

Durham Region's Future Climate (2040 – 2049) SUMMARY

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1. What Is this Document?

This document provides a summary of a comprehensive study prepared by SENES Consultants for the Durham Region Roundtable on Climate Change (DRRCC) entitled *Durham Region's Future Climate (2040-2049)*. The SENES study constitutes a key starting point in the creation of a Community Climate Adaptation Plan (CCAP) which is being undertaken in 2014 by the Adaptation Sub-Committee of the DRRCC. The full study is available on request to climatechange@durham.ca.

The SENES study is based on a similar study undertaken by SENES for the City of Toronto in 2011 that covered the GTA and beyond. City of Toronto officials graciously provided access to the data compiled for Toronto's study which included certain sites in Durham Region. This has allowed the DRRCC to undertake this study focused on 8 locations in Durham at significantly lower cost than the Toronto study and to complete a number of special detailed analyses (combinations of parameters) of particular interest to stakeholders.

The study provides projections of the climate that Durham Region will experience in the decade 2040 to 2049 compared the past decade (2000 to 2009). It does not forecast or predict daily weather for the future period; rather it provides projections of both climate averages and weather extremes for the future period and it does so at a high level of geographic resolution (cells of 1 km X 1km). In determining the likely impacts of changing climate in Durham, it is essential to take into account both climate averages and the extremes of temperature, precipitation, wind etc. Society must generally adapt to the changing averages, but it's the extremes that may pose the greatest risk to infrastructure and processes.

2. Why Was the Study Undertaken?

The study was undertaken as the first step of a 5-step process to produce a proposed Community Climate Adaptation Plan (CCAP) for Durham Region during 2014. The purpose of the study is to provide a state-of-the-science projection of key climate parameters for a relevant future period for purposes of planning:

- infrastructure upgrades and new design criteria;
- extreme weather and emergency response programs;
- business continuity programs;
- improved urban and rural design for resilience;
- programs and measures to protect human health and property.

The next steps are to identify the implications of these climate parameters for various sectors of the Durham community and then develop relevant programs and activities to adapt to these future conditions. These steps require stakeholder engagement.

3. What Locations Does It Cover

The report provides detailed climate projections for all eight local municipalities in the Region of Durham:

- Ajax
- Brock (Beaverton)
- Clarington (Bowmanville)
- Oshawa
- Pickering
- Scugog (Port Perry)
- Uxbridge (Town of Uxbridge)
- Whitby

Whitby was selected as the proxy site for Durham Region for purposes of general data presentation in Volume 1 of the SENES report; however, full data sets for all sites are presented in Volume 2 of the study and summarized in the appendices of this document. Special analyses for all 8 sites also appear in Volume 1.

4. How Were the Projections Made?

SENES Consultants is a highly specialized consulting firm based in Richmond Hill, Ontario that was selected by the City of Toronto in 2011 to prepare an extensive study on Toronto's Future Weather and Climate Drivers. The Region of Durham benefitted from this earlier ground-breaking work by selecting the same consultant. For the Toronto and Durham studies, SENES selected the most credible scenario of future global GHG emissions (the A1B scenario of the Intergovernmental Panel on Climate Change) to drive a global climate circulation model (HadCM3) and a regional climate model (PRECIS) connected to the FReSH weather forecasting system to project relevant climate parameters for the 2040 to 2049 period. These combined models also project the climate parameters for the

recent base period 2000 to 2009 which are checked for accuracy against actual historical observations to ensure confidence in the future projections. A separate "backcast" to a specific historical weather event in Durham (the July 11, 2009 microburst in Oshawa) was used to further confirm accuracy of the combined models.

Large portions of the SENES report are dedicated to describing the methodology used in the study and demonstrating the relevance and reliability of the climate projections.

