

**THE CORPORATION OF THE TOWN OF GEORGINA**

**REPORT NO. OI-2023-0005**

**FOR THE CONSIDERATION OF  
COUNCIL**

July 12, 2023

**SUBJECT: WINTER MAINTENANCE SUMMARY 2022/2023**

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**1. RECOMMENDATION:**

- 1. That Council receive Report No. OI-2023-0005 prepared by the Operations Division, Operations & Infrastructure Department dated July 12, 2023, regarding Winter Maintenance during the 2022/2023 season;**
- 2. That Council formally endorse the use of a 100% pre-treated salt mix on all paved, urban roads as a best practice as determined by the Winter Material Trials;**
- 3. That staff update the salt management plan in accordance with this endorsement;**
- 4. That Council endorse the revised Winter Control Reference Guide; and**
- 5. That, understanding the Town of Georgina's proximity to Lake Simcoe, that alternative treatment methods to reduce salt application be explored.**

**2. PURPOSE:**

To provide a summary of the 2022/2023 highways, sidewalks, and windrows winter maintenance season operations and to obtain endorsement of operational best practice for treatment of municipal roads.

**3. BACKGROUND:**

**Sidewalks**

The Town is required to patrol and maintain sidewalks in accordance with O.Reg. 239/02 Minimum Maintenance Standards for Municipal Highways. The Town strives to exceed these standards by using a combination of in-house and contracted services for patrolling and treating the Town's 117km sidewalk network.

Table 1 highlights the sidewalk operations from 2022/2023 winter season:

	<b>Sidewalks</b>
Number of Routes	4
Average length of Routes (km)	29.25
Material Mix (Sand:Salt)	7:3
Number of deployments	149
Sand (Tonnes)	232.1
Salt (Tonnes)	99.5
Average route completion (hours)	8.9

*Table 1: Sidewalk Winter Maintenance Highlights from 2022/23*

A material mix of 7 parts sand and 3 parts salt (7:3 mix) is used on sidewalks. This is used as sidewalks do not receive the same traffic that roads do, and thus sand will remain in place and allow grit for pedestrians to aid in traction. Sidewalks receive an application rate of 89kg per KM during treatment. Establishing a defined application rate promotes uniformity across the town and mitigates risk associated with any perceived negligence or operator error. Increased application rates are applied as necessary in high-pedestrian areas inclusive but not limited to School Zones, Intersections, and Crosswalks. Material bins were placed at crosswalks prior to the 2022/2023 season with an overwhelmingly positive response.

## Highways

The Town is required to patrol and maintain highways in accordance with O.Reg. 239/02 Minimum Maintenance Standards for Municipal Highways. The Town strives to exceed these standards by using a combination of in-house and contracted services for patrolling and plowing the Town's 720 single-lane kilometers of road.

Unassumed roads that require winter maintenance based on resident occupancy account for approximately 25 single-lane kilometers. Table 2 outlines a summary of highway winter maintenance from the 2022/23 winter season.

	<b>In-house (Rural and Semi-urban)</b>	<b>Contracted (Urban)</b>
Total Kilometers	233	126
Number of Deployments	194	234
Sand (Tonnes)	2,134.9	141.2
Salt (Tonnes)	713.4	2,162.1
Average route completion (hours)	6	6

*Table 2: Highway Winter Maintenance Highlights 2022/23*

## Windrows

The Windrow Snow Clearing Program runs concurrently during winter maintenance operations using a combination of in-house administrative resources, and contracted plowing services, for eligible applicants. This program utilizes online applications for applicant intakes as well as contractor monitoring.

Resources are deployed when there is snow accumulation of 7.5 cm or greater. Staff take in-field measurements in East (Pefferlaw), Central (Sutton), and West (Keswick) locations to understand regional needs and deploy contracted staff if the accumulations meet the threshold.

