

Mechanical Sidewalk Winter Maintenance Trial

Date: May 10, 2021

To: Infrastructure and Environment Committee

From: General Manager, Transportation Services

Wards: 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 19

SUMMARY

Transportation Services concluded a trial to test the use of new smaller sidewalk snow plows with an enclosed cab that were only recently available in the marketplace. The goal of the trial is to determine whether sidewalk snow clearing could be expanded to include areas of the city that do not currently receive mechanical clearing as part of the City's current winter maintenance program. These areas have previously been excluded because the existing fleet of larger sidewalk plows is unable to safely clear narrow sidewalks with frequent physical obstructions.

The smaller snow plows were tested on nine routes covering 231 kilometres of sidewalks over two winter seasons to observe and document the performance of the machines in a range of snow conditions and street settings.

Based on the information gathered through the trial, Transportation Services has concluded that it is technically possible to expand snow clearing service to include the large majority of sidewalks in the city. The results of the trial and the recommendation to expand the program are presented in this report for City Council's consideration.

RECOMMENDATIONS

The General Manager, Transportation Services recommends that:

1. City Council request the General Manager, Transportation Services, expand the current mechanical sidewalk winter snow clearing service to the remaining approximately 1,300 km of sidewalks currently not receiving this service, effective for the 2021/2022 winter season.
2. City Council request the General Manager, Transportation Services, in consultation with General Manager, Fleet Services to purchase necessary winter maintenance equipment in the approved 2021 – 2023 Fleet Capital Budget to expand the mechanical sidewalk winter snow clearing service.

3. City Council request the General Manager, Transportation Services, to transition the current Seniors or Persons with Disabilities Sidewalk Clearing Program beginning for the 2021/2022 winter season to the proposed expanded and enhanced mechanical sidewalk winter snow clearing service.

4. City Council request the General Manager, Transportation Services, to include all necessary staff and budgets costs associated with the expansion for consideration in the 2022 Budget process.

FINANCIAL IMPACT

Funding of approximately \$5.3 million will be required for equipment to start the partial expansion of this program starting in 2021/2022 winter season and is available in the approved 2021-2030 Fleet Capital Budget and Plan.

Subject to vehicle delivery, the potential staffing requirement for the two months of the 2021/2022 winter expansion of mechanical snow clearing is estimated to be \$362,000 and can be accommodated within existing the approved 2021 Operating Budget for Transportation Services. Further Operating Budget funding of approximately \$4 million annually for additional staff positions, overtime and stand-by expenditures will be required in the 2022 Operating Budget for expansion of this program into the full winter season and will be included for consideration as part of the 2022 Budget process.

The Chief Financial Officer and Treasurer has reviewed this report and agrees with the financial impact information.

EQUITY IMPACT STATEMENT

The actual impact of this proposal on equity-seeking and vulnerable communities is not definitively established, however, equal access improvements to transportation infrastructure resulting from this proposal are discussed within the comments section of this report.

DECISION HISTORY

On January 12, 2021 Toronto and East York Community Council requested the General Manager, Transportation Services, to prepare a budget briefing note to the Budget Committee assessing the cost of providing harmonized snow clearing for the entire City of Toronto for the 2021/2022 winter season for consideration during the 2021 budget process, including an equity lens.

Toronto and East York Community Council requested the Director, Operations and Maintenance, Transportation Services to re-consider the pilot project and trial area of snow clearing for 2021 to include Ward 13, Ward 10 and any other downtown neighbourhoods not included, and to report back in spring 2021 on the operational and Mechanical Sidewalk Winter Maintenance Trial

financial considerations that would be required to expand mechanical and manual plowing on sidewalks, multi-use trails and park pathways to meet the Accessibility for Ontarians with Disabilities Act on a permanent basis in the future.

Toronto and East York Community Council requested the General Manager Transportation Services, in consultation with the Chief Purchasing Officer, to report back to its meeting on February 24th, 2021, on approaches to accelerate the procurement process for mechanical snow clearing equipment, sufficient to clear snow on residential streets to the same standards across the city, to be procured in time for the 2021/2022 winter season.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2021.TE22.15>

On November 25, 2020 City Council requested the General Manager, Transportation Services to seek and implement measures to increase the snow clearing sidewalk pilot for this winter, including the possibility of obtaining more equipment and stretching the hours of service.

