



**STAFF REPORT
INFORMATION ONLY**

**Confirmation of Levels of Service for Winter
Maintenance of Bikeways, Windrow Opening, Sidewalks
and AODA Compliance – Supplementary Report**

Date:	April 28, 2014
To:	Public Works and Infrastructure Committee
From:	General Manager, Transportation Services
Wards:	All Wards
Reference Number:	P:\2014\ClusterB\TRA\ScarboroughPw1438\Supplementary.docx AFS19532

SUMMARY

The purpose of this report is to provide supplementary information on winter maintenance levels of service following the report provided to Public Works and Infrastructure Committee on April 9, 2014 entitled, "Confirmation of Levels of Service for Winter Maintenance of Bikeways, Windrow Opening, Sidewalks and AODA Compliance".

The report provides clarification on matters related to sidewalk snow clearing standards and equipment specifications in other jurisdictions, Transportation Services' plan for compliance with Accessibility for Ontarians with Disabilities Act (AODA) legislation, a conceptual plan for the expansion of the mechanical sidewalk clearing program, and how desired pavement conditions may be achieved on cycle tracks and priority lanes.

Financial Impact

There are no financial impacts associated with this report.

DECISION HISTORY

At its meeting of April 9, 2014, Public Works and Infrastructure Committee had before it a report entitled Confirmation of Levels of Service for Winter Maintenance of Bikeways, Windrow Opening, Sidewalks and AODA Compliance, as item PW30.8.

Public Works and Infrastructure Committee deferred consideration of the item until the May 14, 2014 PWIC meeting and requested that the General Manager, Transportation Services submit a further report providing the following additional information:

1. Sidewalk snow clearing standards in other jurisdictions;
2. Mechanical snow clearing equipment available in the market-place and being used in other government jurisdictions or in the private sector to clear narrow-width sidewalks and walkways;
3. Any information related slips and falls claims, settlement costs or pertinent court decisions with respect to winter sidewalk maintenance in Toronto;
4. Existing funds committed to sidewalk snow clearing programs for seniors and disabled residents;
5. Further information related to the AODA requirements and the City's "plan" for winter sidewalk maintenance to meet those requirements, including which are "high pedestrian volume sidewalks" will receive higher level of service in 2015;
6. The feasibility of structuring the tender call to consider the costs for different levels of service;
7. Concept implementation plan and estimated costs for a phased-in, multi-year plan to expand the implementation of sidewalk snow clearing throughout Toronto;
8. Further steps required to achieve the desired pavement condition on cycle tracks and priority bike lanes, including best practices from other cities.

ISSUE BACKGROUND

Transportation Services provides a full suite of winter maintenance services including roadway de-icing, roadway ploughing, driveway windrow opening, cycle track clearing, Martin Goodman Trail clearing, sidewalk clearing, bus stop clearing, senior's sidewalk clearing, and snow removal (haulage or on-site melting), including laneway frontages. Where mechanically possible, these services are delivered consistently and equitably to all areas of the city.

COMMENTS

Sidewalk Snow Clearing Operations Standards in Other Jurisdictions

There are no commonly accepted best practices amongst municipalities for the maintenance of sidewalks during the winter months. In fact, there are currently no legally mandated minimum maintenance standards for sidewalk snow clearing that are legislated on municipalities in Ontario. A recent Ontario Good Roads Association (OGRA) Task Force reviewed the sidewalk snow clearing standards throughout the province and, given the inconsistency in levels of service provided, was unable to arrive at any proposed best practices. This task force was comprised of approximately ten municipalities of various sizes, including the City of Toronto, and representatives from the Ontario Municipal Insurance Exchange (OMEX) and several legal firms who regularly represent municipalities. It is also apparent that the general approach is mostly related to residents' and property owners' responsibilities to clear snow adjacent to their property within a defined time limit.

