

To: Community Services Committee

From: Ron Diskey, Commissioner,  
Community Services Department

Report Number: CS-20-05

Date of Report: January 13, 2020

Date of Meeting: January 20, 2020

Subject: KPMG Snow Clearing Audit

File: C-3100

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## **1.0 Purpose**

The purpose of this report is to present the KPMG Snow Clearing Audit (Attachment 1).

## **2.0 Recommendation**

That the Community Services Committee recommend to City Council:

That Report CS-20-05, dated January 13, 2020 and Attachment 1, being the KPMG Snow Clearing Audit, be received for information and that the recommendations and management responses in the KPMG audit be endorsed as the general basis for implementing improvements to snow clearing.

## **3.0 Executive Summary**

Not applicable.

## **4.0 Input From Other Sources**

The Snow Clearing audit by KPMG was conducted with the involvement of the appropriate City employees.

## **5.0 Analysis**

The Council-endorsed 2019 Audit Plan included the Snow Clearing audit.

The Snow Clearing audit includes three medium risk recommendations and two low risk recommendations related to the following aspects:

1. Procurement of Automatic Vehicle Location/GPS System (medium risk)

2. Sidewalk Clearing Operations (medium risk)
3. Compliance with Minimum Maintenance Standards and use of contracted staff (medium risk)
4. Clear documentation and sign offs on log sheets and shift forms (low risk)
5. Municipal Resident Feedback Surveys (low risk)

The KPMG recommendations and the City's management response will be the basis for implementing on-going improvements for snow clearing.

It should also be noted that through the 2020 budget deliberations, Council approved an additional four temporary staff for winter operations.

## **6.0 Financial Implications**

Not applicable

## **7.0 Relationship to the Oshawa Strategic Plan**

The report responds to the goals of Economic Prosperity & Financial Stewardship and Accountable Leadership.



Mike Saulnier, Director,  
Operations Services



Ron Diskey, Commissioner,  
Community Services Department



# City of Oshawa

## Snow Clearing

### Overall report rating

Yellow-Green: Significant assurance with minor improvement opportunities

KPMG LLP

January 2020



## Contents

	<b>Page</b>
1. Executive Summary	3
2. Recommendations	6
3. Summary of findings and work undertaken	10

## Appendices

- A. Snow Clearing Operations and Size Comparison
- B. Current Cost of Snow Clearing
- C. Current Costs of Sidewalk Clearing
- D. Analysis of Complaints Data
- E. Work Logs and Shift Reports
- F. Benchmarking survey results
- G. Staff Involvement and Documents Reviewed

## Distribution

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## CC (for information):

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## Sponsor:

- Ron Diskey, Commissioner, Community Services

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## Section One

### Executive Summary

#### Conclusion

We have provided an assurance rating of “significant assurance with minor improvement opportunities” following our review of the snow clearing activities across the City. As part of our review we assessed the service delivery model and service standards in place for snow clearing, along with the costs associated with the clearing of snow and how these are measured. We have also benchmarked the City’s snow clearing practices against nine other comparator municipalities in Ontario to provide further insight into how snow clearing activities are undertaken across other organizations.

The City’s winter maintenance program is carried out in compliance with the Provincial Minimum Maintenance Standards (MMS). The City has also adopted other policies and procedures around snow clearing, including the snow and ice by-laws. Compliance with MMS and other procedures and by-laws is monitored by Road Operations. In the 2017/18 winter, the City’s percentage of MMS non-compliant events (i.e. instances where snow clearing activity is not undertaken within the required timeframes following a snow fall) was 15.7% (an average of 4.25 events) and in 2018/19, 17.9% (an average of 5 events) . It should be noted that 50% of the failures in both years were attributed to back to back snow events. We noted the challenges the City faces with staffing above their mandated provincial legislation and overtime limits. Road Operations should continue to analyze the costs and benefits of hiring additional contract staff in order to reduce in-house overtime hours and help reduce the number of non-compliant events.

As part of our review we assessed the current costs the City incurs in delivering their snow clearing activities. Over the past three years, the annual expenditures for the winter maintenance program have averaged \$3.75m (\$5.4m with regular and overtime labour included). It costs roughly \$1.42m for present sidewalk clearing activities (123km of sidewalks), taking into account equipment costs, contractor costs and staff overtime. The City has a further 305 km of arterial/collector sidewalks and 268 km of residential sidewalks which it does not clear. Based on additional contractor costs and material costs alone, it would cost approximately \$5,770 per year for each additional km of sidewalk cleared should the City expand its sidewalk clearing operations.

As part of our review we undertook detailed analysis of complaints received relating to snow clearing. Please see appendix D for further information. We noted a significant number of complaints related to snow plowing in zones 1, 3, 8,10 and 16, and an increase in sidewalk complaints from 2017-2018 to 2018-2019, most commonly for sidewalks in zones 3 and 8. Complaints data should be reviewed regularly and taken into account by Road Operations when reviewing their snow clearing routes and priority systems.



Our testing of a sample of winter events over the 2017/18 and 2018/19 winters identified that the relevant forms and logs had been completed, however noted forms with missing signatures, dates and shift times. Road Operations should remind staff of the importance of retaining up to date and accurate records of events.

As part of our review we have undertaken a benchmarking exercise with other municipalities in Southern Ontario in order to understand snow clearing practices at other organizations. Results of our findings can be seen in Appendix F. In particular, we noted that other municipalities used an Automatic Vehicle Location)/GPS System for road patrolling and vehicle locating, with the City of Oshawa being the only municipality from those surveyed without such system. The City should assess utilizing an AVL/GPS system to help improve real time tracking and response times to patrol staff and complaints. The City should also consider utilizing resident feedback surveys to gather customer satisfaction data over their winter maintenance operations.

### Background

This review forms part of the Internal Audit Plan for 2019 for the City of Oshawa ("City" or "Corporation").

It is important that City roads, paths, sidewalks and driveway windrows are cleared of snow and ice on a timely basis, as failure to do so will impact the safety of City residents. It is important that snow clearing services are delivered in an efficient and cost effective manner and that service standards are appropriately set, monitored and delivered upon.

As part of our review we have assessed the service delivery model and service standards in place for snow clearing across the City. We have also reviewed the costs associated with the clearing of snow and how these are measured by the City. Where possible, we have reviewed leading practices and standards in place at comparator municipalities in Durham Region and across Southern Ontario to provide insight to the City.

Please see Appendix A for detailed comparatives.

### Objectives

Objective	Description of work to undertake
<p><b>Objective one</b> Review snow clearing operations</p>	<p>We have assessed the efficiency and effectiveness of the City's snow clearing service model. As part of this we have considered:</p> <ul style="list-style-type: none"> <li>• The service standards and legislative requirements/by-laws around snow clearing and how the City manages and monitors compliance;</li> <li>• The City's priority system for snow clearing (e.g. roads, driveways, sidewalks, trails, facilities etc.) and the appropriateness of the timescales for clearing snow;</li> <li>• The process for scheduling staff for snow clearing activities;</li> </ul>



	<ul style="list-style-type: none"> <li>• How the City ensures that work is completed in a timely and complete manner; and</li> <li>• The current cost of service delivery and the impact on costs should a program (e.g. sidewalk clearing) be expanded City-wide or the service standards changed (i.e. more / less frequent clearing)</li> </ul> <p>We have also undertaken a high level review of the complaints process and reviewed any trends or patterns in complaints received relating to snow clearing.</p> <p>Where appropriate, we have benchmarked the City’s snow clearing standards and activities against comparator municipalities from Durham Region (given local climate most comparable) and Southern Ontario to understand how the City compares to service standards set elsewhere.</p>
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### Recommendations raised

Following our review of the snow clearing activities across the City, we have raised the following recommendations: Please see section two of this report for further information.

	High	Medium	Low	Total
Raised	0	3	2	5
Accepted	0	3	2	5

### Acknowledgement

We thank the staff involved for their help in completing this review.

### Contact Information

The contacts at KPMG in connection with this report are:

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## Section Two

### Recommendations

This section summarizes the recommendations that we have identified from our work. We have given each of our observations a risk rating as follows:

Priority rating for recommendations raised		
<p><b>High – (Priority One):</b> Issues arising referring to important matters that are fundamental and material to the system of internal control. The matters observed might cause a system objective not to be met or leave a risk unmitigated and need to be addressed as a matter of urgency.</p>	<p><b>Medium – (Priority Two):</b> Issues arising referring mainly to issues that have an important effect on the controls but do not require immediate action. A system objective may still be met in full or in part or a risk adequately mitigated, the weakness represents a deficiency in the system.</p>	<p><b>Low – (Priority Three):</b> Issues arising that would, if corrected, improve internal control in general but are not vital to the overall system of internal control. These recommendations are of leading practice as opposed to weaknesses that prevent systems objectives being met.</p>

#	Risk	Recommendation	Management response, owner and deadline
1	Med	<p><b>Procurement of Automatic Vehicle Location/GPS System</b></p> <p>Our survey findings noted that all surveyed municipalities have an AVL (Automatic Vehicle Location)/GPS System for road management except for the City of Oshawa. An AVL/GPS system allows for improved tracking of City vehicles during road patrols.</p> <p>At present, there are six patrol officers employed by the City. Real time data is not tracked and updated by the Roads Operations staff in a timely manner, due to manual communication methods. This can delay Road Operations’ response times to issues.</p> <p><b><u>We recommend:</u></b></p> <p>Roads Operations, with the assistance of Finance, look into the cost / benefits for an AVL/GPS program. The City should research program specifications and determine their compatibility</p>	<p><b>Agreed</b></p> <ul style="list-style-type: none"> <li>Road Operations staff, IT, Purchasing and Finance staff have confirmed appropriate budget is available to proceed with initiating a project in 2020.</li> <li>Specifications, project scope and procurement is targeted for early Q1 of 2020.</li> <li>Project shall commence in Q2 of 2020 with full implementation by late Q4 of 2020</li> </ul> <p>There is a budget available of \$180K</p> <p><b>Owners:</b></p>



#	Risk	Recommendation	Management response, owner and deadline
		with Maximo and/or CityView. An integrated technological solution would offer significant improvements in real time tracking and fast response times to patrol staff and complaints.	<ul style="list-style-type: none"> <li>• Manager, Road Operations</li> <li>• Fleet Manager</li> <li>• Manager of ITS, Finance</li> </ul> <p><b>Deadline:</b> Q1-Q4 2020</p>
2	Med	<p><b>Sidewalk Clearing Operations</b></p> <p>With a 26% increase in sidewalk km since the last report to Council in 2013 (See Appendix A), sidewalks should be prioritized for compliance with provincial and municipal standards.</p> <p>We reviewed complaints from Service Oshawa and noted an increase in sidewalk complaints from 2017-2018 to 2018-2019, the most common complaints occurring in zones 3 and 8. The present snow clearing order of operations does not take into account historical geographical complaints.</p> <p><b><u>We recommend:</u></b></p> <p>We recommend that the City reviews processes in high-complaint zones (zones 3, 8, etc.) and prioritize sidewalk clearing for City-owned sidewalks in those zones, as well as more targeted communications of residential sidewalk clearing by-laws in the upcoming winter season. For example, mail distribution of residential notices in the fall reminding residents in high complaint zones of the sidewalk clearing by-laws.</p>	<p><b>Agreed</b></p> <p>There is a Green Belt project scheduled for Q4 of 2019 to review the sidewalk clearing process. This will include a review of high complaint zones and how these areas can be prioritized with respect to sidewalk clearing.</p> <p>Targeted communications for winter maintenance is a regular on-going annual task. Forms of media regularly used are: all social media, large billboards strategically placed around the City, newspaper ads in both local papers, radio ads and City web site.</p> <p><b>Owners:</b></p> <ul style="list-style-type: none"> <li>• Manager, Road Operations</li> <li>• Green Belt Team</li> <li>• Manager, Road Operations</li> <li>• Corporate Communications</li> </ul> <p><b>Deadline:</b> Q4 2019/annually</p>
3	Med	<p><b>Compliance with MMS and use of contracted staff</b></p>	<p><b>Agreed</b></p> <ul style="list-style-type: none"> <li>• Management will continue to review</li> </ul>

#	Risk	Recommendation	Management response, owner and deadline
		<p>We identified that 50% of instances of non-compliance with MMS occurred following two back-to-back winter storm events for both 2017-2018 and 2018-2019. We also noted that of all snow removal and spot plowing complaints made, 152 out of 167 complaints were made during the times the City did not comply with MMS.</p> <p>Road Operations noted that City staff often reach the maximum hours of service permitted by legislation, which limits the available pool of over-time staff and can lead to non-compliance with MMS.</p> <p><b><u>We recommend:</u></b></p> <p>The City should consider looking at alternative staffing models (additional contracted staff/temp/part time staff) who can be called upon at high demand times to reduce the overtime hours incurred by in-house staff and ensure improved rates of compliance with MMS.</p>	<p>staffing requirements to ensure an efficient and effective mix of in-house and contracted staff.</p> <ul style="list-style-type: none"> <li>• Management increased contracted services in 2019.</li> <li>• Council have approved an additional four temporary staff in the 2020 budget</li> </ul> <p><b>Owner:</b></p> <ul style="list-style-type: none"> <li>• Manager, Road Operations</li> <li>• Finance</li> </ul> <p><b>Deadline:</b></p> <p>On-going</p>
4	Low	<p><b>Clear documentation and sign offs on log sheets and shift forms</b></p> <p>During our review of the weather event tracking process, we identified the following (See Appendix E-E.4):</p> <ul style="list-style-type: none"> <li>• Patrol forms are filled out and approved manually;</li> <li>• For a number of example forms selected, there were missing signatures, or missing dates and shift times.</li> <li>• The current review of snow clearing for MMS is functional but could be improved to provide more accurate and complete data for review and evaluation for improvement opportunities. The exact nature or specific instance which caused non-compliance with MMS is not clearly captured.</li> </ul> <p><b><u>We recommend</u></b></p>	<p><b>Agreed</b></p> <ul style="list-style-type: none"> <li>• Management to review the recommendation as part of the Work Management Software rollout in 2021.</li> <li>• Records and reports will be reviewed weekly moving forward as part of the normal course of winter operation shift duties.</li> </ul> <p><b>Owner:</b></p> <ul style="list-style-type: none"> <li>• Manager, Road Operations</li> <li>• Road Supervisors</li> </ul> <p><b>Deadline:</b></p> <p>Q2 2021 (to align with software rollout). Records</p>

#	Risk	Recommendation	Management response, owner and deadline
		<ul style="list-style-type: none"> <li>The City explores the use of electronic shift tracking software. While we note that nine out of ten municipalities surveyed do not use software, the City may wish to explore this in the future to align with future growth.</li> <li>Road Operations staff are reminded of the need to complete log sheets and shift forms accurately and completely.</li> <li>Road Operations improve their current tracking mechanism for compliance with MMS standards and include further information explaining the nature and reasoning for non-compliance.</li> </ul>	and reports to be reviewed with immediate effect.
5	Low	<p><b>Municipal Resident Feedback Surveys</b></p> <p>Our survey results identified that eight out of the 10 comparator municipalities utilized resident feedback surveys to gather customer feedback on their winter maintenance operations. Currently, the City of Oshawa does not deploy this method.</p> <p><b><u>We Recommend</u></b></p> <p>The City introduce a resident feedback survey to gather customer satisfaction data over winter maintenance. Surveys should be issued on a periodic basis and findings reviewed and actioned upon where relevant.</p>	<p><b>Agreed</b></p> <p>Resident survey will be initiated following the winter season, from spring 2020</p> <p><b>Owner</b> Operation and Communication</p> <p><b>Deadline</b> Q2 2020</p>



## Section Three – summary of findings and work undertaken

The City's winter maintenance program is carried out in compliance with the Provincial Minimum Maintenance Standards (MMS) and Council approved Quality Standards. This program includes clearing 109 lane kilometres (KM) of arterial roads, 307 lane KM of urban collector roads, 112.5 lane KM of rural collector roads, and 702.75 lane KM of residential roads within the City. It also includes clearing of 171 crosswalks, and 123.2 KM of sidewalks, as well as the snow clearing assistance program for seniors and residents with disabilities.