City Council requested the General Manager, Transportation Services to report to the December 2, 2020 meeting of the Toronto and East York Community Council with the streets that will receive sidewalk snow clearing during the 2020-2021 winter season, the rationale for not providing full sidewalk clearing harmonization, if applicable, and a path forward to full harmonization for the 2021-2022 winter season for City Council's consideration.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2020.IE17.7>

October 1, 2020 City Council requested the General Manager, Transportation Services provide an update on the Winter Maintenance Program Review that would include but not be limited to: a plan on harmonizing sidewalk clearing standards for neighbourhoods in Midtown, East York and the downtown core, equipment procurement, and a budget impact assessment to the October 6, 2020 Infrastructure and Environment Committee Meeting.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2020.MM24.23>

On October 17, 2019 City Council requested a report directly on:

- a) the feasibility of implementing the enhanced mechanical sidewalk clearing pilot as recommended by HDR Consultants in the Winter Maintenance Program Review.
- b) the number of kilometres of sidewalk proposed to be cleared as part of the staff proposed pilot project
- c) the possibility of enhanced snow clearing in bike lanes:
 1. after the first 48 hours
 2. use of brushes and more narrow plows
 3. the removal of parked cars to clear parking spaces adjacent to bike lanes.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.IE8.6>

At its meeting on March 7, 2019 City Council requested the General Manager, Transportation Services to include the following items in the winter maintenance review:

- a. cost and considerations for the delivery of enhanced snow clearing on:
 - i. sidewalks on residential streets in every neighbourhood in Toronto;
 - ii. pathways in Parks; and
 - iii. enforcement of parking that obstructs Toronto Transit Commission and bike lanes; and
- b. cost of increasing the amount of snow removal City-wide

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.EX2.5>

COMMENTS

Winter Maintenance Services Review

In March of 2019, City Council requested Transportation Services conduct a comprehensive review of its winter maintenance services program to ensure that the City is providing reliable, cost-effective and equitable winter clearing services to maintain a safe and reliable transportation system during the winter season.

Transportation Services procured HDR Inc. consultants to conduct a winter maintenance services review and provide recommendations to improve it, where needed. Public polling was also conducted as part of the review and found that the level of service of winter maintenance on roadways, bikeways and sidewalks generally matches or exceeds that of other cities in the Greater Toronto and Hamilton Area, and that a majority (57%) of residents polled are satisfied with the winter maintenance services provided in Toronto.

HDR Inc. recommended Transportation Services conduct a trial to test the feasibility and effectiveness of using new and smaller equipment to clear narrower sidewalks.

Current Sidewalk Snow Clearing Program

Transportation Services mechanically clears snow from sidewalks in most areas of the City, where existing contractor's snow plows are able to navigate sidewalks to physically clear the snow. Transportation Services oversees 15 contracts that provide snow clearing and salting of sidewalks with 237 sidewalk machines. Sidewalk clearing services are provided on about 6,070 km of the total 7,300 km of sidewalks by the City's contractors.

Approximately 1,230 km, of sidewalks are not mechanically cleared of snow and ice by the City's existing contractors, which is mapped out in Appendix A. Under the current program, the City does not provide mechanical sidewalk clearing if:

- The sidewalk is too narrow for current contracted equipment. Unserved sidewalks are approximately 1.3 to 1.5 metres wide

- The sidewalks contains obstacles, such as utility poles;
- There is limited space to store snow cleared from the sidewalk (such as the presence of parked cars immediately adjacent the sidewalk); or
- There are encroachments from private properties (such as retaining walls or fences) that could be damaged by sidewalk plows.

2020-2021 Sidewalk Snow Clearing Trial

When new smaller sidewalk plows became available, Transportation Services began a Sidewalk Snow Clearing Trial in February 2020. Nine plows were purchased and used during the trial.

The trial included sidewalks in Wards 4, 8, 9, 11, 12, 14 and 19. Nine routes were designed to primarily capture locations on the *Senior or Persons with Disabilities Sidewalk Clearing Program*. Although the trial focused on clearing houses enrolled in the aforementioned program (1,731 houses), operators possibly cleared the entire length of sidewalk on the effected block. This allowed for a greater length of sidewalk to be cleared continuously on each block.

The routes were also designed to be representative of the sidewalks that currently do not receive mechanical clearing. The routes included characteristics such as narrow widths, on-street parking and obstructions to enable staff to properly evaluate the equipment and understand the challenges with mechanically clearing snow on unserved sidewalks. Appendix B illustrates the nine trial routes. The routes were posted on the City of Toronto winter web page at www.toronto.ca/snow. The routes, along with background information, were also provided to 311.

