## IE8.6 - Attachment 2

Attachment 2: Winter Maintenance Program Review (HDR)

FC



# Winter Maintenance Program Review

City of Toronto

September 2019

## **Executive Summary**

The **2019 Winter Maintenance Program Review** builds on a previous program review which was conducted in 2013. Both studies revealed that Toronto's level of service standards for winter maintenance are comparable to other municipalities on higher volume roadways such as expressways, arterials and collectors, but that they generally exceed other municipalities' levels of service on the lower volume roadways such as local and residential streets, and sidewalks. Toronto also does windrow clearing.

Notwithstanding that the City provides a high level of winter maintenance services there have been a number of significant weather events in recent years that have led to a call for a review of the City's approach.

The **2019 Winter Maintenance Program Review** compares Toronto's winter maintenance level of service with peer cities; reviews Toronto's climate environment; examines the City's compliance with the Ontario Minimum Maintenance Standards and the Ontarians with Disabilities Act (AODA); and reviews the provision of sidewalk clearing of municipally owned sidewalks through a lens of equity, accessibility and safety.

Six peer cities (Chicago, Milwaukee, Minneapolis, New York, Montreal and Ottawa) and five cities within the Greater Toronto and Hamilton Area (Brampton, Hamilton, Mississauga, York Region, and London) were chosen for comparison.

Toronto is a "winter city" and based on a five year average may be expected to experience the following winter weather events each year:

- 2 days of lower than -18 C temperatures
- 3 days of greater than 10 cm snowfall
- 7 days of freezing precipitation

These are relatively infrequent events; however, there may be great variability in the frequency and severity of winter weather events. It is the response to these significant weather events which create questions from the public and Members of Council, and challenges for the winter maintenance of Toronto's roadways and sidewalks.

The 2019 Winter Maintenance Program Review is structured as follows:

- **Transportation Winter Related 311 Data.** Provides a summary of winter maintenance related City 311 service requests (SRs) for the winter seasons 2013/2014 to 2018/2019.
- **Toronto Resident Survey.** Provides the findings of a survey commissioned to collect feedback from Toronto residents regarding winter maintenance services. As well, input from Cycle TO, Walk Toronto and representatives of the senior's community was documented.
- **Toronto Climate Summary.** Provides an analysis of Toronto's climate data, with a focus on snowfall, rainfall, and temperature over the winter maintenance period.
- **Peer City Comparison.** Compares a comparison of the winter maintenance level of service between Toronto and comparable North America peer cities.

- **GTHA City Level of Service Comparison.** Provides a comparison of winter maintenance level of service for selected cities within the Greater Toronto and Hamilton Area (GTHA).
- **Regulated/Legislated Level of Service Assessment.** Assesses the regulated/legislated level of service for Toronto and the peer cities considered in the study.
- AODA Requirements Assessment. Reviews the City's current procedures and practices in regards to winter maintenance and the compliance with AODA requirements.
- **Sidewalk Program Assessment**. Presents a business case to assess the implementation of a city-wide sidewalk snow clearing program.

The **Winter Maintenance Program Review** and the **Toronto Resident Survey** identified three program areas within which Transportation Services could consider recommendations to create a more robust and equitable winter maintenance program as summarized below.

### Level of Service Assessment

Overall, the City of Toronto meets or exceeds the winter maintenance level of service for roadways, paths and sidewalks as compared to peer cities, other cities within the GTHA, and current policies. Although Toronto provides an excellent sidewalk snow clearing program in most City districts there are approximately 1,400 km of sidewalks within the inner districts of the City that are currently not cleared. Considerations of roadway and sidewalk widths, encroachments, and equipment limitations preclude these sidewalks from being mechanically cleared. As identified within the Sidewalk Program Assessment and during the field trip to Ottawa it may be possible to develop a program enhancement to clear all sidewalks, albeit at a significant cost.

To better understand the implications of clearing snow from the constricted sidewalks it is recommended that Transportation Services:

- 1. Conduct a physical inventory of the 1,400 km of sidewalk that are currently not mechanically cleared to confirm the sidewalk segment lengths, widths and encroachments which will assist with program development.
- 2. During the 2019 / 2020 winter season conduct a snow clearing trial program on approximately 250 km of the sidewalks which are currently not cleared to assess program feasibility, staffing, manual clearing, equipment and cost.

Additionally, the City should explore the following program enhancements:

- 3. Initiate snow clearing on low volume sidewalks at a 2cm accumulation of snow (currently 8cm) to improve equity of service, safety, and pedestrian mobility.
- 4. Review the efficacy of the Major Snow Storm Condition declaration and consider a more robust application of the program to improve parking control and snow clearing along major City routes.
- 5. Review sidewalk encroachment management, resident responsibilities and bylaw control.

- 6. Review the snow clearing LOS on cycle facilities to ensure current practices meet the needs of the cycle community.
- 7. Review the application of "Design for Winter" principles to ensure the design of facilities consider unique winter maintenance needs for snow clearing and storage.

### **Climate Assessment**

The report provides a summary of Toronto climate data with a focus on weather events during the fringe periods of April, October, and November. The trend of snowfall and snowfall frequency over the 25 year period (1994 to 2019) is relatively consistent with significant variations above or below the average every few years. Based on the climate data it can be concluded that the core winter maintenance program is an appropriately robust program; however, the occasional weather event outside the normal range will stress the current program.

Of concern are significant weather events which occur outside of the core winter maintenance period of mid-November to mid-April when there is not a full complement of staff and equipment available. The climate data indicates that significant April weather events are possible. To mitigate the impact of a major fringe weather event the City should consider the following:

- 8. The City should review the balance between in-house and contract staff within the winter maintenance program to ensure more staff are available during the winter fringe period.
- 9. The City should review the retention of contractor equipment within the maintenance depots for possible deployment during major fringe weather events.

### **Communications Assessment**

The **Toronto Resident Survey** identified that there is a general lack of public knowledge and awareness regarding the winter maintenance program, and there is significant concern with the quality and timeliness of resident interaction with the 311 service. Based on the resident feedback it is recommended that:

- 10. The City develop a comprehensive public advertising and communication plan to improve the public's understanding of the City's winter maintenance program policies, level of service, service delivery, activities and responsibilities. As well, the realities of winter maintenance responses to major weather events needs to be better understood.
- 11. The City review the 311 response policies and phone script to ensure the services are meeting the needs of the residents and the winter maintenance program.

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## 1 Study Purpose

In 2013 the City of Toronto conducted a review of their winter maintenance program. The study compared the Toronto winter maintenance services with a number of peer cities to identify opportunities for improvement. The study also examined the city's climate and micro-climate zones to understand the winter maintenance challenges. As well, a public consultation process gathered views, opinions and facilitated discussion about the City's winter maintenance services. The study developed an in-depth understanding of the challenges and best practices for winter maintenance.

The 2013 review revealed that Toronto's level of service standards for winter maintenance are comparable to other municipalities on higher volume roadways such as expressways, arterials and collectors, but that they generally exceed other municipalities' levels of service on the lower volume roadways such as local and residential streets, and sidewalks. Moreover, Toronto's service standards exceed the Province's minimum legislated requirements as well as the City of Toronto Act requirements. Toronto also provides certain services (such as sidewalk and windrow clearing) in some districts which are not provided in other districts due to equipment limitations and other logistical reasons.

Notwithstanding that the City provides a high level of winter maintenance services there have been a number of significant weather events in recent years that have led to a call for a review of the City's approach.

The current study will compare Toronto's winter maintenance level of service with peer cities; review Toronto's climate environment; examine the City's compliance with the Ontario Minimum Maintenance Standards and the Ontarians with Disabilities Act (AODA); and review the provision of sidewalk clearing of municipally owned sidewalks through a lens of equity, accessibility and safety.

Six peer cities (Chicago, Milwaukee, Minneapolis, New York, Montreal and Ottawa) and five cities within the Greater Toronto and Hamilton Area (Brampton, Hamilton, Mississauga, York Region, and London) were chosen for comparison.

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These are relatively infrequent events; however, there may be great variability in the frequency and severity of winter weather events. Of note are two weather events, the April 2018 ice storm and the January 2019 snow storm, which were both of a severity significantly outside the normal range.

At least once a year Toronto may be expected to experience a winter weather event of significant low temperatures, heavier than normal snowfall and/or heavy freezing precipitation. It is these events which create questions from the public and Members of Council, and challenges for the winter maintenance of Toronto's roadways and sidewalks.

The report is structured as follows:

- **Transportation Winter Related 311 Data.** Provides a summary of winter maintenance related City 311 service requests (SRs) for the winter seasons 2013/2014 to 2018/2019.
- **Toronto Resident Survey.** Provides the findings of a survey commissioned to collect feedback from Toronto residents regarding winter maintenance services. As well, input from several special interest groups was documented.
- **Toronto Climate Summary.** Provides an analysis of Toronto's climate data, with a focus on snowfall, rainfall, and temperature over the winter maintenance period.
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- **AODA Requirements Assessment.** Reviews the City's current procedures and practices in regards to winter maintenance and the compliance with AODA requirements.
- **Sidewalk Program Assessment**. Presents a business case to assess the implementation of a city-wide sidewalk snow clearing program.
- **Recommendations.** Provides a summary of recommendations.

## 2 Transportation Winter Related 311 Data

The City maintains a 311 Contact Centre to provide information to residents and refer service requests (SRs) to the appropriate City division. The Service Requests are organized by topic and division responsible for addressing the request. Winter maintenance related service requests for the winter seasons 2013/2014 to 2018/2019 have been reviewed to provide an understanding of the type, volume and district of origin for SRs related to transportation during the winter season.

**Table 1** indicates the monthly number of winter maintenance related SRs received by the City over the course of the winter seasons 2013/2014 to 2018/2019.

Season	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Oct	7	5	3	-	-	5
Nov	570	337	53	44	30	119
Dec	2,691	1,560	691	5,409	2,554	144
Jan	5,113	930	1,399	722	2,711	6,981
Feb	7,017	6,670	859	1,305	2,025	11,038
Mar	1,776	998	922	136	41	2,227
Apr	55	25	191	15	737	22
May	25	23	9	8	22	-
Jun	14	9	3	4	11	-
Jul	1	7	5	5	4	-
Aug	1	1	1	1	2	-
Sep	2	4	1	1	3	-
Total	17,272	10,569	4,137	7,650	8,140	20,536

#### Table 1: Winter Maintenance Related SRs by Month

The data indicates that the bulk of the transportation winter-related SRs are generated from December through March, and the annual totals vary considerably from a high of 20,536 over the latest (2018/2019) winter season to a low of 4,137 during the 2015/2016 season. **Figure 1** graphically presents the winter maintenance related SRs per winter season.



Figure 1: Winter Maintenance Related SRs per Winter Season

Table 2 lists the volume of winter maintenance related SR by category and season.

SR Problem Description	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Road-Winter Request/Complaint	5,158	2,850	1,543	2,237	2,392	4,980
Road-Ploughing Required	1,787	1,556	542	963	1,474	3,915
Sidewalk - Snow Clearing	1,722	1,792	556	1,013	1,193	3,293
Driveway-Blocked by Windrow	2,141	1,914	316	1,190	893	3,057
Sidewalk-Icy, Needs Sand/Salt	3,308	819	456	919	1,016	2,379
Road-Salting/Sanding Required	1,181	168	105	221	226	378
Sidewalk-Sidewalks Seniors-Snow Clearing	257	232	87	232	240	495
Bus Stops-Snow Clearing Required	186	248	92	133	144	425
Walkway - Snow Clearing/Salting Required	296	128	67	137	63	175
Snow Removal - Sightline Problem	160	118	17	88	46	368
Bus Stops-Icy, Needs Sand/Salt	283	68	58	83	78	218
Boulevards-Snow Piled High/Too Much	171	160	23	70	43	297
Roadside - Plough Damage	89	133	136	116	144	94
Snow Removal - General	81	137	21	102	81	254
Road-Plough Damage	63	61	71	57	50	49
Bridge-Icy, Needs Sand/Salt	86	64	37	31	23	38
Snow Removal - School Zone	41	57	10	32	24	79
Laneway-Snow Not Plowed	163	50		11	2	5
Laneway-Salting/Sanding/Salt	98	12		15	8	37
Snow Fence	1	2				

#### Table 2: Winter Maintenance Related SRs by Category per Season

In order to simplify the data and aid in interpretation, SRs have been grouped into 4 categories based on their description: road, sidewalk, windrow, and other. **Table 3** provides a summary of the percentage share of SRs by category. Over the past 6 winter seasons, SRs related to roadway issues typically accounted for nearly half the total (48%), followed by sidewalk related requests (30%).

Grouped Category	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Road	48%	44%	54%	46%	51%	46%
Sidewalk	32%	28%	28%	30%	31%	31%
Windrow	12%	18%	8%	16%	11%	15%
Other	7%	9%	10%	9%	7%	9%

### Table 3: Winter Maintenance Related SRs by Grouped Category Percentage

Table 4 and Figure 2 present the grouped category of SRs by volume of calls.

#### Table 4: Winter Maintenance Related SRs by Grouped Category Volume

			•			
Grouped Category	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Road	8,253	4,695	2,237	3,484	4,139	9,390
Sidewalk	5,583	2,971	1,166	2,301	2,512	6,342
Windrow	2,141	1,914	316	1,190	893	3,057
Other	1,295	989	418	675	596	1,747



### Figure 2: Winter Maintenance Related SRs by Grouped Category Volume

**Table 5** and **Figure 3** presents the winter maintenance related SRs by city district. The data indicates that over the past 6 winter seasons, Scarborough generally had the most SRs compared to other districts, followed by Etobicoke and York. However, the difference in the number of SRs received between districts was marginal.

Winter Season	ТМС	Toronto and East York	Etobicoke and York	North York	Scarborough	Total
2013 / 2014	1,281	3,556	4,074	4,168	4,193	17,272
2014 / 2015	175	2,587	2,595	2,510	2,702	10,569
2015 / 2016	110	698	998	904	1,427	4,137
2016 / 2017	243	1,541	2,156	1,772	1,938	7,650
2017 / 2018	250	1,580	2,358	1,604	2,348	8,140
2018 / 2019	422	5,622	4,792	3,595	6,105	20,536
Average	414	2,597	2,829	2,426	3,119	11,384

#### Table 5: Winter Maintenance Related SRs by District

TMC – Transportation Management Centre



#### Figure 3: Winter Maintenance Related SRs by District

As shown by **Table 6**, Toronto and East York had the highest share of SRs related to roadway and sidewalk issues compared to the other districts (average of past 6 winter seasons), while Scarborough and North York had the highest share of windrow requests.

Table 6.	Winter	Maintenance	Related	SRs	nor	Grouned	Category	/ hv	
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District	Road	Sidewalk	Windrow	Other
Toronto and East York	55%	36%	1%	8%
Etobicoke and York	48%	29%	14%	9%
North York	43%	30%	19%	8%
Scarborough	41%	31%	20%	9%
Toronto All	48%	30%	13%	9%

**Table 7** and **Table 8** provide an overview of the winter maintenance related SRs by winter season and district per 1,000 residents.

The road calls per 1,000 residents range from a high of 3.4 calls in the 2018/2019 winter season to a low of 0.8 calls in the 2015/2016 winter season.

District	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
Toronto and East York	2.1	1.6	0.4	0.9	0.9	3.5
Etobicoke and York	3.9	2.4	1.1	1.7	2.3	4.2
North York	2.3	1.4	0.7	1.2	1.2	2.1
Scarborough	2.6	1.5	1.1	1.2	1.7	3.6
Toronto All	3.0	1.7	0.8	1.3	1.5	3.4

#### Table 7: Transportation Road Calls per 1,000 People

Similarly, the sidewalk calls range from a high of 2.3 calls per in the 2018/2019 winter season to a low of 0.4 calls in the 2015/2016 winter season.

#### District 2013/14 2014/15 2015/16 2016/17 2017/18 2018/19 **Toronto and East York** 1.5 1.0 0.3 0.6 0.7 1.9 **Etobicoke and York** 2.2 1.2 0.5 1.4 1.4 3.0 North York 1.0 0.4 0.7 0.7 1.7 2.1 Scarborough 1.2 2.6 0.6 0.8 1.1 3.0 **Toronto All** 2.0 1.1 0.4 0.8 0.9 2.3

### Table 8: Transportation Sidewalk Calls per 1,000 People

The majority of 311 requests arise during and following significant weather events, or when weather is outside of normal conditions. This underscores the importance of strategic communications in order to better inform the public on winter maintenance operations and help minimize the extent of service requests.

## 3 Toronto Resident Survey

A survey of Toronto residents aged 18 years and older was conducted by Ipsos Public Affairs to collect feedback regarding winter maintenance services. The survey was conducted between June 18 and June 29, 2019 with a total of 1,000 online interviews. The survey results are weighted to the latest Statistics Canada census data according age, region, and gender to ensure that the sample of residents are representative of the population of adult City of Toronto residents, and the poll is considered accurate to within +/- 3.5 percentage points.

The survey Key Findings are noted below, and the full survey presentation is contained in **Appendix A**.

### 3.1 Key Findings

### Satisfaction with Winter Maintenance

 More than half of residents are satisfied with the winter maintenance services provided by the City of Toronto.

