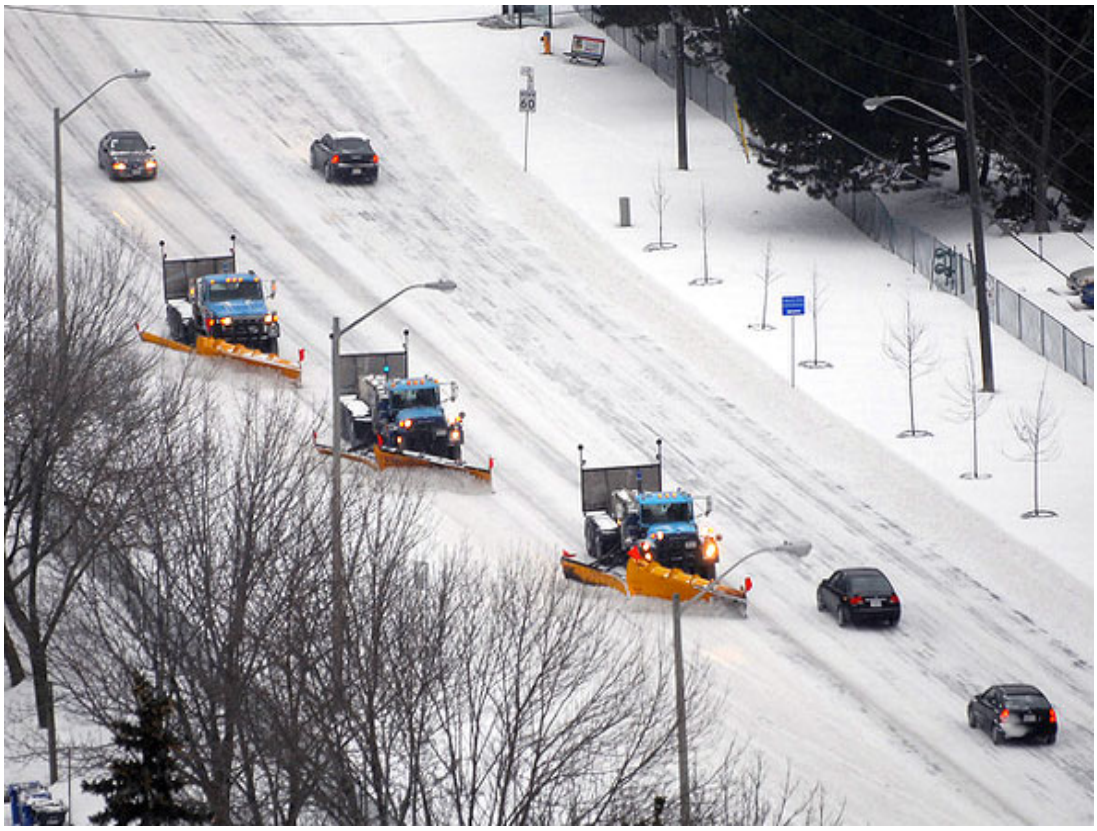
# AU6.2 Attachment 1



# Audit of Winter Road Maintenance Program –

# Phase One: Leveraging Technology and Improving Design and Management of Contracts to Achieve Service Level Outcomes

## Transportation Services Division

## October 14, 2020

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Auditor General

AUDITOR GENERAL TORONTO

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# Executive Summary

Keeping our roads and sidewalks salted and cleared of snow during winter months helps to ensure that the people travelling in the City of Toronto are safe and have a reliable transportation network.

**Audit Objective and Scope**

The objectives of this audit were to determine whether Transportation Services Division:

1. meets the council-approved service levels for winter road maintenance to provide a safe and reliable transportation network in the City of Toronto, and
2. manages contracts, evaluates contractor performance, and holds contractors accountable as per the contract terms.

This audit covered the period between November 2018 to January 2020 and included individual standby and operating payments for 850 vehicles sampled that were operational during this period. We also analyzed the entire 261,113 payment records over the past five years to calculate standby charges.

**Winter Road Maintenance program annual budget - $90M**

Transportation Services (the Division) is responsible for delivering the City's Winter Road Maintenance program with an annual budget of $90 million.

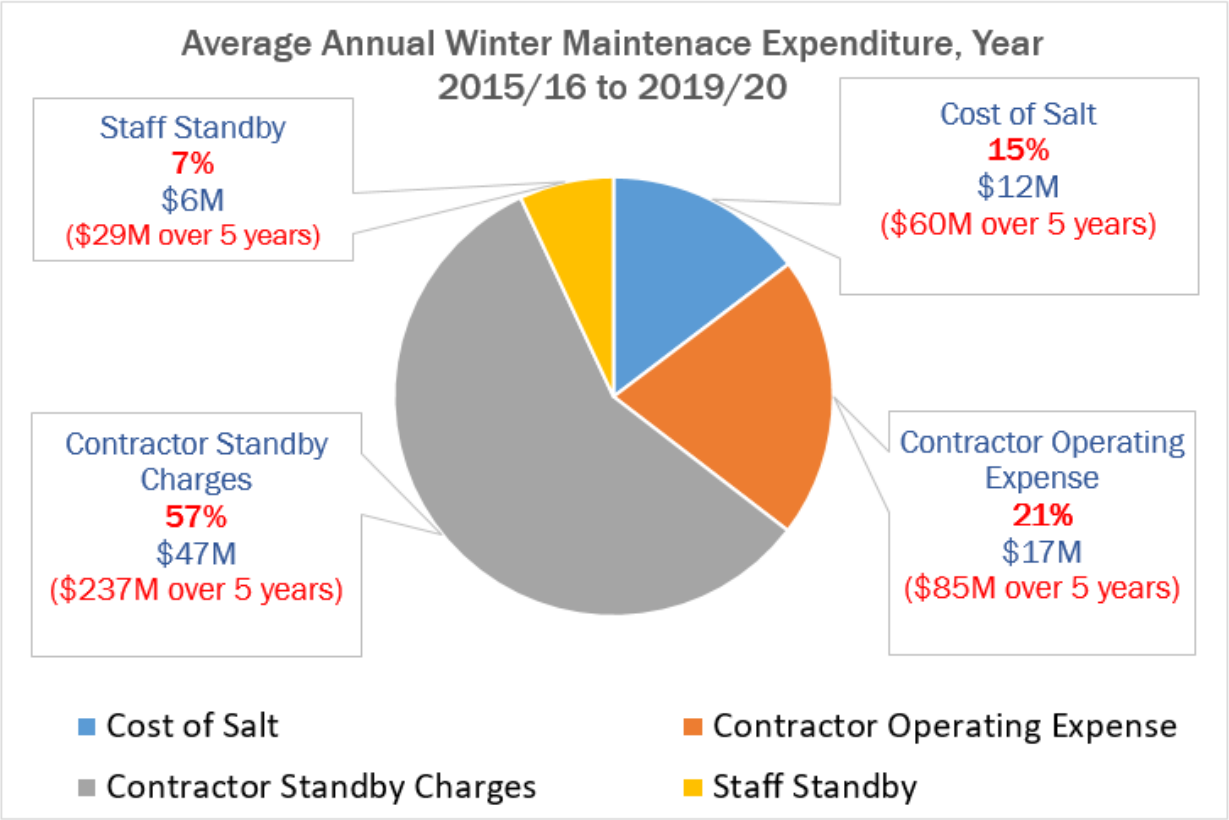
**Fleet of 1,100 contracted vehicles**

The Division has 47 seven-year contracts with 21 different contractors and a fleet of 1,100 contracted vehicles to deliver winter maintenance activities such as anti-icing, de-icing, snow plowing, and snow removal. In-house staff perform a small portion of winter maintenance work for local roads and laneway salting.

**57% ($47M annually or $237M over five years) of budget spent for contractors to be available on standby**

On average, the Division spends:

- 57 per cent ($47 million annually, $237 million over five years) of its winter maintenance expenditure on standby payments so that the contractors are available when it snows,
- 21 per cent ($17 million annually, $85 million over five years) on operating costs paid to the contractors for their services,
- 15 per cent ($12 million annually, $60 million over five years) on salt, and
- 7 per cent ($6 million annually, $29 million over five years) for the City's own staff to be available on standby, as shown in the pie chart below.




**$237M spent in last 5 years for contractor standby charges**

Over the last five years, the Division has paid $237 million in contractor standby charges to have the contractors' equipment on-site and personnel available during the winter season.

**On average, Toronto experiences:**
**7 snow days > 5 cm**
**13 snow days > 2.5 cm**

According to Environment Canada, each winter Toronto experiences an average of seven snow days of five centimeters or more and 13 snow days of two and a half centimeters or more.

Our analysis shows that the Division uses contracted vehicles for plowing and salting activities 14 days on average in a typical winter. The winter season runs from October to April with mid-November to mid-April being the peak season.

**The City's 7-year winter maintenance contracts are nearing the end of their term**

The winter contracts were signed in 2015 and are nearing the end of their seven-year term. This audit provides an opportunity for the Division to address the issues identified and make necessary improvements to the contracts prior to the next contract cycle.

**This is an opportunity to leverage this audit to improve the contracts and modernize monitoring of operations**

Our audit of winter operations is being conducted in two phases. The first phase, which is the subject of this report, focused on winter contract management. The second phase will consider the operating efficiencies and the cost-benefits of contracting out versus in-house delivery of winter services.

**Council approves service levels for Toronto annually**

**Service levels are higher than provincially mandated minimum standards**

City Council approves the City's winter maintenance service levels for various road types, and these service levels are higher than the provincially mandated minimum standards. This approval is done annually during the Operating Budget approval process. See the figure below for Council-approved service levels.

**Levels of Snow Clearing Service, Toronto**

| Road Type | When does the City start salting? | When does the City start plowing?* | How many hours after the snow stops falling does it take to clear an average storm? |
|---|---|---|---|
| Expressways (Don Valley Parkway & Gardiner Expressway) | When snow first accumulates | 2.5 cm | 2-3 hours |
| Major roads, streetcar routes, bus routes, streets with hills and bike lanes | | 5 cm | 6-8 hours |
| Neighbourhood roads | | 8 cm | 14-16 hours |

**Council-approved service levels, 2015-2022*

Since the **majority of the City's winter maintenance activities are performed by contractors**, it is critical to make sure the Division designs and manages the contracts properly. Although the Division contracts out the winter maintenance services, it remains responsible to ensure that contractors deliver the services in compliance with the contract terms, as well as meet City Council's expectations.

**Not meeting service levels can cause safety and reliability issues on the City's transportation network**

Good contract management ensures that contractors are only being paid for the services provided, and that program targets are met.

If contractors are not meeting their required service targets during winter snow events, it can cause safety and reliability issues for the City's transportation network.

Each winter vehicle, whether owned by the City or a contractor, is required to have a functioning GPS device installed for tracking and monitoring purposes. We used this GPS technology during our audit for samples where the GPS device was installed and functioning properly.

**Randomly sampled 850 out of 1,100 vehicles from all 47 contracts**

Our audit covered the period between November 2018 and January 2020. We randomly sampled 850 of 1,100 vehicles, from all 47 contracts.

**27% (227 of 850) of the samples reviewed did not have functioning GPS devices**

Twenty-seven per cent (or 227) of the above 850 samples did not have GPS information available either because the GPS devices malfunctioned or because the vehicles operated without a GPS unit. As a result, we could not verify whether service levels were met by these vehicles or whether the contractor payments for these audit samples were correct, and neither could management.

**Several contractors not consistently meeting service targets and many issues found with contractor performance**

We found that several contractors were not consistently meeting service targets, and Transportation Services staff were not appropriately managing contracts. For example, we found that several contractors had excessive stop times, were starting their shifts late, claiming more hours than worked, and operating without a functioning GPS device. As a result, Council approved service levels may not be met.

**Staff generally not using GPS data to verify contractors' services or measure route completion**

In addition, Transportation Services staff were generally not using the GPS data available to verify the contractors' services or to measure route completion and service levels. Staff primarily use the GPS information to address 311 service requests and verify claims from members of the public for damage to personal property and bodily injury caused by unsafe road conditions during the winter.

**Total estimated financial impact to the City of $31M over 5 years due to non-compliance by contractors ($7.1M) and not following the express terms of the contract for standby payments ($24M)**

From the issues identified during our audit, we estimate that the City overpaid approximately $7.1 million over a five-year period due to non-compliance by contractors. We estimate the City could have saved an additional $24 million in contractor standby charges if it had applied the express terms of the contract for standby payments. This results in a total estimated financial impact of $31 million over a five year period as shown in the table below. In addition, we were not able to quantify the long term impact of other issues such as salt spreader errors and inefficiencies of using manual processes.

**Potential savings of an additional $9.6M for 2 remaining years in current contract if express terms of contract applied for standby payments**

With two years remaining in the current contract, the City could save an additional $9.6 million if Transportation Services applied the express terms of the contract for standby payments, dependent on legal advice. Given past practices this is a question for the City's legal services to consider further.

Total Estimated Financial Impact of Contractor Non-Compliance and Standby Issue

| Issue | Estimated financial impact per operating day from samples | Estimated financial impact projected over five years[2] |
|---|---|---|
| Late starts | $62,800 | $3,807,500 |
| Contractors claiming more hours than worked | $19,500 | $1,181,000 |
| Excessive stop times | $20,900 | $1,274,700 |
| Vehicle not available for operations | $13,000 | $792,200 |
| GPS not working[1] | Unknown | Unknown |
| GPS vendor billing errors | - | $50,000 |
| Potential salt wastage due to salt spreader errors[3] | Unknown | Unknown |
| **Estimated loss from contractor non-compliance** | **$116,200** | **$7,105,400** |
| Estimated financial impact of not following express contract terms for standby payment[4] | - | **$23,949,600** |
| **Total estimated financial impact** | **$116,200** | **$31,055,000** |

*[1] According to the contract, Transportation Services can withhold daily standby payments to contractors if they are responsible for GPS units malfunctioning. We found 227 of 850 sampled vehicles did not have a working GPS device. Many of these units had not reported since at least 2019, and some as far back as 2015/16. On average, the daily standby rate amounts to $323 per vehicle, although it varies by contract and type of vehicle. It is difficult to estimate the amount of standby payment that should have been withheld due to many variables and lack of information.*

*[2] Projection based on average of seven snow days of five centimeters or more, per year (source: Environment Canada).*

*[3] Errors in salt spreader equipment may potentially result in excessive salt being applied. The amount of excessive salt usage is not quantifiable.*

*[4] Standby overpayment calculated based on the consideration that: (1) vehicles are not eligible for standby payment when working, and (2) standby rate can be pro-rated based on working and non-working time.*

### A. Modernizing Processes – Using Technology to its Fullest Potential

**Need to leverage GPS technology and modernize processes**

There is an opportunity for Transportation Services to fully leverage the use of GPS technology and modernize its processes to be more efficient and effective in contract management and the delivery of its winter operations.