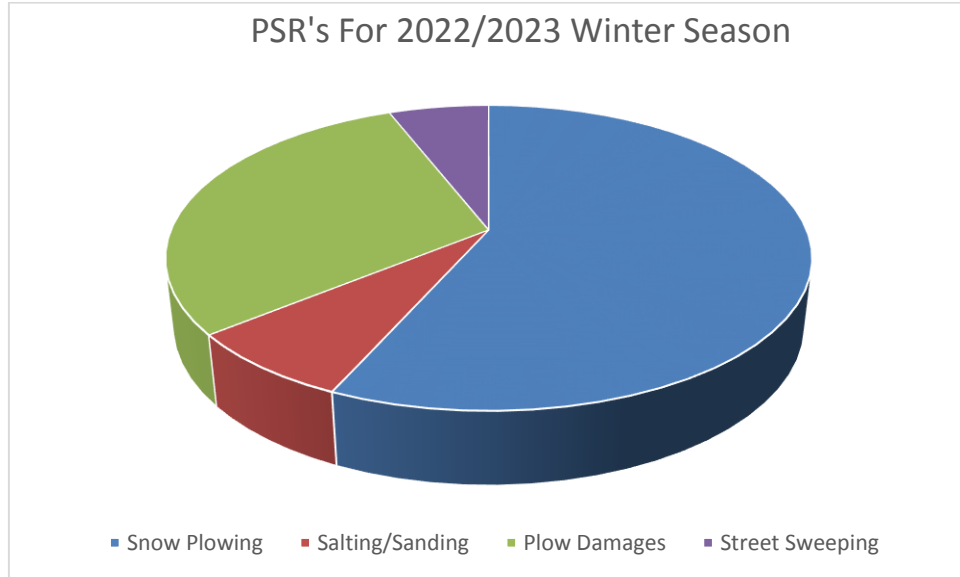
Windrows are cleared within 24 hours following completion of the Highway and Sidewalk deployments. Table 3 outlines the summary of the 2022/23 windrow program. Based upon historical meteorological data, the expected # of threshold events is 14. In 2022/2023, only 5 events, or 36% of the expected number, were deployed. The 2022/2023 season had extremely variable temperatures and precipitation, including the lowest total snowfall in the past 5 years, not of benefit to the deployment threshold.

2022/2023 Windrow Program	
Number of driveways	341
Number of windrow events	5

*Table 3: 2022/23 Windrow Clearing Program highlights 2022/23*

## Customer Service

All inquiries, requests, and concerns are addressed promptly throughout the winter season. Staff document and follow up through WorkTech software. The data collected allows staff to analyze and potentially modify operations to better support residents. Graph 1 depicts the distribution of Public Service Requests in relation to Winter Maintenance. Most inquiries are regarding snow plowing, specifically relating to snow storage or timing of operations. This summary includes sidewalks, highway and window clearing programs.



*Figure 1: Distribution of PSRs in Relation to Winter Maintenance*

Grass and boulevard restoration are a level of service that the Town provides to vegetative areas adjacent to the roads and sidewalks that have been damaged due to winter maintenance activities. Residents can fill out an online form or contact Service Georgina for damages to be logged and mapped for restoration. All damages were restored by Operations staff and winter maintenance contractors before May 14, 2023.

### **Winter Control Guide**

The Winter Control Reference Guide is a great resource for residents to better understand operating practices used throughout the winter season. These practices include how and where we perform winter maintenance, what happens when the Town is impacted by winter weather and other items relating to the above operations including material handling/storage, fleet maintenance and resident concerns. Operations reviews this resource annually to ensure the most current information is being presented to the public.

### **Contracted Services**

Staff are consistently monitoring to improve the winter maintenance contracted services. Over the last winter season, staff assessed the work completed by contractors to ensure contract compliance. Recent enhancements to the AVL/GPS system allowed staff to monitor all winter operations and easily hold contractors accountable for deliverables that did not meet contractor compliance. Through documented liquidated damages, downtime (unjustified stops), and operating holdbacks; staff applied a 4.5% recovery of the total awarded fees for winter maintenance contracted services.

Other non-technological measures that assist in contractor performance management include regimented biweekly meetings, operator competency tests, and regular equipment maintenance by contracted staff. Overall, communication and accountability improved over the course of the season and staff expect this trend to continue in future years.

