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

SANITARY SEWER DESIGN SHEET

PROJECT: FORMER CFB ROCKCLIFFE
LOCATION: CITY OF OTTAWA
CLIENT: CANADA LANDS COMPANY

LOCATION				RESIDENTIAL										ICI AREAS							INFILTRATION ALLOWANCE				TOTAL	PROPOSED SEWER DESIGN						
				UNIT TYPES					AREA	POPULATION		PEAK	PEAK	AREA (Ha)						PEAK	AREA (Ha)			FLOW	FLOW	CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
												FACTOR	FLOW	INSTITUTIONAL		COMMERCIAL		INDUSTRIAL		FLOW										(full)		
STREET	AREA ID	FROM MH	TO MH	SF	SD	TH/F	TH/S	APT	(Ha)	IND	CUM		(L/s)	IND	CUM	IND	CUM	IND	CUM	(L/s)	PARKS	IND	CUM	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	L/s	(%)
PHASE 1 - CODD'S ROAD SHAFT																																
Major Collector	100A	MH100A	MH (52)					500	3.81	900.0	900.0	3.83	13.96									3.81	3.81	1.07	15.03	84.38	48.00	250	1.85	1.665	69.36	82.19
Major Collector		MH (52)	MH105A								900.0	3.83	13.96										3.81	1.07	15.03	84.38	37.62	250	1.85	1.665	69.36	82.19
Major Collector	105A	MH105A	MH (54)				41		0.77	94.3	994.3	3.80	15.31								0.65	1.42	5.23	1.46	16.78	62.04	62.95	250	1.00	1.224	45.26	72.96
Major Collector		MH (54)	MH (55)							0.0	994.3	3.80	15.31										5.23	1.46	16.78	62.04	50.36	250	1.00	1.224	45.26	72.96
Major Collector		MH (55)	MH108A							0.0	994.3	3.80	15.31										5.23	1.46	16.78	43.87	76.71	250	0.50	0.866	27.09	61.76
Major Collector	COM2	MH126A	MH (379)													2.03	2.03			1.76		2.03	2.03	0.57	2.33	60.47	85.08	250	0.95	1.193	58.14	96.15
Major Collector		MH (379)	MH120A														2.03			1.76			2.03	0.57	2.33	60.47	87.33	250	0.95	1.193	58.14	96.15
Major Collector	COM1	MH120A	MH (402)													2.44	4.47			3.88		2.44	4.47	1.25	5.13	43.87	91.89	250	0.50	0.866	38.74	88.30
Major Collector		MH (402)	MH108A														4.47			3.88			4.47	1.25	5.13	43.87	70.26	250	0.50	0.866	38.74	88.30
---	108A	MH108A	MH (375)						1.32	0.0	994.30	3.80	15.31				4.47			3.88		1.32	11.02	3.09	22.28	54.08	80.08	250	0.76	1.067	31.81	58.81
---		MH (375)	MH (376)							0.0	994.3	3.80	15.31				4.47			3.88			11.02	3.09	22.28	54.08	37.59	250	0.76	1.067	31.81	58.81
---		MH (376)	MH114A							0.0	994.3	3.80	15.31				4.47			3.88			11.02	3.09	22.28	54.08	118.80	250	0.76	1.067	31.81	58.81
---	EXT1	Ex	MH114A						5.53	1574.0	1574.0	3.66	23.36									5.53	5.53	1.55	24.91							
---		MH125A	MH (405)			33				89.1	89.1	4.00	1.44				0.00			0.00			0.00	0.00	1.44	44.30	72.00	250	0.51	0.874	42.86	96.74
---		MH (405)	MH114A							0.0	89.1	4.00	1.44				0.00			0.00			0.00	0.00	1.44	44.30	105.98	250	0.51	0.874	42.86	96.74
---	114A	MH114A	MH (65)				95		1.72	218.5	2786.8	3.47	39.17				4.47			3.88		1.72	18.27	5.12	48.16	71.33	69.47	300	0.50	0.978	23.17	32.48
---		MH (65)	MH (66)							0.0	2786.8	3.47	39.17				4.47			3.88			18.27	5.12	48.16	71.33	81.98	300	0.50	0.978	23.17	32.48
---		MH (66)	MH (67)							0.0	2786.8	3.47	39.17				4.47			3.88			18.27	5.12	48.16	71.33	24.65	300	0.50	0.978	23.17	32.48
---		MH (67)	MH113A							0.0	2786.8	3.47	39.17				4.47			3.88			18.27	5.12	48.16	71.33	10.46	300	0.50	0.978	23.17	32.48
---		MH113A	MH119A							0.0	2786.8	3.47	39.17				4.47			3.88			18.27	5.12	48.16	71.33	52.12	300	0.50	0.978	23.17	32.48
---		MH119A	MH130A							0.0	2786.8	3.47	39.17				4.47			3.88			18.27	5.12	48.16	71.33	72.19	300	0.50	0.978	23.17	32.48
---	INST1, INST2	MH120A	MH125A							0.0	0.0	4.00	0.00	*5.55*	5.55					4.82		5.55	5.55	1.55	6.37	58.86	191.19	250	0.90	1.162	52.48	89.17
---	125A	MH125A	MH130A				*253*		*3.09*	581.9	581.9	3.94	9.29		5.55					4.82		3.09	8.64	2.42	16.52	58.86	176.08	250	0.90	1.162	42.33	71.93
---	163A	MH163A	MH (381)				42		0.75	96.6	96.6	4.00	1.57									0.75	0.75	0.21	1.78	35.64	87.43	250	0.33	0.703	33.86	95.02
		MH (381)	MH130A							0.0	96.6	4.00	1.57										0.75	0.21	1.78	35.64	71.87	250	0.33	0.703	33.86	95.02
---	---	MH130A	MH135A							0.0	3465.3	3.39	47.57		5.55		4.47			8.70			27.66	7.74	64.01	100.18	88.80	375	0.30	0.879	36.18	36.11
---	164A	MH164A	MH (383)				41		0.96	94.3	94.3	4.00	1.53									0.96	0.96	0.27	1.80	35.64	87.27	250	0.33	0.703	33.84	94.96
---		MH (383)	MH135A							0.0	94.3	4.00	1.53										0.96	0.27	1.80	35.64	71.78	250	0.33	0.703	33.84	94.96
---	135A	MH135A	MH140A					191	1.76	343.8	3903.4	3.34	52.86		5.55		4.47			8.70		1.76	30.38	8.51	70.06	100.18	107.95	375	0.30	0.879	30.12	30.07
---	---	MH140A	MH (61)							0.0	3903.4	3.34	52.86		5.55		4.47			8.70			30.38	8.51	70.06	100.18	75.16	375	0.30	0.879	30.12	30.07
---		MH (61)	MH150A							0.0	3903.4	3.34	52.86		5.55		4.47			8.70			30.38	8.51	70.06	100.18	76.66	375	0.30	0.879	30.12	30.07
Codd's Road	142A	MH142A	MH (45)																		6.81	6.81	6.81	1.91	1.91	75.98	87.81	250	1.50	1.500	74.07	97.49
Codd's Road		MH (45)	MH (46)																				6.81	1.91	1.91	75.98	70.10	250	1.50	1.500	74.07	97.49
Codd's Road		MH (46)	MH (47)																				6.81	1.91	1.91	33.98	61.03	250	0.30	0.671	32.07	94.39
Codd's Road		MH (47)	MH150A																				6.81	1.91	1.91	33.98	55.07	250	0.30	0.671	32.07	94.39
---	301A	MH301A	MH160A				110		1.87	253.0	253.0	4.00	4.10									1.87	1.87	0.52	4.62	35.64	155.83	250	0.33	0.703	31.02	87.03
---	---	MH160A	MH161A							0.0	253.0	4.00	4.10										1.87	0.52	4.62	70.74	78.00	250	1.30	1.396	66.11	93.46
---	302A	MH302A	MH161A				70		1.25	161.0	161.0	4.00	2.61									1.25	1.25	0.35	2.96	50.02	155.84	250	0.65	0.987	47.06	94.08
Main Street	---	MH161A	MH163A							0.0	414.0	4.00	6.71									0.00	3.12	0.87	7.58	78.47	78.12	250	1.60	1.549	70.89	90.34
---	314A	MH314A	MH308A				35		0.53	80.5	80.5	4.00	1.30									0.53	0.53	0.15	1.45	75.98	75.81	250	1.50	1.500	74.53	98.09
---	314A	MH308A	MH163A							0.0	80.5	4.00	1.30								0.71	0.71	1.24	0.35	1.65	75.98	80.05	250	1.50	1.500	74.33	97.83
Main Street	---	MH163A	MH164A							0.0	494.5	3.98	7.97									0.00	4.36	1.22	9.19	78.47	88.92	250	1.60	1.549	69.29	88.29
---	311A	MH311A	MH164A				84		1.41	193.2	193.2	4.00	3.13									1.41	1.41	0.39	3.53	65.07	155.87	250	1.10	1.284	61.54	94.58
Main Street	---	MH164A	MH165A							0.0	687.7	3.90	10.86									0.00	5.77	1.62	12.48	58.86	107.96	250	0.90	1.162	46.38	78.80
---	205A	MH205A	MH (7)					*510*	*4.39*	918.0	918.0	3.82	14.22								5.93	10.32	10.32	2.89	17.11	50.02	80.40	250	0.65	0.987	32.91	65.79
---		MH (7)	MH326A							0.0	918.0	3.82	14.22										10.32	2.89	17.11	36.70	51.99	250	0.35	0.724	19.59	53.39

---	326A	MH323A	MH (10)					*224*	1.77	403.2	403.2	4.00	6.53									1.77	1.77	0.50	7.03	50.02	29.23	250	0.65	0.987	42.99	85.95
---		MH (10)	MH (9)							0.0	403.2	4.00	6.53										1.77	0.50	7.03	50.02	37.86	250	0.65	0.987	42.99	85.95
---		MH (9)	MH326A							0.0	403.2	4.00	6.53										1.77	0.50	7.03	50.02	36.84	250	0.65	0.987	42.99	85.95

---	312A	MH326A	MH312A					171	1.55	307.8	1629.0	3.65	24.11									1.55	13.64	3.82	27.93	43.87	150.87	250	0.50	0.866	15.94	36.34

---	312A	MH312A	MH165A					190	1.69	342.0	1971.0	3.59	28.67									1.69	15.33	4.29	32.96	43.87	155.81	250	0.50	0.866	10.91	24.86
Main Street	165A	MH165A	MH155A							0.0	2658.7	3.49	37.55								0.60	0.60	21.70	6.08	43.63	63.80	151.90	300	0.40	0.874	20.18	31.62
Codd's Road	201A	MH201A	MH155A					214	1.32	385.2	385.2	4.00	6.24			1.23	1.23					2.55	2.55	0.71	6.96	79.69	157.08	250	1.65	1.573	72.73	91.27

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

SANITARY SEWER DESIGN SHEET

PROJECT: FORMER CFB ROCKCLIFFE
LOCATION: CITY OF OTTAWA
CLIENT: CANADA LANDS COMPANY

LOCATION				RESIDENTIAL										ICI AREAS							INFILTRATION ALLOWANCE				TOTAL	PROPOSED SEWER DESIGN						
				UNIT TYPES					AREA	POPULATION		PEAK	PEAK	AREA (Ha)						PEAK	AREA (Ha)			FLOW	FLOW	CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
												FACTOR	FLOW	INSTITUTIONAL		COMMERCIAL		INDUSTRIAL		FLOW										(full)		
STREET	AREA ID	FROM MH	TO MH	SF	SD	TH/F	TH/S	APT	(Ha)	IND	CUM		(L/s)	IND	CUM	IND	CUM	IND	CUM	(L/s)	PARKS	IND	CUM	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	L/s	(%)
Codd's Road	150A	MH155A	MH (411)					285	2.55	513.0	3556.9	3.38	48.68				1.23				0.92	3.47	27.72	7.76	56.44	81.80	105.38	375	0.20	0.717	25.36	31.00
Codd's Road		MH (411)	MH150A							0.0	3556.9	3.38	48.68				1.23						27.72	7.76	56.44	91.46	65.59	375	0.25	0.802	35.01	38.28
---		MH150A	MH151A							0.0	7460.3	3.08	93.08		5.55		5.70			9.77		0.00	64.91	18.17	121.02	129.34	30.28	375	0.50	1.134	8.32	6.43
---	190A	MH190A	MH (358)	4		19			0.96	64.9	64.9	4.00	1.05									0.96	0.96	0.27	1.32	63.27	65.18	250	1.04	1.249	61.95	97.91
---		MH (358)	MH (359)							0.0	64.9	4.00	1.05										0.96	0.27	1.32	63.27	17.99	250	1.04	1.249	61.95	97.91
---		MH (359)	MH (360)							0.0	64.9	4.00	1.05										0.96	0.27	1.32	63.27	37.59	250	1.04	1.249	61.95	97.91
---		MH (360)	MH (361)							0.0	64.9	4.00	1.05										0.96	0.27	1.32	63.27	26.53	250	1.04	1.249	61.95	97.91
---		MH (361)	MH185A							0.0	64.9	4.00	1.05										0.96	0.27	1.32	63.27	57.21	250	1.04	1.249	61.95	97.91
---	185A	MH185A	MH (363)			12			0.38	32.4	97.3	4.00	1.58									0.38	1.34	0.38	1.95	35.64	16.83	250	0.33	0.703	33.69	94.52
---		MH (363)	MH183A							0.0	97.3	4.00	1.58										1.34	0.38	1.95	35.64	64.96	250	0.33	0.703	33.69	94.52
---	192A	MH192A	MH (364)	*39*					1.52	132.6	132.6	4.00	2.15									1.52	1.52	0.43	2.57	35.64	89.21	250	0.33	0.703	33.06	92.78
---		MH (364)	MH190A							0.0	132.6	4.00	2.15										1.52	0.43	2.57	35.64	91.02	250	0.33	0.703	33.06	92.78
---	EXT2	BULKHEAD	MH190A						8.97	538.2	538.2	3.96	8.63									8.97	8.97	2.51	11.14	35.64	65.00	250	0.33	0.703	24.50	68.74
---	190A	MH190A	MH179A			9			0.31	24.3	695.10	3.90	10.97									0.31	10.80	3.02	14.00	84.38	78.92	250	1.85	1.665	70.39	83.41
---	194A	MH194A	MH (356)	*24*					1.28	81.6	81.6	4.00	1.32									1.28	1.28	0.36	1.68	48.06	105.74	250	0.60	0.948	46.37	96.50
---		MH (356)	MH179A							0.0	81.6	4.00	1.32										1.28	0.36	1.68	48.06	100.13	250	0.60	0.948	46.37	96.50
---	179A	MH179A	MH (76)			10			0.34	27.0	803.7	3.86	12.56								0.37	0.71	12.79	3.58	16.15	47.65	43.07	250	0.59	0.940	31.51	66.12
---		MH (76)	MH183A							0.0	803.7	3.86	12.56										12.79	3.58	16.15	47.65	34.27	250	0.59	0.940	31.51	66.12
---	183A	MH183A	MH182A	*9*					0.60	30.6	931.6	3.82	14.41									0.60	14.73	4.12	18.54	31.02	119.22	250	0.25	0.612	12.48	40.23
---	195A	MH195A	MH182A	*14*					0.85	47.6	47.6	4.00	0.77									0.85	0.85	0.24	1.01	59.18	107.15	250	0.91	1.168	58.17	98.29
---	---	MH182A	MH175A							0.0	979.2	3.81	15.10										15.58	4.36	19.46	31.02	76.76	250	0.25	0.612	11.56	37.27
---	230A, INST3	MH230A	MH (353)			42			1.08	113.4	113.4	4.00	1.84	2.44	2.44					2.12		3.52	3.52	0.99	4.94	51.91	110.31	250	0.70	1.024	46.96	90.48
---		MH (353)	MH175A							0.0	113.4	4.00	1.84		2.44					2.12			3.52	0.99	4.94	51.91	68.80	250	0.70	1.024	46.96	90.48
---	175A	MH175A	MH (92)	7					0.52	23.8	1116.4	3.77	17.04		2.44					2.12		0.52	19.62	5.49	24.66	45.12	50.21	300	0.20	0.618	20.46	45.35
---		MH (92)	MH172A							0.0	1116.4	3.77	17.04		2.44					2.12			19.62	5.49	24.66	45.12	62.97	300	0.20	0.618	20.46	45.35
---	192A	MH192A	MH(120)	11					0.68	37.4	37.4	4.00	0.61									0.68	0.68	0.19	0.80	43.87	15.79	250	0.50	0.866	43.07	98.18
		MH(120)	MH194A							0.0	37.4	4.00	0.61										0.68	0.19	0.80	43.87	66.64	250	0.50	0.866	43.07	98.18
---	194A	MH194A	MH195A	18					1.43	61.2	98.6	4.00	1.60									1.43	2.11	0.59	2.19	48.06	78.09	250	0.60	0.948	45.87	95.45
---		MH195A	MH172A							0.0	98.6	4.00	1.60										2.11	0.59	2.19	48.06	77.14	250	0.60	0.948	45.87	95.45
---		MH172A	MH151A							0.0	1215.0	3.74	18.43		2.44					2.12			21.73	6.08	26.63	45.12	69.18	300	0.20	0.618	18.49	40.98
---		MH151A	MH (421)								8675.3	3.02	105.98		7.99		5.70			11.88			86.64	24.26	142.12	153.03	124.53	375	0.70	1.342	10.91	7.13
---		MH (421)	EX Shaft							0.0	8675.3	3.02	105.98		7.99		5.70			11.88		0.00	86.64	24.26	142.12	153.03	9.66	375	0.70	1.342	10.91	7.13
---	213A	MH213A	MH (374)					89	1.43	160.2	160.2	4.00	2.60									1.43	1.43	0.40	3.00	35.64	56.18	250	0.33	0.703	32.64	91.59
		MH (374)	MH211A							0.0	160.2	4.00	2.60										1.43	0.40	3.00	35.64	106.64	250	0.33	0.703	32.64	91.59
---	---	MH211A	MH217A							0.0	160.2	4.00	2.60										1.43	0.40	3.00	35.64	15.04	250	0.33	0.703	32.64	91.59
Hemlock Road	230A	MH230A	MH (80)				100		1.51	230.0	230.0	4.00	3.73									1.51	1.51	0.42	4.15	51.16	68.00	250	0.68	1.010	47.01	91.89
Hemlock Road		MH (80)	MH216A							0.0	230.0	4.00	3.73										1.51	0.42	4.15	51.16	32.59	250	0.68	1.010	47.01	91.89
---	222A	MH222A	MH220A			55			1.49	148.5	148.5	4.00	2.41								3.70	5.19	5.19	1.45	3.86	50.78	176.73	250	0.67	1.002	46.92	92.40
---	220A	MH220A	MH216A					102	1.70	183.6	332.1	4.00	5.38									1.70	6.89	1.93	7.31	47.32	177.16	300	0.22	0.648	40.01	84.55
---	---	MH216A	MH (84)							0.0	562.1	3.95	8.99										8.40	2.35	11.34	45.12	37.76	300	0.20	0.618	33.78	74.86
---		MH (84)	MH217A							0.0	562.1	3.95	8.99										8.40	2.35	11.34	45.12	25.15	300	0.20	0.618	33.78	74.86
---	---	MH217A	EX Shaft							0.0	722.3	3.89	11.37									0.00	9.83	2.75	14.12	45.12	48.76	300	0.20	0.618	30.99	68.69
PHASE 3 - NRC SHAFT																																
Major Collector	COM3	MH126A	MH300A							0.0	0.0	4.00	0.00			2.31	2.31			2.01		2.31	2.31	0.65	2.65	41.62	168.74	250	0.45	0.821	38.96	93.63
Major Collector	COM4	MH300A	MH310A							0.0	0.0	4.00	0.00			0.87	3.18			2.76		0.87	3.2	0.89	3.65	53.73	84.20	250	0.75	1.060	50.08	93.20
Major Collector	310A	MH310A	MH (28)			31			0.98	83.7	83.7	4.00	1.36			0.00	3.18			2.76		0.98	4.16	1.16	5.28	53.73	97.88	250	0.75	1.060	48.45	90.17
Major Collector		MH (28)	MH315A							0.0	83.7	4.00	1.36			0.00	3.18			2.76		0.00	4.16	1.16	5.28	53.73	109.91	250	0.75	1.060	48.45	90.17
---	300A	MH300A	MH301A			10			0.34	27.0	27.0	4.00	0.44			0.00	0.00			0.00		0.34	0.34	0.10	0.53	35.64	82.87	250	0.33	0.703	35.11	98.51
---	301A	MH301A	MH302A			11			0.37	29.7	56.7	4.00	0.92			0.00	0.00			0.00		0.37	0.71	0.20	1.12	35.64	78.00	250	0.33	0.703	34.52	96.86
---	302A	MH302A	MH314A			10			0.34	27.0	83.7	4.00	1.36			0.00	0.00			0.00		0.34	1.05	0.29	1.65	43.87	77.94	250	0.50	0.866	42.22	96.24
---	314A	MH314A	MH315A			12			0.38	32.4	116.1	4.00	1.88			0.00	0.00			0.00		0.38	1.43	0.40	2.28	92.02	78.38	250	2.20	1.816	89.74	97.52
---	315A	MH315A	***MH320A***			8			0.32	21.6	221.4	4.00	3.59			0.00	3.18			2.76		0.32	5.91	1.65	8.00	67.96	97.62	250	1.20	1.341	59.96	88.22
---	311A	MH311A	MH (256)			19			0.76	51.3	51.3	4.00	0.83									0.76	0.76	0.21	1.04	50.02	117.03	250	0.65	0.987	48.97	97.91
---		MH (256)	MH323A							0.0	51.3	4.00	0.83										0.76	0.21	1.04	50.02	27.17	250	0.65	0.987	48.97	97.91