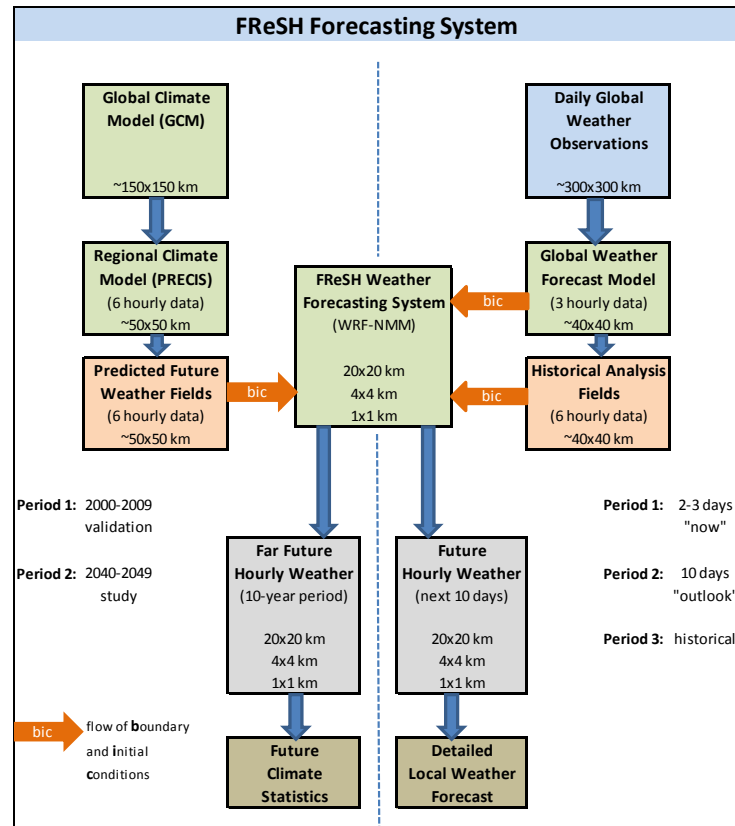


Figure 1 Schematic of how future weather and climate is determined

5. Overview of Results

Overall, Durham Region's climate in the 2040 to 2049 period can be described as:

- Considerably warmer with higher humidity
- Less snow, more rain in winter
- More frequent and intense summer rain events
- Lower winds generally
- More extreme weather events with high winds and heavy rain.

Consolidated projections for all 8 sites in Durham are presented in Appendix A and summary tables for all 8 locations in Durham are found in Appendix B.

The following summarizes the projected climate for the Whitby proxy site for the base and future periods:

Summary for Whitby

Climate Parameter	Detailed Parameter	2000-2009	2040-2049
Extreme precipitation	Max. in one Day (mm)	79	117
	# days/year >25mm	6	10
	Annual Total Precipitation (mm)	869	1004
Extreme rainfall	Max. in one day (mm)	79	117
	# days/year > 25mm	5	10
Extreme Snowfall	Max. in one day (cm)	28	17
	# days/year > 5 cm	9	2
Extreme Heat	Average max daily (°C)	25	28
	Extreme max. (°C)	33	40
	# days/year > 30(°C)	2	17
Extreme Cold	Average min Daily (°C)	-8	-1
	Extreme min. (°C)	-25	-13
	# days/year < -10(°C)	27	1
	# days/year with min. <0 (frost days)	129	75
Wind Chill	Extreme Daily (°C)	-37	-19
	# days/year <-20 (°C)	15	0
Degree Days	# degree days/year > 24 (°C) (AC req'd)	8	49
	# degree days/year > 0 (°C)	3444	4508
	# degree days/year < 0(°C) (heating req'd)	475	70
Humidex	Max (°C)	47	51
	Average # days/year >40(°C)	3	19
Extreme Wind	Max hourly speed (km/hr)	62	54
	Max. gust speed (km/hr)	119	74
	# days/year with wind speed > 52 km/hr	2.0	0.1
	# days/year with wind speed > 63 km/hr	0.0	0.0
Potential for Violent Storms	# days with high lightning potential/year	29	42
	# days/year with EHI > 1	15.0	17.2
	# days/year with EHI 2-5	4.9	7.5
	# days/year with EHI >= 5	0	0.3

Future Period: 2040-2049 Compared to 2000-2009

The following summarizes the projected climate changes for the proxy Whitby site for the future period compared with the base period:

