d	Peak Fact. Indust. per MOE graph		Mannings N	0.013



Location			Residential Area and Population							Commercial		Institutional		Industrial		Infiltration				Pipe Data							
Area ID	Up	Down	Area	Number of Units			Pop.	Cumulative	Peak	Q _{res}	Area	Accu.	Area	Accu.	Area	Accu.	Q _{CHH}	Total	Accu.	Infiltration	Total	DIA	Slope	Length	Q _{cap}	Q / Q full	
				by type	Area	Pop.																					Fact.
			(ha)	Singles	Semi's	Town's	Apt's	(ha)	Pop.	(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(L/s)	(-)	
Mer Bleue CDP ISS North Allowance			2.420					238.0	2.420	238.0	3.92	3.78	2.63	2.63			2.3	5.050	5.050	1.414	7.48						
											*Per Mer Bleue CDP ISS																
Mer Bleue CDP ISS South Allowance			2.800					326.0	2.800	326.0	4.00	5.28	4.45	4.45			3.9	7.250	7.250	2.030	11.18						





Orleans Family Health Hub

Stormwater Management & Servicing Report

Type of Document:
Site Plan Application

Project Name:
Orleans Family Health Hub (OFHH)

Project Number
OTT-00240132-A0

Prepared By:
exp Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 8H6
Canada

Date Submitted
April 5, 2018

Gerry Lalonde Dr. (ground Elevation = 88.43m):

Maximum HGL = 130.4m

Peak Hour HGL = 125.7 m

Max Day (8 L/s) + Fire Flow (32L/s) = 126.8m

Based on the HGL for max day + fire flow, a pressure analysis was performed to calculate the residual pressure at the building. Based in these calculations residual pressure of 52 psi (358kPa) was estimated for the connection off Brian Coburn Blvd and 50.7 psi (349 kPa) for the connection off Gerry Lalonde Drive. Refer to Appendix B for calculations. The estimated residual water pressure is greater than the minimum requirement of 20psi (140kPa) as per the City of Ottawa Design Guidelines. Therefore, the existing municipal water supply system will have adequate capacity to meet the domestic and fire demands for the proposed development.

4 Sanitary Sewer Design

The development will be serviced by a new 200mm sanitary service which will be connected to the existing 375mm diameter sewer main on Gerry Lalonde Drive. A 200mm diameter sanitary stub will be also provided to service the future development towards the north of the property.

The design flows of the site have been determined as follows: Design Flow for

Commercial Use: 50,000 L/day/ha or 0.5787 L/s/ha

Peaking Factor: 1.5

Site Area: 9.16 hectares

Extraneous Flow: 0.28 L/s/ha

Peak Design Flow: = $(0.5787\text{L/s/ha})(9.16\text{ha})(1.5) + (9.16\text{ha})(0.28\text{L/s/ha})$
= **7.9 L/s**

The proposed on-site sanitary sewer will be installed at a minimum grade of 0.5%. At this slope, a 200 mm diameter sanitary sewer has a capacity of 23 L/s and a full flow velocity of 0.74 m/s. The proposed sanitary sewer will therefore have sufficient capacity to service the site.

The sanitary sewer system was designed to accommodate flows from future development on the property on the north side of the site. The flows from the site will ultimately drain to the Tenth Line Sanitary Trunk Sewer and Pump Station.



- **Taggart Group of Companies**

Infrastructure Servicing Brief

Type of Document

Issued for Site Plan Application

Project Name

Chaperal – Site Plan

Project Number

2762

Prepared By:

exp Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 8H6
Canada

Date Submitted

February 22, 2013
August 22, 2013 – Revision 1
October 8, 2013 – Revision 2
November 20, 2013 – Revision 3

3 Sanitary Sewer Design

Sanitary sewer flows for this development have been calculated based on the City of Ottawa criteria indicated in the Ottawa Design Guidelines (Section 4). Refer to Appendix 3 for the sanitary sewer design sheet (Table 3.1) and drainage area plan 2762-SAN1. The design criteria for this development are as follows:

