

APPENDIX A

REFERENCES AND ABBREVIATIONS

REFERENCES

1. Moira River Conservation Authority. Flood Plain and Water Management Study, Bell Creek. Report prepared by MacLaren Plansearch Inc. dated March, 1984.
2. City of Belleville. Official Plan of the Belleville and Suburban Planning Area Amendment No. 122. Report prepared by Ainley and Associates Ltd. dated November, 1987.
3. Township of Thurlow. Comprehensive Zoning By-Law No. 3014. by Township of Thurlow. dated August 1987.
4. U.S. Department of Agriculture. Soil Conservation Services, Urban Hydrology for Small Watersheds, Technical Release No.55. by the Engineering and Watershed Planning Unit. dated January 1975.
5. Ministry of Transportation of Ontario. Design Flood Estimation for Medium and Large Watersheds, Bridge Hydraulics Manual Chapter C. Downsview: 1979.
6. U.S. Department of Agriculture. Soil Conservation Services, National Engineering Handbook, Section 4, Hydrology. Washington: U.S. Government Printing Office, 1972.
7. Bureau of Reclamation, U.S. Department of the Interior. Design of Small Dams. Washington: U.S. Government Printing Office, 1974.
8. Ministries of Natural Resources, Environment, Municipal Affairs, and Transport and Communications; Association of Conservation Authorities of Ontario; Municipal Engineers Association; and Urban Development Institute, Ontario. URBAN DRAINAGE DESIGN GUIDELINES. April 1987.

ABBREVIATIONS

m	metres
yr, yrs	years
cfs	cubic feet per second
m ³ /s, cms	cubic metres per second
km	kilometres
sq km, km ²	square kilometres
Ref.	reference(s)
no.	number
CN	curve number (used in hydrology)
hr	hours
SWM	Storm Water Management
trib	tributary
CNR	Canadian National Railway
w/	with
CPR	Canadian Pacific Railway
pre	pre-development
post	post-development
m ² /s,	square metres per second

APPENDIX B

12-HOUR DESIGN RAINFALL DEPTHS

12-HOUR DESIGN RAINFALL DEPTHSBELL CREEK

Return Period (yr)	12-Hour Rainfall (mm)	Depths (in)
5	50.1	1.97
10	56.7	2.23
25	65.0	2.56
50	71.1	2.80
100	77.1	3.04

