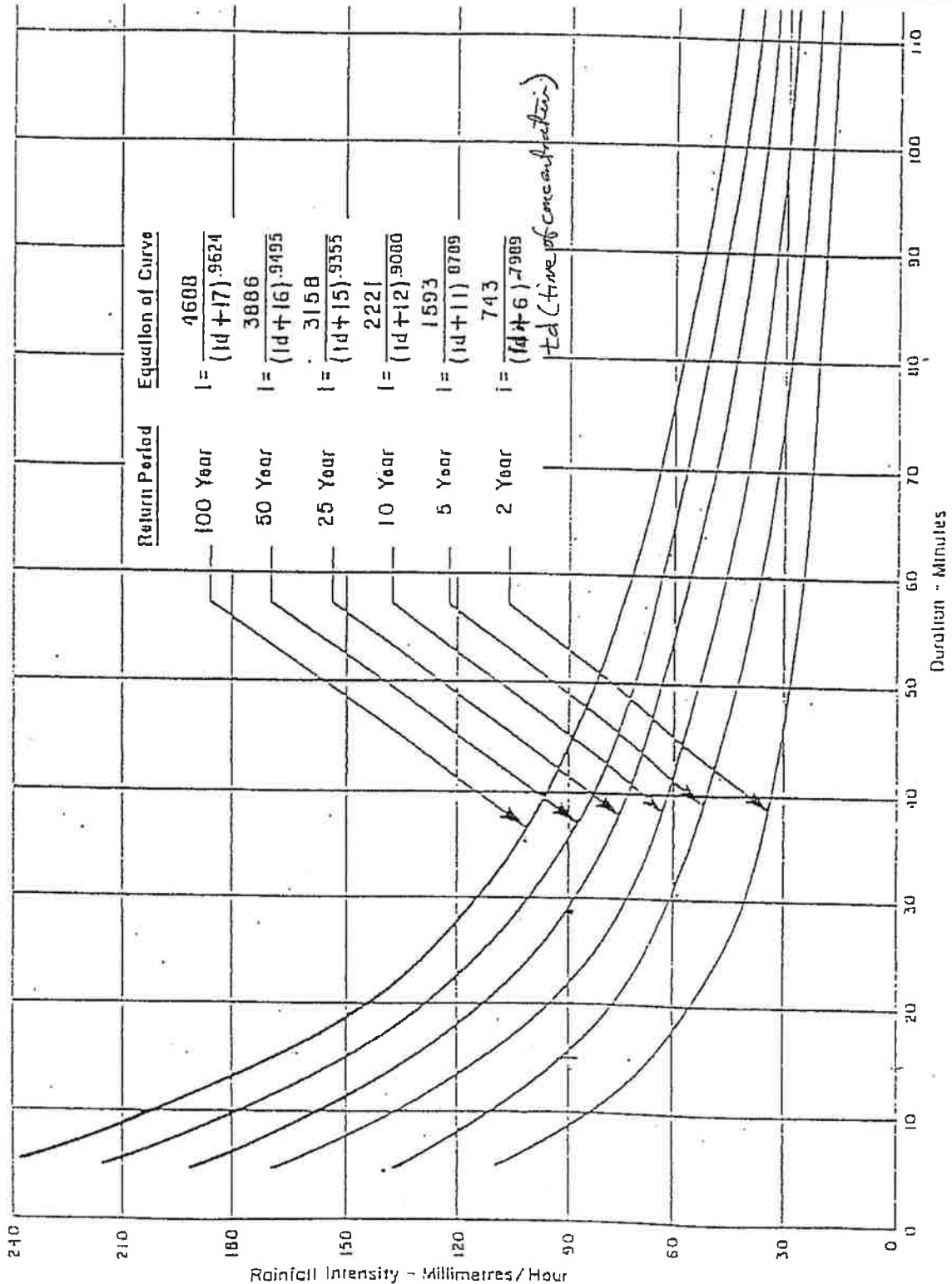




# CITY OF GUELPH

STANDARDS OF DESIGN FOR  
 SUBDIVISION ENGINEERING, SEWERS,  
 ROADS AND WATERMAINS "METRIC"