### **Expectations and Priorities**

- Half of residents state that their expectations for snow plowing and maintenance were met by the City of Toronto.
- Residents emphasized that responsiveness or speed of snow plowing is important.
- Residents stated that they wished to see expressways prioritized for snow clearing, followed by major roads, and major sidewalks.

### **Knowledge and Awareness of Current Policies**

• Only a minority of residents say that they are knowledgeable about winter maintenance activities and policies. Improved public communications would be beneficial.

### **Contacting the City of Toronto**

• About one in ten residents stated they contacted the City this past winter about winter maintenance activities. Most of these residents called Toronto 311. A majority of those who did contact the City were not satisfied with quality or timeliness of the service provided.

### **Budget Implications**

• Budget preferences among Torontonians are split, with about one third preferring to maintain winter maintenance and snow plowing standards with no change to the budget dedicated to those services, while another one third state that winter maintenance and snow plow levels should be expanded by redirecting funds from other City services.

### Communications

• More than half of polled residents stated they would be likely to use an email or smartphone alert system that offers real time information about snow plowing. However, a majority of respondents stated they are not aware of the current PlowTO service.

### 3.2 Special Interest Group Input

In addition to the findings from the Resident Survey, the program review secured input from Cycle TO, Walk Toronto and representatives of the senior's community. In general, the groups called for an increased emphasis on sidewalk and cycle facility snow clearing, both from the time of an initial response and ongoing follow up clearing. The groups requested faster initial snow clearing and follow up on crosswalks and intersections were autos turning move snow into the pedestrian and cycle path of travel after the initial snow clearing. There was a request to view snow management of sidewalks, crosswalks and cycle facilities from the perspective of the unique users.

## 4 Toronto Climate Summary

This section provides a summary of Toronto climate data with a discussion of weather events during the fringe periods, defined as the months of April, October, and November.

The 2013 Winter Maintenance Program Review provided a detailed examination of the city's climate and micro-climate zones. The current climate review builds on the previous work and provides a more in-depth focus on snowfall, rainfall and temperature as related to the winter maintenance period and the fringe months.

Toronto is a "winter city" and based on a five year average may be expected to experience the following winter weather events each year:

- 2 days of lower than -18 C temperatures
- 3 days of greater than 10 cm snowfall
- 7 days of freezing precipitation

These are relatively infrequent events; however, there may be great variability in the frequency and severity of winter weather events. At least once a year Toronto may be expected to experience a winter weather event of significant low temperatures, heavier than normal snowfall and/or heavy freezing precipitation.

As well, there are occasional random weather events that are significantly outside the expected historical range. The 2013 December North American storm complex was one such event that included major snow storms, crippling ice storms and multiple tornados across south, central and northeastern North America. Toronto was one of the hardest hit by the ice storms with multiple days of freezing rain and ice accumulation.

There are two more recent weather events to note, the April 2018 ice storm and the January 2019 snow storm, both of which were of a severity significantly outside the normal range. These events caused public questions regarding the City's winter maintenance program. While both of these events generated news media reports and social media comments, a review of the Toronto climate data helps put these events into perspective.

This section begins with a summary of the media responses to the two recent significant weather events followed by a broad discussion of snowfall and rainfall trends as informed by the climate data. Following, an analysis of the fringe months (defined as April, October, and November) helps identify potential trends that may inform discussions surrounding alternative winter maintenance service delivery strategies.

### 4.1 Media Response

The media response to both the April 2018 ice storm and January 2019 snow storm are documented in the following section.

### 4.1.1 April 2018 Ice Storm

Media coverage of the April 2018 ice storm was not dominated by direct comments on winter road maintenance. The media focused on flight cancellations, power outages, and vehicle

collisions. Discussion of collisions generally referenced dangerous weather conditions rather than the lack of roadway maintenance.

CBC News summarized the impact of the storm after the event<sup>1</sup>. The article refers to the City relying on salt trucks rather than plows citing a city spokesperson relating this decision to risk of flooding rather than lack of equipment. An article<sup>1</sup> the previous day however, did refer to lack of access to plows but cites a city spokesperson claiming the city is still "well-equipped".

The media referred to "treacherous driving conditions"<sup>1</sup> and referred to the City as having less equipment than in "peak winter weeks" but stopped short of accusing the City of a lack of appropriate preparation or service. Media outlets acknowledged that the ice storm was "very unspring-like" which perhaps suppressed any criticism the City may have otherwise received during an event of this scale.

The majority of social media comments about the storm were neutral in regard to winter maintenance. Many referenced careless drivers or factual statements about roadway closures. Social media also included messages of 'thanks' for the winter maintenance crews.

### 4.1.2 January 2019 Snow Storm

Media reporting in relation to the January 2019 snow storm repeated factual statements regarding salting and plowing operations<sup>1</sup>. The media also referred to the volume of snow falling in 24 hours as unusual with references to 1968 as the last year with more than 20cm of snow in a single day<sup>1</sup>.

However, in contrast to the April 2018 ice storm discussed above, there were many complaints about winter road and sidewalk maintenance on social media. Social media complaints included complaints about snow covered sidewalks, salting conditions, and the sense that the City was slow to respond to the need for snow removal.

### 4.2 Climate Data Sources

Multiple weather stations and sources were assessed for consistency and completeness of climate data. North York (*climate identifier: 615S001*) was selected as a representative station for Toronto as it contains daily data to 2019 and did not have missing data elements. All data was obtained the '*Government of Canada, Environmental and Natural Resources: Historical Data*' database<sup>1</sup>. The North York station provides data from 1994 to April, 2019. The limitation of this dataset is the 1994 year solely includes November and December.

### 4.3 Snowfall Data Summary

When assessing the 25 year period (1994-2019) the snowfall trend is relatively flat with variations above and below the average of 127 cm of snowfall per year. Annual snowfall peaked in 2008 with 245.6cm of total snowfall and has not exceeded 200cm since that winter season. As an example, while 2013 and 2014 experienced 90% and 13% increases in snowfall in comparison to previous year volumes, respectively, 2015 saw a 50% drop in total snowfall.

<sup>&</sup>lt;sup>1</sup> Government of Canada, Environment and Natural Resources. Weather, Climate and Hazard, Historical Data <u>http://climate.weather.gc.ca/historical\_data/search\_historic\_data\_e.html</u>

Such variation is present throughout the assessment period, as shown by **Figure 4**. Mean temperature per snow day also exhibits substantial variation, peaking in 2002 (-0.8°C) and dropping to a historical low in 2015 (-8.1°C). While the mean temperature rose to -2.6°C in 2016, it fell to -3.2°C in 2018.

In summary, snowfall and mean temperature is variable and the overall snowfall intensity has remained relatively constant, with random events being key exceptions.



### Figure 4: Annual Snowfall Comparison (cm)

Similarly, **Figure 5** provides a summary of snowfall frequency. Similar to snowfall volume, the amount of snow days peaked in 2008 with 64 days. Since 2008, however, the number of snow days only varied slightly relative to the average of 43 snow days per year.

In general, the snowfall for the majority of years assessed vary slightly around the average.



#### Figure 5: Annual Snowfall Frequency Comparison (events)

**Table 9** provides a summary of snowfall by year for all months that experienced snowfall since 1994. One observation noticed is that snowfall rarely occurs in October. Although 2016 and 2018 saw 1.6cm and 0.6cm of snowfall in October, respectively, it had only previously occurred in 1997 and 2008. Lastly, the snowfall that occurred on May 2, 2005 was the only instance of May snowfall since 1994.

Year	Jan	Feb	Mar	Apr	Мау	Oct	Nov	Dec	Total
1994	-	-	-	-	-	-	6.2	28.8	35.0
1995	23.4	14.0	4.6	4.0	-	-	32.2	34.2	112.4
1996	19.0	10.8	38.4	15.8	-	-	8.6	30.0	122.6
1997	56.2	20.8	45.4	5.8	-	2.4	28.8	14.8	174.2
1998	30.4	1.8	34.0	-	-	-	0.2	7.4	73.8
1999	87.8	3.0	25.4	3.2	-	-	2.8	6.4	128.6
2000	18.4	40.6	10.6	9.6	-	-	1.2	77.8	158.2
2001	20.6	43.6	38.0	-	-	-	-	11.8	114.0
2002	39.2	7.2	19.2	15.6	-	-	30.8	19.6	131.6
2003	49.4	18.8	26.6	7.0	-	-	7.6	14.8	124.2
2004	50.8	22.6	11.6	0.8	-	-	1.6	46.8	134.2
2005	46.1	37.8	29.4	3.6	0.2	-	16.0	46.7	179.8
2006	11.7	32.3	0.6	0.8	-	-	-	5.2	50.6
2007	16.4	34.4	24.8	2.6	-	-	10.2	63.4	151.8
2008	23.9	77.8	56.8	0.6	-	1.4	18.6	66.5	245.6

#### Table 9: Total Snowfall by Year and Month (cm)

Year	Jan	Feb	Mar	Apr	Мау	Oct	Nov	Dec	Total
2009	71.4	29.8	0.8	8.0	-	-	-	12.4	122.4
2010	15.4	32.4	-	-	-	-	0.2	35.8	83.8
2011	43.4	44.6	24.4	4.2	-	-	1.4	12.6	130.6
2012	24.0	30.0	2.8	1.2	-	-	-	22.4	80.4
2013	19.0	72.8	12.6	5.0	-	-	6.6	36.6	152.6
2014	35.6	62.0	31.2	4.0	-	-	14.5	24.8	172.1
2015	19.8	51.4	3.4	1.6	-	-	0.8	8.5	85.5
2016	20.2	17.0	16.2	16.2	-	1.6	7.4	49.0	127.6
2017	11.6	23.6	9.8	3.2	-	-	1.6	43.8	93.6
2018	28.4	26.0	7.4	15.2	-	0.6	14.6	10.2	102.4
2019	60.6	46.6	10.8	-	-	-	-	-	118.0

### 4.4 Rainfall Data Summary

Since 1995, the average rainfall per year is approximately 765mm. While 2015 and 2016 experienced below-average rainfall, the 2017 volume of 943.6mm was similar to the 2006 high of 945.2mm. **Figure 6** provides a comparison of annual rainfall levels since 1995<sup>2</sup>. The mean temperature per rain day is fairly consistent, with an average of 10.6°C<sup>3</sup>.

In summary, the overall trend shows consistency, with above-average rainfall noticed every few years. The data also shows that consecutive years of above-average rainfall are infrequent.

<sup>&</sup>lt;sup>2</sup> 1994 was excluded since it only contains November and December data

<sup>&</sup>lt;sup>3</sup> This average is skewed by warmer temperatures during rain days over summer months



#### Figure 6: Annual Rainfall Comparison (mm)

Similarly, **Figure 7** provides a summary of rainfall frequency. One key trend noticed is every 2-3 years, the total number of rain days exceeds the average of 119 days and approaches 139 rain days, which is the highest annual rainfall amount since 1995.

Similar to total rainfall, it's rare for two consecutive years to experience an above-average amount of rain days. When the number of rain days exceeds the average, however, it tends to be close to 139 days.





**Table 10** provides a summary of rainfall by year for all months since 1994. Typically, May - August experience the majority of rainfall.

The summer months (May-August) generally experience the highest average amount of rainfall.

Year	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1994	-	-	-	-	-	-	-	-	-	-	58.2	26.3	84.5
1995	102.9	6.5	45.0	74.5	81.7	56.0	63.3	134.1	32.9	136.0	93.9	4.4	831.2
1996	56.3	30.5	4.1	77.7	89.4	128.9	96.0	55.3	180.6	73.3	27.1	79.3	898.5
1997	20.9	53.7	27.6	26.7	72.8	84.8	68.3	65.1	63.1	30.8	37.8	16.0	567.6
1998	69.0	49.7	64.4	61.1	63.5	81.7	37.6	46.0	48.2	24.8	36.8	58.0	640.8
1999	32.5	24.4	0.2	47.0	61.0	73.9	50.6	60.3	107.7	66.7	88.9	24.6	637.8
2000	17.6	12.8	12.9	82.4	151.7	175.9	121.8	71.1	74.3	20.2	66.0	12.6	819.3
2001	16.0	39.2	10.2	42.8	111.2	67.4	55.8	41.4	62.0	115.4	83.0	32.6	677.0
2002	13.4	32.0	45.8	81.3	83.8	58.4	105.0	12.8	80.4	59.3	46.3	13.0	631.5
2003	-	31.0	29.8	31.6	148.7	84.3	40.0	70.5	129.5	52.8	136.7	48.0	802.9
2004	5.6	6.0	49.5	80.6	93.6	79.2	149.0	72.8	24.6	38.6	64.6	47.6	711.7
2005	42.2	42.0	7.2	100.4	25.8	65.2	69.3	218.0	79.8	46.8	83.8	29.8	810.3
2006	69.4	54.7	53.8	73.2	99.8	70.6	105.6	40.0	104.9	133.4	81.8	58.0	945.2
2007	24.0	-	24.2	70.3	63.6	39.8	75.7	18.7	33.6	36.8	69.6	52.2	508.5
2008	35.4	29.0	29.0	49.8	65.5	195.2	126.4	60.2	100.4	48.4	77.9	43.4	860.6

Table 10: Te	otal Rainfall by	/ Year and	Month (mm)
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Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2009	0.8	45.2	69.8	120.2	82.2	75.2	81.6	95.4	39.6	73.3	34.8	69.6	787.7
2010	18.2	-	59.9	32.4	63.6	195.7	100.4	69.6	108.4	69.4	85.4	19.4	822.4
2011	12.8	20.6	85.6	91.8	134.6	78.0	44.2	114.0	108.4	103.5	89.4	40.6	923.5
2012	32.4	4.6	14.4	42.3	40.0	77.0	124.8	59.8	146.6	118.6	11.0	52.4	723.9
2013	51.2	24.6	13.6	98.3	97.2	140.4	178.0	45.4	68.8	101.4	31.0	56.4	906.3
2014	14.8	13.2	8.6	90.4	56.6	114.8	140.4	128.6	118.4	100.2	32.0	20.4	838.4
2015	19.0	-	9.6	80.2	90.0	172.6	28.6	93.0	65.8	91.6	32.6	36.3	719.3
2016	35.6	30.2	51.6	35.8	47.8	40.2	40.0	84.0	41.2	52.0	48.4	26.8	533.6
2017	67.0	53.4	53.8	113.4	143.5	150.6	91.9	112.4	34.2	60.8	53.8	8.8	943.6
2018	39.6	36.0	24.6	117.6	57.4	43.8	87.6	119.2	70.0	65.8	94.0	50.4	806.0
2019	12.8	24.0	48.2	63.6	-	-	-	-	-	-	-	-	148.6

## 4.5 Fringe Period Assessment

This section provides an analysis of snowfall during the winter fringe periods, defined as the months of April, October, and November.

### 4.5.1 April Snowfall Assessment

In general, the frequency of April snow events shows substantial variation. Over the 25 year period (1994-2019), there have only been 4 years (1996, 2002, 2016 and 2018) with more than 10 cm snowfall in April and in terms of snowfall per day, April has only experienced 2 snow days with greater than 10cm of snowfall and 5 days of snowfall between 6 and 10cm.





**Figure 9** illustrates snowfall for the month of April, and **Table 11** summarizes the intensity of April snow events by volume grouping since 1994.

Year	Snow Day (0-5cm)	Snow Day (6-10cm)	Snow Day (11-15cm)	Total Snow Days
1994	-	-	-	-
1995	2	-	-	2
1996	2	2	-	4
1997	5	-	-	5
1998	-	-	-	-
1999	1	-	-	1
2000	2	1	-	3
2001	-	-	-	-
2002	5	-	1	6
2003	5	-	-	5
2004	2	-	-	2
2005	2	-	-	2
2006	2	-	-	2
2007	6	-	-	6
2008	2	-	-	2
2009	2	1	-	3
2010	-	-	-	-
2011	2	-	-	2
2012	2	-	-	2
2013	2	-	-	2
2014	2	-	-	2
2015	1	-	-	1
2016	5	-	1	6
2017	1	-	-	1
2018	5	1	-	6
2019	-	-	-	-

#### Table 11: April Snowfall Intensity Comparison

**APRIL 2016** 

In April 2016, snowfall totaled 16.2 cm over 6 snow days. The bulk of snowfall occurred on April 3 which saw 10.6cm of snowfall. Toronto has not seen such a snowfall since April 2, 2002 which coincidentally saw 10.6cm of snowfall. Prior to the snowfall on April 3<sup>rd</sup>, the mean temperature began dropping which may be considered as a signal for a potential snowfall event.

#### Figure 9: April 2016 Snowfall



#### **APRIL 2018**

In April 2018, snowfall totaled 15.2 cm and occurred on 6 snow days. Similar to 2016, the majority of the snowfall occurred on single day with April 14 experiencing 7.6cm. The mean temperature usually drops 1-2 days prior to a relatively more intense snowfall event as noticed by the April 14<sup>th</sup> event.

In general, snow days between 6 and 10cm of snowfall are relatively uncommon in April. Prior to 2018, the last similar snow event occurred in 2009 which saw 5.6cm of snowfall on April 6.