At a national level, amongst major municipalities, there is a general trend toward the municipal provision of snow clearing of sidewalks for arterial or high pedestrian volume routes only. The desired pavement condition after plowing operations ranges from 'bare pavement' to 'safe and passable' to 'snow packed.' The time to complete plowing operations also varies from a low of approximately four hours for high volume routes to a high of four to five days for all sidewalks. In Toronto, all sidewalks are cleared within thirteen hours. Appendix 1 highlights sidewalk snow clearing standards that are in place in other major Canadian municipalities.

In the United States of America, major municipalities such as Milwaukee, Philadelphia, and Minneapolis also require the adjacent property owner to keep the sidewalk clear of snow and ice within a specified time frame.

Mechanical Sidewalk Plow Equipment Standards in Other Jurisdictions

The mechanical sidewalk plows utilized by Transportation Services in Toronto are typical of those used in other municipal jurisdictions throughout Canada. Table 1 itemizes the most commonly used pieces of equipment in the industry and shows both the width of the machine and the width of the plow blade. Transportation Services uses a variety of the different types of equipment listed including those manufactured by Trackless, Holder, Kubota, John Deere, and Hako. These are similar to those used in both Ottawa and Montréal. Staff are not aware of any municipality using equipment that is narrower than that listed in Table 1.

As part of maintaining an open and transparent tendering process, Transportation Services contracts do not specify certain equipment by manufacturer. Currently, two

categories of sidewalk plow are required (minimum 65hp and minimum 40hp). In both categories, the machines are required to; be no more than 1.27m (50") wide, be equipped with blades that are no more than 1.2m (48") wide, and be equipped with both straight blade and 'V' blade. To minimize the amount of sod damage that can result as part of the plowing operation, the corners of the blades are to be trimmed by a 50mm x 150mm section. The 65hp units are also required to be equipped with a snow blower and are used to clear areas where there are snow drifts or after heavy snowfalls.

Table 1 – Sidewalk Equipment Specifications

Make	Model	Tractor Width	Blade Width
Trackless	MT6	1.3m (50")	1.2m (47")
Holder	C270	1.1m (45")	1.3m (50")
Kubota	L4060DT	1.2m (47")	1.8m (72")
John Deere	2000 Series	1.3m (52")	1.4m (54")
Prinroth	SW4S	1.3m (52")	1.5m (60")
Hako	CM1250	1.2m (47")	1.5m (60")

Summary of Slip and Fall Claims

The information presented in this section is routinely disclosed by Corporate Finance, Insurance & Risk Management and is available at

<http://www1.toronto.ca/wps/portal/contentonly?vnextoid=dafa285441f71410VgnVCM10000071d60f89RCRD&vnextfmt=default>.

In summary, Transportation Services receives an average of approximately 390 slip and fall claims per year. This represents 23% of all claims received by the Division. The number of claims received is influenced by a variety of factors that reflect winter severity including amount of snow accumulation, extended cold periods such as during the winter of 2013/2014 and the number of freeze/thaw cycles that create daytime melting followed by an overnight re-freeze. The average claim value is approximately \$32,000.

Table 2 – Icy Sidewalk – Slip and Fall Claims as at December 13, 2013

Calendar Year	Total Number of all Transportation Claims	Number of Icy Sidewalk Slip&Fall Claims	% of Total	Financial Information on Icy Sidewalk Slip&Fall Claims ONLY			
				Paid \$000*	Outstanding \$000*	Total Incurred \$000*	Average Claim Value \$000
2009	2,352	413	18%	6,380	9,267	15,647	37.8
2010	1,386	381	27%	3,543	7,454	10,997	28.8
2011	2,070	445	21%	2,139	14,750	16,890	37.9
2012	1,019	288	28%	657	7,144	7,801	27.0
2013	1,940	431	22%	285	11,182	11,468	26.6
Average	1,753	392	23%	2,600	9,959	12,561	31.6

Note: Slip & fall claims caused by ice and snow must demonstrate the City's gross negligence or a complete disregard for its maintenance obligations.