The trial amounted to 231 kilometers of sidewalk that are sufficiently representative of the variety of conditions to effectively evaluate the equipment. The trial was designed to achieve the following:

- Evaluate the estimated speed and performance of the new sidewalk machines;
- Determine if the new plows can clear the narrow sidewalks mechanically;
- Determine the rate of accomplishment from the machines;
- Determine how many machines would be needed to mechanically clear snow on the remaining 18 percent of sidewalks;
- Determine how many staff would be needed to operate machines for an expanded program and satisfy the Council approved Levels of Service; and
- Calculate the Capital and Annual Operating Budget costs for an expanded program.

Staff used the information from the trial to answer the above subjects to determine whether it's feasible to expand mechanical sidewalk plowing on a permanent basis.

2020-2021 Sidewalk Snow Clearing Trial Equipment, Methodology and Results

The sidewalk plows used during the trial were the Holder x45i with a 1.27 metres width, and a power unit of 44 horse power (this particular size cannot accommodate a stronger power unit). Each plow was equipped with an enclosed driver's cab, calibrated salt spinning mechanism, variable plow blade, Global Positioning System (GPS) device and an outward facing on-board camera. The plows were accompanied by "nurse" pick-up trucks, which replenished the salting mechanisms and assisted the plow operators serving as "spotters" to ensure safe passage through the routes.

The sidewalk clearing trial began in early 2020 and continued through the 2020-2021 winter season to gather sufficient and relevant information that would best assess the effectiveness and appropriateness of the new sidewalk machines.

Each plow was assigned two routes ranging from 10-15 km of sidewalk and were deployed whenever two centimetres (2 cm) of snow accumulated, in accordance with the current service levels to activate current contracted sidewalk plows. The plows operated during daylight hours, so that operators can easily identify obstacles and safely navigate through narrower spaces.

For every snow event the operator applied salt using a calibrated spinning mechanism and cleared the snow using an articulating plow. Each route took approximately 7-10 hours to complete in light snow (less than 5cm) and approximately 12 hours during a heavy snowfall (10cm or more). Each activation was video recorded and documented on how the plow performed, identifying route and mechanical challenges.

Between February 2020 and March 2021 the trial sidewalk plows were deployed for 16 separate events. The majority of the trial winter events received between 2 to 6 cm of snow accumulation. On February 15 and 16 2021, approximately 10-15 cm of snow accumulated, which presented the most challenges.

Based on the trial performance from the 16 winter events, snow was successfully cleared on 90 percent - 208 km of 231 km - of the trial sidewalks and did not present insolvable challenges, while 23 km of sidewalks could still not be navigated by the new plows to clear the snow and ice (see Appendix C for map of passable and non-passable sidewalks). The following ongoing issues presented pinch points preventing the plows to proceed beyond the obstructions:

- Narrow sidewalks;
- Utility and sign posts;
- Encroachments (legal and possibly illegal) such as retaining walls, fences and gates;
- Fire hydrants;
- Mail boxes;
- Overgrown trees and shrubs; and
- Vehicle obstructions from on-street parking.

See Appendix D for images of passable and non-passable sidewalk. The non-passable sidewalks remained un-serviced, with the exception of Senior and Persons with Disabilities Program locations where the snow was manually cleared. There were a few occasions where damage occurred to property such as a scratched/dented vehicle and broken encroachment (wall). On the non-passable sidewalks the operators attempted to reverse to the nearest driveway or opening where they can exit safely, however this manoeuver proved dangerous and will not be recommended for future operations.

The plows were not able to navigate the sidewalks and clear the snow on the neighbourhoods' designated waste collection day. The waste bins occupied a significant portion of the sidewalk thus rendering the sidewalk much too narrow for even the new smaller machines (Please see Appendix E). For this situation staff will have to return either later in the day or the next day, after the waste bins have been removed by the home owner, to mechanically clear the snow.

A small segment of the above-mentioned issues and obstructions (approximately 2 percent) may be alleviated through enforcement of illegal encroachments and relocating sign posts, thus creating a passable sidewalk for mechanical winter clearing.

In addition to the aforementioned operational issues, a few plows experienced mechanical issues especially during the heavy snowfalls, such as lack of power, lack of traction, failed hydraulic systems and uncomfortable cabs. These issues may be addressed through a procurement process with the plow manufacturer.