- Average residential flow 350 l/cap/day
- Peaking factor for residential flow (Harmon formula) $1+(14/(4+(P/1000)^{1/2}))*K$
- (max. = 4.0, min. = 2.0, P = population in 1000's, K=1)
- Extraneous flow allowance 0.28 l/ha/sec
- Population density for single family units 3.4 persons/unit
- Population density for town-home units 2.7 persons/unit
- Mixed Use lands 25% Res. 75% Comm.
- Undeveloped land 60 persons/gross ha.
- Minimum full flow velocity 0.60 m/sec
- Maximum velocity 3.0 m/sec
- Minimum pipe size 200 mm
- If 10 or fewer units are tributary to a sewer, then a 200 mm diameter sewer at a minimum grade of 0.65% shall be used.

Sanitary sewers for the development will connect to an extension of the existing 305mm diameter sanitary sewer previously approved and constructed within the adjacent pathway block to the north during the construction of Chaperal Phase 4. The sanitary sewer system has been designed and constructed to accommodate flows from future development in the areas north of the Brian Coburn Boulevard. The design sheet provided in support of the site plan is an extension of the previous Chaperal Phase 4 sanitary design with required adjustments to demonstrate the site specifics of the site plan development. The flows ultimately drain to the Tenth Line Sanitary Trunk sewer and Pumping Station.

The allowable flow from the Block 20 development area is derived from the “Appendix 1 – Sanitary Sewer Design” sheet provided in the IBI Community Design Plan infrastructure Servicing Study. A marked up excerpt from the design sheet and the associated plan is provided in Appendix 3. The “Block 20” area (1.19 ha) is split between the IBI catchment areas represented by “MH100 to MH101” and “MH101 to MH102” and the allowable flow is summarized as follows:

“MH100 to MH101” - Residential Area = 0.11ha (98.6 person/ha)
 “MH101 to MH102” - Mixed Use Area = 1.07 ha (270 persons/ha)
 Population = $(0.11)(98.6) + (1.07)(270) = 300$ persons
 Allowable flow = $(300 \times 350 \times 4) / 86400 = 1.19 \times 0.28 = 5.19$ L/s

- Peak Population Flow (l/s) = Cumulative Population x 350 l/person/day x Peaking Factor / 86400 sec/day
- Peak Extraneous Flow (l/s) = Cumulative Area (ha) x 0.28 l/s/ha

From Table 3.1 the design flow of **4.01 L/s** is less than the allowable flow of **5.19 L/s**.

SANITARY SEWER CALCULATIONS
for
CHAPERAL Site Plan

exp Services Inc.