* **Paid may include** a combination of settlements, including damages, interest, also court ordered judgements and all expenses pertaining to the claims process which can include legal fees, claims adjuster fees and defence expert costs.

* **Outstanding are amounts** reserved for possible future payment and may include damages, interest, also court ordered judgements and all expenses pertaining to the claims process which can include legal fees, claims adjuster fees and defence expert costs

* **Total Incurred** is the sum of **Paid** plus **Outstanding**

Table 3 – Icy Sidewalk Claims Denied and Paid as at March 26, 2014

Year	Total	Denied	% of Total	Claims Paid	Amount \$	% of Total	Outstanding	% of Total
2009	413	217	53	80	2,336,588	19	116	28
2010	382	193	51	83	1,506,487	22	106	28
2011	446	178	40	53	744,779	12	215	48
2012	292	100	34	18	226,383	6	174	60
2013	510	80	16	12	34,465	2	418	82
Average	409	154	39	49	969,740	12	206	49

Funding for Sidewalk Snow Clearing for Seniors and Disabled

Transportation Services currently provides a manual sidewalk snow clearing service for seniors and the disabled. The cost of this service is approximately \$1,160,000. The service is provided by Solid Waste Management temporary staff on behalf of Transportation Services and funded through an interdivisional charge (IDC). The service

is primarily offered in Toronto & East York and, to a lesser extent Etobicoke-York and North York.

Accessibility for Ontarians with Disability Act (AODA) Requirements

The City of Toronto is in compliance with the Accessibility for Ontarians with Disabilities Act (AODA) as it applies to winter maintenance of sidewalks. The Act requires that municipalities have multi-year accessibility plans that contain procedures and policies about maintenance of public infrastructure and public spaces such as sidewalks. Specifically, the Act requires the prompt clearing of snow along accessible routes intended for winter use, including sidewalks, pathways and trails.

The AODA does not require municipalities to clear all sidewalks of snow, nor does it state a minimum width to which sidewalks should be cleared. As stated above, it does require that municipalities have a plan. The City of Toronto has a plan for winter maintenance on sidewalks. Transportation Services' plan for 2015 - 2022 includes;

- All high pedestrian volume sidewalks will be cleared at 2cm of snow accumulation where mechanically possible. High pedestrian volume sidewalks to be defined as those on arterial and collector roads, bus routes, and certain local roads where there are steep grades that may make walking difficult.
- Clearing high pedestrian volume sidewalks within approximately 4 – 6 hours of the end of a snow fall.
- All low pedestrian volume sidewalks will be cleared at 8cm of snow accumulation where mechanically possible. Low pedestrian volume sidewalks to be defined as primarily local (residential) roads.
- Clearing low pedestrian volume sidewalks within approximately 13 hours of the end of a snow fall.
- Snow clearing for seniors & disabled in those areas where mechanical snow clearing is not possible.
- Enforcement of Municipal Code Chapter 719, Snow and Ice Removal to ensure that adjacent property owners clear their sidewalk to a minimum width of 1.2 metres wherever the City has not undertaken to clear the snow and ice.

Sidewalk Snow Clearing Request for Quotation (RFQ)

Staff are currently in the process of preparing for the next round of winter contracts for the period 2015 – 2022. Contracts of longer duration permit contractors to amortize equipment purchases over a longer period of time as they provide increased security and should result on lower overall costs. The contract tendering process for the approximately fifty winter maintenance contracts will begin in November 2014 and continue until March 2015.

The structure of the contract is sufficiently flexible to respond to level of service adjustments that increase/decrease the threshold for plowing operations to commence and providing that there is no change to the timeframe required to complete plowing operations.

Total equipment requirements are based on the current level of service of thirteen hours to complete all sidewalks. Contractors bid both a daily standby rate that ensures the availability of the equipment and an hourly rate to compensate them for operating expenses when the equipment is plowing.