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

SANITARY SEWER DESIGN SHEET

PROJECT: FORMER CFB ROCKCLIFFE
LOCATION: CITY OF OTTAWA
CLIENT: CANADA LANDS COMPANY

LOCATION				RESIDENTIAL										ICI AREAS							INFILTRATION ALLOWANCE				TOTAL	PROPOSED SEWER DESIGN						
				UNIT TYPES					AREA	POPULATION		PEAK	PEAK	AREA (Ha)						PEAK	AREA (Ha)			FLOW	FLOW	CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
												FACTOR	FLOW	INSTITUTIONAL		COMMERCIAL		INDUSTRIAL		FLOW										(full)		
STREET	AREA ID	FROM MH	TO MH	SF	SD	TH/F	TH/S	APT	(Ha)	IND	CUM		(L/s)	IND	CUM	IND	CUM	IND	CUM	(L/s)	PARKS	IND	CUM	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	L/s	(%)
---	323A	MH323A	MH (12)							0.0	51.3	4.00	0.83								0.47	0.47	1.23	0.34	1.18	87.74	41.89	250	2.00	1.731	86.56	98.66
---		MH (12)	MH (13)							0.0	51.3	4.00	0.83										1.23	0.34	1.18	87.74	32.20	250	2.00	1.731	86.56	98.66
---		MH (13)	***MH320A***							0.0	51.3	4.00	0.83										1.23	0.34	1.18	87.74	27.05	250	2.00	1.731	86.56	98.66
---	320A	MH320A	MH (15)							0.0	272.7	4.00	4.42			0.00	3.18			2.76	3.44	3.44	10.58	2.96	10.14	72.08	60.67	250	1.35	1.423	61.94	85.93
---		MH (15)	MH (16)							0.0	272.7	4.00	4.42			0.00	3.18			2.76			10.58	2.96	10.14	72.08	66.68	250	1.35	1.423	61.94	85.93
---		MH (16)	MH (17)							0.0	272.7	4.00	4.42			0.00	3.18			2.76			10.58	2.96	10.14	72.08	82.93	250	1.35	1.423	61.94	85.93
---		MH (17)	MH (18)							0.0	272.7	4.00	4.42			0.00	3.18			2.76			10.58	2.96	10.14	72.08	39.16	250	1.35	1.423	61.94	85.93
---		MH (18)	***MH333A***							0.0	272.7	4.00	4.42			0.00	3.18			2.76			10.58	2.96	10.14	72.08	29.65	250	1.35	1.423	61.94	85.93
---	SDA	MH330A	MH331A					275	6.36	495.0	495.0	3.98	7.97									6.36	6.36	1.78	9.75	35.64	132.70	250	0.33	0.703	25.88	72.63
---		MH331A	MH332A							0.0	495.0	3.98	7.97									0.00	6.36	1.78	9.75	35.64	60.29	250	0.33	0.703	25.88	72.63
---	332A, AVIATION	MH332A	MH (367)							0.0	495.0	3.98	7.97		AVIATION MUSEUM FIXED FLOW FROM 332A TO NRC SHAFT -->					*29.00*	2.45	2.45	8.81	2.47	39.44	45.12	48.21	300	0.20	0.618	5.68	12.58
---		MH (367)	MH (368)							0.0	495.0	3.98	7.97							*29.00*		0.00	8.81	2.47	39.44	45.12	83.95	300	0.20	0.618	5.68	12.58
---		MH (368)	MH (369)							0.0	495.0	3.98	7.97							*29.00*		0.00	8.81	2.47	39.44	45.12	29.01	300	0.20	0.618	5.68	12.58
---		MH (369)	MH (370)							0.0	495.0	3.98	7.97							*29.00*		0.00	8.81	2.47	39.44	45.12	42.26	300	0.20	0.618	5.68	12.58
---		MH (370)	MH338A							0.0	495.0	3.98	7.97							*29.00*		0.00	8.81	2.47	39.44	45.12	94.01	300	0.20	0.618	5.68	12.58
---		MH338A	***MH333A***							0.0	495.0	3.98	7.97							*29.00*		0.00	8.81	2.47	39.44	45.12	217.08	300	0.20	0.618	5.68	12.58
---		***MH333A***	NRC SHAFT							0.0	767.7	3.87	12.04			0.00	3.18			*31.76*			19.39	5.43	49.23	91.46	35.09	375	0.25	0.802	42.23	46.17
PHASE 2 - PEACH TREE LANE SHAFT																																
---	175A	MH175A	MH242A	7					0.69	23.8	23.80	4.00	0.39									0.69	0.69	0.19	0.58	57.20	125.31	250	0.85	1.129	56.62	98.99
---	242A	MH242A	MH (95)			21			0.68	56.7	80.50	4.00	1.30									0.68	1.37	0.38	1.69	53.73	49.67	250	0.75	1.060	52.04	96.86
---		MH (95)	MH244A							0.0	80.50	4.00	1.30									0.00	1.37	0.38	1.69	53.73	49.28	250	0.75	1.060	52.04	96.86
---	235A	MH235A	MH210A			22			0.80	59.4	59.40	4.00	0.96									0.80	0.80	0.22	1.19	48.06	41.66	250	0.60	0.948	46.87	97.53
---		MH210A	MH244A							0.0	59.40	4.00	0.96									0.00	0.80	0.22	1.19	48.06	78.62	250	0.60	0.948	46.87	97.53
---	244A	MH244A	MH (105)							0.0	139.90	4.00	2.27								2.64	2.64	4.81	1.35	3.61	58.86	137.40	250	0.90	1.162	55.24	93.86
---		MH (105)	MH258A							0.0	139.90	4.00	2.27									0.00	4.81	1.35	3.61	58.86	79.88	250	0.90	1.162	55.24	93.86
---	257A	MH257A	MH256A					158	1.40	284.4	284.40	4.00	4.61									1.40	1.40	0.39	5.00	35.64	68.32	250	0.33	0.703	30.64	85.97
---	256A	MH256A	MH258A					196	1.45	352.8	637.20	3.92	10.11									1.45	2.85	0.80	10.91	35.64	111.37	250	0.33	0.703	24.73	69.39
---	258A	MH258A	MH (108)				234		2.83	538.2	1315.30	3.72	19.82									2.83	10.49	2.94	22.76	31.02	32.57	250	0.25	0.612	8.26	26.63
---		MH (108)	MH (345)							0.0	1315.30	3.72	19.82									0.00	10.49	2.94	22.76	31.02	90.36	250	0.25	0.612	8.26	26.63
---		MH (345)	MH252A							0.0	1315.30	3.72	19.82									0.00	10.49	2.94	22.76	31.02	11.96	250	0.25	0.612	8.26	26.63
---	---	MH252A	MH251A							0.0	1315.30	3.72	19.82									0.00	10.49	2.94	22.76	31.02	72.52	250	0.25	0.612	8.26	26.63
---	256A	MH256A	MH (113)					*296*	*2.65*	532.8	532.80	3.96	8.55									2.65	2.65	0.74	9.29	62.04	32.51	250	1.00	1.224	52.75	85.03
---		MH (113)	MH (114)							0.0	532.80	3.96	8.55									0.00	2.65	0.74	9.29	62.04	31.73	250	1.00	1.224	52.75	85.03
---		MH (114)	MH (115)							0.0	532.80	3.96	8.55									0.00	2.65	0.74	9.29	62.04	29.65	250	1.00	1.224	52.75	85.03
---		MH (115)	MH (116)							0.0	532.80	3.96	8.55									0.00	2.65	0.74	9.29	62.04	40.58	250	1.00	1.224	52.75	85.03
---		MH (116)	MH (117)							0.0	532.80	3.96	8.55									0.00	2.65	0.74	9.29	62.04	35.05	250	1.00	1.224	52.75	85.03
---		MH (117)	MH251A							0.0	532.80	3.96	8.55									0.00	2.65	0.74	9.29	62.04	22.97	250	1.00	1.224	52.75	85.03
---	251A	MH251A	MH (347)							0.0	1848.10	3.61	27.04								0.76	0.76	13.90	3.89	30.93	33.98	36.49	250	0.30	0.671	3.05	8.96
---		MH (347)	MH250A							0.0	1848.10	3.61	27.04									0.00	13.90	3.89	30.93	33.98	32.48	250	0.30	0.671	3.05	8.96
Hemlock Road	230A	MH230A	MH (341)				100		1.40	230.0	230.00	4.00	3.73									1.40	1.40	0.39	4.12	67.96	46.37	250	1.20	1.341	63.84	93.94
Hemlock Road		MH (341)	MH (342)							0.0	230.00	4.00	3.73									0.00	1.40	0.39	4.12	67.96	40.25	250	1.20	1.341	63.84	93.94
Hemlock Road		MH (342)	MH235A							0.0	230.00	4.00	3.73									0.00	1.40	0.39	4.12	67.96	27.62	250	1.20	1.341	63.84	93.94
Hemlock Road	235A	MH235A	MH (99)				79		1.15	181.7	411.70	4.00	6.67									1.15	2.55	0.71	7.39	35.64	94.25	250	0.33	0.703	28.25	79.28
Hemlock Road		MH (99)	MH245A							0.0	411.70	4.00	6.67									0.00	2.55	0.71	7.39	35.64	49.39	250	0.33	0.703	28.25	79.28
Hemlock Road	245A, MUSEUM	MH245A	MH212A						0.37	0.0	411.70	4.00	6.67	0.00	0.00					0.00		0.37	2.92	0.82	7.49	62.04	47.70	250	1.00	1.224	54.55	87.93
Hemlock Road		MH212A	MH (102)							0.0	411.70	4.00	6.67	0.00	0.00					0.00		0.00	2.92	0.82	7.49	62.04	44.25	250	1.00	1.224	54.55	87.93
Hemlock Road		MH (102)	MH250A							0.0	411.70	4.00	6.67	0.00	0.00					0.00		0.00	2.92	0.82	7.49	43.87	54.82	250	0.50	0.866	36.38	82.93
Hemlock Road	250A	MH250A	MH (120)							0.0	2259.80	3.54	32.44	0.00	0.00					0.00	0.00	0.00	16.82	4.71	37.15	71.33	58.91	300	0.50	0.978	34.18	47.92
Hemlock Road		MH (120)	MH (121)							0.0	2259.80	3.54	32.44	0.00	0.00					0.00		0.00	16.82	4.71	37.15	71.33	57.91	300	0.50	0.978	34.18	47.92
Hemlock Road		MH (121)	MH271A							0.0	2259.80	3.54	32.44	0.00	0.00					0.00		0.00	16.82	4.71	37.15	71.33	50.47	300	0.50	0.978	34.18	47.92
Hemlock Road	271A	MH271A	MH272A					0	0.43	0.0	2259.80	3.54	32.44	0.00	0.00					0.00		0.43	17.25	4.83	37.27	71.33	141.24	300	0.50	0.978	34.06	47.75
---	MONTFORT	MH261A	MH262A							0.0	0.00	4.00	0.00	8.36	8.36					7.26		8.36	8.36	2.34	9.60	75.98	145.47	250	1.50	1.500	66.38	87.37
---	261A	MH262A	MH272A					158	1.77	284.4	284.40	4.00	4.61	0.00	8.36					7.26		1.77	10.13	2.84	14.70	75.98	236.46	250	1.50	1.500	61.28	80.65
---		MH272A	Ex MH253A							0.0	2544.20	3.50	36.10	0.00	8.36					7.26		0.00	27.38	7.67	51.02	74.82	169.89	300	0.55	1.025	23.80	31.81
Future Museum			Ex MH253A											11.33	11.33							11.33	38.71	10.84	10.84							
Total Flow To Airbase																																
Pullback Sewer																									61.86	*83.80*	*50.00*	*300*	*0.69*	*1.148*	*21.94*	*26.18*

Design Parameters:

Residential			ICI Areas			Peak Factor
SF	3.4	p/p/u	INST	50,000	L/Ha/day	1.5
THF	2.7	p/p/u	COM	50,000	L/Ha/day	1.5
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
THS	2.3	p/p/u				
Other	60	p/p/Ha				

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day
3. Infiltration allowance: 0.28 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+P^0.5))
where P = population in thousands

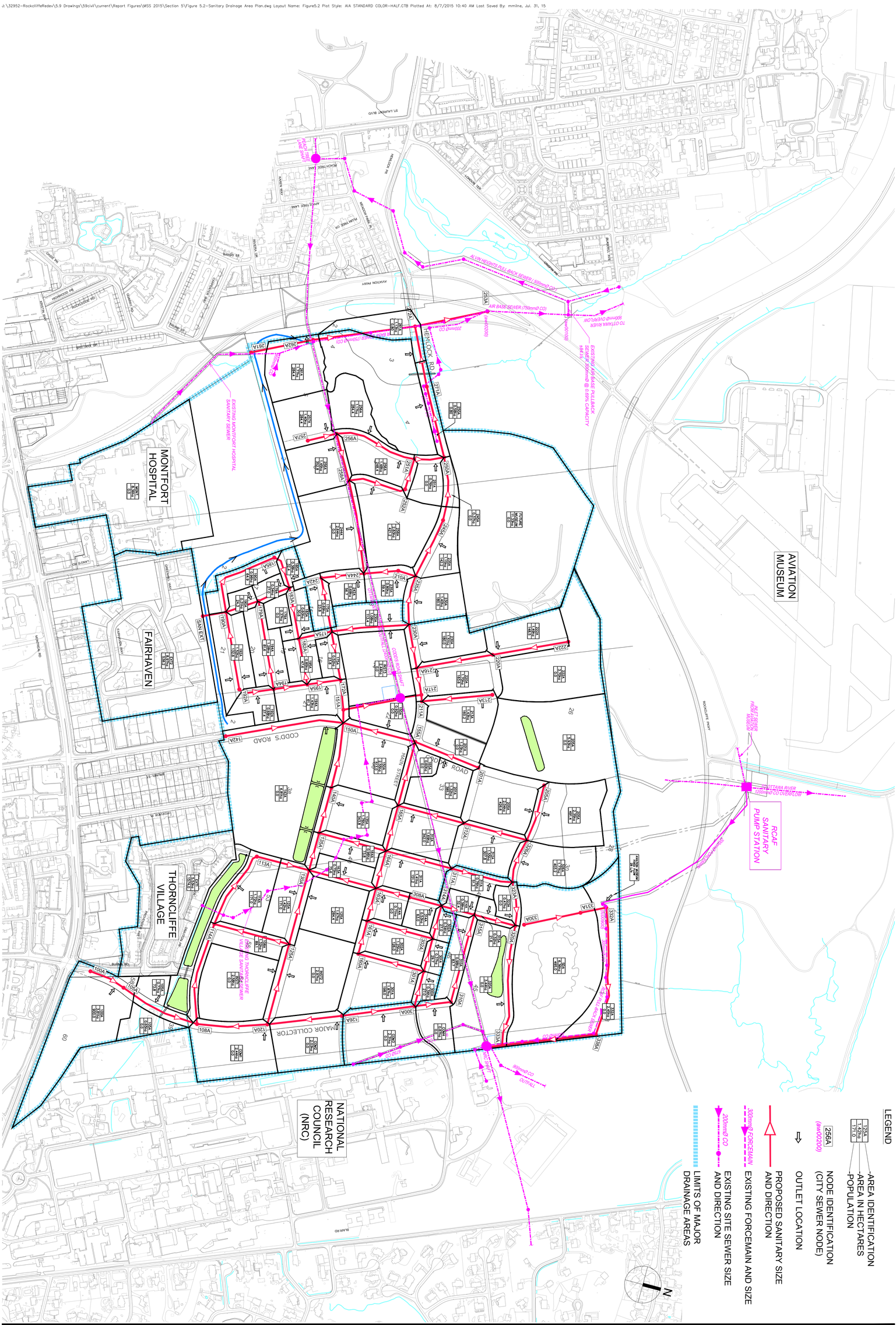
Designed:
Michael Black - E.I.T.

Checked:
Jim Moffatt - P.Eng

Dwg. Reference:
FIGURE 5.1

No.	Revision	Date
1.	MASTER SERVICING STUDY SUBMISSION 1 FOR CITY REVIEW	2014-10-24
2.	MASTER SERVICING STUDY SUBMISSION 2 FOR CITY REVIEW	2015-02-12
3.	MASTER SERVICING STUDY SUBMISSION 3 FOR CITY APPROVAL	2015-08-14

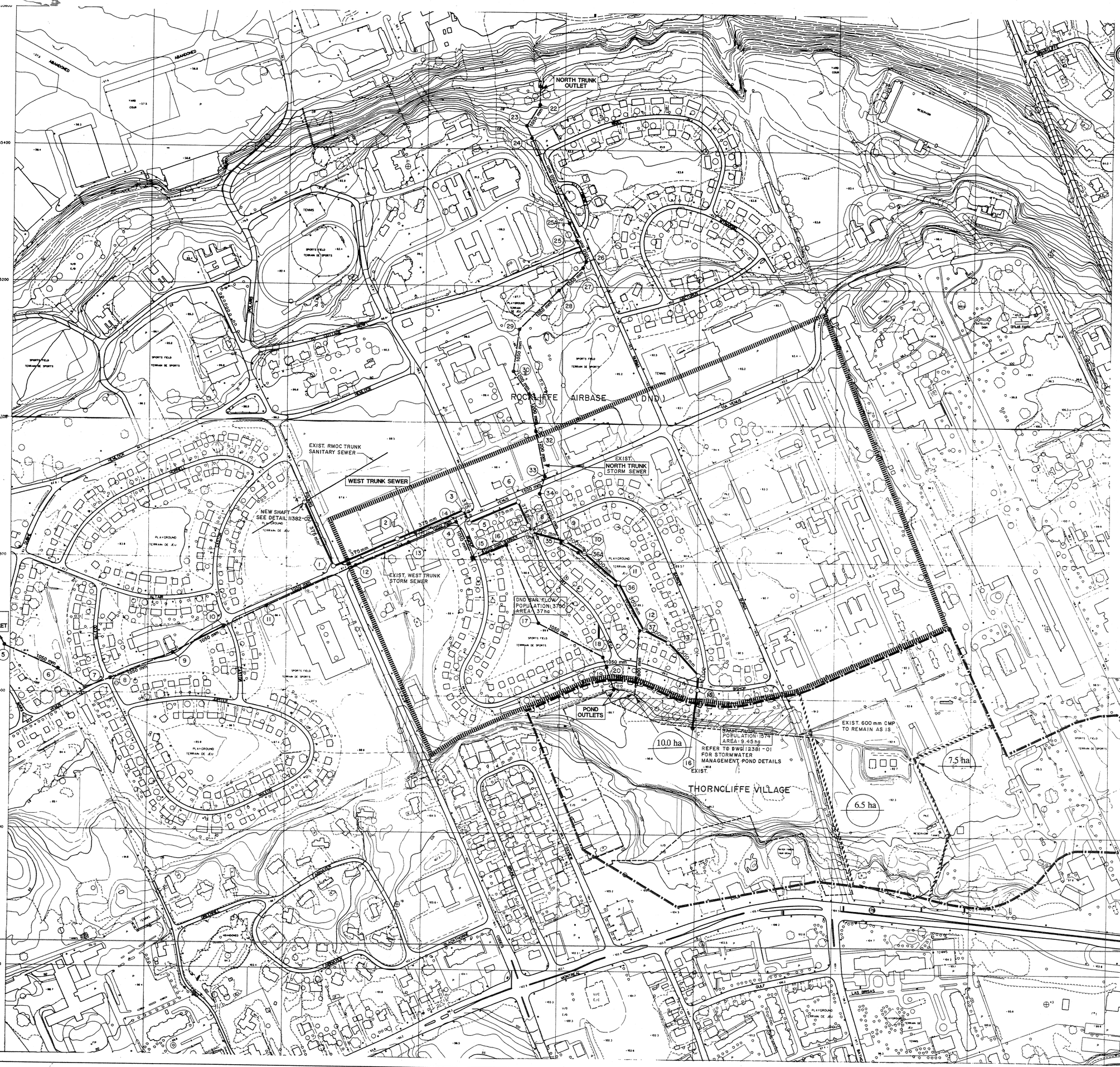
File Reference:
32952-5.7.1



Sheet No.	Drawing Title	Project Title	Scale
FIGURE 5.2	SANITARY DRAINAGE AREA PLAN	FORMER CFB ROCKCLIFFE MASTER SERVICING STUDY	0 100 200

IBI

No	DATE	REVISION	BY
1	02/05/91	SUBMITTED FOR APPROVAL	M.F.S.
2	31/07/91	SUBMITTED FOR TENDER	M.F.S.



PROFESSIONAL STAMP

LEGEND

SANITARY DRAINAGE AREA – DND LANDS

PROPOSED SANITARY SEWER AND MANHOLE (10)

AREA TO BE DEVELOPED

WATERSHED BOUNDARY

SUB WATERSHED BOUNDARY

EXISTING STORM SEWER & MANHOLE

AREA OF SUB WATERSHED / SUB WATERSHED NUMBER (6.5 ha)

PROJECT: THORNCLIFFE VILLAGE

TITLE: DND LANDS PROPOSED STORM WATER MANAGEMENT POND AND SANITARY SEWER OUTLET

CLIENT: THORNCLIFFE VILLAGE INC.

J.L. Richards & Associates Limited
Consulting Engineers, Architect & Planners
OTTAWA, KINGSTON, SUDBURY, CANADA.

SCALE 1:2000

DWG No 12381 S1

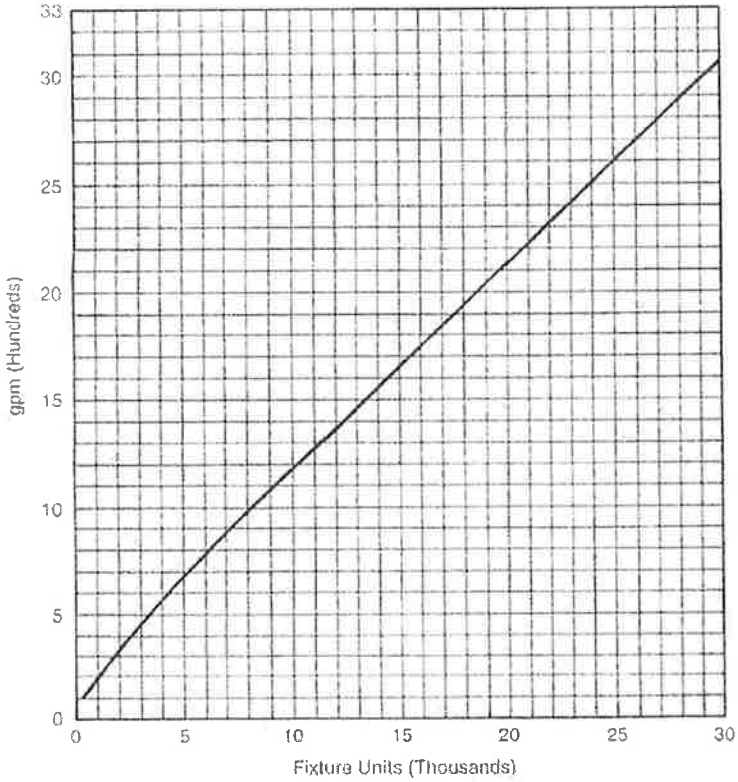
Table 7.5.8.4.
Size and Developed Length of Stack Vents and Vent Stacks

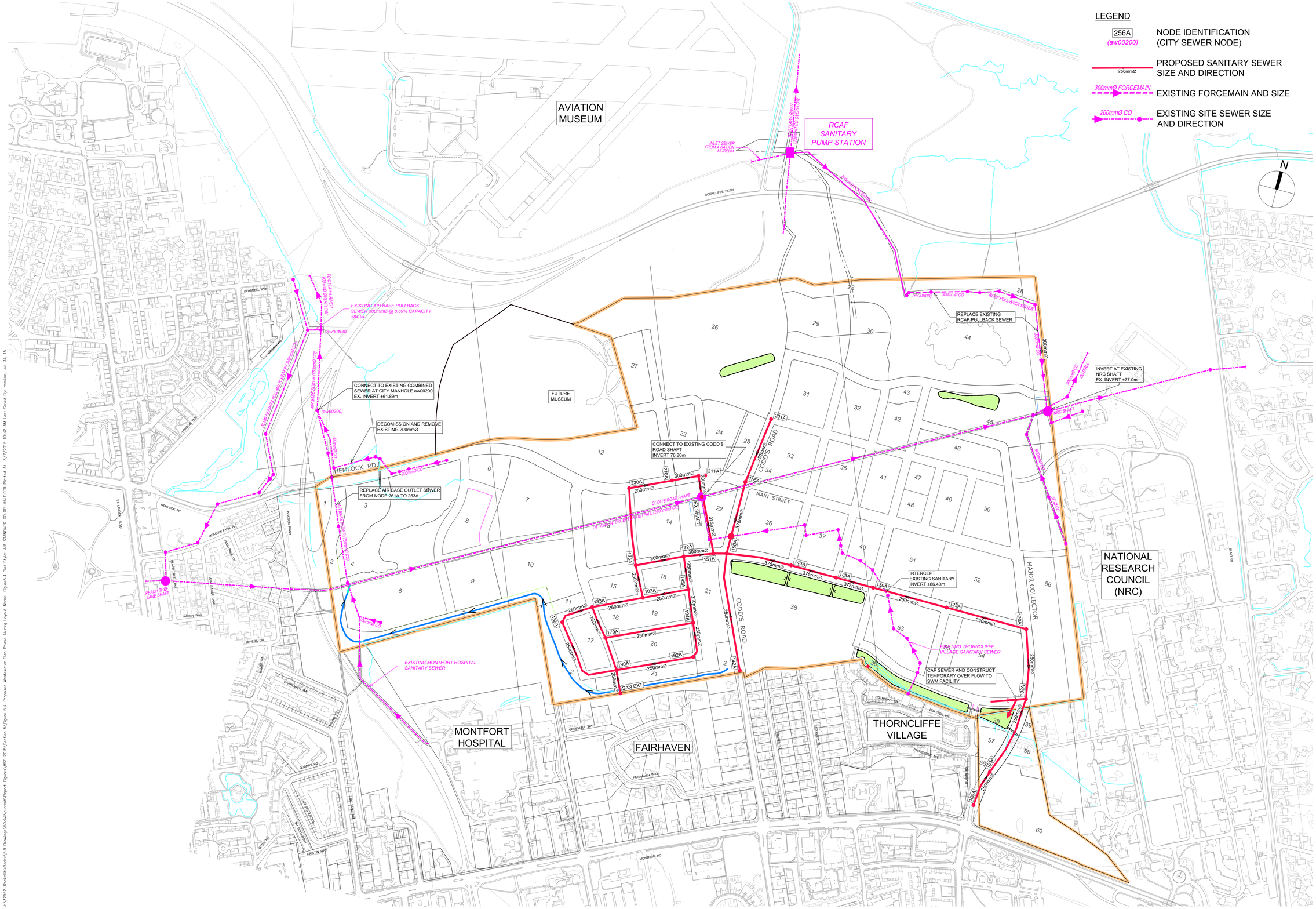
Forming Part of Sentence 7.5.8.4.(1)

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12	Column 13
Size of Soil or Waste Stack, in.	Total Hydraulic Load Being Vented, *fixture units*	Water Occupied Area	*Size of Stack Vent or Vent Stack*, in.									
			1¼	1 ½	2	3	4	5	6	8	10	12
			Maximum Length of *Stack Vent or Vent Stack*, m									
1¼	2	0.29	9									
1½	8	0.25	15	46								
2	12	0.25	9	23	61							
	24	.29	8	15	46							
3	10	0.15		13	46	317	Not Limited					
	21	.20		10	33.5	247						
	53	.25		8	28.5	207						
	102	.29		7.5	26	189						
4	43	0.15	Not Permitted		10.5	76	299	Not Limited				
	140	.20			8	61	229					
	320	.25			7	52	195					
	540	.29			6.5	46	177					
5	190	0.15	Not Permitted			25	97.5	302	Not Limited			
	490	.20				29	76	232				
	940	.25				16	64	204				
	1 400	.29				15	58	180				
6	500	0.15	Not Permitted			10	39.5	122	305	Not Limited		
	1 100	.20				8	30.5	94.5	238			
	2 000	.25				6.5	25.5	79	201			
	2 900	.29				6	23.5	73	183			
8	1 800	0.15	Not Permitted				9.5	29	73	287	Not Limited	
	3 400	.20					7	22	58	219.5		
	5 600	.25					6	19	49	186		
	7 600	.29					5.5	17	43	70.5		
10	4 000	0.15	Not Permitted					9.5	24	94.5	292.5	Not Limited
	7 200	.20						7	18	73	225.5	
	11 000	.25						6	15.5	61	192	
	15 000	.29						5.5	14	55	174	
12	7 300	0.15	Not Permitted						9.5	36.5	116	287
	13 000	.20							7	28.5	91	219.5
	20 000	.25							6	24	76	186
	26 000	.29							5.5	22	70	152
15	15 000	0.15	Not Permitted							12	39.5	94.5
	25 000	.20								9.5	29	73
	38 000	.25								8	24.5	62
	50 000	.29								7	22.5	55

water piping inside the building up to the point where the connection is taken off to the hot water heater supply.