Road and sidewalk clearing is operated by a combination of 50% City Staff and 50% contract staff. The overall winter maintenance program includes the following fulltime staff: 45 road maintenance staff, 6 patrol staff, 6 supervisors, and the Manager of Road Operations who report to the Director of Operation within the Community Services Department.

Over the past three years, the annual expenditures for the winter maintenance program have averaged \$3.75m (reaching \$5.4m when including regular and overtime labour costs), which encompasses winter contractor costs, capital and operating equipment costs, and material costs.

Operations and size and staffing compared to the preceding snow clearing review CS-13-91 dated November 13, 2013 highlights the growth the City of Oshawa has experienced in the past five to six years. Overall, road clearing has increased by around 5% and sidewalk clearing increased by around 26%. Annual expenditures have increased by 9% since the report published in 2013. The population of Oshawa has grown by ~10,000 people, and accounts for the increase in residential and rural roads operations. (See Appendix A)

Below we have provided further commentary against each of the areas of the terms of reference for this review. We have referenced the findings from our survey results where we feel additional context is required. Our survey results can be found in Appendix F.

### **The service standards and how the City manages and monitors compliance**

The levels of service around snow clearing are executed to be compliant with standards at a municipal and provincial level. Municipal standards includes the Approved Quality Standards, Approved Policy and Procedures, Snow and Ice Bylaw and the Snow Clearing Assistance Program Bulletin. Road Operations undergoes periodic reviews to refresh the standards. The present provincial Minimum Maintenance Standards (MMS) over winter operations has been in effect since 2009. The City's snow clearing program has been developed to provide the optimal order of operations to comply with provincial MMS.



The City complies with the standards/ legislation/by-laws and ensures accurate records are kept through shift reporting for all weather events. Daily logs are filled out for each eight hour shift per day and logs when the storm starts and ends. All operations are logged including salting, de-icing, plowing and sidewalk clearing.

At the end of the winter season, the weather event snow clearing timelines are plotted against the baseline MMS times – 12 hours after snowfall for arterial/collector roads, 16 hours after snowfall for residential roads, and 48 hours after snowfall for sidewalks.

For the review of snow clearing, we reviewed the compliance of significant weather storm events that occurred in 2017-2018 (27 logged storm events), and 2018-2019 (28 logged storm events). This includes the following compliance areas with provincial MMS:

- Arterial/Collector Roads – Cleared within 12 hours after snow fall
- Residential Roads – Cleared within 16 hours after snow fall
- Sidewalks (including Sidewalk Clearing Assistance Program) – Cleared by midnight the day after the snowfall ends

We noted that the percentage of non-compliance for 2018-2019 was 17.9% (between 3-7 events, averaging to 5 events) across clearing Arterial and Collector Roads, Sidewalks, and the Snow Clearing Assistance Program. Based on inquiry with Roads Operations, and a review of a sample of logs, there were instances of non-compliance due to back-to-back weather storms, and some of non-compliance events related to isolated cleaning up of certain roads after regular operations ceased, whether due to complaints or identification by patrol operations. The non-compliance figures for 2018-2019 were slightly higher than the non-compliance for 2017-2018 which was 15.7% (between 3 – 5 events, averaging to 4.25 events). Based on inquiry with Roads Operations, and a review of a sample of logs, there were instances of non-compliance due to back-to-back weather storms, and some non-compliance in Residential Roads and Sidewalks were because of the decision to prioritize clearing Arterial and Collector Roads in severe weather events.

KPMG has identified that 50% of instances of non-compliance occurred following two back-to-back winter storm events for both 2017-2018 and 2018-2019. 50% of instances were through a weekend storm for 2017-2018 and 40% for 2018-2019. Road Operations notes that often staff reach the maximum hours of service permitted by provincial legislation, which limits the available pool of over-time staff. Road Operations has 45 dedicated Roads staff, 34 Parks Operations and 15 Recreation Staff to be utilized for winter maintenance activities however Roads Operations faces challenges with adequate staffing during back-to back storm events, or weekend operations.

Residential sidewalk clearing is the responsibility of the property owner to clear the sidewalk by midnight the day following the snowfall. This is communicated to property



owners by the City through extensive communications in the fall including advertisements in the newspaper, Twitter, Facebook, radio advertisements, pamphlets in community centres and public billboards. Enforcement of compliance is managed by Municipal Law Enforcement and Road Operations patrol teams and by resident complaints of non-compliance. Please refer to Appendix D for our analysis over sidewalk clearing complaints.

### **The City's priority system for snow clearing (roads, driveways, sidewalks, trails) and the appropriateness of the timescales for clearing snow**

Internal audit reviewed the City's priority system for snow clearing and its appropriateness and compliance. The priority system focuses on high traffic roads and city facilities to be cleared first, followed by low traffic roads, sidewalks, trails and walkways, the Snow Clearing Assistance Program, and other facilities. The priority system is the most common snow clearing system across the municipalities surveyed. Please see Appendix F, Question 1 for details.

The municipal priority system was developed by Road Operations based off of the provincial Classes (1 to 5) and the MMS. For example, Class 1 roads are approximated to Arterial/Collector roads as being the highest priority for snow clearing. Focusing on the priority system provides Roads Operations a clear schedule for efficiency. Using the standardized priority system, snow clearing routes are optimized for efficiency and practicality. Salting trucks carry a specific amount of salt for each route, to ensure that each truck can salt the entire route without running out of salt. The routes are designed with their provincial Class in mind, the total lane KM in length, and their geography. Roads Operations follow a clear order of operations with routine snow clearing routes that ensure snow clearing activities are carried out in the most efficient way possible.

Deadheading (when a plow truck passes through a road without plowing) it is minimized as much as possible, however it does occur on Regional Roads that are owned by the region of Durham as the City of Oshawa is not responsible for plowing Regional Roads. In residential areas, there is a specific route that plows follow that minimize the amount of deadheading, as the trucks follow its pre-determined snow clearing paths, which ensures that the area is getting fully plowed in the most efficient manner.

Other means of modifying the pre-determined routes to combine roads and sidewalk clearing as part of the same route would create inefficiencies and delays in the process. The present priority system focuses on MMS targets.

Road Operations faces difficulties when plowing residential roads due to illegal street parking and reduced road widths in newly developed areas. This increases risks of colliding with parked cars with the snow plow, and causes delays and decreases efficiencies when the plow has to maneuver around the parked car. At present, the



Operator calls into Winter Control and provides the address and details of the parked car. Winter Control will prepare a list to provide to municipal law enforcement. This is a manual and slow process, and the City is looking for a new Automatic Vehicle Location (AVL)/GPS system and will investigate potential integration with Maximo and/or CityView, the new work management and land management systems. **(See Recommendation 1)**

Current operations is able to meet provincial MMS in most cases, and the present timelines for winter operations is effective.

Overall, our assessment of the present snow clearing paths identified is that they are appropriate to ensure efficient and effective snow clearing activities.

### **The process for scheduling staff for snow clearing activities**

The staff schedule is prepared in advance of the winter, with four staffing groups assigned to weeks based on the winter Call-Board schedule. There are contractors, in-house staff from Roads, Park Staff and other staff who volunteer to take part in the call board after normal hours.

As the City has been growing, there has been an increase in the number of sidewalks, cross walks, and new residential roads. The growth, coupled with increasingly unpredictable winters has made it challenging for the City to consistently meet MMS.

The biggest challenges that Roads Operations faces with scheduling is the restriction with provincial legislation and overtime limits. During back-to-back storm events, it is difficult to obtain adequate staffing for overtime events, and the City is balancing in-house staff with external contractors.

### **The current cost of service delivery and the impact on costs should a program (e.g. sidewalk and road clearing) be expanded City-wide or the service standards changed**

See Appendix B for the current cost of service delivery. It is noted that in the past few years, the cost of overtime staff have significantly increased, while contract costs for snow clearing has decreased. The City should evaluate the cost-benefit analysis of hiring additional contract staff to reduce the overtime hours incurred by in-house staff, as well as provincial overtime limits being met. **(See Recommendation 3)**

See Appendix C for the Current Costs of Sidewalk Clearing, and Appendix C.2 for Costs to Increase Sidewalk Clearing.

The Roads Operations department prepared a financial calculation over present costs of increased sidewalk clearing. Internal Audit developed an illustrative example of increasing snow clearing costs, and it would require a minimum \$355,000 or \$710,000 increase in contractor labour and materials alone if the sidewalk clearing program



expanded by 1.5 or 2 times respectively. This estimation does not include pricing for additional equipment required or other factors.

### **High level review of the complaints process and review any trends or patterns in complaints received relating to snow clearing.**

We reviewed the complaints logged by Service Oshawa against the Roads Operations self-identification of non-compliance with MMS. Please refer to Appendix D for detailed geographical analysis and trends over complaints. The majority of complaints pertain to residential sidewalks not being cleared, which suggests that the City of Oshawa's communication efforts in bringing public awareness to the by-laws has been effective for complainants, but not for residents who are non-compliant.

### **Snow Clearing Assistance Program**

In 2017-2018, the most complaints for Not Plowed in zones 3, 4, 5 and 6 totalled 78 complaints. Of these complaints, 26 out of 78 co-occurred with weather events that the city did not meet MMS. Of all complaints made, 57 out of 212 complaints were made during the times the City did not comply with MMS.

In 2018-2019, the most complaints for Not Plowed in zones 1, 4, 5 and 6 totalled 76 complaints. Of these complaints, 62 out of 76 co-occurred with weather events that the city did not meet MMS. Of all complaints made, 185 out of 243 complaints were made during the times the City did not comply with MMS.





## Appendices

### Appendix A: Snow Clearing Operations and Size Comparison

The increase in snow clearing lane KM has increased proportionally with the population increase in Oshawa. There has been significant growth in Northern Oshawa, as new subdivisions are being built. The increase in the population is being supported by the increase in the average annual expenditure. We reviewed the information from a 2013 Council report and the 2019 winter inventory and have highlighted below the findings:

	2013	2019	Increase	Increase %
<b>Snow Clearing Details</b>				
Arterial Roads (Lane KM)	109	109	0	0%
Collector Roads (Lane KM)	289	307	18	6%
Residential and Rural Roads (Lane KM)	776	815	39	5%
Sidewalks (KM)	97	123	26	26%
Crosswalks (#)	109	171	62	57%
Snow Clearing Assistance Program (# Participants)	2141	2292	151	7%
Population of Oshawa	152,450*	162,966*	10,516	6.9%
Annual expenditures (Past 3 years)	\$3.38M**	\$3.75M	\$ 0.32	9%
<b>Staffing</b>				
Road Maintenance Staff	35	37	n/a- see comment below	
Patrol Staff	4	6		
Supervisors	5	6		
Support from other branches	30-40	42		

Please note that differences in staffing levels from 2013 to 2019 are due to consolidation of roads and parks staff and fluctuations between those that volunteer for winter overtime. Taking these into account, the actual increase in staff equates to 2 full time positions.

2013 data from 2013 Snow Clearing audit report

2019 data from Operations Services Winter Inventory data prepared by B. Stockfish Aug 2016

\*149,607 per 2011 Census. 2013 figure: 152,450 - Approximation based on 2011 Census (5.7% over 5 years)

159,458 per 2016 Census. 2019 figure: 165,773 - Approximation based on 2016 Census (6.6% increase over 5 years)

\*\*Adjusted for inflation. 2013 figure: \$3.1M

Statistics Canada. 2017. Oshawa, CY [Census subdivision], Ontario and Ontario [Province] (table). Census Profile. 2016 Census.

Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E> (accessed August 19, 2019)



## Appendix B: Current Cost of Snow Clearing

The cost of snow clearing for the last three years is shown below. The average number of snow events for the three years below equates to 41 events per year.

	2016-2017	2017-2018	2018-2019	Average
<b>Labour</b>				
Regular time*	865,576.31	988,584.68	1,027,949.29	960,703.43
Overtime	364,907.23	542,051.20	561,521.95	489,493.46
Allowance	2,189.94	3,861.18	4,108.38	3,386.50
Standby	164,914.50	198,416.25	207,292.50	190,207.75
<b>Total Labour</b>	<b>1,397,587.98</b>	<b>1,732,913.31</b>	<b>1,800,872.12</b>	<b>1,643,791.14</b>
<b>Equipment</b>	<b>120,328.40</b>	<b>589,326.97</b>	<b>599,311.57</b>	<b>436,322.31</b>
<b>Winter Contractors</b>	<b>2,124,317.22</b>	<b>1,941,846.25</b>	<b>2,104,682.37</b>	<b>2,056,948.61</b>
<b>Material</b>				
Salt	1,289,461.51	1,291,622.55	773,581.74	1,118,221.93
Salted Sand	7,758.44	11,778.04	29,325.42	16,287.30
Brine	20,317.04	35,588.40	69,525.00	41,810.15
Green Salt	69,832.35	75,002.47	106,443.02	83,759.28
<b>Total Material</b>	<b>1,387,369.34</b>	<b>1,413,991.46</b>	<b>978,875.18</b>	<b>1,260,078.66</b>
<b>Total Costs</b>	<b>5,029,602.94</b>	<b>5,678,077.99</b>	<b>5,483,741.24</b>	<b>5,397,140.73</b>
<b>Total Costs less Labour**</b>	<b>3,632,014.96</b>	<b>3,945,164.68</b>	<b>3,682,869.12</b>	<b>3,753,349.59</b>

\*Regular labour time is calculated based on time recorded from December – March inclusive for each year in order to obtain the most accurate figure

\*\*Total Costs less Labour are used in the average cost of snow clearing above



## Appendix C: Current Costs of Sidewalk Clearing

Roads Operations and Finance have prepared a high level financial model of the current costs of sidewalk clearing operations at present capacity. Using a weighted average cost between regular time and overtime, it costs roughly \$1.42M for present sidewalk clearing activities. This consists of \$318,554 of regular time, \$877,891 of 1.5x overtime, and \$223,152 of 2x overtime (Sundays). The City clears 123,176 metres of sidewalk. There are 305,132 metres arterial/collector sidewalks and 268,608 metres residential sidewalks not cleared by the City.