S.P. No. 18.08.74  
 EFFECTIVE DATE: ---  
 PAGE 7 OF 17 PAGES



**INTENSITY - DURATION FREQUENCY CURVE**  
 (Partial Duration Series based on 16 years of Guelph O.A.C. Rain Gauge Data)



# CITY OF GUELPH

## STORM WATER MANAGEMENT AND SEDIMENT CONTROL GUIDELINES "METRIC"

S.P. NO. \_\_\_\_\_  
EFFECTIVE DATE: ---  
PAGE 3 OF 6 PAGES

### CITY OF GUELPH STORM HYETOGRAPHS

#### 2 YEAR STORM

Total Rainfall Depth = 33.127 mm  
Storm Hyetograph in mm/hr for DT = 5.00 min

.00	3.07	3.33	3.63	4.00	4.49	5.07	5.88	7.04	8.81
11.86	18.31	39.76	109.40	45.91	24.59	16.60	12.52	10.06	8.43
7.26	6.40	5.72	5.18	4.74	4.38	4.07	3.80	3.57	3.37
3.19	3.05	.00	.00						

#### 5 YEAR STORM

Total Rainfall Depth = 46.808 mm  
Storm Hyetograph in mm/hr for DT = 5.00 min

3.06	3.35	3.70	4.13	4.68	5.37	6.30	7.59	9.48	12.46
17.72	28.80	51.69	139.29	70.60	39.22	25.91	18.86	14.61	11.81
9.86	8.42	7.33	6.48	5.80	5.24	4.78	4.39	4.05	3.77
3.52	3.30	3.10	3.05						

#### 100 YEAR STORM

Total Rainfall Depth = 88.429 mm  
Storm Hyetograph in mm/hr for DT = 5.00 min

3.05	3.33	3.70	4.14	4.68	5.34	6.18	7.26	8.89	10.63
13.39	17.51	24.10	35.69	59.35	121.59	238.35	137.52	90.54	53.35
39.19	28.84	22.65	18.33	15.19	12.83	11.00	9.56	8.41	7.46
6.68	6.02	5.49	4.99	4.58	4.22	3.91	3.63	3.39	3.17
3.05	.00								

#### 100 YEAR HANLON BUSINESS PARK STORM

Total Rainfall Depth = 100.33 mm  
Storm Hyetograph in mm/hr for DT = 5.00 min

5.50	3.30	4.30	5.20	6.40	7.60	10.40	14.00	20.40	30.50
162.30	118.90	283.50	170.10	94.50	60.00	41.80	30.20	23.20	18.30
14.30	12.50	10.10	8.90	7.30	6.70	5.50	5.20	4.00	4.00
4.00	3.30	2.70	2.70	2.70	2.70				