Less snow and more rain in winter

About 16% more precipitation (snow and rainfall) overall

- ~50% increase in the one day maximum rainfall
- ~40% decrease in the one day maximum snowfall
- 100% increase in the number of days of rain greater than 25 mm
- 80% reduction in the number of days with snow more than 5 cm
- 146% more rain and 61% less snow in January
- 217% more rain and 75% less snow in February

Rainstorm events will be more extreme

- 15% increase in the potential for violent storms
- 53% increase in the potential for tornadoes
- 74% more rain in July
- 79% more rain in August

Average annual temperatures increase of 4.0°C

- average winter temperatures increase by 5.8°C
- average summer temperatures increase by 2.6°C
- extreme daily minimum temperature "becomes less cold " by 12°C
- extreme daily maximum temperature "becomes warmer " by 7.1°C

Average wind speed about the same

- maximum hourly winds reduced
- maximum wind gusts reduced about 13%

"Comfort" remains similar but with some extreme events

- humidity and temperature taken together as the Humidex remains similar (within 8% of present on average) for most of the year but shows increases in November (up 30%) and in May through to September (up 15%) and pushes past the "dangerous" level (45) on several summer days
- Wind Chill is reduced by about 50% on average but is reduced 25-45% during the winter months (Note: Environment Canada recognizes that Wind Chill is not confined to winter).

6. Implications

Based on these climate projections, we now need to assess the implications for our physical infrastructure, business continuity, government services, food production, health and security. Will there be increase flooding, heat stroke, vector-borne diseases, tornados, disruption to energy supply? What can we do to protect ourselves and make our community more resilient to these coming changes?

This is where we require the expertise of various sectors of the community to:

- identify implications;
- assess vulnerabilities;
- identify measures and actions to reduce impacts and increase resilience;
- assist in the development of a proposed Community Climate Adaptation Plan for adoption and implementation by the public and private sectors in Durham Region.

The full SENES report is available on request to climatechange@durham.ca.

Appendix A - Consolidated Projections (2000-2009 and 2040-2049 data)

Climate Parameter	Detailed Parameter	Ajax		Whitby		Oshawa		Clarington		Uxbridge		Port Perry		Beaverton		Pickering	
		2000-09	2040-49	2000-09	2040-49	2000-09	2040-49	2000-09	2040-49	2000-09	2040-49	2000-09	2040-49	2000-09	2040-49	2000-9	2040-9
Extreme precipitation	Max. in one Day (mm)	79	84	79	117	84	88	99	96	82	100	87	122	85	88	81	97
	# days/year >25mm	5	9	6	10	6	10	6	9	7	11	7	11	4	9	5	9
	Annual Total Precipitation (mm)	820	954	869	1004	880	1023	883	977	1025	1115	988	1104	828	955	822	960
Extreme rainfall	Max. in one day (mm)	79	84	79	117	84	88	99	96	82	100	87	122	85	88	81	97
	# days/year > 25mm	4	9	5	10	5	10	6	9	6	11	6	11	4	8	4	9
Extreme Snowfall	Max. in one day (cm)	29	14	28	17	29	18	27	21	40	26	39	25	27	31	33	29
	# days/year > 5 cm	8	2	9	2	9	3	9	1	13	6	11	4	12	5	8	2
Extreme Heat	Average max daily (°C)	24	26	25	28	24	28	24	27	25	29	25	29	24	29	25	28
	Extreme max. (°C)	31	40	33	40	32	40	32	40	37	43	35	44	33	40	35	43
	# days/year > 30(°C)	1	6	2	17	1	11	1	9	5	28	5	27	4	26	4	15
Extreme Cold	Average min Daily (°C)	-7	0	-8	-1	-8	-1	-7	-1	-9	-2	-9	-2	-10	-2	-8	-1
	Extreme min. (°C)	-24	-12	-25	-13	-25	-11	-25	-11	-28	-14	-27	-14	-29	-15	-25	-13
	# days/year < -10(°C)	24	0	27	1	27	0	25	0	36	2	36	2	39	2	27	1
	# days/year with min. <0 (frost days)	122	60	129	75	128	73	126	71	141	91	144	92	141	82	129	72
Wind Chill	Extreme Daily (°C)	-36	-17	-37	-19	-37	-17	-36	-17	-41	-20	-40	-20	-39	-21	-37	-20
	# days/year <-20 (°C)	13	0	15	0	16	0	14	0	24	0	23	0	25	0.3	14	0
Degree Days	# degree days/year > 24 (°C) (AC req'd)	4	17	8	49	6	38	5	32	12	90	10	80	6	68	9	43
	# degree days/year > 0 (°C)	3342	4329	3444	4508	3415	4459	3420	4443	3283	4378	3280	4384	3260	4365	3431	4490
	# degree days/year < 0(°C) (heating req'd)	444	50	475	70	474	69	457	64	614	132	602	127	627	121	463	62
Humidex	Max (°C)	43	48	47	51	46	50	45	48	45	54	46	54	45	54	48	53
	Average # days/year >40(°C)	1	6	3	19	3	16	2	13	3	24	4	25	4	25	4	17
Extreme Wind	Max hourly speed (km/hr)	65	57	62	54	65	56	70	56	69	50	69	49	75	59	62	57
	Max. gust speed (km/hr)	120	74	119	74	120	77	113	77	108	78	116	80	106	84	108	74
	# days/year with wind speed > 52 km/hr	3	0.3	2	0.1	2	0.2	3	0.1	2	0	2	0	4	0.6	2	0.2
	# days/year with wind speed > 63 km/hr	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0
Potential for Violent Storms	# days with high lightning potential/year	27	43	29	42	27	43	27	41	26	32	25	32	22	29	29	44
	# days/year with EHI > 1	11.2	13.5	15.0	17.2	12.8	15.8	10.9	12.9	20.5	28.2	20.7	27.5	19.3	25.1	15.6	16.7
	# days/year with EHI 2-5			4.9	7.5												
	# days/year with EHI >= 5			0	0.3												