**Transportation Services' manual processes result in inefficiencies**

Transportation Services' manual processes are inefficient and have resulted in a lack of documentation, poor record-keeping, inconsistencies, errors, and a lack of timely resolution of contractor performance issues. Over the last five years, the Division has paid $2.4 million for the GPS technology to be installed and used on the winter vehicles, however, the Division is not fully using this technology to help manage operations effectively.

With real-time GPS information, alerts, and the ability to report exceptions, staff can track and monitor the routes, ensure payments are accurate, and better respond to claims and service requests, resulting in more efficient processes. Transportation Services staff time would also be freed up to perform other value-adding activities.

**Other City Divisions can also benefit from GPS technology and modernization**

Several other City Divisions use the same GPS vendor as Transportation Services to manage their operations. These Divisions should also consider the two recommendations in this report directed to the City Manager and whether:

1. GPS technology can be further utilized to manage operations, and
2. Processes should be modernized and integrated with GPS technology to be more efficient and effective.

Modernizing and integrating processes with enhanced use of GPS technology and having the ability to extract key data reports will help to improve efficiencies, help the Division improve how it manages contractor performance, and ensure that service levels for winter maintenance are achieved.

### B. Contract Management Needs Improvement

**Effective contract management needed for achieving service levels**

Effective contract management across all contracts and locations is necessary to achieve the desired service levels. Robust internal processes and controls are required to ensure contractor performance issues are identified and remediated promptly, and to ensure work is appropriately verified before payment is approved and issued to contractors.

#### B.1 Issues Found with Delivery of Contracted Services

**Contractors are paid by hours or kilometers**

Contractors are paid on a different basis by the type of winter maintenance activity- performed:

- plowing - number of **hours** spent plowing
- salting – number of **kilometers** salted
- standby – vehicle is **on-site** during winter season and available when called out for winter operations

Each contractor submits a daily operating log for salting and plowing activities, outlining the time they leave and return to the yard and the total hours worked.

**Multiple contractor performance issues noted in 850 samples**

We reviewed 850 samples of which 623 had GPS information available. We compared GPS information to contractors' daily operating logs and noted many instances where the contractors:

- started their shift late,
- claimed more hours than worked,
- took excessive stop times, and
- did not make their vehicles available for operations as required.

These discrepancies were not identified by Transportation Services staff, so no payments were deducted, except for a few instances where the contract vehicles left the yard late. Issues were noted across most contracts, although certain issues were more prevalent for some contractors. The table below summarizes the type of issue and number of instances observed by contractor, and provides a synopsis of where the City can start focussing their management efforts.

**Number of Samples with Issues (Out of 850 Samples)**

| Type of issue | Contractor[1] | | | | | | Total instances |
|---|---|---|---|---|---|---|---|
| | B | A | C | M | S | Others | |
| | Number of instances | | | | | | |
| Late starts | 28 | 11 | 1 | 3 | 11 | 29 | **83** |
| Claimed more hours than worked | 44 | 25 | 32 | 6 | 1 | 63 | **171** |
| Excessive stop time (> 20% of trip time) | 20 | 32 | 13 | 6 | 13 | 94 | **178** |
| Vehicle not available for operations | 6 | 6 | | | 2 | 3 | **17** |
| GPS not working | 33 | 17 | 3 | 29 | 22 | 123 | **227** |
| Call-out time not documented | 97 | 43 | 37 | 46 | 14 | 210 | **447** |
| Inaccurate departure and return time | 56 | 27 | 31 | 7 | 20 | 72 | **213** |
| Other issues | 34 | 8 | 37 | 25 | 2 | 189 | **295** |
| **Total instances** | **318** | **169** | **154** | **122** | **85** | **783** | **1631** |

[1] *Each contractor is assigned a letter of the alphabet to keep their name confidential. The letter does not represent the initials of a contractor's name.*

## Late Starts

**10% of the contractor vehicles started late, an estimated loss of $3.8M over 5 years**

We found that for 10 per cent (83 out of 850) of the samples reviewed, vehicles left the designated sites later than they were supposed to.

The City can charge liquidated damages for every minute the contractor is late. 'Liquidated damages' are a pre-determined estimate of damages to the City as agreed to by the parties to the contract. The pre-determined amount is to be payable to the City on a contractor's failure to perform a specific task or comply with a particular duty or obligation in the contract.

We estimate the City could have charged $39,200 in liquidated damages and recovered $23,600 in standby charges for these specific cases. **Over the five years, the estimated loss is $3.8 million for late starts.**

Contractors Claimed More Hours than Worked

We noted that almost half (194 of 395) of the plowing trips and one in six (19 of 117) of the salting trips reviewed had timing inaccuracies of 15 minutes or more.

**$1.2M estimated overpayment over 5 years, due to contractors claiming more hours than worked**

Out of the 194 instances identified as inaccurate departure or return time for plowing, 171 of these instances resulted in contractors claiming an extra 195 hours or $19,500. **Over the five years, the estimated overpayment is $1.2 million.**

Excessive Stop Times

We also noted that some contractors were taking stop times during their shifts that were much longer compared to other contractors. While there may be valid operational reasons for vehicles to stop during operations, the Division has no clear guidelines for what is considered a reasonable stop time. For our audit, we considered 20 per cent of the total hours worked to be a reasonable stop time.

**45% of plowing trips had stop times greater than 20% of the trip time**

We noted that for 45 per cent (178 of 395) of plowing trips reviewed, there were stop times greater than our threshold that should have been questioned.

Of these 178 trips with stop times that should have been questioned:

- Some operators took more than 40 per cent of their shift time as stop times, i.e. four hours of a 10 hour shift, for 24 of the 178 trips.
- There were often no notes on file to suggest Transportation Services staff followed up with contractors to inquire about the excessive stops to determine if they were justified.

**Estimated $1.3M in overpayments for excessive stop times over 5 year period**

We estimate this resulted in $20,900 in overpayments for potential non-productive time. **Over the five years, the estimated overpayment is $1.3 million.**

**Vehicle Not Available for Operations**

a) Vehicles did not go out

Based on our review of GPS records, we noted 13 instances where vehicles did not go out when required for work, but the contractor was still paid for the operating activity.

Spare vehicles are used by contractors on an operating day when a regular vehicle is out for repairs. However, most spare vehicles do not have GPS devices, making it difficult to verify if the spare vehicle went out or if the operator completed their work. In the 13 instances identified, there were no notes to explain if a spare was used.

b) Vehicles not on site but paid standby charges

**Contractors still paid even though vehicles were not available and did not leave the site when required for work, with an estimated $792,000 loss over 5 years**

Contractors must have their vehicles available on-site to be eligible for standby payments. From the review of GPS records, we identified four vehicles in our sample that were paid standby charges, even though they were not on site.

**The loss due to vehicles not available for operations is estimated at $792,000 over five years.**

**Routes Potentially Not Completed**

When salting and plowing activities are required, each vehicle is assigned a particular route to complete. When vehicles don't complete the route they are assigned, it has an impact on the cost of service, service levels, and ultimately on public safety and reliability of the City's transportation network.

**Contractors still paid in 19 instances where vehicle traveled fewer kilometers than assigned**

Of the 512 trips reviewed, we noted that in 19 instances, the kilometres traveled per the GPS were less than the required kilometres for that route.

**121 vehicles did not have functioning GPS and 163 vehicles did not have a documented assigned route**

However, the vehicles were still paid for completing the full route. Our scope of the audit work in this area was limited, as 121 vehicles did not have a functioning GPS device and 163 vehicles did not have an assigned route documented on the operating logs.

**B.2 Contract Requirements Need to Be Clear**

It is important to design the contract in a manner that allows for easy management and monitoring.

**Contracts not clear in certain key areas**

We found areas within the contract that were unclear or insufficiently explained:

- Unclear responsibilities and timelines for reporting and resolving issues related to malfunctioning GPS devices
- Contract is silent on reasonable stop and break times

Contract language on liquidated damages needs to be simplified and enforced consistently, and the pre-determined amounts for liquidated damages should be reviewed.

The impact of the issues found can include malfunctioning GPS devices not being reported or fixed, overpayments to contractors, public safety issues, inaccuracies in GPS route completion reports, and challenges in enforcing liquidated damages.

It will be important to ensure that the contracts for the next contract cycle simplify and clarify the contract language to avoid these issues. At the beginning of the winter season, it may also be helpful to provide clarity to contractors on roles, responsibilities, and expectations for compliance with the contract.

### B.3 Ensuring Appropriate Verification of Work and Monitoring of Contracts

Transportation Services staff have a responsibility to monitor that contractors perform their work diligently and to ensure they adequately verify the contractor's work before payment.

#### Lack of Adequate Verification of Work before Payment

**Staff do not always verify the contractor's work before approving payments**

Transportation Services Supervisors are required to review contractors' operating logs for accuracy and completeness and must approve them before payment can be issued. We noted that staff do not always verify the contractor's work before approving payments.

For the majority of the plowing, salting, and standby logs reviewed, we noted issues that were not identified by staff for follow-up prior to approving payments. These issues included incorrect departure or return times, late starts, excessive stop times, consistent breakdowns for some contractors, claiming more hours than worked, and routes not completed. Much of this was identifiable through GPS, but given that the above issues were not flagged by staff, it appears that staff are not using GPS information to verify work, or if they did, no action was taken.

#### Transportation Services is Not Using GPS that is Already Installed

Transportation Services has installed GPS devices in contractor vehicles, but overall is not leveraging it or using it to help manage the winter maintenance fleet. Below are some examples of this.

## Lack of Monitoring of GPS Devices

**Staff did not maintain an accurate list of active GPS devices resulting in 153 inactive devices being paid for**

Transportation staff did not maintain a complete or accurate list of active GPS devices. We found that the GPS vendor billed for 1,192 GPS devices, even though 153 devices have not worked since at least 2019. Given that the winter maintenance program has a fleet of 1,100 vehicles, it is unclear why the vendor had been billing for more devices than there are vehicles. The City continued to pay service fees associated with these 'inactive' devices of approximately $10,000 annually ($50,000 over five years). It also highlights that GPS is not being consistently used to monitor vehicles.

**27% (227 of 850) of GPS devices were not working on the date of sample**

Transportation Services need to identify GPS devices that are not working on a regular basis. GPS reports can be produced to identify which GPS devices are not working. Approximately 27 per cent of GPS devices were not working on the date of the sample (227 of 850). This seriously affected the Division's ability to monitor the contractor's work and service levels. If staff had been using GPS data to verify contractor work, they would have been able to confirm relevant information, such as start and return times, stop time, etc.

**All contractor vehicles require a functioning GPS device as per contract**

The contract requires that all contractor vehicles have a functioning GPS device installed. We noted most of the spare vehicles did not have a GPS device installed. Without a GPS device, it is difficult to monitor contractor performance and verify when vehicles are deployed, for how long, and if the operator completed their work.

## Lack of Standardized Processes

Winter maintenance services operate out of multiple locations. We noted several differences in how staff monitored contractor work across these different locations, impacting the quality of how contracts were monitored and managed. For example, some staff did not consistently use the required form (Form 81) for monitoring of contractor vehicles during winter events.

While Transportation Services have recently reorganized from a district-based model to a functional model, it appears that roles and responsibilities have not fully transitioned to align with the new model, and the culture has not fully changed to ensure central oversight and consistency across all locations.

**Guidance and training is needed for staff to improve contract management practices**

Although Transportation Services has policies and procedures for winter operations, it does not have a formal contract management manual to guide staff in managing day-to-day contractor performance and maintaining service levels. Policies and processes have also not been updated to incorporate monitoring and managing using GPS technology.

Transportation Services provides winter operations training to staff, however, further guidance and training is needed to ensure consistent contract management practices.

Given that winter maintenance is such a large operation, it is important to ensure that staff invest the time to set up contract monitoring and payment properly, including performance indicators, then carry out their roles consistently so that any issues with contractor performance are identified and remediated appropriately.

## Liquidated Damages are Not Consistently Enforced

**Staff did not consistently enforce liquidated damages**

When a contractor fails to meet certain contract requirements and deliverables, the City can charge liquidated damages for non-performance. From our review of samples, we noted that staff did not consistently identify contractor non-compliance which could trigger liquidated damages. We estimate that the City did not charge $39,200 in liquidated damages.

## Standby Payments for Working Time

During the winter season, contractors' vehicles are required to be available on-site 24 hours a day, seven days a week, and be ready to be deployed when needed by the Division. Contractors are paid a daily rate to be available on standby.

**Contractors could receive both standby and working time payments for the same day, but they would not be paid both for the same hour**

According to the contract terms, and supported by legal opinions, standby and working time are mutually exclusive. That is, a contractor could receive both standby and working time payments for the same day, but they would not be paid both for the same hour. The opinions confirm that the contracts are clear and all four types of contracts (salting, plowing, sidewalks, and depot contracts) contain the same provisions regarding standby and working time.

According to the legal opinions:

*"The express terms of the contract documents reviewed suggest that the definitions of **Standby Time and Working Time are mutually exclusive**. Standby Time is not to be paid during such time as equipment or personnel are engaged in Working Time, and Standby Time, including any Working Time, is not to exceed 10 hours for any Working Day. **Therefore, a vendor is not entitled to payment for Standby Time, during such time as their equipment or personnel are being paid for Working Time.**"*

**Transportation Services implemented a business practice that differed from the express terms of the contract for standby payments**

Transportation Services implemented a business practice that differed from the express terms of the contract related to the standby payment provisions, for the duration of the agreement which started in 2015.

We noted that Transportation Services paid the working time submitted by the contractors, and the daily standby charge without any adjustments, so that payments for working time and standby were paid for the same hours when the contractors were working.

While Transportation Services paid a daily standby rate for vehicles for every hour of the contract period, it did not follow the express terms of the contract and use the formula in the contract to prorate the standby payments so that contractors would not be paid both standby and working time for the same hour.

**This practice has been in place for a long period of time and before the current management were in place**

This practice has been in place for a long period of time and before the current management were in place. Management advises this practice was likely also in place for the previous five-year contract cycle.

The true understanding of why this has happened is not known because so many years have passed. We do not believe this action to be untoward and it did not commence under the current management of Transportation Services.