**SUMMARY OF RAINFALL MAXIMA FOR GUELPH ARBORETUM (6143069) COMPOSITE STATION**

Year	5 min	10 min	15 min	30 min	1 h	2 h	6 h	12 h	24 h
1954	6.3	12.2	17.3	22.6	23.9	25.1	50.3	83.1	115.8
1955	12.7	15.0	15.7	18.3	21.6	26.9	28.7	39.1	46.5
1956	8.9	12.2	13.5	17.8	19.8	30.5	37.1	57.7	66.3
1957	6.9	9.1	9.9	12.7	16.5	19.0	30.5	32.5	51.3
1958	11.4	14.7	16.0	17.8	19.6	21.1	35.6	53.8	58.7
1959	7.4	8.9	10.4	12.7	15.0	18.5	26.2	27.2	27.2
1960			15.0	19.6	19.8	19.8	28.2	32.8	44.7
1961	7.9	12.4	13.2	16.8	20.1	31.5	37.8	37.8	50.0
1962	10.9	11.4	14.2	15.5	22.4	27.7	31.7	33.3	54.4
1963	9.4	13.2	15.5	18.5	19.8	22.1	27.4	31.7	34.8
1964	11.4	16.8	22.1	32.3	43.7	43.7	45.0	45.0	51.6
1965	11.9	15.0	17.3	17.8	17.8	19.0	30.0	35.8	45.5
1966	3.6	4.8	6.9	10.2	15.0	27.9	45.5	45.7	55.1
1967	6.9	9.1	11.2	14.7	23.1	33.0	43.9	45.2	45.2
1968	12.7	19.0	25.7	40.9	71.6	71.9	79.5	79.5	79.5
1969	3.6	6.1	8.1	9.1	11.9	21.1	46.2	46.2	46.2
1970	9.1	15.0	18.3	26.9	30.7	31.7	33.5	33.8	34.3
1971	12.7	25.4	30.5	39.4	39.4	42.2	60.7	61.0	61.0
1972	7.9	10.9	12.7	15.5	20.8	22.4	27.2	30.2	49.3
1973	9.4	9.9	11.7	18.3	22.1	27.2	31.2	32.3	33.3
1974	7.6	7.9	8.9	12.4	14.0	15.7	30.5	41.7	47.5
1975	11.7	15.5	17.3	22.9	26.9	50.5	82.3	91.2	93.7
1976	5.3	7.4	10.2	12.2	13.7	21.1	40.1	65.8	70.6
1977	11.2	16.8	21.6	22.4	22.4	22.4	22.6	22.6	38.6
1978	10.1	12.9	13.2	13.4	15.4	17.7	22.9	26.6	35.7
1979	11.7	12.0	12.0	14.7	18.7	25.7	37.2	38.4	42.5
1980	12.7	16.1	17.2	17.4	18.0	21.6	33.3	43.1	48.6
1981	5.9	10.1	13.7	17.2	17.8	21.2	27.1	35.5	49.6
1982	10.1	20.2	28.7	46.3	55.8	66.5	69.5	69.7	69.8
1983	9.1	10.9	12.2	13.6	13.8	17.8	28.8	34.8	35.0
1984	13.0	17.7	21.7	23.7	23.9	24.7	26.7	26.7	41.6
1985	11.6	13.0	19.4	30.5	30.5	30.5	40.6	43.7	46.2
1986	15.7	19.7	22.5	29.2	29.8	34.0	50.6	62.5	83.8
1987	8.6	10.5	10.5	13.4	18.5	23.2	34.7	43.4	53.7
1988	10.1	17.4	24.2	32.3	33.2	51.5	52.9	52.9	53.4
1989	3.9	6.8	7.2	7.4	9.8	12.7	21.0	28.6	37.4
1990	11.4	16.7	19.7	23.2	30.3	33.5	39.6	41.1	41.6
1991	8.4	10.4	11.1	16.1	21.7	30.9	45.6	57.0	62.6
1992	6.8	8.5	12.3	17.7	23.7	28.3	29.9	45.1	56.0
1993	10.8	12.0	16.8	23.0	25.6	26.6	37.0	37.8	38.5
1994	7.9	9.0	12.3	18.1	18.5	22.2	34.4	40.0	42.6
1995	15.9	21.0	27.8	42.6	44.8	47.4	47.8	47.8	47.8
1996	5.2	10.0	12.0	14.6	15.3	17.1	34.1	50.2	57.7
1997	13.6	15.0	15.6	24.6	28.2	28.2	28.4	28.4	29.2
1998	7.8	10.2	12.2	18.0	24.4	28.4	29.6	29.8	54.0
1999	12.2	23.6	26.4	28.0	29.6	30.6	38.8	43.0	48.2
2000	8.2	14.6	17.6	23.2	26.8	27.6	31.2	36.2	41.6
2001	5.4	9.2	10.6	17.2	19.6	22.2	29.4	36.0	36.6
2002	15.0	21.4	24.8	24.8	24.8	24.8	31.4	31.4	43.8
2003	5.6	8.6	10.4	12.8	17.8	20.2	21.0	25.8	27.4
2004	5.0	7.2	9.4	16.4	25.6	30.4	30.8	30.8	37.8
2005	7.0	14.0	19.8	29.6	33.0	34.4	42.6	48.2	53.2
2006	8.8	14.0	19.8	24.8	27.4	34.0	44.6	54.8	55.6
2007					51.0	51.2	83.0	83.4	99.8
2008					63.4	69.2	73.4	75.8	76.0
2009	7.8	13.8	17.0	20.0	21.0	21.0	25.0	25.4	28.8
2010	6.6	12.8	18.0	24.4	27.2	32.8	38.0	38.0	48.2

- Filled using Wellington Waterloo A
- Missing/Unavailable Data
- Identified as an outlier in original EC IDF data file or based on previously stated 100 yr return period values
- From GRCA guelph lake station
- From AMEC City hall station

**GRCA GUELPH LAKE STATION (HOURLY DATA)**

Year	Annual Maximum Depth (mm) for given time period (minutes)								
	5	10	15	30	60	120	360	720	1440
2001					38.6	38.6	39.8	39.8	39.8
2002					20.8	21.8	21.8	23.8	28.4
2003					15.0	19.2	21.4	23.6	25.8
2004					20.8	21.8	21.8	23.8	28.4
2005					63.4	69.6	74.8	80.2	81.8
2006					24.6	37.0	49.2	49.2	49.2
2007					51.0	51.2	83.0	83.4	99.8
2008					63.4	69.2	73.4	75.8	76.0
2009					41.4	43.2	43.2	44.8	44.8
2010					18.4	18.4	23.4	23.6	25.2

**GRCA SPEED RIVER ROAD 32 STATION (HOURLY DATA)**

Year	Annual Maximum Depth (mm) for given time period (minutes)								
	5	10	15	30	60	120	360	720	1440
2008					28.8	28.8	30.0	30.2	35.6
2009					15.8	20.8	21.2	29.6	33.8
2010					25.2	28.6	41.2	47.0	47.0