Table 3.1

LOCATION			INDIVIDUAL				Inst./Comm.	CUMULATIVE	PEAKING	PEAK	Cumulative	Institutional/Commercial			PEAK	PEAK	PROPOSED SEWER DATA					AVAIL.	
STREET	FROM	TO	NET RES.	POP.	MIXED	POP.	AREA	POP.	FACTOR	POP.	Inst./Comm.	PEAK	Accu.	GROSS RES.	Accu. Area	EXTRAN.	DESIGN	LENGTH	PIPE	GRADE	CAPACITY	VELOCITY	CAPACITY
	MH	MH	AREA (Ha)		AREA (Ha)		(Ha)		M	FLOW (l/s)	Area (Ha)	FLOW (l/s)	FLOW (l/s)	AREA (Ha)	(ha)	FLOW (l/s)	FLOW (l/s)	(m)	SIZE (mm)	(%)	(l/s)	(m/s)	%
SANITARY FLOW ESTIMATIONS (See Note 1)			10.30	1015.58	2.04	550.80	7.33	1566.38	3.67	23.26	7.33		6.36		26.65	7.46	37.09	38.5	381	0.15	70.91	0.62	47.7%
BLOCK 20																							
	156	154		16.20				16.20	4.00	0.26			0.00	0.09	0.08	0.03	0.29	54.2	203.2	0.66	27.83	0.86	99.0%
	165	154		16.20				16.20	4.00	0.26			0.00	0.09	0.08	0.02	0.29	55.7	203.2	0.65	27.61	0.85	99.0%
	154	153		8.10				40.50	4.00	0.66			0.00	0.09	0.22	0.56	0.72	30.1	203.2	0.37	20.83	0.64	99.0%
	158	153		32.40				32.40	4.00	0.53			0.00	0.14	0.14	0.04	0.56	55.7	203.2	0.35	20.26	0.62	97.2%
	157	153		32.40				32.40	4.00	0.53			0.00	0.11	0.12	0.03	0.56	47.5	203.2	0.74	29.46	0.91	98.1%
	153	151		8.10				113.40	4.00	1.84			0.00	0.09	0.53	0.15	1.99	30.1	203.2	0.37	20.83	0.64	90.5%
	166	165		16.20				16.20	4.00	0.26			0.00	0.09	0.09	0.03	0.29	53.4	203.2	0.65	27.61	0.65	99.0%
	165	164		8.10				24.30	4.00	0.39			0.00	0.09	0.14	0.04	0.83	30.1	203.2	0.37	20.83	0.64	97.9%
	168	164		32.40				32.40	4.00	0.53			0.00	0.14	0.14	0.04	0.56	55.0	203.2	0.42	20.26	0.64	97.5%
	164	162		8.10				64.80	4.00	1.05			0.00	0.09	0.34	0.15	1.15	30.1	203.2	0.37	20.83	0.64	94.5%
	167	162		16.20				16.20	4.00	0.26			0.00	0.11	0.14	0.03	0.29	53.2	203.2	0.65	27.61	0.85	99.0%
	162	151		16.20				97.20	4.00	1.58			0.00	0.1	0.88	0.15	1.73	55.7	203.2	0.37	20.83	0.64	91.7%
	160	151		16.20				16.20	4.00	0.26			0.00	0.11	0.14	0.03	0.29	54.7	203.2	0.65	27.61	0.85	99.0%
	151	150		0.00				226.80	4.00	3.68			0.00	0	1.19	0.83	4.01	12.8	203.2	0.37	20.83	0.64	80.8%
(See Note 2)																							
Adjusted Future Sanitary Flow Estimations through the detailed review of the Phase 2A land area																							
Easement	Stub(300Ø)	Ex136			0.23	62.10	7.33	288.90	4.00	4.68	7.33		6.36	10.24	10.24	2.87	13.91	41.8	304.8	0.29	54.38	0.15	74.4%
Gerry Lalonde Drive	Ex137	Ex136		51.30				51.30	4.00	0.83				0.61	0.61	0.17	1.90	73.7	203.2	0.65	27.61	0.95	96.4%
Gerry Lalonde Drive	Ex136	Ex135		72.90				413.10	4.00	6.69	7.33		6.36	0.88	11.73	3.28	16.34	100.3	381	0.15	70.91	0.62	77.0%
Gerry Lalonde Drive	Ex135	Ex134		24.30				437.40	4.00	7.09	7.33		6.36	0.30	12.03	3.37	16.82	38.4	381	0.16	73.24	0.64	77.0%
Gerry Lalonde Drive	Ex134	Ex133		32.40				469.80	3.99	7.59	7.33		6.36	0.13	12.46	3.49	17.44	47.6	381	0.16	70.91	0.62	75.4%
Gerry Lalonde Drive	Ex133	Ex111		5.40				475.20	3.99	7.67	7.33		6.36	0.13	12.59	3.53	17.56	32.0	381	0.15	70.91	0.62	75.2%
...continued																							

Note 1 - "Sanitary Flow Estimations" are based on the Sanitary Sewer Design sheet contained in the Neighbourhood 5 - Cumberland East Urban Community Infrastructure Servicing Study by IBI Group
The flows shown are the anticipated future flows that are west of Phase 1 boundary at Chinian Street

Note 2 - The "future" land areas have been reduced by the land area of Phase 2, 3 and 4

Note 3: The land area total in the "Mixed Area" column has been reduced from 1.42ha to 0.23ha to account for the 1.19ha represented by the Site Plan development area. The trunk line has been designed with the tributary area in mind.