**City could have saved $24M if Transportation Services had applied the express terms of the contract for standby payments**

After extensively analyzing the entire 261,000 payment records for the past five years, we estimate the City could have saved an estimated $24 million in standby payments from the beginning of the current contract cycle in 2015, if Transportation Services had applied the express contract terms for standby payments.

This is a detailed estimate prepared using actual payment data of the Division.

**Potential savings of an estimated $9.6M for 2 remaining years in current contract if the express contract terms for standby are applied, dependent on legal advice**

With two years remaining in the current contract cycle, there is a potential saving of an estimated $9.6 million if the express contract terms for standby provisions are applied, dependent on legal advice. Given past practices this is a question for the City legal services to consider further.

### C. Overall Service Levels for Winter Maintenance May Not Be Met

#### C.1 Meaningful Key Performance Indicators (KPIs) are Needed

**Current KPIs do not measure service levels achieved**

The Key Performance Indicators (KPIs) used by Transportation Services only measure the level of activity (i.e. outputs) during a winter storm. They do not measure whether the required service levels have been achieved, or whether the program's intended outcomes were met. Without clearly defining meaningful performance measures and targets, it is difficult to track and evaluate the effectiveness of the program, measure service levels, ensure public safety, and improve the reliability of the transportation network.

**Outcome-based KPIs are needed to evaluate the effectiveness of the program**

To measure the overall effectiveness of the program, outcome-based performance measures are most useful. While Transportation Services has recently started working on outcome-based KPIs, it is important to implement robust internal controls and processes to collect the information necessary for measuring outcomes.

#### C.2 Measuring KPIs Using GPS Data

**GPS reports can be used to monitor route completion and service levels**

GPS provides various data points and reports on performance that can help to better assess contractor route completion and monitor service levels. This information is useful in monitoring a vehicle's real-time location, and in providing a view of the entire fleet in order to perform trend analysis and identify issues and anomalies.

#### C.3 Using Data Analysis and Analyzing Results to Improve Service

**Service request and claims data should be analyzed to assess contractor performance and improve service**

The City's Risk Management Group receives claims from members of the public for damage to personal property and bodily injury caused by unsafe road conditions during winter. For claims that are settled by contractors, Transportation Services does not receive key information, including which contractors were involved, details of the incidents, and their outcomes. This information can be useful to identify areas where service levels are not being met, to address deficiencies in contractor performance, and to improve the quality of work.

Transportation Services tracks and reports on all winter maintenance 311 service requests for the Division. However, Transportation Services does not track how many requests require further follow up with contractors. This information is important and can provide insight into whether the contractors are completing their assigned routes properly and whether the work is of appropriate quality year-over-year.

Using the valuable data available can assist in decision-making, managing contractor performance, identifying deficiencies, and improving overall service delivery.

## Conclusion

**Recommendations will help improve the efficiency and effectiveness of the program, including resolving contractor performance issues, and measuring service levels**

There are opportunities for Transportation Services to strengthen the winter road maintenance program. Implementing the recommendations in this report will help Transportation Services improve the efficiency and effectiveness of the winter road maintenance program, including resolving contract management and contractor performance issues, and measuring and meeting the Council-approved service levels.

We express our appreciation for the co-operation and assistance we received from the management and staff of the Transportation Services Division.

# Background

Transportation Services' mission is to provide a safe, efficient, and effective transportation system that serves the residents, businesses, and visitors of the City of Toronto in an environmentally, socially, and economically sustainable manner.

**City must meet provincial and council-approved service levels for winter maintenance**

Transportation Services (the Division) is responsible for managing the City's winter road maintenance program. The majority of winter services provided by the Division are delivered using contractors. The City of Toronto Act, 2006 (Ontario Regulation 612/06), mandates the minimum maintenance standards for highways in the City of Toronto. These standards cover various winter maintenance activities undertaken by the Division, including snow plowing and road salting.

City Council approves the City's winter maintenance service levels, which are higher than the provincially mandated minimum standards. The current service level requirements for 2015 to 2022 were approved by Council in December 2013 and are reviewed and approved every year during the Operating Budget approval process.

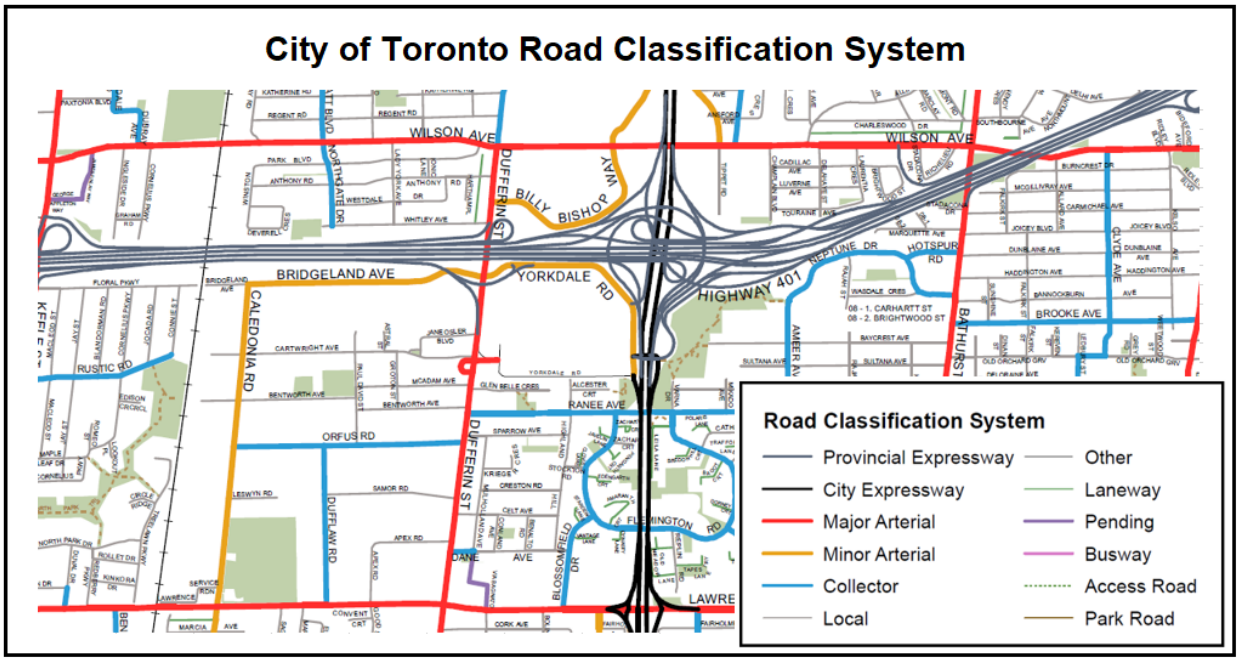
The following table provides an overview of the City's Council-approved service levels for snow clearing.

**Levels of Snow Clearing Service, Toronto**

| Road Type | When does the City start salting? | When does the City start plowing?* | How many hours after the snow stops falling does it take to clear an average storm? |
|---|---|---|---|
| Expressways (Don Valley Parkway & Gardiner Expressway) | When snow first accumulates | 2.5 cm | 2-3 hours |
| Major roads, streetcar routes, bus routes, streets with hills and bike lanes | | 5 cm | 6-8 hours |
| Neighbourhood roads | | 8 cm | 14-16 hours |

**Council-approved service levels, 2015-2022*

As per the service level requirements, plowing and salting expressways and collector roads are the highest priority, followed by arterial (major) roads, and then local roads. The picture below shows the various types of roads:




Contracted equipment is deployed in a phased manner between October and April. During the core winter season between November 15 and April 15, the fleet operates at full capacity.

Based on a five-year average, Toronto typically experiences:

- three days with more than 10 cm of snowfall
- seven days with more than 5 cm of snowfall
- 13 days with more than 2.5 cm of snowfall
- two days with temperatures lower than -18 C
- seven days of freezing rain.

**Key winter maintenance activities include anti-icing, de-icing, snow plowing and snow removal**

Winter road maintenance includes four main activities: anti-icing, de-icing, snow plowing, and snow removal. The type of winter maintenance activity depends upon the particular winter and road conditions, amount of snowfall, and temperatures. Division staff regularly monitor weather forecasts and trends to plan winter maintenance activities.

**Winter maintenance program has an annual budget of $90M, 1,100 vehicles, and 1,500 personnel**

Transportation Services' budget is $90 million annually to deliver the winter road maintenance program. Actual expenditures vary each year and directly correlate to the storm events during the year. The City has access to 571 snow plows, 329 sidewalk plows, and 202 salt trucks. It has approximately 1,500 personnel to tackle the winter season, 24 hours a day and seven days a week.

The majority of winter equipment is contractor-owned and operated. To track and monitor winter activities, City and contractor vehicles are fitted with a GPS unit.

During the winter season, Transportation Services staff patrol the expressways, arterial roads, and potential trouble spots, such as hills on collector or local roads, 24 hours a day, seven days a week. In-house staff also focus on salting local roads, manually clearing steps and priority locations, and responding to service requests.

### Winter Maintenance Annual Expenditure

**Standby charges account for 57% or $47M of the total annual winter maintenance expenditure on average**

On average, contractor standby charges account for about 57% ($47 million) of the total annual winter maintenance expenditure.

- Standby charges are paid to have the contractors' equipment on-site and personnel available during the winter season. The standby charges cover the contractor's fixed and variable costs including investment in equipment, electronic controllers, licensing, fuel, maintenance, insurance, and operator costs for periods when the contractor is not working.
- In addition, operating charges are paid on a kilometer or hourly basis for the days when vehicles are performing salting and/or plowing activities.

The following table breaks down winter maintenance activities and the actual expenditures for the 2015-2020 winter seasons.

**Winter Road Maintenance Actual Expenditures (In Millions $), 2015 to 2020**

| | | Contractor Operating Expenses | | | | Contractor Standby Charges | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Season | Cost of Salt | Road Plowing | Sidewalk Plowing | Salting | Subtotal | Road Plowing | Sidewalk Plowing | Salting | Subtotal | Staff Standby | Total |
| 2015-2016 | 11.9 | 5.5 | 3.0 | 6.9 | 15.5 | 15.9 | 11.5 | 15.4 | 42.8 | 4.3 | 74.5 |
| 2016-2017 | 8.8 | 4.7 | 4.0 | 4.2 | 12.8 | 19.9 | 11.7 | 15.6 | 47.2 | 4.9 | 73.7 |
| 2017-2018 | 15.0 | 5.3 | 4.9 | 5.2 | 15.4 | 20.7 | 11.8 | 15.8 | 48.3 | 5.7 | 84.5 |
| 2018-2019 | 12.8 | 8.4 | 6.6 | 5.4 | 20.3 | 21.6 | 13.0 | 16.1 | 50.6 | 6.3 | 90.0 |
| 2019-2020* | 11.8 | 7.8 | 8.0 | 5.4 | 21.2 | 19.6 | 12.0 | 16.3 | 47.9 | 7.3 | 88.2 |
| **Total** | **60.3** | **31.7** | **26.5** | **27.1** | **85.2** | **97.7** | **59.9** | **79.1** | **236.7** | **28.6** | **410.8** |
| Average | 12.1 | 6.3 | 5.3 | 5.4 | 17.0 | 19.5 | 12.0 | 15.8 | 47.3 | 5.7 | 82.2 |
| | 15% | | | | 21% | | | | 57% | 7% | |

**Budget numbers used for 2019-2020*

Source: Transportation Services

# Audit Results

## A. Modernizing Processes - Using Technology to Its Fullest Potential

### A. 1. The Time for Change is Now

The coronavirus's spread across the globe has put tremendous pressure on local governments to be at the forefront of the response, recovery, and re-build, given that they provide many critical and essential services to the public that must continue uninterrupted.

Many local governments are now re-thinking how to provide services to meet their citizens' needs in a better and cheaper way. Digitalizing and modernizing processes to make them more effective and efficient in areas such as winter maintenance will be important.

**Opportunity to enhance the use of technology to modernize processes**

There is no better time for change at Transportation Services because the Division has a new management team, and the winter maintenance contracts are nearing the end of their term with two years out of a seven-year term remaining. There is an opportunity for Transportation Services to use technology to modernize its processes, which will help the Division to be more efficient and effective. This also requires letting go of some old processes because it will not be efficient to run parallel processes.

Other City Divisions use GPS technology and the same GPS vendor to manage their operations. GPS technology can help City divisions modernize their processes to be more efficient and effective.

### A. 2. The Critical Need for Digitalization

Although Transportation Services has GPS in place, it remains highly reliant on many manual processes and has not switched to fully utilizing its GPS technology or integrated it into billing and managing contractor performance. There is a critical need for digitalization, which is using digital technologies (i.e. GPS) to change the business model and provide new value-producing opportunities.

Transportation Services advised that the original intent of the GPS contract for winter maintenance was to validate claims. The GPS technology currently being used has many additional features that can be utilized with some modifications to monitor contractor performance and optimize winter operations. The current GPS contract is a City-wide corporate contract used by Transportation Services and other City divisions. Transportation Services should assess what it needs to monitor and pay contractors, then assess if the technology is available and meets its operational needs.

**Improving service levels and contractor performance with better technology integration and modernization**

Transportation Services would benefit from optimizing its GPS technology and modernizing its processes to improve efficiencies, as well as to improve how it manages contractor performance to ensure service levels are achieved. It also presents a win-win opportunity for contractors to improve how they manage their fleet and staff.

## Reliance on Manual Processes is Inefficient and Can Lead to Overpaying Contractors

**Manual processes can lead to inefficiencies and contractor overpayment**

Given the size, complexity, and cost of winter maintenance activities, the Division needs efficient processes to be able to verify work in a timely and accurate manner, and to ensure contractors meet service levels. In addition, the issues we found with the Division's use of manual processes can also result in overpaying contractors. This also makes it challenging to enforce liquidated damages, where the contractor breached the contract.

**Manual processes have resulted in poor record-keeping, inconsistencies, errors, and delays**

We found the winter maintenance program is highly reliant on manual processes and observed the following issues:

- *Lack of documentation:* We found several instances where we could not find documentation of the call-out time, or the call-out time was not recorded at all. Call-out time is the time given by Transportation Services, by when contractor vehicles must leave to start their routes. Given contractors are paid based on hours for plowing, recording the call-out time is critical to monitor the contractors' performance and to assess and charge liquidated damages where appropriate. Other important items were often not documented, such as the use of spare vehicles, contractor vehicle repairs, and assessment of liquidated damages. There were generally no staff explanations documented to note whether they considered any action to address the issues we found (e.g. excessive stop times), or whether there were any valid reasons.