### Figure 10: April 2018 Snowfall

#### 4.5.2 October Snowfall Assessment

Since 1994, there have only been 5 snowfall events in October. In recent years, 2016 and 2018 saw 1.6cm and 0.6cm of snowfall, respectively. Previous snowfall events occurred in 2008 and 1997. In the rare event of an October snowfall, the data implies it would occur on a single day and that total snowfall would be less than 3 cm. **Table 12** provides a 25 year summary of snow events in October.

Year	Number of Snow Days	Total Snowfall (cm)	Mean Temperature (°C)
1997	2	2.4	1.1
2008	1	1.4	3.0
2016	1	1.6	1.0
2018	1	0.6	4.0

#### **Table 12: Summary of October Snow Events**

### 4.5.3 November Snowfall Assessment

The frequency of November snow events also show substantial variation. Over the 25 year period (1994-2019), there have only been 7 years (1995, 1997, 2002, 2005, 2008, 2014 and 2018) with more than 10 cm snowfall in November and in terms of snowfall per day, November has only experienced 2 snow days with greater than 10cm of snowfall and 7 days of snowfall between 6 and 10cm.

**Figure 11** illustrates snowfall for the month of November, and **Table 13** summarizes the intensity of November snow events by volume grouping since 1994.





Year	Snow Day (0-5cm)	Snow Day (6- 10cm)	Snow Day (11- 15cm)	Total Snow Days
1994	5.0	-	-	5.0
1995	11.0	2.0	-	13.0
1996	10.0	-	-	10.0
1997	6.0	-	-	6.0
1998	1.0	-	-	1.0
1999	2.0	-	-	2.0
2000	2.0	-	-	2.0
2001	-	-	-	-
2002	6.0	1.0	1.0	8.0
2003	5.0	-	-	5.0
2004	2.0	-	-	2.0
2005	3.0	2.0	-	5.0
2006	-	-	-	-
2007	6.0	-	-	6.0
2008	7.0	1.0	-	8.0
2009	-	-	-	-
2010	1.0	-	-	1.0
2011	1.0	-	-	1.0
2012	-	-	-	-
2013	2.0	-	-	2.0
2014	4.0	1.0	-	5.0
2015	1.0	-	-	1.0
2016	4.0	-	-	4.0
2017	1.0	-	-	1.0
2018	6.0	-	1.0	7.0

### Table 13: November Snowfall Intensity Comparison

### 4.6 Toronto Climate Assessment

Overall, the climate data shows consistency over the past 25 years with periodic extreme events above or below the average frequency or volume of rainfall or snowfall. Of particular interest to winter maintenance are the snowfall and freezing rain events during the winter fringe months of November and April, and major storm events during the winter months. The 2013 December ice storm, the 2018 April ice storm, and the 2019 January snow storm being examples of major weather events which had significant impacts to Toronto.

## 5 Peer City Comparison

### 5.1 Overview

This section provides a comparison of winter maintenance level of service (LOS) for select peer cities. A number of North American cities (Ottawa, Montreal, Chicago, Milwaukee, Minneapolis, and New York) with characteristics similar to Toronto were selected for the peer city comparison. While Toronto and each peer city have unique features, geographies and climates a review of winter maintenance policy and practice in each peer city helped benchmark Toronto's winter maintenance activities.

The peer city information was collected from winter maintenance operational contacts, available documentation and desktop research. Additionally, the project team conducted field research tours in Ottawa and New York.

### 5.2 Municipal Profile

The municipal profile provides an overview of each city including population, roadway and sidewalk length.

Municipality	Population	Roadways (Km)	Roadways (Lane-Km)	Sidewalks (Km)	Other
Toronto	2,731,571	5,600	14,400	8,000	<ul> <li>262,000 driveways</li> </ul>
Ottawa	934,243	5,705	12,459	2,233	<ul><li>40km of bike lanes</li><li>2,095 km of sidewalks</li></ul>
Montreal	1,753,034	4,178	11,436	6,295	450km of bike paths
Chicago	2,705,994	6,560	15,130	-	<ul> <li>3,000 km of alleys</li> </ul>
Milwaukee	595,351	3,038	11,200	3,500	<ul> <li>4,233 bus stops</li> </ul>
Minneapolis	425,403	4,662	11,655	2,969	300 km of bike lanes
New York	8,175,133	9,775	30,600	20,500	

### Table 14: Population and Roadway Geography Data by Peer City

### **5.3 Winter Maintenance Policy Goals**

### Table 15: Peer City Policy Goals

Municipality	Winter Maintenance Policy Goal
Toronto	"Transportation Services aims to provide timely and effective winter maintenance to ensure the safety of road and sidewalk users. This is done while striving to minimize the adverse effects that salt use can have on the environment."
Ottawa	"Road Services is is committed to helping make Ottawa's roads, sidewalks and cycling network safe and passable for vehicles, pedestrians and cyclists. An effective winter maintenance program is essential to allow the City to function under normal winter weather conditions." "To provide safe and passable roads and sidewalks by reducing the hazards caused by snow and ice accumulation."

Municipality	Winter Maintenance Policy Goal
Montreal	Montreal's objectives are related to the efficiency and safety of movements on its road network, including pedestrians, transit users, motorists, and cyclists. Beyond these considerations Montreal has objectives to clear snow efficiently.
Chicago	Chicago's webpages on snow clearance refer to their strategy and capabilities rather than policy goals. A Winter Preparation YouTube video states a goal of being "ready to provide safe streets throughout winter".
Milwaukee	Public safety is the number one priority when clearing snow and ice. The primary mission is to remove snow and ice as expeditiously and economically as possible to restore safe motorist and pedestrian travel, to minimize economic losses to the community and industry when workers are unable to get to or perform their jobs, and to facilitate Fire and Police Department responses to emergencies.
Minneapolis	Provide snow and ice control services for public streets, alleys and other transportation related facilities
New York	District Snow Plans provide various functional goals and statements such as 'fighting winter weather, clearing streets for safe transportation, and addressing issues of public safety related to snow and ice conditions'.

There are a number of common themes in the peer city winter maintenance policy goals, including:

- Providing a safe and reliable municipal transportation system
- Minimizing economic losses to communities and industry
- Facilitating emergency response operations (Police, Fire, EMS)
- Facilitating transit operations
- Providing winter maintenance at an affordable price

### 5.4 Peer City Climate Comparison

To help understand and compare Toronto with the climate conditions of the peer cities Table 16, Table 17 and Table 18 provide data for temperature, precipitation and snowfall.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC	Year
Toronto	-3.7	-2.6	1.4	7.9	14.1	19.4	22.3	21.5	17.2	10.7	4.9	-0.5	9.4
Ottawa	-10.2	-7.9	-2.2	6.5	13.5	18.7	21.2	19.9	15.3	8.4	2	-5.6	6.7
Montreal	-8.9	-7.2	-1.2	7	14.5	19.3	22.3	20.8	15.7	9.2	2.5	-5.6	7.4
Chicago	-4	-1.8	3.8	10.2	16.1	21.7	24.4	23.4	19.1	12.3	5.3	-1.7	10.8
Milwaukee	-6	-4.4	0.4	8	12.4	19.2	23.3	23.2	19.1	10.8	1.2	0.1	9.0
Minneapolis	-9.1	-6.2	0.4	8.6	15.1	20.4	23.2	21.8	16.7	9.4	0.9	-6.8	7.9
New York	0.3	1.8	5.8	11.7	16.9	21.9	24.7	24	20	13.8	8.7	3.1	12.8

### Table 16: Daily Average Temperature (°C)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC	Year
Toronto	61.5	55.4	53.7	68	82	70.9	63.9	81.1	84.7	64.4	84.1	61.5	831.2
Ottawa	62.9	49.7	57.5	71.1	86.6	92.7	84.4	83.8	92.7	85.9	82.7	69.5	919.5
Montreal	73.6	70.9	80.2	76.9	86.5	87.5	106.2	100.6	100.8	84.3	93.6	101.5	1062.6
Chicago	52	49	69	92	105	103	102	101	84	82	87	65	991
Milwaukee	45	42	58	90	86	99	93	101	81	67	69	52	883
Minneapolis	23	20	48	68	85	108	103	109	78	62	45	29	778
New York	93	78	111	114	106	112	117	113	109	112	102	102	1269

### Table 17: Average Precipitation (mm)

### Table 18: Average Snowfall (cm)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC	Year
Toronto	37.2	27	19.8	5	0	0	0	0	0	0.1	8.3	24.1	121.5
Ottawa	44.3	34.7	29.1	7.2	0	0	0	0	0	2.9	16	41.3	175.5
Montreal	45.9	46.6	36.8	11.8	0.4	0	0	0	0	2.2	24.9	57.8	226.4
Chicago	29	23	14	2.5	0	0	0	0	0	0.3	3.3	22	94.1
Milwaukee	37	25	18	5.1	0.3	0	0	0	0	0.8	6.1	27	119.2
Minneapolis	31	20	26	6.1	0	0	0	0	0	1.5	24	30	138.6
New York	18	23	9.9	1.5	0	0	0	0	0	0	0.8	12	65.2

### 5.5 Road Surface Condition

Each peer city specifies a target road condition based on the roadway classification. Road conditions are generally defined as bare pavement, center bare pavement, snow packed, or 'safe and passable'. The target road surface conditions for each peer city are summarized by **Table 19**.

Although each peer city creates individual standards road surface conditions, they generally ensure bare pavement for high volume roads, and center bare or safe and passable for all other roadway classifications. Toronto is the only city among six peer cities that offers windrow services to residents.

#### Table 19: Target Road Surface Condition<sup>4</sup>

Note: Municipalities use varied terminology to describe their operations which makes direct comparisons difficult.

Municipality	Expressways	Arterials	Collectors	Locals	Laneways	Sidewalks
Toronto	Bare	Bare	Center bare	Safe and	Safe and	-
	pavement	pavement		passable	passable	
Ottawa	Bare	Bare	Bare	Snow	Snow packed	Bare
	pavement	pavement	pavement for	packed		pavement
			major and			for major
			some minor			sidewalks.
			collectors.			Snow
			Center bare/			packed for
			Snow packed			other
			for low class			locations
			minor			
			collectors			
Montreal	Service	-	-	-	-	-
	provided by					
	MTQ					
Chicago	Outside City	Once depl	oyed, trucks patr	ol, plow or	-	-
	Authority	salt rout	es 'as necessary	' or until		
			'Deemed Safe'			
Milwaukee	-	Bare	Center bare	Safe and	Safe and	-
		pavement	-	passable	passable	
Minneapolis	-	Center	Center bare	Plowed	Snow	Clear as
		bare		and	Emergency:	needed
				treated	plow to snow	
				snow	pack (No	
				pack	immediate	
					treatment)	
New York	-	-	-	-	-	-

### 5.6 Snow Clearing Trigger Condition

**Table 20** shows that the 'trigger' condition, or snow accumulation threshold for the start of winter maintenance services, varies across the peer cities. Although many cities have the same snowfall or snow accumulation threshold for different road types, most cities have an order of priority for clearance.

In general, Toronto's level of service on the snow clearing trigger condition exceeds most U.S. peer cities. Compared to other U.S. peer cities, Toronto is the only city that differentiates snow clearing trigger conditions by road type, which supports effective resource planning and snow clearing efficiency. In addition, Toronto is the only city among six that sets a trigger condition for windrow clearing.

<sup>&</sup>lt;sup>4</sup> Source: Information retrieved from 2013 Winter Maintenance Program Final Report, and HDR online research.
Compared to other Canadian peer cities, Toronto has a higher snow accumulation threshold, which could be explained by the broader level of service provided. However, Toronto's level of service exceeds most U.S. peer cities.

#### Table 20: Snow Clearing Trigger Condition<sup>5</sup>

Note: There were challenges obtaining detailed responses from all peer cities and on line research was used to supplement peer survey information.

Municipality	Expressways	Arterials	Collectors	Locals	Laneways	Sidewalks	Bus Stops
Toronto	2.5-5cm and	5cm and	5-8 cm	8 cm	Subject to	5-8 cm	5 cm
	still snowing	Still			localized		
Ottowe	A.c.	snowing			conditions		
Ottawa	AS Accumulation	-	-	-	-	-	-
	begins						
Montreal	Service provided by	2.5cm	2.5cm	2.5cm	-	2.5cm	-
	MTQ						
Chicago	-	Only once	e Lakeshore D	Drive and	-	-	-
		Arterials	s are safe / sn	ow has			
		stopped	do teams mo	ve on to			
			other streets	10			
Milwaukee	-	10cm	10cm and	10cm	-	10cm of	-
		and still	Still	and still		accumulation for	
		snowing	snowing	snowing		clearance of	
						/ "Sufficient" snow	
						accumulation for	
						sidewalks and	
						walkways on	
						bridges / adjacent	
						to city property.	
Minneapolis	-					Where applied: 1	-
		Δει	equired to m	oot sorvico		inch for commuter	
		A3 I	equired, to m			trails, 2 inches for	
						others	
New York	-	5cm of	5cm of	5cm of	-	After salting an	d plowing
		snowfall	snowfall	snowtall		operations have	e stopped.
						Adjacent property	owners are
						responsible fol	clearing
						sidewall	(5.

### 5.7 Target Road Clearing Completion Time

**Table 21** illustrates that Toronto's level of service on target road clearing completion time either exceeds or is comparable with other peer cities. Specifically, Toronto's target completion time on expressways is at the same level as Ottawa, and Toronto's target completion time on arterials and local roads is shorter than Milwaukee and Minneapolis.

<sup>&</sup>lt;sup>5</sup> Source: Information retrieved from 2013 Winter Maintenance Program Final Report, and HDR online research.

Municipality	Expressways	Arterials	Collectors	Locals	Laneways	Sidewalks	Bus Stops
Toronto	2-3 hrs	6-8 hrs	8-10 hrs	14-16 hrs	-	15 hrs (6 to 7 hrs for high volume and 6 to 7 hrs for low volume facilities)	48 hrs
Ottawa	2 hrs	3hrs	4hrs for major collectors, 6hrs for minor collectors	10hrs	16hrs	4hrs or areas with high concentrations; 12 hrs for most primary sidewalks; 16 hrs for most residential sidewalks	24 hrs
Montreal	Service provided by MTQ	4 hrs	4 hrs	4hrs	-	4hrs	-
Chicago	-	-	-	-	-	-	-
Milwaukee	-	6-12 hrs	6-12 hrs	18-24 hrs	24-48 hrs	3-5 days	72 hrs
Minneapolis	-	12 hrs	12 hrs	24-48 hours	12 hours	12 hrs	-
New York	-	-	-	-	-	-	-

#### Table 21: Target Road Clearing Completion Time<sup>6</sup>

### 5.8 Snow Removal

The trigger for snow removal from roads and sidewalks varies; however, it is generally initiated when the depth of snow exceeds the mechanical ploughing capability, there is no longer any snow storage capacity along the right-of-way or when the accumulated snow impedes the safe movement of vehicles or people.

### 5.9 Sidewalk and Windrow Policy

**Table 22** shows that only Canadian cities consider sidewalk clearing as a partial or entire city responsibility, whereas in the U.S. responsibilities fall under residents/property owners. Even though other 2 Canadian peer cities consider sidewalk clearing as an entire city responsibility, Toronto is the only city among six that clears resident windrows.

Municipality	Sidewalk Responsibility
Toronto	Partial City Responsibility. For areas of the city that do not receive sidewalk snow clearing services (i.e. in Toronto & East York, York, and parts of Etobicoke and North York districts) property owners are required to clear their sidewalks of snow within 12 hours after a storm has taken place.
Ottawa	City Responsibility
Montreal	City Responsibility
Chicago	Resident's Responsibility

#### Table 22: Summary of Resident Responsibility Findings

<sup>&</sup>lt;sup>6</sup> Source: Information retrieved from 2013 Winter Maintenance Program Final Report, and HDR online research.

Municipality	Sidewalk Responsibility
Milwaukee	Resident's / Property Owner's Responsibility
Minneapolis	Resident's Responsibility
New York	Resident's Responsibility

### 5.10 Snow Route Policy

Most peer cities have defined snow routes and corresponding policies except for Montreal. In general, other peer cities have more strict tagging, towing and impound policies with respect to parking violations on snow routes compared to Toronto.

#### 5.10.1 Toronto Snow Route Policy

The Mayor and the General Manager of Transportation Services have the authority to declare a Major Snow Storm Condition (MSSC). When a MSSC is declared, parking on roads designated as snow routes is prohibited for a period of 72 hours. Vehicles parked on a designated snow route during a major snow event may be tagged, towed and impounded. This is to permit the prompt and efficient clearing of snow along these routes. The declaration may be terminated sooner than 72 hours or it may be extended for a further period of time at the discretion of the General Manager of Transportation Services.

Designated snow routes are primarily located in the downtown core and include all streetcar routes. They are all clearly signed and the declaration of a major snow storm condition would be publicized in the media.

Notwithstanding that Toronto has the ability to declare a Major Snow Storm Condition, there may be a need to apply the policy more rigorously.