Population = 3.4 persons/unit for single family units = 98.6 persons/net hectare
Population = 2.7 persons/unit for townhouse units = 270 persons/net hectare
Commercial, Office average daily flow = 50,000 l/ha/day

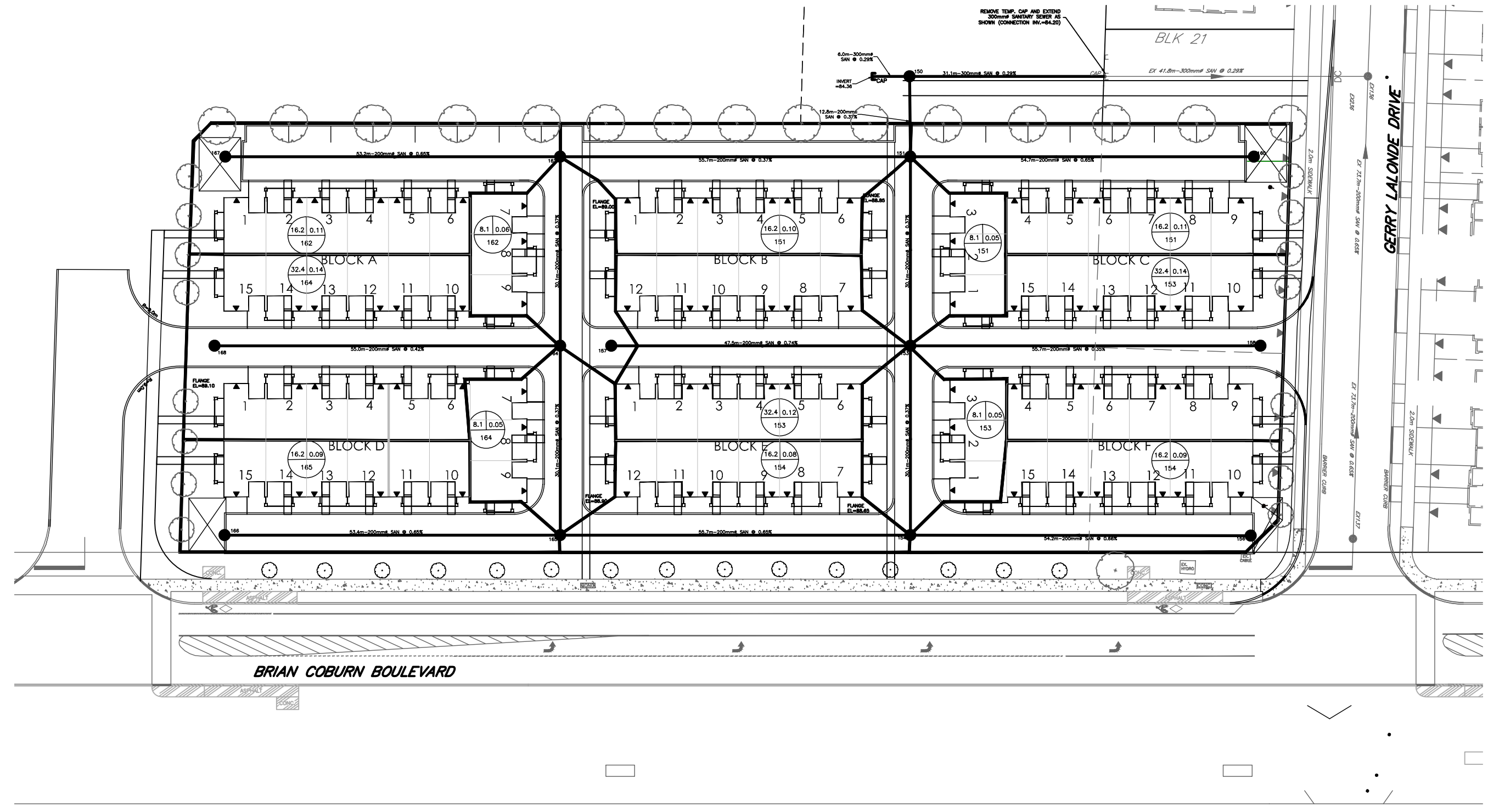
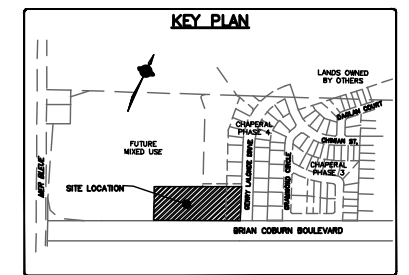
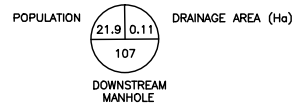
Peaking Factor = $1 + 14/(4 + (P)^{0.5})$ P = Population in 1000's