- *Poor record-keeping*: It was challenging for us (and staff) to locate all of the manual records for our audit samples. Due to reorganization and staff relocation, the files were not properly relocated or tracked. Also, documentation of daily winter maintenance activities was not maintained properly. For example, for most of the cases we weren't able to find the tracking documents that are to be used for monitoring routes during a snow event (called Form 81). As a result, it was not clear whether staff were monitoring the vehicles during the winter events.

- *Inconsistencies:* During winter storms, staff track vehicles and randomly audit the contractors to monitor their compliance. Differences across Transportation Services offices in how staff monitor winter events and contractor performance make it difficult to assess the effectiveness of the operations at a holistic level.

  Data analysis performed with central oversight – similar to what we did when completing our work -- would help identify issues, improve standardization, and help ensure all contractors are treated with the same consistency.

- *Errors:* Staff manually review trip details such as departure and return times without always comparing them to information from the GPS data. The result is that staff have overpaid contractors and not identified overpayment errors.

- *Lack of timeliness:* Staff can take up to a few weeks to process contractors' operating logs after a winter storm. We also found that GPS functionality issues with contractors were often not resolved for months. This makes it very challenging to ensure contractors are aware of and addressing issues on a timely basis, and improving their performance.

Modernizing processes and integration with GPS technology will help address the above issues and others. It will also help to improve efficiencies, provide reliable records that are available in real-time for managing the contractors' performance, and thereby ensure only services provided by contractors are paid.

## Managing Contractor Performance and Accountability through Fully Using GPS Technology and Reports

**Managing contractor performance and accountability with GPS**

Transportation Services has GPS technology in place to modernize contract management, but it is not being fully used. For example, it does not use GPS to verify whether contractors worked the hours they claimed, completed the assigned routes, or whether the stop time taken by the vehicles was reasonable and for valid reasons.

With GPS reports and pre-defined metrics, Transportation Services will have more in-depth information available about contractor behaviours and will be able to better verify work that contractors report. Real-time GPS information can include alerts, and reporting of exceptions, allowing staff to track and monitor the routes, ensure accuracy of payments, and better respond to claims and service requests.

By reducing manual processes and optimizing the use of the existing GPS technology, and implementing enhancements to reporting, Transportation Services staff will be freed up for more value-added activities.

**By fully using GPS technology, Transportation Services can:**

- improve how it plans routes by analyzing GPS information, such as routes completed, traffic, average speeds, and the time it takes to complete a route. This is important to undertake prior to setting up the next set of contracts.

- electronically monitor if contractors are leaving the yard on time, instead of relying on staff to physically observe at the gates

- verify in real-time or for previous trips where contractors say they are at a particular time via time stamps and geolocation records. This helps to ensure that the contractors are completing their specified route for Transportation Services during the hours required.

- verify salt application rates and the quantities used to ensure compliance with environmental regulations and to control inventory

- identify on a timely basis if vehicles are taking excessive stop times, or breaking down excessively. For example, GPS can send automatic alerts when drivers have stopped longer than a certain amount of time (e.g. 15 minutes), and notify both the supervising staff and the driver. Contractors can also monitor their staff for productivity and potential issues.

## Potential Benefits of Digitalization and Modernization

**Digitalization and modernization will help improve productivity, public safety, fraud detection, internal controls, and accountability**

Transportation Services could further digitalize and modernize its processes by eliminating manual records/processes and integrating its GPS and contractor payment system. If GPS information was used for billing, it would reduce the work required to verify contractor-reported information. It would also ensure that only vehicles with a functional GPS device are paid.

Fully using technology and modernizing processes presents the following additional benefits:

- Improve value-add of staff time: Automating contractor billings and integrating with GPS would reduce the staff time required to verify work reported by contractors. In addition, by using the GPS's geofencing feature, staff would not need to physically stand at the gate to observe when contractor vehicles depart and arrive. Other tasks can also be automated so that staff can focus on exceptions only.

- Improve winter road conditions and public safety: Technology solutions can be implemented on winter vehicles to collect real-time weather information, analyze road conditions, and adjust the operational response. For example, in Minnesota, about two-thirds of the state's 850 plow trucks are equipped with technology that uses real-time weather data to recommend which chemicals/salt to use, how much to apply, and how frequently to plow, to ensure safety.

- Enhance fraud detection: GPS can support geofencing, which allows staff to be notified if a vehicle leaves the City boundaries or if vehicles leave a site without proper notification. Geofencing can prevent drivers from using vehicles off-hours, doing side errands during work hours, time-theft, skipping routes or streets, and not providing services in the time required.

- Strengthen internal controls: An effective GPS setup can provide management with an accurate accounting of a contractor's billable hours, actual time spent on trips, actual travel time, stop time, accurate travel distances, and more. It can also allow the Division to provide real-time responses and quick follow-up to resolve operational or contractor performance issues.

- Increased accountability: Enhanced real-time GPS reporting helps to hold contractors accountable. It also provides evidentiary information to assess service requests, and can support legal claims. For example, the Washington State Department of Transportation was able to reduce its annual payments for tort claims from an average of $2 million per year down to $500,000 per year using GPS technology.

Modernizing and integrating processes with an enhanced use of GPS technology provides many benefits. It will help to improve efficiencies, strengthen the management of contractor performance, and ensure that service levels for winter maintenance are achieved.

**Recommendations:**

1. **City Council request the General Manager, Transportation Services Division, to fully utilize the GPS technology available, which includes real-time exception reports, notifications, and route completion and performance reports, to better monitor contractor performance.**

2. **City Council request the City Manager, to:**

    a. **coordinate with Heads of Divisions for those using GPS technology, including Transportation Services, to ensure the contract with the City's GPS vendor meets the needs of the Divisions and City.**

    b. **forward this audit report to all other Heads of Divisions for those using GPS technology and centrally oversee that the City's Divisions are fully utilizing GPS technology and letting go of inefficient manual processes.**

3. **City Council request the General Manager, Transportation Services Division, to prepare a plan with specific deliverables and timelines to modernize processes and integrate technology solutions with its GPS system.**

4. **City Council request the City Manager to work together with the Heads of Divisions using GPS technology and the Chief Information Officer, to prepare plans with specific deliverables and timelines to modernize processes and integrate technology solutions with the GPS system.**

## B. Contract Management Needs Improving

### B. 1. Issues Found with Delivery of Contracted Services

Proper contract management is important to ensure the contractor has completed their required contracted services and is paid only for the services they actually provided. Given that the majority of winter maintenance activities are performed by contractors, it is critical to ensure the Division manages contracts properly.

If all contractors meet all their required services, and the contract requirements are designed appropriately, the City's overall service levels should be achieved. However, if contractors are not meeting their required deliverables, the overall service levels might not be met.

The objectives of this audit were to determine whether Transportation Services Division:

1. meets the council-approved service levels for winter road maintenance, and
2. manages contracts, evaluates contractor performance, and holds contractors accountable as per the contract terms.

**Randomly sampled 850 out of 1,100 vehicles from all 47 contracts**

We randomly sampled 850 winter vehicles out of the 1,100 vehicles, across all of the 47 contracts.

Our sample included vehicles that performed salting and plowing activities - as well as those vehicles that were paid standby charges. Standby charges are paid for each vehicle for their availability when they are not working during the winter season. The standby charges cover the contractor's fixed and variable costs including investment in equipment, electronic controllers, licensing, fuel, maintenance, insurance, and operator costs. The table below shows the breakdown of our audit sample coverage by type of payment.

**Audit Sample Coverage by Type of Payment**

| | Number of vehicles reviewed |
|---|---|
| Standby charges | 217 |
| Operating charges | |
| *Salting* | 131 |
| *Plowing* | 502 |
| Total | 850 |

Contractors are paid based on the total kilometres salted and/or the number of hours plowed. Contractors submit a daily operating log for salting and plowing activities. This log shows the contractors' record for the time they leave and return to the yard, total hours worked, and any other trip details.

We compared the contractors' operating logs to GPS records to verify whether contractors were meeting contract deliverables.

We noted many discrepancies on the contractors' daily operating logs when compared to GPS records for both salting and plowing operations, across several contracts. For example, we noted that the contractors over claimed for hours worked, documented incorrect shift times, started their shifts late, had excessive stop times, and in some cases did not leave the site when they were directed to. For further details, refer to Exhibits 1 and 2 in the Appendices.

The discrepancies were not always and consistently identified by Transportation Services staff, so no payments were deducted, except for a few instances where the contract vehicles left the yard late. The issues we noted with contractor deliverables are described further by issue below.

### a) Late Starts

Contractors are given a call-out time by Transportation Services and must have all their vehicles leave for their routes by that time. The City can charge liquidated damages for each minute the vehicles are late to leave. The liquidated damages rates vary by vehicle type, category of road, and type of operation. For the City to correctly assess liquidated damages, it is critical for contractors to accurately record the time they leave, and for Transportation Services to verify and document this timing.

**Examples of contractors delaying operations without consequences**

**Example 1:** Contractor A was directed to start sidewalk plowing at 11:00 am during a snow storm. The vehicle assigned to plow the sidewalk left the yard at 1:02 pm. Even though the vehicle left the yard 122 minutes late, staff did not assess any liquidated damages. There was also no explanation on file for the delay or for not applying liquidated damages.

**Example 2:** In another case, the call-out time given to Contractor F was 4:00 pm. Contractor F's vehicle did not leave the yard until 5:44 pm, 104 minutes late. No liquidated damages were applied and there was no explanation on file.

**83 out of 512 plowing and salting trips had late starts**

**Late starts resulted in an estimated loss of $3.8M to the City over the past 5 years**

Out of 512 plowing and salting trips reviewed where GPS information was available, we noted 83 instances where vehicles left after the call-out time or later than the time reported on the contractors' operating logs. In most of these cases, staff did not charge liquidated damages because they did not consistently track late starts. We estimate the City could have charged $39,200 in liquidated damages and recovered $23,600 in standby charges for these cases. **Over the five years, the estimated loss is $3.8 million for late starts.**

We also noted that call-out times were not always recorded on the operating log, making it difficult to assess if liquidated damages should have been charged. Documentation is critical for enforcing liquidated damages. This issue of late starts was found more often for five of the contractors as shown in Table A below.

## Table A: Late Starts

| Contractor[1] | Number of trips | | % | Estimated Loss[2] | Projected loss over 5 years |
|---|---|---|---|---|---|
| | With GPS info available | Starting late | | | |
| | (1) | (2) | (2/1) | | |
| A | 61 | 11 | 18% | $9,500 | $576,300 |
| B | 77 | 28 | 36% | $15,400 | $933,800 |
| S | 31 | 11 | 35% | $4,700 | $285,600 |
| F | 16 | 8 | 50% | $4,200 | $255,100 |
| H | 6 | 5 | 83% | $4,000 | $240,700 |
| Others | 321 | 20 | 6% | $25,000 | $1,516,000 |
| Total | 512 | 83 | 16% | $62,800 | $3,807,500 |

[1] *Each contractor is assigned a letter of the alphabet to keep their name confidential. The letter does not represent the initials of a contractor's name.*

[2] *Includes stand-by, operating charge, liquidated damages, as applicable*

### b) Contractors claimed more hours than worked

**Contractors claimed more hours than worked for almost half of the plowing trips**

For plowing operations, since payment to contractors is based on the total hours worked, it is important to verify that the time recorded by contractors in their operating logs is accurate. We noted that almost half (194 of 395) of the plowing trips and one in six (19 of 117) of the salting trips reviewed had timing inaccuracies of 15 minutes or more, as shown in Table B below.

GPS data was not available for 107 plowing and 14 salting vehicles. Since we could not confirm if the timings reported were accurate for these vehicles, the amount of hours over claimed by contractors could be higher than what we've reported.

## Table B: Inaccurate Departure and Return Times

| Type of activity | Samples Reviewed | # of Samples with GPS info available (A) | Samples with Timing inaccuracies >= 15 min (B) | % (B/A) |
|---|---|---|---|---|
| Plowing | 502 | 395 | 194 | 49% |
| Salting | 131 | 117 | 19 | 16% |
| Total | 633 | 512 | 213 | 42% |

**Estimated loss of $1.2M to the City over past 5 years for contractors claiming more hours than worked**

Out of 194 instances of inaccurate departure or return times for plowing, 171 resulted in the contractor claiming an extra 195 hours or $19,500. Over five years, we have estimated that the City lost $1.2 million due to contractors claiming more hours than they worked. This issue was more prevalent amongst four contractors as shown in Table C.

The inaccurate departure and return time for 19 salting trips did not have any dollar impact, as salting trips are paid by kilometres.

## Table C: Contractors Claimed More Hours than Worked

| Contractor[1] | Number of trips where | | | Hours claimed | Hours worked per GPS | Excess hours claimed | % | Excess amount claimed | Projected loss over 5 years |
|---|---|---|---|---|---|---|---|---|---|
| | GPS info available | Hours claimed > Hours worked | % | | | | | | |
| | (1) | (2) | (2/1) | (3) | (4) | (3-4) | (4/3) | | |
| A | 61 | 25 | 41% | 242 | 196 | 47 | 24% | $4,700 | $283,500 |
| B | 77 | 44 | 57% | 478 | 430 | 48 | 11% | $4,800 | $292,000 |
| C | 34 | 32 | 94% | 367 | 323 | 44 | 14% | $4,400 | $264,300 |
| D | 19 | 18 | 95% | 203 | 181 | 22 | 12% | $2,200 | $132,700 |
| Others | 204 | 52 | 25% | 608 | 574 | 34 | 6% | $3,400 | $208,500 |
| Total | 395 | 171 | 43% | 1,898 | 1,704 | 195 | 11% | $19,500 | $1,181,000 |

*[1] Each contractor is assigned a letter of the alphabet to keep their name confidential. The letter does not represent the initials of a contractor's name.*

### Examples of contractors claiming more hours than worked

**Example 1:** Contractor G was directed to start plowing at 5:30 pm. One of contractor G's drivers claimed to have left the yard at 5:30 pm as directed, and returned at 6 am the next morning. However, the GPS records indicated that the vehicle returned at 11:37 pm, the same night, after performing about 6 hours and 20 minutes of work. The contractor billed 12.5 hours or 6 extra hours of work for this vehicle.

**Example 2:** Contractor C claimed an extra 43 hours and 12 minutes in total for a fleet of 25 vehicles during a single shift. For each of these vehicles, the contractor claimed between 1 to 3 hours extra, resulting in an overpayment of approximately $4,000 to the contractor for this one shift.