Municipality	Snow Route Policy
Toronto	Following an initial declaration of a Major Snow Storm Condition, parking is prohibited on Snow Routes for a period of 72 hours with possibility of early termination or extension.
Ottawa	A snow route is declared when there is a forecast for two inches or more of snow and involves parking restrictions with threat of towing and or fines.
Montreal	Montreal has no snow routes. A pilot program was trialed in 2008 but it was not well understood by residents and there is no intention to resume a snow route policy.
Chicago	There is a winter overnight parking ban on 107 miles of vital arterial streets December 1st – April 1st, 3am-7am every night, regardless of snow. An additional 500 miles of main streets can have a parking ban activated when there is at least 2 inches of accumulation.
Milwaukee	Has 'Snow Tow' routes. Snow Tow Routes are brought into effect during a Snow Emergency and involve no parking on either side of posted snow tow routes until the snow emergency is lifted. During a snow emergency, parking is permitted on over 20 school playgrounds between 7pm and 7am.
Minneapolis	Has Snow Emergency Routes which are brought into effect when accumulations exceed 4 inches or more. Snow Emergencies are declared by the Director of Public Works and staff have estimated about four snow emergencies are declared per year on average. The routes involve parking restrictions to allow streets to be plowed as wide as possible. Restrictions are "aggressively enforced with ticketing and towing". Towing is contracted.

#### Table 23: Snow Route Policy

Municipality	Snow Route Policy
New York	Has over 250 Snow Emergency Routes throughout the city. Towing is undertaken in house using the same pool of staff as snow clearance and the city owns four impound lots for storing towed cars.

### **5.11 Information and Communications**

**Table 24** shows that 311 telephone service is the primary information service in most peer cities except for Minneapolis, However, other communication channels such as mobile app, social media, SMS/email/phone alert are also gaining popularity.

Table 24: Winter Maintenance Public Information Services by Municipality	

Municipality	Service	Alternative Information Service
Toronto	311 PlowTO Map Twitter	General Media Other Social Media
Ottawa	311 / Service Requests	Individual messages from councilors, Print ads, Radio ads, PSAs, Mobile app, Email alerts, Twitter alerts, Snow disposal etiquette flyer.
Montreal	311 INFO-Neige MTL Mobile App	Online 'Practical Guides'. Social Media (Facebook, Twitter), Snow route signage, snow parking signage, and snow disposal mapping tool.
Chicago	311 YouTube information videos	Plow Tracker / ClearStreets.org, Twitter, press releases, SMS alerts
Milwaukee	311 Snow Mobile Winter Text Alert	Aldermanic Newsletters, Social Media
Minneapolis	Snow Emergency Smartphone App 348-SNOW recorded message hotline with alternative language options	311, SMS alerts, Email alerts Phone alerts (robo-dialling), "Robust web site presence" including interactive snow emergency parking rules map lookup. Strong social media presence, Local cable TV information.
New York	311	DSNY's Bureau of Public Affairs will issue a "snow alert declaration" to all media and the public via a news advisory and all social media channels. Such advisories will also be posted on OEM's New York City's Severe Weather page, available at: http://www.nyc.gov/severeweather.

### 5.12 Peer City Visit

As a component of the Winter Maintenance Program Review (WMPR), the study team conducted visits with Ottawa and New York City. Both cities offered insights into communications strategies, extent of bylaw enforcement, and general winter maintenance operations.

#### 5.12.1 Ottawa

Ottawa provides snow clearing on all municipal sidewalks, and the Ottawa field visit provided specific insights into sidewalk maintenance that may have application in Toronto. Ottawa mechanically clears most sidewalks; however, where that is not feasible sidewalks are manually cleared. Equipment will attempt to maneuver round obstructions within the sidewalk right of way. If that is not possible the obstruction is documented and staff manually clear that section of sidewalk. As well, staff may move garbage cans that are on the sidewalk. The Ottawa encroachment by-laws, especially within the sidewalk, are enforced and damages to encroachments are investigated. Ottawa does not operate a 'friendly tow' program. Rather, the city issues a ticket for the parking infraction and tows the vehicle to remove the obstruction.

Ottawa has made extensive use of social media "informational tidbits" to give the public an understanding of how the winter maintenance services are performed. Greater service awareness helps to reduce complaints and manage expectations. It was mentioned that messaging is important and issuing informal notices to stay home when needed is also useful.

Key observations include the documentation of sidewalk encroachments and manually clearing of sidewalks where necessary; the tagging and towing of vehicles disrupting the snow clearing efforts; and the proactive public messages that attempts to educate the public and minimizing the amount of complaints.

#### 5.12.2 New York City

The New York Department of Sanitation oversees winter maintenance operations. The Department holds press conferences before anticipated snowfall events and posts to its public YouTube channels and social media, providing reminders regarding travel bans and restrictions, fun facts etc. Keeping catch basins clear and managing drainage is one of the key messages.

During a snow storm, garbage collection is suspended and declaring a snow alert, or 'hazardous weather advisory', is common. The Department is proactive regarding snow clearing as the downside is risky. While the snow clearing response may be considered excessive at times, negative community complaints are avoided. All operations are monitored from a "snow command center" which collects information from various weather systems and sensors, traffic cameras, service requests, and weather forecasting centers to be able to respond quickly to specific areas as necessary. This highlighted the importance and utility of technology to help manage the Department's equipment, labor and snow clearing response.

Similar to Ottawa, parking bylaw enforcement is strict however, it was noted, that due to the high cost of New York parking, many individuals seemingly internalize the risk of receiving a ticket. Additionally, the New York plows move snow left to right and cars parked on the right side of the road are typically buried under snow. While this a common resident complaint, the city does not respond to such calls and classifies the issue as a resident responsibility.

New York provided several important learnings. Firstly, the visit underscored the importance of public communications as it relates to effective winter maintenance operations. The city's use of various social media platforms in addition to traditional means helps reach a broad audience. As well, their willingness to declare a 'hazardous weather advisory' when necessary as a tool to

manage parking helps in the management of significant weather events. Strict bylaw enforcement further helps ensure routes are generally free of obstructions. The visit also highlighted the importance of increased resident responsibility related to vehicle parking. New York strictly enforces parking violations and does not respond to service requests related to buried / "snowed in" vehicles etc.

## 6 GTHA City Level of Service Comparison

### 6.1 Overview

This section provides a comparison of winter maintenance level of service (LOS) for select cities within the Greater Toronto and Hamilton Area (GTHA). The cities in the comparison include Brampton, Hamilton, Mississauga, London, and York Region. Areas of comparison include target road surface conditions, snow accumulation thresholds for snow plowing, target road clearing completion times, sidewalk clearing practices, and property owner responsibility regarding sidewalk maintenance. Given these criterion, Toronto's LOS either exceeds or is in alignment with its peer cities within the GTHA.

### 6.2 Roadway Surface Condition

All of the selected cities assessed surface condition based on the roadway classification. In general, roadways are defined either as Priority or Secondary, or by various classes. These classifications are summarized by **Table 25** while the general classifications as defined by the Ontario Minimum Maintenance Standards for Municipal Highways are summarized by **Table 26**.

Municipality	Winter Class	Road Classification	
Brampton	Priority Roads	Major roads, arterial, and collector roads	
	Secondary Roads	Residential/secondary roads	
Hamilton	Class 1	Major arterial roads & escarpment accesses	
	Class 2A	Primary collector roads	
	Class 2B	Secondary collector roads & steep residential hills	
	Class 3	Rural roads	
	Class 3R	Residential roads	
Mississauga	Priority Roads	Major roads, arterial, and collector roads	
	Secondary Roads	Residential/secondary roads Priority sidewalks Bus stops Pedestrian crossings	
York Region	Ontario Minimum Maintenance Standards (MMS) roadway classification. Within the region, different municipalities have separate policies		
London	Priority Roads	Major roads, arterial, and collector roads	
	Secondary Roads	Residential/secondary roads	
Toronto	Priority Roads	Expressways	
		Arterial roads and streetcar routes	
	Secondary Roads	Collector roads, bus routes and local streets with hills	
		All other local streets	

#### Table 25: Roadway Classification

Avorago Daily				Speed Limit	t		
Traffic	91 - 100 km/h	81 - 90 km/h	71 - 80 km/h	61 - 70 km/h	51 - 60 km/h	41 - 50 km/h	1 - 40 km/h
53,000 +	1	1	1	1	1	1	1
23,000 - 52,999	1	1	1	2	2	2	2
15,000 - 22,999	1	1	2	2	2	3	3
12,000 - 14,999	1	1	2	2	2	3	3
10,000 - 11,999	1	1	2	2	3	3	3
8,000 - 9,999	1	1	2	3	3	3	3
6,000 - 7,999	1	2	2	3	3	4	4
5,000 - 5,999	1	2	2	3	3	4	4
4,000 - 4,999	1	2	3	3	3	4	4
3,000 - 3,999	1	2	3	3	3	4	4
2,000 - 2,999	1	2	3	3	4	5	5
1,000 - 1,999	1	3	3	3	4	5	5
500 - 999	1	3	4	4	4	5	5
200 - 499	1	3	4	4	5	5	6
50 - 199	1	3	4	5	5	6	6
0 - 49	1	3	6	6	6	6	6

#### Table 26: Ontario Minimum Maintenance Standards, Roadway Classification

Source: Ontario Regulation 239/02: Minimum Maintenance Standards for Municipal Highways

Roadway classifications 1, 2, and 3 generally refer to priority roads, including arterial and collectors, while classes 4, 5, and 6 refer to local streets and rural roads.

As mentioned, each municipality specifies a target road condition based on the roadway classification. Road conditions are generally defined as bare pavement, center bare pavement, snow packed, or 'safe and passable'. The target road surface conditions for each peer city are summarized by **Table 27**.

#### Table 27: Target Road Surface Condition

Municipality	Road Classification	Target Surface Condition	
Brampton	Major roads, arterial, and collector roads	Bare pavement	
	Residential/Secondary roads	Safe and passable	
Hamilton	Major arterial roads & escarpment accesses	Bare pavement	
	Primary collector roads	Bare pavement	
	Secondary collector roads & steep residential hills	Centre bare pavement	
	Rural roads	Centre bare to snow packed pavement	
	Residential roads	Bare pavement	
Mississauga	Major roads, arterial, and collector roads	Bare pavement	
	Residential/secondary roads Priority sidewalks Bus stops Pedestrian crossings	Safe and passable	
York Region	Ontario Minimum Maintenance Standards (MMS). Within the region, different municipalities have separate policies		

Municipality	Road Classification	Target Surface Condition		
London Priority Roads		The combination of salt and high traffic volumes will result in bare pavement conditions		
	Secondary Roads	Safe and passable		
Toronto	Expressways	Bare pavement		
	Arterial roads and streetcar routes	Bare pavement		
	Collector roads, bus routes and local streets with hills	Centre bare pavement		
	All other local streets	Safe and passable		

Although some local municipalities within the York Region create individual winter maintenance policies, all adhere at a minimum to the Ontario Minimum Maintenance Standards for Municipal Highways. These standards, with respect to target surface conditions, align with the selected cities. The standards and times specified within the regulation, summarized in following sections, generally ensure bare pavement for high volume roads (classified as priority roads) and safe and passable conditions for all other roadway classifications.

### 6.3 Snow Clearing Trigger Condition

The 'trigger' condition, or snow accumulation threshold for the start of winter maintenance services, varies across the cities assessed and their respective road classifications. Table 28 provides a summary of the trigger condition for snow plowing.

Municipality	Road Classification	Trigger Condition		
Brampton	Major roads, arterial, and collector roads	Salted when snowfall begins		
	Residential/Secondary	Snowfall <7.5cm: salted only		
	roads	Snowfall >7.5cm: plowed and salted		
Hamilton	Major arterial roads & escarpment accesses	2.5-5cm		
	Primary collector roads	Snowfall >8cm		
	Secondary collector roads & steep residential hills	Snowfall >8cm		
	Rural roads	Snowfall >10cm		
	Residential roads	Snowfall >8cm		
Mississauga	Major roads, arterial, and collector roads	Snowfall <8cm: salted only Snowfall >8cm: plowed and salted		
	Residential/secondary roads Priority sidewalks Bus stops Pedestrian crossings	Snowfall <8cm: salted only Snowfall >8cm: plowed and salted		

#### Table 28: Snow Clearing Trigger Condition

Municipality	Road Classification	Trigger Condition	
York Region	Summarized by the Ontario Minimum Maintenance Standards		
London	Priority Roads	Summarized by the Ontario Minimum Maintenance Standards	
	Secondary Roads		
Toronto	Expressways	2-5cm	
	Arterial roads and streetcar routes	5cm	
	Collector roads, bus routes and local streets with hills	5-8cm	
	All other local streets	8cm	

In summary, Toronto offers a higher LOS when compared to other GTHA cities. Many of the cities do not plow major roads until 8cm of snow accumulation while Toronto begins plowing at expressways at 2.5cm and arterial roads at 5cm. The City also surpasses its peers when comparing LOS for collector roads and is alignment with respect to local streets. In addition, Toronto's LOS exceeds Ontario's Minimum Maintenance Standards (MMS) as summarized in **Table 29**.

Table 29:	The City's	<b>Snow Plowing</b>	<b>Depth Standard</b>	Comparison
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Class of	s of Depth Comparison	
Highway	Ontario MMS	Toronto LOS
1	2.5 cm	✓ 2.5 to 5.0 cm and still snowing
2	5.0 cm	✓ 5.0 cm and still snowing
3	8.0 cm	√ 5.0-8.0 cm
4	8.0 cm	√ 8.0 cm
5	10.0 cm	√ 8.0 cm

Sources: Ontario Regulation 239/02: Minimum Maintenance Standards for Municipal Highways. City of Toronto Levels of Service for Winter Maintenance

### 6.4 Target Road Clearing Completion Time

**Table 30** shows that the City's LOS regarding target road clearing completion times exceeds other GTHA cities. When assessing completion times across all road classifications, the City has shorter target completion time.

#### Table 30: Target Road Clearing Completion Time

Municipality	Road Classification	Target Completion Time
Brampton	Major roads, arterial, and collector roads	-
	Residential/Secondary roads	<24hrs
Hamilton	Major arterial roads & escarpment accesses	<4hrs
	Primary collector roads	<8hrs

Municipality	Road Classification	Target Completion Time		
	Secondary collector roads & steep residential hills	<8hrs		
	Rural roads	<24hrs		
	Residential roads	<24hrs		
Mississauga	Major roads, arterial, and collector	Snowfall between 8cm - 15cm:		
	roads	< 12 hours		
		Snowfall >15cm:		
		< 24 hours		
	Residential/secondary roads	Snowfall between 8cm - 15cm:		
	Priority sidewalks	< 24 hours		
	Bus stops	Snowfall >15cm:		
	Pedestrian crossings	< 36 hours		
York Region	Summarized by the Ontario Minimum Maintenance Standards			
London	Priority Roads	Summarized by the Ontario Minimum		
	Secondary Roads	Maintenance Standards		
Toronto	Expressways	2-3hrs		
	Arterial roads and streetcar routes	6-8hrs		
	Collector roads, bus routes and local streets with hills	14-16hrs		
	All other local streets	14-16hrs		

Similarly, Toronto exceeds the Ontario Minimum Maintenance Standards. **Table 31** provides a comparison of the current Toronto LOS as compared to the regulated standard.

Class of	Time Comparison		
Highway	Legislated Standard	Toronto LOS	
1	4 hours	✓ 2-3 hrs	
2	6 hours	√ 6-8 hrs	
3	12 hours	√ 8-10 hrs	
4	16 hours	√ 14-16 hrs	
5	24 hours	√ 14-16 hrs	

#### Table 31: The City's Snow Clearing Time Standard Comparison

Sources: Ontario Regulation 239/02: Minimum Maintenance Standards for Municipal Highways. City of Toronto Levels of Service for Winter Maintenance

### 6.5 Sidewalk Clearing

Toronto's LOS on sidewalk clearing exceeds other cities within the GTHA. Specifically, Toronto has a significantly lower snow accumulation trigger point (2cm) for high pedestrian volume sidewalk clearing. Toronto also has a more responsive sidewalk clearing standard for low volume pedestrian sidewalks, which requires snow clearing at 8cm of snow accumulation, as compared to only salting sidewalks when snow accumulation is less than 8cm or only clearing sidewalks within 12-48 hours after a snow event. As well, Toronto exceeds Ontario's Minimum

Maintenance Standards which specify that snow accumulation must be reduced to a depth less than or equal to 8 centimeters within 48 hours and a minimum clear width of 1 meter must be maintained.<sup>7</sup>

Municipality	Sidewalk Clearing Standard			
Brampton	Priority aligns with roads. Municipal standard not readily available			
Hamilton	Must be cleared within 24 hours after a snow event			
Mississauga	Priority sidewalks are cleared within 12-36 hours			
York Region	Sidewalks must be cleared to less than or equal to 8cm within 48 hours after a			
London	snow event.			
Toronto	High pedestrian volume sidewalks (arterial roads, school zones, transit areas, accessibility locations) are cleared at 2cm of snow accumulation. Low pedestrian volume sidewalks (collector roads & local roads) are cleared at 8cms of snow accumulation.			