Sidewalk Inventory Study

In 2020 Transportation Services staff retained CIMA Plus Consultants to assess and conduct an inventory of sidewalks that are currently not mechanically cleared as part of the City's winter maintenance program. The two objectives of this study were to:

- obtain an inventory of sidewalks that can and cannot be successfully passed by the sidewalk machine specified; and
- create a list of sidewalk encroachments for sidewalk locations that cannot be safely passed by the machine.

The study was undertaken in the summer of 2020 by a consultant team that collected sidewalk data and measurements. Concurrently, City staff tested the small mechanical sidewalk plows within the study areas as an initial assessment of areas that would be difficult to navigate during a winter event. The comprehensive data collected through these efforts included sidewalk segment lengths, widths, encroachments at private properties such as planters and retaining walls and other obstructions such as utility poles, street furniture and adjacent on-street parking.

Using the trial results and the information collected in this study, staff developed a dataset and mapping platform to assess the feasibility of adding the new smaller sidewalk equipment to all the sidewalks that currently do not receive mechanical sidewalk clearing and conduct operational, resource and financial analyses for an expanded program. Transposing the trial results into the study dataset and staffs, the City can feasibly provide mechanical sidewalk winter services to 91 percent of the Mechanical Sidewalk Winter Maintenance Trial

approximately 1,230 kilometres of sidewalks not receiving mechanical sidewalk winter clearing services, which is demonstrated in Appendix F. The 9 percent of sidewalks still not able to receive mechanical snow clearing will be served manually by City staff, likely using electric snow blowers.

Expanded Mechanical Sidewalk Winter Program Benefits

If approved by City Council, mechanical sidewalk snow clearing would be provided on most sidewalks across the city from December to March, once there is a minimum accumulation of 2 cm of snow.

Expansion of the program would allow the City's sidewalk clearing service to be provided equitably across all areas of the city. Expanded sidewalk clearing would benefit people who walk and people who use mobility devices to travel in older areas of the city, as well as residents who are currently required to clear snow from the sidewalk in front of their property.

If the program is expanded, a small portion of sidewalks would not be cleared due to obstacles that prevent mechanical plows from progressing along their route. In some cases, property owners may address obstacles by removing private objects, such as fences and landscaping features, located on City-owned property in order to allow snow plow machines to pass safely.

Equal Access to Transportation Infrastructure Considerations

Geographic Equity

Under the current snow clearing program, the City does not provide mechanical sidewalk clearing to areas in which the sidewalk width is too narrow, space is inadequate to store cleared snow, or sidewalk plows could damage private properties encroachments. This sidewalk trial contributes to geographic equity and ensures equitable mobility opportunities for all by focusing on geographic areas in the city that do not currently receive mechanical sidewalk snow plowing services.

Social Equity

(1) Vulnerable Populations: Seniors and People with Disabilities

This sidewalk trial will bring mechanical clearing to areas that serve seniors and persons with disabilities who have applied to and are eligible to be included in the City's *Seniors or Persons with Disabilities Sidewalk Clearing Program*. According to a research conducted by Parachute Canada and funded by the Public Health Agency of Canada ⁽¹⁾, falls are a leading cause of injury-related hospitalizations among adults aged 65 years and older and in Canada, more than 1.6 million seniors fall each year. Close to 20% of seniors die within one year of a fall. Unplowed sidewalks in winter is a recognized slipping hazard that may contribute to falls among seniors and people with disabilities. A sidewalk trial targeting area serving these two vulnerable groups helps to save lives and minimize unintentional injuries, especially for those in greatest need.

(2) Toronto's Neighbourhood Improvement Areas

Approximately one fifth of the sidewalk trial locations fall within Toronto's Neighbourhood Improvement Areas (NIAs). Created by the Social Development and Financial Administration (SDFA) division, NIAs represent the most equity-seeking and marginalized neighbourhoods in Toronto. These neighbourhoods were identified by considering five different domains of neighbourhood wellbeing, including economic opportunities, social development, civil engagement, healthy lives, as well as natural and built environments. These affected NIAs that are within the sidewalk trial locations benefit from the removal of trip hazards that could otherwise endanger pedestrians and other vulnerable road users living in and passing through these equity-seeking neighbourhoods.