Figure 13-7 Conversion of Fixture Units to gpm (Mixed System)





Scale

Project Title

FORMER CFB ROCKCLIFFE
MASTER SERVICING STUDY

Drawing Title

RECOMMENDED PHASE 1A
WASTEWATER PLAN

Sheet No.

FIGURE 5.4

a:\32952-RockcliffeRedev\5.9 Drawings\5Civil\current\Report Figures\MSS 2015\Section 5\Figure 5.4-Proposed Wastewater Plan Phase 1A.dwg Layout Name: Figure5.4 Plot Style: AIA STANDARD COLOR-HALF CTB Plotted At: 8/7/2015 10:42 AM Last Saved By: mmilne, Jul. 31, 15

CLC Rockcliffe Development
Protection of Interceptor Outfall Sewer and Future Twin
Meeting #2

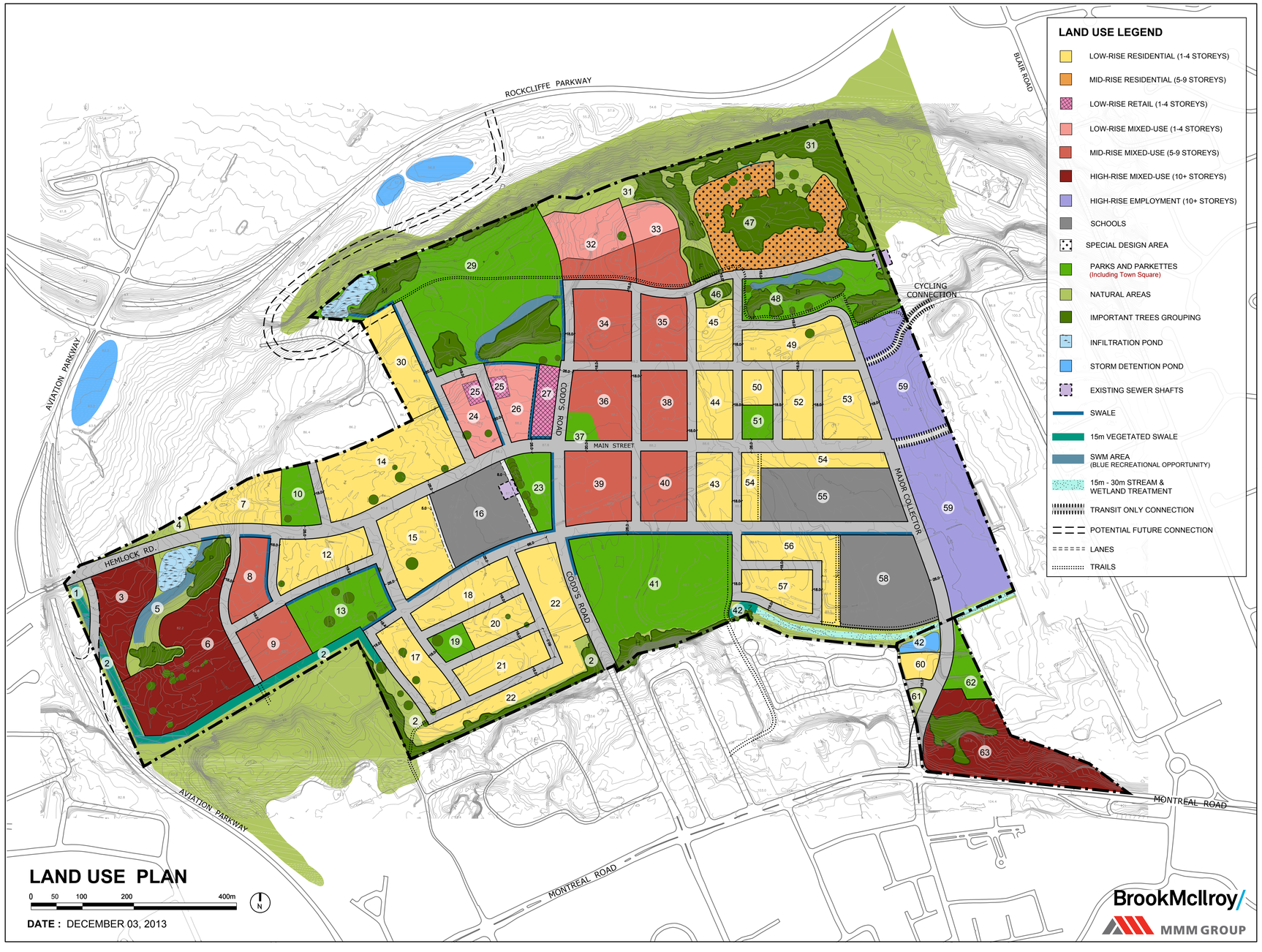
Clyde Avenue Training Room, 1st Floor
January 13, 2017

FINAL MEETING NOTES
(prepared by Chris Rogers)

In attendance:
Chris Rogers (CR), PGM
Selma Hassan, PGM
Louis Julien, ISD
Shelly McDonald, ESD
Michael Burt, ESD
Gerry Taylor, ESD

	ITEM	ACTION
1	January 7 meeting notes corrections: ISD (Peter McKay) is responsible for setting priority condition assessment of drop shafts, not ISD. IBI (Jim Moffat) requested corrections to minutes on how hydraulic capacity of drop shafts are assessed.	
2	January 7 meeting action item update: SH provided information on existing IOS easement. The easement is not registered. City will work with CLC to have the easement registered as first step. This will also allow CLC to obtain "Absolute Plus Title" and proceed with plan of subdivision. Legal has indicated that a blanket easement for future twin can be secured at the subdivision approval stage. (It is anticipated that the entire CDP study area will be included in a single subdivision application.) LJ is working on establishing a single elevation as a maximum depth of excavation to protect IOS / future twin. SH has added Curtis Rampersad, MB, SM to CLC Rockcliffe TAC.	
3	Draft CDP expected to be circulated in February. There will be a 1 month review period (SH). Drop shaft condition assessment should be completed in about a month so that this information is available to support review of the CDP and MSS. GT suggested that this should be feasible, but winter conditions (fog issues) may cause delays. CR to prompt Peter Mckay on making this work a priority.	**CR**
4	Consideration should be given to maintaining surface easement as well as securing strata easement. Steve Dover (attended meeting briefly) thought that this may have been approach taken for US Embassy, which was built over existing IOS. The ultimate dimensions of the strata easements would likely be slightly larger than indicated in the January 7 meeting minutes (LJ).	

5	Following January 7 meeting, LJ and MB concluded that new IOS shaft is needed due to a lack of staging area around existing shafts. Existing IOS alignment intersects 3 proposed parks in the development area. Suitable area within **one** of these parks should be planned to allow for <u>temporary use</u> as staging area at any time in future to allow for O&M activities related to the IOS, as well as potential future renewal (relining) work. LJ to confirm area required for these activities, in consultation with CSST consultant and ESD. This area would be also include a <u>permanent</u> access shaft. On the surface, there would be a 2.5m x 2.5m Bilco-type hatch to access the shaft. A large area concrete structure (6m diameter) could be hidden below grade, but no unrelated structures could be built over this area. Alternative locations include the parks located on Block 23 (potentially adjacent to existing drop shaft) and Block 48 (immediately west of existing drop shaft). Blocks shown on attached land use plan (Dec 3, 2013 version). Criteria for selection would be based on input from CLC, City Parks staff, and ESD/ISD staff. Intent would be to plan and construct the new IOS shaft before occupancy of the land in which these blocks are located (candidate locations are not in the Phase 1 development).	**LJ**
6	Provision for **one** access shaft for future IOS twin is required. Alternative locations include Blocks 29, 41, and 48. (per Dec 3, 2013 land use plan). Criteria for selection to be established as per proposed shaft for existing IOS. Construction would most likely take place after development and occupancy of surrounding land. Construction staging area required is estimated at ~0.5 ha. LJ to confirm. The construction staging area could include ROW area, and could involve protection of features (e.g. trees) within the staging area. Detailed mitigation and reinstatement requirements would be established in consultation with City Parks staff at the time that plans for the IOS twin shaft are prepared. The IOS twin shaft location could also serve as entry/exit point for tunnel boring machine, in which case construction activities could extend over 18-24 months.	**LJ**
7	Intent to add blanket strata easement over entire site for future IOS twin at subdivision stage to be added to CDP documentation. CDP should also identify intent to construct 2 shafts, one for IOS and one for future twin, and also identify alternative locations. Detailed design of land use would need to be compatible with needs associated with the shafts as described above. SH to coordinate.	**SH**


LAND USE LEGEND
LOW-RISE RESIDENTIAL (1-4 STOREYS)
MID-RISE RESIDENTIAL (5-9 STOREYS)
LOW-RISE RETAIL (1-4 STOREYS)
LOW-RISE MIXED-USE (1-4 STOREYS)
MID-RISE MIXED-USE (5-9 STOREYS)
HIGH-RISE MIXED-USE (10+ STOREYS)
HIGH-RISE EMPLOYMENT (10+ STOREYS)
SCHOOLS
SPECIAL DESIGN AREA
PARKS AND PARKETTES
(Including Town Square)
NATURAL AREAS
IMPORTANT TREES GROUPING
INFILTRATION POND
STORM DETENTION POND
EXISTING SEWER SHAFTS
SWALE
15m VEGETATED SWALE
SWM AREA
(BLUE RECREATIONAL OPPORTUNITY)
15m - 30m STREAM &
WETLAND TREATMENT
TRANSIT ONLY CONNECTION
POTENTIAL FUTURE CONNECTION
LANES
TRAILS
ROCKCLIFFE PARKWAY
BLAIR ROAD
CYCLING CONNECTION
AVIATION PARKWAY
CODD'S ROAD
MAIN STREET
MAJOR COLLECTOR
HEMLOCK RD.
MONTREAL ROAD
LAND USE PLAN
0 50 100 200 400m
N
DATE : DECEMBER 03, 2013
BrookMcIlroy/
MMM GROUP

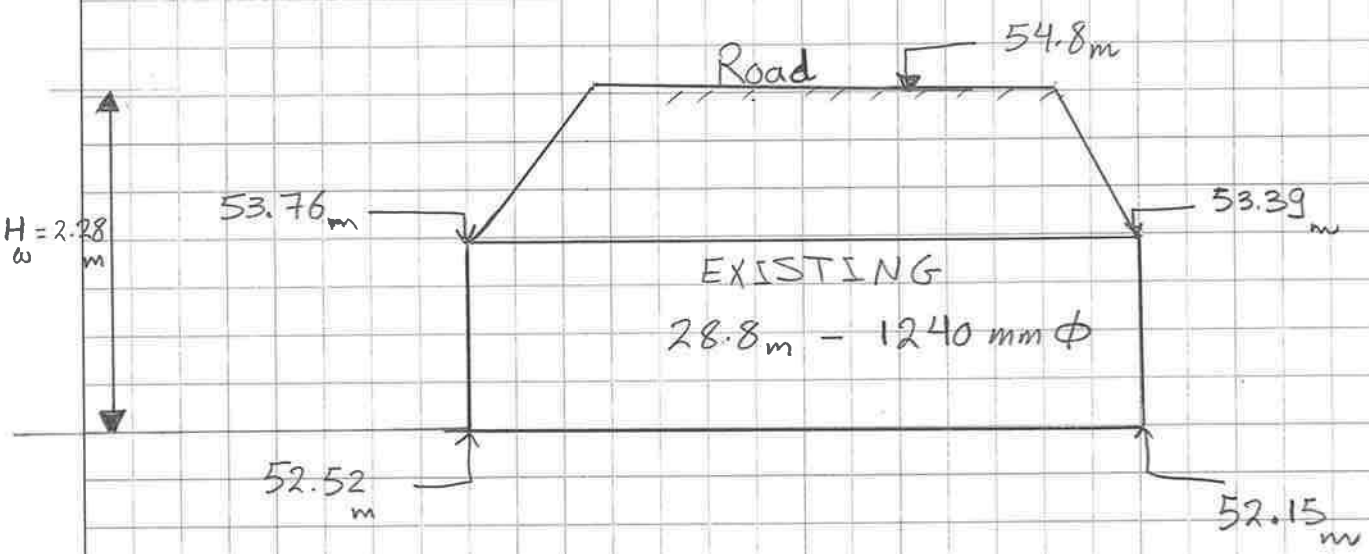
APPENDIX E

STORMWATER MANAGEMENT SYSTEM: SUPPORTING INFORMATION

- Culvert Design Nomographs – Eastern (Rockcliffe Parkway) Culvert
- Figure 6.7 Recommended Storm Sewer System
- Figure 6.8 Trunk Sewer Profiles
- Figure 6.9 Rational Method Drainage Area Plan
- Figure 6.11 Existing Conditions SWMHYMO Schematic
- Figure 6.12 Post-Development Conditions SWMHYMO Schematic
- Storm Sewer Design Sheets
- Water Quality Volume Calculations
- Figure 6.15 Macro Grading Plan
- Figure 6.16 Sewer Clearance Plan
- Street Segment Velocity x Depth Summary
- Southwest Drainage Channel Design
- NRC Drainage Swale Design
- 25 mm Outflow from Eastern SWMFacility
- 25 mm Outflow from Western SWM Facility
- Baseflow Augmentation to Eastern Creek
- Figure 6.28 Eastern SWM Facility Outlet Pipe Profile
- Boundary Condition for Western Creek Outlet
- Hydraulic Grade Line Summary
- Figure 6.32 Post-Development Conditions XPSWMM Schematic – East
- Figure 6.33 Post-Development Conditions XPSWMM Schematic – West
- Figure 6.34 Recommended Phase 1A Storm Sewer System
- CD with model files and report PDF
    - SWMHYMO – Existing Conditions, Post-Development Conditions, Post-Development Conditions Velocity by Depth
    - XPSWMM – all storm events

PROJECT:	PROJECT NO.: 32952	SHEET: OF:
CLIENT:	PREPARED BY:	DATE: 2014-10
DESCRIPTION: FINAL	CHECKED BY:	OTHER:

EASTERN CULVERT (ROCKCLIFFE PARKWAY):



INLET CONTROL:

H_w : 54.80 - 52.52 = 2.28 m

$\frac{H_w}{D} = \frac{2.28}{1.24} = 1.84$ m $\xrightarrow[\text{Chart (D5-1G)}]{\text{Into Design}}$ Q = 3.5 cms

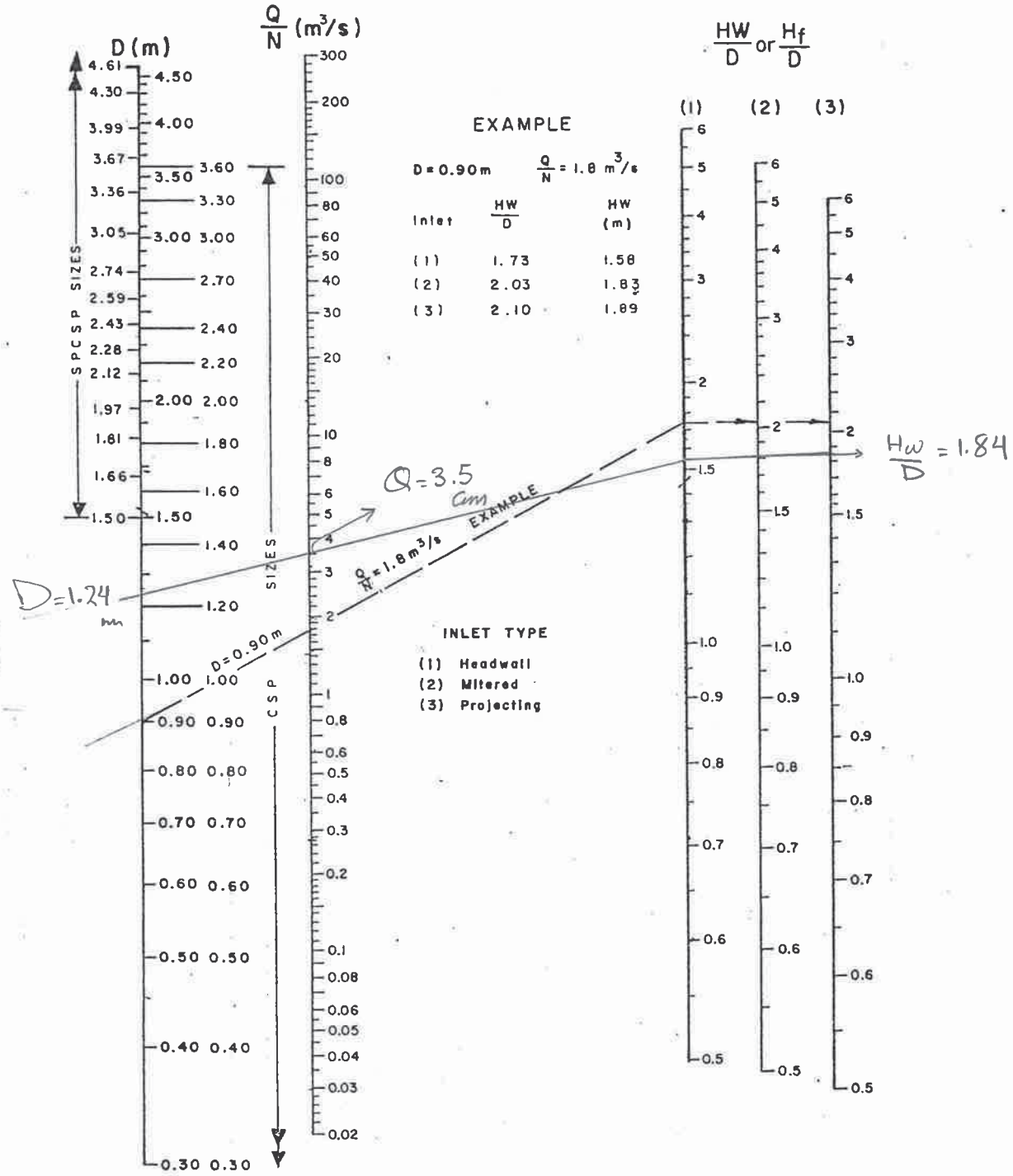
OUTLET CONTROL:

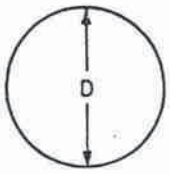
H : 53.39 - 54.80 = 1.41 m $\xrightarrow[\text{Chart (D5-2C)}]{\text{Into Design}}$ Q = 3.5 cms

D = 1.24 m

EASTERN

CHART D5-1G



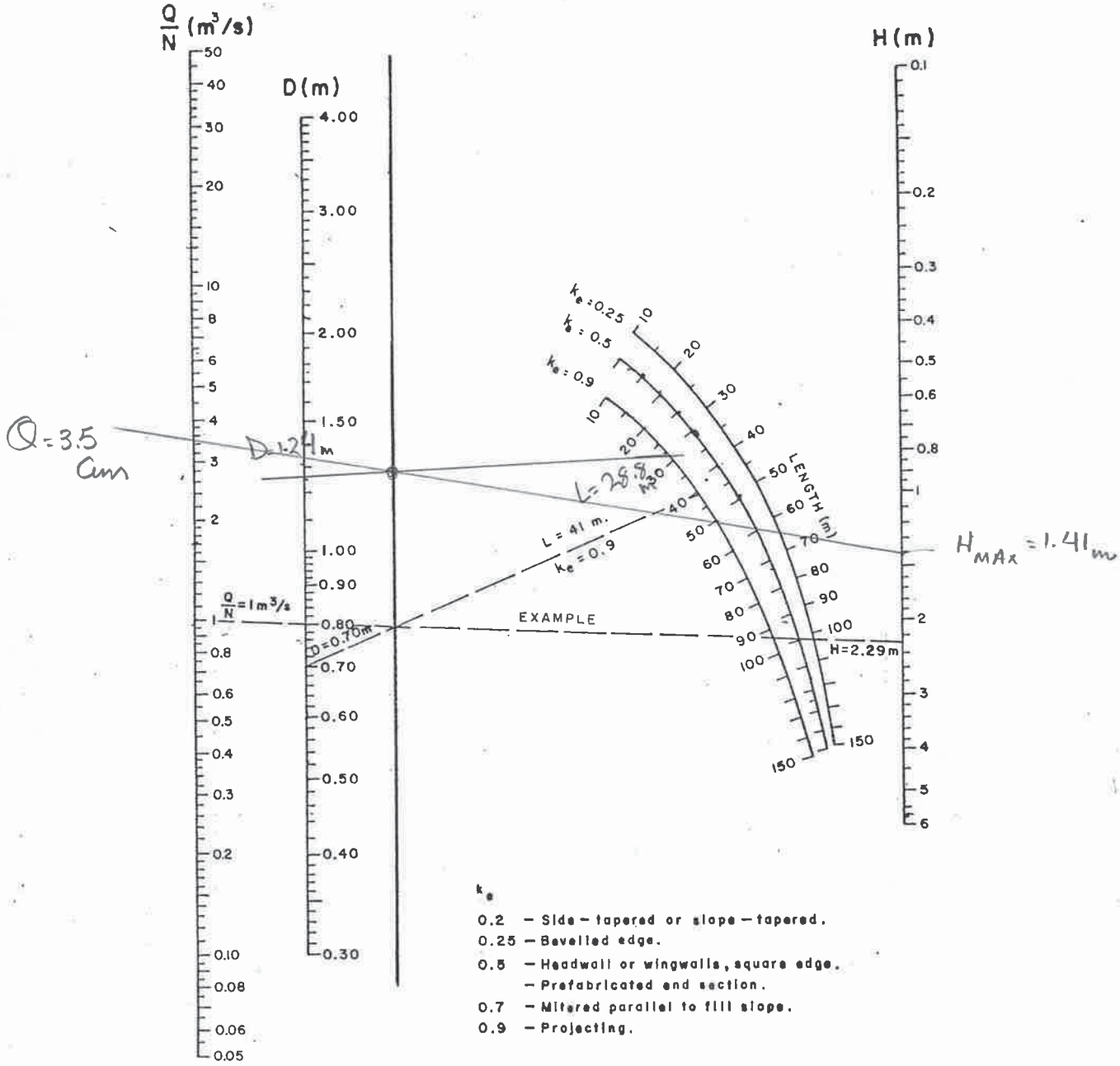


FHA 63 01
METRIC FHA 74 06 (51)