### **Winter Materials Trials**

On May 30, 2018, council received report OI-2018-0006 which outlined a number of service improvements related to Winter Road Maintenance, including the change in sand/salt ratio from 9:1 to 7:3 in an effort to improve service level and minimize abrasive application tonnage (salt and sand). Although the material mix provided inconsistent results, a pre-treated highway coarse rock salt (“Thawrox”) was implemented at a similar time. This product activates quicker, and lowers the freezing point of water, resulting in a greater range of effective temperatures. This product is still in use today.

On November 18, 2020, Council received report OI-2020-0025 prepared by the Road Operations Division, regarding winter maintenance service levels for Town roads. The newly established Winter Control Guide for 2020/2021 outlined the Operation Division’s operating practices, including an intended use of 100% Thawrox® material on select trial roads in Keswick. The purpose of these trials was to analyze the benefits of using a higher *concentration* of salt, intending to realize a reduction in the *amount* of sand or salt applied on roadways, while continuing to provide the same, or improved, level of service.

Following the success of the initial Winter Materials Trials during the 2020/2021 winter season that are detailed in report OI-2021-0007, Council extended the trial allowing staff to analyze the benefits of applying 100% Thawrox® salt on all paved urban roads throughout Georgina. The extended trial took place over 2021/2022 and 2022/2023 winter seasons. Complete results of the trial are summarized within the Analysis.

## **4. ANALYSIS:**

### **A. WINTER MATERIALS TRIALS – DATA COMPARISON**

To accurately compare the Winter Materials Trial with previous years, data was compiled back to the 2019/2020 season, being the season prior to the trials as described above. This season is referenced as the benchmark season. The seasons were then compared by focusing on the key categories shown below:

#### **I. Weather Data – *how do the trial seasons compare with the benchmark?***

Daily reporting data provided by Environment Canada was used to ensure accuracy. The Town references Baldwin weather station (ID 6110480) as a

reliable station, central to Georgina. Table 4 includes the meteorological data comparisons for the past five winter seasons.

	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
Lowest Temperature (°C)	-27.5	-29.5	-27.0	-34.0	-23.5
Highest Temperature (°C)	16.0	16.0	24.0	19.5	13.5
Total Snowfall (cm)	163.0	171.6	158.4	208.8	144.0
Total Rain (mm)	120.2	123.0	121.0	72.0	154.8
Average Mean Temperature (°C)	-3.6	-1.3	-1.2	-3.0	-2.3
Total Weather Events (>1cm/day)	25	37	24	33	24
Major Weather Events (>15cm/day)	3	3	5	3	2

**Table 4: Weather Comparison Fall 2018 to Spring 2023**

The 2021-2022 season was very demanding with 208cm of snow (21% increase from 2019-2020) and colder temperatures than previous years. When comparing snowfall with the number of events, 2021-2022 also experienced more concentrated weather events than the previous three seasons.

The 2022-2023 season was mild with 144cm of snow (lowest of the five-year comparison) but more freezing rain events. When comparing snowfall with the number of events, this past season had the same average snow fall per event as 2021-2022. This information sets the stage for understanding winter severity as compared with the benchmark season.

**II. Deployments – Did the Town reduce the number of deployments while providing the same or better level of service?**

A total of 420 deployments from winter events were recorded in 2021/2022 compared to the 462 deployments in 2019/2020. This equates to a 10% decrease in deployments, while still providing a higher level of service (more bare pavement, reduced circuit times), during a season with 21% higher overall snow accumulation.

For 2022-2023 winter season, a total of 428 deployments were recorded in response to weather events. Freezing rain events throughout the season increased the total deployments from the previous season, however, total deployments still decreased from the 2019/2020 benchmark by 8%.

**III. Material Type – What benefits does pre-treated salt have that sand doesn't?**

Thawrox® is a pre-treated highway material that activates quicker, stays on the road longer (reduces bounce) and has a lower operating temperature capacity (-17 C compared to untreated salt -9 C). The hypothesized outcome of this material trial was to reduce the amount of material on Town roads, and increase efficiency by eliminating the extensive seasonal preparation, impact to stormwater systems and subsequent clean-up required of sand.