It is impossible for staff to build in the flexibility that adjusts the amount of equipment required and avoids the risk of increased bid prices. As this relates specifically to the potential expansion of the mechanical sidewalk clearing program in Toronto & East York, the more prudent approach would be to tender a separate contract for the clearing of sidewalks on local roads should Council provide that direction for anytime during the 2015 – 2022 contract term.

Implementation Plan for Mechanical Sidewalk Plowing Throughout Toronto

The City of Toronto's level of service for mechanical sidewalk clearing is similar to that provided in both Montréal and Ottawa, two municipalities of similar age and urban density as Toronto. Appendix 1 highlights sidewalk snow clearing standards that are in place in other major Canadian municipalities, including Montréal and Ottawa. Both of these jurisdictions provide mechanical sidewalk clearing wherever sidewalk widths are equal to or greater than 1.5m. Where sidewalks are narrower than 1.5m manual clearing is often required that may involve the sidewalk plow operator leaving the plow to manually clear a 'pinch point' or a team of manual clearers required to extended stretches of narrow sidewalk. Comparable equipment is used to deliver the service.

When all of the components that make up a sidewalk clearing level of service, such as the extent to which all sidewalks are cleared, requirement for adjacent property owners to clear, time frame to complete the operations, desired pavement condition after clearing, and material used to maintain traction (e.g. salt, sand, crushed stone) are taken into account, no two municipalities provide precisely the same level of service.

The significant difference between the winter maintenance program provided in Toronto as compared to those provided in Ottawa and Montréal is that both of those municipalities receive significantly higher average annual snowfall amounts (Montréal – 209cm & Ottawa – 175cm vs. Toronto – 133cm). This results in more frequent snow removal operations, such as haulage to a snow storage site or on-site melting, as they are required to continually maintain the availability of snow storage space for future snow events. A full-scale snow removal operation occurs in Toronto approximately once every

6 – 7 years (e.g. January 1999 & February 2008) and can cost upwards of \$12,000,000 depending on the scope of work required. During a typical winter in Toronto, the City experiences numerous freeze/thaw cycles that result in much of the snow melting prior to the onset of the next storm. Ottawa and Montréal undertake full-scale snow removal to storage sites or on-site melting approximately six times per year and at significant cost. In Montréal, for example, the snow removal budget is approximately \$110,000,000. In Toronto, snow removal that involves haulage or on-site melting is an unbudgeted activity and undertaken only when required for safety reasons at targeted locations. Staff are concerned that there would be subsequent pressure to broaden the scope of a snow removal program beyond the limits of local road sidewalks primarily in the Toronto & East York District.

The existence of on-street permit parking at many locations in the Toronto & East York District creates a situation for sidewalk plows that has the effect of plowing through a long tunnel. The sidewalk is bordered by encroachments such as retaining walls, fences, and steps on one side and parked cars on the other, leaving very little space available for snow storage. This requires the regular removal of the snow to a snow storage site or to be melted on-site to maintain the width of the sidewalk. If the sidewalk machine should begin to plow a section of sidewalk and is then impeded by some obstruction such as an overhanging car mirror, then the machine is required to attempt to reverse out of the tunnel, thereby further increasing the risk of damage to private property. Parked cars must be removed in order to facilitate the both the snow plowing and snow removal operations.

If snow removal including haulage and/or on-site melting were to be implemented for local roads primarily in the Toronto & East York District such a plan would include the following components:

1. A communications program to advise residents of those streets with on-street parking that currently do not receive mechanical sidewalk clearing of the new program and the impact to residents. This program would require pre-season notification and in-season reminders of the expectations placed on residents;
2. More aggressive by-law enforcement as part of both the sidewalk plowing and snow removal operations to ensure the removal of parked cars. Enforcement measures may include ticketing and possibly towing of parked cars to provide access for snow removal equipment;
3. Expanding the scope of the current sidewalk clearing program to include an additional 1100km of sidewalk primarily in the Toronto & East York District and the contracting of approximately 32 additional sidewalk plows at a cost of approximately \$1,600,000;
4. Development of a snow removal program for sidewalks where there is on-street parking with a frequency of approximately four times per season at a cost of approximately \$10,000,000 per season. A snow removal program intended to remove snow by hauling it to a snow storage site or melting it on-site approximately four times per year on the 1100km of local sidewalk that do not

receive mechanical clearing would involve the contracting of dedicated snow removal equipment. This equipment would be paid both daily standby and hourly operating rates to ensure its availability when required and the regularity with which it may be required. Staff continue to be of the opinion that the current approach to both sidewalk clearing and snow removal is the most fiscally responsible; and