INLET CONTROL
CSP & SPCSP CULVERT

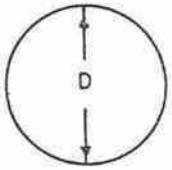
EASTERN

CHART D5-2C



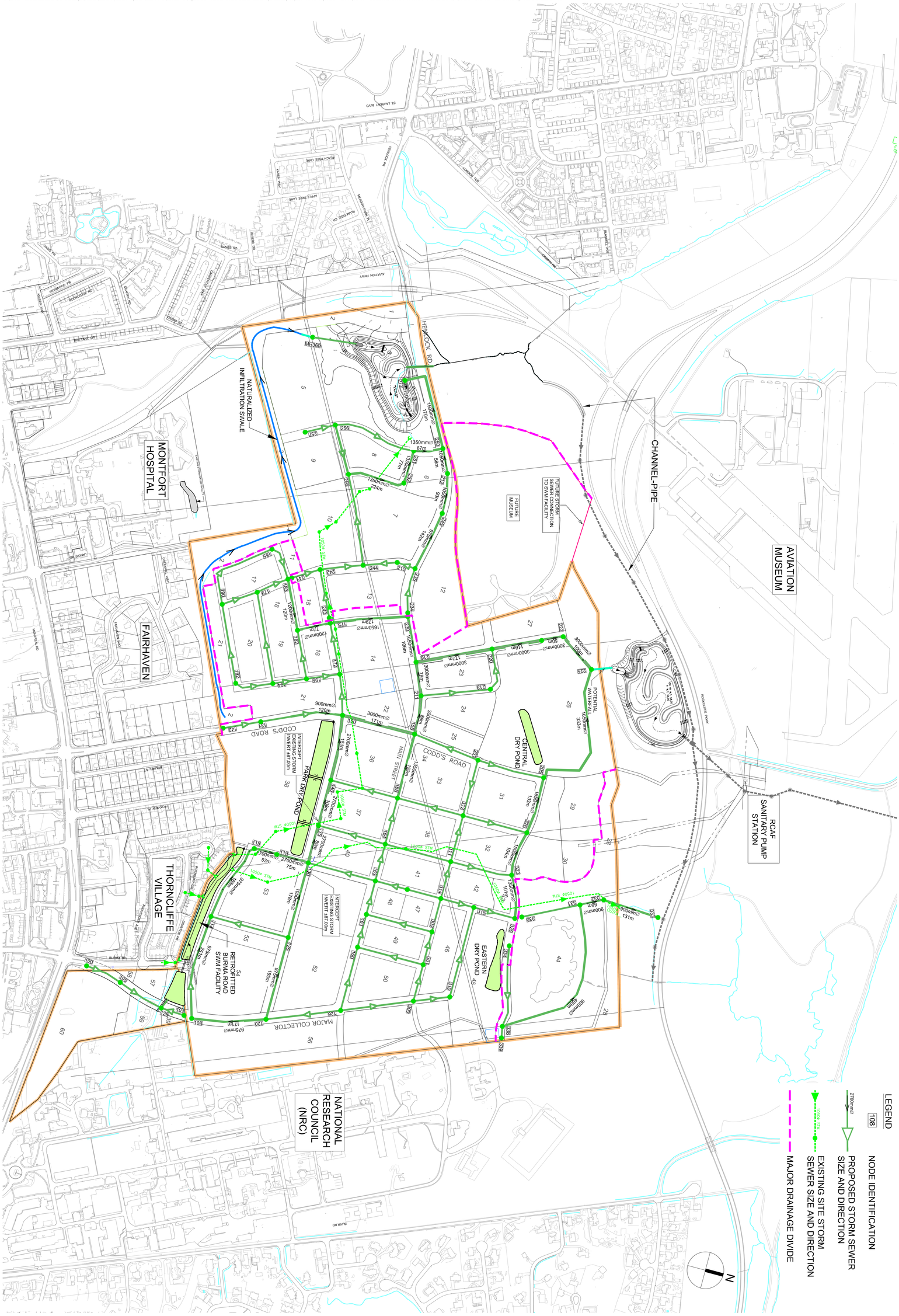
k_e

0.2 — Side — tapered or slope — tapered.
0.25 — Bevelled edge.
0.5 — Headwall or wingwalls, square edge.
— Prefabricated end section.
0.7 — Mitered parallel to fill slope.
0.9 — Projecting.



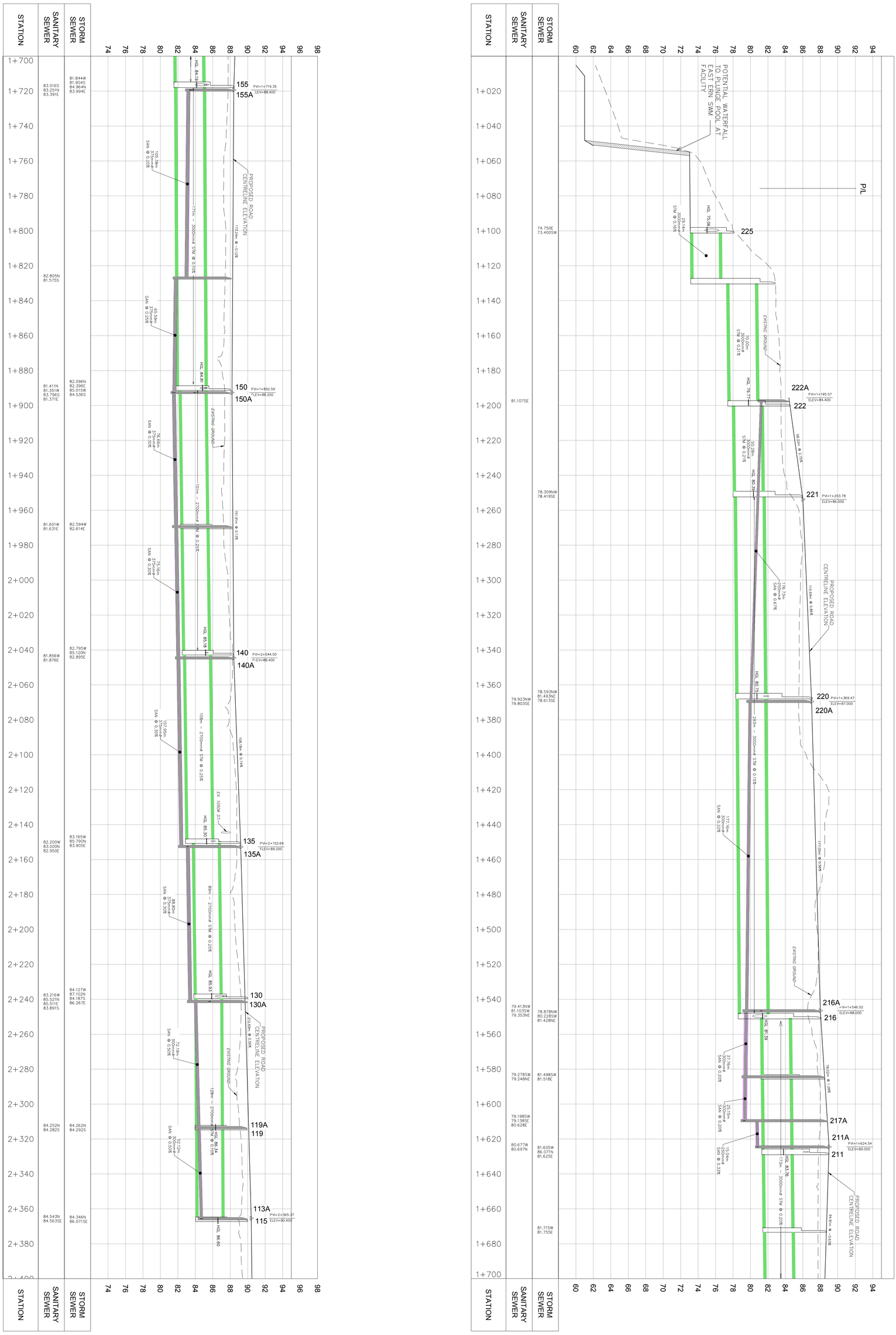
OUTLET CONTROL
CORRUGATED STEEL PIPE
FLOWING FULL
n = 0.024

FHA 6301
METRIC FHA 74 06 (51)



Sheet No.	Drawing Title	Project Title	Scale
FIGURE 6.7	RECOMMENDED STORM SEWER SYSTEM	FORMER CFB ROCKCLIFFE MASTER SERVICING STUDY	0 100 200

IBI



Sheet No.

FIGURE 6.8

Drawing Title

TRUNK
SEWER PROFILES

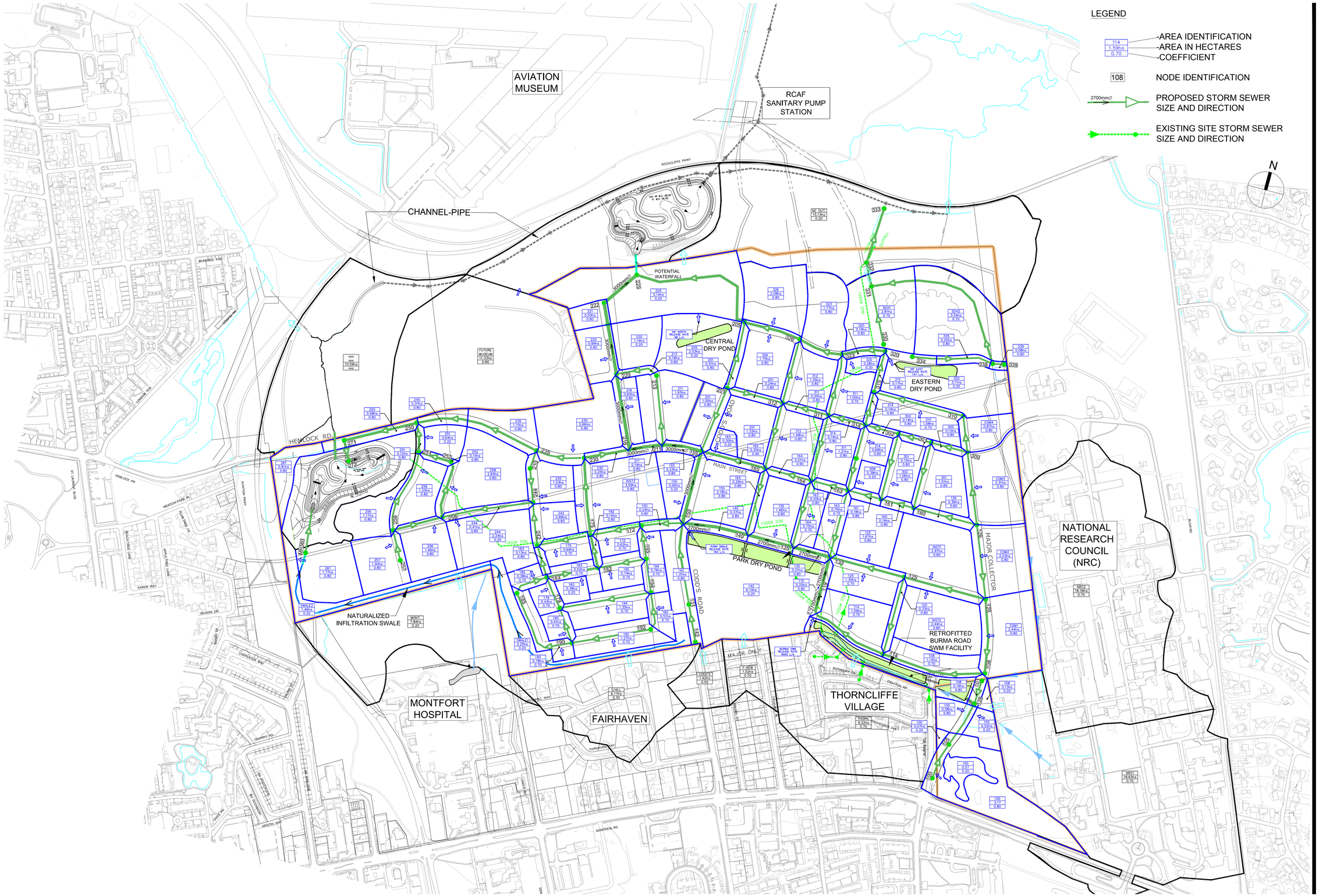
Project Title

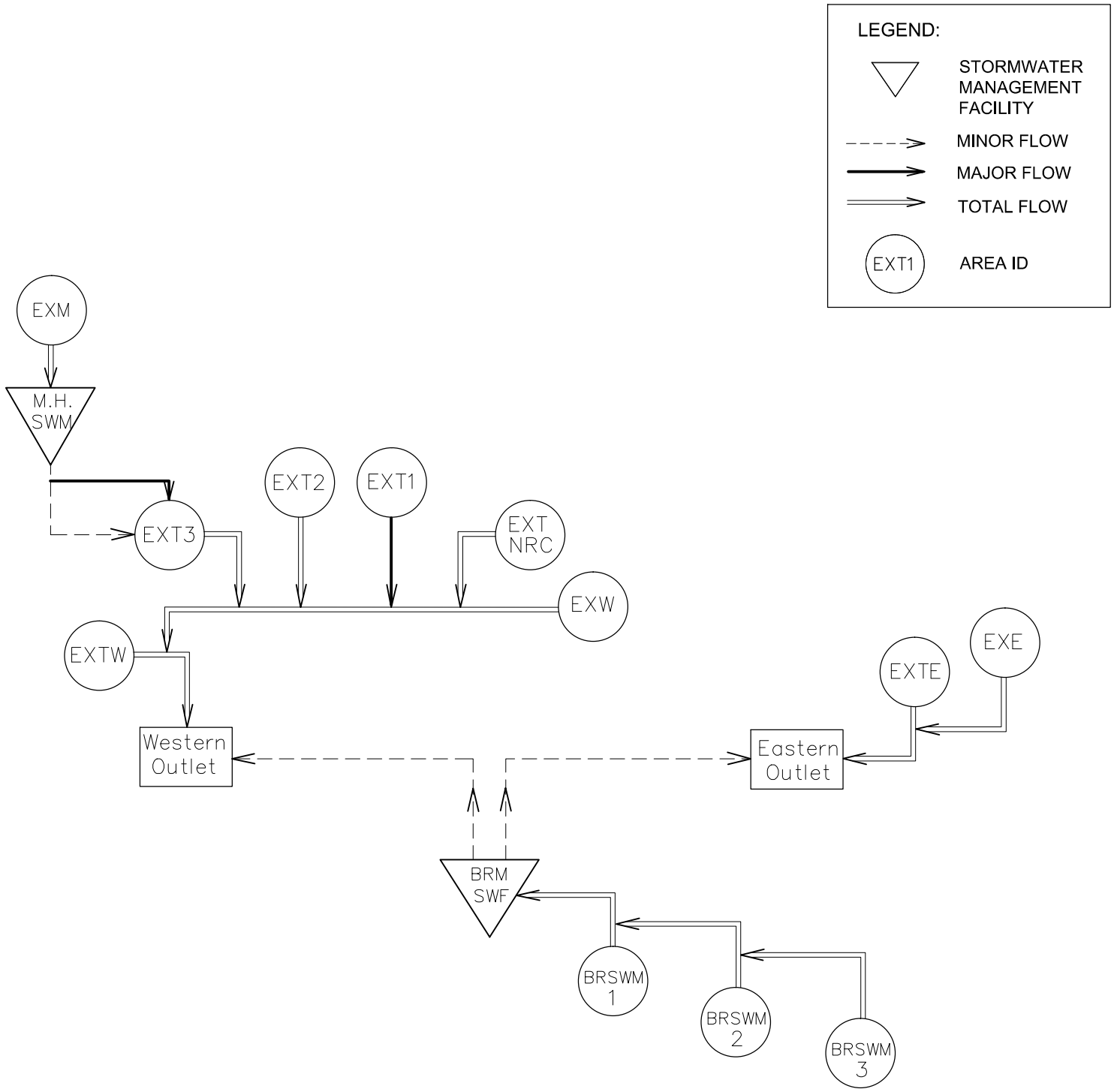
FORMER CFB ROCKCLIFFE
MASTER SERVICING STUDY

Scale

HORIZ 1:100
VERT 1:100

IBI

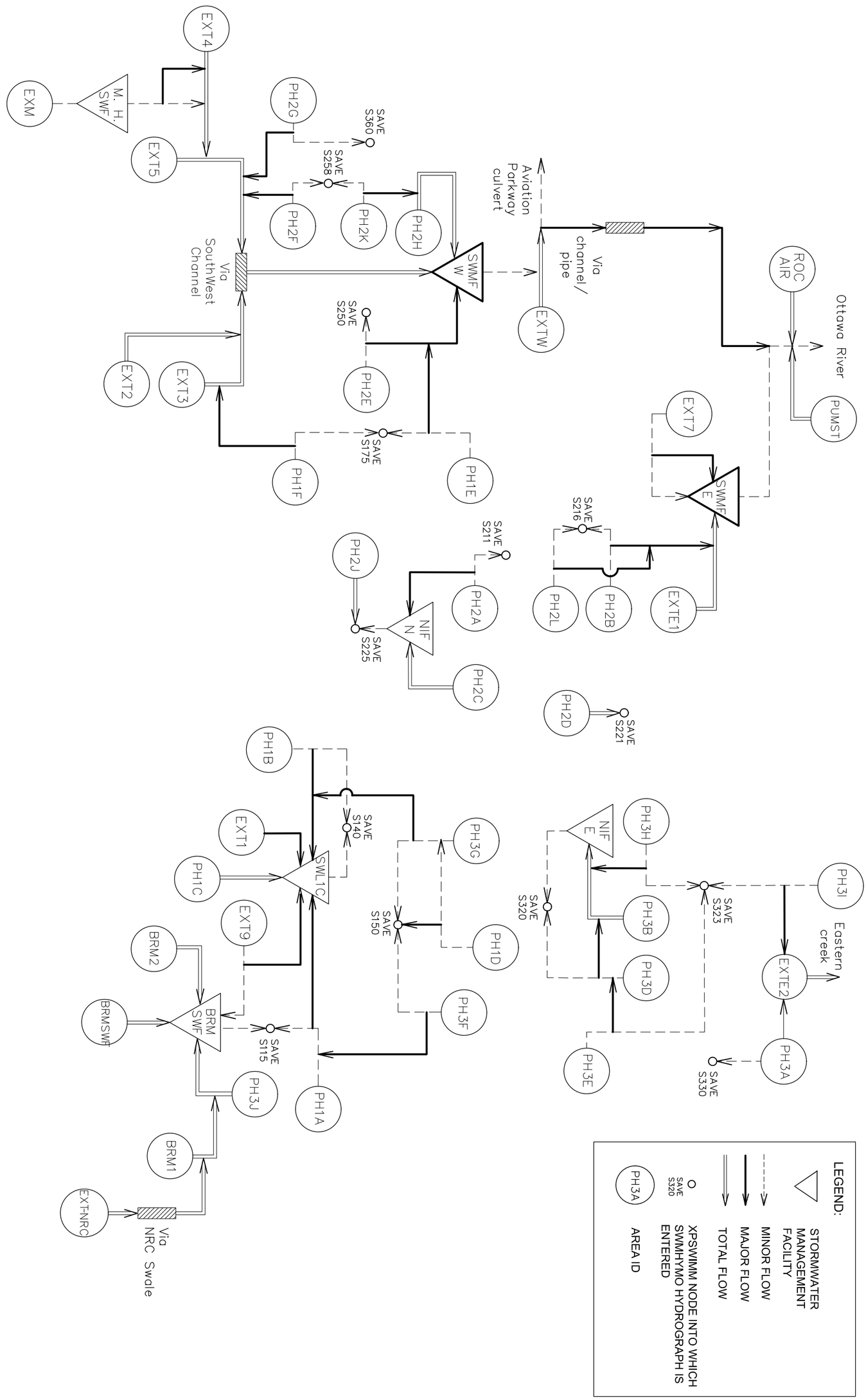

LEGEND
114
1.59ha
0.70
-AREA IDENTIFICATION
-AREA IN HECTARES
-COEFFICIENT
108
NODE IDENTIFICATION
2700mmØ
PROPOSED STORM SEWER SIZE AND DIRECTION
EXISTING SITE STORM SEWER SIZE AND DIRECTION
N
AVIATION MUSEUM
RCAF SANITARY PUMP STATION
CHANNEL-PIPE
POTENTIAL WATERFALL
CENTRAL DRY POND
EASTERN DRY POND
PARK DRY POND
RETROFITTED BURMA ROAD SWM FACILITY
NATURALIZED INFILTRATION SWALE
MONTFORT HOSPITAL
FAIRHAVEN
THORNCLIFFE VILLAGE
NATIONAL RESEARCH COUNCIL (NRC)
HEMLOCK RD.
MAIN STREET
CODD'S ROAD
MAJOR COLLECTOR
MAJOR ONLY
ROCKCLIFFE PKWY
BLACKBELT AVE
LONDON TER
ST LAURENT BLVD
AVIATION PKWY
MEADOW PARK PL
KAREN WAY
RIVIERA DR
CARPENTER WAY
QUARRY RD
KRISTIN WAY
MONTREAL RD
BLAIR RD
Scale
0
100
200
Project Title
FORMER CFB ROCKCLIFFE
MASTER SERVICING STUDY
Drawing Title
RATIONAL METHOD
DRAINAGE AREA PLAN
Sheet No.
FIGURE 6.9



J:\32952-RockcliffeRedev\5.9 Drawings\59civil\current\Report Figures\MSS 2015\Section 6\Figure 6.11 Existing Conditions SWMHYMO.dwg Layout Name: Figure6.11

Project Title	Drawing Title	Sheet No.
FORMER CFB ROCKCLIFFE MASTER SERVICING STUDY	EXISTING CONDITIONS SWMHYMO SCHEMATIC	FIGURE 6.11

J:\32952-RockcliffeRedev\5.9 Drawings\5.9civil\current\Report Figures\MSS 2013\Section 6\Figure 6.12 Post Development Conditions SWMHYMO.dwg Layout Name: Figure6.12 Plot Style: AIA STANDARD COLOR-HALF.CTB Plot Scale: 1:0.98 Plotted At: 8/10/2015 3:12 PM Last Saved By: mmline Last Saved At: Jul. 31, 15



Sheet No.	Drawing Title	Project Title	Scale
FIGURE 6.12	POST-DEVELOPMENT CONDITIONS SWMHYMO SCHEMATIC	FORMER CFB ROCKCLIFFE MASTER SERVICING STUDY	N.T.S.