		<u>Regular Time</u>	<u>Overtime Time @ 1.5</u>	<u>Overtime Time @ 2</u>
	Number	Cost	Cost	Cost
<b>City Staff</b>				
Operator for Sidewalk Plow	12	\$4,693 (a)	\$5,767	\$7,689
Operator for Feeder Truck	3	\$1,185 (a)	\$1,457	\$1,942
Supervisor	1	\$585 (a)	\$719	\$958
Dispatcher	1	\$427 (a)	\$525	\$700
Patrol	4	\$1,671 (a)	\$2,053	\$2,738
City Staff Standby	68	\$128,577 (b)	\$128,577	\$128,577
<b>Contractor</b>				
Contractor Operating	2	\$1,700 (a)	\$1,700	\$1,700
Contractor Standby	2	\$90,000 (b)	\$90,000	\$90,000
Fuel	123,176	\$80 (a)	\$80	\$80
<b>Materials</b>				
Salt	123,176	\$2,642 (a)	\$2,642	\$2,642
<b>Fleet</b>				
Class 31 - Sidewalk Plow	12	\$425,578 (b)	\$425,578	\$425,578
Class 12 - Feeder Truck	3	\$161,448 (b)	\$161,448	\$161,448
<b>Other</b>				
Operation Duration (hrs)	10.0			
Burden	24.5%			
Total Events (Average over three years)	41			
Operating Hours per event	230			
Total Operating Hours	9430			
Inventory (meters)	123,176			
Total Variable Cost per Event (sum of "a" amounts above)		\$12,983	\$14,943	\$18,450
Fixed Costs (sum of "b" amounts above)		\$805,604	\$805,604	\$805,604
Total Annual Cost		\$1,337,926	\$1,418,277	\$1,562,065
Weighting		24%	62%	14%
Average cost distribution		\$318,554	\$877,981	\$223,152
Average Total Cost (sum of average cost distribution)				\$1,419,687



## Appendix C.2: Costs to Increase Sidewalk Clearing

### Increase in Sidewalk clearing by 50% and 100% - effect on variable costs

Internal Audit has utilized Roads Operations financial model to calculate the potential increase in costs given increased sidewalk clearing activities. This proposed calculation should not be taken as fact, but rather as an illustrative example of potential cost increases that arise with expanded operations.

To provide a high level calculate the increased costs, Internal Audit took the present snow clearing operations average sidewalk clearing hours per weather event (10 hours) and proportionally increased the hours taken based on increased inventory of sidewalk cleared to determine additional personnel required. The current model utilizes 12 in-house and 2 contractor staff for sidewalk clearing. At 1.5 times of sidewalk cleared, we estimated it would utilize 7 additional contractor staff (based on a 50% increase in contracted staff) to meet the expanded operations – total 9 contractors. At 2 times of sidewalk cleared, we estimated it would utilize 14 additional contractor staff to meet the expanded operations – total 16 contractors.

Based on the calculation below, it would, at minimum, cost an additional \$354,922 and \$709,844 in contractor labour and materials alone if the sidewalk clearing program expanded by 1.5 times and 2 times respectively.

This proposed calculation only takes into account additional contractor costs and material costs. It does not take into account the potential increase in costs of contractor labour rates, costs of purchasing or renting additional equipment, costs to store additional equipment, costs to develop new sidewalk clearing routes, logistical burden on present operations, or compliance with provincial MMS. We were informed by Finance that there would be too many variables in these costs to provide an accurate figure.

	Present Operations	1.5 X Sidewalk Clearing (i.e. an additional 61,588m)	2 X Sidewalk Clearing (i.e. an additional 123,176m)
Inventory (m)	123,176 (current number of sidewalks clearer in meters)	184,764	246,352
Contractor Operating	2	9	16
Average Total Cost	\$1,419,687	\$1,774,609*	\$2,129,531*
Added Cost of Increased Operations	N/A	\$354,922	\$709,844

\*Note these figures are based on an efficiency factor of 50% as determined by Road Operations. Figures are also based on an average of 41 snow events each year

Should the City clear the 305km of arterial/collector sidewalks and 268km of residential sidewalks it would cost an additional \$3.3m using the same formulas as above.



## Appendix D: Analysis of Complaints Data

We have assessed the geographical patterns and trends of winter weather related complaints from 2017-2018 and 2018-2019. Findings can be seen on the following page.

# Sidewalk Complaints

## Number of Complaints

Winter 2019 : **102**  
Previous: 79

▲ (29%)

## Icy Complaints

Winter 2019 : **32**  
Previous: 10

▲ (220%)

## Not Cleared Complaints

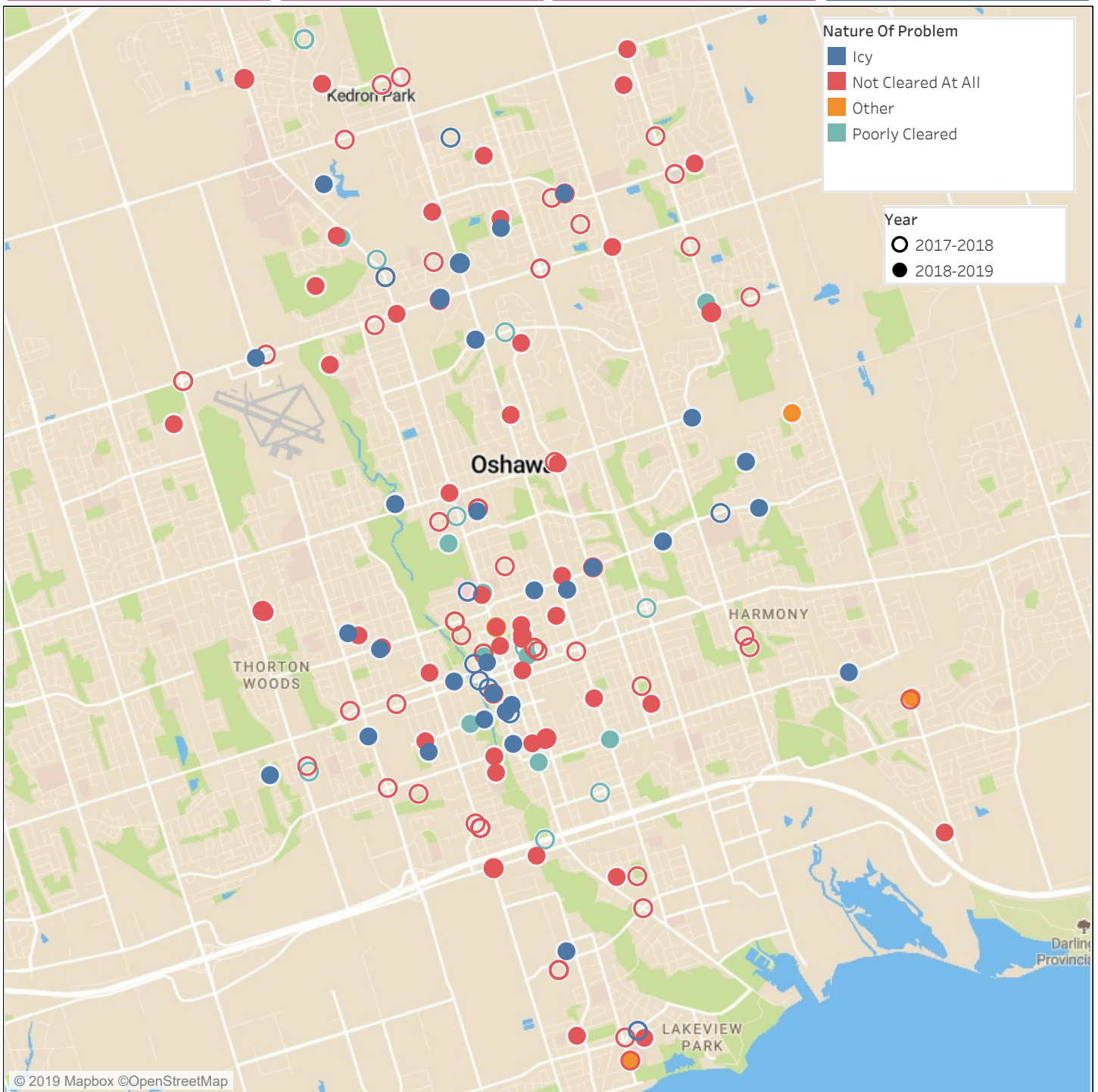
Winter 2019 : **56**  
Previous: 54

▲ (4%)

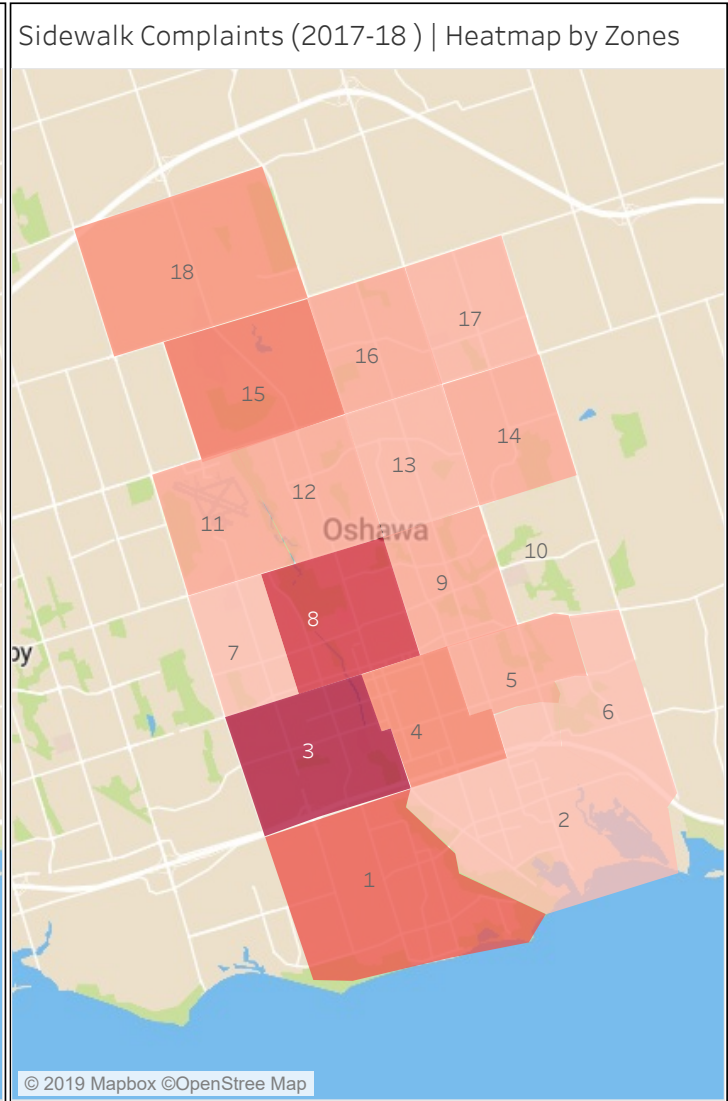
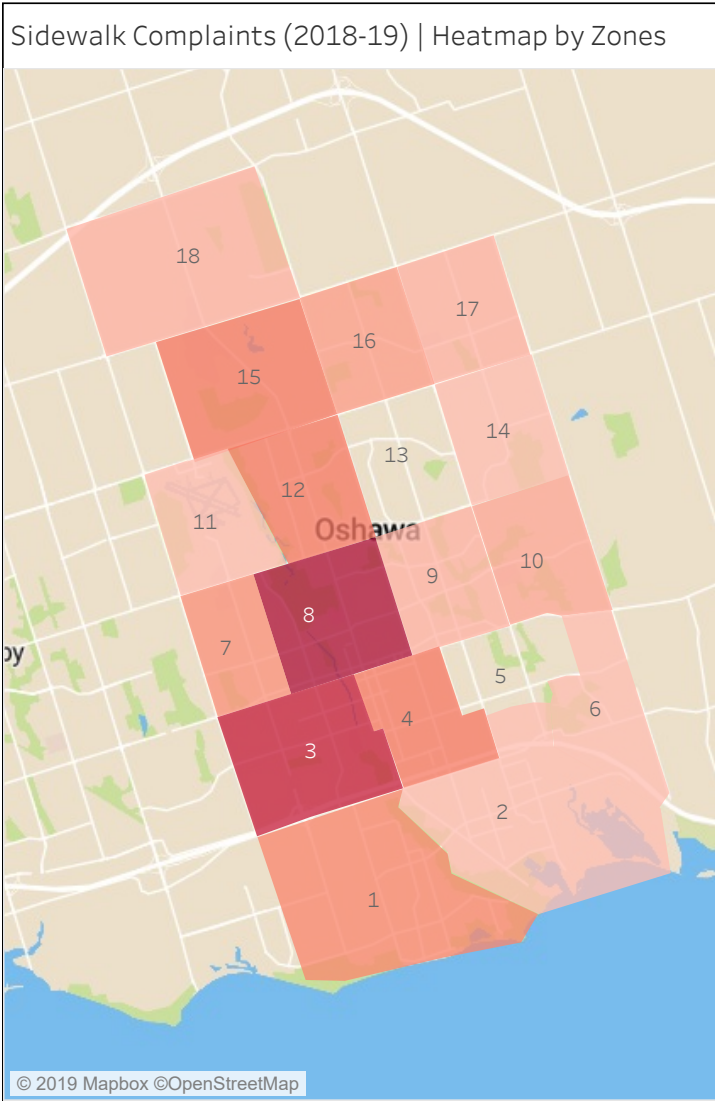
## Poorly Cleared Complaints

Winter 2019 : **10**  
Previous: 13

▼ (23%)