**IV. Material Mix – Does the change in mix increase the amount of material used compared to the benchmark?**

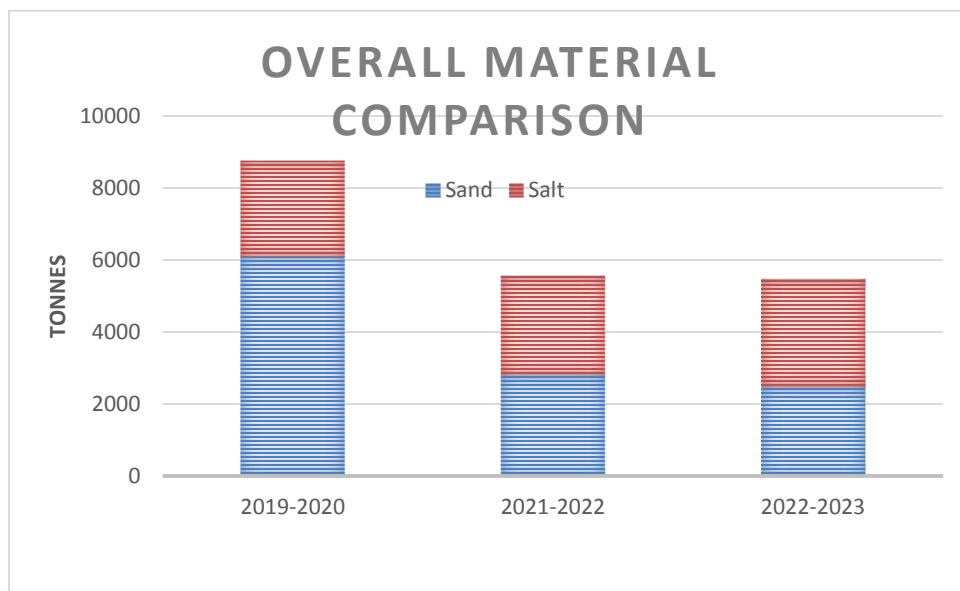
**Sand:** A total of 2,830 Tonnes of sand was spread on Town roadways during the 2021-2022 season, a **46%** reduction in sand compared to the 2019-2020 season with 6,106 Tonnes.

During the 2022-2023 season, Road Operations applied a total of 2,508 Tonnes of sand on Town roadways, a **51%** reduction in sand compared to the 2019-2020 season.

**Salt:** A 3.6% increase in salt materials was recognized when comparing the 2021-2022 season with the 2019-2020 benchmark, a total of 2,744 Tonnes of salt compared to 2,647 Tonnes. A 12% increase in salt materials was recognized when comparing the 2022-2023 season with the 2019-2020 benchmark, a total of 2,975 Tonnes of salt compared to 2,647 Tonnes.

It is expected to recognize an increase of approximately 4% material usage as a result of the increase of 12.1km, or 3.5%, of total assumed road network between 2019 – 2023. Additional over-runs can be attributed to the number of freezing rain and freeze-thaw events (see weather data above) through 2022/2023 season. Notably, there was minimal increase in salt tonnage, but significant reduction in sand tonnage as a result of the change in mix.

Hypothetically, if the mix remained unchanged at a 7:3 ratio, 213T of Sand (17.6T/km annual) and 92T of Salt (7.6T/km annual), or 305T total material, would have been used due to the additionally assumed roads throughout the same period.



**Figure 2: Overall material comparison**

On average, a reduction of material used from 19 Tonnes (2019-2020) to 13 Tonnes (2021-2022 & 2022-2023) per deployment was recognized during the trial seasons. It is evident a reduction in overall material use, with almost no addition in salt tonnage, is recognized whilst providing a better level of service.

**v. Application Rates – *What is the difference when applying only salt, to that of a sand/salt mix?***

The application rate of salt varies between 90Kg/2ln-km – 130Kg/2ln-km, dependent upon the temperature of the road surface and the type of forecasted weather. For reference, on the same road using a sand/salt mix, the rates would be 250Kg/2ln-km – 350Kg/2ln-km, or 3 to 4 times more. This would result in the same amount of salt being used, but diluted by sand.