Equipment Resources

The expanded program will begin once the City is able to acquire a fleet of new smaller plows, which may partially be fulfilled prior to the 2021/2022 winter season. Mechanically clearing snow on approximately 1,111 kilometres of narrow sidewalks will require a fleet of 59 sidewalk plows (53 operating and 6 spares). Transportation Services have purchased 9 plows for the trial, therefore 50 machines need to be obtained. Sufficient funding exists within the Transportation Services Fleet Replacement Reserve Fund XQ1015 for the Division to purchase the necessary winter maintenance equipment.

The City's Fleet Services Division has two open contracts to supply sidewalk plows with the required specifications to successfully navigate through narrow sidewalks. At least 20 units (potentially more) can be supplied for the upcoming 2021/2022 winter season and the remaining units will be supplied for 2022/2023 winter season if purchase orders can be completed in weeks of City Council approval.

In addition to the sidewalk plows 17 pick-up trucks will also be purchased to serve as "nurse" trucks to replenish salt supplies and deliver snow blowers to the sidewalks still unable to receive mechanical snow clearing. The purchase of the aforementioned 17 vehicles can be accommodated by funds within the above-mentioned Transportation Services fleet reserve.

Staffing

Seasonal staff to deliver this program in the winter months will be shared with Parks, Forestry, and Recreation Division for summer maintenance. The staffing requirement for the two months of the 2021/2022 winter expansion of mechanical snow clearing will be accommodated within the existing approved 2021 Operating Budget. Two shifts per day employing 86 staff will be organized with plow operators and "nurse" truck staff, with overtime and weekend stand-by periods used to ensure staff are available 7 days a week, 24 hours per day, to match the City's service levels for mechanical sidewalk winter maintenance contracted.

Seniors or Persons with Disabilities Sidewalk Clearing Program

The City has a sidewalk manual snow clearing program for seniors and persons with disabilities residing in areas where mechanical snow clearing is not possible. This service is provided free of charge and an application form must be completed and submitted accompanied with a doctor's certificate to be eligible for the program. There are currently 8,157 addresses enrolled in the program.

The current eligibility requirements are as follows:

- Resident owner or tenant/occupant of a one or two family dwelling;
- Over the age of 65 (proof of age is required i.e. photocopy of a driver's licence, health card or passport); or,
- Under the age of 65 and have a physical disability with proof of disability required (i.e. photocopy of accessible parking permit or doctor's note).

In order to be eligible to receive manual sidewalk clearing services, residents must also confirm that there are no relatives under the age of 65 that reside at their address unless the relative(s) has a physical disability.

The proposed program will transition these locations and residents to the new expanded mechanical sidewalk snow clearing service. Service to participants in the program will actually be enhanced as plows are deployed at 2cm snow accumulation, whereas the current program services the addresses when the snow fall ends. The Seniors or Persons with Disabilities Sidewalk Clearing program will help inform the proposed expanded mechanical sidewalk snow clearing service.

Transportation Services paid an annual Interdivisional charge of approximately \$1.5 M to Solid Waste Management Services for their staff service to execute the Seniors Program. This annual cost will now be eliminated however, Transportation Services will discuss with Solid Waste Management Services the possibility of engaging their staff for other winter maintenance activities at a rate to be negotiated.

Public Engagement

Given the high level of interest from residents and the broader public in the trial, Transportation Services and the Public Consultation Unit organized four virtual public information events in May to provide an update on the status of the trial and communicate some of the key observations gathered through the project. Approximately 143,000 notices were mailed to houses in areas of the city that do not currently receive mechanical sidewalk clearing, including houses along the nine trial routes, informing them of the virtual information events. City staff also notified local resident and ratepayers associations and other known stakeholder groups of the sessions via email. The events were open to the general public. Each meeting included a presentation by staff followed by a Question & Answer period. Information gathered from these sessions will be used to further assess issues concerning sidewalks that still remain unviable to mechanically service and to develop education and communication Mechanical Sidewalk Winter Maintenance Trial

campaigns. The presentation materials and information about the trial were made available through the City of Toronto web site.

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ATTACHMENTS

Appendix A: Map of Sidewalk Locations Currently not Receiving Mechanical Winter Maintenance

Appendix B: Map of Sidewalk Trial Beats 1-9

Appendix C: Map of Sidewalk Trial Operational Results

Appendix D: Images of Passable and Non-passable Sidewalks

Appendix E: Image of Waste Collection Bins

Appendix F: Locations that are Passable and Non-passable for Mechanical Winter Maintenance