#### Table 32: Sidewalk Clearing Standard

### 6.6 Property Owner Responsibility

When comparing the property owner requirements regarding sidewalk clearing, many of the municipalities have similar policies. The cities of London and Brampton specify a specific time whereby sidewalks must be cleared while others (i.e. snow and ice must be cleared by 11am), including York Region and cities of Hamilton and Toronto require clear sidewalks within a time frame following a winter event (i.e. snow and ice must be cleared within 24hrs). While the time-specific policies have merit, there is potential for sidewalks to not be cleared for upwards of 24 hours following the end of a snowfall. Thus, as compared to other GTHA cities, Toronto's requirement for property owners to clear snow and ice within 12 hours ensures timely removal and ensures increased safety for residents. **Table 33** below summarizes the requirements for property owners regarding sidewalk clearing.

Municipality	Property Owner Responsibility
Brampton	Clear snow and ice from sidewalks in front of or beside the property before 11AM
Hamilton	Clear snow and ice from sidewalks adjacent to the property and roofs that overhand the City sidewalk within 24 hours after an event
Mississauga	Clearing sidewalks adjacent to their properties. No by-law is current enacted.
York Region	Clear the sidewalk within 24 hours of a snowfall. Local municipalities specify their own standards.
London	Property owners located in certain areas must clear snow and ice before 10am, with holidays being an exception

#### Table 33: Property Owner Responsibility, Sidewalk Clearing

<sup>&</sup>lt;sup>7</sup> Ontario Regulation 612/06: Minimum Maintenance Standards for Highways in the City of Toronto. <u>https://www.ontario.ca/laws/regulation/060612</u>

Municipality	Property Owner Responsibility
Toronto	Clear snow and ice within 12 hours in front of, alongside or at the rear of the building (as applicable) after an event. Apply abrasive agents as necessary to prevent slippery conditions

### 6.7 Summary

Toronto's winter maintenance LOS with regards to roadway and sidewalk clearing exceeds other cities within the GTHA, and Toronto also provides windrow clearing which is not provided in other cities. Toronto also imposes stricter timelines for property owners with regards to sidewalk clearing in order to ensure safe and passable conditions for residents.

## 7 Regulated / Legislated Level of Service Assessment

This section provides an assessment of the regulated / legislated level of service (LOS) for Toronto and the peer cities considered in the study.

The section is structured as follows. Firstly, given its application to Toronto and Ottawa, the *Ontario Minimum Maintenance Standards* are summarized in order understand the provincial requirements surrounding winter maintenance. Following, the City's adherence to those standards is assessed. The assessment shows that the City's LOS regarding winter maintenance operations meets or exceeds the province's minimum maintenance standards. Lastly, the peer cities identified were assessed to see whether there are any regulated / legislated requirements. It was determined that the majority of peer cities solely incorporate local procedures regarding snow and ice control and are not governed by specific winter maintenance policies.

### 7.1 Ontario Minimum Maintenance Standards

The Ontario Minimum Maintenance Standards outline specific standards surrounding winter maintenance for roadway, bicycle lanes and sidewalks, as well as potholes, cracks, lighting, signage etc.

Highways are classified based on the speed limit and AADT count as summarized by **Table 34** below. With respect to winter maintenance, this ensures that roadways with greater vehicle usage are given priority attention while ensuring that all other roadways are given sufficient treatment.

Average Deily	Speed Limit						
Traffic	91 - 100 km/h	81 - 90 km/h	71 - 80 km/h	61 - 70 km/h	51 - 60 km/h	41 - 50 km/h	1 - 40 km/h
53,000 +	1	1	1	1	1	1	1
23,000 - 52,999	1	1	1	2	2	2	2
15,000 - 22,999	1	1	2	2	2	3	3
12,000 - 14,999	1	1	2	2	2	3	3
10,000 - 11,999	1	1	2	2	3	3	3
8,000 - 9,999	1	1	2	3	3	3	3
6,000 - 7,999	1	2	2	3	3	4	4
5,000 - 5,999	1	2	2	3	3	4	4
4,000 - 4,999	1	2	3	3	3	4	4
3,000 - 3,999	1	2	3	3	3	4	4
2,000 - 2,999	1	2	3	3	4	5	5
1,000 - 1,999	1	3	3	3	4	5	5
500 - 999	1	3	4	4	4	5	5
200 - 499	1	3	4	4	5	5	6
50 - 199	1	3	4	5	5	6	6
0 - 49	1	3	6	6	6	6	6

#### Table 34: Highway Classification

Source: Ontario Regulation 239/02: Minimum Maintenance Standards for Municipal Highways

#### 7.1.1 Patrolling Frequency

Patrolling is conducted to assess and verify road and weather conditions. Should the patrols find that there is a substantial likelihood of snow and/or ice accumulation on roadways, the City has discretion to specify alternative patrolling frequencies in order to maintain an appropriate LOS.

Class of Highway	Patrolling Frequency		
1	3 times every 7 days		
2	2 times every 7 days		
3	Once every 7 days		
4	Once every 14 days		
5	Once every 30 days		

#### Table 35: Patrolling Frequency Standard

Source: Ontario Regulation 239/02: Minimum Maintenance Standards for Municipal Highways

Currently, the City conducts 24-hours patrols in order to monitor weather and road conditions. Additionally, City staff monitor pavement temperature and weather to ensure preparedness and readiness for all conditions.<sup>8</sup> The use of proactive patrolling ensures that the City will be aware of developing weather events.

#### 7.1.2 Weather Monitoring

#### TORONTO WEATHER FORECASTING OVERVIEW

The use of contract meteorologists, Road Weather Information System (RWIS) sites and road temperature monitoring provide cities with advanced notice of weather events which facilities winter maintenance response planning. Peer cities share similarities in the use of weather technologies for decision making, and a discussion of the Toronto program provides a good overview of the weather forecasting and responses process.

The Toronto contract meteorologist retrieves and archives all data from the nine Toronto Road Weather Information System (RWIS) stations, creates a pavement temperature forecast, and maintains a dedicated City of Toronto weather website which is available to all City staff and contractors involved in winter maintenance activities. As well, the meteorologist issues dedicated district forecasts via email four times per day (04:30, 09:00, 14:30 and 20:30 hours) during the October 1 to April 30 time period. The forecasts are also sent to the Salt Management Plan and the four Snow Communication Supervisor. Staff may also access the most recent weather forecast by visiting the website https://customers.twncs.com/toronto/RWIStofc.htm.

It is the job of the weather provider to integrate RWIS data with weather data to provide real time and forecast reports to allow better snow and ice control decision-making. This information is available on a dedicated web site accessible to Supervisory staff involved in Winter

<sup>&</sup>lt;sup>8</sup> City of Toronto. Winter Road Maintenance.

https://www.toronto.ca/services-payments/streets-parking-transportation/road-maintenance/winter-maintenance/

Operations. The web site also provides access to a full range of products and tools including; QEW cameras, 401 Cameras across Toronto, Toronto RESCU cameras, and Doppler radar. A full discussion of the current weather trends and observations is also included in the forecast. Storm alerts are provided on the website and through links to Environment Canada. The meteorologist may also be contacted directly 24/7 for weather consultations. The meteorologist also provides annual weather training sessions as part of the City of Toronto Snow School.

#### **RECORDING WEATHER FORECASTS**

Under the Minimum Maintenance Standards (Ontario Regulation 46/13 of the City of Toronto Act) there is a requirement for the weather forecast to be monitored once per shift or three times per calendar day during the period October 1 to April 30. A designated management staff person prints, signs, dates and files the forecast 3 times daily (9am, 2:30pm, & 8:30pm). As well, the record indicates if direct liquid application equipment was mobilized in advance of an event or if salting equipment was mobilized in response to an event.

#### 7.1.3 Winter Communications Protocol

Appendix G of the Salt Management Plan outlines the Winter Communications Protocol which provides the communications guidelines for the response to winter storms. The Protocol ensures a consistent and systematic communications and operational strategy, and response by staff and agencies with regard to winter storms.

The Protocol includes pre-season communication and education; road operations communications, external stakeholder communication, and the issuing of snow advisories.

The pre-season communications includes a briefing binder for City Councilors and their staff, and a winter maintenance overview for 311 staff. Additionally, a Snow School training program is provided for Road Operations staff to prepare them for all aspects of winter maintenance; including salt management, communications, record keeping, policies and procedures, weather forecasting, minimum maintenance standards, and materials and techniques.

### 7.2 Snow Accumulation

The standards and thresholds for snow accumulation vary based on the roadway classification. Similarly, the snow removal for bicycle lanes depend on the classification of the accompanying roadway.

#### 7.2.1 Roadways

The standard is to deploy resources as soon as snow accumulation has been determined to be greater than the depths<sup>9</sup> specified in Table 36. There must be a minimum lane width that is the lesser of three metres for each lane or the actual lane width. Roads that are classified as Class 4 or Class 5 and contain two lanes must be a provided a total clear width of at least five meters.

<sup>&</sup>lt;sup>9</sup> Depth of snow accumulation may be determined by measurements, weather monitoring, or a visual estimate

Should the depth be less than the standard provided, then the roadway is deemed to be in a state of repair [with respect to snow accumulation].<sup>10</sup>

Class of Highway	Depth	Time
1	2.5 cm	4 hours
2	5.0 cm	6 hours
3	8.0 cm	12 hours
4	8.0 cm	16 hours
5	10.0 cm	24 hours

#### Table 36: Snow Accumulation Standard, Roadways

Source: Ontario Regulation 239/02: Minimum Maintenance Standards for Municipal Highways

#### 7.2.2 Bicycle Lanes

Similarly to roadways, the City must deploy resources as soon as snow accumulation in excess of the standards has been realized. Accumulation must be reduced to a depth less than the specified standard while provided a clear width that is the less of one meter or the actual bicycle lane width. The standard is summarized by **Table 37**.

Bicycle lanes are salted and/or plowed based on the LOS classification of the adjacent roadway.<sup>11</sup> Given that the City's roadway operations meet the legislated standard, the winter maintenance of bicycle lane infrastructure remains in compliance.

Class of Highway or Adjacent Highway	Depth	Time
1	2.5 cm	8 hours
2	5.0 cm	12 hours
3	8.0 cm	24 hours
4	8.0 cm	24 hours
5	10.0 cm	24 hours

#### Table 37: Snow Accumulation Standard, Bicycle Lanes

Source: Ontario Regulation 239/02: Minimum Maintenance Standards for Municipal Highways

#### 7.2.3 Sidewalks

Ontario regulations specify that snow accumulation on sidewalks must be reduced to a depth less than or equal to 8 centimeters within 48 hours and a minimum clear width of 1 meter must be maintained.<sup>12</sup> The City salts and/or plows high priority<sup>13</sup> sidewalks after 2cm of snow accumulation where mechanically possible.<sup>14</sup> Sidewalks with lower pedestrian volumes, such as

<sup>&</sup>lt;sup>10</sup> Ontario Regulation 612/06: Minimum Maintenance Standards for Highways in the City of Toronto. <u>https://www.ontario.ca/laws/regulation/060612</u>

<sup>&</sup>lt;sup>11</sup> Ibid.

<sup>&</sup>lt;sup>12</sup> Ontario Regulation 612/06: Minimum Maintenance Standards for Highways in the City of Toronto. <u>https://www.ontario.ca/laws/regulation/060612</u>

<sup>&</sup>lt;sup>13</sup> Priority sidewalks are those with high pedestrian volumes including arterial zones, school zones, transit routes, and near accessibility areas.

<sup>&</sup>lt;sup>14</sup> City of Toronto. "Levels of Service for Winter Maintenance." <u>https://www.toronto.ca/services-payments/streets-parking-transportation/road-maintenance/winter-maintenance/levels-of-snow-clearing-service/</u>

those on collector and local roads, are maintained after 8cm of snow has fallen. This approach continuously ensures regulatory compliance and maintains safe passage for pedestrians.

### 7.3 Ice Accumulation

The City is required to patrol and monitor in accordance with **Table 35** in order to maintain acceptable levels of service. Should these activities identify a high likelihood of ice formation, then the City is required to treat the roadway to prevent ice from forming in accordance with standard summarized by **Table 38**. Should ice accumulate despite these efforts, then the City must treat the roadways per **Table 39**.

Sidewalk ice accumulation is treated similarly. Weather must be monitored in accordance with **Table 35** and sidewalks require to be treated should the City determine there is a high likelihood of ice formation. Should ice form despite these efforts, then the City must treat the sidewalks within 48 hours to remain compliant.

#### **Table 38: Ice Formation Prevention Standard**

Class of Highway	Time
1	6 hours
2	8 hours
3	16 hours
4	24 hours
5	24 hours

Source: Ontario Regulation 239/02: Minimum Maintenance Standards for Municipal Highways

#### Table 39: Treatment of Icy Roadways Standard

Class of Highway	Time
1	3 hours
2	4 hours
3	8 hours
4	12 hours
5	16 hours

Source: Ontario Regulation 239/02: Minimum Maintenance Standards for Municipal Highways

### 7.4 City of Toronto Compliance

The City of Toronto's winter maintenance LOS either meets or exceeds the Province's Minimum Maintenance Standards which were adopted by the City in 2013 and 2014.<sup>15</sup> **Table 40** provides a comparison of snow plowing standard and the City's current LOS.

<sup>&</sup>lt;sup>15</sup> City of Toronto. "Levels of Service for Winter Maintenance." <u>https://www.toronto.ca/services-</u> payments/streets-parking-transportation/road-maintenance/winter-maintenance/levels-of-snow-clearingservice/

Class of	Depth Comparison		Time Comparison	
Highway	Legislated Standard	Toronto LOS	Legislated Standard	Toronto LOS
1	2.5 cm	✓ 2.5 to 5.0 cm and still snowing	4 hours	√ 2-3 hrs
2	5.0 cm	✓ 5.0 cm and still snowing	6 hours	√ 6-8 hrs
3	8.0 cm	√ 5.0-8.0 cm	12 hours	√ 8-10 hrs
4	8.0 cm	<b>√</b> 8.0 cm	16 hours	√ 14-16 hrs
5	10.0 cm	<b>√</b> 8.0 cm	24 hours	√ 14-16 hrs

#### Table 40: Snow Plowing Standards Comparison

Sources: Ontario Regulation 239/02: Minimum Maintenance Standards for Municipal Highways. City of Toronto: Levels of Service for Winter Maintenance

Similarly, **Table 41** summarizes the standards surrounding the de-icing of roadways and the City of Toronto LOS. As noted in **Table 40** and **Table 41**, the City maintains a higher LOS compared with the legislated standards.

#### Table 41: De-icing Standards Comparison

Class of Highway	Legislated Standard	Toronto LOS
1	3 hours	✓ 1-2hrs. Up to 2.5 cm of snow.
2	4 hours	✓ 2-4 hrs. Up to 5 cm of snow & continuing.
3	8 hours	✓ 4-6 hrs. Up to 8 cm of snow & stopped.
4	12 hours	( 0.42 hrs. Up to 0 em of enough stepped
5	16 hours	$\sqrt{8-12}$ ms. Up to 8 cm of show & stopped.

Sources: Ontario Regulation 239/02: Minimum Maintenance Standards for Municipal Highways. City of Toronto: Levels of Service for Winter Maintenance

### 7.5 Peer Cities

Ontario municipalities are governed by the provincial *Minimum Maintenance Standards* which specifies patrolling and weather monitoring frequencies, and standards related to snow and ice treatment activities. Similarly, Montreal has established a snow removal policy that provides a consistent LOS across the City. The other peer cities assessed do not have legislated / regulated LOS requirements. Rather, the cities establish local procedures, roadway prioritizations, and standards to achieve.

#### Table 42: Regulated / Legislated Level of Service Comparison

Peer City	Regulation / Legislation?	Comment
Ottawa	$\checkmark$	Provincial regulation
Montreal	$\checkmark$	Municipal snow removal policy
Chicago	-	
Milwaukee	—	Internal policy and procedures. State Departments of Transportation
Minneapolis	_	handbooks / guidelines available
New York	_	

The following section provides additional commentary for each peer city assessed.

#### 7.5.1 Ottawa

Similarly to Toronto, the City of Ottawa Roads Services is obligated to meet the provincial minimum maintenance standards<sup>16</sup>.