APPENDIX C

MACLAREN's FIGURES 3.1 AND 3.7

APPENDIX H

DETAILED LIST OF POST-DEVELOPMENT FLOWS

APPENDIX H

BELL CREEK STORM WATER MANAGEMENT POST-DEVELOPMENT

LOCATION	100 year		50 year		25 year		10 year		5 year	
	PEAK FLOW	Qp	PEAK FLOW	Qp	PEAK FLOW	Qp	PEAK FLOW	Qp	PEAK FLOW	Qp
	(cfs)	(cms)	(cfs)	(cms)	(cfs)	(cms)	(cfs)	(cms)	(cfs)	(cms)
BASIN 301	626.77	17.75	550.53	15.59	477.93	13.53	382.56	10.83	309.43	8.76
BASIN 302	543.60	15.39	480.50	13.61	418.60	11.85	335.17	9.49	271.36	7.68
FLOW PT #101	1141.80	32.33	1008.60	28.56	878.00	24.86	702.20	19.88	567.70	16.08
REACH #1	904.50	25.61	792.30	22.44	682.40	19.32	536.30	15.19	425.40	12.05
BASIN 305	273.93	7.76	241.85	6.85	210.41	5.96	169.22	4.79	138.47	3.92
PARTIAL FLOW @ PT #102	1111.80	31.48	969.80	27.46	832.10	23.56	649.70	18.40	519.40	14.71
BASIN 303	578.78	16.39	513.15	14.53	448.57	12.70	361.41	10.23	294.37	8.34
FLOW PT #102	1615.90	45.76	1416.20	40.10	1224.30	34.67	967.60	27.40	773.80	21.91
REACH #2	1485.40	42.06	1294.50	36.66	1109.10	31.41	869.90	24.63	694.90	19.68
BASIN 306	268.92	7.62	239.43	6.78	210.37	5.96	170.95	4.84	140.48	3.98
FLOW @ RR TRACK	1628.00	46.10	1422.80	40.29	1223.10	34.63	957.20	27.11	768.10	21.75
RESERVOIR 501	1496.60	42.38	1262.10	35.74	1069.60	30.29	789.80	22.36	645.60	18.28
REACH #3	1447.60	40.99	1250.10	35.40	1057.10	29.93	785.10	22.23	640.80	18.15
BASIN 320	46.64	1.32	41.81	1.18	37.02	1.05	30.50	0.86	25.40	0.72
FLOW D/S OF RR @ 320	1454.70	41.19	1256.50	35.58	1062.90	30.10	789.80	22.36	644.80	18.26
BASIN 307	141.19	4.00	124.55	3.53	108.24	3.07	86.29	2.44	69.52	1.97
REACH #4	110.70	3.13	99.90	2.83	89.00	2.52	73.80	2.09	60.10	1.70
BASIN 308	301.33	8.53	265.98	7.53	231.31	6.55	184.65	5.23	148.95	4.22
ADD HYD (134)	407.60	11.54	362.20	10.26	318.20	9.01	258.50	7.32	209.00	5.92
BASIN 310	110.77	3.14	98.62	2.79	86.65	2.45	70.41	1.99	57.85	1.64
BASIN 308+310	484.10	13.71	430.50	12.19	378.50	10.72	307.80	8.72	249.80	7.07
RESERVOIR 502	196.40	5.56	184.90	5.24	170.60	4.83	151.00	4.28	135.60	3.84
REACH #5	194.60	5.51	183.10	5.18	168.70	4.78	149.10	4.22	133.40	3.78
BASIN 319	32.48	0.92	28.92	0.82	25.41	0.72	20.64	0.58	16.94	0.48
ADD HYD (132)	199.60	5.65	187.60	5.31	172.70	4.89	152.60	4.32	136.40	3.86
FLOW PT #103	1654.20	46.84	1444.10	40.89	1235.60	34.99	939.80	26.61	776.40	21.99
REACH #6	1595.40	45.18	1409.50	39.91	1196.40	33.88	897.20	25.41	742.30	21.02
BASIN 312	161.87	4.58	144.93	4.10	128.19	3.63	105.36	2.98	87.58	2.48
ADD HYD (134)	1625.00	46.02	1436.40	40.67	1220.70	34.57	914.40	25.89	753.90	21.35
BASIN 304	593.85	16.82	517.50	14.65	443.27	12.55	345.67	9.79	276.02	7.82
RESERVOIR #503	354.80	10.05	325.80	9.23	298.70	8.46	254.50	7.21	208.20	5.90
BASIN 309	263.90	7.47	233.71	6.62	203.98	5.78	163.98	4.64	133.25	3.77
ADD HYD (135)	510.70	14.46	463.70	13.13	417.40	11.82	348.00	9.85	289.60	8.20
PARTIAL @ PT #104	2097.80	59.40	1863.10	52.76	1603.30	45.40	1206.60	34.17	993.50	28.13
BASIN 313	154.44	4.37	137.53	3.89	120.85	3.42	98.25	2.78	80.78	2.29
BASIN 314	69.20	1.96	61.15	1.73	53.25	1.51	42.61	1.21	34.49	0.98
FLOW PT #105	218.80	6.20	194.70	5.51	170.90	4.84	138.70	3.93	113.90	3.22
REACH #8	149.90	4.24	131.80	3.73	114.00	3.23	90.30	2.56	72.70	2.06
BASIN 315	24.84	0.70	21.98	0.62	19.16	0.54	15.43	0.44	12.57	0.36
ADD HYD (116)	173.70	4.92	152.80	4.33	132.20	3.74	105.20	2.98	85.20	2.41
BASIN 311	81.37	2.30	72.42	2.05	63.60	1.80	51.65	1.46	42.41	1.20
FLOW PT #106	241.40	6.84	212.10	6.01	183.60	5.20	145.60	4.12	117.00	3.31
REACH #9	234.00	6.63	206.70	5.85	180.60	5.11	144.10	4.08	117.20	3.32
BASIN 316	84.85	2.40	75.00	2.12	65.34	1.85	52.32	1.48	42.37	1.20
ADD HYD (116)	292.30	8.28	260.20	7.37	228.40	6.47	184.20	5.22	149.50	4.23
FLOW PT #104	2306.00	65.30	2028.60	57.44	1749.40	49.54	1315.70	37.26	1088.80	30.83
REACH #10	2254.60	63.84	1984.40	56.19	1705.70	48.30	1297.00	36.73	1070.50	30.31
BASIN 317	109.56	3.10	96.63	2.74	84.53	2.39	68.21	1.93	55.64	1.58
FLOW PT #107	2290.40	64.86	2012.60	56.99	1730.80	49.01	1317.80	37.32	1088.00	30.81
RESERVOIR #504	1844.60	52.23	1617.90	45.81	1410.10	39.93	1137.90	32.22	958.60	27.14
REACH #11	1844.20	52.22	1618.80	45.84	1409.00	39.90	1137.30	32.20	957.60	27.12
BASIN 318	38.58	1.09	32.92	0.93	27.48	0.78	20.40	0.58	15.23	0.43
FLOW PT #108	1849.60	52.38	1632.60	46.23	1413.20	40.02	1140.60	32.30	960.30	27.19