IBI

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

STORM SEWER DESIGN SHEET

PROJECT: FORMER CFB ROCKCLIFFE
LOCATION: CITY OF OTTAWA
CLIENT: CANADA LANDS COMPANY

LOCATION				AREA (Ha)						RATIONAL DESIGN FLOW													SEWER DATA								
STREET	AREA ID	FROM MH	TO MH	C= 0.20	C= 0.50	C= 0.70	C= 0.75	C= 0.80	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	FIXED FLOW (L/s) IND	FIXED FLOW (L/s) CUM	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	PIPE SIZE (mm) W	PIPE SIZE (mm) H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr) (L/s)	AVAIL CAP (5yr) (%)
Major Collector	100	**MH100**	MH (125)	*0.64*				3.17		7.41	7.41	10.00	0.28	10.28	104.19	122.14	178.56	771.65			0.00	771.65	871.26	49.50	600			1.85	2.985	99.61	11.43%
Major Collector		MH (125)	**MH105**							0.00	7.41	10.28	0.21	10.48	102.76	120.45	176.07	761.00			0.00	761.00	871.26	37.24	600			1.85	2.985	110.26	12.66%
Major Collector	105	**MH105**	MH (127)	0.52				0.58		1.58	8.98	10.48	0.41	10.90	101.70	119.21	174.25	913.79			0.00	913.79	1,161.41	63.10	750			1.00	2.547	247.62	21.32%
Major Collector		MH (127)	**MH128**							0.00	8.98	10.90	0.31	11.21	99.68	116.83	170.75	895.63			0.00	895.63	1,161.41	48.05	750			1.00	2.547	265.78	22.88%
Major Collector		**MH101**	**MH128**	0.13				0.19		0.49	0.49	10.00	1.14	11.14	104.19	122.14	178.56	51.56			0.00	51.56	91.46	55.00	375			0.25	0.802	39.90	43.62%
Major Collector	---	**MH128**	**HW128**							0.00	9.48	11.21	0.22	11.43	98.20	115.08	168.19	930.92			0.00	930.92	1,194.45	23.91	900			0.40	1.819	263.53	22.06%
Major Collector	COM2	**MH126**	MH (310)					2.03		4.51	4.51	10.00	0.67	10.67	104.19	122.14	178.56	470.40			0.00	470.40	624.34	86.13	600			0.95	2.139	153.94	24.66%
Major Collector		MH (310)	**MH120**							0.00	4.51	10.67	0.67	11.34	100.78	118.12	172.65	454.98			0.00	454.98	624.34	86.49	600			0.95	2.139	169.36	27.13%
Major Collector	COM1	**MH120**	MH (298)					2.44		5.43	9.94	11.34	1.02	12.36	97.59	114.36	167.13	970.15			0.00	970.15	1,168.98	92.83	975			0.25	1.517	198.82	17.01%
Major Collector		MH (298)	**MH108**							0.00	9.94	12.36	0.86	13.23	93.17	109.16	159.49	926.18			0.00	926.18	1,168.98	78.49	975			0.25	1.517	242.79	20.77%
---	108	**MH108**	MH (300)			1.13				2.20	12.14	13.23	0.54	13.77	89.76	105.15	153.60	1,089.69			0.00	1,089.69	1,956.07	82.38	975			0.70	2.538	866.38	44.29%
---		MH (300)	MH (299)							0.00	12.14	13.77	0.25	14.02	87.76	102.80	150.15	1,065.42			0.00	1,065.42	1,956.07	37.87	975			0.70	2.538	890.65	45.53%
---		MH (299)	**MH114**							0.00	12.14	14.02	0.80	14.81	86.87	101.75	148.62	1,054.66			0.00	1,054.66	1,956.07	121.42	975			0.70	2.538	901.41	46.08%
---	125	**MH125**	MH (302)					0.33		0.73	0.73	10.00	1.06	11.06	104.19	122.14	178.56	76.47			0.00	76.47	130.62	73.06	375			0.51	1.146	54.16	41.46%
---	---	MH (302)	**MH114**							0.00	0.73	11.06	1.61	12.67	98.90	115.90	169.39	72.58			0.00	72.58	130.62	110.65	375			0.51	1.146	58.04	44.44%
---	114	**MH114**	MH (138)			1.59				3.09	15.97	14.81	0.26	15.07	84.16	98.56	143.94	1,343.92			0.00	1,343.92	1,653.18	32.98	975			0.50	2.145	309.26	18.71%
---		MH (138)	MH (139)							0.00	15.97	15.07	0.27	15.34	83.33	97.58	142.50	1,330.63			0.00	1,330.63	1,653.18	35.10	975			0.50	2.145	322.55	19.51%
---		MH (139)	MH (140)							0.00	15.97	15.34	0.64	15.98	82.46	96.57	141.01	1,316.81			0.00	1,316.81	1,653.18	82.05	975			0.50	2.145	336.37	20.35%
---		MH (140)	MH (141)							0.00	15.97	15.98	0.20	16.18	80.52	94.28	137.65	1,285.71			0.00	1,285.71	1,653.18	25.43	975			0.50	2.145	367.47	22.23%
---		MH (141)	**MH115**							0.00	15.97	16.18	0.10	16.28	79.93	93.59	136.64	1,276.40			0.00	1,276.40	1,653.18	12.64	975			0.50	2.145	376.78	22.79%
---	115	**MH115**	MH119					0.25		0.56	16.52	16.28	0.47	16.75	79.65	93.25	136.15	1,316.11		9,092.00	9092.00	10,408.11	11,180.46	53.40	2700			0.10	1.892	772.35	6.91%
---		MH119	**MH130**							0.00	16.52	16.75	0.66	17.41	78.31	91.68	133.84	1,293.97			9092.00	10,385.97	11,180.46	75.21	2700			0.10	1.892	794.50	7.11%
---	INST1, INST2	**MH120**	**MH125**					*5.41*		12.03	12.03	10.00	1.20	11.20	104.19	122.14	178.56	1,253.63			0.00	1,253.63	2,091.13	194.64	975			0.80	2.713	837.49	40.05%
---	125	**MH125**	**MH130**			1.30		1.67		6.24	18.28	11.20	1.07	12.26	98.28	115.17	168.32	1,796.05			0.00	1,796.05	2,483.52	177.59	1050			0.76	2.779	687.47	27.68%
---	163	**MH163**	MH (304)			0.75				1.46	1.46	10.00	1.66	11.66	104.19	122.14	178.56	152.07			0.00	152.07	195.57	87.43	525			0.19	0.875	43.50	22.24%
---		MH (304)	**MH130**							0.00	1.46	11.66	1.37	13.03	96.15	112.67	164.65	140.33			0.00	140.33	195.57	71.88	525			0.19	0.875	55.23	28.24%
---	130	**MH130**	**MH135**					0.21		0.47	36.73	17.41	0.49	17.90	76.50	89.56	130.72	2,809.65		0.00	9092.00	11,901.65	17,677.86	88.81	2700			0.25	2.991	5776.22	32.67%
---	164	**MH164**	MH (306)			0.75				1.46	1.46	10.00	1.62	11.62	104.19	122.14	178.56	152.07			0.00	152.07	200.65	87.33	525			0.20	0.898	48.58	24.21%
---		MH (306)	**MH135**							0.00	1.46	11.62	1.33	12.95	96.35	112.90	164.99	140.62			0.00	140.62	200.65	71.77	525			0.20	0.898	60.03	29.92%
---	135	**MH135**	**MH140**					1.46		3.25	41.43	17.90	0.60	18.51	75.21	88.04	128.50	3,116.31		0.00	9092.00	12,208.31	17,677.86	107.93	2700			0.25	2.991	5469.55	30.94%
---	165	**MH165**	MH (308)					0.29		0.64	0.64	10.00	1.81	11.81	104.19	122.14	178.56	67.20			0.00	67.20	91.46	87.19	375			0.25	0.802	24.26	26.52%
---		MH (308)	**MH140**							0.00	0.64	11.81	1.49	13.30	95.51	111.91	163.54	61.60			0.00	61.60	91.46	71.60	375			0.25	0.802	29.86	32.65%
---	140	**MH140**	MH (134)					0.37		0.82	42.90	18.51	0.40	18.91	73.71	86.28	125.91	3,162.24		0.00	9092.00	12,254.24	17,677.86	72.45	2700			0.25	2.991	5423.62	30.68%
---		MH (134)	**MH150**							0.00	42.90	18.91	0.44	19.35	72.74	85.13	124.24	3,120.56			9092.00	12,212.56	17,677.86	79.45	2700			0.25	2.991	5465.31	30.92%
Codd's Road	CODD'S	**MH142**	MH131	6.10	1.42			1.31		8.28	8.28	10.00	0.50	10.50	104.19	122.14	178.56	862.60			0.00	862.60	1,074.02	87.78	675			1.50	2.908	211.42	19.69%
Codd's Road		MH131	MH (147)							0.00	8.28	10.50	0.40	10.90	101.61	119.10	174.09	841.20			0.00	841.20	1,074.02	69.94	675			1.50	2.908	232.82	21.68%
Codd's Road		MH (147)	MH (148)							0.00	8.28	10.90	0.65	11.56	99.65	116.79	170.70	824.97			0.00	824.97	1,034.42	61.65	900			0.30	1.575	209.45	20.25%
Codd's Road		MH (148)	**MH150**							0.00	8.28	11.56	0.62	12.18	96.63	113.24	165.48	800.01			0.00	800.01	1,034.42	58.50	900			0.30	1.575	234.41	22.66%
Codd's Road	150	**MH150**	MH (150)	0.92				2.18		5.36	56.54	19.35	0.52	19.87	71.71	83.92	122.46	4,054.18		160.00	9252.00	13,306.18	14,807.43	62.99	3000			0.10	2.029	1501.25	10.14%
Codd's Road		MH (150)	**MH155**							0.00	56.54	19.87	0.89	20.76	70.54	82.55	120.44	3,988.20			9252.00	13,240.20	14,807.43	108.36	3000			0.10	2.029	1567.23	10.58%
Main Street	126	**MH126**	**MH160**					0.36		0.80	0.80	10.00	2.86	12.86	104.19	122.14	178.56	83.42			0.00	83.42	100.18	150.55	375			0.30	0.879	16.76	16.73%
---	301	**MH301**	**MH160**					1.51		3.36	3.36	10.00	2.45	12.45	104.19	122.14	178.56	349.91			0.00	349.91	392.18	155.83	675			0.20	1.062	42.27	10.78%
Main Street	160	**MH160**	**MH161**					0.19		0.42	4.58	12.86	0.48	13.34	91.19	106.84	156.08	417.80		0.00	0.00	417.80	999.86	78.00	675			1.30	2.707	582.06	58.21%
---	302	**MH302**	**MH161**					1.06		2.36	2.36	10.00	1.60	11.60	104.19	122.14	178.56	245.63			0.00	245.63	361.72	155.85	525			0.65	1.619	116.09	32.09%

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

STORM SEWER DESIGN SHEET

PROJECT: FORMER CFB ROCKCLIFFE
LOCATION: CITY OF OTTAWA
CLIENT: CANADA LANDS COMPANY

LOCATION				AREA (Ha)						RATIONAL DESIGN FLOW													SEWER DATA								
STREET	AREA ID	FROM MH	TO MH	C= 0.20	C= 0.50	C= 0.70	C= 0.75	C= 0.80	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	FIXED FLOW (L/s) IND	FIXED FLOW (L/s) CUM	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	PIPE SIZE (mm) W	PIPE SIZE (mm) H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr) (L/s)	AVAIL CAP (5yr) (%)
Main Street	161	**MH161**	**MH163**					0.18		0.40	7.34	13.34	0.44	13.78	89.35	104.67	152.90	655.76		0.00	0.00	655.76	1,109.24	79.62	675			1.60	3.003	453.48	40.88%
---	314, 308	**MH314**	MH308	0.38				0.68		1.72	1.72	10.00	0.61	10.61	104.19	122.14	178.56	179.59			0.00	179.59	358.16	79.88	450			1.45	2.182	178.57	49.86%
---		MH308	**MH163**							0.00	1.72	10.61	0.59	11.20	101.08	118.47	173.17	174.22			0.00	174.22	351.93	75.98	450			1.40	2.144	177.71	50.50%
Main Street	163	**MH163**	**MH164**					0.20		0.44	9.51	13.78	0.49	14.26	87.73	102.76	150.09	834.07		0.00	0.00	834.07	1,105.77	87.42	675			1.59	2.994	271.70	24.57%
---	311	**MH311**	**MH164**					1.21		2.69	2.69	10.00	1.34	11.34	104.19	122.14	178.56	280.39			0.00	280.39	318.96	155.81	450			1.15	1.943	38.57	12.09%
Main Street	164	**MH164**	**MH165**						0.21	0.53	12.72	14.26	0.80	15.07	86.01	100.74	147.13	1,094.42		0.00	0.00	1,094.42	1,252.90	109.46	825			0.70	2.271	158.48	12.65%
---	312	**MH312**	**MH165**					1.48		3.29	3.29	10.00	1.29	11.29	104.19	122.14	178.56	342.95			0.00	342.95	448.66	155.81	525			1.00	2.008	105.70	23.56%
Main Street	165	**MH165**	**MH155**	0.30					0.30	0.92	16.93	15.07	1.80	16.86	83.34	97.59	142.52	1,411.17		0.00	0.00	1,411.17	2,083.42	151.92	1350			0.14	1.410	672.25	32.27%
Codd's Road	201	**MH201**	**MH155**					*2.33*		5.18	5.18	10.00	0.93	10.93	104.19	122.14	178.56	539.92			0.00	539.92	822.81	157.13	600			1.65	2.819	282.89	34.38%
Hemlock Road	155	**MH155**	MH (159)					0.23		0.51	79.17	20.76	0.26	21.02	68.63	80.30	117.15	5,432.88		0.00	9252.00	14,684.88	20,940.87	44.47	3000			0.20	2.870	6256.00	29.87%
Hemlock Road		MH (159)	**MH211**							0.00	79.17	21.02	0.26	21.28	68.09	79.68	116.23	5,390.65			9252.00	14,642.65	20,940.87	45.30	3000			0.20	2.870	6298.22	30.08%
Hemlock Road	211	**MH211**	MH (161)					0.19		0.42	79.59	21.28	0.25	21.53	67.56	79.05	115.31	5,376.94			9252.00	14,628.94	20,940.87	43.34	3000			0.20	2.870	6311.94	30.14%
Hemlock Road		MH (161)	**MH216**							0.00	79.59	21.53	0.20	21.73	67.06	78.46	114.45	5,336.97			9252.00	14,588.97	20,940.87	34.81	3000			0.20	2.870	6351.91	30.33%
---	190	**MH190**	MH (276)			0.78				1.52	1.52	10.00	0.52	10.52	104.19	122.14	178.56	158.15			0.00	158.15	231.37	63.61	375			1.60	2.029	73.21	31.64%
---		MH (276)	MH (277)							0.00	1.52	10.52	0.17	10.69	101.51	118.98	173.92	154.08			0.00	154.08	231.37	20.18	375			1.60	2.029	77.28	33.40%
---		MH (277)	MH (278)							0.00	1.52	10.69	0.32	11.01	100.69	118.02	172.50	152.84			0.00	152.84	231.37	38.64	375			1.60	2.029	78.53	33.94%
---		MH (278)	MH (279)							0.00	1.52	11.01	0.22	11.22	99.17	116.22	169.86	150.52			0.00	150.52	231.37	26.40	375			1.60	2.029	80.84	34.94%
---		MH (279)	**MH185**							0.00	1.52	11.22	0.48	11.70	98.15	115.03	168.11	148.98			0.00	148.98	231.37	58.52	375			1.60	2.029	82.38	35.61%
---	185	**MH185**	MH (281)			0.38				0.74	2.26	11.70	0.32	12.02	95.98	112.47	164.36	216.67			0.00	216.67	300.45	19.48	600			0.22	1.029	83.78	27.89%
---		MH (281)	**MH183**							0.00	2.26	12.02	1.02	13.04	94.62	110.87	162.00	213.59			0.00	213.59	300.45	63.18	600			0.22	1.029	86.86	28.91%
---	192	**MH192**	MH (283)			1.27				2.47	2.47	10.00	1.30	11.30	104.19	122.14	178.56	257.50			0.00	257.50	332.84	89.00	600			0.27	1.140	75.34	22.64%
---		MH (283)	**MH190**							0.00	2.47	11.30	1.39	12.69	97.79	114.60	167.48	241.68			0.00	241.68	332.84	95.19	600			0.27	1.140	91.16	27.39%
---	190	**MH190**	**MH179**			0.41				0.80	3.27	12.69	0.47	13.17	91.84	107.60	157.20	300.25			0.00	300.25	871.26	85.03	600			1.85	2.985	571.00	65.54%
---	194	**MH194**	MH (286)			1.35				2.63	2.63	10.00	1.21	11.21	104.19	122.14	178.56	273.73			0.00	273.73	347.53	112.65	525			0.60	1.555	73.80	21.24%
---		MH (286)	**MH179**							0.00	2.63	11.21	1.07	12.28	98.22	115.11	168.23	258.04			0.00	258.04	347.53	100.19	525			0.60	1.555	89.49	25.75%
---	179	**MH179**	MH (209)			0.43				0.84	6.73	13.17	0.33	13.50	89.99	105.42	154.00	605.92		0.00	0.00	605.92	892.10	39.25	750			0.59	1.956	286.18	32.08%
---		MH (209)	**MH183**							0.00	6.73	13.50	0.32	13.82	88.74	103.94	151.84	597.47			0.00	597.47	892.10	37.55	750			0.59	1.956	294.63	33.03%
---	183	**MH183**	**MH182**	0.38		0.52				1.22	10.21	13.82	1.65	15.47	87.57	102.57	149.82	894.43		0.00	0.00	894.43	1,408.95	119.58	1200			0.12	1.207	514.53	36.52%

---	195	**MH195**	**MH182**			0.74				1.44	1.44	10.00	1.09	11.09	104.19	122.14	178.56	150.04			0.00	150.04	283.73	113.34	450			0.91	1.728	133.69	47.12%

---	182	**MH182**	**MH175**					0.14		0.31	11.97	15.47	0.92	16.39	82.06	96.09	140.31	981.88		0.00	0.00	981.88	1,626.92	77.03	1200			0.16	1.394	645.04	39.65%
---	192	**MH192**	MH(121)			0.51				0.99	0.99	10.00	0.27	10.27	104.19	122.14	178.56	103.41			0.00	103.41	129.34	18.24	375			0.50	1.134	25.93	20.05%
---		MH(121)	**MH194**							0.00	0.99	10.27	1.04	11.31	102.80	120.50	176.15	102.02			0.00	102.02	129.34	70.91	375			0.50	1.134	27.31	21.12%
---	194	**MH194**	**MH195**			0.76				1.48	2.47	11.31	0.84	12.15	97.75	114.55	167.41	241.58			0.00	241.58	347.53	78.13	525			0.60	1.555	105.95	30.49%
---		**MH195**	**MH172**							0.00	2.47	12.15	0.83	12.97	94.07	110.22	161.06	232.49			0.00	232.49	347.53	77.09	525			0.60	1.555	115.03	33.10%
---	150	**MH150**	MH (293)					0.24		0.53	0.53	10.00	0.62	10.62	104.19	122.14	178.56	55.61			0.00	55.61	105.81	53.85	300			1.10	1.450	50.19	47.44%
---		MH (293)	**MH172**							0.00	0.53	10.62	0.47	11.09	101.03	118.42	173.09	53.93			0.00	53.93	105.81	40.80	300			1.10	1.450	51.88	49.03%
---	172	**MH172**	MH (205)			0.62				1.21	4.21	12.97	0.51	13.49	90.73	106.30	155.29	382.15		0.00	0.00	382.15	607.69	64.19	600			0.90	2.082	225.54	37.11%
---		MH (205)	**MH175**							0.00	4.21	13.49	0.44	13.93	88.79	104.00	151.92	373.95			0.00	373.95	607.69	54.95	600			0.90	2.082	233.74	38.46%
---	INST3	**MH175**	MH (289)					3.09		6.87	23.05	16.39	0.77	17.16	79.31	92.86	135.57	1,828.01		0.00	0.00	1,828.01	3,153.62	65.71	1650			0.11	1.429	1325.61	42.03%
---		MH (289)	**MH230**							0.00	23.05	17.16	1.32	18.48	77.17	90.34	131.88	1,778.73			0.00	1,778.73	3,153.62	113.29	1650			0.11	1.429	1374.90	43.60%
Hemlock Road	230	**MH230**	**MH216**					0.25		0.56	23.60	18.48	1.30	19.78	73.77	86.35	126.02	1,741.36			0.00	1,741.36	3,006.86	106.28	1650			0.10	1.362	1265.51	42.09%
---	216	**MH216**	**MH220**					0.83		1.85	105.04	21.73	1.19	22.92	66.66	77.99	113.77	7,001.89		0.00	9252.00	16,253.89	18,135.33	177.18	3000			0.15	2.485	1881.44	10.37%

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

STORM SEWER DESIGN SHEET

PROJECT: FORMER CFB ROCKCLIFFE
LOCATION: CITY OF OTTAWA
CLIENT: CANADA LANDS COMPANY

LOCATION				AREA (Ha)						RATIONAL DESIGN FLOW													SEWER DATA								
STREET	AREA ID	FROM MH	TO MH	C= 0.20	C= 0.50	C= 0.70	C= 0.75	C= 0.80	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	FIXED FLOW (L/s) IND	FIXED FLOW (L/s) CUM	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	PIPE SIZE (mm) W	PIPE SIZE (mm) H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr) (L/s)	AVAIL CAP (5yr) (%)
---	211	**MH211**	MH (297)					1.93		4.29	4.29	10.00	0.99	10.99	104.19	122.14	178.56	447.23			0.00	447.23	516.44	105.62	600			0.65	1.769	69.21	13.40%
---		MH (297)	**MH213**							0.00	4.29	10.99	0.51	11.51	99.22	116.28	169.95	425.87			0.00	425.87	516.44	54.28	600			0.65	1.769	90.57	17.54%
---	213	**MH213**	MH (294)					0.18		0.40	4.69	11.51	0.19	11.69	96.86	113.50	165.87	454.52			0.00	454.52	640.56	24.75	600			1.00	2.195	186.04	29.04%
---		MH (294)	MH (295)							0.00	4.69	11.69	0.23	11.92	96.02	112.52	164.43	450.60			0.00	450.60	640.56	30.15	600			1.00	2.195	189.96	29.66%
---		MH (295)	**MH220**							0.00	4.69	11.92	0.34	12.26	95.03	111.35	162.70	445.92			0.00	445.92	640.56	44.98	600			1.00	2.195	194.64	30.39%