#### 7.5.2 Montreal

In 2015, Montreal harmonized and implemented a new snow removal policy that ensures consistency amongst the 19 boroughs and guarantees a standard LOS across the city.<sup>17</sup> <sup>18</sup>

#### 7.5.3 Chicago

While the Department of Streets and Sanitation does not specify performance standards, it has local procedures that prioritize main routes prior to servicing side streets.<sup>19</sup>

#### 7.5.4 Milwaukee

The Department of Public Works specifies internal response timelines and roadway prioritization<sup>20</sup> while the Wisconsin Department of Transportation provides a highway maintenance manual which includes winter operations.<sup>21</sup> There is no regulation or legislative standard that governs the City's winter maintenance

#### 7.5.5 Minneapolis

Despite the lack of a regulation or legislative standard, the Department of Public Works' website provides weather monitoring frequency and snow operations procedures. The Minnesota Department of Transportation provides a field handbook that helps guide local snow clearing operations.<sup>22</sup>

<sup>&</sup>lt;sup>16</sup> Ontario Regulation 239/02: Minimum Maintenance Standards for Municipal Highways. <u>https://www.ontario.ca/laws/regulation/020239</u>

<sup>&</sup>lt;sup>17</sup> Montreal Gazette. "Montreal to Harmonize Snow-Clearing Policy across 19 Boroughs." <u>https://montrealgazette.com/news/local-news/montreal-unveils-its-new-snow-clearing-policy</u>

<sup>&</sup>lt;sup>18</sup> City of Montreal. "Snow Removal: Operations and Timeframe." <u>http://ville.montreal.qc.ca/snowremoval/operations-delais</u>

<sup>&</sup>lt;sup>19</sup> City of Chicago. "Snow Clearing Winter of 2018-2019."

https://www.chicago.gov/city/en/depts/streets/provdrs/street/svcs/snow\_clearing.html <sup>20</sup> City of Milwaukee. "Snow and Ice Control Operations."

https://city.milwaukee.gov/mpw/divisions/operations/snowoperationstatus#.XOgMgohKi71

<sup>&</sup>lt;sup>21</sup> Wisconsin Department of Transportation. "Highway Maintenance Manual." <u>https://wisconsindot.gov/Pages/doing-bus/local-gov/hwy-mnt/mntc-manual/chapter06.aspx</u>

<sup>&</sup>lt;sup>22</sup> Minnesota Department of Transportation. "Minnesota Snow and Ice Control." http://www.mnltap.umn.edu/publications/handbooks/documents/snowice.pdf

#### 7.5.6 New York

The Department of Sanitation sets internal procedures for snow and ice control<sup>23</sup> and the New York Department of Transportation provides a handbook of highway winter maintenance guidelines.<sup>24</sup>

<sup>24</sup> New York Department of Transportation. "Highway Maintenance Guidelines: Snow and Ice Control." <u>https://www.dot.ny.gov/divisions/operating/oom/transportation-</u> <u>maintenance/repository/NYS\_SI\_Manual\_Apr2006\_RevJan2012.pdf</u>

 <sup>&</sup>lt;sup>23</sup> New York City Department of Sanitation. "Snow Operations FAQs"
 <u>https://www1.nyc.gov/assets/dsny/docs/about\_snow-faq\_0815.pdf</u>
 <sup>24</sup> New York Department of Transportation. "Highway Maintenance Guidelines"

## 8 AODA Requirement Assessment

The Accessibility for Ontarians with Disabilities Act (AODA) is an Ontario law mandating that organizations develop an accessibility policy and identify barriers that prevent persons with disabilities from accessing the organization's goods, services, or facilities, and to determine how those barriers can be prevented or removed. Transportation and the design of public spaces were specifically identified as areas covered under AODA and the Integrated Accessibility Standards Regulation (IASR).

A review of the City's current procedures and practices in regards to winter maintenance, specifically sidewalk maintenance, concludes that the City is in compliance with AODA requirements.

The following section summarizes the steps implemented by the City of Toronto in order to be compliant with AODA requirements.

### 8.1 Sidewalk Maintenance

The AODA is silent with regards to winter maintenance. While the Act does not require municipalities to clear all sidewalks nor does it specify a minimum clear width, it mandates that municipalities have multi-year accessibility plans. The accessibility plans must specify policies and procedures regarding maintenance of public infrastructures and spaces.<sup>25</sup> <sup>26</sup> The City's 2014 staff report<sup>27</sup> outlines the activities that promote accessibility:

- Clearing all high pedestrian volume<sup>28</sup> sidewalks at 2cm of snow accumulation within ~4-6 hours where mechanically possible;
- Clearing all low pedestrian volume<sup>29</sup> sidewalks within ~13 hours at 8cm of snow accumulation where mechanically possible;
- Clearing sidewalks for seniors and disabled persons where mechanical snow clearing is not possible; and
- Enforcing *Municipal Code Chapter 719 (Snow and Ice Removal)*<sup>30</sup> to ensure that sidewalks adjacent to properties not serviced by the City are cleared within 12 hours.

d%20Bicycle%20Lanes%20(D.Guthrie,%20R.Burlie).pdf

<sup>26</sup> City of Toronto. "Confirmation of Levels of Service for Winter Maintenance of Bikeways, Windrow Opening, Sidewalks and AODA Compliance". 2014. <u>https://www.toronto.ca/wp-content/uploads/2018/02/8b0f-Winter-Maintenance\_Staff-Report\_Spring2014.pdf</u>

<sup>&</sup>lt;sup>25</sup> Ontario Good Roads Association. "Managing Winter Operations Workshop: MMS – Sidewalks, Bicycle Lanes, and Multi-user Trails." 2018 <u>https://www.ogra.org/images/eBlast/Weekly/MWOW/2018/Presentations/09\_MMS%20Sidewalks%20an</u>

<sup>&</sup>lt;sup>27</sup> Ibid

<sup>&</sup>lt;sup>28</sup> Refers to sidewalks on arterial and collector roads, bus routes, and certain local roads that make walking more difficult (i.e. steeper grades etc.)

<sup>&</sup>lt;sup>29</sup> Primarily local / residential roads

<sup>&</sup>lt;sup>30</sup> City of Toronto. "Toronto Municipal Code: Chapter 719, Snow and Ice Removal". <u>https://www.toronto.ca/legdocs/municode/1184\_719.pdf</u>

Property owners / occupants are prohibited from storing snow on public roadways, sidewalks, or lanes. Non-compliance results in fines and victim surcharges.

One specific requirement regarding sidewalk maintenance is that all new sidewalks, and pedestrian paths must have a minimum width of 1.5 metres and be firm and stable.<sup>31</sup> This aligns with the City standards to mechanically clear sidewalks wherever widths are equal to (or greater) than 1.5 metres in order to maintain a travel width of 1.2 metres.<sup>32</sup>

### 8.2 AODA Recommendations

While the City is in compliance with its mandate regarding winter maintenance activities, there are specific areas that may be improved. These include timely review and updates to the multi-year accessibility plan and subsequent annual progress report updates. Lastly, the City should ensure that its minimum standards for pedestrian clearway (T-310-010.10) are met when redeveloping existing or installing new sidewalks.

#### 8.2.1 Accessibility Plans

The AODA regulation requires all multi-year accessibility plans to be publicly available and reviewed and updated at least once every 5 years.<sup>33</sup> The last plan produced by the City dates back to 2012 and covers years 2012-2017. This required an updated plan to be produced and available on the City website in 2017. Based on information currently available, while the City has begun the process of updating the plan<sup>34</sup> to span 2017-2025 in order to achieve AODA-required accessibility by 2025<sup>35</sup>, the plan has not been completed and / or made available on the City website<sup>36</sup>. The City also notes that annual progress status reports are to be completed and be made available, however the last report was produced in 2015.

It's recommended that the City finalize and make available the 2017-2025 multi-year accessibility plan and provide a 2017 update to the previous (2012-2017) plan. This would allow stakeholders to assess the efficacy of the previous plan and understand the City's plan to achieve the legislated accessibility requirement by 2025. It's further recommended the City

<sup>&</sup>lt;sup>31</sup> Government of Ontario. "Ontario Regulation 191/11: Integrated Accessibility Standards under Accessibility for Ontarians with Disabilities Act 82.23 (1) and (3), 2005". <u>https://www.ontario.ca/laws/regulation/110191#BK91</u>

<sup>&</sup>lt;sup>32</sup> City of Toronto. "Confirmation of Levels of Service for Winter Maintenance of Bikeways, Windrow Opening, Sidewalks and AODA Compliance". 2014. <u>https://www.toronto.ca/wpcontent/uploads/2018/02/8b0f-Winter-Maintenance\_Staff-Report\_Spring2014.pdf</u>

<sup>&</sup>lt;sup>33</sup> Government of Ontario. "Ontario Regulation 191/11: Integrated Accessibility Standards under Accessibility for Ontarians with Disabilities Act, 2005". https://www.ontario.ca/laws/regulation/110191#BK91

<sup>&</sup>lt;sup>34</sup> City of Toronto. "Updating the City's Multi-year Accessibility Plan." 2017. <u>https://www.toronto.ca/legdocs/mmis/2017/ex/bgrd/backgroundfile-101385.pdf</u>

<sup>&</sup>lt;sup>35</sup> Accessibility for Ontarians with Disability Act, 2005 1 (a) specifies that accessibility with respect to goods, services, facilities, accommodations, buildings, structures, and premises will be achieved on or before January 1, 2015. <u>https://www.ontario.ca/laws/statute/05a11</u>

<sup>&</sup>lt;sup>36</sup> City of Toronto. "Multi-year Accessibility Plan." <u>https://www.toronto.ca/city-government/accessibility-human-rights/accessibility-at-the-city-of-toronto/multi-year-accessibility-plan/</u>

provide ongoing annual updates to the 2017-2025 plan in order to track progress towards the AODA requirement.

#### 8.2.2 Seniors and Disabled Persons Services

While providing snow clearing services for seniors and persons with disabilities ,where mechanical snow clearing is not possible, is provided free of charge, an application form must be completed and submitted accompanied with a doctor's certificate. Following the 2013 Winter Maintenance Program Review the City implemented a permanent eligibility for seniors which eliminated the need to reapply each year.

## 9 Sidewalk Program Assessment

The section below presents a business case for the implementation of a city-wide sidewalk snow clearing program.

### 9.1 Overview

An analysis of climate data shows that, based on a 5-year average, Toronto may expect to experience 3 days of snowfall in excess of 10cm and 17 days of snowfall in excess of 2cm each year. Although this presents a challenge for sidewalk clearing it is increasingly recognized that these services are important for general urban mobility as well as the mobility and safety of seniors, persons with disabilities, and other vulnerable citizens.

In addition to managing snow and ice on Toronto's roads, cycle routes, and transit corridors, the winter maintenance program is responsible for sidewalk clearing. Currently the program provides snow clearing of sidewalks to all areas of Toronto where it is mechanically possible. Should sidewalks fail to meet the criteria defined below they are excluded from snow clearing services. This criteria includes<sup>37</sup>:

- Street width greater than 8 metres;
- Sidewalk width greater than 1.5 metres;
- Sidewalk must not be immediately adjacent to the street;
- Parking must not be immediately adjacent to the sidewalk;
- Clearing along a contiguous area; and
- No obstructions immediately adjacent to or within the sidewalk (including utility poles, planters, and retaining walls etc.) that would impede the equipment and/or create pubic hazards.

As summarized by **Table 43**, there are approximately 1,400 kilometers of sidewalks located in Toronto and East York, North York, Etobicoke, and Scarborough that do not meet these criteria. This business case discusses potential options, advantages and disadvantages, and recommendations to implement a City-wide sidewalk snow clearing program.

District	Kilometers
Toronto & East York	940
North York	269
Etobicoke York	189
Scarborough	7
Total	1,405

#### Table 43: Sidewalk Kilometers That Currently Do Not Receive Mechanical Clearing

<sup>&</sup>lt;sup>37</sup> City of Toronto. "Mayor's Winter Services Review, Local Road Sidewalk Clearing Implementation Plan." 2019.

**Figure 12** below provides a summary of the decision process for sidewalk clearing, specifically areas for assessment, and specific action items discussed within the business plan.



Figure 12: Sidewalk Clearing Process Map

### 9.2 Reassess Criteria to Determine Sidewalk Eligibility for Mechanical Clearing

As mentioned previously, the criteria for mechanically clearing sidewalks includes street and sidewalk width, whether the sidewalk is adjacent to the street or parking, and if there are any obstructions on the sidewalk.

Given that manual slow clearing is significantly less efficient and more expensive than mechanical clearing, considerations should be first given to potentially modify existing criterion to include additional sidewalks within the mechanical sidewalk clearing program. Additional considerations regarding deviations from the criteria should be assessed. These considerations are summarized below.

#### **Considerations:**

- It is recommend that a *sidewalk inventory program* be initiated. This program should consist of physical survey in order to confirm and validate the linear kilometers summarized in **Table 44** and accurately assess the current status and conditions of the sidewalks. This will further help Toronto Winter Operations understand the balance between mechanical as compared to manual clearing.
- Document the location and nature of illegal encroachments into the sidewalk right of way. These encroachments increase the difficulty of mechanical sidewalk clearing and may be damaged during a clearing operation.
- Explore possibilities to acquire or customize snow clearing equipment that are able to operate on narrower sidewalks;
- Assess the viability of smaller mobile snow melting equipment<sup>38</sup> that would avoid costly and lengthy snow hauling, and reduce truck traffic on local roads;
- Enforce on-street parking bans so that sidewalks adjacent to streets can also be mechanically cleared and have the sidewalk snow clearing operate in tandem with street clearing; and
- Mechanically clear as much as possible by planning specific obstruction detour plans for each neighborhood.

#### 9.2.1 Peer City Example

While obstructions or encroachments into the sidewalk pose challenges, other municipalities have established procedures to accomplish sidewalk clearing. Specifically, Ottawa offers procedural examples on approaches to overcoming the constraints. Firstly, the city usually does a few passes of snow clearing equipment and it is common that parked vehicles have been moved which addresses the issue of adjacent parking. Encroachment by-laws, especially against the sidewalks, are enforced and damages to encroachments are investigated. If there is no encroachment permit there is no compensation to the property owner. As well, all encroachments are documented. Operators attempt to maneuver close to and around the encroachments prior to initiating manual clearing of the sidewalk. Further, operators move garbage cans as necessary however effective communication the residents minimizes this requirement.

<sup>&</sup>lt;sup>38</sup> Small snowmelters such as the Trecan CT-15 may be maneuvered in cul-de-sacs and narrow streets http://www.trecan.com/portable-models.php

### 9.3 Manually Salt and/or Plow Sidewalks

Sidewalks that currently do not receive mechanical clearing may be salted and/or manually cleared to achieve the objective of city-wide sidewalk snow clearing. The manual efforts may be performed either by in-house labour or by selected qualified contractor(s).

Firstly, **Table 44** provides a summary comparison while following sections provide greater detail regarding the two labour options. It should be noted that the values provided in the following sections are estimates and the true cost of snow removal may vary based on the outcome of the recommended *sidewalk inventory program* and other factors.

Variable	Contract Labour	In-House Labour	
Annual Costs	\$7,642,836	\$10,878,050	One-time capital cost: \$7,630,000
Advantages	Lower cost to the City	Lower liability on property damage claims	
Disadvantages	Higher liability on property damage claims may prevent contractors from obtaining liability insurance	Higher cost to the City	

#### Table 44: Labour Options for Manual Snow Clearing

#### 9.3.1 Contract Labour

Contract labour is the relatively cheaper alternative regarding manual sidewalk clearing. Assuming a beat size<sup>39</sup> of 13hrs, **Table 45** provides an estimate of the number of crews required to manually clear the approximately 1,400km of sidewalks. Crews typically consist of two labourers and one pickup truck. Ottawa, as an example, has a mix of in-house and contract labour, with the majority of the contract labour focusing on residential sidewalk operations.

#### Table 45: Manual Sidewalk Clearing, Hand Crew Estimate

District	Kilometers	Hand Crews
Toronto & East York	940	72
North York	269	21
Etobicoke York	189	15
Scarborough	7	1
Total	1,405	109

Based on current contract prices, the estimated annual cost is \$7.6 million including labour and equipment. Daily standby costs are estimated at \$4.2 million per year while annual operating expenses may total \$3.4 million. Current contracts expire in 2022 and it is anticipated that contract costs will increase in the future.

<sup>&</sup>lt;sup>39</sup> Assuming the current level of service (13 hours) and 1 km/hr. average travel speed

District	Daily Standby	Annual Operating	Total Annual Cost
Toronto & East York	\$2,822,688	\$2,215,200	\$5,037,888
North York	\$823,284	\$655,200	\$1,478,484
Etobicoke York	\$588,060	\$468,000	\$1,056,060
Scarborough	\$39,204	\$31,200	\$70,404
Total	\$4,273,236	\$3,369,600	\$7,642,836

#### Table 46: Contract Labour Cost Estimate

There may be a reluctance of sidewalk contractors to take on increased liability since the contractors have a legal duty to defend the City in the event of liability claims for damage to private property. Potential increases in such liability claims may hinder a contractor's ability to obtain liability insurance or result in a significant cost premium to offset the increase in claims.

In such instances, the City could consider assisting contractors with obtaining enhanced liability insurance. Additionally, the City may introduce performance goals and required standards in contractual language in order to ensure consistency and minimize neighborhood complaints.

#### 9.3.2 In-House Labour

As a result of the liability issues and other considerations, the City may choose to employ inhouse labour for manual snow clearing despite the increase in cost (relative to contractor labour). **Table 47** provides a summary of labour costs while **Table 48** summarizes anticipated equipment costs which includes pickups and snowblowers.