Ice Storms (pg. 108 vol. 1) ice storms will totally disappear by 2040-2049

Freezing rain and high wind 72 hours with > 12.5 mm with wind gust of >=90km/hr: zero occurrences in 2040-2049

72 hours with freezing rain of 19 mm and wind gusts of >=100 km/hr: zero occurrences in 2040-2049

Lightning #days/year increases by 16 in Pickering and Ajax, Uxbridge, Port Perry and Beaverton lowest increase of approx. 6.7days/year

If this information is required in an accessible format, please call 1-800-372-1102 ext.2600.

Appendix B - Projections by Municipality (2000-2009 and 2040-2049)

Ajax

Climate Parameter	Detailed Parameter	2000-09	2040-49	Notes:
Extreme precipitation	Max. in one Day (mm)	79	84	
	# days/year >25mm	5	9	
	Annual Total Precipitation (mm)	820	954	
Extreme rainfall	Max. in one day (mm)	79	84	
	# days/year > 25mm	4	9	
Extreme Snowfall	Max. in one day (cm)	29	14	
	# days/year > 5 cm	8	2	
Extreme Heat	Average max daily (°C)	24	26	
	Extreme max. (°C)	31	40	
	# days/year > 30(°C)	1	6	
Extreme Cold	Average min Daily (°C)	-7	0	
	Extreme min. (°C)	-24	-12	
	# days/year < -10(°C)	24	0	
	# days/year with min. <0 (frost days)	122	60	
Wind Chill	Extreme Daily (°C)	-36	-17	
	# days/year <-20 (°C)	13	0	
Degree Days	# degree days/year > 24 (°C) (AC req'd)	4	17	
	# degree days/year > 0 (°C)	3342	4329	
	# degree days/year < 0(°C) (heating req'd)	444	50	
Humidex	Max (°C)	43	48	
	Average # days/year >40(°C)	1	6	
Extreme Wind	Max hourly speed (km/hr)	65	57	
	Max. gust speed (km/hr)	120	74	
	# days/year with wind speed > 52 km/hr	3	0.3	
	# days/year with wind speed > 63 km/hr	0	0	
Potential for Violent Storms	# days with high lightning potential/year	27	43	
	# days/year with EHI > 1	11.2	13.5	
	# days/year with EHI 2-5			
	# days/year with EHI >= 5			