2018-19	Number of Complaints <b>102</b>	Most Frequent Complaint <b>Not Cleared At All</b>	2017-18	Number of Complaints <b>79</b>	Most Frequent Complaint <b>Not Cleared At All</b>
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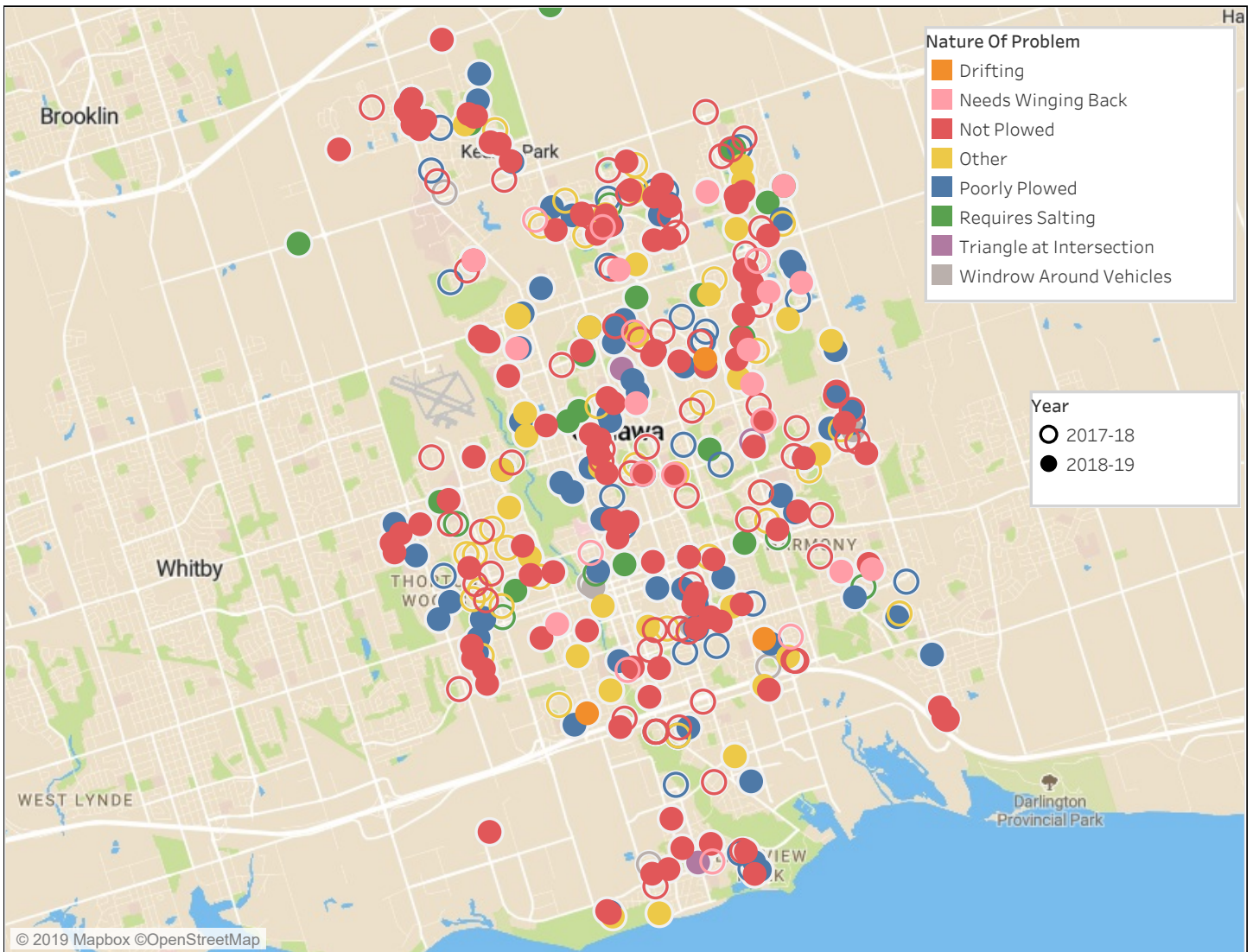
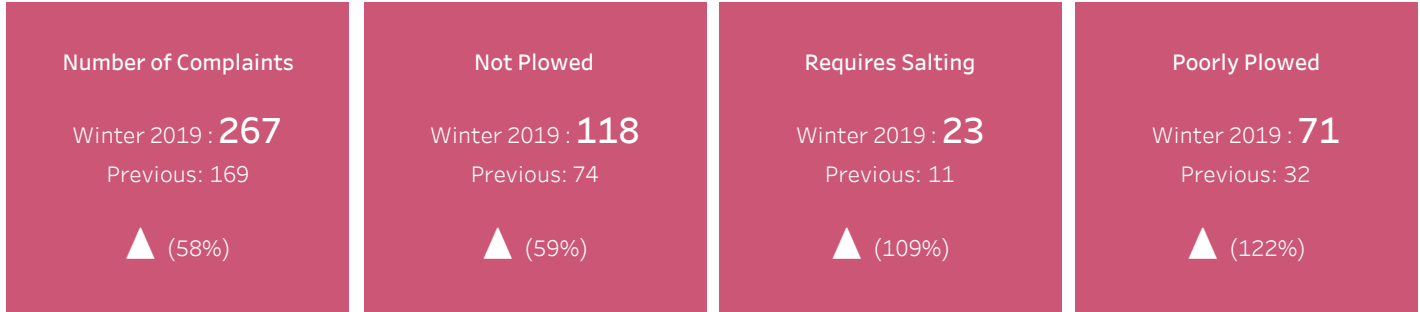
Sidewalk Complaints (2018-19) | Top 5 Zones

Nature Of Problem	3	8	1	15	4
Icy	3	2	1	3	
Not Cleared At All	10	7	7	3	5
Other		2			
Poorly Cleared	2	1	1	1	1
	3	8	1	15	4

Sidewalk Complaints (2017-18) | Top 5 Zones

Nature Of Problem	8	3	4	15	1
Icy	5	8		2	1
Not Cleared At All	10	6	7	4	5
Other					1
Poorly Cleared	3	2	1	2	
	8	3	4	15	1

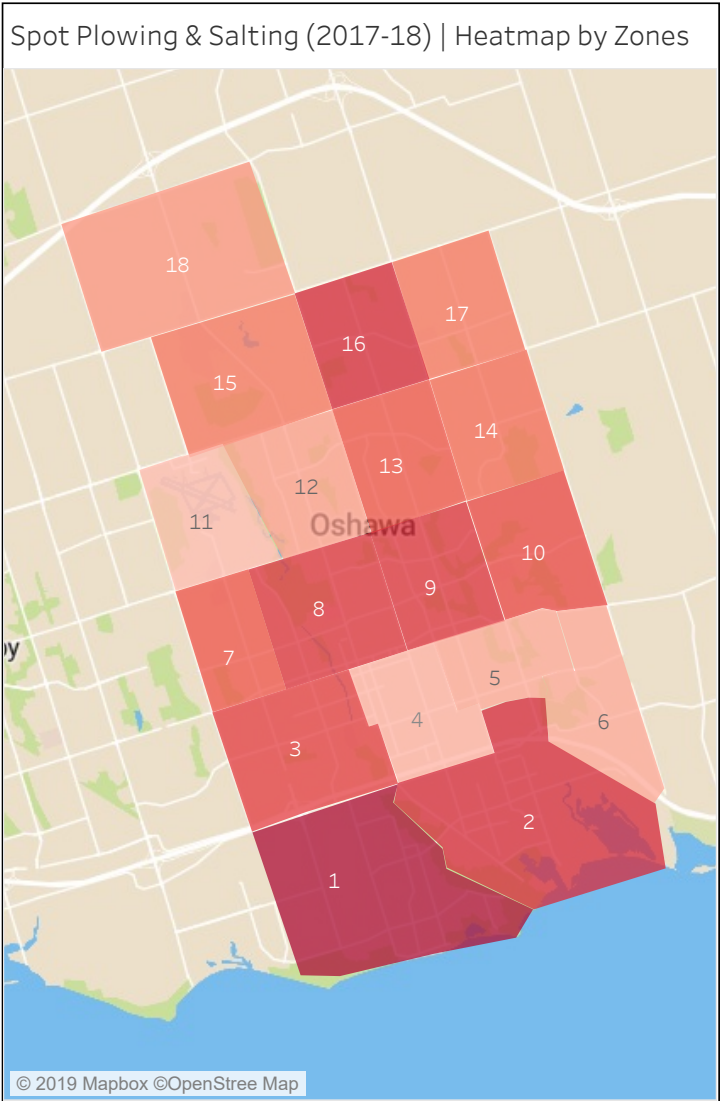
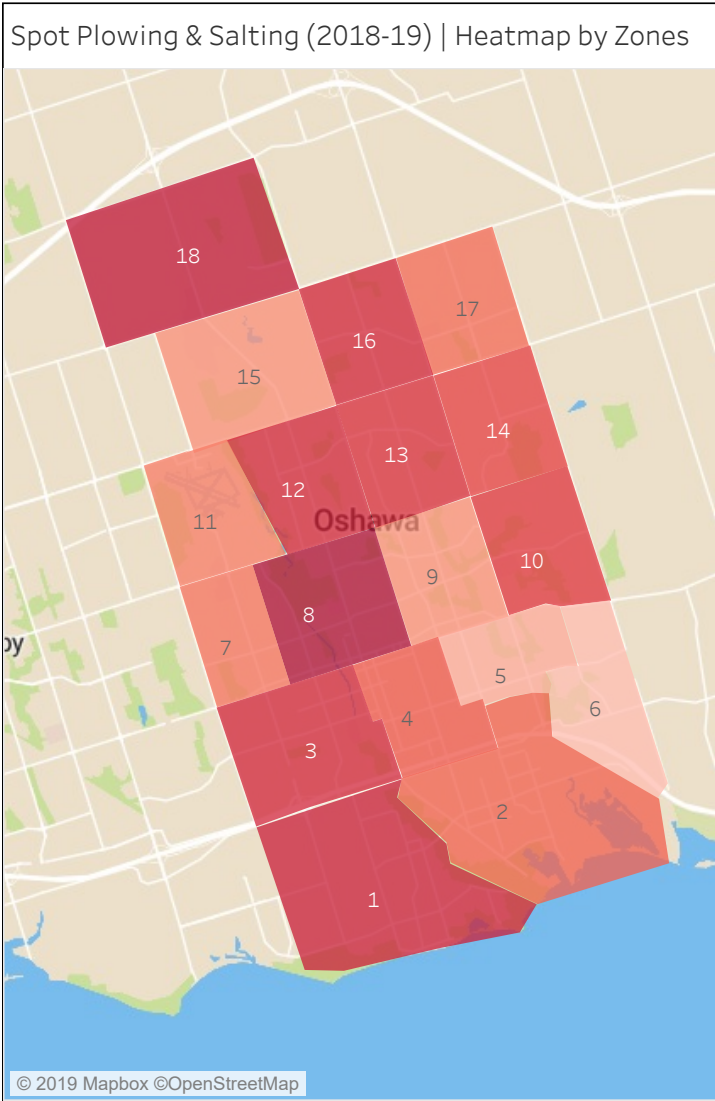
# Spot Plowing & Salting





2018-19	Number of Complaints	Most Frequent Complaint
	267	Not Plowed

2017-18	Number of Complaints	Most Frequent Complaint
	169	Not Plowed



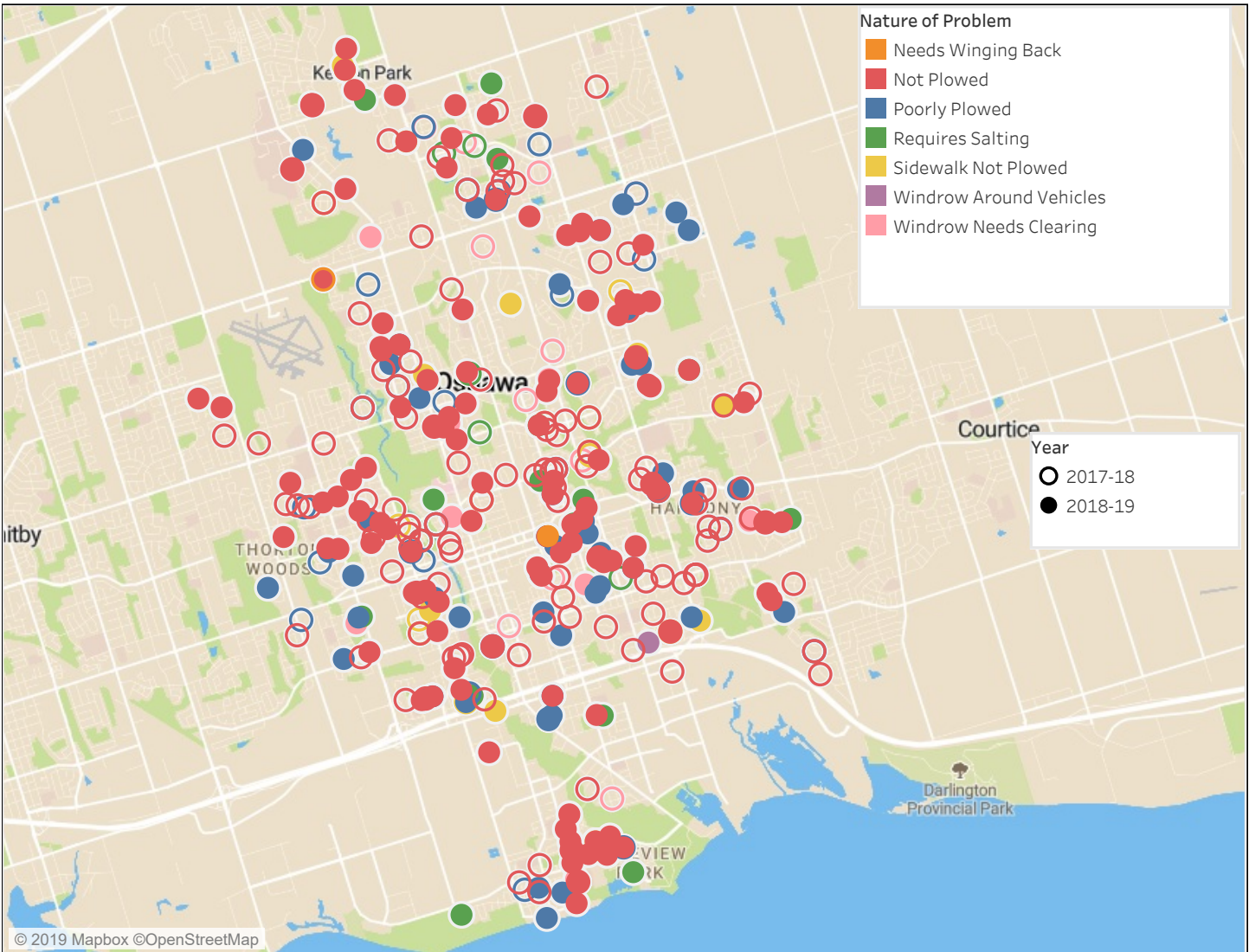
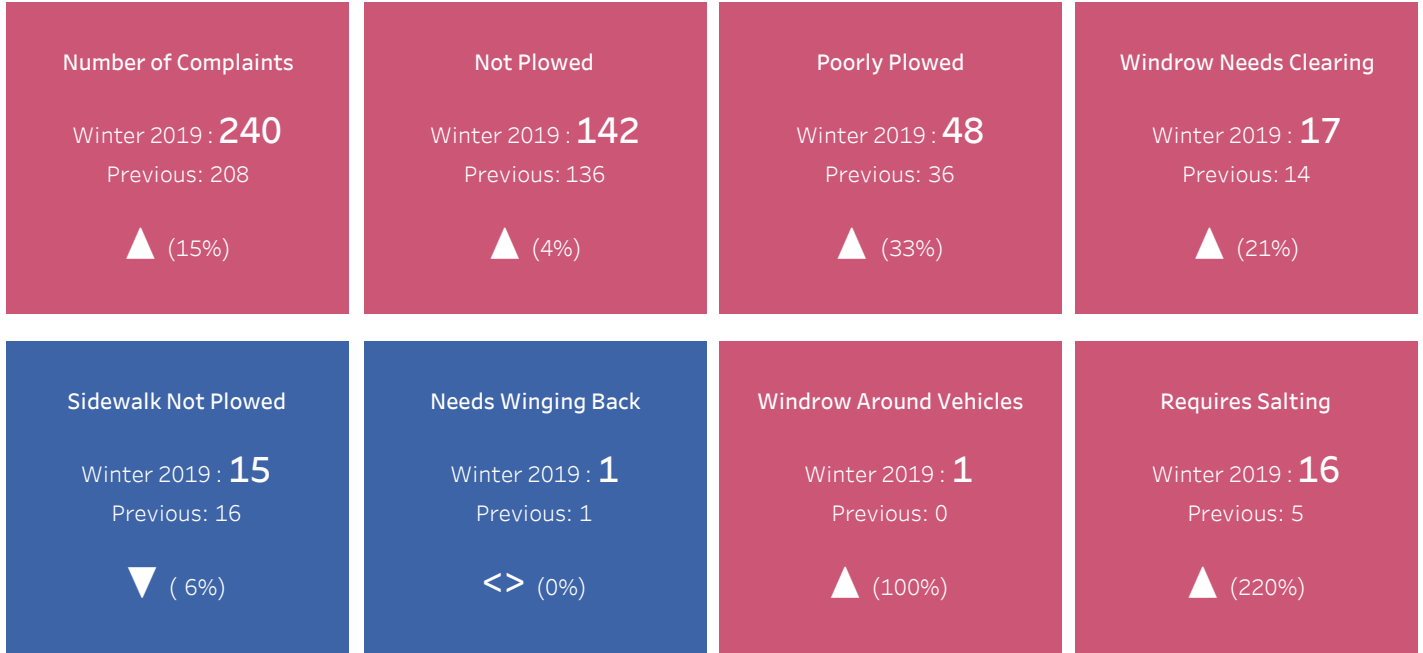
Spot Plowing & Salting (2018-19) | Top 5 Zones