**Some contractors rounded the departure and arrival times to the same times for the entire fleet**

Some of the timing inaccuracies were due to contractors rounding the departure and return times. For example, some contractors rounded their entire fleet to the same in or out times.

In another example, some contractors claimed that every vehicle in their fleet left at exactly 4:00 pm or returned at exactly 5:00 am, as shown in the excerpt below.

**An Excerpt from an Operating Log Illustrating Rounding (or Inaccurate Recording) of Departure and Return times**

| | Operating log | | GPS records | |
|---|---|---|---|---|
| | Departure time | Return time | Departure time | Return time |
| Vehicle 1 | 4:00 PM | 5:00 AM | 3:29 PM | 2:11 AM |
| Vehicle 2 | 4:00 PM | 4:30 AM | 3:42 PM | 2:09 AM |
| Vehicle 3 | 4:00 PM | 4:30 AM | 3:34 PM | 1:27 AM |
| Vehicle 4 | 4:00 PM | 5:00 AM | 3:36 PM | 1:52 AM |
| Vehicle 5 | 4:00 PM | 5:00 AM | 3:37 PM | 2:29 AM |

GPS reports can be used to verify departure and return times recorded on the operating logs. When timings are rounded or the same for all vehicles in a fleet, it should alert staff to question these. By not flagging these instances, the obvious issues of claiming more hours than the contractors worked were missed. The result and impact of these timing inaccuracies and claiming more hours than the contractor worked has been included in Tables B and C above.

**c) Excessive Stop Times**

We noted that some contractors took stop times during their shifts that were much longer than other contractors.

**No clear guidelines on reasonable stop times**

There is no clear guideline or standard to help staff to determine what is considered a reasonable stop time. This makes it difficult to ensure all contractors are consistently held accountable in this area, when monitoring contractor stop times. It can also impact contractor performance, driver safety, operational time, service levels, and liquidated damages.

There may be valid operational reasons for stops, such as meal and bathroom breaks, equipment breakdowns, and replenishing a vehicle's salt supply. We noted that staff did not always verify the extent or validity of the stop time before approving payments. There were often no notes on file to suggest staff followed up with contractors to inquire about excessive stop times or why these stops may have been justified.

In our audit sample we included findings for stop times that were at least 20 per cent of the total trip duration recorded by GPS, and had no staff or contractor explanations. So, for a shift of 10 hours, we identified where stop times were two hours or more.

**45% (178 of 405) of plowing trips had excessive stop times**

For approximately 45 per cent (178 of 405) of the plowing trips reviewed, there were excessive stop times. We noted that some contractors stopped up to three continuous hours during the middle of their night shift, and others took up to 40 per cent of their shift time as stop times.

We noted at least 32 vehicles that stopped for 20 minutes or more within the first hour of leaving the site. Given that liquidated damages are payable for each minute of a late start, it is possible that contractors may be leaving the yard on time to avoid liquidated damages but starting the route much later. Transportation Services staff commented that contractors sometimes drive the equipment out of the yard and park just outside for a variety of reasons, such as waiting to bring in enough operators to drive the vehicles. We also noted at least 41 instances of vehicles stopping for 20 minutes or more within the last hour of returning to the site. For example, two vehicles stopped for at least 20 minutes at a shopping plaza shortly before returning to the site. Stopping at the start or end of a shift is unscheduled activity, and staff were unable to determine if any of the stops were appropriate.

Two additional examples are provided below of contractors taking excessive stops during their shifts.

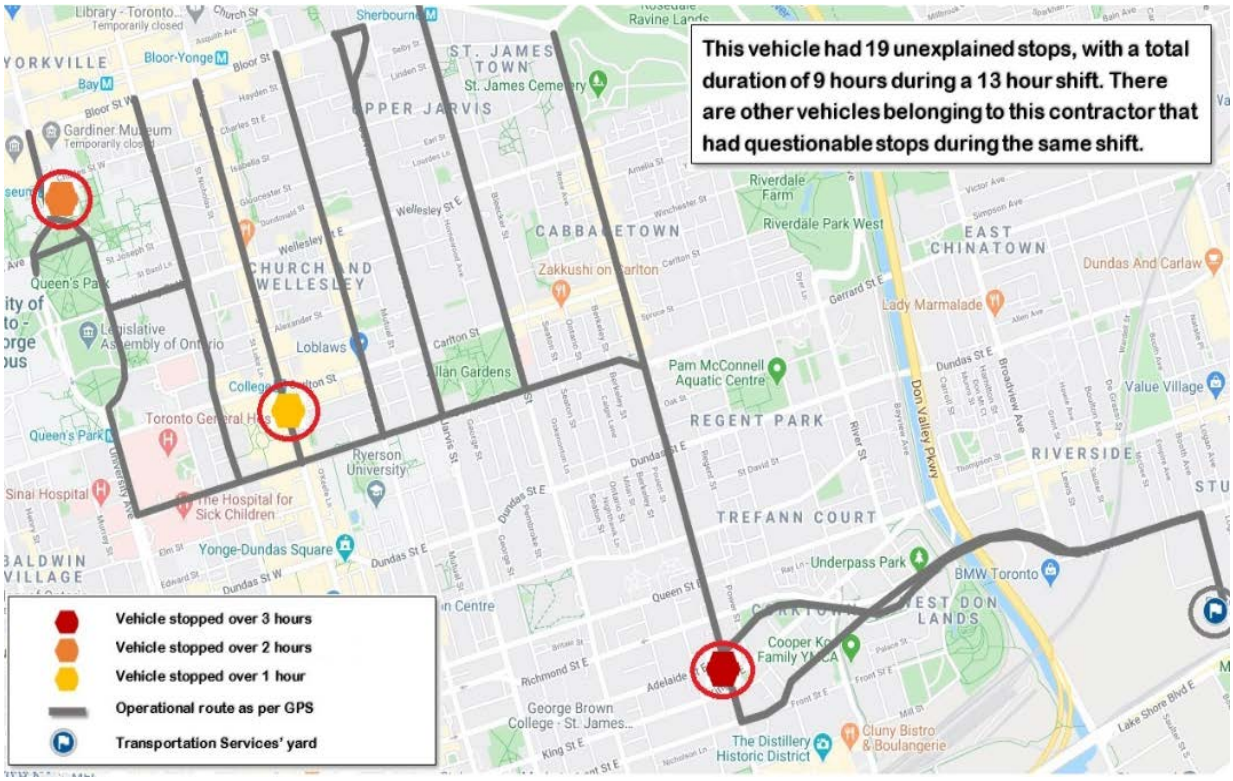
**Examples of contractors taking excessive stops during their shifts**

**Example 1:** During a winter storm, Contractor A had at least three vehicles with unexplained stops during their night shift. The stop times ranged from 35% to 55% of their total trip times. The drivers took long stop times around midnight. There were no notes on file to explain these breaks. Staff were not able to explain why these stop times were taken and had not reviewed the GPS records for these vehicles.

| Vehicle | Hours claimed by Contractor A | Actual trip time per GPS (1) | Stop time hours per GPS (2) | Stop time as % of actual trip time (2/1) |
|---|---|---|---|---|
| 1 | 11 | 8 | 4 | 50% |
| 2 | 10 | 8.5 | 3 | 35% |
| 3 | 11 | 10 | 5.5 | 55% |

**time rounded to nearest half-hour*

**Example 2:** In a 13-hour shift, a vehicle belonging to Contractor H had 19 unexplained stop occurrences, totaling nine hours. Three of these stops ranged from 1 to 3.5 hours each. There were no notes on file to explain these breaks. Five out of nine of Contractor H's vehicles sampled had extended stop times during their shift that should have been questioned.




**Contractors' excessive stop times are estimated to have cost the City $1.3M over the past 5 years**

Certain contractors seemed to take more frequent and extended stops than others, as outlined in the table below. We estimated $20,900 in overpayments of operating charges for potential non-productive time, calculated as the sum of operating charges paid for stop durations greater than 20 per cent of the trip time, as shown in Table D below. Over the five years, the estimated loss is $1.3 million.

**Table D: Excessive Stop Times**

| Contractor[1] | Trips reviewed[2] | Number of trips where vehicle spent more than 20% of trip time as stops | % of trips where stop time > 20% | Cost impact of excessive stops | Extrapolated loss over 5 years |
|---|---|---|---|---|---|
| A | 61 | 32 | 52% | $3,900 | $236,200 |
| E | 35 | 23 | 66% | $2,600 | $160,200 |
| B | 77 | 20 | 26% | $2,000 | $124,400 |
| H | 6 | 5 | 83% | $2,000 | $122,700 |
| L | 25 | 15 | 60% | $1,900 | $114,600 |
| Others | 191 | 83 | 60% | $8,500 | $516,600 |
| Total | 395 | 178 | 45% | $20,900 | $1,274,700 |

[1] Each contractor is assigned a letter of the alphabet to keep their name confidential. The letter does not represent the initials of a contractor's name.

[2] includes only those trips where GPS information was available

We found a related issue with stops for equipment breakdowns. In a single shift, a contractor claimed that almost half of their entire fleet of 25 vehicles experienced an equipment breakdown (operating log in figure below). Six of these vehicles had a breakdown of more than an hour. The contract allows for equipment breakdowns of one hour for each vehicle during each shift before any liquidated damages can be applied.

**Staff did not follow-up on equipment breakdowns**

The contractor must inform the contract administrator of the breakdown as soon as it happens. We found no notes on file to indicate whether the contract administrator was informed about these breakdowns. It was unclear whether the vehicles actually broke down or if the contractor was simply using the one-hour allowance provided in the contract as break time.

Example of multiple vehicle breakdowns **in a single shift** for Contractor A

MULTIPLE VEHICLE BREAKDOWNS

TORONTO
TRANSPORTATION SERVICES DIVISION

DISTRICT: [redacted]

TMMS W.O. #_____

OPERATING PLOWING RECORD
LOCALS

Date: 01/28/19 (mm/dd/yr) Call Out Time: 22:00 | Contractor Name/Yard: [redacted] | Contract Number: [redacted]

| COMPLETE FOR EACH UNIT DEPARTURE AND RETURN | | | | | TOTAL HOURS PER BEAT | COMMENTS |
|---|---|---|---|---|---|---|
| BEAT NUMBER | EQUIPMENT ID | CURB KM'S PLOWED | DEPARTURE TIME | RETURN TIME | | |
| [redacted] | [redacted] | 34.49 | 21:45 | 16:15 | 18 ✓ | BREAKDOWN 1hr 30min - REDUCE TOTAL BY 30 min ADJ |
| [redacted] | [redacted] | 35.54 | 21:50 | 17:00 | 19.16 ✓ | BREAKDOWN <1hr N/A x2 |
| [redacted] | [redacted] | 30.77 | 21:45 | 16:45 | 19 | BREAKDOWN <1hr N/A |
| [redacted] | [redacted] | 36.09 | 21:55 | 16:40 | 18.75 ✓ | BREAKDOWN 1hr 3min -N/A |
| [redacted] | [redacted] | 31.12 | 21:55 | 15:40 | 16.75 ✓ | BREAKDOWN & LUNCH 2hrs 30 min - REDUCE TOTAL BY 1hr. ADJ |
| [redacted] | [redacted] | 31.07 | 21:55 | 16:25 | 18.5 ✓ | BREAKDOWN + 3.75hrs N/P - REDUCE TOTAL BY 3hrs |
| [redacted] | [redacted] | 27.87 | 22:00 | 17:50 | 19.83 ✓ | |
| [redacted] | [redacted] | 30.09 | 22:30 | 17:40 | 17.67 ✓ | BREAKDOWN 2hrs 3min REDUCE TOTAL BY 1hr.30min |
| [redacted] | [redacted] | 27.53 | 21:45 | 18:35 | 20.83 ✓ | |
| [redacted] | [redacted] | 30.42 | 22:00 | 18:40 | 20.66 ✓ | |
| [redacted] | [redacted] | 25.39 | 22:00 | 17:40 | 19.66 ✓ | |
| [redacted] | [redacted] | 18.11 | 21:30 | 16:00 | 18.5 | BREAKDOWN <1hr - N/A x2 |
| [redacted] | [redacted] | 23.92 | 21:45 | 13:35 | 15.83 ✓ | |
| [redacted] | [redacted] | 26.30 | 21:50 | 15:05 | 16.25 ✓ | BREAKDOWN x2 2hrs 46min REDUCE TOTAL BY 1hour |
| [redacted] | [redacted] | 21.82 | 21:45 | 13:56 | 16.08 ✓ | BREAKDOWN <1hr N/A |
| [redacted] | [redacted] | 28.63 | 21:45 | 16:50 | 19.08 ✓ | |
| [redacted] | [redacted] | 28.65 | 22:00 | 16:20 | 18.33 ✓ | BREAKDOWN <1hr - N/A |

If the frequent breakdowns were valid, they could be explained by the use of older vehicles. We were informed by staff that the equipment specifications in the contracts for local roads permit older vehicles to be used. While using older vehicles may be aimed at reducing costs, it increases the risk of more frequent breakdowns and service interruptions.

### d) Vehicles Not Available for Operations

**Contractor still paid even though vehicles were not available and did not leave the site when required for work, with estimated $792,000 loss over 5 years**

The estimated loss to the City from the two issues below for vehicles not available for operations is estimated at $792,000 over five years.

<u>Vehicles did not go out</u>

On operational days of winter snowstorms, vehicles are expected to go out to salt and/or plow. If a vehicle is unable to go out for a valid reason such as repair is needed, a spare vehicle may be deployed. No operating charges should be paid if no replacement is sent.

**13 instances where contractors were paid operating charges even though vehicles did not leave the site**

Of the 512 trips reviewed where GPS information was available, there were 13 instances where the vehicles did not leave the yard but were paid for operations.

There was no documentation of a spare being used or any notes to explain why the vehicles were paid even though the vehicles did not leave the site. Transportation staff do not consistently check whether vehicles have gone out before payment is made. In addition, not all spares have a GPS unit installed, although it is required in the contract. This makes it difficult to verify whether a spare was used.

Additionally, we noted 121 vehicles in our sample either did not have a GPS device installed or had a malfunctioning GPS device. In these cases, it was not possible to verify whether the vehicles left the site and performed operating activities.