---	220	**MH220**	**MH221**	1.14				0.99		2.84	112.57	22.92	0.78	23.70	64.43	75.37	109.92	7,252.30		0.00	9252.00	16,504.30	18,135.33	115.67	3000			0.15	2.485	1631.03	8.99%
---	221	**MH221**	**MH222**					0.50		1.11	113.68	23.70	0.28	23.98	63.06	73.76	107.56	7,168.13			9252.00	16,420.13	21,458.01	50.28	3000			0.21	2.941	5037.87	23.48%
---		**MH222**	MH (194)							0.00	113.68	23.98	0.40	24.38	62.57	73.19	106.72	7,112.73			9252.00	16,364.73	21,458.01	70.00	3000			0.21	2.941	5093.28	23.74%
---		MH (194)	**MH225**							0.00	113.68	24.38	0.13	24.51	61.90	72.41	105.58	7,037.17		0.00	9252.00	16,289.17	21,458.01	22.14	3000			0.21	2.941	5168.84	24.09%
---	300	**MH300**	**MH301**					0.15		0.33	0.33	10.00	1.78	11.78	104.19	122.14	178.56	34.76			0.00	34.76	133.02	86.45	450			0.20	0.810	98.26	73.87%
---	301	**MH301**	**MH302**					0.15		0.33	0.67	11.78	1.60	13.38	95.65	112.08	163.79	63.82			0.00	63.82	133.02	78.00	450			0.20	0.810	69.20	52.02%
---	302	**MH302**	**MH314**					0.14		0.31	0.98	13.38	0.99	14.37	89.17	104.46	152.59	87.26			0.00	87.26	220.58	79.44	450			0.55	1.344	133.32	60.44%
---	314	**MH314**	**MH311**					0.14		0.31	1.29	14.37	0.81	15.17	85.66	100.32	146.52	110.49			0.00	110.49	297.43	87.56	450			1.00	1.812	186.95	62.85%
---	311	**MH311**	**MH312**					0.20		0.44	1.73	15.17	1.01	16.18	83.00	97.20	141.93	143.98			0.00	143.98	297.43	109.47	450			1.00	1.812	153.45	51.59%
---	201	**MH201**	**MH312**					0.24		0.53	0.53	10.00	2.37	12.37	104.19	122.14	178.56	55.61			0.00	55.61	67.67	131.93	300			0.45	0.927	12.06	17.82%
---	312	**MH312**	**MH326**					1.35		3.00	5.27	16.18	2.41	18.59	79.93	93.58	136.63	421.28		0.00	0.00	421.28	579.98	151.78	825			0.15	1.051	158.70	27.36%
Major Collector	COM3	**MH126**	**MH300**					2.31		5.14	5.14	10.00	2.01	12.01	104.19	122.14	178.56	535.29			0.00	535.29	636.13	168.48	750			0.30	1.395	100.85	15.85%
Major Collector	COM4	**MH300**	**MH310**					0.87		1.93	7.07	12.01	0.66	12.67	94.64	110.89	162.04	669.32			0.00	669.32	971.71	84.22	750			0.70	2.131	302.38	31.12%
Major Collector	310	**MH310**	MH (178)			1.58				3.07	10.15	12.67	0.70	13.37	91.92	107.69	157.34	932.72			0.00	932.72	1,296.87	98.01	825			0.75	2.350	364.15	28.08%
Major Collector		MH (178)	**MH315**							0.00	10.15	13.37	0.81	14.18	89.23	104.53	152.70	905.46			0.00	905.46	1,296.87	114.82	825			0.75	2.350	391.42	30.18%
---	314	**MH314**	**MH315**					0.14		0.31	0.31	10.00	0.72	10.72	104.19	122.14	178.56	32.44			0.00	32.44	92.02	78.38	250			2.20	1.816	59.58	64.74%
																						0.00									
---	315	**MH315**	**MH320**					0.17		0.38	10.84	14.18	0.55	14.73	86.30	101.08	147.63	935.18		0.00	0.00	935.18	1,640.43	97.47	825			1.20	2.973	705.25	42.99%
---	320	**MH320**	MH (182)	*3.39*				0.19		2.31	13.14	14.73	0.35	15.07	84.45	98.90	144.43	1,109.97		147.20	147.20	1,257.17	1,760.81	24.77	1350			0.10	1.192	503.64	28.60%
---		MH (182)	MH (183)							0.00	13.14	15.07	0.46	15.53	83.32	97.57	142.48	1,095.14			147.20	1,242.34	1,760.81	32.67	1350			0.10	1.192	518.48	29.45%
---		MH (183)	**MH323**							0.00	13.14	15.53	0.60	16.13	81.88	95.88	140.00	1,076.23			147.20	1,223.43	1,760.81	43.11	1350			0.10	1.192	537.39	30.52%
---	311	**MH311**	MH (321)			1.00				1.95	1.95	10.00	1.01	11.01	104.19	122.14	178.56	202.76			0.00	202.76	311.95	115.02	450			1.10	1.900	109.19	35.00%
---		MH (321)	**MH323**							0.00	1.95	11.01	0.25	11.26	99.15	116.20	169.83	192.95			0.00	192.95	311.95	28.70	450			1.10	1.900	119.01	38.15%
---	323	**MH323**	MH (185)					1.77		3.94	19.03	16.13	0.35	16.49	80.06	93.74	136.87	1,523.34		0.00	147.20	1,670.54	2,332.02	26.99	1500			0.10	1.278	661.49	28.37%
---		MH (185)	MH (186)							0.00	19.03	16.49	0.48	16.97	79.05	92.55	135.11	1,503.95			147.20	1,651.15	2,332.02	37.18	1500			0.10	1.278	680.87	29.20%
---		MH (186)	**MH326**							0.00	19.03	16.97	0.53	17.50	77.69	90.95	132.77	1,478.13			147.20	1,625.33	2,332.02	40.46	1500			0.10	1.278	706.70	30.30%
---	326	**MH326**	MH (188)					*3.83*		8.52	32.82	18.59	0.60	19.18	73.51	86.04	125.57	2,412.31		0.00	147.20	2,559.51	3,006.86	48.73	1650			0.10	1.362	447.36	14.88%
---		MH (188)	**MH205**							0.00	32.82	19.18	1.02	20.21	72.10	84.38	123.13	2,365.82			147.20	2,513.02	3,006.86	83.74	1650			0.10	1.362	493.85	16.42%
Codd's Road	201	**MH201**	MH (324)					0.31		0.69	0.69	10.00	1.76	11.76	104.19	122.14	178.56	71.83			0.00	71.83	91.46	84.87	375			0.25	0.802	19.62	21.45%
Codd's Road		MH (324)	**MH205**							0.00	0.69	11.76	1.49	13.25	95.72	112.16	163.90	65.99			0.00	65.99	91.46	71.59	375			0.25	0.802	25.46	27.84%
---		**MH205**	MH (386)							0.00	33.50	20.21	0.05	20.25	69.80	81.68	119.17	2,338.54		98.00	245.20	2,583.74	4,754.27	6.00	1650			0.25	2.154	2170.53	45.65%
---		MH (386)	MH (190)							0.00	33.50	20.25	0.11	20.37	69.70	81.56	119.00	2,335.18			245.20	2,580.38	4,754.27	14.70	1650			0.25	2.154	2173.89	45.73%
---	205	MH (190)	MH (191)	2.53						1.41	34.91	20.37	0.58	20.95	69.45	81.27	118.58	2,424.69			245.20	2,669.89	4,754.27	75.27	1650			0.25	2.154	2084.38	43.84%
---		MH (191)	MH (192)							0.00	34.91	20.95	0.37	21.32	68.23	79.84	116.47	2,382.04			245.20	2,627.24	4,754.27	48.00	1650			0.25	2.154	2127.03	44.74%
---		MH (192)	MH (193)							0.00	34.91	21.32	1.08	22.41	67.48	78.95	115.17	2,355.70			245.20	2,600.90	4,754.27	140.00	1650			0.25	2.154	2153.37	45.29%
---		MH (193)	**MH225**							0.00	34.91	22.41	0.43	22.83	65.38	76.49	111.56	2,282.44			245.20	2,527.64	4,754.27	54.94	1650			0.25	2.154	2226.63	46.83%
---	225	**MH225**	**MH226**	5.14						2.86	151.45	24.51	0.04	24.55	61.70	72.16	105.22	9,343.86		0.00	9497.20	18,841.06	22,981.60	5.14		3600	3000	0.10	2.128	4140.54	18.02%
---	SDA1	**MH330**	**MH331**			2.81				5.47	5.47	10.00	1.04	11.04	104.19	122.14	178.56	569.75			0.00	569.75	640.56	136.42	600			1.00	2.195	70.81	11.05%
---		**MH334**	**MH (335)**							0.00	0.00	10.00	0.40	10.40	104.19	122.14	178.56	0.00			0.00	0.00	200.37	42.56	375			1.20	1.757	200.37	100.00%
---	335	**MH (335)**	MH (336)					0.25		0.56	0.56	10.40	0.48	10.88	102.11	119.69	174.95	56.77			0.00	56.77	200.37	50.31	375			1.20	1.757	143.60	71.67%
---		MH (336)	MH (337)							0.00	0.56	10.88	0.57	11.45	99.76	116.92	170.89	55.47			0.00	55.47	200.37	60.52	375			1.20	1.757	144.90	72.32%
---		MH (337)	**MH338**							0.00	0.56	11.45	0.33	11.78	97.09	113.78	166.27	53.98			0.00	53.98	200.37	34.55	375			1.20	1.757	146.39	73.06%
---	339	**MH339**	**MH338**					0.08		0.18	0.18	10.00	0.60	10.60	104.19	122.14	178.56	18.54			0.00	18.54	91.46	28.84	375			0.25	0.802	72.92	79.73%

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

STORM SEWER DESIGN SHEET

PROJECT: FORMER CFB ROCKCLIFFE
LOCATION: CITY OF OTTAWA
CLIENT: CANADA LANDS COMPANY

LOCATION				AREA (Ha)						RATIONAL DESIGN FLOW													SEWER DATA								
STREET	AREA ID	FROM MH	TO MH	C= 0.20	C= 0.50	C= 0.70	C= 0.75	C= 0.80	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	FIXED FLOW (L/s) IND	FIXED FLOW (L/s) CUM	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	PIPE SIZE (mm) W	PIPE SIZE (mm) H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr) (L/s)	AVAIL CAP (5yr) (%)
---	SDA2	**MH338**	MH (339)			3.54				6.89	7.62	11.78	1.33	13.11	95.64	112.06	163.76	729.01		0.00	0.00	729.01	944.29	114.46	900			0.25	1.438	215.28	22.80%
---		MH (339)	MH (340)							0.00	7.62	13.11	0.40	13.51	90.21	105.68	154.38	687.65			0.00	687.65	944.29	34.49	900			0.25	1.438	256.64	27.18%
---		MH (340)	MH (341)							0.00	7.62	13.51	0.47	13.97	88.71	103.91	151.79	676.19			0.00	676.19	944.29	40.17	900			0.25	1.438	268.10	28.39%
---		MH (341)	MH (342)							0.00	7.62	13.97	0.47	14.44	87.02	101.93	148.88	663.37			0.00	663.37	944.29	40.24	900			0.25	1.438	280.93	29.75%
---		MH (342)	MH (343)							0.00	7.62	14.44	0.71	15.15	85.41	100.03	146.09	651.05			0.00	651.05	944.29	60.97	900			0.25	1.438	293.24	31.05%
---		MH (343)	MH (344)							0.00	7.62	15.15	0.37	15.52	83.08	97.30	142.08	633.33			0.00	633.33	944.29	31.89	900			0.25	1.438	310.96	32.93%
---		MH (344)	**MH331**							0.00	7.62	15.52	0.90	16.42	81.92	95.93	140.07	624.48			0.00	624.48	944.29	77.80	900			0.25	1.438	319.81	33.87%
---	--	**MH331**	MH332							0.00	13.09	16.42	0.36	16.78	79.24	92.77	135.44	1,037.30		0.00	0.00	1,037.30	1,689.20	55.85	900			0.80	2.572	651.90	38.59%
---		MH332	**MH333**							0.00	13.09	16.78	0.65	17.43	78.21	91.57	133.68	1,023.90			0.00	1,023.90	1,689.20	100.00	900			0.80	2.572	665.30	39.39%
---	183	**MH241**	**MH242**					0.13		0.29	0.29	10.00	0.93	10.93	104.19	122.14	178.56	30.12			0.00	30.12	62.04	68.00	250			1.00	1.224	31.91	51.44%
---	175	**MH243**	**MH242**			0.69				1.34	1.34	10.00	1.27	11.27	104.19	122.14	178.56	139.90			0.00	139.90	168.64	113.00	375			0.85	1.479	28.73	17.04%
---	242	**MH242**	MH (218)					0.89		1.98	3.61	11.27	0.38	11.65	97.92	114.75	167.70	353.60		0.00	0.00	353.60	759.45	46.80	675			0.75	2.056	405.85	53.44%
---		MH (218)	**MH244**							0.00	3.61	11.65	0.42	12.08	96.21	112.73	164.74	347.42			0.00	347.42	759.45	52.32	675			0.75	2.056	412.03	54.25%
---	235	**MH235**	MH210					1.03		2.29	2.29	10.00	0.46	10.46	104.19	122.14	178.56	238.68			0.00	238.68	347.53	43.37	525			0.60	1.555	108.85	31.32%
---		MH210	**MH244**							0.00	2.29	10.46	0.84	11.31	101.80	119.32	174.42	233.20			0.00	233.20	347.53	78.74	525			0.60	1.555	114.33	32.90%
---	244	**MH244**	MH (240)	2.24				0.41		2.16	8.06	12.08	0.93	13.01	94.37	110.57	161.57	760.54		0.00	0.00	760.54	1,101.81	134.65	750			0.90	2.416	341.27	30.97%
---		MH (240)	**MH258**							0.00	8.06	13.01	0.53	13.54	90.61	106.15	155.07	730.23			0.00	730.23	1,101.81	77.04	750			0.90	2.416	371.58	33.72%
---	257	**MH257**	**MH256**					1.40		3.11	3.11	10.00	1.47	11.47	104.19	122.14	178.56	324.42			0.00	324.42	367.27	71.26	750			0.10	0.805	42.86	11.67%
---	256	**MH256**	**MH258**					1.46		3.25	6.36	11.47	1.09	12.56	97.00	113.67	166.12	616.98			0.00	616.98	821.24	117.34	750			0.50	1.801	204.27	24.87%
---	258	**MH258**	MH (243)					2.83		6.29	20.71	13.54	0.28	13.82	88.60	103.79	151.60	1,835.28		0.00	0.00	1,835.28	2,490.17	28.39	1350			0.20	1.685	654.88	26.30%
---		MH (243)	MH (266)							0.00	20.71	13.82	0.90	14.72	87.58	102.59	149.84	1,814.15			0.00	1,814.15	2,490.17	91.02	1350			0.20	1.685	676.01	27.15%
---		MH (266)	**MH252**							0.00	20.71	14.72	0.14	14.85	84.48	98.94	144.49	1,749.89			0.00	1,749.89	2,490.17	13.86	1350			0.20	1.685	740.27	29.73%
---	252	**MH252**	**MH251**					0.15		0.33	21.05	14.85	0.77	15.62	84.03	98.41	143.71	1,768.58			0.00	1,768.58	2,490.17	77.49	1350			0.20	1.685	721.58	28.98%
---	256	**MH256**	MH (233)					*2.50*		5.56	5.56	10.00	0.21	10.21	104.19	122.14	178.56	579.31			0.00	579.31	876.93	30.59	675			1.00	2.374	297.62	33.94%
---		MH (233)	MH (234)							0.00	5.56	10.21	0.23	10.44	103.07	120.82	176.62	573.08			0.00	573.08	876.93	32.54	675			1.00	2.374	303.85	34.65%
---		MH (234)	MH (235)							0.00	5.56	10.44	0.21	10.65	101.91	119.45	174.61	566.61			0.00	566.61	876.93	30.14	675			1.00	2.374	310.32	35.39%
---		MH (235)	MH (236)							0.00	5.56	10.65	0.28	10.94	100.86	118.21	172.79	560.76			0.00	560.76	876.93	40.35	675			1.00	2.374	316.17	36.05%
---		MH (236)	MH (237)							0.00	5.56	10.94	0.24	11.18	99.49	116.60	170.42	553.14			0.00	553.14	876.93	34.51	675			1.00	2.374	323.79	36.92%
---		MH (237)	**MH251**							0.00	5.56	11.18	0.18	11.36	98.35	115.26	168.44	546.80			0.00	546.80	876.93	25.72	675			1.00	2.374	330.13	37.65%
---	251	**MH251**	MH (270)	0.64				0.12		0.62	27.23	15.62	0.20	15.82	81.60	95.55	139.52	2,222.04		0.00	0.00	2,222.04	4,313.09	35.44	1350			0.60	2.919	2091.05	48.48%
---		MH (270)	**MH250**							0.00	27.23	15.82	0.18	16.01	80.99	94.83	138.46	2,205.29			0.00	2,205.29	4,313.09	32.23	1350			0.60	2.919	2107.80	48.87%
Hemlock Road	230	**MH234**	MH (273)					2.66		5.92	5.92	10.00	0.25	10.25	104.19	122.14	178.56	616.39			0.00	616.39	876.93	35.00	675			1.00	2.374	260.54	29.71%
Hemlock Road		MH (273)	MH (274)							0.00	5.92	10.25	0.27	10.52	102.91	120.63	176.34	608.81			0.00	608.81	876.93	38.92	675			1.00	2.374	268.12	30.57%
Hemlock Road		MH (274)	**MH235**							0.00	5.92	10.52	0.21	10.73	101.53	119.00	173.95	600.63			0.00	600.63	876.93	30.00	675			1.00	2.374	276.30	31.51%
Hemlock Road	235	**MH235**	MH (262)					1.15		2.56	8.47	10.73	1.13	11.86	100.49	117.78	172.15	851.50			0.00	851.50	1,045.56	91.62	975			0.20	1.357	194.06	18.56%
Hemlock Road		MH (262)	**MH245**							0.00	8.47	11.86	0.61	12.47	95.32	111.69	163.21	807.68			0.00	807.68	1,045.56	49.80	975			0.20	1.357	237.89	22.75%
Hemlock Road	245	**MH245**	MH (223)					0.37		0.82	9.30	12.47	0.27	12.74	92.75	108.66	158.77	862.21			0.00	862.21	2,626.46	47.67	1050			0.85	2.938	1764.25	67.17%
Hemlock Road		MH (223)	MH212							0.00	9.30	12.74	0.26	12.99	91.66	107.38	156.89	852.10			0.00	852.10	2,626.46	45.18	1050			0.85	2.938	1774.36	67.56%
Hemlock Road		MH212	**MH250**							0.00	9.30	12.99	0.33	13.32	90.65	106.20	155.15	842.75			0.00	842.75	2,626.46	58.30	1050			0.85	2.938	1783.71	67.91%
Hemlock Road	250	**MH250**	MH (227)					0.46		1.02	37.55	16.01	0.32	16.33	80.44	94.18	137.51	3,020.37		0.00	0.00	3,020.37	5,214.57	54.46	1500			0.50	2.859	2194.19	42.08%
Hemlock Road		MH (227)	MH (228)							0.00	37.55	16.33	0.35	16.68	79.51	93.09	135.91	2,985.44			0.00	2,985.44	5,214.57	60.48	1500			0.50	2.859	2229.12	42.75%
Hemlock Road		MH (228)	**MH271**							0.00	37.55	16.68	0.33	17.01	78.50	91.91	134.17	2,947.69			0.00	2,947.69	5,214.57	56.40	1500			0.50	2.859	2266.88	43.47%
Hemlock Road	271	**MH271**	**MH272**					0.58		1.29	38.84	17.01	0.32	17.33	77.59	90.83	132.60	3,013.51			0.00	3,013.51	4,545.95	47.91	1500			0.38	2.492	1532.44	33.71%
Hemlock Road	271	**MH272**	**HW**					0.58		1.29	40.13	17.33	0.05	17.38	76.72	89.82	131.10	3,078.82			0.00	3,078.82	4,545.95	7.58	1500			0.38	2.492	1467.14	32.27%
---	261	**MH360**	**HW-3**					1.77		3.94	3.94	10.00	0.68	10.68	104.19	122.14	178.56	410.15				410.15	549.49	100.00	525			1.50	2.459	139.34	25.36%

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed:
Michael Black - E.I.T.

Checked:
Jim Moffatt - P.Eng

Dwg. Reference:
FIGURE 6.9

No.	Revision	Date
1.	MASTER SERVICING STUDY SUBMISSION 1 FOR CITY REVIEW	2014-10-24
2.	MASTER SERVICING STUDY SUBMISSION 2 FOR CITY REVIEW	2015-02-12
3.	MASTER SERVICING STUDY SUBMISSION 3 FOR CITY APPROVAL	2015-08-14

File Reference:
32952-5.7.1

Water Quality Volume Calculations

Eastern SWM Facility

The Stormwater Management Facility is being designed as a wet pond at an Enhanced Level of Protection.

Drainage area = 160.58 ha (see Table 1)
Total imperviousness ratio = 63% (see Table 1)

From MOE Stormwater Management Planning and Design Manual, March 2003. p. 3-10:

Protection Level	**SWMP Type**	**Storage Volume (m^3/ha) for Impervious Level**	
		55 %	**70 %**
Enhanced 80% long-term S.S. removal	Wet Pond	190	225

Total storage volume for wet pond:

$$Y_3 = Y_2+(X_3-X_2)[(Y_2-Y_1)/(X_2-X_1)]$$
$$= 190 + (225 – 190)[(63 – 55)/(70 – 55)]$$
$$= 208.7 \text{ m}^3\text{/ha}$$

An imperviousness ratio of 66% corresponds to a total storage volume of 209 m^3/ha.

If extended detention = 40 m^3/ha
Then permanent storage = (209 m^3/ha – 40 m^3/ha) = 169 m^3/ha

Therefore:
Permanent storage volume = 169 m^3/ha x 160.58 ha = 27138.02 m^3 = 2.72 ha-m
Extended detention volume = 40 m^3/ha x 160.58 ha = 6423.2 m^3 = 0.642 ha-m

Table 1: Total Area and Total Weighted imperviousness for Water Quality Calculation – Eastern SWM Facility (refer to Table 6.13 and 6.14 for summary of hydrological parameters)

Area ID	Area (ha)	Weighted Total Imperviousness (%, TIMP)	Area (ha) x TIMP
Tributary To Eastern SWM Facility			
PH3B	3.11	0*	0.00
PH3D	5.07	81	410.67
PH3E	0.44	79	34.76
PH3F	4.36	79	344.44
PH3G	8.21	83	681.43
PH3H	6.92	80	553.60
PH3I	2.38	86	204.68
PH3J	5.23	64	334.72
PH2A	1.93	86	165.98
PH2B	2.5	86	215.00
PH2C	2.53	0*	0.00
PH2D	1.14	0*	0.00
PH2J	5.14	0*	0.00
PH2L	0.49	86	42.14
PH1A	16.91	81	1369.71
PH1B	5.81	74	429.94
PH1C	6.1	0*	0.00
PH1D	1.15	0*	0.00
PH1E	3.53	86	303.58
PH1F	8.53	69	588.57
EXT1	1.52	71	107.92
EXT9	2.18	71	154.78
BRM2	7.04	71	499.84
BRMSWF	1.47	0*	0.00
BRMR1	18.65	71	1324.15
EXT-NRC	18.39	71	1305.69
EXTE1 (SWM Block)	8.52	0*	0.00
EXT7	11.33	86	974.38
Total Area (ha) =	**160.58**	**Sum of Area (ha) X TIMP =**	**10045.98**
	Total Weighted Imperviousness (water Quality) =		**63**

*Note: * In rural areas, imperviousness is set at zero.*

Water Quality Volume Calculations

Western SWM Facility

The Stormwater Management Facility is being designed as a wetland at an Enhanced Level of Protection.

Drainage area = 44.80 ha (see Table 2)
Total imperviousness ratio = 35% (see Table 2)

From MOE Stormwater Management Planning and Design Manual, March 2003. p. 3-10:

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level
		35 %
Enhanced 80% long-term S.S. removal	Wet Pond	140

Total storage volume for wetland:

Y_3 = 140 ha-m

An imperviousness ratio of 35% corresponds to a total storage volume of 140 m^3/ha.

If extended detention = 40 m^3/ha
Then permanent storage = (140 m^3/ha – 40 m^3/ha) = 100 m^3/ha

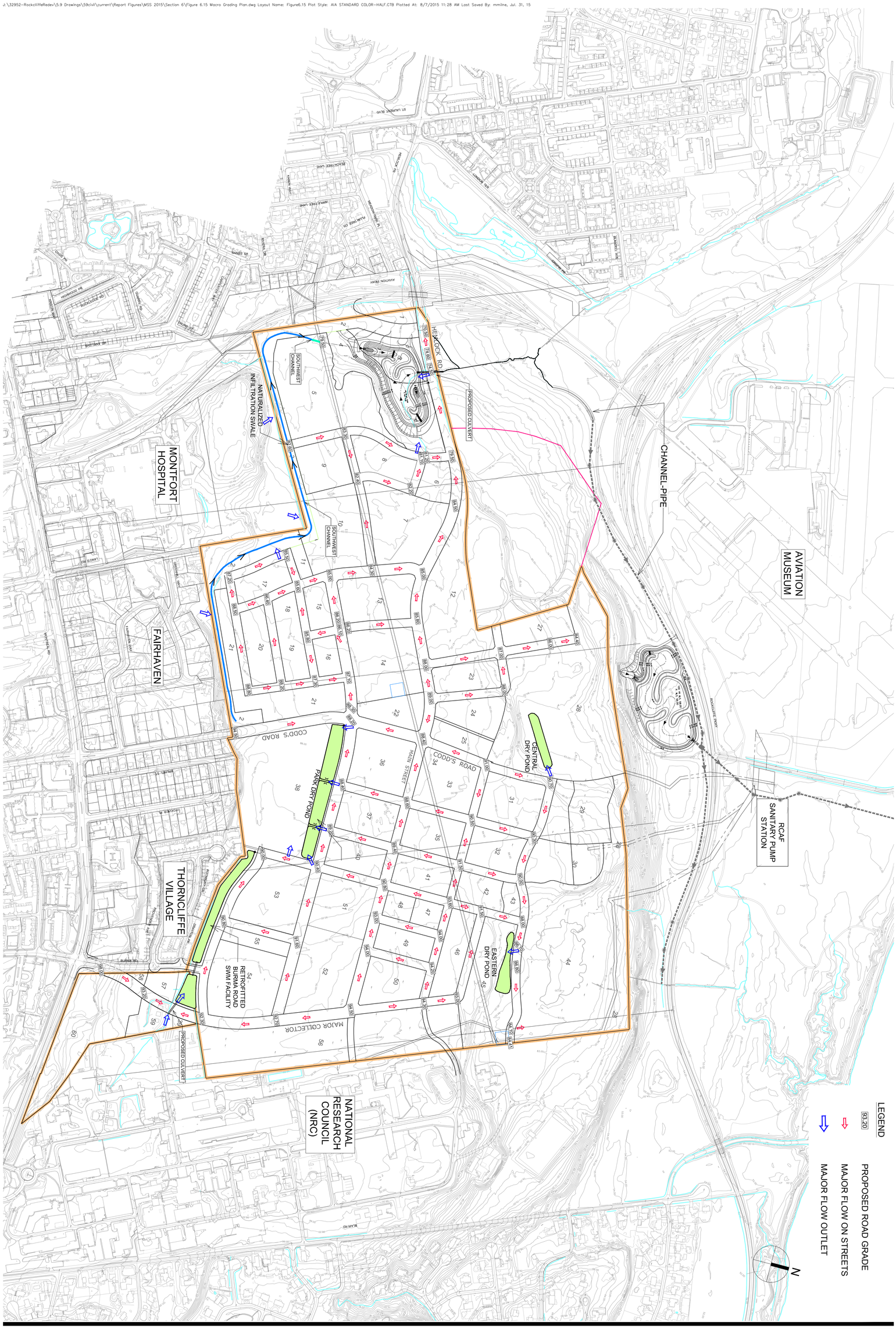
Therefore:
Permanent storage volume = 100 m^3/ha x 44.80 ha = 4480 m^3 = 0.45 ha-m
Extended detention volume = 40 m^3/ha x 44.80 ha = 1792 m^3 = 0.18 ha-m

Table 2: Total Area and Total Weighted imperviousness for Water Quality Calculation – Western SWM Facility (refer to Table 6.13 and 6.14 for summary of hydrological parameters)

Area ID	Area (ha)	Weighted total Imperviousness (%, TIMP)	Area (ha) x TIMP
Tributary To Western SWM Facility			
PH2E	16.11	70	1127.70
PH2F	1.09	86	93.74
PH2G	1.77	86	152.22
PH2H (SWM Block)	4.52	0*	0.00
PH2K	1.57	86	135.02
EXM	2.02	31	62.62
EXT4	7.84	0*	0.00
EXT5	1.46	0*	0.00
EXT3	2.25	0*	0.00
EXT2	6.17	0*	0.00
Total Area (ha)	**44.8**	**Sum of Area (ha) X TIMP**	**1571.30**
	Total Weighted Imperviousness (water Quality) =		**35**