Nature Of Problem	8	1	3	16	10
Drifting			1		
Needs Winging Back			1		1
Not Plowed	10	10	8	12	5
Other	2	3	4	3	2
Poorly Plowed	9	6	5	3	8
Requires Salting	1				
Triangle at Intersection		1			
Windrow Around Vehicles	1			1	1
	8	1	3	16	10

Spot Plowing & Salting (2017-18) | Top 5 Zones

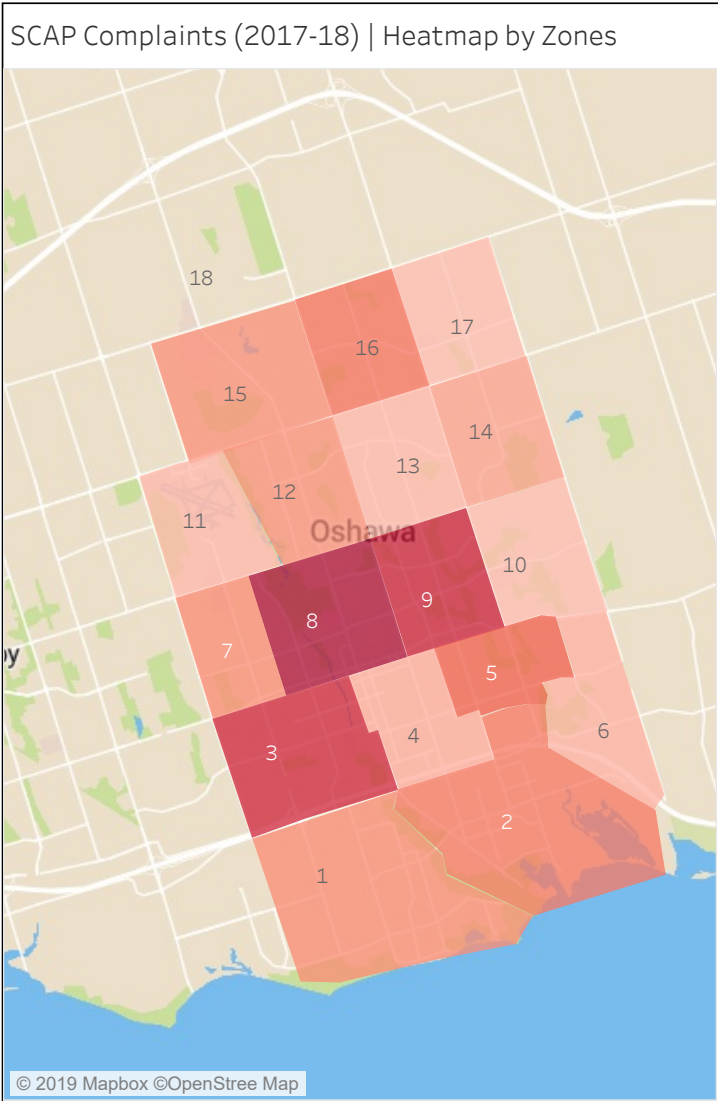
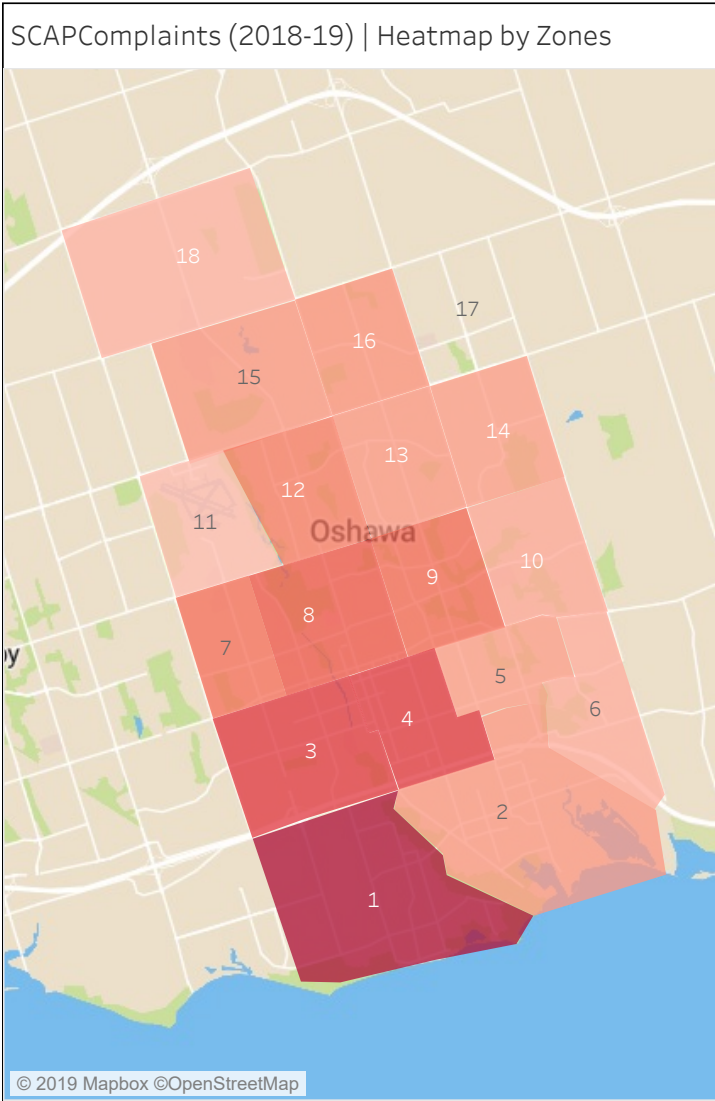
Nature Of Problem	1	16	8	3	10
Needs Winging Back	1	1	2	1	
Not Plowed	10	5	5	4	9
Other	1	4	2	5	2
Poorly Plowed	4	4	3	2	1
Requires Salting	2	1	1	1	
Windrow Around Vehicles	1		1		
	1	16	8	3	10

# Snow Clearing Assistance Program Complaints



2018-19	Number of Complaints	Most Frequent Complaint
	240	Not Plowed

2017-18	Number of Complaints	Most Frequent Complaint
	208	Not Plowed



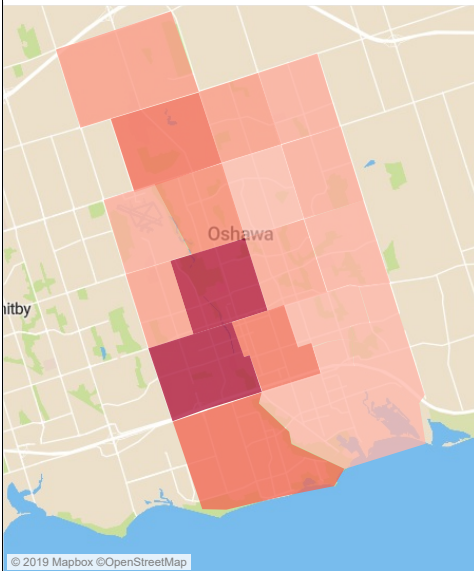
Snow Clearing Assistance Program (2018-19) | Top 5 Zones

Nature of Problem	1	3	4	8	9
Needs Winging Back			1		
Not Plowed	21	11	13	16	11
Poorly Plowed	5	10	8	1	3
Requires Salting	3	2		1	2
Sidewalk Not Plowed	3	1	2		1
Windrow Needs Clearing	4	2	2	3	1
	1	3	4	8	9

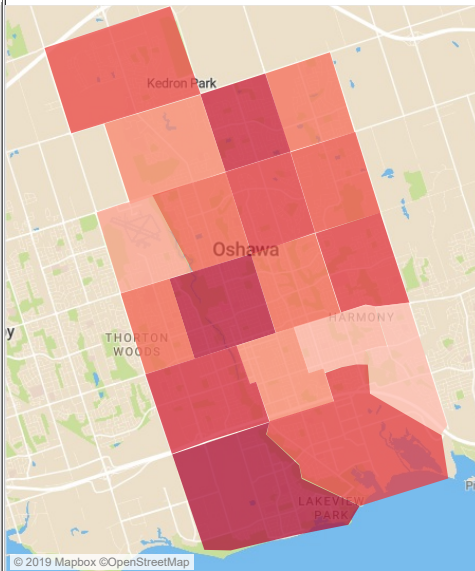
Snow Clearing Assistance Program (2017-18) | Top 5 Zones

Nature of Problem	8	9	3	1	4
Not Plowed	20	19	20	7	2
Poorly Plowed	7	3	4	3	
Requires Salting	1				1
Sidewalk Not Plowed	3	6	3		
Windrow Needs Clearing	3	1	1	1	2
	8	9	3	1	4

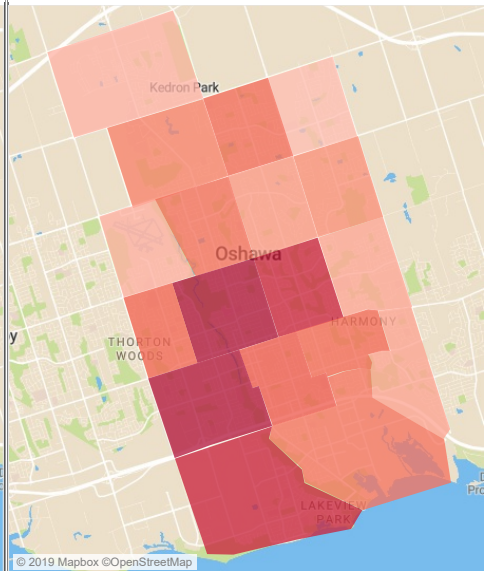
Sidewalk Complaints | Heatmap by Zones



Spot Plowing and Salting | Heatmap by Zones



Snow Clearing Assistance Program | Heatmap by Zones



Sidewalk Complaints | Top 3 Zones

Zone ID	Icy	Not Cleared At All	Other	Poorly Cleared
3	11	16		4
8	7	17	2	4
1	2	12	1	1

Spot Plowing and Salting | Top 3 Zones

Zone ID	Needs Winged Back	Not Plowed	Other	Poorly Plowed	Requires Salting	Triangle at Intersections	Windrow Around Vehicles
1	1	20	4	10	2	1	1
8	2	15	4	12	2		2
16	1	17	7	7	1		1

Snow Clearing Assistance Program | Top 3 Zones

Zone ID	Not Plowed	Poorly Plowed	Requires Salting	Sidewalk Not Plowed	Windrow Needs Clearing
8	36	8	2	3	6
3	31	14	2	4	3
1	28	8	3	3	5



## Appendix E: Shift Reports and Work Logs

As part of our review, we have reviewed the completeness and accuracy of Road Operations manual shift tracking by reviewing management’s winter maintenance tracking sheets which consist of Shift Reports and Work Logs.

The Shift Reports (Winter Control Operations Shift Reports) detail the shift start and end times, precipitation details, and operations information. The full shift report includes the Roads and Sidewalks Winter Patrol shift information that details various locations’ current weather standing.

The Work Logs (Plow/ Salt Combo Logs) detail the shift start and end times, the Zone routes for the shift, the Supervisor(s), Patrol staff, and drivers on shift. Each driver’s Zone route is noted on the Work Log and their start and finish times.

We have selected three weather events as per our review for 2017/2018, and three weather events as per our review for 2018/2019.