Appendix B - Projections by Municipality (2000-2009 and 2040-2049)

Whitby

Climate Parameter	Detailed Parameter	2000-09	2040-49	Notes:
Extreme precipitation	Max. in one Day (mm)	79	117	
	# days/year >25mm	6	10	
	Annual Total Precipitation (mm)	869	1004	
Extreme rainfall	Max. in one day (mm)	79	117	
	# days/year > 25mm	5	10	
Extreme Snowfall	Max. in one day (cm)	28	17	
	# days/year > 5 cm	9	2	
Extreme Heat	Average max daily (°C)	25	28	
	Extreme max. (°C)	33	40	
	# days/year > 30(°C)	2	17	
Extreme Cold	Average min Daily (°C)	-8	-1	
	Extreme min. (°C)	-25	-13	
	# days/year < -10(°C)	27	1	
	# days/year with min. <0 (frost days)	129	75	
Wind Chill	Extreme Daily (°C)	-37	-19	
	# days/year <-20 (°C)	15	0	
Degree Days	# degree days/year > 24 (°C) (AC req'd)	8	49	
	# degree days/year > 0 (°C)	3444	4508	
	# degree days/year < 0(°C) (heating req'd)	475	70	
Humidex	Max (°C)	47	51	
	Average # days/year >40(°C)	3	19	
Extreme Wind	Max hourly speed (km/hr)	62	54	
	Max. gust speed (km/hr)	119	74	
	# days/year with wind speed > 52 km/hr	2.0	0.1	
	# days/year with wind speed > 63 km/hr	0.0	0.0	
Potential for Violent Storms	# days with high lightning potential/year	29	42	
	# days/year with EHI > 1	15.0	17.2	
	# days/year with EHI 2-5	4.9	7.5	
	# days/year with EHI >= 5	0	0.3	

Appendix B - Projections by Municipality (2000-2009 and 2040-2049)

Oshawa

Climate Parameter	Detailed Parameter	2000-09	2040-49	Notes:
Extreme precipitation	Max. in one Day (mm)	84	88	
	# days/year >25mm	6	10	
	Annual Total Precipitation (mm)	880	1023	
Extreme rainfall	Max. in one day (mm)	84	88	
	# days/year > 25mm	5	10	
Extreme Snowfall	Max. in one day (cm)	29	18	
	# days/year > 5 cm	9	3	
Extreme Heat	Average max daily (°C)	24	28	
	Extreme max. (°C)	32	40	
	# days/year > 30(°C)	1	11	
Extreme Cold	Average min Daily (°C)	-8	-1	
	Extreme min. (°C)	-25	-11	
	# days/year < -10(°C)	27	0	
	# days/year with min. <0 (frost days)	128	73	
Wind Chill	Extreme Daily (°C)	-37	-17	
	# days/year <-20 (°C)	16	0	
Degree Days	# degree days/year > 24 (°C) (AC req'd)	6	38	
	# degree days/year > 0 (°C)	3415	4459	
	# degree days/year < 0(°C) (heating req'd)	474	69	
Humidex	Max (°C)	46	50	
	Average # days/year >40(°C)	3	16	
Extreme Wind	Max hourly speed (km/hr)	65	56	
	Max. gust speed (km/hr)	120	77	
	# days/year with wind speed > 52 km/hr	2	0.2	
	# days/year with wind speed > 63 km/hr	0	0	
Potential for Violent Storms	# days with high lightning potential/year	27	43	
	# days/year with EHI > 1	12.8	15.8	
	# days/year with EHI 2-5			
	# days/year with EHI >= 5			

Appendix B - Projections by Municipality (2000-2009 and 2040-2049)