*Note: *In rural areas, imperviousness is set at zero.*

J:\32952-RockcliffeRedev\5.9 Drawings\59civil\current\Report Figures\MSS 2015\Section 6\Figure 6.15 Macro Grading Plan.dwg Layout Name: Figure6.15 Plot Style: AIA STANDARD COLOR-HALF.CTB Plotted At: 8/7/2015 11:28 AM Last Saved By: mmline, Jul. 31, 15



Sheet No.	Drawing Title	Project Title	Scale
FIGURE 6.15	MACRO GRADING PLAN	FORMER CFB ROCKCLIFFE MASTER SERVICING STUDY	0 100 200

IBI

Sheet No.	Drawing Title	Project Title	Scale
FIGURE 6.16	SEWER CLEARANCES PLAN	FORMER CFB ROCKCLIFFE MASTER SERVICING STUDY	

IBI

Street Segment Velocity x Depth Calculation

Iteration equation:

Velocity:

$$v_x = v_{min} + \frac{Q_x - Q_{min}}{Q_{max} - Q_{min}}\left(v_{max} - v_{min}\right)$$

Depth:

$$d_x = d_{min} + \frac{Q_x - Q_{min}}{Q_{max} - Q_{min}}\left(d_{max} - d_{min}\right)$$

100 Year 3 Hour Chicago Storm																			
					SWMHYMO (32952VXD.out)					Calculation Sheet: Overflow for Typical Road Ponding Area					Continuous Grade (SWMHYMO 32952VXD.out)			
Area ID (Dummy Segment, if applicable)	Road ROW Section	Longitudinal Slope (%)	Overflow Flowrate		Flowrate (cms)		Velocity (m/s)			Flowrate (cms)		Depth (m)			Depth (m)			Velocity x Depth
			Qx (l/s)	Qx (cms)	Qmin	Qmax	vmin	vmax	vx	Qmin	Qmax	dmin	dmax	dx	dmin	dmax	dx	(m^2/s)
PH3H(323 TO 320)	20	1.49	1237	1.24	1.00	1.32	1.61	1.80	1.75	n/a	n/a	n/a	n/a	n/a	0.14	0.15	0.15	0.26
PH1A (163 TO 130)	20	0.5	808	0.81	0.77	0.98	1.04	1.14	1.06	n/a	n/a	n/a	n/a	n/a	0.15	0.16	0.15	0.16
PH1A (130 TO 115)	20	0.58	1286	1.29	1.06	1.32	1.22	1.30	1.29	1.28	1.35	0.23	0.24	0.23	n/a	n/a	n/a	0.30
PH1A (125 TO 130)	26	0.73	1297	1.30	1.15	1.43	1.04	1.09	1.07	n/a	n/a	n/a	n/a	n/a	0.19	0.21	0.20	0.21
PH3G (155 TO 150)	26	0.54	500	0.50	0.48	0.60	0.72	0.78	0.73	0.49	0.52	0.17	0.17	0.17	n/a	n/a	n/a	0.12
PH2E (230 TO 235)	26	0.71	673	0.67	0.55	0.69	0.82	0.89	0.88	n/a	n/a	n/a	n/a	n/a	0.14	0.15	0.15	0.13
PH1F (183 TO 185)	20	1.65	893	0.89	0.76	1.05	1.51	1.69	1.59	n/a	n/a	n/a	n/a	n/a	0.12	0.14	0.13	0.21
PH1F (190 TO 185)	20	1.19	595	0.60	0.47	0.65	1.19	1.28	1.25	n/a	n/a	n/a	n/a	n/a	0.11	0.12	0.12	0.15
PH2E (251 TO 250)	20	2.86	2290	2.29	2.21	2.61	1.62	1.67	1.63	n/a	n/a	n/a	n/a	n/a	0.20	0.22	0.20	0.33
PH2E (250 TO 271)	26	3.7	3950	3.95	3.84	4.65	2.45	2.52	2.46	n/a	n/a	n/a	n/a	n/a	0.22	0.24	0.23	0.56

Master Servicing Study - Southwest Drainage Channel Design
Former CFB Rockcliffe

South West Channel Design Reach 1 (Section A-A, refer to Figure 6.25

New Swale Section Required flow =	1170	L/s		(1.17	cms)			
From Seelye use n =	0.040						area =	1.41
Choose Slope S =	0.50	%					wp =	4.42
Ditch Bottom =	1.00	m						
Ditch slopes =	3	:1						
Water depth =	**0.54**	m	(depth needed to carry	1.17	cms)			
						Ditch Bottom =	86.50	m
Check Ditch Capacity (Q) :						Ditch Top =	88.00	m
Q =	1.17	cms	and Velocity =	0.83	m/s	Freeboard =	0.96	m

South West Channel Design Reach 2 (Section B-B, refer to Figure 6.25

New Swale Section Required flow =	2610	L/s		(2.61	cms)			
From Seelye use n =	0.040						area =	1.78
Choose Slope S =	1.40	%					wp =	5.04
Ditch Bottom =	1.50	m						
Ditch slopes =	3	:1						
Water depth =	**0.56**	m	(depth needed to carry	2.61	cms)			
						Ditch Bottom =	83.50	m
Check Ditch Capacity (Q) :						Ditch Top =	85.50	m
Q =	2.63	cms	and Velocity =	1.48	m/s	Freeboard =	1.44	m

South West Channel Design Reach 3

New Swale Section Required flow =	3440	L/s		(3.44	cms)			
From Seelye use n =	0.040						area =	2.88
Choose Slope S =	0.75	%					wp =	6.79
Ditch Bottom =	3.00	m						
Ditch slopes =	3	:1						
Water depth =	**0.60**	m	(depth needed to carry	3.44	cms)			
						Ditch Bottom =	80.40	m
Check Ditch Capacity (Q) :						Ditch Top =	82.60	m
Q =	3.52	cms	and Velocity =	1.22	m/s	Freeboard =	1.60	m

South West Channel Design Reach 4

New Swale Section Required flow =	5768	L/s		(5.77	cms)			
From Seelye use n =	0.040						area =	3.08
Choose Slope S =	1.70	%					wp =	6.98
Ditch Bottom =	3.00	m						
Ditch slopes =	3	:1						
Water depth =	**0.63**	m	(depth needed to carry	5.77	cms)			
						Ditch Bottom =	78.40	m
Check Ditch Capacity (Q) :						Ditch Top =	79.80	m
Q =	5.82	cms	and Velocity =	1.89	m/s	Freeboard =	0.77	m

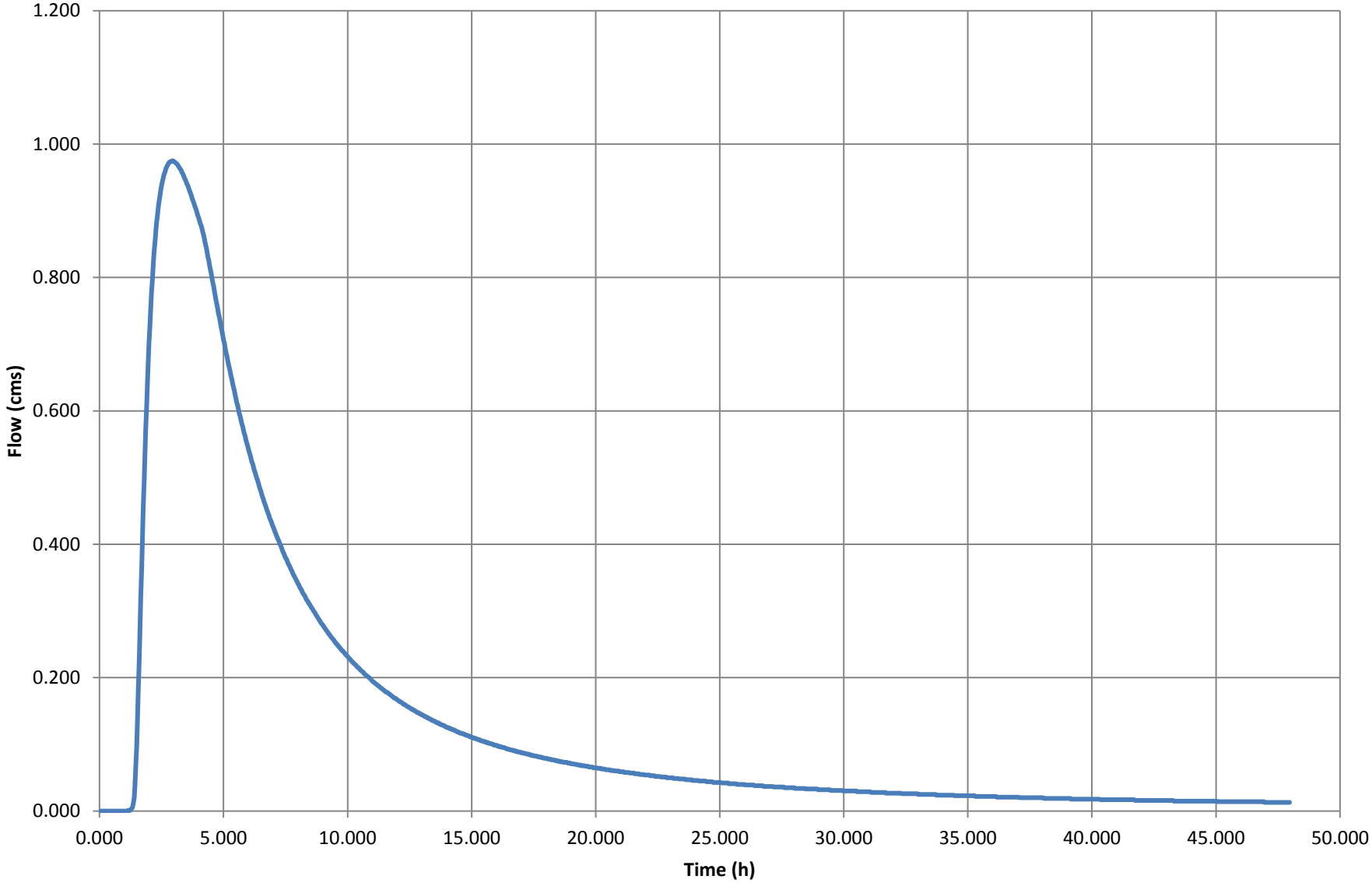
Q = A*(1.0/n)*R^2/3*S^1/2 where: A = cross sectional area in Sq. m
n = friction coefficient
R = hydraulic radius = A / wetted perimetre (wp) in m
S = ditch slope in %

Master Servicing Study - NRC Drainage Swale Design
Former CFB Rockcliffe

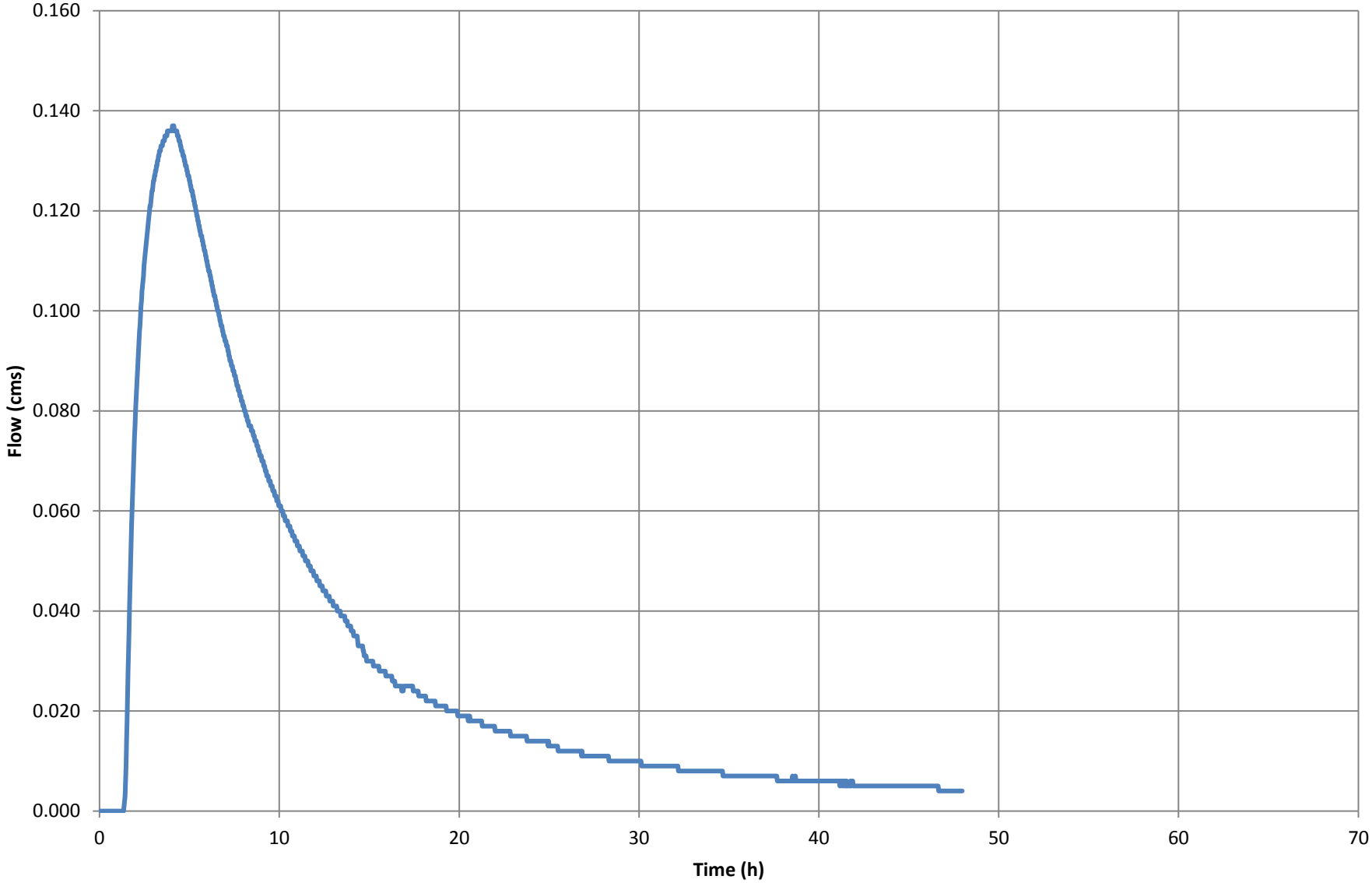
NRC Drainage Ditch Commercial Lands			Commercial Lands Ditch For NRC Surface Drainage			
New Swale Section Required flow = 5700 l/s			5.70 Cu m/sec			
From Seelye use n =	0.050				area=	4.95
choose: slope S =	0.65	%			wp=	8.01
Ditch Bottom	3.00	metres	Max Easement width =	9.15 m		
Ditch slopes	2.50	:1				
Water depth	**0.93**	metres (depth needed to carry 5.70 Cu. M/sec)				
Check Ditch Capacity (Q)						
Q =	5.80	Cu M/sec	and Velocity =	1.17 M/s		

Q = A*(1.0/n)*R^2/3*S^1/2 where: A = cross sectional area in Sq. m
n = friction coefficient
R = hydraulic radius = A/wetted perimetre (wp) in m

Eastern SWM Facility
25 mm Hydrograph Out of Pond



Western SWM Facility
25 mm Hydrograph Out of Pond



Eastern Creek Baseflow Augmentation Calculation

Existing Conditions

Area to Eastern Creek (refer to Figure 2.16): *(36.34 ha + 24.68 ha) = 61.02 ha*

Under post-development conditions, there is no proposed development of Area EXTE2 (refer to Figure 6.12), which measures 15.13 ha, so for the purposes of this calculation, consider: *(61.02 ha – 15.13 ha) = 45.89 ha*

Considering annual infiltration rate per the Aquafor Beech water budget analysis (MSS Table 6.4): *235 mm/year*

Existing conditions volumetric infiltration:

= $235\frac{mm}{year} x \frac{1m}{1000mm} x\ 45.89\ ha\ x \frac{10000m2}{1ha}$

= $107{,}842\frac{m3}{year}$

It is assumed that approximately 50% of the volumetric infiltration will participate in generating baseflow feeding the Eastern Creek:

= $107{,}842\frac{m3}{year}\ x\ 50\%$

= $53{,}741\frac{m3}{year}$

Expressed on a per hectare basis, the existing conditions volumetric infiltration:

= $\frac{\left(53{,}741\frac{m3}{year}\right)}{45.89ha}$

= $1171\frac{m3}{year}\ per\ hectare$

Post-Development Conditions

Two drainage areas contribute flow to Eastern Creek, PH3A and EXTE2 (refer to Figure 6.12).

Referring to the 25 mm SWMHYMO simulation results, the runoff coefficients for the drainage areas are as follows:

Area ID	Land Use	Area (ha)	Volumetric Runoff Coefficient
PH3A	Urban	6.68	0.717 ≈ 0.72 *(∴ ≈ 0.28 infiltrates)*
EXTE2	Rural (no proposed change)	15.13	0.174 ≈ 0.17 *(∴ ≈ 0.83 infiltrates)*

From the above it is concluded that an urban development can produce approximately 34% of the infiltration in comparison with a rural area.

The post-development urban area contributing flow to the Eastern Creek, PH3A measures: *6.68 ha*

The corresponding infiltrated volume for this urban area:

= $6.68\ ha\ x\ \frac{1171 m3/year}{ha}\ x\ 0.34$

= $2660\ \frac{m3}{year}$

The baseflow compensation to the Eastern Creek is therefore:

$= V_{Existing} - V_{PostDev}$

= $(53{,}741\ \frac{m3}{year}) - (2660\ \frac{m3}{year})$

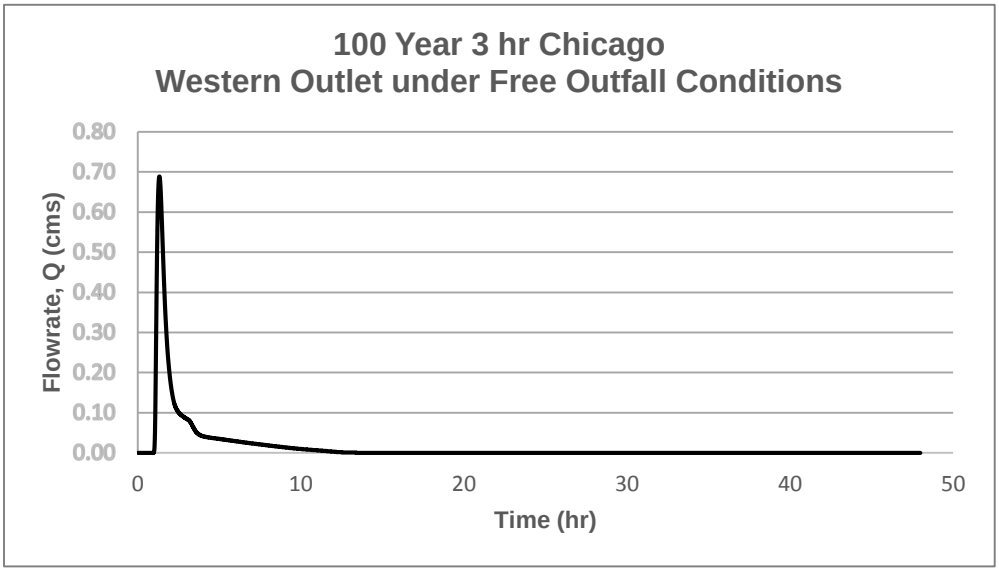
= $51{,}081\ \frac{m3}{year}$

It is recommended that this be confirmed at the detailed design stage, supported by continuous modeling.

Boundary Condition for Western Creek Outlet

Step 1. Run XPSWMM model assuming “Free Outfall” with the depth criterion “minimum yc_yn”. Where yc is critical depth and yn is normal depth.

Step2. Export Outflow vs Time rating curve from “Aviation CH” link between DROP and NODE220 Nodes (see 100 year 3 hour Chicago example below).



Step3. Calculate a ratio based on flow rate for each time step from the Outflow-Time curve from Step 2. See equation below:

Ratio (R_x):

$$R_x = \frac{Q_x - Q_{min}}{Q_{max} - Q_{min}}$$

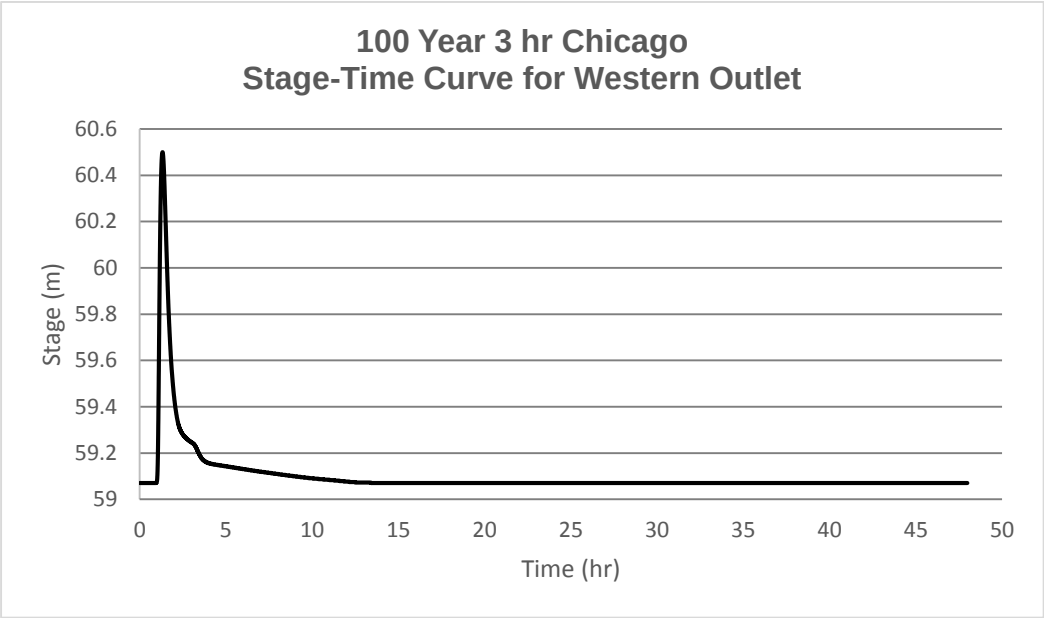
Where: Q_x: Flow rate at time x
Q_{min}: Minimum flow rate from all time steps
Q_{max}: Maximum flow rate from all time steps

Step4. Using the invert of the Western Creek at approximately 113 m downstream of the Aviation culvert (elevation 59.07 m), the maximum possible Western Creek water level (60.50 m), which corresponds to the existing road elevation at the culvert crossing further downstream, and the ratio determined in Step 3, create a Stage vs Time relationship at each time step. See equation below:

Outlet Stage (m):

$$H_x = R_x\,(Cr_{WL} - Cr_{inv}) + Cr_{inv}$$

Where: R_x: Ratio from Step 3
Cr_{wl}: Maximum Western Creek water level (m)
Cr_{inv}: Western Creek invert at approximately 113m downstream of the Aviation culvert (node Drop)



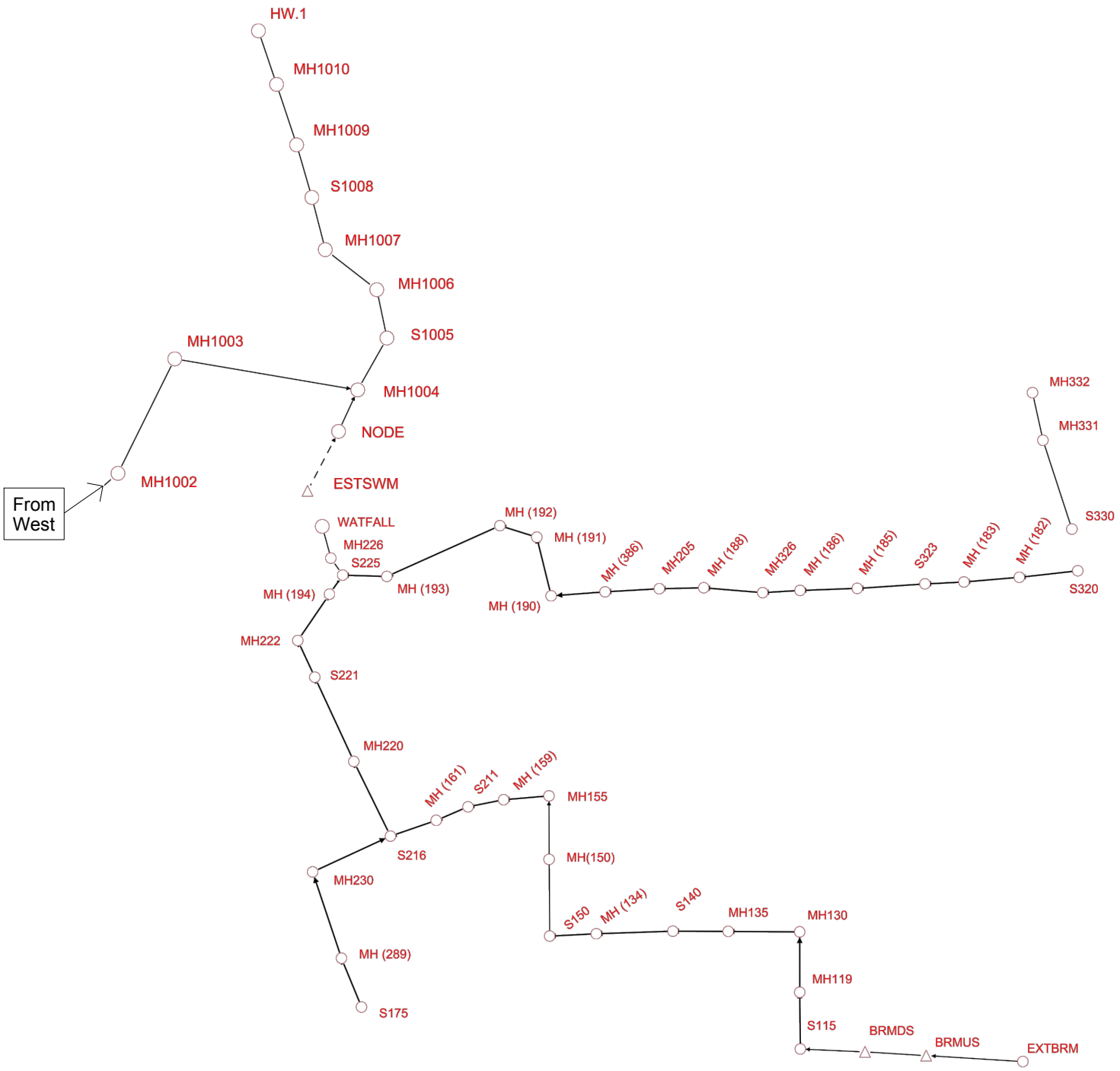
Step5: Copy Stage vs Time curve created in Step 4 into XPSWMM via Node DROP ->Outfall -> 3.3 User Stage History -> Coordinates. Re-run XPSWMM with User Stage History specified as the outlet condition.