### Appendix E.1: Shift Report Checklist – 2017/2018 Storm Events

When analyzing shift reports, we noted several instances where information was missing or logs were not filled in correctly. Most notably, over the three samples (19 reports examined):

- 1 shift report was missing a supervisor sign-off
- 11 shift reports were missing a management sign-off

January 12-13, 2018				
Date	Shift	Filled Out	Signed by Supervisor	Signed by Manager
11-Jan	11 PM - 7 AM	Y	Y	N
12-Jan	7 AM - 3 PM	Y	Y	Y
12-Jan	3 PM - 11 PM	Y	Y	Y
12-Jan	11 PM - 11 AM*	Y	Y	Y
13-Jan	11 AM - 11 PM*	Y	Y	Y
13-Jan	11 PM - 11 AM*	Y	Y	Y

\*Note: Discrepancy in the shift length on Jan 12 & Jan 13 (12hrs), as opposed to all other shifts (8 hrs)



January 29 - February 2, 2018

Date	Shift	Filled Out	Signed by Supervisor	Signed by Manager
29-Jan	3 PM - 11 PM	Y	Y	N
29-Jan	11 PM - 7 AM	Y	Y	N
30-Jan	7 AM - 3 PM	Y	Y	N
30-Jan	3 PM - 11 PM	Y	Y	N
30-Jan	11 PM - 7 AM	Y	Y	N
31-Jan	7 AM - 3 PM	Y	Y	N
31-Jan	3 PM - 11 PM	Y	Y	N
31-Jan	11PM - 7 AM	Y	Y	N
1-Feb	7 AM - 3 PM	Y	Y	Y
1-Feb	3 PM - 11 PM	Y	Y	Y
1-Feb	11 PM - 7AM	Y	N	Y

March 16 -17, 2018

Date	Shift	Filled Out	Signed by Supervisor	Signed by Manager
15-Mar	11 PM - 7 AM	Y	Y	N
16-Mar	7 AM - 3 PM	Y	Y	N



## Appendix E.2: Work Logs Checklist – 2017/2018 Storm Events

Through analyzing work logs, we noted several instances where information was missing or logs were not filled in correctly. Most notably, over the three samples (39 logs examined):

- 4 log reports were missing a supervisor sign-off
- 13 log reports contained missing information [Note: missing information includes missing dates, supervisors, patrol officers, time in/out and/or truck number]

January 12-13, 2018							
Logs Checklist	Date	Shift	Supervisor	Patrol	Time In/Out	Truck	Signature
Arterial/Collector	12-Jan	7 AM - 3 PM	Y	Y	Y	Y	Y
Arterial/Collector	12-Jan	3 PM - 11 PM	Y	Y	N	Y	Y
Arterial/Collectors	13-Jan	11 PM - 11 AM	Y	Y	Y	Y	Y
Residential	12-Jan	3 PM - 12 AM	Y	Y	N	N	Y
Residential	12-Jan	3 PM - 12 AM	Y	Y	Y	N	Y
Residential	12-Jan	7 AM - 3 PM	Y	Y	Y	Y	Y
Residential	13-Jan	10PM - 11:30 AM	Y	N	Y	N	Y
Sidewalk Mechanical	11-Jan	11 PM - 7 AM	Y	Y	Y	Y	Y
Sidewalk Mechanical	12-Jan	3 PM - 11 PM	Y	Y	N	N	Y
Sidewalk Mechanical	12-Jan	11 PM - 11 AM	Y	Y	Y	N	Y

January 29 – Feb 2, 2018							
Logs Checklist	Date	Shift	Supervisor	Patrol	Time In/Out	Truck	Signature
Arterial/Collectors	29-Jan	3 PM - 11 PM	Y	Y	Y	Y	Y
Arterial/Collectors	29-Jan	11 PM - 7 AM	Y	Y	Y	Y	Y
Arterial/Collectors	30-Jan	7 AM - 3 PM	Y	Y	Y	Y	Y
Arterial/Collectors	30-Jan	3 PM - 11 PM	Y	Y	Y	Y	Y
Arterial/Collectors	31-Jan	7 AM - 3 PM	Y	Y	Y	Y	N
Arterial/Collectors	31-Jan	7 AM - 3 PM	Y	Y	Y	Y	N
Arterial/Collectors	31-Jan	3 PM - 11 PM	Y	Y	Y	Y	Y
Arterial/Collectors	1-Feb	7 AM - 3 PM	Y	Y	Y	Y	Y
Arterial/Collectors	2-Feb	7 AM - 3 PM	Y	N	N	N	N
Arterial/Collectors	2-Feb	11 PM - 7 AM	Y	Y	Y	Y	Y
Residential	29-Jan	3 PM - 11 PM	Y	Y	Y	N	Y
Residential	29-Jan	11 PM - 7 AM	Y	Y	Y	Y	Y



Residential	30-Jan	7 AM - 3 PM	Y	Y	Y	Y	Y
Residential	30-Jan	3 PM - 11 PM	Y	Y	Y	Y	Y
Residential	30-Jan	11 PM - 7 AM	Y	Y	Y	Y	Y
Residential	31-Jan	7 AM - 3 PM	Y	Y	Y	Y	N
Residential	31-Jan	3 PM - 11 PM	Y	Y	Y	Y	Y
Residential	1-Feb	7 AM - 3 PM	Y	Y	Y	Y	Y
Residential	2-Feb	11 PM - 7 AM	Y	Y	Y	Y	Y
Residential	2-Feb	7 AM - Not Filled In	Y	Y	N	Y	Y
Sidewalk Mechanical	29-Jan	11 PM - 7 AM	Y	Y	Y	Y	Y
Sidewalk Mechanical	30-Jan	7 AM - 3 PM	Y	Y	Y	N	Y
Sidewalk Mechanical	30-Jan	3 PM - 11 PM	Y	Y	Y	Y	Y
Sidewalk Mechanical	30-Jan	11 PM - 7 AM	Y	Y	N	Y	Y
Sidewalk Mechanical	31-Jan	3 PM - 11 PM	Y	Y	Y	N	Y
Sidewalk Mechanical	1-Feb	7 AM - 3 PM	N	N	N	N	Y
Sidewalk Mechanical	1-Feb	3 PM - 11 PM	Y	Y	Y	Y	Y

### March 16 -17, 2018

Logs Checklist	Date	Shift	Supervisor	Patrol	Time In/Out	Truck	Signature
Arterial/Collectors	29-Jan	3 PM - 11 PM	Y	Y	Y	Y	Y
Arterial/Collectors	29-Jan	11 PM - 7 AM	Y	Y	Y	Y	Y





## Appendix E.3: Shift Report Checklist – 2018/2019 Storm Events

When analyzing shift reports, we noted several instances where information was missing or logs were not filled in correctly. Most notably, over the three samples (18 reports examined):

- 1 shift report was missing a supervisor sign-off

January 2- 4, 2019				
Date	Shift	Filled Out	Signed by Supervisor	Signed by Manager
2-Jan	7 AM - 3 PM	Y	Y	Y
2-Jan	3 PM - 11 PM	Y	Y	Y
2-Jan	11 PM - 7 AM	Y	Y	Y
3-Jan	7 AM - 3 PM	Y	Y	Y
3-Jan	3 PM - 11 PM	Y	Y	Y

January 31 – February 1, 2019				
Date	Shift	Filled Out	Signed by Supervisor	Signed by Manager
30-Jan	11 PM - 7 AM	Y	N	Y
31-Jan	7 AM - 3 PM	Y	Y	Y
31-Jan	3 PM - 11 PM	Y	Y	Y
31-Jan	11 PM - 7 AM	Y	Y	Y
1-Feb	7 AM - 3 PM	Y	Y	Y
1-Feb	3 PM - 11 PM	Y	Y	Y

January 31 – February 1, 2019				
Date	Shift	Filled Out	Signed by Supervisor	Signed by Manager
6-Feb	7 AM - 3 PM	Y	Y	Y
6-Feb	3 PM - 11 PM	Y	Y	Y
6-Feb	11 PM - 7 AM	Y	Y	Y
7-Feb	7 AM - 3 PM	Y	Y	Y
7-Feb	3 PM - 11 PM	Y	Y	Y
7-Feb	11 PM - 7 AM	Y	Y	Y
8-Feb	7 AM - 3 PM	Y	Y	Y



## Appendix E.4: Work Logs Checklist – 2018/2019 Storm Events

When analyzing work logs, we noted several instances where information was missing or logs were not filled in correctly. Most notably, over the three samples (36 logs examined):

- 7 log reports were missing a supervisor sign-off
- 22 log reports contained missing information [Note: missing information includes missing dates, supervisors, patrol officers, time in/out and/or truck number]

January 2-4, 2019							
Logs Checklist	Date	Shift	Supervisor	Patrol	Time In/Out	Truck	Signature
Arterial/Collector	2-Jan	4:30PM - 11PM	Y	Y	Y	Y	Y
Arterial/Collector	2-Jan	4:30PM - 11PM	Y	Y	Y	Y	Y
Residential	2-Jan	4:30PM - 11PM	Y	Y	Y	Y	Y
Residential	3-Jan	7 AM - 3PM	Y	Y	N	Y	Y
Residential	3-Jan	3PM - 11PM	Y	Y	Y	Y	Y
Sidewalk Mechanical	3-Jan	7AM - 3PM	Y	Y	N	N	Y
Sidewalk Mechanical	3-Jan	3PM - 11PM	Y	Y	Y	Y	Y
Sidewalk Mechanical	3-Jan	11PM - 7AM	Y	Y	Y	Y	Y
Arterial/Collector	2-Jan	4:30PM - 11PM	Y	Y	Y	Y	Y
Arterial/Collector	2-Jan	4:30PM - 11PM	Y	Y	Y	Y	Y

January 31 – February 1, 2019							
Logs Checklist	Date	Shift	Supervisor	Patrol	Time In/Out	Truck	Signature
Residential	31-Jan	7 AM - 3 PM	Y	Y	N	N	Y
Residential	31-Jan	3 PM - 11PM	Y	N	N	N	Y
Residential	31-Jan	11 PM - 7 AM	Y	N	Y	Y	Y
Residential	1-Feb	7 AM - 3 PM	Y	Y	Y	Y	Y
Sidewalk Mechanical	31-Jan	7 AM - 3 PM	Y	N	N	N	Y
Sidewalk Mechanical	31-Jan	3 PM - 11 PM	Y	Y	Y	Y	Y
Sidewalk Mechanical	31-Jan	11 PM - 7 AM	Y	Y	Y	N	Y
Sidewalk Mechanical	31-Jan	11 PM - 7 AM	Y	Y	Y	N	Y
Sidewalk Mechanical	1-Feb	7 AM - 3 PM	Y	Y	Y	N	Y
Sidewalk Mechanical	1-Feb	3 PM - 11 PM	Y	Y	Y	Y	Y
Residential	31-Jan	7 AM - 3 PM	Y	Y	N	N	Y
Residential	31-Jan	3 PM - 11PM	Y	N	N	N	Y



February 6-8, 2019

Logs Checklist	Date	Shift	Supervisor	Patrol	Time In/Out	Truck	Signature
Arterial/Collector	6-Feb	7 AM - 3 PM	Y	Y	Y	Y	Y
Arterial/Collector	6-Feb	3 PM - 11 PM	Y	Y	Y	Y	Y
Arterial/Collector	6-Feb	Not Filled In	Y	Y	N	N	Y
Arterial/Collector	6-Feb	11 PM - 7 AM	Y	Y	Y	N	N
Arterial/Collector	7-Feb	7 AM - 3 PM	Y	Y	Y	N	N
Residential	6-Feb	7 AM - 3 PM	Y	Y	Y	N	Y
Residential	6-Feb	3 PM - 11 PM	Y	Y	Y	Y	Y
Residential	6-Feb	11 PM - 7 AM	Y	Y	Y	Y	N
Residential	7-Feb	7 AM - 3 PM	Y	Y	Y	N	N
Residential	7-Feb	3 PM - 11 PM	Y	Y	Y	Y	Y
Residential	7-Feb	11 PM - 7 AM	Y	Y	Y	N	Y
Residential	8-Feb	7 AM - 3 PM	Y	Y	Y	N	Y
Sidewalk Mechanical	7-Feb	7 AM - 11 PM	Y	Y	Y	N	N
Sidewalk Mechanical	7-Feb	3 PM - 11 PM	Y	Y	Y	N	Y
Sidewalk Mechanical	7-Feb	11 PM - 7 AM	Y	Y	Y	N	Y
Sidewalk Mechanical	7-Feb	11 PM - 7 AM	Y	Y	Y	N	N
Sidewalk Mechanical	8-Feb	7 AM - 3 PM	Y	Y	Y	N	Y
Sidewalk Mechanical	8-Feb	3 PM - 11 PM	Y	Y	N	N	N

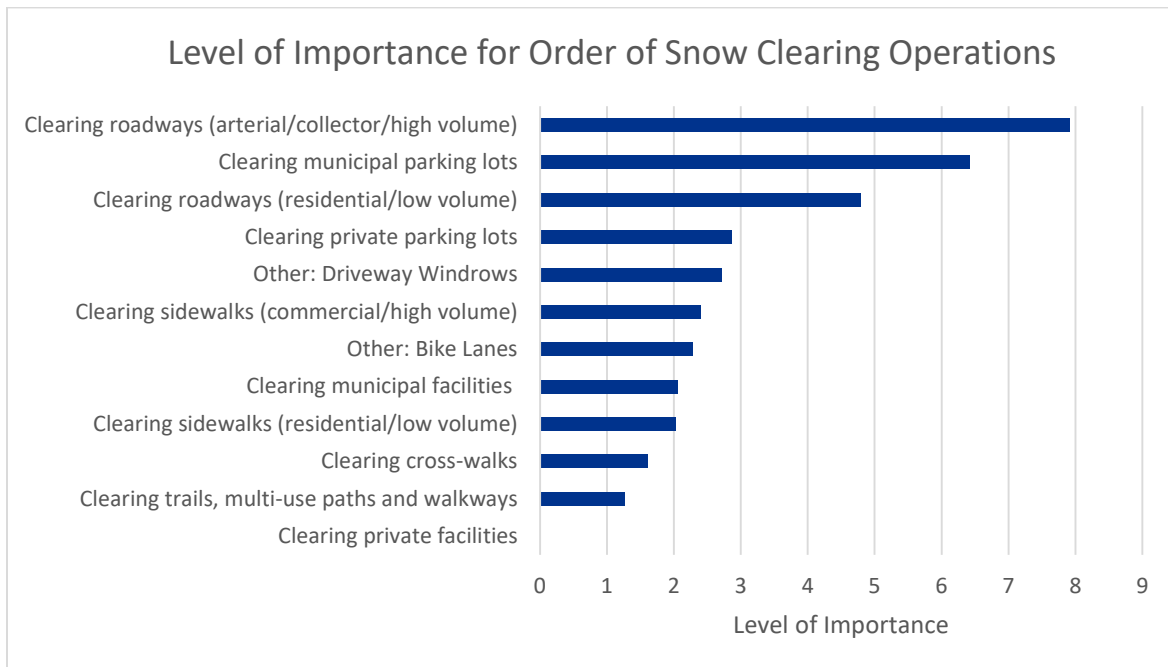


## Appendix F: Benchmarking survey results

In the following Appendix, we have outlined the results of our benchmarking survey. In total, ten responses were received from municipalities in Southern Ontario. Please note that we have not audited the accuracy of the data, and have therefore placed reliance on the information provided to us to formulate our findings. In addition, for confidentiality reasons, we have anonymized our survey results. Each municipalities reference number is constant across all graphs (where a reference is provided) in order to help process the findings and make appropriate comparisons. A summary of our findings can be seen below.

Note that where graphs show benchmarking results by municipality (i.e. municipality is listed on the “x” axis), Oshawa is municipality number 10.

### Question 1: Municipality’s sequential order of operations following a snowfall:



Level of importance was determined through applying a weighted scoring system based on each municipality’s response. “Clearing roadways (arterial/collector/high volume)” had the highest weighted score and so was determined the most important operation.