**AMEC GAUGE DATA FOR 2010 (ROOF OF GUELPH CITY HALL ON CARDEN STREET)**

Month	Annual Maximum Depth (mm) for given time period (minutes)								
	5	10	15	30	60	120	360	720	1440
June	6.0	9.6	12.4	24.4	25.8	32.8	38.0	38.0	38.2
July	6.4	12.6	16.0	17.2	17.2	17.2	26.6	29.8	29.8
August	2.4	3.2	3.8	3.8	4.4	6.6	8.8	9.2	13.8
September	6.6	12.8	16.0	21.6	27.2	28.0	28.0	28.0	37.6
October	3.6	4.6	6.0	7.2	7.8	9.6	17.6	22.8	23.2
November	1.4	1.8	1.8	3.0	5.0	9.4	19.0	20.2	22.6
<b>MAXIMUM</b>	<b>6.6</b>	<b>12.8</b>	<b>16.0</b>	<b>24.4</b>	<b>27.2</b>	<b>32.8</b>	<b>38.0</b>	<b>38.0</b>	<b>38.2</b>

**EC GUELPH TURFGRASS DATA - DAILY EXTREMES (HOURLY DATA USED FOR 24 HOUR VALUE)**

Year	Annual Maximum Depth (mm) for given time period (minutes)								
	5	10	15	30	60	120	360	720	1440***
1997	13.6	15.0	15.6	24.6	28.2	28.2	28.4	28.4	
1998	7.8	10.2	12.2	18.0	24.4	28.4	29.6	29.8	
1999	12.2	23.6	26.4	28.0	29.6	30.6	38.8	43.0	
2000	8.2	14.6	17.6	23.2	26.8	27.6	31.2	32.0	
2001	5.4	9.2	10.6	17.2	19.6	22.2	29.4	36.0	36.6
2002	15.0	21.4	24.8	24.8	24.8	24.8	31.4	31.4	32.8
2003	5.6	8.6	10.4	12.8	17.8	20.2	21.0	23.0	27.4
2004	5.0	7.2	8.6	10.8	13.2	17.8	24.4	29.0	29
2005	7.2	10.2	13.6	17.2	22.2	25.4	28.0	28.0	28

\*\*\*24H data based on analysis of hourly data

**EC WATERLOO WELLINGTON A DATA - DAILY EXTREMES (HOURLY DATA USED FOR 24 HOUR VALUE)**

Year	Annual Maximum Depth (mm) for given time period (minutes)								
	5	10	15	30	60	120	360	720	1440***
2000	7.2	13.0	18.5	27.9	33.7	36.0	36.2	36.2	42.0
2001									
2002	5.3	9.2	11.8	17.5	23.0	24.0	24.6	24.8	33.1
2003	5.8	8.8	10.0	13.2	15.2	18.8	30.8	37.6	40.2
2004									
2005	7.0	14.0	19.8	29.6	33.0	34.4	42.6	48.2	53.2
2006	8.8	14.0	19.8	24.8	27.4	34.0	44.6	54.8	55.6
2007	7.2	10.6	11.8	18.8	21.8	21.8	25.4	25.6	31.8

\*\*\*24H data based on analysis of hourly data

**EC GUELPH TURFGRASS - BASED ON RAW TIP DATA FROM U OF G WEBSITE**

Year	Annual Maximum Depth (mm) for given time period (minutes)								
	5	10	15	30	60	120	360	720	1440
2001	5.4	9.2	10.6	17.2	19.6	22.2	29.4	36.0	37.0
2002	15.0	21.4	24.8	24.8	24.8	24.8	31.4	33.2	43.8
2003	5.6	8.6	10.4	12.8	17.8	20.2	21.0	26.0	30.4
2004	5.0	7.2	9.4	16.4	25.6	30.4	30.8	30.8	37.8
2005*	7.2	10.2	13.6	17.2	22.2	25.4	28.0	28.0	28.0
2006#	12.0	12.8	12.8	14.2	16.6	16.6	20.8	27.4	34.8
2007	11.2	17.6	22.6	28.2	29.8	29.8	34.4	38.8	40.6
2008@	2.0	2.4	2.4	3.2	4.6	7.6	13.4	18.0	29.6
2009	7.8	13.8	17.0	20.0	21.0	21.0	25.0	25.4	28.8
2010&	7.6	10.0	10.4	15.0	18.2	18.8	26.6	30.6	31.0

\*Data only goes to July 27th, missing major storm on July 16th, 2005

#Some data screened out - questionable data on August 31/September 1st, missing major storm on September 13th, 2006

@Some data screened out - questionable data on September 19th/20th 2008

&Data only available after July 16th 2010

Short Duration Rainfall Intensity-Duration-Frequency Data  
 Données sur l'intensité, la durée et la fréquence des chutes  
 de pluie de courte durée

