

Mechanical Ice Breaker for Winter Sidewalk Maintenance 2020-2021 Pilot Project Update

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Recommended by:	General Manager of Growth and Infrastructure

Report Summary

This report provides a recommendation regarding the status of the mechanical ice breaker winter sidewalk maintenance pilot project.

Resolution

THAT the City of Greater Sudbury directs staff to continue the pilot project for mechanical ice breaking on winter sidewalks through the 2021/2022 winter season, as outlined in the report entitled “Mechanical Ice Breaker for Winter Sidewalk Maintenance 2020-2021 Pilot Project Update”, from the General Manager of Growth and Infrastructure, presented at the Operations Committee meeting on July 12, 2021.

Relationship to the Strategic Plan, Health Impact Assessment and Community Energy & Emissions Plan (CEEP)

A pillar of the Strategic Plan 2019 – 2027 is the Asset Management and Service Excellence strategic initiative. One of the key principles of this initiative is to continually look for innovative and cost-effective approaches for the operational services staff deliver each day. Utilizing this continuous improvement approach ensures Linear Infrastructure Services provides efficient, high quality operational activities that meet the needs of residents and supports how they work, live and play in Greater Sudbury. As well, accessible winter sidewalks will encourage more residents to utilize active transportation rather than use motorized vehicles to get to their destination, which is consistent with the objectives of Greater Sudbury's Community Energy and Emissions Plan (CEEP).

Financial Implications

Annual operating costs are estimated to be \$38,155. For the purpose of the pilot project, approximately \$13,354 will be expended in 2021 with these costs forming part of the 2021 year-end position if the pilot is continued. The remaining estimated costs of \$24,800 would be realized in 2022 and would be included as a one-time expenditure in the operating budget should the resolution be accepted. The 2021 expenditures are unbudgeted and could decrease the forecasted 2021 surplus, if approved. These costs could be offset if favourable weather conditions are realized during the 2021/2022 winter season. As this is a pilot project for an enhanced level of service, the costs are incremental to the organization.

Background

Current Service Levels

Winter sidewalk maintenance involves plowing and sanding sidewalks to reduce slip hazards and provide a smooth surface for sidewalk users. Roads maintenance staff are responsible for maintaining approximately 350 kilometers of sidewalks across the City each winter season with a target level of service of a snow packed, sanded surface.

This maintenance activity is performed by Municipal Tractors (MT's) which operate with a straight plow or snow blower and sander depending on weather conditions, and are capable of maintaining up to a 1.5 m sidewalk width. Sidewalk plowing begins once 8 cm of snow accumulation occurs or icy conditions are detected. The City has 4 - 24 hours after a snow event has ended to complete this service standard during typical winter storms. Snow accumulation on sidewalks is generally cleared with a single pass. During periods of non-snow/ice events, sidewalks are patrolled and are spot plowed and/or sanded as necessary to ensure the sidewalk is passable for users.

In recent years, there has been an increase in significant temperature fluctuations and varying weather conditions. In the winter months, this can result in melting conditions throughout the daytime, changing to freezing conditions overnight. This causes the snow packed condition on the sidewalks to become soft, with traffic causing the surface to become irregular. When freezing conditions occur over night, this freezes the snow in the irregular surface condition.

With the current service level for sidewalk winter maintenance and the equipment the City utilizes for sidewalk snow plowing, once this irregular surface condition begins to form on the sidewalk, it is extremely difficult to return to a smooth condition.

Pilot Project Background

In late 2019 staff completed a demonstration of the mechanical ice breaker attachment on a sidewalk plow. This demonstration was performed on a City sidewalk with successful results. In February 2020, the Operations Committee was presented with a report and presentation entitled "Winter Control Operations Update", in which photographs, and a brief video of the demonstration was shown. Subsequent to the presentation, the Committee passed resolution OP2020-04, directing staff to prepare a report regarding the use of ice breaker attachments for municipal tractors.

In September 2020, staff prepared a report entitled "Mechanical Ice Breaker for Winter Sidewalk Maintenance – Pilot Project" that requested approval to purchase a mechanical ice breaker to support a pilot project. Operations Committee supported the request and passed the Resolution #OP2020-22.

In October 2020, staff returned to Operation Committee with a supplemental report to the "Mechanical Ice Breaker for Winter Sidewalk Maintenance – Pilot Project" report that would consider options to expand the use of the ice breaker technology to some additional sidewalks. Operations Committee supported Option # 1 in the report to add an additional sidewalk route in the downtown area to the pilot project and passed Resolution #OP2020-25

Pilot Project - Approach

The goal of the proposed pilot project is to assess the effectiveness of a mechanical ice breaker for clearing ice and snow pack from the sidewalk and validate the operational cost estimate to provide this service. The pilot project will allow staff to determine whether the operational cost estimate is reasonable. It will also enable staff to determine the actual sidewalk conditions in which this equipment is appropriate to be used and the amount of time this equipment will be able to be utilized in a winter season. This data will provide a basis to complete a more accurate cost estimate in order to review the purchase of additional mechanical ice breakers in the future and if the program should be expanded.