5. More frequent use of snow storage sites in conjunction with snow melters to ensure capacity is maintained for future snow events at a cost of up to \$2,000,000 per season. A further \$1,200,000 is also required for the one-time purchase of a stationary snow melter to be installed at a central snow storage facility. Pending further review, additional snow storage sites may be required. Given the current shortage of snow storage sites there is also an inherent risk that regular snow removal to support a sidewalk clearing program may consume so much snow storage space that it would threaten the City's ability to undertake a full-scale removal operation.

To clarify, there is a significant distinction between snow plowing and snow removal. Snow plowing is the immediate post-storm response that is targeted towards clearing the sidewalks of snow and includes the application of a de-icing material. The current mechanical sidewalk clearing program as delivered by Transportation Services costs approximately \$13,500,000. This does not include any snow removal to snow storage sites or on-site melting that may be required. Snow removal typically takes place when snow has accumulated at the roadside to the extent that the width of the roadway is compromised to the point that vehicular or cycling lanes have been narrowed and pose a safety concern. In this context of sidewalk clearing, snow removal to storage sites or melted on-site would be required to maintain the width of the sidewalk to a minimum of 1.2m in the absence of any significant freeze/thaw cycles. The existence of on-street parking would restrict the ability of the sidewalk plow to deposit the snow on the road. If the snow were to be deposited on the road, it would encroach upon the on-street parking area thereby forcing cars further from the curb. Therefore, as indicated above, snow removal by melting or hauling would be a required component of a mechanical sidewalk clearing program aimed at locations in the Toronto & East York District where there is on-street parking.

Achievement of Desired Pavement Conditions on Cycle Tracks and Priority Lanes

There are currently no formal levels of service for winter maintenance on cycling facilities. The current informal level of service is to salt and plow bike lanes to the same frequency as the adjacent general purpose lane. The challenge is to achieve a bare pavement level of service without the benefit of motor vehicle traffic. There is no 'one size fits all' approach to winter maintenance given the range of bicycle infrastructure. What is new is that there is now a 'desired pavement condition' for a bike lane just as there is for the roadway. Staff are proposing a combination of more aggressive salting,

plowing, and snow removal to achieve a bare pavement condition and will use progressive means to best achieve this based on snowfall and temperatures. In principle, this is the same approach that is used for the maintenance of the roadway. A multi-faceted plan is required that will include the following techniques:

1. Repeated targeted salting applications following snow event to break bond between the snow and the pavement (while remaining environmentally sensitive regarding salt usage).
2. Use of a 'slusher' blade to agitate the snow where it has compacted making it easier to plow and to clear away accumulated slush that has been cast into bike lanes by vehicular traffic.
3. Snow removal under cumulative Storm Type 2 or greater conditions (5 – 15cm) in the absence of significant freeze/thaw cycles that promote a natural melting of the snow.
4. Pursuit of pilot projects where appropriate to achieve bare pavement such as the exploration of the use of liquids, other de-icers, or specialized equipment more suited to bicycle infrastructure.

There are no consistent best practices for the maintenance of bicycle infrastructure during the winter months. The levels of service provided to bicycling infrastructure are typically reflective of winter severity and more specifically the amount of snow received and average temperatures experienced by a municipality. This is also true of the levels of service provided to roads.