Gumbel - Method of moments/Méthode des moments

2010/04/13

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GUELPH ARBORETUM		ON	6143069
(composite)			
Latitude: 43 33'N	Longitude: 80 13'W	Elevation/Altitude: 327	m
Years/Années : 1954 - 2003	# Years/Années :	42	

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Table 1 : Annual Maximum (mm)/Maximum annuel (mm)

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Year Année	5 min	10 min	15 min	30 min	1 h	2 h	6 h	12 h	24 h
1954	6.3	12.2	17.3	22.6	23.9	25.1	50.3	83.1	115.8
1955	12.7	15.0	15.7	18.3	21.6	26.9	28.7	39.1	46.5
1956	8.9	12.2	13.5	17.8	19.8	30.5	37.1	57.7	66.3
1957	6.9	9.1	9.9	12.7	16.5	19.0	30.5	32.5	51.3
1958	11.4	14.7	16.0	17.8	19.6	21.1	35.6	53.8	58.7
1959	7.4	8.9	10.4	12.7	15.0	18.5	26.2	27.2	27.2
1960	-99.9	-99.9	15.0	19.6	19.8	19.8	28.2	32.8	44.7
1961	7.9	12.4	13.2	16.8	20.1	31.5	37.8	37.8	50.0
1962	10.9	11.4	14.2	15.5	22.4	27.7	31.7	33.3	54.4
1963	9.4	13.2	15.5	18.5	19.8	22.1	27.4	31.7	34.8
1964	11.4	16.8	22.1	32.3	43.7	43.7	45.0	45.0	51.6
1965	11.9	15.0	17.3	17.8	17.8	19.0	30.0	35.8	45.5
1966	3.6	4.8	6.9	10.2	15.0	27.9	45.5	45.7	55.1
1967	6.9	9.1	11.2	14.7	23.1	33.0	43.9	45.2	45.2
1968	12.7	19.0	25.7	40.9	71.6	71.9	79.5	79.5	79.5
1969	3.6	6.1	8.1	9.1	11.9	21.1	46.2	46.2	46.2
1970	9.1	15.0	18.3	26.9	30.7	31.7	33.5	33.8	34.3
1971	12.7	25.4	30.5	39.4	39.4	42.2	60.7	61.0	61.0
1972	7.9	10.9	12.7	15.5	20.8	22.4	27.2	30.2	49.3
1973	9.4	9.9	11.7	18.3	22.1	27.2	31.2	32.3	33.3
1976	5.3	7.4	10.2	12.2	13.7	21.1	40.1	65.8	70.6
1977	11.2	16.8	21.6	22.4	22.4	22.4	22.6	22.6	38.6
1978	10.1	12.9	13.2	13.4	15.4	17.7	22.9	26.6	35.7
1979	11.7	12.0	12.0	14.7	18.7	25.7	37.2	38.4	42.5
1980	12.7	16.1	17.2	17.4	18.0	21.6	33.3	43.1	48.6
1981	5.9	10.1	13.7	17.2	17.8	21.2	27.1	35.5	49.6
1982	10.1	20.2	28.7	46.3	55.8	66.5	69.5	69.7	69.8
1983	9.1	10.9	12.2	13.6	13.8	17.8	28.8	34.8	35.0
1984	13.0	17.7	21.7	23.7	23.9	24.7	26.7	26.7	41.6
1985	11.6	13.0	19.4	30.5	30.5	30.5	40.6	43.7	46.2
1986	15.7	19.7	22.5	29.2	29.8	34.0	50.6	62.5	83.8
1987	8.6	10.5	10.5	13.4	18.5	23.2	34.7	43.4	53.7
1988	10.1	17.4	24.2	32.3	33.2	51.5	52.9	52.9	53.4
1989	3.9	6.8	7.2	7.4	9.8	12.7	-99.9	-99.9	37.4
1990	11.4	16.7	19.7	23.2	30.3	33.5	39.6	41.1	41.6

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1991	8.4	10.4	11.1	16.1	21.7	30.9	45.6	57.0	62.6
1997	13.6	15.0	15.6	24.6	28.2	28.2	28.4	28.4	29.2
1998	7.8	10.2	12.2	18.0	24.4	28.4	29.6	29.8	54.0
1999	12.2	23.6	26.4	28.0	29.6	30.6	38.8	43.0	48.2
2000	8.2	14.6	17.6	23.2	26.8	27.6	31.2	36.2	41.6
2001	5.4	9.2	10.6	17.2	19.6	22.2	29.4	36.0	36.6
2002	15.0	21.4	24.8	24.8	24.8	24.8	31.4	31.4	43.8
2003	5.6	8.6	10.4	12.8	17.8	20.2	21.0	25.8	27.4