Clarington

Climate Parameter	Detailed Parameter	2000-09	2040-49	Notes:
Extreme precipitation	Max. in one Day (mm)	99	96	
	# days/year >25mm	6	9	
	Annual Total Precipitation (mm)	883	977	
Extreme rainfall	Max. in one day (mm)	99	96	
	# days/year > 25mm	6	9	
Extreme Snowfall	Max. in one day (cm)	27	21	
	# days/year > 5 cm	9	1	
Extreme Heat	Average max daily (°C)	24	27	
	Extreme max. (°C)	32	40	
	# days/year > 30(°C)	1	9	
Extreme Cold	Average min Daily (°C)	-7	-1	
	Extreme min. (°C)	-25	-11	
	# days/year < -10(°C)	25	0	
	# days/year with min. <0 (frost days)	126	71	
Wind Chill	Extreme Daily (°C)	-36	-17	
	# days/year <-20 (°C)	14	0	
Degree Days	# degree days/year > 24 (°C) (AC req'd)	5	32	
	# degree days/year > 0 (°C)	3420	4443	
	# degree days/year < 0(°C) (heating req'd)	457	64	
Humidex	Max (°C)	45	48	
	Average # days/year >40(°C)	2	13	
Extreme Wind	Max hourly speed (km/hr)	70	56	
	Max. gust speed (km/hr)	113	77	
	# days/year with wind speed > 52 km/hr	3	0.1	
	# days/year with wind speed > 63 km/hr	1	0	
Potential for Violent Storms	# days with high lightning potential/year	27	41	
	# days/year with EHI > 1	10.9	12.9	
	# days/year with EHI 2-5			
	# days/year with EHI >= 5			

Appendix B - Projections by Municipality (2000-2009 and 2040-2049)

Uxbridge

Climate Parameter	Detailed Parameter	2000-09	2040-49	Notes:
Extreme precipitation	Max. in one Day (mm)	82	100	
	# days/year >25mm	7	11	
	Annual Total Precipitation (mm)	1025	1115	
Extreme rainfall	Max. in one day (mm)	82	100	
	# days/year > 25mm	6	11	
Extreme Snowfall	Max. in one day (cm)	40	26	
	# days/year > 5 cm	13	6	
Extreme Heat	Average max daily (°C)	25	29	
	Extreme max. (°C)	37	43	
	# days/year > 30(°C)	5	28	
Extreme Cold	Average min Daily (°C)	-9	-2	
	Extreme min. (°C)	-28	-14	
	# days/year < -10(°C)	36	2	
	# days/year with min. <0 (frost days)	141	91	
Wind Chill	Extreme Daily (°C)	-41	-20	
	# days/year <-20 (°C)	24	0	
Degree Days	# degree days/year > 24 (°C) (AC req'd)	12	90	
	# degree days/year > 0 (°C)	3283	4378	
	# degree days/year < 0(°C) (heating req'd)	614	132	
Humidex	Max (°C)	45	54	
	Average # days/year >40(°C)	3	24	
Extreme Wind	Max hourly speed (km/hr)	69	50	
	Max. gust speed (km/hr)	108	78	
	# days/year with wind speed > 52 km/hr	2	0	
	# days/year with wind speed > 63 km/hr	1	0	
Potential for Violent Storms	# days with high lightning potential/year	26	32	
	# days/year with EHI > 1	20.5	28.2	
	# days/year with EHI 2-5			
	# days/year with EHI >= 5			

Appendix B - Projections by Municipality (2000-2009 and 2040-2049)

Port Perry

Climate Parameter	Detailed Parameter	2000-09	2040-49	Notes:
Extreme precipitation	Max. in one Day (mm)	87	122	
	# days/year >25mm	7	11	
	Annual Total Precipitation (mm)	988	1104	
Extreme rainfall	Max. in one day (mm)	87	122	
	# days/year > 25mm	6	11	
Extreme Snowfall	Max. in one day (cm)	39	25	
	# days/year > 5 cm	11	4	
Extreme Heat	Average max daily (°C)	25	29	
	Extreme max. (°C)	35	44	
	# days/year > 30(°C)	5	27	
Extreme Cold	Average min Daily (°C)	-9	-2	
	Extreme min. (°C)	-27	-14	
	# days/year < -10(°C)	36	2	
	# days/year with min. <0 (frost days)	144	92	
Wind Chill	Extreme Daily (°C)	-40	-20	
	# days/year <-20 (°C)	23	0	
Degree Days	# degree days/year > 24 (°C) (AC req'd)	10	80	
	# degree days/year > 0 (°C)	3280	4384	
	# degree days/year < 0(°C) (heating req'd)	602	127	
Humidex	Max (°C)	46	54	
	Average # days/year >40(°C)	4	25	
Extreme Wind	Max hourly speed (km/hr)	69	49	
	Max. gust speed (km/hr)	116	80	
	# days/year with wind speed > 52 km/hr	2	0	
	# days/year with wind speed > 63 km/hr	1	0	
Potential for Violent Storms	# days with high lightning potential/year	25	32	
	# days/year with EHI > 1	20.7	27.5	
	# days/year with EHI 2-5			
	# days/year with EHI >= 5			