In cities where the average winter temperatures are consistently below freezing, cycling lanes are maintained by removing loose snow, while leaving a snow packed condition on the travel surface. Provided the surface is not smooth and there is traction, then travel on a hard packed surface can work assuming that the cyclist proceeds at a responsible rate of speed. This approach is acceptable in such winter cities as Winnipeg (Canada), Oulou (Finland), Bodeo (Norway), and Umea (Sweden).

If a city's winter temperatures typically include numerous days where the temperature is above freezing thereby producing significant freeze/thaw cycles then there is an opportunity to achieve a bare pavement condition through the use of salting and plowing operations. With the extreme temperatures of the 2013/2014 winter season standing as an exception, Toronto's average winter daytime temperature typically hovers just slightly below freezing making it an ideal environment for the use of road salt.

Transportation Services has been very successful over the past decade at incorporating the use of liquids into Toronto's winter maintenance program. Manufacturers of roadway salting equipment have made significant advances in technology that have facilitated the requisite precision for optimum application of material. Unfortunately, manufacturers of sidewalk plowing equipment have lagged behind and the use of liquids on both sidewalks and bike lanes where smaller equipment is typically required is not yet widespread.

Toronto will continue to learn from other North American and European cities when it comes to winter maintenance of cycling infrastructure. In addition, Toronto will build on its current successful development of winter maintenance programs for such cycling infrastructure on the Sherbourne cycle track and the Martin Goodman Trail where small sidewalk plows and brooms have been incorporated.

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ATTACHMENTS

Appendix 1 – Sidewalk Snow Clearing Standards in Major Canadian Municipalities

APPENDIX 1
SIDEWALK SNOW CLEARING STANDARDS IN MAJOR CANADIAN MUNICIPALITIES

City	Desired Pavement Condition by Sidewalk Class	Threshold for Plowing by Sidewalk Class	Completion Time for Plowing By Sidewalk Class	Comments
Toronto*	Safe & passable on all class; 90% salt / 10% sand blend is applied to provide traction and melt snow/ice All sidewalks cleared where mechanically possible.	2cm – high pedestrian volume 8cm – low pedestrian volume	13 hrs to complete one round on all road class(approx 4 hr high volume, 9 hr low volume)	Residents responsible for clearing snow on 1,100km of sidewalk under by-law Snow removal (haulage or on-site melting) is an unbudgeted activity.
Montréal	Safe & passable on all class; 50% salt / 50% crushed gravel is applied to provide traction as temperatures are typically too cold for salt All sidewalks are cleared.	2.5 cm for all sidewalk class	14 hrs Manual sidewalk clearing in downtown core	Sidewalk plowing supplemented by frequent snow removal on local roads in old city Snow removal budget is \$110M
Ottawa	Bare pavement when conditions allow on arterial, Safe & passable on local All sidewalks are cleared.	2.5 cm in downtown 5 cm for remaining sidewalks	4 hrs for areas with high concentrations (CBD/Malls/etc...) 12 hrs for most primary sidewalks 16 hrs for most residential sidewalks	Sidewalk plowing supplemented by frequent snow removal on local roads in old city Snow removal budget is \$8M
Winnipeg	Bare pavement in downtown core when conditions allow, Snow packed on remaining sidewalks All sidewalks are cleared.	5 cm for Priority 1 & 2 8 cm for residential sidewalks	36 hrs for most sidewalks 5 days for residential sidewalks	
Calgary	Safe & passable on all class Sidewalks are only cleared on major roads, collectors and bus routes where the sidewalk is not adjacent to private property.	Not specified	4 days after end of snowfall	The owner or occupant of a private piece of land shall remove snow and ice from adjacent sidewalks within 24hrs
Edmonton	Sidewalks are only cleared adjacent to City owned land. Sidewalks adjacent to private property are the responsibility of the property owner.	Not specified	24 hrs (only near transit facilities) 48 hrs (only near city-owned land)	Residents responsible for clearing snow on 3,562km of sidewalk under by-law Snow removal budget is \$5.4M
London	Snow packed on all class	8cm for all sidewalk class	24 hrs	

*Toronto standards represented are for 2015 - 2022