<u>Vehicle not on site but paid standby charges</u>

Contractors receive a standby payment per vehicle when they are not working but available to the City to perform winter maintenance. The vehicles are expected to be parked at designated City locations. On a daily or weekly basis, the Division's inspection staff go to these sites to see if the vehicles are where they should be. Vehicles not on site lose their daily standby pay and are also subject to liquidated damages of $400 to $1,500 per vehicle per hour depending on the vehicle type.

From our GPS review of 217 daily standby payment samples, we noted that four vehicles were not on site for the days tested and there were no notes to explain why. Also, 10 vehicles did not have a GPS device installed, and 96 vehicles had a malfunctioning GPS device, making it difficult to verify the vehicles' location.

We performed site visits on two days in March 2020 at various locations to verify whether the vehicles were on site for standby payment and noted the following:

- At one location, we observed that the patroller approved the standby log without performing a physical verification. This was a concern because one of the vehicles was out for repair. This was not documented on the standby log and it is not clear if the patroller was aware. We noted a similar situation at another location where the vehicle was not on site, and staff were not aware of it. It is important that staff perform proper physical verification.

- At another location, we could not locate six vehicles on the standby list. We found three unmarked vehicles, but could not determine whether these were part of the six or not, and could not locate the remaining three vehicles.

- In another case, we noted that two vehicles were labeled with the same vehicle ID and another two were unmarked. It is important that vehicles are correctly identified for standby, operating, and claims purposes.

It is important for City staff to have visibility of all contractor vehicles, including spares, to ensure the vehicle is available when needed and to enforce liquidated damages if necessary. It is also important that standby charges are paid only for on-site vehicles.

### e) Routes Potentially Not Completed

When salting and plowing activities are required, each vehicle is assigned a particular route to complete. Each route contains a set of streets, a set number of kilometres, as well as a time range of how long it should take to complete that route. When contractors don't complete the routes they are assigned to, it has an impact on the cost of service, service levels, and ultimately on public safety and the reliability of the City's transportation network.

In some situations, there may be valid reasons for why contractors did not complete their assigned route. For example, a vehicle may be required to do work on another route that it wasn't originally assigned to. The route may also not be possible to complete if, for example, parked cars are obstructing the area to be cleared.

In our findings below, staff did not document explanations on why routes were not completed. Management should examine potential valid operational reasons and evaluate whether related issues (e.g. parked cars) need to be addressed.

We identified the following issues:

**Contractors still paid for 19 instances where vehicle traveled fewer kilometers than required**

- Of the 512 trips reviewed, we noted that in 19 instances, the kilometers traveled per the GPS were less than the required kilometers for that route. However, the vehicles were still paid for completing the full route. There were no notes to explain why the entire routes were not completed, or if another vehicle completed the remainder of that route. Staff rarely use GPS information to confirm whether a route was completed.

**163 vehicles did not have an assigned route documented and 121 vehicles did not have a functioning GPS device**

- For 163 vehicles, the assigned route and/or the route kilometers were not indicated on the daily operating log. We were not able to verify what the assigned route was, how many kilometers it required, and whether the vehicle completed its route.

- For 121 vehicles, we could not verify if the routes were completed, as either the vehicles did not have a GPS device installed or had a malfunctioning GPS device.

- In at least eight instances, the kilometers completed appeared reasonable when compared to the route design, but the route taken by the vehicles did not match the assigned routes. There was no documentation on file to explain why. This is a concern as some streets could have been missed, leaving them unsalted and/or unplowed.

- In at least 20 instances, staff correctly identified that vehicles had missed certain streets, but full payments were still made.

**Recommendations:**

5. **City Council request the General Manager, Transportation Services Division, to ensure staff use GPS information and reporting to monitor route completion, departure and return times, late starts, excessive stop times, and vehicle locations for operational as well as standby purposes, and assess liquidated damages where applicable.**

6. **City Council request the General Manager, Transportation Services Division, to develop clear guidelines and allowances for acceptable stop times, break times, and the valid operational reasons for taking these stops and breaks.**

7. **City Council request the General Manager, Transportation Services Division, to improve how it documents and tracks vehicle breakdowns and the deployment of spare vehicles.**

8. **City Council request the General Manager, Transportation Services Division, to:**

    a. **ensure all vehicles, including spares, are properly marked with vehicle identification numbers,**

    b. **conduct daily physical verification of contractor vehicles on standby, including spares, and document and compare the observations to contractor standby logs, and**

    c. **require the contractor to obtain prior approval from the contract administrator when a vehicle needs to go off-site for any reason and document the expected return date.**

9. **City Council request the General Manager, Transportation Services Division, to:**

    a. **improve documentation of assigned routes (and kilometers) and completed routes by contractor, as well as ensure explanations are documented for when routes are not fully completed, and**

    b. **examine the cases where routes do not appear to be completed for potential valid operational reasons and evaluate whether related issues need to be addressed.**

## B. 2. Contract Requirements Need to Be Clear

It is important to set-up contract management by design and to ensure that the contracted deliverables are clear and understood by all. We found areas within the contract that were unclear or insufficient. The impact of these issues can result in malfunctioning GPS devices not being reported or fixed, overpayments to contractors, public safety issues, inaccuracies in GPS route completion reports, and challenges in enforcing liquidated damages.

### a) Unclear Responsibilities and Timelines for Reporting and Resolving Issues Related to Malfunctioning GPS Devices

**Contract is unclear on the responsibility for reporting GPS device malfunctions and does not include required timelines for resolving GPS issues**

The contract is not clear on who (contractor or Transportation Services) has the responsibility to report if the GPS device malfunctions.

The contract requires that the contractor must bear the repair costs, if the GPS malfunction is the contractor's fault. Also, the contractor loses standby charges if the GPS continues to malfunction for 30 minutes or more during storms due to the contractor's fault. While we found many instances of GPS devices not working for an extended period, Transportation Services did not enforce the loss of standby. This was possibly due to the lack of monitoring of GPS devices and difficulty in determining the contractor's fault. There could be additional recoverable standby amounts that we weren't able to quantify.

The contract is silent on the timeline required for reporting and turn-around time for GPS repairs.

**27% (227 of 850) vehicles reviewed had a malfunctioning GPS device, but standby charges were not deducted**

From our review of 850 vehicles, 227(or 27 per cent) had a malfunctioning GPS device, but standby charges were not deducted for these. In some cases, the contractors' staff may have been responsible for the GPS malfunctioning. However, the contract does not explain how to identify the nature and cause of the malfunction, making it difficult to enforce the loss of standby. In one instance, Transportation staff withheld the daily standby payment for certain malfunctioning GPS devices. However, the contractor successfully challenged this because the contract didn't specify the time limit for reporting GPS malfunctions. Transportation Services had to pay the standby charges.

Even though GPS has been a part of the winter maintenance program for the past five years, there has been no dedicated resource to manage GPS issues. Transportation Services needs to monitor GPS functionality given the importance of identifying contractor performance issues, and to be able to measure whether they achieve service levels. If a GPS device is not functioning, it is difficult to verify contractor logs. It is also important to ensure the contract clearly identifies the responsibilities and timelines for reporting and resolving GPS functionality issues.

### b) Contract Silent on Reasonable Stop and Break Times

**Contract is silent on reasonable stop and break times, resulting in inconsistencies by staff managing the contracts**

The winter contracts are silent about stop and break times. The contracts do not define any criteria for non-productive time and non-billable hours in a shift. Without clear contract language, staff are not provided with clear standards in determining whether stop times are reasonable or excessive, and it can result in inconsistencies in how contracts are managed.

### c) Restrict Vehicle Swapping Between Contracts

**Some contractors swap vehicles between sites and contracts, making it difficult for staff to have accurate GPS device information and monitor route completion**

Staff informed us that contractors with multiple contracts for different locations often switch vehicles between sites and contracts. Since each vehicle has an assigned route, switching vehicles between different locations or routes affects the accuracy of GPS reports on route completion. It also poses significant challenges for staff to actively monitor work being performed during winter storms. The contract should have clear provisions restricting this practice.

### d) Liquidated Damages

**Liquidated damages provisions require review and improved clarity for the next contract cycle**

The provisions for liquidated damages in the contract are difficult to understand and can be cumbersome to enforce. For example, we noted that for late starts for salting operations, staff have to manually track the departure time for each vehicle and use a complicated formula to calculate liquidated damages. This may have contributed to Transportation staff applying inconsistent methods to calculate liquidated damages or deciding not to assess liquidated damages.

There is also a lack of clarity in the contract on the definition of when operations are deemed to have commenced, and this can impact the ability of Transportation Services in collecting liquidated damages.

The contract is not clear on the definition of when the contractor has commenced operations. For example, in some parts, the contract speaks to 'commencing operations' within the two hour call out window, and in other parts refers to the actual plowing or salting of streets within the two hour window. As a result, it is not clear whether the contractor has commenced the operations when the driver has arrived in the yard, the vehicle departs from the designated site, or when the contractor begins plowing or salting activity on the road.

Transportation Services has used the measure of vehicles leaving the yard within two hours of notifying the contractor as their interpretation of 'commencement' of operations. The lack of clarity in this contract definition has resulted in some contractors challenging the application of liquidated damages by Transportation Services.

Another area needing review in the contracts for the next contract cycle are the amounts set for pre-estimated liquidated damages.

The pre-estimated liquidated damages amounts were included in the contract when the current contract cycle began in 2015. For liquidated damages to be enforceable, the pre-estimated amounts must be reasonable and must represent the fair estimate of actual damages to avoid being deemed as punitive.

Therefore, Transportation Services need to reassess and document the rationale for liquidated damages amounts in the next contract cycle, taking into account past claims against the City and other potential losses, to continue to ensure that the liquidated damages amounts are fair and supportable.

**Recommendations:**

**10. City Council request the General Manager, Transportation Services Division, to clarify wording in future winter maintenance contracts concerning:**

- **a. contractor's obligation to detect and report GPS device malfunctioning within a set timeframe,**
- **b. reasonable stop and break times,**
- **c. preventing vehicle swapping between routes and locations to ensure GPS device information is accurate, and**
- **d. provisions for the assessment and enforcement of liquidated damages including clarifying the expectation for when the work commences.**

**11. City Council request the General Manager, Transportation Services Division, to reassess and document the rationale for liquidated damages amounts in the next contract cycle taking into account past claims against the City and other potential losses, to ensure that the liquidated damages amounts are fair and supportable.**

**12. City Council request the General Manager, Transportation Services Division, to coordinate with the City Manager to discuss and make improvements to the contract with the GPS vendor related to GPS repairs and turn-around time for devices.**

## B. 3. Ensuring Appropriate Verification of Work and Monitoring of Contract

Specific contract deliverables are outlined in the winter maintenance contracts. Contractors are expected to perform the work as outlined in these contracts. Transportation Services staff have a responsibility to monitor that contractors perform their work diligently and to ensure they adequately verify the contractors' billings before payment. Without adequate monitoring, contractors may be overpaid and may not be meeting the required service levels.

### a) Lack of Adequate Verification Before Payment

Given that most of the City's winter maintenance services are outsourced, the City has an important oversight role over the contractors. It is necessary to ensure that the contractors' work is verified and paid according to the contract terms.

**Winter maintenance contracts cost an estimated $443M over a seven-year contract cycle**

It is especially important to ensure that contract monitoring and payment processes are set up properly at the beginning of each contract cycle, and then verified regularly. These contracts are estimated to be valued at $443 million over seven years. Errors in setting up monitoring, payment processes, and calculations can result in a big risk of the City overpaying for services.

**Staff not using GPS information to verify work of contractors prior to making payments**

Our review identified that staff did not always verify the contractors' work before approving payments. Contractors submit an operating log outlining the work they performed during a winter event. Supervising staff review and approve the operating logs for accuracy and completeness before making payments. This review serves as a key control, as the City pays contractors based on the information from the operating logs submitted. It is important for staff to use GPS to verify the work prior to issuing payment.

However, we found that a majority of the plowing, salting, and standby logs had one or more issues that were not identified by staff for follow-up. This indicates a lack of sufficient review and monitoring before approving payments. Also, staff are not using the installed GPS technology to monitor, but are instead continuing with manual processes. For example, staff do not use GPS data to monitor the departure and return times for vehicles, which are key for ensuring accurate amounts are paid to contractors.

### b) Lack of Monitoring of GPS Devices

#### i) GPS Billings versus Active GPS Devices in Database

**Staff did not maintain an accurate list of active GPS devices**

**153 GPS devices were found to be inactive but still paid for, some as far back as 2015/16, costing the City an estimated $50,000 over 5 years**

We noted during our audit that staff did not maintain a complete and accurate list of GPS devices installed in vehicles. We compared the listing of GPS devices in the GPS database to the GPS vendor invoices. We found 1,192 GPS devices being billed by the GPS vendor even though 153 or 13 per cent of these units (see Tables E and F below for breakdown by year and contractor) were not showing as functioning since at least 2019, and some as far back as 2015/16. As a result, the City continued to pay service fees associated with these inactive devices of approximately $10,000 annually or $50,000 over five years.

The contract requires City staff to verify that GPS devices are functioning properly when the equipment first reports for the winter season. However, after the initial check, staff did not periodically verify that the GPS devices were working or reconcile the GPS billings to the vehicles. It is of further concern that no one noticed these vehicles were missing their GPS information. This raises monitoring issues which are discussed further, below.

**Table E: Status of GPS Devices Not Working as of February 27, 2020**

| Last reported in | Number of GPS units not working |
|---|---|
| 2015 | 1 |
| 2016 | 9 |
| 2017 | 3 |
| 2018 | 76 |
| 2019 | 64 |
| **Total** | **153** |

**Table F: Status of GPS Devices Not Working as of February 27, 2020**

| Contractor[1] | GPS units paid for by the City | GPS units not working since 2019 or before | % |
|---|---|---|---|
| O | 58 | 26 | 45% |
| Q | 30 | 9 | 30% |
| M | 86 | 22 | 26% |
| F | 43 | 11 | 26% |
| C | 59 | 11 | 19% |
| S | 49 | 9 | 18% |
| P | 103 | 15 | 15% |
| Others | 760 | 50 | 7% |
| Total | 1,188 | 153 | 13% |

[1] *Each contractor is assigned a letter of the alphabet to keep their name confidential. The letter does not represent the initials of a contractor's name.*

### ii) Malfunctioning GPS Devices in Audit Sample

**27% of GPS devices in our sample were not working (227 out of 850)**

From our samples, we noted approximately 27 per cent of GPS devices were not working (227 out of 850), and numerous instances when GPS devices appeared to be interrupted temporarily. Intermittently working GPS can seriously affect the ability of Transportations Services staff to monitor the contractors' work and service levels. It also impacted our ability to audit these samples as GPS was not functioning on these vehicles. The impact of our findings could be even greater than shown, had the GPS been consistently working so that we could have verified all of our results.