Appendix B - Projections by Municipality (2000-2009 and 2040-2049)

Beaverton

Climate Parameter	Detailed Parameter	2000-09	2040-49	Notes:
Extreme precipitation	Max. in one Day (mm)	85	88	
	# days/year >25mm	4	9	
	Annual Total Precipitation (mm)	828	955	
Extreme rainfall	Max. in one day (mm)	85	88	
	# days/year > 25mm	4	8	
Extreme Snowfall	Max. in one day (cm)	27	31	
	# days/year > 5 cm	12	5	
Extreme Heat	Average max daily (°C)	24	29	
	Extreme max. (°C)	33	40	
	# days/year > 30(°C)	4	26	
Extreme Cold	Average min Daily (°C)	-10	-2	
	Extreme min. (°C)	-29	-15	
	# days/year < -10(°C)	39	2	
	# days/year with min. <0 (frost days)	141	82	
Wind Chill	Extreme Daily (°C)	-39	-21	
	# days/year <-20 (°C)	25	0.3	
Degree Days	# degree days/year > 24 (°C) (AC req'd)	6	68	
	# degree days/year > 0 (°C)	3260	4365	
	# degree days/year < 0(°C) (heating req'd)	627	121	
Humidex	Max (°C)	45	54	
	Average # days/year >40(°C)	4	25	
Extreme Wind	Max hourly speed (km/hr)	75	59	
	Max. gust speed (km/hr)	106	84	
	# days/year with wind speed > 52 km/hr	4	0.6	
	# days/year with wind speed > 63 km/hr	1	0	
Potential for Violent Storms	# days with high lightning potential/year	22	29	
	# days/year with EHI > 1	19.3	25.1	
	# days/year with EHI 2-5			
	# days/year with EHI >= 5			

Appendix B - Projections by Municipality (2000-2009 and 2040-2049)

Pickering

Climate Parameter	Detailed Parameter	2000-09	2040-49	Notes:
Extreme precipitation	Max. in one Day (mm)	81	97	
	# days/year >25mm	5	9	
	Annual Total Precipitation (mm)	822	960	
Extreme rainfall	Max. in one day (mm)	81	97	
	# days/year > 25mm	4	9	
Extreme Snowfall	Max. in one day (cm)	33	29	
	# days/year > 5 cm	8	2	
Extreme Heat	Average max daily (°C)	25	28	
	Extreme max. (°C)	35	43	
	# days/year > 30(°C)	4	15	
Extreme Cold	Average min Daily (°C)	-8	-1	
	Extreme min. (°C)	-25	-13	
	# days/year < -10(°C)	27	1	
	# days/year with min. <0 (frost days)	129	72	
Wind Chill	Extreme Daily (°C)	-37	-20	
	# days/year <-20 (°C)	14	0	
Degree Days	# degree days/year > 24 (°C) (AC req'd)	9	43	
	# degree days/year > 0 (°C)	3431	4480	
	# degree days/year < 0(°C) (heating req'd)	463	62	
Humidex	Max (°C)	48	53	
	Average # days/year >40(°C)	4	17	
Extreme Wind	Max hourly speed (km/hr)	62	57	
	Max. gust speed (km/hr)	108	74	
	# days/year with wind speed > 52 km/hr	2	0.2	
	# days/year with wind speed > 63 km/hr	0	0	
Potential for Violent Storms	# days with high lightning potential/year	29	44	
	# days/year with EHI > 1	15.6	16.7	
	# days/year with EHI 2-5			
	# days/year with EHI >= 5			