District	Seasonal Staff	Salary	Daily Standby	Overtime	Total Labour Costs
Toronto & East York	144	\$3,600,000	\$1,464,139	\$1,113,362	\$6,177,501
North York	42	\$1,050,000	\$427,040	\$324,731	\$1,801,771
Etobicoke York	30	\$750,000	\$305,029	\$231,950	\$1,286,979
Scarborough	2	\$50,000	\$20,335	\$15,463	\$85,799
Total	218	\$5,450,000	\$2,216,543	\$1,685,506	\$9,352,050

#### Table 47: In-House Labour Cost Estimate

## Table 48: In-House Equipment and Annual Maintenance Costs (Pickups and Snowblowers)

District	Machines	Capital	Annual Maintenance	Annual Replacement	Annual O&M Costs
Toronto & East York	72	\$5,040,000	\$504,000	\$504,000	\$1,008,000
North York	21	\$1,470,000	\$147,000	\$147,000	\$210,000
Etobicoke York	15	\$1,050,000	\$105,000	\$105,000	\$294,000
Scarborough	1	\$70,000	\$7,000	\$7,000	\$14,000
Total	109	\$7,630,000	\$763,000	\$763,000	\$1,526,000

Labour costs are estimated to be upwards of \$9.3 million. When combined with annual operations and maintenance (O&M) costs of approximately \$1.5 million, in-house sidewalk clearing costs total \$10.9 million annually which represents a multiple of 1.4 over contract work

(estimated at \$7.6 million). In addition to annual labour and maintenance costs, there is also a one-time capital cost of approximately \$7.6 million.

While the in-house labour option presents a higher cost to the City, there are potential areas for increased effectiveness and efficiency. Firstly, standby hours may be reduced through analysis of existing weather monitoring and reliable forecasts in order to reduce the cost burden of excessive standby hours. The City may also consider assessing rate changes for working vs. standby hours. Lastly, there may be further cost efficiencies associated with leasing as compared to purchasing required equipment to assist with manual slow clearing efforts.

#### 9.3.3 Sidewalk Classification

Based on current City standards, high pedestrian volume sidewalks (i.e. arterial roads, school zones, transit areas, and accessibility locations) are cleared at 2cm of snow accumulation while low pedestrian volume sidewalks (i.e. collector and local roads) are cleared at 8cm of accumulation. In reinforcing the City's commitment to equitable service, and given that Toronto typically experiences 17 snow days where snowfall exceeds 2cm, it's recommended that the Level of Service (LOS) for low volume sidewalks be increased to 2cm of accumulation to allow for improved pedestrian conditions.

Applying the high and low-volume pedestrian volume classification to sidewalks that are unable to be mechanically cleared provides various options for implementing City-wide snow clearing. These potential options are summarized by **Table 49** below.

Options	Advantages	Disadvantages
<b>Option 1</b> : Snow clearing of sidewalks for both high and low volume sidewalks at 2cms of snow accumulation	Enhanced City reputation regarding improving equity	Significantly higher cost to the City
<b>Option 2:</b> Maintain current snow clearing standard for high pedestrian volume sidewalks. Only salt, or a combination of salt and less frequent snow clearing, for low pedestrian volume sidewalks	Lower cost to the City	Potential for negative community feedback regarding the City's level of service
<b>Option 3</b> : Salt both high and low pedestrian volume sidewalks prior to major snow storms	Potential to reduce post- snowfall clearing work. Reinforces equity.	Additional labour and resources required. Potential for adverse environmental impacts as a result of increased use of salt

#### **Table 49: Implementation Plan Options**

Further, it may be feasible to prioritize snow clearing for seniors and persons with disabilities through the provision of financial assistance programs or providing continued services free-of-charge. This would accomplish equitable snow clearing services across the city and ensure ongoing compliance with Accessibility for Ontarians with Disabilities Act (AODA) despite incurring a significant financial impact. Such costs may be potentially offset through exploring cost-sharing arrangements for windrow clearing and other City winter maintenance services.

#### 9.3.4 Trial Program

It's further recommended the City consider implementing a trial snow clearing program. Through clearing a sample of the 1,400 kilometers of non-mechanically cleared sidewalks, the City will gain an enhanced understanding regarding costs, scheduling, and potential issues that would need to be addressed prior to unveiling a complete City-wide program.

### 9.4 Snow Removal on All Sidewalks

Piled snow needs to be removed from sidewalks as the final step of the City-wide snow clearing program in order to maintain safe sidewalk conditions. In the absence of snow removal, accumulated snow will push up against vehicles thereby preventing access and potentially resulting in significant damage. Sidewalks would also be unsuitable for residents with disabilities, seniors, families with strollers, and generally compromise general public safety. Snow removal further ensures access for emergency vehicles and maintains on-street permit parking. Ottawa, as an example, has snow removal triggered by the narrowing of the sidewalk travel width. Typically, a travel width of 50% is a trigger for removal however this varies by road classification. Some roads, such as those classified as Class 5, do not have snow removal.

The biggest constraint associated with snow removal is the significant cost. While full removal is preferred, partial removal would be relatively less expensive despite potentially not meeting the equity and accessibility objectives. **Table 50** provides a comparison of full (both sides) and partial (one side) snow removal based on 4 removals per winter season.

District	Full Removal	Partial Removal
Toronto & East York	\$8,898,026	\$4,449,013
North York	\$2,542,063	\$1,271,032
Etobicoke York	\$1,785,665	\$892,832
Scarborough	\$66,276	\$33,138
Total	\$13,292,031	\$6,646,015

#### Table 50: Snow Removal Cost Estimate

It should be noted that snow removal represents an additional expense associated with either a mechanical or manual sidewalk clearing program regardless whether the work is performed by in-house or contract labour.

Full removal is the preferred option which would allow for safe and passable sidewalks across the City, thereby fully addressing equity and accessibility goals. Costs may be partially offset through exploring cost-sharing arrangements for windrow clearing and other City winter maintenance services. In general, high costs and concerns surrounding equity are key constraints surrounding snow removal. **Table 51** provides a summary of key constraints and mitigation strategies.

Constraints	Mitigation Strategy
High Cost	Remove snow for sidewalks adjacent to higher volume roadways more frequently as compared to lower volume roads
	Assess the feasibility to combine seasonal and winter maintenance crews from other departments for snow removal operations
Equity Considerations	Prioritize snow removal for seniors and persons with disabilities
	Initiate a cost-sharing program for windrow clearing to partially offset snow removal costs and allow for City-wide removal
Parking Restrictions	Enforce parking restrictions to ensure timely snow removal and adjust the towing policy accordingly
	Assess revising the definition of a Major Snow Storm Condition (MSSC) to facilitate removal of snow on local streets

#### Table 51: Snow Removal Constraints and Mitigation Strategies

#### 9.4.1 Parking Restrictions and Towing Policies

The City should consider reassessing current parking restrictions and towing policies during the snow removal period. Clear streets with no curbside parking is an essential pre-condition for efficient snow removal. It is recommended that the City assess and investigate options for enforcing parking restrictions and towing policies during the snow removal period in order to ensure an efficient and timely snow removal process. As an example, the effectiveness of 'friendly tow' and other policies should be assessed for effectiveness and incorporated into the sidewalk maintenance plan. During Peer City review, Ottawa mentioned they do not operate a 'friendly tow' program. Rather, Ottawa tags and tows the parked vehicle to remove the obstruction.

### 9.5 Summary

Toronto's winter maintenance program is robust and exceeds the level of service of its peer cities. Where possible, the City mechanically clears all sidewalks to ensure safe passage. There are approximately 1,400 kilometers of sidewalks that are currently unable to be mechanically cleared as a result of not meeting necessary conditions including:

- Street width greater than 8 metres;
- Sidewalk width greater than 1.5 metres;
- Sidewalk must not be immediately adjacent to the street;
- Parking must not be immediately adjacent to the sidewalk;
- Clearing in a contiguous area; and
- No obstructions immediately adjacent to or within the sidewalk (including utility poles, planters, and retaining walls etc.) that would impede the equipment and/or create pubic hazards.

The following key considerations would aid the City in making a decision regarding City-wide sidewalk clearing plan:

- Assess contract vs. in-house labor for sidewalk clearing operations;
- Create a detailed sidewalk inventory to confirm the sidewalk linear kilometers, accurately assess the current status and conditions of the sidewalks, and help Toronto Winter Operations understand the balance between mechanical as compared to manual clearing;
- Assess and investigate current parking restrictions and towing policies in order to efficiently implement a sidewalk clearing plan;
- Better understand and enforce sidewalk encroachments; and
- Implement a trial snow clearing program to gain an enhanced understanding regarding costs, scheduling, and potential issues that would need to be addressed prior to unveiling a complete City-wide program.



## 10 Program Assessment and Recommendations

The Winter Maintenance Program Review and the Toronto Resident Survey identified three program areas within which Transportation Services could consider a number of recommendations to create a more robust and equitable winter maintenance program.

### **10.1 Level of Service Assessment**

Overall, the City of Toronto meets or exceeds the winter maintenance level of service for roadways, paths and sidewalks as compared to peer cities, other cities within the GTHA, and current policies. Although Toronto provides an excellent sidewalk snow clearing program in most City districts there are approximately 1,400 km of sidewalks within the inner districts of the City that are currently not cleared. Considerations of roadway and sidewalk widths, encroachments, and equipment limitations preclude these sidewalks from being mechanically cleared. As identified in Section 9 Sidewalk Program Assessment and during the field trip to Ottawa it may be possible to develop a program enhancement to clear all sidewalks, albeit at a significant cost.

To better understand the implications of clearing snow from the constricted sidewalks it is recommended that Transportation Services:

- 1. Conduct a physical inventory of the 1,400 km of sidewalk that are currently not mechanically cleared to confirm the sidewalk segment lengths, widths and encroachments which will assist with program development.
- 2. During the 2019 / 2020 winter season conduct a snow clearing trial program on approximately 250 km of the sidewalks which are currently not cleared to assess program feasibility, staffing, manual clearing, equipment and cost.

Additionally, the City should explore the following program enhancements:

- 3. Initiate snow clearing on low volume sidewalks at a 2cm accumulation of snow (currently 8cm) to improve equity of service, safety, and pedestrian mobility.
- Review the efficacy of the Major Snow Storm Condition declaration and consider a more robust application of the program to improve parking control and snow clearing along major City routes.
- 5. Review sidewalk encroachment management, resident responsibilities and bylaw control.
- 6. Review the snow clearing LOS on cycle facilities to ensure current practices meet the needs of the cycle community.
- 7. Review the application of "Design for Winter" principles to ensure the design of facilities consider unique winter maintenance needs for snow clearing and storage.

### **10.2 Climate Assessment**

Section 4 provides a summary of Toronto climate data with a focus on weather events during the fringe periods of April, October, and November. The trend of snowfall and snowfall frequency over the 25 year period (1994 to 2019) is relatively consistent with significant

variations above or below the average every few years. Based on the climate data it can be concluded that the core winter maintenance program is an appropriately robust program; however, the occasional weather event outside the normal range will stress the current program.

Of concern are significant weather events which occur outside of the core winter maintenance period of mid-November to mid-April when there is not a full complement of staff and equipment available. The climate data indicates that significant April weather events are possible. To mitigate the risk of a major fringe weather event the City should consider the following:

- 8. The City should review the balance between in-house and contract staff within the winter maintenance program to ensure more staff are available during the winter fringe period.
- 9. The City should review the retention of contractor equipment within the maintenance depots for possible deployment during major fringe weather events.

### **10.3 Communications Assessment**

The Toronto Resident Survey identified that there is a general lack of public knowledge and awareness regarding the winter maintenance program, and there is significant concern with the quality and timeliness of resident interaction with the 311 service. Based on the resident feedback it is recommended that:

- 10. The City develop a comprehensive public advertising and communication plan to improve the public's understanding of the City's winter maintenance program policies, level of service, service delivery, activities and responsibilities. As well, the realities of winter maintenance responses to major weather events needs to be better understood.
- 11. The City review the 311 response policies and phone script to ensure the services are meeting the needs of the residents and the winter maintenance program.

## Appendix A: Toronto Resident Survey



**Ipsos Public Affairs** 



# City of Toronto 2019 Transportation Services Winter Maintenance Survey

JULY, 2019 - FINAL REPORT

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Winter Maintenance Program Review City of Toronto

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### Contents





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# City of Toronto BACKGROUND & OBJECTIVES

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### **Background & Objectives**

#### BACKGROUND

This research was commissioned by the City of Toronto to collect feedback from Toronto residents regarding winter maintenance services.

Transportation Services is the City division responsible for all aspects of Toronto's transportation network including expressways and streets, traffic control, pedestrian and cycling infrastructure.

#### OBJECTIVES

Topics included in the Winter Maintenance Survey include:

- Residents' satisfaction with winter maintenance services
- Expectations and priorities regarding winter maintenance services
- Knowledge and awareness of current winter maintenance policies
- Contacting the City of Toronto regarding winter maintenance
- Winter maintenance funding preferences
- Communications



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### **Study Overview**



- The survey was conducted online by Ipsos Public Affairs among City of Toronto residents aged 18 and older.
- The results of the survey are based on a total of n=1,000 online interviews.
- Interviews were completed between June 18<sup>th</sup> to June 29<sup>th</sup>, 2019.
- Results are weighted to the latest Statistics Canada census data according to age, region, and gender to ensure that the sample of respondents are representative of the population of adult City of Toronto residents according to age, region, and gender.
- The precision of Ipsos online polls is measured using a credibility interval. In this case, the poll is accurate to within +/- 3.5 percentage points.
- Where applicable, results from a 2013 study have been included for tracking purposes. Comparisons between the 2013 study and this study should be treated with caution due to differences in the methodological approach utilized for each of these surveys.





Winter Maintenance Program Review City of Toronto

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# City of Toronto EXECUTIVE SUNNARY



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### **Executive Summary**

#### **Executive Summary**

#### Satisfaction with Winter Maintenance

- More than half of Torontonians (57%) are satisfied with winter maintenance services provided by the City of Toronto. Overall satisfaction is down 5 points from the previous survey conducted in 2013. Positive responses focused on services and implementation with one in five specifying timely service (21%) and clearing of streets and roads (20%). Negative mentions focused on delayed or slow service (15%).
- Seven in ten (70%) Torontonians believe that winter maintenance services have either improved (33%) or stayed the same (37%) over the past five years with cyclists (8%) and young respondents (10%) being more likely to state that services have significantly improved. One in five (22%) residents say it has gotten worse.

#### **Expectations and Priorities**

- Half (50%) of Torontonians state that their expectations for snow plowing and maintenance were met by the City of Toronto, and another half of residents state that their expectations were not met (15%) or only partially met (36%).
- Torontonians emphasized the speed of snow plowing from sidewalks (43%) and the speed of snow plowing from streets and roads (39%) when asked about their priorities. Additionally, Torontonians stated that they wished to see expressways prioritized for snow clearing (50%), followed by major roads (33%), and major sidewalks (10%).
- Torontonians are inclined to allow snow to accumulate to 5cm before triggering plowing, although on major roads and expressways nearly a quarter of respondents state that plowing should occur at 2cm.

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### **Executive Summary**

#### **Executive Summary**

#### **Knowledge and Awareness of Current Policies**

- Only a minority of Torontonians say that they are knowledgeable about winter maintanence levels and policies. Respondents who rate winter maintenance as excellent are significantly more likely to state that they are "very knowledgeable" about snow plowing policies.
- Less than a quarter of Torontonians know that 1% of the City's budget is allocated to winter maintenance (22%).

#### Contacting the City of Toronto

• About one in ten (9%) residents claim to have contacted the City this past winter about snow plowing. Most of these residents called Toronto 311. Among those who did contact the City, nearly half (46%) stated that they were unable to get what they needed, and only 36% agree that they were satisfied with the overall quality of service.

#### **Budget Implications**

- Budget preferences among Torontonians are split, with 31% preferring to maintain winter maintenance and snow plowing standards, with no change to the money dedicated to those services, while 30% state that winter maintenance and snow plow levels should be expanded by redirecting money from other City services. Those who rate overall winter maintenance services as "poor" are more likely to want the City to redirect funds for winter maintenance (57%).
- 96% of Torontonians support a service that would remove snow from streets and roads where residents use on-street parking.



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### **Executive Summary**



#### Communications

• More than half (61%) of polled Torontonians state they would be likely to use an alert system provided by the City that offers real time information about snow plowing to an email or smartphone. However, a majority of respondents (86%) state they are not aware of the PlowTO service. 55% of Torontonians state they are likely to use PlowTO, while 45% state they are not.



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# City of Toronto

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### **Key Findings**

#### Key Findings

- Overall, a small majority of residents are satisfied with the winter maintenance services provided by the City of Toronto. However, the gap between those residents that are satisfied and those that are dissatisfied seems to shrinking. Importantly, fewer than half of residents agree that the current level of winter maintenance services provided by the City is adequate. The perception among many residents is that that winter maintenance services provided by the City are not keeping up with population growth, increasing road usage and congestion, and perhaps climate change and that winter maintenance services could be expanded to meet the needs of a growing city.
- Residents tend to view the speed of snow plowing more importantly than the amount of snow that is being removed from roads and sidewalks. Evidence of this is provided by how residents prioritize speed of plowing over amount being plowed and numerous negative comments referring to the lack of timeliness of snow plowing. This requires careful consideration by the City, as current policies tend to favor a minimum accumulation amount before snow clearing commences. The research suggests that residents would react positively to more timely snow plowing activities or at a minimum a greater awareness of how quickly the City responds to winter weather conditions as they develop.
- In order of priority, residents want to see winter snow clearing activities focused on: (1) expressways, (2) major roads, and (3) major sidewalks first. Efforts to prioritize services associated with windrow clearing, services provided to seniors and those residents with disabilities, and laneway salting could also be prioritized due to lower levels of satisfaction.