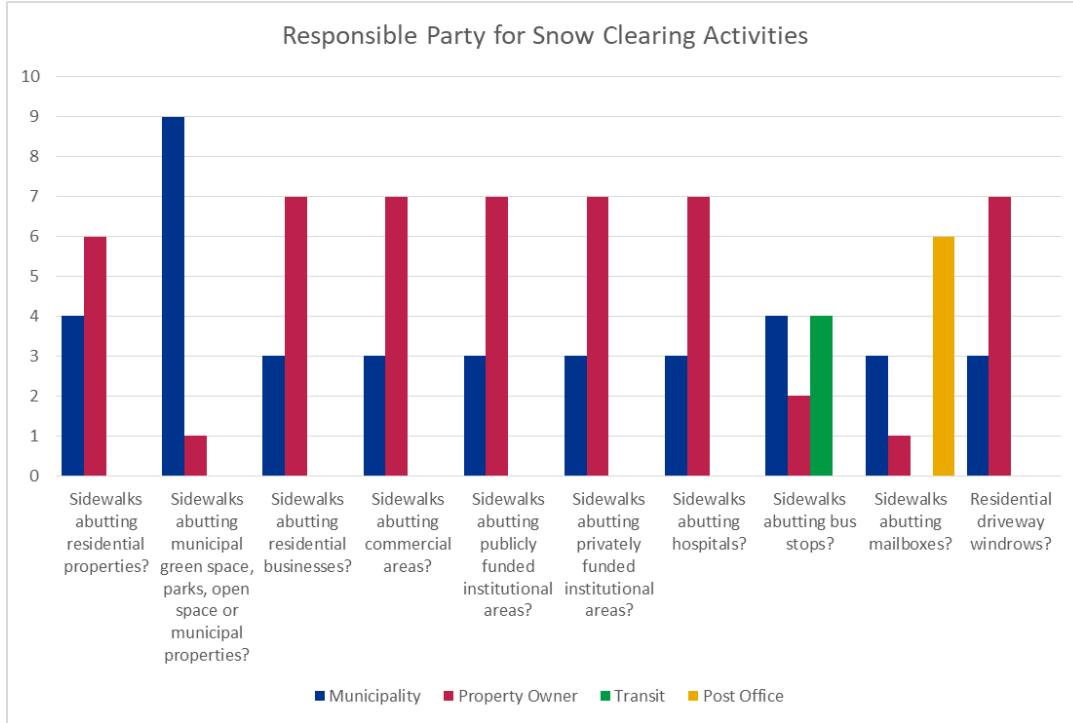
We have concluded that the three highest priority areas in snow clearing is as follows:

1. Clearing high volume roadways and municipal parking lots
2. Clearing low volume roadways and sidewalks
3. Clearing cross-walks and private parking lots

These findings are in-line with Oshawa’s priority system for snow clearing.



**Question 2: Municipality responsibility in performing the following activities:**



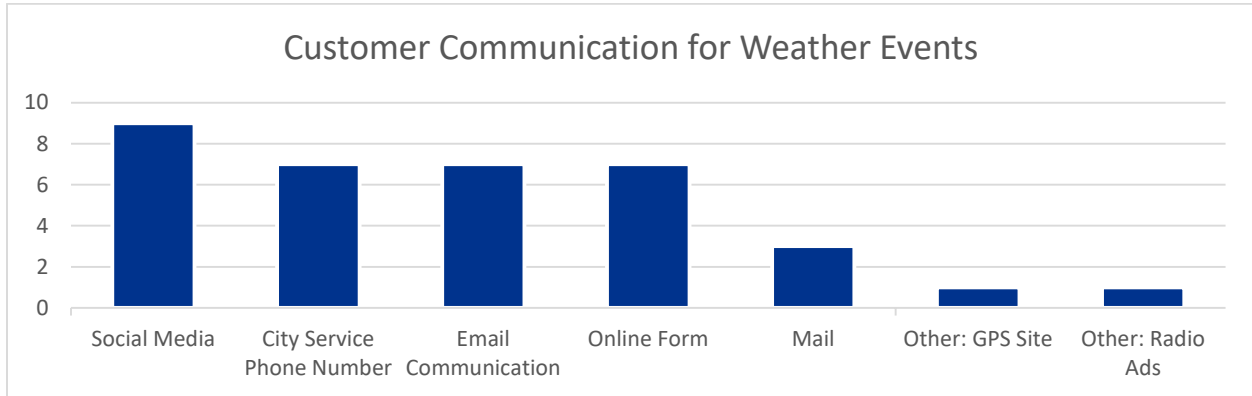
We have concluded the following on municipalities’ responsibilities:

- 90% of municipalities surveyed noted the municipality clears sidewalks abutting municipal green space, parks, open space or municipal properties
- Approximately 40% of municipalities clear sidewalks abutting residential properties, whereas for 60% of municipalities, the responsibility resides with the property owner

We noted overall that the City of Oshawa’s municipal responsibilities align with the majority of the municipalities surveyed.



**Question 3: Contact services for customer communication for weather events:**



Social Media is the most popular communication platform for Weather Events, followed by Online Forms, and email and phone contact options. We noted that Oshawa undertakes the top four communication methods.

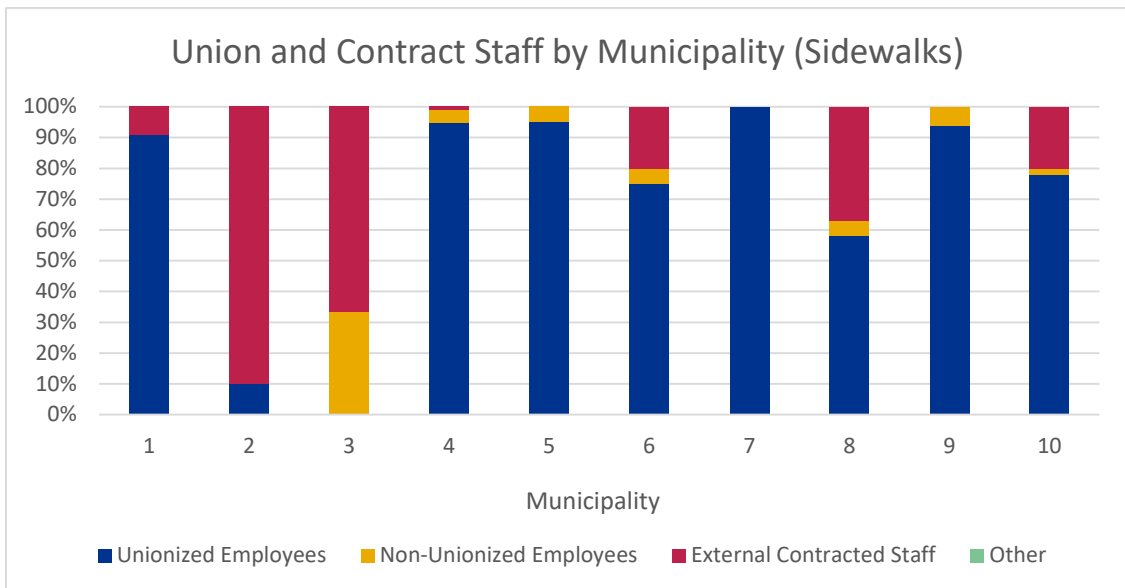
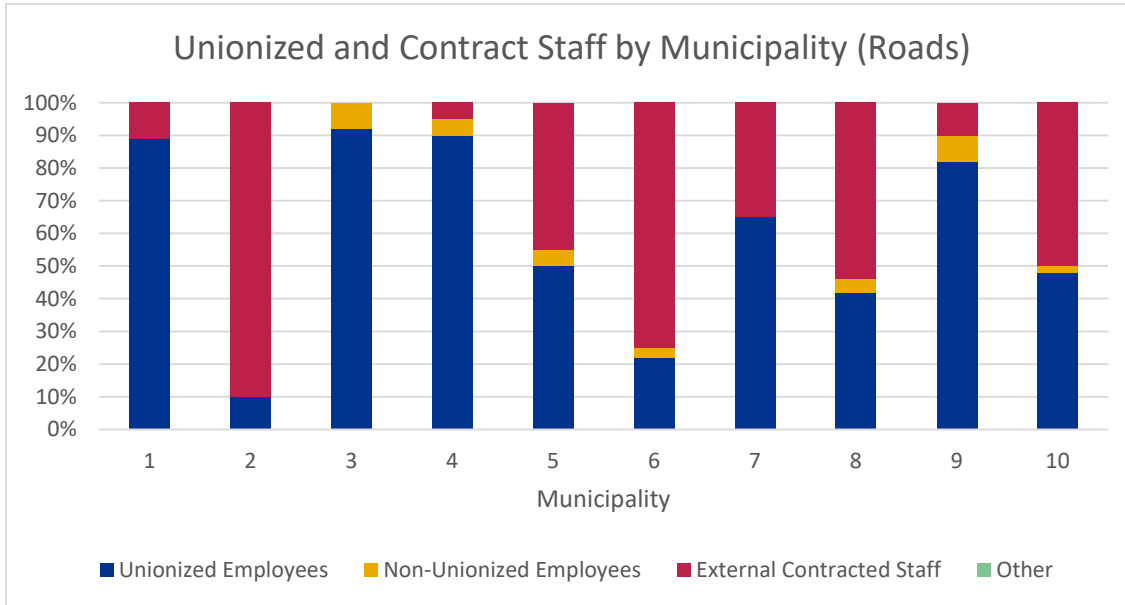
**Question 4: Snow Clearing Assistance Program (SCAP)**

Do you have a snow clearing assistance program for seniors?	# of Municipalities
Yes	9
No	1
How is the Program Funded?	# of Municipalities
Annual Flat Fee	3
No Cost to Senior (Part of Municipal Tax Levy)	6
Does the Program have a Max Annual Capacity (i.e. is there a limit to the number of seniors who can be accepted on the program)	# of Municipalities
Yes	3
No	6
Is there a maximum income level for eligibility?	# of Municipalities
Yes (See Rationale Below)	1
Program is available to seniors who are unable to afford private snow clearing	
No	8
Are there other eligibility factors for participation in the program?	# of Municipalities
Yes (See Rationale Below)	6
(6) Minimum age of 65 or eligible disabled person with no younger individuals living in home	
(6) Medical documentation for disabled person eligibility	
(1) Eligibility for home owners, not renters	
No	3

We have concluded the following on municipalities' snow clearing programs:

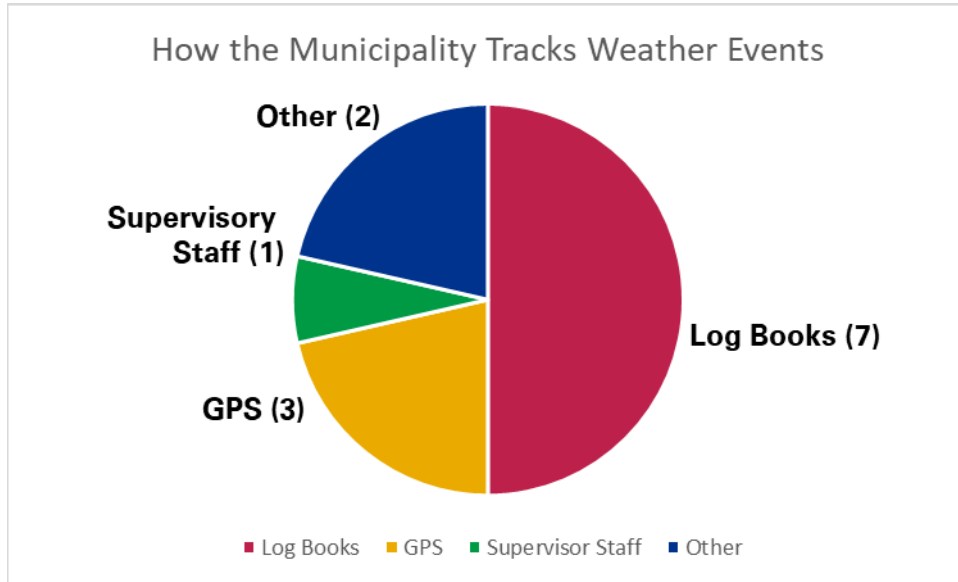
- 90% of municipalities surveyed have a snow clearing program, of which 33% funds the programs via a flat fee, and 33% have a maximum annual capacity.
- Responses received from the City align with the majority of survey responses.

Question 5: The percentage breakdown between unionized and contract staff.



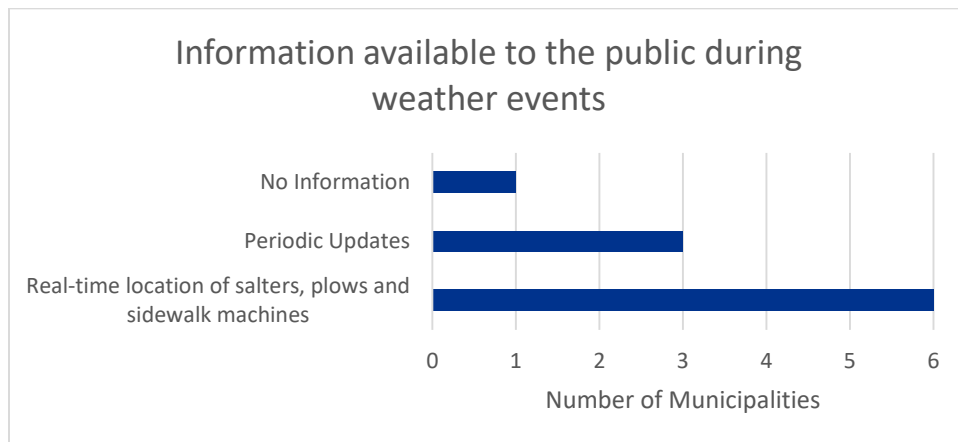
There is a wide range in the percentage breakdown between unionized and contracted staff for winter operations, notably, the larger municipalities employed a greater amount of external contracted staff compared to their smaller counterparts for Road Clearing. The average distribution for road clearing is 59% unionized, 3% non-unionized, and 38% external. Most municipalities favoured a higher percentage of unionized employees for sidewalk clearing. The average distribution for sidewalk clearing is 70% unionized, 6% non-unionized, and 24% external.