Transportation Services staff need to identify GPS devices that are not working regularly and monitor their functionality. According to our research, it is possible to configure GPS technology to provide exception reports that would identify when batteries are running low, or not working, to detect potential tampering or malfunctioning.

There may be a risk that GPS devices could be tampered with and therefore, it important for Transportation Services to regularly monitor the GPS devices to ensure they are working properly.

Also, the contractors need to be held to the contract. Recurring problems need investigating and addressing to ensure that the City has the proper information to pay contractors and that all contractors are held to the same standard of monitoring.

### iii) GPS Not Installed on all Vehicles and Not Utilized Effectively for Monitoring Work

**Spare vehicles not installed with GPS, impacting ability to monitor contractor work and service levels**

The contract requires that all vehicles, including spare vehicles, have a GPS device installed. We noted that most of the spare vehicles in the contractors' fleet did not have a GPS device installed. Without a GPS device on all vehicles, it is difficult to verify when and where they are deployed, for how long, and if they completed their work. GPS information is also useful in defending against any legal claims arising from unsafe winter road conditions. Transportation Services staff should ensure that all vehicles, including spares, have a GPS device installed, to ensure the City can respond to legal claims and service requests, and monitor contractor performance.

Transportation Services should work with the GPS vendor to ensure their needs are met in being able to efficiently and effectively monitor contractor performance using the GPS information. This includes ensuring that all vehicles, including spares, have GPS installed and working properly.

### c) Lack of Monitoring of Salt Spreader Functionality and Not Using GPS Technology

**In 65 out of 122 salting trips, salt spreader device did not record salt usage**

**In 48 trips, the salt usage recorded did not match the operating logs**

Staff direct contractors on how much salt to apply based on the weather and road conditions. The rate at which the salt is applied is programmed to the vehicle. Using GPS technology, we noted 65 out of 122 salting trips where the salt spreader device did not record salt usage. Additionally, there were 48 trips where the salt usage recorded by the salt spreader did not match the contractors' operating logs. The salt spreader devices must be calibrated and functioning as per the specifications to ensure the correct amount of salt is applied, based on road conditions and to protect the environment.

**Manual weigh scales not regularly calibrated or reliable, and GPS technology not being fully utilized**

Staff informed us that they rely on in-house manual weigh scales for calculating salt usage and do not rely upon the GPS salt spreader data. However, these in-house scales are also not regularly calibrated to ensure they are accurate. It would be more efficient to make the best use of technology already available with Transportation Services for real-time data on salt usage and spreading rates, than to rely on manual weigh scales that are not calibrated regularly.

### d) Lack of Standardized Processes

**Inconsistent contract management and monitoring practices across locations**

Winter maintenance services operate out of multiple locations. We noted differences in how staff monitored contractor work across these different locations, impacting the quality of how contracts were monitored and managed. For example, some staff did not consistently use the required form (Form 81) for monitoring of contractor vehicles during winter events.

While Transportation Services has recently reorganized and moved away from a district-based model to a functional model, it appears that roles and responsibilities have not fully transitioned to align with the new model. Also, the Division's culture has not yet fully changed to ensure central oversight and consistency across all locations.

Given that winter maintenance is such a large operation, it is important to ensure that staff carry out their roles consistently and use standard procedures so that they can identify and remediate contractor performance issues appropriately.

Although Transportation Services has policies and procedures and training for winter operations, it does not have a formal contract management manual or training on contract management to guide staff in managing day-to-day contractor performance and maintaining service levels. Given the lack of standard procedures for contract management, supervisors use their judgment to determine call-out times, verify standby vehicles, calculate liquidated damages, and monitor departure and return times. Further guidance and training are needed to ensure consistent contract management practices.

Locations also use different formats for operating logs, which makes it difficult to analyze specific trip information and identify issues, trends, and anomalies across locations.

Also, at some locations, staff monitor the vehicles that leave City boundaries, while at the other locations, they monitor operating routes during storms. Similarly, one location uses time cards to track the contractors' departure and return times, while other locations do not.

Digitalization may help standardize processes and overcome some of these issues through consistent application of controls. Written standardized policies and procedures, standardized forms, additional training, and centralized oversight would also help in improving consistency of contract management practices by staff. Transportation Services should leverage the GPS system that is already in place to standardize their monitoring processes.

### e) Liquidated Damages are not Consistently Enforced

**Staff did not consistently enforce liquidated damages**

When a contractor fails to meet certain contract requirements and deliverables, the City can charge liquidated damages for non-performance. Liquidated damages are amounts specified in the contract that are payable by the party that breaches the contract terms, to compensate the other party for their pre-estimated losses. For example, any delay by the contractor in commencing plowing operation may cause public safety risks such as accidents or may impact service levels. As discussed in the subsequent sections, poor road conditions due to not meeting service levels may result in claims against the City and may result in financial loss. We noted that staff inconsistently used the contract provisions to enforce liquidated damages when the contractor did not perform as per the contract.

We estimate that the City did not charge $39,200 in liquidated damages from the samples reviewed. Staff must be trained to objectively and consistently identify and assess liquidated damages when necessary. They need to leverage the current GPS technology they already have in place and maintain proper documentation and sufficient evidence to support the application of liquidated damages.

Staff applied judgment in determining when and how to apply liquidated damages. For example, we noted that staff often provided varying grace periods using their discretion. Liquidated damages must be applied according to the contract. Clear guidelines need to be developed to assist staff to objectively and consistently assess liquidated damages claims against contractors. This guidance is important to avoid bias, treat all contractors fairly, and to assess contractor performance consistently. It is also important to maintain proper documentation of the reasons why the full amount of liquidated damages is not enforced against a contractor.

As a result, the City may not be holding contractors accountable for failure to perform work as outlined in the contract, by not applying liquidated damages to the full extent.

### f) Standby Payments for Working Time

**1,100 contractor vehicles on standby during winter**

Each winter, Toronto averages about seven days of snowfall greater than five centimeters, and the City needs to have vehicles ready to plow and salt during these snow events. About 1,100 contracted vehicles are kept on standby to be used solely for winter maintenance services under the City's seven-year winter maintenance contracts.

**Contractor vehicles paid standby charges to be on-site and available 24/7**

During the winter season, contractors' vehicles are required to be available on-site 24 hours a day, seven days a week, and be ready to be deployed when required by the Division. Contractors are paid a daily amount for standby to be available and also to cover the contractor's fixed and variable costs, including investment in equipment, electronic controllers, licensing, fuel, maintenance, and insurance.

Over the last 5 years, the Division has paid $237 million (or 57% of the total budget on average) in contractor standby charges to keep the contractor's equipment and personnel on standby for the winter events.

**Contractors are paid working time based on their daily operating logs**

Contractors are also paid for their working time, when they are called out by the Division to plow or salt the roads and sidewalks during snow events. Contractors submit daily operating logs detailing the hours of work, kilometers driven, and departure and return times of the vehicles. Transportation Services issues payment for working time based on these operating logs.

**Contractors are paid a daily amount for every day for standby**

The Division also pays contractors a daily amount for every day of the contract period for standby. Payment for standby time is initiated by the Division and not by a contractor's invoice.

### i) Contract Terms are Clear and Take Precedence

**According to the express terms of the contract, standby should not be paid to contractors for the same hour as working time**

We reviewed all four types of winter maintenance contracts (depot, salting, plowing, and sidewalks). Legal opinions confirmed that the contracts are clear and all four types of contracts contain the same provisions regarding standby and working time. According to the contract terms, standby and working time are mutually exclusive. That is, a contractor could receive both standby and working time payments for the same day, but they would not be paid both for the same hour. The contracts also take precedence in the hierarchy of contract and Request for Quote documents.

We verified our findings with multiple lawyers and sought their opinion on the following question:

**Do the terms of the contracts require the City to pay standby charges for vendor equipment or personnel (as applicable to the specific contract) on days when such vendor's equipment or personnel are engaged in their applicable snow clearing or winter maintenance operations?**

According to the legal opinions:

**Legal opinions confirmed standby time should not be paid during such time as equipment or personnel are engaged in working time**

> *"The express terms of the Contract Documents reviewed suggest that the definitions of **Standby Time and Working Time are mutually exclusive.** Standby Time is not to be paid during such time as equipment or personnel are engaged in Working Time, and Standby Time, including any Working Time, is not to exceed 10 hours for any Working Day. **Therefore, a vendor is not entitled to payment for Standby Time, during such time as their equipment or personnel are being paid for Working Time.**"*
>
> *"The Standby Time is also subject to an upward limit, in which Standby Time, when combined with Working Time, cannot exceed 10 hours in any Working Day."*
>
> *"A plain-language interpretation of the provisions of the Agreement would suggest that if a Working Day included five hours of Working Time, that the maximum amount of Standby Time that could be charged for such Working Day would be five hours (assuming the equipment is not being used on other work and is fully operational). It also stands to reason for this initial interpretation that on a non-Working Day, that the Standby Time would be paid for the whole 24-hour period and would not be subject to the Working Day limit of ten hours."*

It is our opinion that the express terms of the contract documents on standby payment are unambiguous, and this is supported by legal opinions.

The contracts also include a specific formula that lays out the calculation for how much standby is to be paid when the contractor also works that day. The formula should be applied to adjust standby payments to contractors, so that **standby charges are not paid for the same hours when the contractor vehicles are working.** When the vehicles are working, they are paid for the actual hours of work and should not receive standby payment for those same hours, according to the express terms of the contract.

On a working day, a vehicle can receive standby payment for part of the day it is not working. For example, a vehicle may work part of the day and be on standby for the remainder of the day. In such a case, the vehicle should not receive standby payments for the whole day.

In addition, standby time is also subject to an upward limit, in which standby time, when combined with working time, cannot exceed 10 hours in any working day.

There is no issue with paying contractors a daily amount for standby, however this amount should then be adjusted for working time using the formula of the contract. This requires the Division's payment system to be set up to align with the contract.

**ii) Transportation Services Implemented a Business Practice that Differed from the Express Terms of the Contract**

Transportation Services implemented a business practice that differed from the express terms of the contract related to the standby payment provisions, for the duration of the agreement which started in 2015.

**Transportation Services paid both working time and standby time for the same hours of work**

We noted that Transportation Services paid the working time submitted by the contractors, and the daily standby charge without any adjustments, so that payments for working time and standby were paid for **the same hours** when the contractors were working.

While Transportation Services paid a daily standby rate for vehicles for every hour of the contract period, it did not follow the express terms of the contract and use the formula in the contract to prorate the standby payments so that contractors would not be paid both standby and working time for the same hour.

This practice has been in place for a long period of time and before the current management were in place. Management advises this practice was likely also in place for the previous five-year contract cycle.

The true understanding of why this has happened is not known because so many years have passed. We do not believe this action to be untoward and it did not commence under the current management of Transportation Services.

### iii) City Could have Saved an Estimated $24 Million if Express Terms of the Contract were Followed

**City could have saved $24M if Transportation Services had followed express terms of the contract for standby provisions**

If contractors had been paid according to the express terms of the contract, an estimated $24 million could have been saved in standby charges over the past five years. This detailed estimate was prepared using actual payment data of the Division.

There is also an opportunity for a potential cost savings of $9.6 million for the remaining 2 years of the contract if the express terms of the contract are applied, dependent on legal advice. Given past practices, this is a question for the City legal services to consider further.

### iv) Strong Contract Management Practices are Key

**Strong contract management practices are key in going forward**

Contract management starts with consistency in the Request for Quotation (RFQ) and contract documents, and in setting up the contract well. Going forward, there needs to be consistency in the RFQ and contract documents and in setting up the contract. Before the Division enters into its next contract cycle, the contract documents and RFQs would benefit from a detailed review for internal consistency, consistent use of terminology and defined terms, and simplification for implementation.

It is also important to:

- consider how payments will be made and tracked to make it simpler for staff
- ensure that the set-up of the payment system for the next contract cycle is consistent with the terms of the contract, and,
- manage to the express terms of the contract.

Given that the City is nearing the end of its contract term, and the cost to have equipment and staff on standby, we believe it is it is worthwhile to perform a cost-benefit analysis of outsourcing the winter maintenance services prior to the start of the next contract cycle. A Phase Two audit of this program is being planned, which could include a cost-benefit analysis.

**g) Loss of Standby due to GPS Not Working**

According to the contract, Transportation Services can withhold daily standby payments if a contractor is responsible for GPS malfunctioning.

From our sample, we identified 227 of 850 GPS devices not working. It is unclear whether it was the contractor's fault or the City's. If the City was at fault in each of these cases, the amount lost would be $0. If the contractor was at fault in each of these cases, we estimate the impact could be an additional two million dollars over a five-year term if Transportation Services were to withhold standby payments. We have indicated 'unknown' in the estimated total loss as there is too much uncertainty to quantify this. However, it also indicates this is an important area for Transportation Services staff to be monitoring, and where appropriate, to withhold standby payments to the contractor. It is possible to have reports showing when GPS devices are not working on vehicles.

**Summary of Total Estimated Financial Impact to the City due to Non-compliance by Contractors and Not Following Express Terms of the Contract for Standby Payments**

**Total estimated financial impact to the City of $31M over 5 years due to non-compliance by contractors ($7.1M) and not following express terms of the contract for standby payments ($24M)**

From the issues identified in our audit, we estimate that the City overpaid approximately $7.1 million over a five-year period due to non-compliance by contractors, excluding areas where it was difficult to calculate the savings, and as shown in the table below.

In addition, $24 million could have been saved in contractor standby charges, if the Division had applied the express terms of the contract for standby payments. The total estimated financial impact is $31 million over a five-year period.