An original commitment to ensuring the success of the pilot project was to enhance communications with residents, sidewalk users and monitor the public's perception of the enhanced service. Staff held a media event in December 2020 to introduce the mechanical ice breaker to local media and discuss the pilot program. Staff also met with the Downtown BIA to discuss a feedback program from business owners and patrons on their impressions of the enhanced sidewalk maintenance service. This type of community engagement and communication will continue if the pilot project is extended into the 2021/2022 winter season.

Pilot Project – 2020/2021 Update

The intent of the mechanical ice breaker attachment is to break up the snow pack and ice layers that build up on a sidewalk from plowing with existing equipment. This layer needs to be a sufficient thickness that the “teeth” on the ice breaker can break through the layers. If there is not sufficient depth, the ice breaker attachment will not have enough snow or ice to break into and will only drive along the sidewalk surface. The proposed locations in the pilot project to utilize the mechanical ice breaker attachment did not have sufficient measurable snow pack this winter season. The sidewalks under normal service levels were maintained to minimal snow pack with partial bare conditions.



Photo 1 - Larch Street, Downtown Sudbury
February 3, 2021

Staff utilized the equipment on area sidewalks with measurable snow pack. These sidewalk locations include Southview Drive, Kelly Lake Road and Rushbrook Crescent in Chelmsford.



Photo 2 - Measurement of Snow Pack on Sidewalk
Rushbrook Crescent, Chelmsford



Photo 3 - Sidewalk Condition Prior to Utilizing the
Mechanical Ice Breaker Attachment



Photo 4 - Sidewalk Condition After Utilizing the Mechanical Ice Breaker Attachment

Staff observed the following:

1. That the attachment was effective at widening the sidewalk width, bringing the snow pack surface to a consistent width across the sidewalk.
2. Because the attachment has spikes or “teeth” that crush or “scarify” the snow pack and ice surface the snow pack needs to be deeper than the length of the “teeth” to work effectively.
3. Photo 4 shown above illustrates the sidewalk condition after the utilizing the mechanical ice breaker but before the final pass required with an MT with a blade. Because neither the teeth of the ice breaker or the blade of the sidewalk plow scrape the sidewalk surface directly, using this equipment will not result in bare sidewalk conditions.

The total snow accumulation for the 2020/2021 winter season was 1.7 meters or 5.61 feet compared to the 10-year average of 3.2 meters or 10.39 feet. This represents a 46% decrease. As a comparison, the total snow accumulation for the 2018/2019 winter season was 3.94 meters or 10.0 feet and the total snow accumulation for the 2019/2020 winter season was 3.38 meters or 8.59 feet.

The lower than average snowfall and the overall favourable weather through the 2020/2021 winter season resulted in less snow pack on the City’s sidewalks than in previous years and therefore was insufficient to complete a successful pilot program for a mechanical ice breaker attachment on a sidewalk plow.

Financials

2021 Actual Pilot Project Costs

Labour	\$2,265
Equipment	\$2,292
Fuel	\$105
Total Operating Cost	\$4,662

The original operational estimate was based on an assumption that the ice breaker attachment will be required 25% the time over the course of a winter season, on two sidewalk routes in the downtown core. This estimate will be maintained for the 2021/2022 winter season.

As the 2020/2021 pilot project was impacted by favourable weather conditions, the same logic for estimating costs will be applied to the proposed 2021/2022 pilot project with updated unit rates.

2021/2022 Proposed Continued Pilot Project Budget

Labour	\$33,907
Equipment	\$2,750
Fuel	\$1,498
Total Operating Cost	\$38,155

It is estimated that incremental operating costs for the period of November and December, 2021 will be \$13,354. This service enhancement is currently not included within the 2021 budget and any overage as a result of this service enhancement would be included in the year-end position. The estimated incremental operating costs for the period of January to April, 2022 are \$24,800 and would be included in the 2022 operating budget if approved by subsequent resolution.

Conclusion and Next Steps

It was evident during our initial demonstration in 2019 that the sidewalks maintained with the mechanical ice breaker had a smoother surface and that sidewalks were returned to full width and had less ice/snow pack after they were treated with this attachment. Staff continued to see positive results using the equipment in 2020/2021 winter season.

Although the weather and snow accumulation this winter season was not conducive for the pilot project, with the significant snow accumulation in previous years and the challenges that exist for sidewalk winter maintenance in those years, staff recommends moving forward with the pilot project for another winter season.

Resources Cited

1. Operations Committee Report dated February 10, 2020 titled "Winter Control Operations Update"
<https://pub-greatersudbury.escribemeetings.com/filestream.ashx?documentid=1081>
2. Operations Committee Report dated September 14, 2020 titled "Mechanical Ice Breaker for Winter Sidewalk Maintenance – Pilot Project"
<https://pub-greatersudbury.escribemeetings.com/filestream.ashx?documentid=39212>
3. Operations Committee Report dated October 14, 2020 titled "Mechanical Ice Breaker for Winter Sidewalk Maintenance Pilot Project - Supplemental Report"
<https://pub-greatersudbury.escribemeetings.com/FileStream.ashx?DocumentId=38962>