**Question 6: How the Municipality Tracks Weather Events**



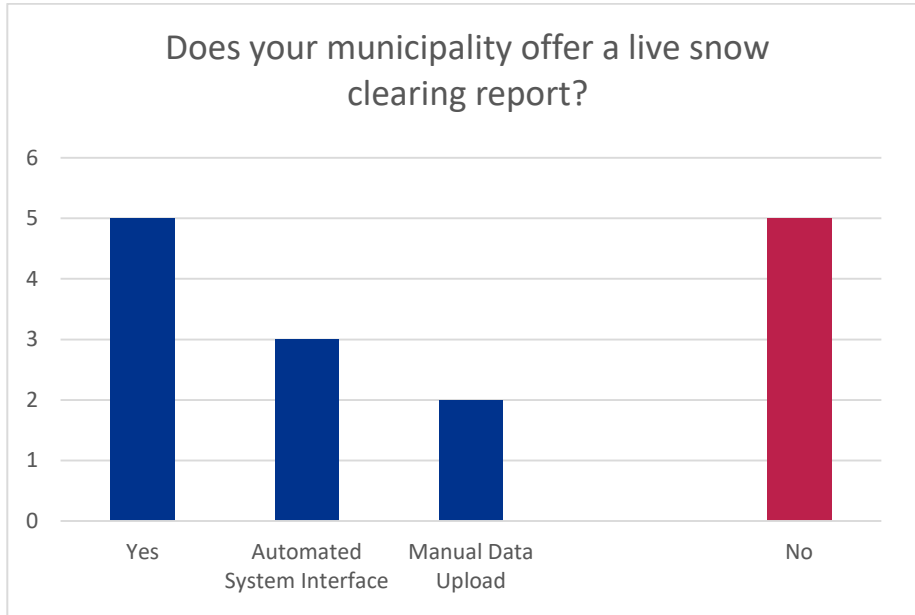
The majority (70%) of municipalities track weather events through log books. Multiple municipalities use a combination of Log Books and GPS. For “Other”, one municipality does not specifically follow provincial MMS, one municipality tracks weather events through a third party contractor, and one municipality uses video surveillance of patrol. The City of Oshawa aligns with the majority of the municipalities surveyed for weather event tracking.

**Question 7: What information does the municipality make available to the public during weather events?**



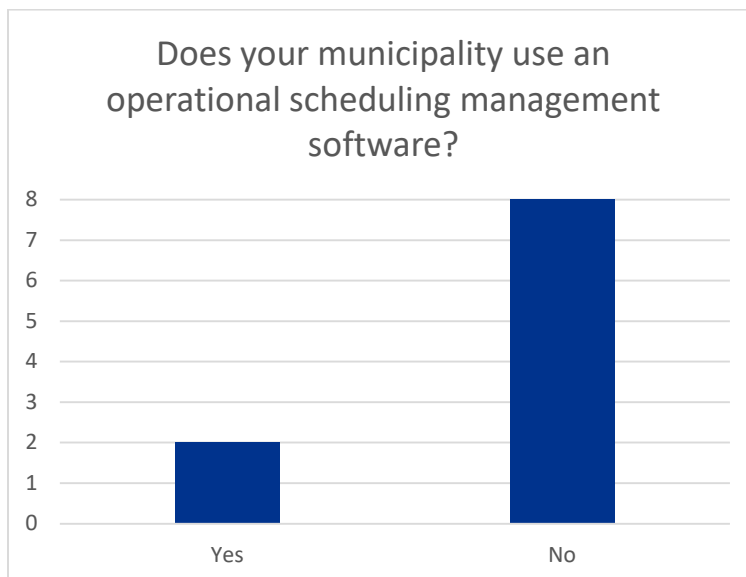


**Question 8: Does your municipality offer a live online snow clearing activity report?**



50% of municipalities offer a live snow clearing activity report. Of the municipalities who offer a live snow clearing activity report, 60% of municipalities use an automated system interface, while 40% use manual data upload. Oshawa is one of the municipalities that uses manual data upload as input in the live snow clearing report. Management can evaluate the use of automation in the future, but it is not used by a high percentage of survey respondents.

**Question 9: Does your municipality use an operational scheduling management software for the day-to-day dispatching and operations, including tracking of scheduled shifts and start/end times?**





Two municipalities use an operational scheduling management software, one for the day to day dispatching and operations and one to track overtime hours. The City of Oshawa is one of eight of the municipality’s surveys who do not use any specific software.

**Question 10: Do you use AVL or GPS tracking for road patrolling and vehicle locating?**

Response:	# of Municipalities
Burnside and Esri	2
BSM	1
Webtech	2
Fleet Complete	1
Focus	1
Fleet Freedom	1
Geotab	1

90% of the municipalities surveyed use AVL or GPS tracking for road patrolling and vehicle locating. The one municipality surveyed that does not employ these tracking methods is Oshawa. A variety of systems are used, with Burnside and Esri, and Webtech being the most used systems at two municipalities each.

**Question 11: What is the cost per linear kilometer for snow removal for your municipality?**

Municipality ID	Cost per linear KM:
3	\$ 1,663
4	\$ 2,429
6	\$ 2,478
8	\$ 1,500

The average cost per linear kilometer for snow removal is calculated by four of ten municipalities. The lowest cost calculated was \$1,663/linear KM and the highest cost calculated was \$2,478/linear KM. Note that six of the municipalities surveyed, including the City of Oshawa, does not track the cost per linear km of snow removal. The City should consider calculating this figure in order to benchmark against those four municipalities who currently track their costs per linear km.

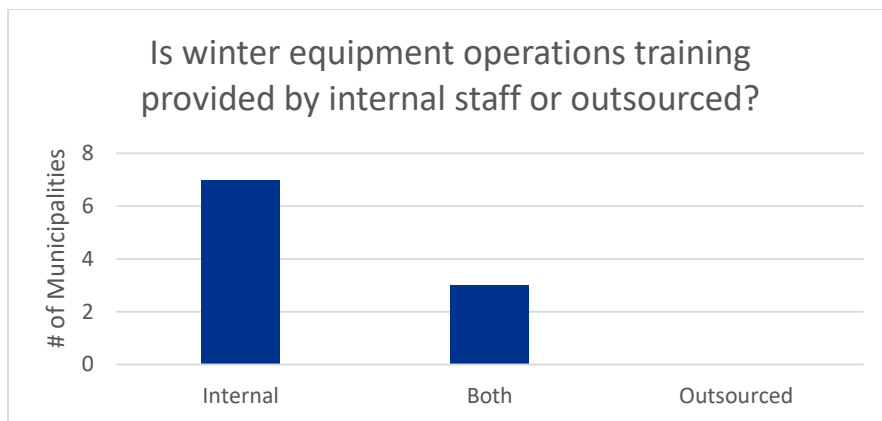


**Question 12: How is the budget developed for snow clearing and winter maintenance? Does your municipality have a winter reserve available?**

Municipality	Response:
1	We have a budget that increases yearly. The extra goes into a reserve.
2	The budget does not fluctuate annually other than for inflationary increases.
3	Budgets have been set by municipal Finance department in the past. Future budgets will be based on multi-year averages.
4	We take the historical average, there is no rolling budget. A reserve exists.
5	Budgets are annually approved by Council which covers all winter control costs. There is no winter reserve.
6	There is an annual budget, and there is a winter reserve available.
7	N/A - No response provided
8	Budgets are reviewed/compared to multi-year averages and then adjusted to respond to growth as our municipality is a growing community. Budgets are continually reviewed/adjusted to meet the service levels.
9	Currently based on prior year with increases for cost of living and growth as approved by Council. Any significant changes to operations such as the addition of on road cycling facilities in the MMS are funded through Issue Papers to Council for an increase to operational budget. There is a winter reserve.
10 (Oshawa)	The winter budget is based on a three year average of budgeted to actuals. There is a reserve of approximately \$1M.

Based on the responses provided, the City of Oshawa’s process over budgeting is fairly in line with other municipalities.

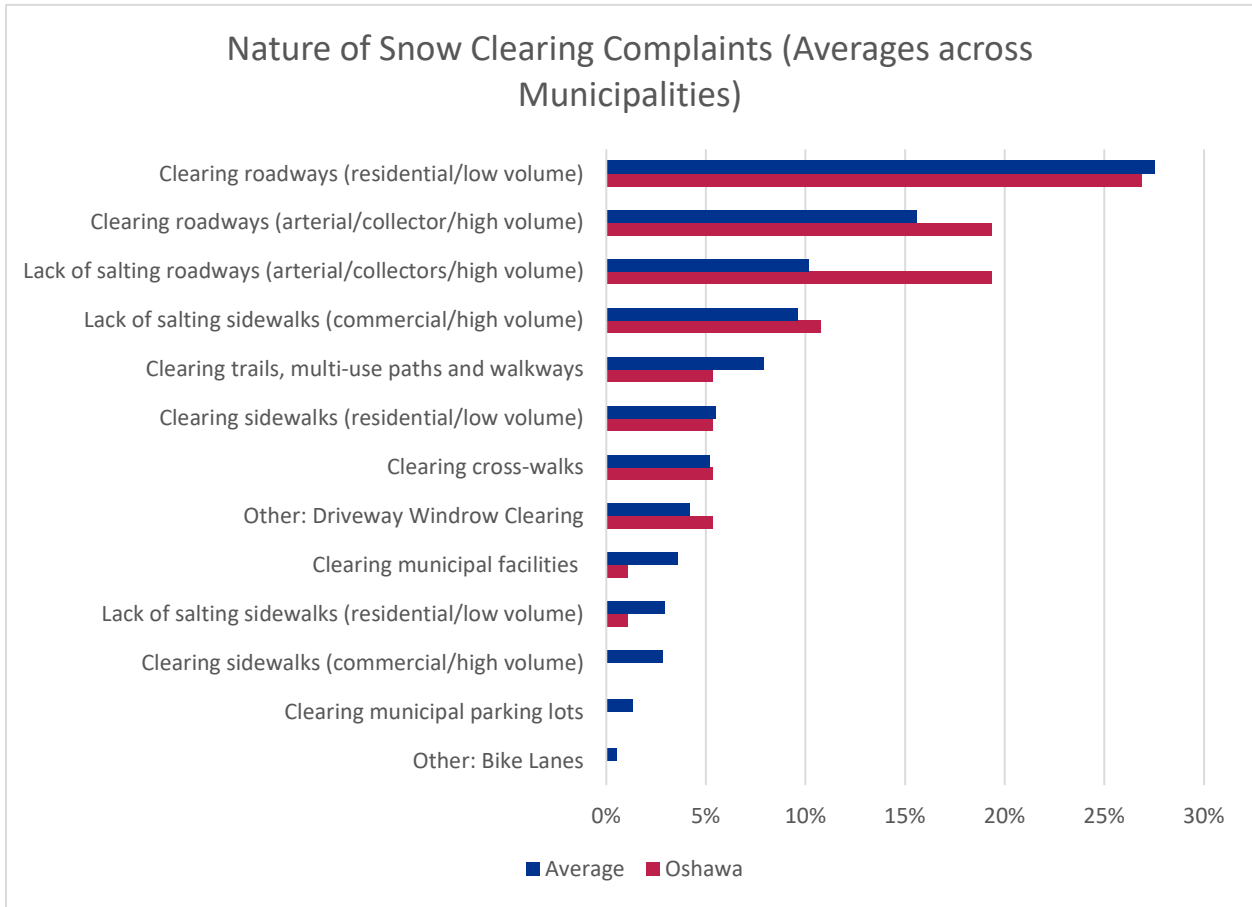
**Question 13: Is winter equipment operations training (i.e. driver training, equipment management training, etc.) provided to staff by internal staff or outsourced to a third party training company?**



In terms of winter operations training, 70% of municipalities (including the City of Oshawa) provide internal training, and the remaining 30% utilize a combination of internal and outsourced training. No municipality fully outsources training.



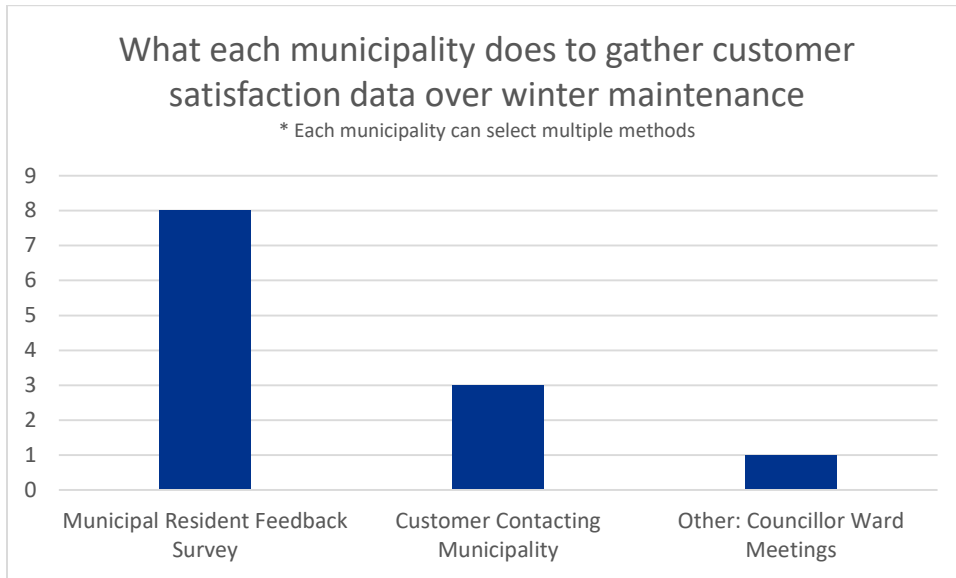
### Question 14: What is the nature of complaints related to snow clearing?



On average, roadway clearing and salting garnered the most complaints. The most frequent complaints pertained to clearing roadways (residential/low volume) with an average of 28%, and clearing roadways (arterial/collector/high volume) with an average of 16%. Overall, Oshawa’s complaints are in-line with the averages across municipalities.



Question 15: What does your municipality do to gather customer satisfaction data over the municipality's snow clearing and winter maintenance?



The most common method municipalities use to gather customer satisfaction data over snow clearing and winter maintenance is through Municipal Resident Feedback Surveys with 80% of municipalities employing this method. The City of Oshawa do not currently use Municipal Resident Feedback Surveys. **(See Recommendation 5)**



## Appendix G: Staff Involvement and Documents Reviewed

We undertook interviews and obtained feedback with key stakeholders to inform this work, including:

Name	Title
Mike Saulnier	Director of Operations
Phil Lyon	Manager, Road Operations
Jason Hotchkiss	Roads Operations Technologist
Jason Bishop	Superintendent, Roads
Phil Laurin	Supervisor, Patrol & Operations Support
Rhonda Grundy	Manager, Customer Service - Interim
Michelle Bretherick	Manager, Financial Reporting and Planning

We received the following documentation over the course of fieldwork:

- Shift Reports and Work Logs for Samples Selected for 2017-2018, and 2018-2019 winter operations
- Gantt chart displaying results of winter weather events for 2017-2018, and 2018-2019 winter operations
- Examples of operational logs used to document assigned staff and equipment during a winter event
- Service Oshawa Reports pertaining to winter complaints for 2017-2019, and 2018-2019
- 2018-2019 Winter Control Shift Schedule (Roads Staff, including Patrol, Howden Depot and Traffic)
- City of Oshawa Snow Clearing Council Approved Quality Standards;
- City of Oshawa Snow Clearing Council Approved Policy and Procedures;
- Ontario Provincial Maintenance Standards;
- City of Oshawa Snow and Ice Bylaw;
- 2018-2019 Snow Clearing Assistance Program Bulletin
- Operations Services Winter Inventory Budget 2017-2019
- Sidewalk Clearing Projection