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## **Key Findings (continued)**

#### Key Findings

- The City could focus efforts in improving communication with residents about winter maintenance activities and policies. Very few residents feel that they are knowledgeable about winter maintenance standards and policies and when tested, a large proportion of residents could not correctly answer questions about winter maintenance programs or the proportion of the City's budget allocated for winter maintenance services.
- In particular, interest is strong for the winter service alert initiative and the PlowTO service. Efforts could be undertaken to
  increase awareness of these programs among residents in particular as these programs could help communicate the
  timeliness of services provided to residents.
- Effort could also be made to address the questions and concerns of the those residents to contact the City via 311 as only about four in ten of those who contacted 311 about winter maintenance agreed that they got what they needed, were satisfied with the quality of service, or the timeliness of service provided.
- Finally, although residents are split about how to allocate the City's budget towards winter maintenance services, those residents who are dissatisfied with the current level of service provided are significantly more likely to voice a preference for increasing the City's winter maintenance budget by reallocating funds from other programs, rather than an increase in property taxes.

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# City of Toronto SATISFACTION WITH WINTER MAINTENANCE

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#### SATISFACTION WITH WINTER MAINTANECE

#### **Overall Satisfaction with Winter Maintenance**

More than half of Torontonians (57%) are satisfied with winter maintenance services provided by the City of Toronto. Younger residents (18 to 24) are more likely to indicate that the City is doing an excellent or good job (14%). Only one in ten (11%) believe the City had performed poorly. Overall satisfaction is down 5 points from the previous study conducted in 2013 – *Caution should be used when comparing survey results as the methodology for both studies is different.* 



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#### SATISFACTION WITH WINTER MAINTANECE

#### **Reasons for Satisfaction and Dissatisfaction**

When asked why they rated the City of Toronto positively, almost half of Torontonians highlighted positive services and implementation (45%), with one in five specifying timely service (21%) and clearing of streets and roads (20%). Negative impressions focused on delayed or slow service (15%) as well as a need to improve clearing of streets, roads, and highways (13%). Older Torontonians were most likely to state they were dissatisfied with City services, specifically implementation (41%).



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#### SATISFACTION WITH WINTER MAINTANECE

#### **Reasons for Satisfaction and Dissatisfaction (Comments)**





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#### SATISFACTION WITH WINTER MAINTANECE

#### Changes in Winter Maintenance Performance vs. 5 Years Ago

A majority (70%) of Torontonians believe that winter maintenance services have either improved (33%) or stayed the same (37%) over the past five years. In particular, cyclists (8%) and young respondents (10%) are most likely to say services have improved significantly. Currently, two in ten state that winter maintenance has worsened over the past 5 years, an increase from the previous wave where only 11% stated that winter maintenance had worsened.



Base: (n=1000)

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SATISFACTION WITH WINTER MAINTANECE					Satisfied (7-10)		
<b>Satisfaction with Various Aspects of</b> While most Torontonians held fairly neutral opinions regardin		Neutral (4-6) Dissatisfied (0-3)					
expressways and 4 in 10 say they are satisfied with salting and However, almost 3 in 10 say they are unsatisfied with snow pl	20 M	)13 ean	2019 Mean				
Salting and snow plowing of City expressways	70%	21	<mark>% 8%</mark>		7.2		
Salting and snow plowing of City roads and streets	59%	27%	14% 7	.0	6.5		
Salting and snow plowing of City sidewalks and walkways	49%	31%	<b>19%</b> 6	.3	5.9		
Salting and snow plowing of transit stop areas	52%	32%	<b>16%</b> 6	.9	6.2		
Salting & snow plowing to allow for the safe passage of	48%	32%	20%		5.9		
The removal of snow and its hauling to storage sites	51%	31%	18% 6	.4	6		
Salting of laneways	47%	30%	23%		5.4		
Snow plowing of driveway windrow openings	39%	34%	<b>27%</b> 5	.2	5.4		
Salting and snow plowing to allow for the safe passage of persons with mobility issues	38%	34%	27%		5.4		
Snow clearing services generally for seniors and people with disabilities	42%	33%	<b>25%</b> 6	.0	5.5		
Salting and snow plowing of bicycle lanes/routes	42%	37%	<b>21%</b> 6	.0	5.		

Using a scale from 0 to 10, where 0 means 'not at all satisfied' and 10 means 'very satisfied,' how satisfied are you with each of the following? Excludes Don't Know. Mean including 0. Base: (varies) Don't know responses removed. © 2019 Ipsos Q14.



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#### SATISFACTION WITH WINTER MAINTANECE

#### **Perceptions of City of Toronto Winter Maintenance**

Almost half of Torontonians agree that snow plowing activities occur within a reasonable amount of time (47%). Opinions are more divided as to whether the City does a good job communicating to the public about its winter maintenance services. Four in ten residents agree that the current level of winter maintenance is appropriate to meet the needs of the City.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

> 2013 Strongly

2019

Strongly



Ipsos Q17. Indicate whether you strongly agree, agree, disagree, or strongly disagree with the following statemen Base: (n=1000) Winter Maintenance Program Review City of Toronto

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# City of Toronto EXPECTATIONS & PRIORITIES

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#### **EXPECTATIONS & PRIORITIES**

**Expectations of Snow Plowing and Winter Maintenance** Torontonians are divided regarding snow plowing expectations. Half (50%) of Torontonians stated that their expectations for snow plowing and maintenance were met by the City of Toronto, and another half of residents state that their expectations were not (15%) or only partially met (36%). Cyclists were more satisfied than most (14%), stating that the City exceeded their expectations of snow plowing.



Overall, to what extent did the City of Toronto meet your expectations regarding snow plowing and maintenance over the course of this past Q18. winter? Base: (n=1000) © 2019 lpsos



Why would you say that the City of Toronto [insert response in Q18]? Base: (n=1000) Q19.

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#### **EXPECTATIONS & PRIORITIES**

#### **Improvement Priorities**

When asked about their winter maintenance and snow plowing priorities, Torontonians emphasized the speed of snow plowing from sidewalks (43%) and the speed of snow plowing from streets and roads (39%).



Q15. When thinking about winter maintenance and snow plowing in the City of Toronto, what, if anything, needs to be improved? You can mention up to two options. Base: (n=1000)



#### Slide 23:

#### EXPECTATIONS & PRIORITIES

#### **Snow Clearing Priorities**

Torontonians expressed a desire to see expressways prioritized for snow clearing (50%), followed by major roads (33%), and major sidewalks (10%). Commuters who drive (61%) and North York residents (59%) emphasize expressways as a priority.



Q16. In what order of priority should the City clear snow from the following, where 1 is the highest priority and should be cleared first and 6 is the lowest priority and should be cleared last? Base: (n=1000)



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#### **EXPECTATIONS & PRIORITIES**

#### **Plowing of Snow by Accumulation and Location**

The majority of Torontonians state that snow accumulation of 5cm should trigger plowing of snow. A lower accumulation threshold is set on major roads and expressways with two in ten stating that major roads should be plowed once 2cm of snow accumulates, and with nearly a quarter of respondents stating that expressways should be cleared after 2cm of snow accumulation.





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#### **EXPECTATIONS & PRIORITIES**

#### **Post-Snow Plowing Road Conditions**

Most Torontonians agree that after snowplowing, it is acceptable to have a small amount of snow left with the pavement visible on the street. More than a third of respondents (35%) stated that expressways needed more attention with only the black pavement showing, while three in ten stated that local residential streets could retain up to 2 inches of snow.

None, the black pavement of the street should be fully visible A small amount of snow and pavement visible on the street Up to 2 inches or 5cm of snow, as long as it is safe and passable More than 2 inches or 5cm of snow on this type of surface Don't know





Base: (n=1000)

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#### **EXPECTATIONS & PRIORITIES**

#### Snow Plowing in Toronto vs. Rest of Canada

Almost half of Torontonians believe that the City of Toronto's snow plowing and maintenance services are the same as the rest of Canada, while approximately one quarter of Torontonians believe they are better. Young Torontonians (35%) are significantly more likely to consider the City's snow plowing superior to the rest of Canada's. The remaining 25% thinks services in Toronto are worse than the rest of Canada.



#### © 2019 Ipsos Q20. Do you believe that winter maintenance services and snow plowing in the City of Toronto are better, worse, or the same as in other cities in Canada? Base: (n=1000)



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# City of Toronto KNOWLEDGE & AWARENESS OF CURRENT POLICY

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#### KNOWLEDGE AND AWARENESS

#### **Knowledge of City of Toronto Snow Plowing Policies**

Torontonians feel generally less knowledgeable about snow plowing policies with 43% stating that they know only a little about the City's Winter Service levels and policies and 17% stating they are not at all knowledgeable about policies. Importantly, those that are more knowledgeable about the City's snow plowing policies are significantly more likely to rate winter maintenance services as excellent.





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# City of Toronto CONTACTING THE CITY OF TORONTO

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#### CONTACTING THE CITY

#### Contacting City, by Method of Contact

Contacted the city this past winter to report

The vast majority (91%) of Torontonians did not contact the city in the past winter about snowplowing. Those who did contact the city did so largely by calling City of Toronto 311 (68%).



#### How did you contact the City?

© 2019 lpsos Q25. Q26.

Have you contacted the City of Toronto this Past winter to report a concern about winter maintenance and/or snow plowing? Base: (n=1000) How did you contact the City of Toronto? Base: Only those who contacted the city (n=87)

DSOS

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#### CONTACTING THE CITY Reasons for Contacting the City

Those who contacted the City expressed challenges including snow not being removed in a timely manner, inaccessibility, and a lack of service.



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Q12. Why would you say that the City of Toronto is doing a [insert option from Q11] job at providing winter maintenance services?Q19. Why would you say that the City of Toronto [insert response in Q18]?



#### CONTACTING THE CITY Quality of Communication with the City

Among those who did contact the City, nearly half (46%) stated that they were unable to get what they needed, and only 36% agree that they were satisfied with the overall quality of service. Regarding the time it took to get service, reactions are split with 34% agreeing they were satisfied, while 37% state they were unsatisfied.





Winter Maintenance Program Review City of Toronto

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# City of Toronto BUDGET IMPLICATIONS

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#### **BUDGET IMPLICATIONS**

#### **Budget Preferences**

Approximately one third of respondents state that maintaining winter maintenance and snow plowing standards, with no change to the money dedicated to those services, should be the priority of the City's budget. Similarly, three in ten state that winter maintenance and snow plow levels should be expanded by redirecting money from other City services.



Q28.

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As you may know, currently less than 1% or \$87 million dollars of the City of Toronto's budget is dedicated to winter maintenance and snow plowing. Considering this, which of the following do you support most? Base: (n=1000)



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#### BUDGET IMPLICATIONS

#### **Budget Preferences**

Importantly, those who rate overall winter maintenance services as "poor" are more likely to want the City to redirect funds for winter maintenance (57%), while those who consider overall services, "excellent" do not request any changes to the budget (56%).

Overall Winter Maintenance Services								
	Excellent	Good	Fair	Poor				
Maintain existing winter maintenance and snow plowing standards, with no change to the money dedicated for these services	56%	40%	17%	13%				
Expand existing winter maintenance and snow plowing, with an annual increase of \$25 to property tax bills for residents	19%	25%	23%	16%				
Expand existing winter maintenance and snow plowing levels, by redirecting money from other City services	15%	19%	40%	57%				

© 2019 Ipsos Q28. As you may know, currently less than 1% or \$87 million dollars of the City of Toronto's budget is dedicated to winter maintenance and snow plowing. Considering this, which of the following do you support most? Base: (n=1000)

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#### BUDGET IMPLICATIONS

#### Support for Snow Removal on Residential Streets with Parking

There is overwhelming support among Torontonians who park on residential streets (96%) for a service that would remove snow from streets and roads where residents use on-street parking.



© 2019 Ipsos Q29. Would you support or oppose a service that would remove snow from streets and roads where residents use on-street parking. Base: Respondents who use on street parking (n=70)
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# City of Toronto COMMUNICATIONS

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## COMMUNICATIONS

# **Preferred Method of Contact**

Six in ten Torontonians (60%) prefer to receive winter maintenance and snow plowing information via television, with older Torontonians (68%) highlighting this medium as their preferred communication. More than a third of respondents prefer communications via the City of Toronto website (36%) while a further third prefer communications via radio broadcasts (33%). Younger residents predictably prefer to be contacted via social media (33%).



© 2019 Ipsos Q30. Which of the following are your preferred sources of information about winter maintenance and snow plowing? Select up to three. Base: (n=1000)



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# COMMUNICATIONS

# **Preferred Method of Contact**

Homeowners are more likely to prefer email newsletters and radio contact to receive winter maintenance and snow plowing information. Respondents with access to laneways for car parking similarly prefer email newsletters.



Email newsletters sent via email from the City Owners 14% vs 7% Renters

Homeowners





Email newsletters sent via email from the City Laneway 22% vs. Driveway 13% vs No Access 9%



Radio (i.e. CBC Radio One) Owners 36% vs. 29% Renters

© 2019 Ipsos Q30.

Which of the following are your preferred sources of information about winter maintenance and snow plowing? Select up to three. Base: (n=1000)



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# COMMUNICATIONS Likelihood to Use Alert System

More than half of polled Torontonians state they would be likely to use an alert system provided by the City that offers real time information about snow plowing to an email or smartphone, with 27% stating they would be very likely to use such a service. This is highest among young Torontonians (31%), while older respondents are confident they would not use such a service (30%).



© 2019 Ipsos Q31. How likely would you be to register for an alert system provided by the City of Toronto by email or to your smartphone that would provide you with real-time information about snow plowing during and after a snow storm? Base; (n=1000).



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# COMMUNICATIONS

# Awareness of and Likelihood to PlowTO

The majority of respondents (86%) state they are not aware of the PlowTO service, however, drivers (5%) and young Torontonians (6%) are more aware than most. 72% state they have never heard of it at all. This is especially high among older respondents (77%). Respondents are divided as to whether they would use the PlowTO service in the future with 55% stating they are likely to use it, while 45% state they are not. Older respondents are particularly confident they would not use PlowTO (23%).



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# **City of Toronto APPENDIX:** TRANSPORTATION PROFILE

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# TRANSPORTATION PROFILE

# Usage by Mode of Transportation

Torontonians frequently walk within the city (89%) followed by using public transit (76%), and driving (70%). Few Torontonians get around by motorcycle or scooter with 86% saying they never utilize this mode of transportation.



#### 8% 39 89% Walk 60% 29% **Public transit or TTC** 76% 7% 46% 31% 17% Drive /Carpool 44% 27% 14% 15% 70% Bike 8% 27% 19% 23% 50% 620 Motorcycle/Scooter/e-scooter 2% 5% 7% 86% 7% Other 19% 21% 4 57% 23% 44 nsos

How often do you use each of the following types of transportation in the City of Toronto? Q1. © 2019 lpsos Base: All Respondents: (n= 1000)

**Regularly/Sometimes** 

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### TRANSPORTATION PROFILE

# **Method of Transportation by Destination**

Driving is the most common form of transportation by Torontonians with the majority driving to work (33%) and to do their shopping (55%). Three in ten prefer to take transit to work while a quarter of Torontonians walk to do their shopping.





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What mode of transportation do you use most often in good weather to get to the following destinations? If you do not participate in any of these activities indicate 'Not Applicable'. Base: All Respondents: (n= 1000)

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# TRANSPORTATION PROFILE **Bike Usage by Season**

Torontonians cycle most frequently in the Summer, followed by Spring, and Fall.







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# VEHICLE PROFILE Number of Vehicles per Household

Three quarters of Torontonians own one or more cars (75%) while half own at least one bicycle (50%). Only 4% of respondents own a wheelchair.



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### HOME AND DRIVEWAY PROFILE

# Access to Driveway by Home Type

The majority of Torontonians live in either a single detached home (36%), or a high-rise apartment/condo building (39%) with only a small percentage living in semi-detached or low-rise apartment housing (9% respectively). Almost all Torontonians in single detached homes have driveways (93%) while more than half of semi-detached residents (59%) and half of townhome residents (50%) have access to driveways.



© 2019 Ipsos Q5. Which of the following types of dwellings do you live in? Base (n=1000) Q9. Do you have access to the following at your home? (Select all) Base(n=517) Slide 49:

# PARKING PROFILE

Q8.

# **Method of Car Parking**

Most car owners use a driveway (37%), a garage (31%), or underground parking (28%) to park their car. Of the 9% of Toronto car owners who park on the street, 74% of them pay for on street parking permits.



Do you pay for a City of Toronto parking permit to park on-street? Base Respondents who use on street parking (n=70)

Slide 50:

# SATISFACTION PROFILE

# Satisfaction with City of Toronto streets and Transportation System

The majority of Torontonians (57%) are satisfied with the City of Toronto's streets and transportation system. Satisfaction is highest among young Torontonians (11%) and cyclists (11%). However, a large percentage say they are only "somewhat" satisfied (28%), and three in ten say they are dissatisfied with the City's streets and transportation system.



Q10. How satisfied are you with the City of Toronto's streets and transportation system overall? This would include roads, expressways, sidewalks, cycling infrastructure in addition to street signs, traffic lights, and so on. Base: (n=1000)



Winter Maintenace Program Review City of Toronto