# Yrs.	42	42	43	43	43	43	42	42	43
Années									
Mean	9.5	13.4	16.0	20.4	24.2	28.4	37.1	42.3	49.8
Moyenne									
Std. Dev.	3.1	4.7	5.9	8.6	11.3	11.7	12.3	14.5	16.5
Écart-type									
Skew.	-0.15	0.55	0.69	1.19	2.39	2.22	1.56	1.15	1.79
Dissymétrie									
Kurtosis	2.56	3.20	2.91	4.45	10.39	8.79	6.00	4.02	8.21

\*-99.9 Indicates Missing Data/Données manquantes

Warning: annual maximum amount greater than 100-yr return period amount  
 Avertissement : la quantité maximale annuelle excède la quantité pour une période de retour de 100 ans

Year/Année	Duration/Durée	Data/Données	100-yr/ans
1954	24 h	115.8	101.5
1968	1 h	71.6	59.7
1968	2 h	71.9	65.2
1968	6 h	79.5	75.8
1982	2 h	66.5	65.2

Table 2a : Return Period Rainfall Amounts (mm)  
 Quantité de pluie (mm) par période de retour

Duration/Durée	2 yr/ans	5 yr/ans	10 yr/ans	25 yr/ans	50 yr/ans	100 yr/ans	#Years Années
5 min	9.0	11.7	13.4	15.7	17.4	19.0	42
10 min	12.6	16.8	19.5	22.9	25.5	28.1	42
15 min	15.0	20.3	23.7	28.1	31.3	34.5	43
30 min	19.0	26.6	31.6	38.0	42.7	47.3	43
1 h	22.3	32.3	39.0	47.3	53.6	59.7	43
2 h	26.4	36.8	43.7	52.4	58.8	65.2	43
6 h	35.1	46.0	53.2	62.3	69.1	75.8	42
12 h	39.9	52.8	61.3	72.1	80.0	87.9	42
24 h	47.1	61.7	71.3	83.5	92.5	101.5	43

Table 2b :

Return Period Rainfall Rates (mm/h) - 95% Confidence limits  
 Intensité de la pluie (mm/h) par période de retour - Limites de confiance de 95%

Duration/Durée	2 yr/ans	5 yr/ans	10 yr/ans	25 yr/ans	50 yr/ans	100 yr/ans	#Years Années
5 min	107.6	139.9	161.4	188.5	208.5	228.5	42
	+/- 10.2	+/- 17.1	+/- 23.1	+/- 31.2	+/- 37.3	+/- 43.5	42

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10 min	75.7	100.5	116.9	137.7	153.1	168.3	42
	+/- 7.8	+/- 13.1	+/- 17.7	+/- 23.9	+/- 28.6	+/- 33.3	42
15 min	60.1	81.0	94.8	112.3	125.3	138.2	43
	+/- 6.5	+/- 10.9	+/- 14.8	+/- 19.9	+/- 23.8	+/- 27.7	43
30 min	38.1	53.2	63.3	75.9	85.3	94.7	43
	+/- 4.7	+/- 7.9	+/- 10.7	+/- 14.4	+/- 17.3	+/- 20.1	43
1 h	22.3	32.3	39.0	47.3	53.6	59.7	43
	+/- 3.1	+/- 5.2	+/- 7.1	+/- 9.5	+/- 11.4	+/- 13.3	43
2 h	13.2	18.4	21.8	26.2	29.4	32.6	43
	+/- 1.6	+/- 2.7	+/- 3.7	+/- 4.9	+/- 5.9	+/- 6.9	43
6 h	5.8	7.7	8.9	10.4	11.5	12.6	42
	+/- 0.6	+/- 1.0	+/- 1.3	+/- 1.8	+/- 2.1	+/- 2.4	42
12 h	3.3	4.4	5.1	6.0	6.7	7.3	42
	+/- 0.3	+/- 0.6	+/- 0.8	+/- 1.0	+/- 1.2	+/- 1.4	42
24 h	2.0	2.6	3.0	3.5	3.9	4.2	43
	+/- 0.2	+/- 0.3	+/- 0.4	+/- 0.6	+/- 0.7	+/- 0.8	43

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Table 3 : Interpolation Equation / Équation d'interpolation:  $R = A \cdot T^B$

R = Interpolated Rainfall rate (mm/h)/Intensité interpolée de la pluie (mm/h)

RR = Rainfall rate (mm/h) / Intensité de la pluie (mm/h)

T = Rainfall duration (h) / Durée de la pluie (h)