**B. WINTER MATERIAL TRIALS – OUTCOME**

The Materials Trials showed positive results over a series of different categories including environmental benefits, increased efficiency, safety, quality, and long-term budgetary impact.

**I. Environmental – Sand**

Ultimately, a significant reduction in material use overall, which is beneficial from an environmental perspective. During the 2022-2023 season, the Town used 51% less sand than 2019-2020 benchmark season. Sand use has its own set of environmental issues associated with its use, and with it being more expensive, less effective, and having a potential detrimental effect on tributaries in sub-watersheds through municipal storm water systems when used as a primary abrasive, it is recommended to review its use, as this trial has completed. The Lake Simcoe Region Conservation Authority has released a technical bulletin outlining details on the on the topic, as referenced at [Georgina.ca/snow](http://Georgina.ca/snow).

**II. Environmental – Salt**

It is important to recognize the stark increase in salinity levels in Lake Simcoe over the past 40 years, as documented by the Lake Simcoe Region Conservation Authority. However, this trial and recommendation, although identified as “100% salt” application, refers to the type of mix of application, and when taking additionally assumed roads into consideration, does not increase the material use within Georgina over the normal expected increase from the benchmark years. In either material mix, salt is used and applied to road surfaces.

It should also be noted that Georgina alone does not impact the salinity levels within Lake Simcoe. In fact, Georgina represents only 2.4% of the total salt used within the Lake Simcoe Watershed, while making up 9% of land mass. Nonetheless, we have a responsibility to ensure all available options are



reviewed to reduce this impact, provided road user safety is considered and legislated guidelines are met.

### **III. Environmental – GHG Emissions**

Run times are also reduced, both by quicker activation of materials and a reduction in reload trips, thus reducing GHG emissions (although we have not quantified this measure).

### **IV. Efficiency of resources – reloading**

By using a lesser application rate, a load of material is able to cover a greater area along a route. By eliminating the sand mix, the salt material is proven to have a greater effectiveness. A route is able to be completed in a shorter amount of time due to effectiveness and fewer return/reload trips to the yard, thereby increasing the level of service or speed at which the route is complete. As a result, the Town continually meets the surface condition thresholds set out by the Minimum Maintenance Standards O.Reg. 239/02.

### **V. Efficiency of resources – Sand lifecycle**

Sand has a significant lifecycle cost; that being mixing, stacking, applying, sweeping, basin cleaning, ditching, dredging and flushing. During the trial seasons, Staff have reported improvements in catch basin and ditch cleaning (in semi-urban roadside environments) requiring less attention, allowing staff to focus on alternative key post-season tasks. Further, the catch-basin cleaning program is likely to change from a biennial cleaning schedule to one-in-four year schedule as a result. This will not be recognized until the 2025 budget due to contract limitations.

Further, a significant reduction in sweeping operations via contracted services from 698 hours in 2020 to 441 in 2023 was realized. Staff also observed an improvement in the winter-spring overlap during clean up operations.

### **VI. Budgetary Impact**

By changing the desired application mix and decreasing the overall volume of sand, there is a net zero budget impact. Although Thawrox® salt is more expensive than sand, the volume of sand necessary in a sand/salt mix is significant and directly relates to additional labour, material, and fuel costs for the reasons mentioned above. There are indirect cost savings within the Town's contracted services, in-house resources, and long-term infrastructure life cycle by making this change.

### **VII. Quality**

Overall, the effectiveness of the Town's Operations has significantly improved. This is recognized by the significant reduction in complaints, especially those related to treatment and/or snow pack. Staff time spent ice-blading on paved surfaces was insignificant, which is a notable difference from the benchmark season of 2019. Road user safety has improved, which was a primary focus throughout the trial period.