APPENDIX I

GLOSSARY

BELL CREEK STORMWATER MANAGEMENTGLOSSARYDrainage Area

1. The area contributing to a single drainage basin, expressed in hectares, square kilometres, or other units of area. Also called Catchment Area, Watershed, and River Basin.
2. The area served by a drainage system receiving storm and surface water; or by a watercourse.

Flood Plain

The relatively flat or lowland area adjoining a river, stream, watercourse, lake, or other body of standing water which has been or may be temporarily with flood water. For administration purposes, the flood plain may be defined as the area that would be inundated with the Regulatory Flood.

Flood Proofing

A combination of structural changes and adjustments to properties subject to flooding primarily for the reduction of flood damages.

Imperviousness Ratio

The ratio of impervious surfaces to total surface area within a watershed or drainage area.

Major Drainage System

That storm drainage system which carries the total runoff of the drainage system less the runoff carried by the minor system. The major system will function whether or not it has been planned and designed, and whether or not developments are situated wisely with respect to it. (Generally overland, above ground flow.)

Minor Drainage System

That storm drainage system which is frequently used for collecting, transporting, and disposing of snowmelt, miscellaneous minor flows, and storm runoff up to the capacity of the system (for Bell Creek - 5 year design storm). The minor system is sometimes termed the "convenience system", "initial system", or "storm sewer system".

Storage

Detention Storage

That water that is detained on a surface and does not become runoff until some time after the storm has ended.

Offstream (off-line) Storage

The temporary storage of storm water away from the main channel of flow.

Onstream (on-line) Storage

The temporary storage of storm runoff water behind embankments or dams located on the channel.

Retention Storage

Water that is more or less permanently retained in an area with a free surface, commonly called a "wet pond" or lake.

Surcharge

The flow condition occurring in closed conduits when the hydraulic grade line is above the conduit crown; or the transition from open channel to pressure flow.

Watercourse

A channel in which a flow of water occurs, either continuously or intermittently, and if the latter, with some degree of regularity. Such flow must be in a definite direction. Watercourses may be either natural or artificial, and flow may occur either on the surface or underground.