Peak Population Flow (l/s) = Cumulative Population (persons) x 350 l/person/day x Peaking Factor / 86400 sec/day

Peak Extraneous Flow (l/s) = Cumulative Area (ha) x 0.28 l/s/ha

Peak Design Flow (l/s) = Peak Population Flow (l/s) + Peak Extraneous Flow (l/s)

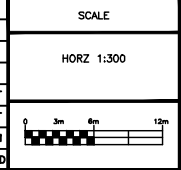
LEGEND



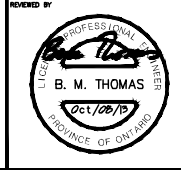
NOTES
 THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



REV	REVISION DESCRIPTION	DATE	BY	APPROV
3	REVISED AS PER CITY COMMENTS	08/10/13	SAB	BMT
2	REVISED AS PER CITY COMMENTS	22/08/13	KLM	BMT
1	ISSUED FOR SITE PLAN APPLICATION	22/02/13	KLM	KLM



DESIGNED BY
 REVISION BY
 CLIENT



TAGGART GROUP OF COMPANIES
 exp Services Inc.
 2025 Deseronto Drive, Unit 102
 Ottawa, ON K2G 9H6
 Canada
 www.taggart.com
 BUILDINGS • EARTH & ENVIRONMENT • ENERGY
 INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY

DESIGN	KLM
CHECKED	KLM
DRAWN	SAB
PROJ. MGR	KLM
APPROVED	KLM

CHAPERAL - BLOCK 20
 CITY OF OTTAWA
SANITARY DRAINAGE AREA PLAN

PROJ. NO.	2762
DATE	FEBRUARY 2013
DRAWING NO.	SAN1

SANITARY SEWER CALCULATION SHEET

CLIENT:
 LOCATION:
 FILE REF: **14-733-SE Quadrant**
 DATE: **22-Jun-18**

DESIGN PARAMETERS

Avg. Daily Flow Res.	350 L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0	Infiltration / Inflow	0.28 L/s/ha	
Avg. Daily Flow Comm	50,000 L/ha/d	Peak Fact. Comm.	1.5	Min. Pipe Velocity	0.60 m/s full flowing
Avg. Daily Flow Instit.	50,000 L/ha/d	Peak Fact. Instit.	1.5	Max. Pipe Velocity	3.00 m/s full flowing
Avg. Daily Flow Indust.	35,000 L/ha/d	Peak Fact. Indust. per MOE graph		Mannings N	0.013



Location			Residential Area and Population							Commercial		Institutional		Industrial		Infiltration			Pipe Data													
Area ID	Up	Down	Area	Number of Units			Pop.	Cumulative	Peak	Q _{res}	Area	Accu.	Area	Accu.	Area	Accu.	Q _{CHH}	Total	Accu.	Infiltration	Total	DIA	Slope	Length	Q _{cap}	Q / Q full						
				(ha)	Singles	Semi's																					Town's	Apt's	(ha)	Pop.	(-)	(L/s)
Taggart Group of Companies Infrastructure Servicing Brief November 20, 2013			1.190					226.8	1.190	226.8	4.00	3.68					0.0	1.190	1.190	0.333	4.01											
Orleans Family Health Hub April 5, 2018								0.000	0.0	4.00	0.00	9.16	9.16				8.0	9.160	9.160	2.565	10.52											
SE Quadrant Dev Applications Total			1.190				226.8	1.190	226.8	4.00	3.68	9.16	9.16				8.0	10.350	10.350	2.898	14.52											