**VIII. Summary**

The Winter Materials Trial was a success. The level of service provided far exceeded our minimum standard, and was improved and optimized by the use of a 100% salt mix on urban paved roads. With the understanding there is support to do more with salt alternatives, especially in proximity to Lake Simcoe, while considering the Town’s levels of service and legislated requirements, Staff are recommending the 100% salt application mix for urban paved surfaces be the standard, and that the Salt Management Plan be updated and returned to Council in the future, inclusive of alternative options for salt use.

**C. WINDROW PROGRAM UPDATE:**

A detailed Windrow Program summary and analysis can be found in Report OI-2022-0014. The Windrow Snow Clearing Program is delivered using a combination of in-house administrative resources and contracted plowing service to eligible applicants.

Enrolment increased by 30% in 2022/2023 from the initial pilot season, making the total number of entrances addressed 341. There is still room for additional applicants, as the upper threshold has not yet been met.

It is expected the policy will not change for the 2023/24 season, however the 7.5cm threshold is being actively monitored and reviewed to maximize the cost:benefit of the program. Weather is inherently unpredictable, so a conservative approach needs to be taken when budgeting. Table 5 depicts a comparison between the 2021/22 pilot program and the first season of the annual program delivery 2022/23. It needs to be noted that the 2021/22 pilot program started mid-winter so the number of events is not an accurate depiction of what the seasonal clearing events would be.

<b>Windrow Program</b>		
	2021/2022	2022/2023
Number of driveways (applicants)	265	341
Number of events	3	5

*Table 5 Yearly Comparison 2021/22 and 2022/23*

Road Operations staff recommend the continuation of the Windrow Clearing Program in future winter seasons and will continue to deliver the program through contracted services.

**D. FUTURE PROGRAMS/UPDATES:**

**Operations Tracker** - The Town successfully launched a public facing platform (Operations Tracker) allowing residents to monitor plowing in their respective areas. It is expected to include sidewalk winter maintenance operations beginning in 2023/2024 season.

**Salt Management Plan** – The Salt Management Plan will need to be updated as a result of this recommendation, prior to the 2023/2024 season.

**5. RELATIONSHIP TO STRATEGIC PLAN:**

**Delivering Service Excellence** - Proactively manage infrastructure and assets to ensure service continuity

Staff continuously evaluate Road Operations, including winter operations, for improvement opportunities and compliance with service targets and legislation. The goal of these activities includes:

- Meeting regulated requirements, Council and community expectations by identifying and monitoring appropriate performance and service levels.
- Improve and sustain efficiency by evaluating the methods, approaches and equipment used to deliver services.
- Ensuring adequate resources are available to achieve these goals while complying with the employment standards act and the minimum maintenance standards.

**6. FINANCIAL AND BUDGETARY IMPACT:**

A net zero budget impact on materials.

Several potential savings opportunities related to these operational changes including fuel costs and extended benefits such as reallocation of equipment and labour could be recognized in future years budgets, along with some contracted services savings associated with the sand lifecycle costs.

**7. PUBLIC CONSULTATION AND NOTICE REQUIREMENTS:**

Residents may inquire about the 2023-2024 Windrow Snow Clearing Program as described in Report OI-2022-0014, and the application deadline is October 15th, 2023.

## **8. CONCLUSION:**

Staff successfully provided a level of service to Georgina residents and visitors that exceeded the Ontario Regulation 239/02, Minimum Maintenance Standards for Municipal Highways, and was both quantitatively and qualitatively improved over previous years.

Several benefits were recognized by utilizing a 100% salt mix on Town highways as a substitute for a sand/salt mix. Most notably, safety for road-users, environmental impact, and efficiency. The Town of Georgina continues to lower the overall volume of abrasive material on the roads, and will continue to explore all available options to reduce salt use, where practicable. No unrealized change in operational budget is required as a result, and many future savings opportunities could be recognized.

## **APPROVALS**

Prepared By: Kate Walkom, Operations Technologist, Road Operations

Reviewed By: Niall Stocking, Manager, Operations

Recommended By: Michael Vos, Director, Operations and Infrastructure

Approved By: Ryan Cronsberry, Chief Administrative Officer

### ***Attachments:***

*Attachment #1:  
2022/23 Winter Control Guide*