The same process is followed for all the storm events modeled.

Hydraulic Grade Line

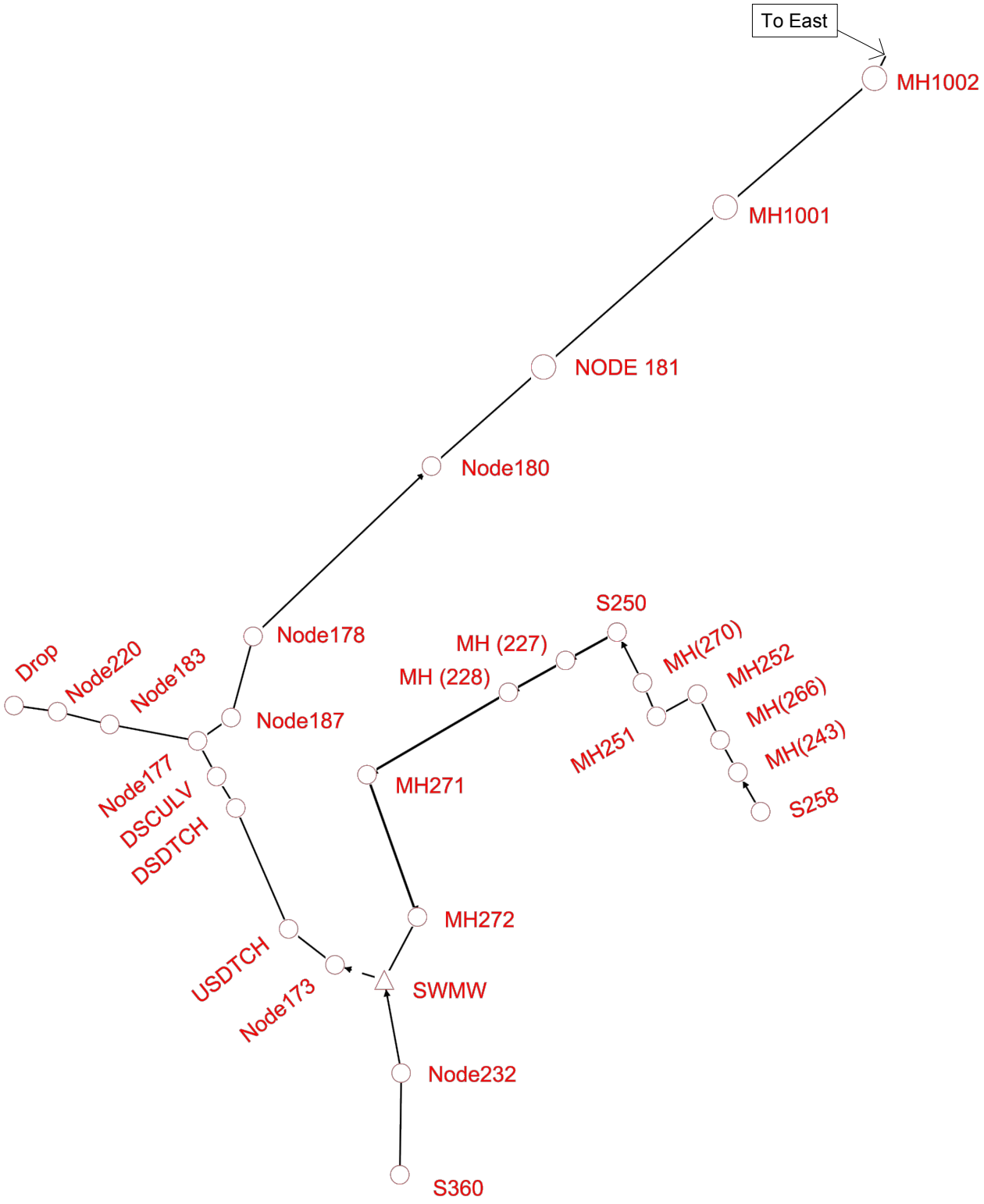
XPSWMM Node ID	MH No.	Proposed Ground Road (m)	USF (m)	100 year 3 hour Chicago + 20%		100 year 24 hour SCS		July 1, 1979		August 1988		August 1996	
				HGL (m)	USF - HGL (m)	HGL (m)	USF - HGL (m)	HGL (m)	USF - HGL (m)	HGL (m)	USF - HGL (m)	HGL (m)	USF - HGL (m)
EASTERN SWM FACILITY													
ESTSWM	N/A	N/A	N/A	58.11	N/A	74.80	N/A	58.59	N/A	58.15	N/A	57.63	N/A
MH 226	226	82.51	80.11	71.23	8.88	75.06	5.05	71.22	8.89	71.21	8.90	71.19	8.92
S225	225	82.51	80.11	75.25	4.86	75.06	5.05	75.12	4.99	75.05	5.06	74.83	5.28
MH (194)	194	82.86	80.46	75.74	4.72	75.54	4.92	75.59	4.87	75.52	4.94	75.27	5.19
MH222	222	84.4	82.00	79.98	2.02	79.77	2.23	79.83	2.17	79.75	2.25	79.50	2.50
S221	221	86	83.60	80.60	3.00	80.39	3.21	80.44	3.16	80.37	3.23	80.12	3.48
MH220	220	87	84.60	80.99	3.61	80.75	3.85	80.81	3.79	80.73	3.87	80.45	4.15
S216	216	88	85.60	81.73	3.87	81.39	4.21	81.47	4.13	81.36	4.24	81.02	4.58
MH (161)	161	88.4	86.00	83.90	2.10	83.65	2.35	83.70	2.30	83.63	2.37	83.34	2.66
S211	211	89	86.60	84.03	2.57	83.76	2.84	83.81	2.79	83.74	2.86	83.44	3.16
MH (159)	159	88.62	86.22	84.15	2.07	83.87	2.35	83.92	2.30	83.84	2.38	83.53	2.69
MH155	155	88.4	86.00	84.52	1.48	84.19	1.81	84.25	1.75	84.17	1.83	83.81	2.19
MH(150)	150	87.75	85.35	84.95	0.40	84.55	0.80	84.62	0.73	84.52	0.83	84.13	1.22
S150	150	88.2	85.80	85.27	0.53	84.81	0.99	84.88	0.92	84.78	1.02	84.34	1.46
S140	140	88.4	86.00	85.82	0.18	85.18	0.82	85.27	0.73	85.14	0.86	84.67	1.33
MH135	135	89.2	86.80	86.02	0.78	85.30	1.50	85.40	1.40	85.27	1.53	84.81	1.99
MH130	130	90.4	88.00	86.45	1.55	85.93	2.07	85.98	2.02	85.92	2.08	85.69	2.31
MH119	119	89.65	87.25	86.84	0.41	86.34	0.91	86.39	0.86	86.32	0.93	86.05	1.20
S115	115	90	87.60	87.15	0.45	86.60	1.00	86.66	0.94	86.58	1.02	86.27	1.33
EXTBRM	128	92.75	N/A	91.32	N/A	90.21	N/A	90.24	N/A	90.20	N/A	90.08	N/A
MH230	230	85.8	83.40	81.86	1.54	81.58	1.82	81.64	1.76	81.55	1.85	81.40	2.00
MH (289)	289	85.97	83.57	81.95	1.62	81.70	1.87	81.77	1.80	81.68	1.89	81.60	1.97
S175	175	85.8	83.40	81.98	1.42	81.75	1.65	81.82	1.58	81.74	1.66	81.68	1.72
MH (193)	193	78.57	76.17	75.93	0.24	75.91	0.26	75.91	0.26	75.91	0.26	75.90	0.27
MH (192)	192	81.23	78.83	76.26	2.57	76.23	2.60	76.23	2.60	76.23	2.60	76.22	2.61
MH (191)	191	82.81	80.41	78.35	2.06	78.32	2.09	78.32	2.09	78.32	2.09	78.32	2.09
MH (190)	190	81.81	N/A	80.46	N/A	80.44	N/A	80.43	N/A	80.43	N/A	80.43	N/A
MH (386)	386	84.95	N/A	80.69	N/A	80.65	N/A	80.65	N/A	80.65	N/A	80.65	N/A
MH205	205	90.7	88.30	80.77	7.53	80.73	7.57	80.73	7.57	80.73	7.57	80.73	7.57
MH (188)	188	90.37	87.97	83.29	4.68	83.27	4.70	83.26	4.71	83.26	4.71	83.26	4.71
MH326	326	90.3	87.90	83.61	4.29	83.58	4.32	83.58	4.32	83.58	4.32	83.57	4.33
MH (186)	186	90.1	87.70	83.90	3.80	83.88	3.82	83.88	3.82	83.87	3.83	83.86	3.84
MH (185)	185	90	87.60	84.04	3.56	84.01	3.59	84.01	3.59	84.01	3.59	84.00	3.60
S323	323	90	87.60	84.14	3.46	84.11	3.49	84.11	3.49	84.10	3.50	84.09	3.51
MH (183)	183	89.08	86.68	84.17	2.51	84.13	2.55	84.14	2.54	84.13	2.55	84.12	2.56
MH (182)	182	88.45	86.05	84.20	1.85	84.16	1.89	84.16	1.89	84.16	1.89	84.14	1.91
S320	320	88	85.60	84.22	1.38	84.18	1.42	84.18	1.42	84.18	1.42	84.16	1.44
S330	330	86	N/A	85.49	N/A	85.47	N/A	85.46	N/A	85.46	N/A	85.47	N/A
MH331	331	83.5	N/A	79.99	N/A	79.99	N/A	79.98	N/A	79.98	N/A	79.98	N/A
MH332	332	82	N/A	79.50	N/A	79.49	N/A	79.49	N/A	79.49	N/A	79.49	N/A
WESTERN SWM FACILITY													
SWMW	HW	77	74.60	72.81	1.79	329	1.98	72.85	1.75	72.57	2.03	71.72	2.88
S360	261	79.5	77.10	75.04	2.06	75.04	2.06	75.04	2.06	75.04	2.06	74.68	2.42

XPSWMM Node ID	MH No.	Proposed Ground Road (m)	USF (m)	100 year 3 hour Chicago + 20%		100 year 24 hour SCS		July 1, 1979		August 1988		August 1996	
				HGL (m)	USF - HGL (m)	HGL (m)	USF - HGL (m)	HGL (m)	USF - HGL (m)	HGL (m)	USF - HGL (m)	HGL (m)	USF - HGL (m)
MH272	272	72.5	N/A	72.81	N/A	72.60	N/A	72.85	N/A	72.70	N/A	71.76	N/A
MH271	271	74.5	N/A	72.81	N/A	72.60	N/A	72.85	N/A	72.67	N/A	71.89	N/A
MH(228)	228	76.29	N/A	72.81	N/A	72.69	N/A	72.99	N/A	72.88	N/A	72.03	N/A
MH (227)	227	77.93	N/A	72.84	N/A	72.80	N/A	73.12	N/A	73.01	N/A	72.25	N/A
S250	250	79.5	77.10	74.35	2.75	74.35	2.75	74.33	2.77	74.33	2.77	74.33	2.77
MH(270)	270	79.5	77.10	75.63	1.47	75.65	1.45	75.63	1.47	75.63	1.47	75.63	1.47
MH251	251	81.2	78.80	75.86	2.94	75.86	2.94	75.86	2.94	75.86	2.94	75.86	2.94
MH252	252	82.2	79.80	76.42	3.38	76.42	3.38	76.39	3.41	76.39	3.41	76.39	3.41
MH(266)	266	82.4	80.00	76.51	3.49	76.50	3.50	76.49	3.51	76.49	3.51	76.49	3.51
MH(243)	243	82.4	80.00	76.64	3.36	76.64	3.36	76.65	3.35	76.64	3.36	76.64	3.36
S258	258	82.4	80.00	76.77	3.23	76.76	3.24	76.76	3.24	76.76	3.24	76.76	3.24



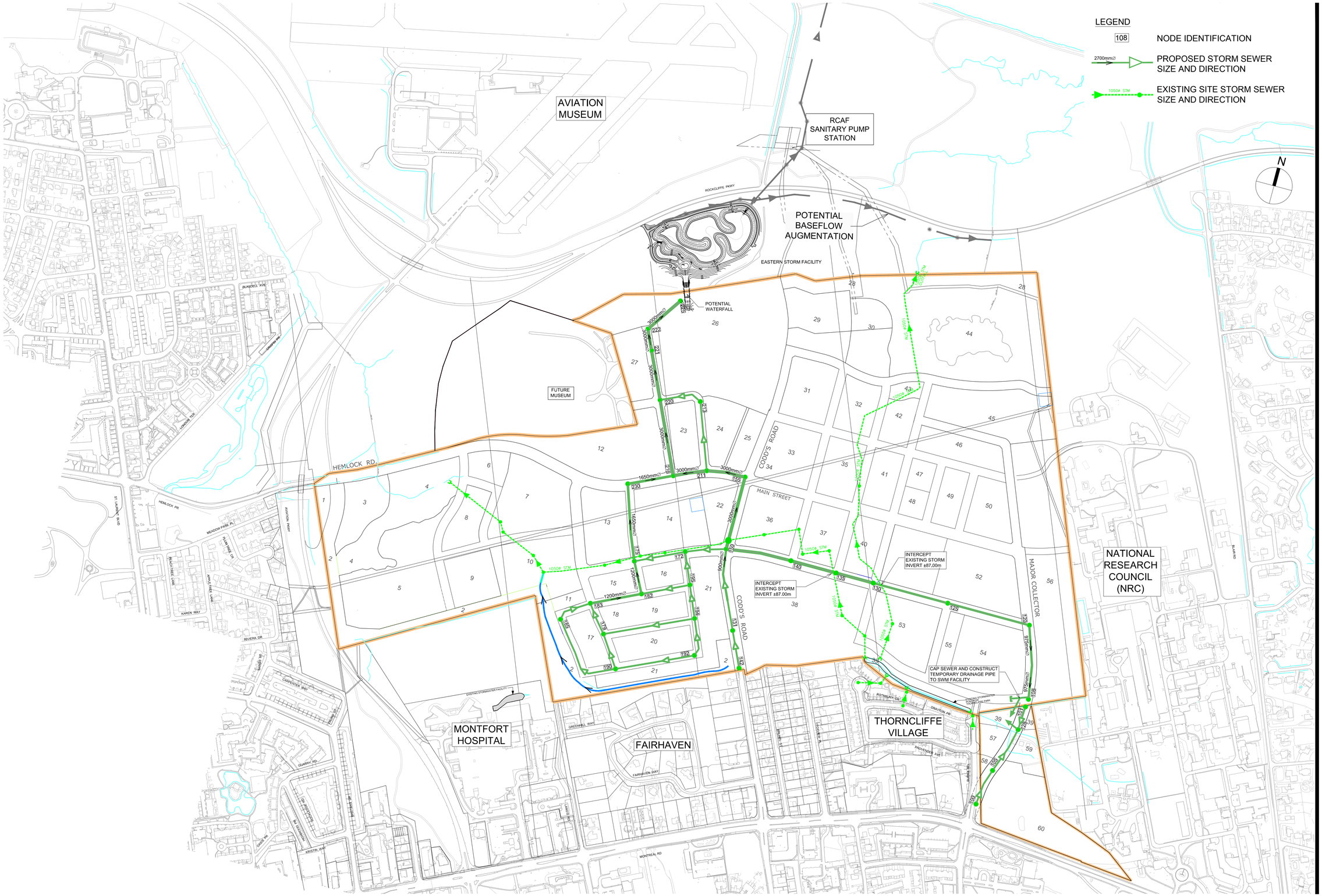
J:\32952-RockcliffeRedev\5.9 Drawings\59civil\current\Report Figures\MSS 2015\Section 6\Figure 6.32 Post-Development Conditions XPSWMM Schematic - East.dwg Layout Name: Figure6.32

Project Title	Drawing Title	Sheet No.
FORMER CFB ROCKCLIFFE MASTER SERVICING STUDY	POST-DEVELOPMENT CONDITIONS XPSWMM SCHEMATIC- EAST	FIGURE 6.32



J:\32952-RockcliffeRedev\5.9 Drawings\59civil\current\Report Figures\MSS 2015\Section 6\Figure 6.33 Post-Development Conditions XPSWMM Schematic -West.dwg Layout Name: Figure6.33

Project Title	Drawing Title	Sheet No.
FORMER CFB ROCKCLIFFE MASTER SERVICING STUDY	POST-DEVELOPMENT CONDITIONS XPSWMM SCHEDMATIC-WEST	FIGURE 6.33


LEGEND
108 NODE IDENTIFICATION
2700mmØ PROPOSED STORM SEWER SIZE AND DIRECTION
1050Ø STM EXISTING SITE STORM SEWER SIZE AND DIRECTION
AVIATION MUSEUM
RCAF SANITARY PUMP STATION
POTENTIAL BASEFLOW AUGMENTATION
EASTERN STORM FACILITY
POTENTIAL WATERFALL
FUTURE MUSEUM
HEMLOCK RD.
CODD'S ROAD
MAIN STREET
MAJOR COLLECTOR
INTERCEPT EXISTING STORM INVERT ±87.00m
INTERCEPT EXISTING STORM INVERT ±87.00m
CAP SEWER AND CONSTRUCT TEMPORARY DRAINAGE PIPE TO SWM FACILITY
NATIONAL RESEARCH COUNCIL (NRC)
THORNCLIFFE VILLAGE
FAIRHAVEN
MONTFORT HOSPITAL
N
Scale
0 100 200
Project Title
FORMER CFB ROCKCLIFFE
MASTER SERVICING STUDY
Drawing Title
RECOMMENDED PHASE 1A
STORM SEWER SYSTEM
Sheet No.
FIGURE 6.34

APPENDIX F

UTILITY MEETING MINUTES

IBI Group
400–333 Preston Street
Ottawa ON K1S 5N4 Canada

tel 613 225 1311
fax 613 225 9868

Notes

To/Attention	Distribution List	**Date**	February 7, 2014
From	Peter Kirkimtzis	**Project No**	32952 - 5.1

Subject Rockliffe Redevelopment – Utility Coordination Meeting
IBI Group Office
February 7, 2014 at 10:00am

Present

Don Schultz	CLC	dschultz@clc.ca
Krista Durie	CLC	kdurie@clc.ca
Tony Stinziano	Hydro	tonystinziano@hydroottawa.com
Mark Wojdan	Hydro	markwojdan@hydroottawa.com
Kristine McNamara	Hydro	kristinemcnamara@hydroottawa.com
Anna Borris	Enbridge	anna.borris@enbridge.com
Jeanne Dubeau	Rogers	jeanne.dubeau@rci.rogers.com
Martin Proulx	Rogers	martin.proulx@rci.rogers.com
Adam Docksteader	Bell	adam.docksteader@bell.ca
Jim Moffatt	IBI	jmoffatt@ibigroup.com
Peter Kirkimtzis	IBI	peter.kirkimtzis@ibigroup.com

Distribution All Present

Item Discussed		**Action By**
1	The redevelopment will include up to 5,500 units in the mid – high density range. There will be roughly 270 single houses and roughly 75,000 square metres of commercial floor space.	Advisory
2	There will be a couple high rise apartments in the 20 storey range within the residential/commercial sector (red areas on the concept plan)	Advisory
3	The redevelopment will also include about 6 hectares owned by National Research Council (NRC) located south-east of the site.	Advisory
4	Complete build out of the redevelopment could take up to 15 – 20 years	Advisory
5	IBI will forward a phasing plan, a CAD file of the site and copies of the soils reports to all utilities.	IBI
6	CLC and IBI will meet with the City in March to discuss street cross sections. The site will consist of 18.0m, 20.0m and 26.0m ROW's. Non standard structures will be included on the cross sections such as sidewalk on both sides of the 18.0m ROW, swales and possible narrow asphalt laneways.	IBI/CLC
7	The preliminary ROW's will be circulated to the utilities for comments before the meeting with the City.	IBI

Item Discussed		Action By
8	Hydro will need to bring a high voltage line from a nearby sub-station to provide service to the site. The likely station candidates are; • Moulten sub-station through La Cite • Overbrook sub-station near St. Laurent • Hydro One sub-station on the adjacent NRC property	Hydro
9	The cost of the high voltage trunk line will be considerable and Hydro will provide CLC with a worst case economic evaluation. The price will also be offset by the number of units built within the first 5 years of construction. CLC previously estimated that about 1000 units could be built within the 5 year timeline. CLC will re-evaluate that estimate.	Hydro
10	Hydro stated that there will not be back-up power available to the site from the trunk line from Moulten sub-station due to the style of servicing provided to the sub-station. A more reliable source could be provided from the Overbrook sub-station.	Advisory
11	With its economic evaluation, Hydro will also provide an estimated timeline to build the trunk line to the site. The timeline may be in the 6 – 12 month range.	Hydro
12	CLC will require power for 2017.	Advisory
13	Hydro is currently servicing a pumping station located to the north through the Rockliffe site. A plan will be required to provide service to the pump station through the redevelopment.	Hydro/CLC
14	Enbridge will require gas loads for the site and upon receipt will begin a layout for the site. Gas will likely come from Montreal Road via Codd's Road. CLC to provide gas load summary to Enbridge.	CLC/Enbridge
15	Enbridge will also provide to CLC an economic evaluation including timelines.	Enbridge
16	Bell and Rogers have existing services on Codd's Road pole line suitable to service the site.	Advisory
17	CLC will confirm whether 3-party or 4-party trenching will be used for the site.	CLC
18	Preliminary construction schedule; Phase 1 will be the south half of the site broken into 2 sub-phases. • Phase 1A west of Codd's Road in 2015 • Phase 1B east of Codd's Road in 2016 Stage 1 will consist of roughly 680 units consisting of singles, towns semis, stacked towns and some commercial area.	Advisory

Please report any serious errors or omissions to these notes to Jim Moffatt at jmoffatt@ibigroup.com or to Peter Kirkimtzis at peter.kirkimtzis@ibigroup.com.