\*\*\*\*\*

Statistics/Statistiques	2	5	10	25	50	100
	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans
Mean of RR/Moyenne de RR	36.5	48.9	57.1	67.5	75.3	82.9
Std. Dev. /Écart-type (RR)	37.3	48.8	56.4	66.0	73.2	80.3
Std. Error/Erreur-type	7.2	12.3	15.7	20.0	23.2	26.3
Coefficient (A)	20.9	28.3	33.1	39.2	43.7	48.2
Exponent/Exposant (B)	-0.723	-0.725	-0.726	-0.727	-0.728	-0.728
Mean % Error/% erreur moyenne	6.3	8.7	9.9	11.0	11.6	12.0

Short Duration Rainfall Intensity-Duration-Frequency Data  
 Données sur l'intensité, la durée et la fréquence des chutes  
 de pluie de courte durée

Gumbel - Method of moments/Méthode des moments

2010/04/13

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WATERLOO WELLINGTON A	ON	6149387
Latitude: 43 27'N	Longitude: 80 23'W	Elevation/Altitude: 317 m
Years/Années : 1971 - 2003	# Years/Années :	30

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Table 1 : Annual Maximum (mm)/Maximum annuel (mm)

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Year Année	5 min	10 min	15 min	30 min	1 h	2 h	6 h	12 h	24 h
1971	11.7	16.0	17.0	20.8	20.8	20.8	22.9	39.4	41.7
1972	6.9	9.1	13.7	19.0	20.3	32.0	38.6	38.6	45.7
1973	5.8	6.1	6.3	8.6	13.0	20.3	28.4	29.2	30.7
1974	7.6	7.9	8.9	12.4	14.0	15.7	30.5	41.7	47.5
1975	11.7	15.5	17.3	22.9	26.9	50.5	82.3	91.2	93.7
1976	5.3	9.9	12.2	19.0	22.9	23.9	31.5	58.9	68.6
1977	10.7	20.3	22.4	27.2	30.5	33.0	36.1	41.9	51.1
1978	9.4	10.2	11.4	12.7	16.7	24.1	29.6	29.8	41.2
1979	7.3	10.8	11.2	11.2	13.5	24.9	37.5	38.2	41.4
1980	10.5	12.6	14.7	14.7	19.3	22.0	27.7	40.0	44.8
1981	6.5	8.9	10.3	10.3	16.6	22.5	40.6	43.9	53.2
1982	9.7	13.0	17.6	34.8	56.4	65.3	67.2	69.0	69.0
1983	7.7	10.7	15.8	19.6	20.4	20.7	40.1	42.2	42.9
1984	13.1	16.4	18.7	23.8	24.7	37.5	49.4	49.4	69.1
1985	10.4	16.4	24.4	40.8	72.8	83.8	88.8	89.4	89.7
1986	10.4	16.2	21.0	21.4	21.5	21.5	34.6	59.4	85.6
1987	12.2	16.7	17.7	20.4	37.4	41.2	56.0	65.4	78.6
1988	15.5	22.0	28.8	42.0	61.5	77.2	85.6	87.1	87.5
1989	5.4	6.8	8.8	10.8	11.2	15.2	21.0	28.6	50.8
1990	10.8	18.7	21.7	31.8	36.4	39.9	40.5	40.5	46.6
1991	8.3	11.3	16.0	24.4	30.8	39.4	65.4	65.6	82.2
1992	6.8	8.5	12.3	17.7	23.7	28.3	29.9	45.1	56.0
1993	10.8	12.0	16.8	23.0	25.6	26.6	37.0	37.8	38.5
1994	7.9	9.0	12.3	18.1	18.5	22.2	34.4	40.0	42.6
1995	15.9	21.0	27.8	42.6	44.8	47.4	47.8	47.8	47.8
1996	5.2	10.0	12.0	14.6	15.3	17.1	34.1	50.2	57.7
1997	11.7	17.3	18.8	19.0	19.2	20.5	23.2	24.8	41.6
1998	11.2	16.2	16.8	19.8	21.6	22.0	-99.9	-99.9	32.2
2000	7.2	13.0	18.5	27.9	33.7	36.1	36.3	36.3	43.0
2002	5.3	9.2	11.8	17.5	23.0	24.1	24.6	24.9	33.1
2003	5.8	8.8	10.0	13.2	15.2	18.8	30.8	37.6	40.2
# Yrs. Années	31	31	31	31	31	31	30	30	31
Mean	9.2	12.9	15.9	21.4	26.7	32.1	41.7	47.8	54.7



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Moyenne									
Std. Dev.	2.9	4.4	5.5	9.2	14.7	17.2	18.6	18.1	18.5
Écart-type									
Skew.	0.47	0.45	0.59	1.00	1.77	1.74	1.43	1.17	0.86
Dissymétrie									
Kurtosis	2.83	2.41	3.30	3.71	6.06	5.85	4.40	3.98	2.73

\*-99.9 Indicates Missing Data/Données manquantes

Warning: annual maximum amount greater than 100-yr return period amount  
 Avertissement : la quantité maximale annuelle excède la quantité pour une période de retour de 100 ans

Year/Année	Duration/Durée	Data/Données	100-yr/ans
1985	1 h	72.8	72.7

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Table 2a : Return Period Rainfall Amounts (mm)  
 Quantité de pluie (mm) par période de retour

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Duration/Durée	2 yr/ans	5 yr/ans	10 yr/ans	25 yr/ans	50 yr/ans	100 yr/ans	#Years Années
5 min	8.7	11.3	13.0	15.2	16.8	18.4	31
10 min	12.2	16.1	18.6	21.9	24.3	26.6	31
15 min	15.0	19.8	23.0	27.1	30.1	33.0	31
30 min	19.9	27.9	33.3	40.1	45.1	50.1	31
1 h	24.3	37.3	45.8	56.7	64.7	72.7	31
2 h	29.2	44.5	54.6	67.3	76.8	86.1	31
6 h	38.7	55.1	66.0	79.7	89.9	100.0	30
12 h	44.8	60.8	71.4	84.7	94.7	104.5	30
24 h	51.6	67.9	78.8	92.4	102.5	112.6	31

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Table 2b :

Return Period Rainfall Rates (mm/h) - 95% Confidence limits  
 Intensité de la pluie (mm/h) par période de retour - Limites de confiance de 95%

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Duration/Durée	2 yr/ans	5 yr/ans	10 yr/ans	25 yr/ans	50 yr/ans	100 yr/ans	#Years Années
5 min	104.4	135.7	156.4	182.5	202.0	221.2	31
	+/- 11.4	+/- 19.3	+/- 26.0	+/- 35.1	+/- 42.0	+/- 48.9	31
10 min	73.2	96.4	111.8	131.2	145.6	159.9	31
	+/- 8.5	+/- 14.3	+/- 19.3	+/- 26.0	+/- 31.1	+/- 36.3	31
15 min	60.0	79.3	92.1	108.2	120.2	132.1	31
	+/- 7.1	+/- 11.9	+/- 16.1	+/- 21.6	+/- 25.9	+/- 30.2	31
30 min	39.7	55.9	66.6	80.1	90.2	100.2	31
	+/- 5.9	+/- 10.0	+/- 13.5	+/- 18.2	+/- 21.7	+/- 25.3	31
1 h	24.3	37.3	45.8	56.7	64.7	72.7	31
	+/- 4.7	+/- 8.0	+/- 10.8	+/- 14.5	+/- 17.4	+/- 20.3	31
2 h	14.6	22.2	27.3	33.7	38.4	43.1	31
	+/- 2.8	+/- 4.7	+/- 6.3	+/- 8.5	+/- 10.2	+/- 11.9	31
6 h	6.4	9.2	11.0	13.3	15.0	16.7	30
	+/- 1.0	+/- 1.7	+/- 2.3	+/- 3.1	+/- 3.7	+/- 4.3	30
12 h	3.7	5.1	5.9	7.1	7.9	8.7	30
	+/- 0.5	+/- 0.8	+/- 1.1	+/- 1.5	+/- 1.8	+/- 2.1	30
24 h	2.2	2.8	3.3	3.9	4.3	4.7	31
	+/- 0.2	+/- 0.4	+/- 0.6	+/- 0.8	+/- 0.9	+/- 1.1	31

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Table 3 : Interpolation Equation / Équation d'interpolation:  $R = A \cdot T^B$

R = Interpolated Rainfall rate (mm/h)/Intensité interpolée de la pluie (mm/h)

RR = Rainfall rate (mm/h) / Intensité de la pluie (mm/h)

T = Rainfall duration (h) / Durée de la pluie (h)

\*\*\*\*\*

Statistics/Statistiques	2	5	10	25	50	100
	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans	yr/ans
Mean of RR/Moyenne de RR	36.5	49.3	57.8	68.5	76.5	84.4
Std. Dev. /Écart-type (RR)	35.9	46.4	53.4	62.3	68.8	75.4
Std. Error/Erreur-type	7.6	13.3	17.0	21.8	25.3	28.7
Coefficient (A)	21.9	30.3	35.9	42.9	48.0	53.2
Exponent/Exposant (B)	-0.696	-0.689	-0.687	-0.684	-0.683	-0.682
Mean % Error/% erreur moyenne	8.1	12.3	14.2	16.0	17.0	17.8