**Total Estimated Financial Impact of Contractor Non-Compliance and Standby Issue**

| Issue | Estimated financial impact per operating day from samples | Estimated financial impact projected over five years[2] |
|---|---|---|
| Late starts | $62,800 | $3,807,500 |
| Contractors claiming more hours than worked | $19,500 | $1,181,000 |
| Excessive stop times | $20,900 | $1,274,700 |
| Vehicle not available for operations | $13,000 | $792,200 |
| GPS not working[1] | Unknown | Unknown |
| GPS vendor billing errors | - | $50,000 |
| Potential salt wastage due to salt spreader errors[3] | Unknown | Unknown |
| **Estimated loss from contractor non-compliance** | **$116,200** | **$7,105,400** |
| Estimated financial impact of not following express contract terms for standby payment[4] | - | **$23,949,600** |
| **Total estimated financial impact** | **$116,200** | **$31,055,000** |

*[1] According to the contract, Transportation Services can withhold daily standby payments to contractors if they are responsible for GPS units malfunctioning. We found 227 of 850 sampled vehicles did not have a working GPS device. Many of these units had not reported since at least 2019, and some as far back as 2015/16. On average, the daily standby rate amounts to $323 per vehicle, although it varies by contract and type of vehicle. It is difficult to estimate the amount of standby payment that should have been withheld due to many variables and lack of information.*

*[2] Projection based on average of seven snow days of five centimeters or more, per year (source: Environment Canada).*

*[3] Errors in salt spreader equipment may potentially result in excessive salt being applied. The amount of excessive salt usage is not quantifiable.*

*[4] Standby overpayment calculated based on the consideration that: (1) vehicles are not eligible for standby payment when working, and (2) standby rate can be pro-rated based on working and non-working time.*

Recommendations:

13. City Council request the General Manager, Transportation Services Division, to establish a formal process to:

    a. ensure GPS devices are installed and functioning in all contractor vehicles, including spares,

    b. track all GPS devices and monitor them regularly to ensure the devices are functioning properly,

    c. periodically reconcile GPS billings,

    d. monitor and ensure GPS functionality issues are being reported to the GPS vendor and repaired on a timely basis, and

    e. monitor the calibration and functionality of salt spreaders.

14. City Council request the General Manager, Transportation Services Division, to:

    a. develop a policy and procedure manual for winter operations, including best practices for contract management, and best practices for assessing and charging liquidated damages,

    b. standardize processes and forms for monitoring contractor performance and for assessing and charging liquidated damages, and

    c. ensure staff verify and review contractors' operating and standby logs, using GPS data, for accuracy of timing and services provided before approving payment.

15. City Council request the General Manager, Transportation Services Division, to provide additional training to ensure staff have an up-to-date and clear understanding of their roles and responsibilities, as well as strong knowledge of winter maintenance contract management policies and procedures.

16. City Council request the General Manager, Transportation Services Division, to consult Legal services in relation to the approach to take on the definition and charging of standby payments for the remainder (two years) of the current contract cycle.

17. **City Council request the General Manager, Transportation Services Division, to work together with Legal services on a detailed review of the contract documents and Request for Quote for the next contract cycle, and make the necessary improvements to ensure internal consistency, consistent use of terminology and defined terms, and simplification for implementation.**

18. **City Council request the General Manager, Transportation Services Division, to ensure that the management and payment for services is consistent with the express terms of the contract for the next contract cycle.**

19. **City Council request the General Manager, Transportation Services Division, to perform a cost-benefit analysis of in-house versus outsourced delivery of its winter road maintenance program, to determine whether it would be beneficial or not to increase the level of in-house delivery.**

## C. Overall Service Levels for Winter Maintenance May Not be Met

### C. 1. Meaningful Key Performance Indicators (KPIs) are Needed

Transportation Services staff need to measure how well the winter maintenance program is performing by establishing appropriate performance measures.

City Council has approved service levels for winter operations. Additionally, the Province has also mandated minimum maintenance standards. It is necessary to develop specific performance metrics based on these service levels and maintenance standards.

Transportation Services currently uses three Key Performance Indicators (KPIs) for reporting:

1. Number of salting activities after a storm < 5 cm
2. Number of plowing activities on expressways and/or arterial roads after a storm > 5 cm
3. Number of service requests taken for roadway salting (all road classifications) after completion of a major storm (72 hrs)

**Current KPIs do not measure service levels achieved**

While the above KPIs are useful in measuring the level of activity during a storm event, they do not measure the achievement of the Council-approved and provincially mandated service levels, which are necessary to ensure public safety and the reliability of the transportation network. Transportation Services does not have appropriate performance metrics that measure the effectiveness of the winter maintenance program and service levels.

Transportation Services has recently hired a staff member to work towards outcome-based KPI's. It is important to implement robust internal controls and processes to collect information necessary for measuring outcomes. We encourage this direction being taken. It will be important to review other jurisdictions' good practices when developing KPIs for the City. By fully using GPS technology and related reporting and modernizing processes, the Division will have the necessary data, information, and reports for measuring the achievement of its service level outcomes.

**Outcome-based KPIs are needed to evaluate the effectiveness of the winter maintenance program**

The Division also does not have any KPIs that measure compliance with contract terms. Effective contract management, as well as consistent and predictable contractor performance, is necessary to achieve the desired service levels. Therefore, various performance metrics must be developed and monitored to hold contractors accountable for compliance with contract terms.

For example, it is important to monitor service interruptions due to unexplained breaks (i.e. excessive stops) and vehicle breakdowns during plowing and salting operations. These performance metrics can provide useful information for monitoring contractor performance and for charging and enforcing liquidated damages where appropriate. See Exhibit 3 for additional information on good practices for contractor performance metrics.

**Recommendation:**

**20. City Council request the General Manager, Transportation Services Division, to:**

**a. develop meaningful Key Performance Indicators (KPIs) to measure the achievement of Council-approved service levels,**

**b. develop performance metrics for the next contract cycle to measure and monitor contractor performance,**

**c. improve processes and documentation to have relevant and readily available information to measure the KPIs, and**

**d. publicly report on the KPIs on at least an annual basis.**

## C. 2. Measuring KPIs Using GPS Data

**GPS reports can be used to monitor route completion and service levels**

GPS information is not being used to measure contractor performance or to monitor service levels. Each contractor vehicle is required to be fitted with one of the City's GPS devices. The City pays for the GPS service. The GPS device is configured to transmit the vehicle's location every 10 seconds. This information is very useful in monitoring the real-time location of the vehicle during a snowstorm, as well as ensuring that the vehicles have completed their designated routes and performed the necessary plowing or salting activity.

The GPS system used by Transportation Services can produce a route completion report, which can identify in real-time the routes that were not completed. However, their current report is not configured correctly to give accurate route completion information. For this functionality to work properly, it is important to accurately map the plowing and salting routes in the GPS device. Transportation Services is not using this functionality.

In the absence of this information, Transportation Services cannot in real-time, determine whether the routes were completed and consequently if the desired service levels were met. When routes are not completed as anticipated, it could increase service requests from citizens. During the audit, the lack of GPS route completion reporting also provided a limitation in our ability to conclude whether service levels are being achieved or not.

**Recommendation:**

**21. City Council request the General Manager, Transportation Services Division, to work with the GPS vendor to configure the:**

**a. route completion report to provide accurate information, and develop other GPS reports for measuring contractor performance and service levels, and**

**b. GPS system's geofencing feature to monitor contractors' adherence to their designated routes.**

## C. 3. Using Data Analysis and Analyzing Results to Improve Service

### Claims Information

The City receives claims from members of the public for damage to personal property and bodily injury caused by unsafe road conditions during winter. Such incidents include slips and falls, motor vehicle accidents, and damage to vehicles from potholes. Required service levels for winter maintenance are set to maintain public safety in the City.

An analysis of claims information can provide insight into the winter maintenance management team regarding potential issues of contractor performance and/or achievement of service levels.

**$22.4M paid between 2015 and 2019 to settle sidewalk injury claims**

Between 2015 and 2019, the City paid $22.4 million to settle 1,150 sidewalk claims. In 2019, the City settled 301 sidewalk claims for $6 million. These amounts include settlement costs, legal expenses, and expert fees, but exclude the claims that the contractors settled directly with the plaintiffs.

The table below outlines the five-year claim history for winter operations:

**Claims Paid (In Millions), 2015 to 2019**

| | Road Weather Conditions | | Sidewalk Weather Condition | | | |
|---|---|---|---|---|---|---|
| Year | Amounts Paid | # of Claims | Amounts Paid | # of Claims | Total Paid | Total Claims |
| 2015 | $0.7 | 67 | $3.4 | 270 | $4.1 | 337 |
| 2016 | $0.3 | 52 | $3.3 | 167 | $3.7 | 219 |
| 2017 | $0.3 | 35 | $3.7 | 187 | $4.0 | 222 |
| 2018 | $0.6 | 44 | $6.0 | 225 | $6.6 | 269 |
| 2019 | $0.4 | 93 | $6.0 | 301 | $6.4 | 394 |
| **Total** | **$2.3** | **291** | **$22.4** | **1,150** | **$24.7** | **1,441** |

The claims process is administered by the City's Risk Management department, with support from Legal Services, external Counsel, an external Adjuster, and Transportation Services. Transportation Services is responsible for investigating winter road maintenance-related claims.

Winter-related claims are generally settled in one of three ways:

(1) the City assumes responsibility and settles the claim accordingly,
(2) the City and the contractor are jointly responsible for the claim and apportionment of the settlement is determined mutually
(3) determination is made that the contractor is fully responsible for the claim.

If the contractor is responsible for the claim, then the contractor's defence lawyer takes over the case. However, this information is not communicated to Transportation Services and it has no visibility of the case, its progress, and its outcome. As a result, Transportation Services is unable to analyze and identify which contractors were involved, which locations, which contract types, the number of cases taken over by contractors, and their outcomes.

This information can be useful to Transportation Services as it allows for better insight, including potentially identifying areas where service levels are not being met. It can also assist in identifying contractor performance issues, quality of work, and improving the winter maintenance program.

The Risk Management department needs to track and share the litigation information with Transportation Services to ensure that they are aware of potential contractor performance issues.

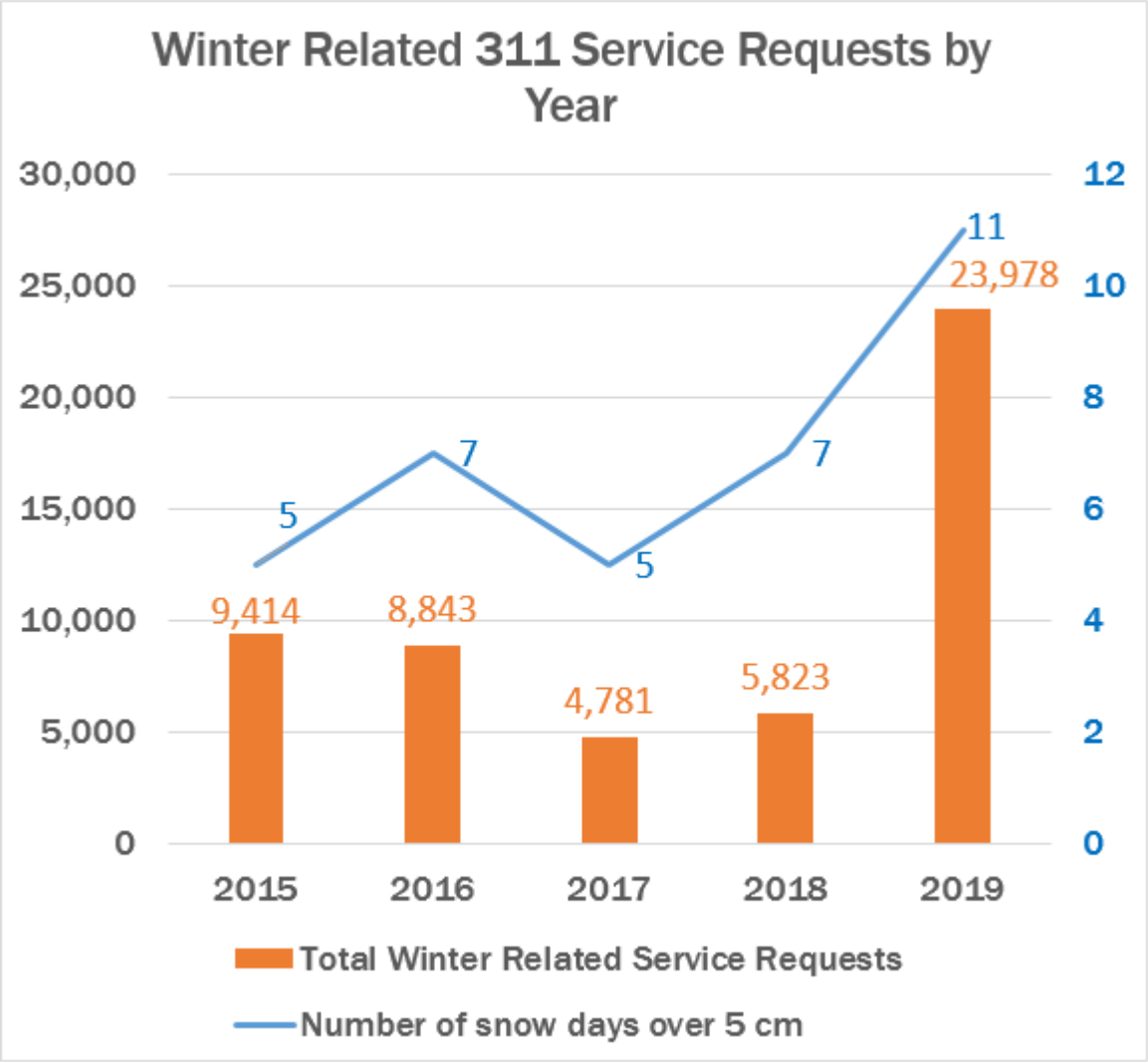
**311 Service Requests**

Through ‘MyPlowTO', an online vehicle tracker, residents can follow winter equipment vehicles that have a working GPS in real-time and check when their streets were last serviced. Residents can also call 311 to inquire about the status of winter maintenance services in their area. Calls not immediately resolved by 311 are escalated to Transportation Services for action. Transportation staff call the resident back to attempt to resolve the call and may also send a service vehicle to investigate the problem to ensure the street is plowed.

As per the service level requirements, plowing and salting of expressways and collector roads have the highest priority, followed by arterial and local roads. Per the Council-approved service levels, local roads are to be plowed within 14 to 16 hours after the snow accumulates to more than eight centimetres. The local roads are often the last ones to be plowed, but generate the most service requests due in part to high public expectations.

Transportation Services tracks and reports on all winter maintenance 311 service requests for the Division. Transportation Services tracks how many winter maintenance service requests were opened and closed in a month. Recently staff also started preparing heat maps of all service requests by geographic area. However, Transportation Services has no readily available statistics to identify and track how many of the 311 service requests represent potential issues with contractor performance for the current or past winter seasons.

Winter maintenance service requests for the past five years are displayed in the graph below:



**Winter related service requests in 2019 were approximately 4 times higher than in 2018**

The number of winter related service requests in 2019 were approximately four times higher than in 2018. According to Transportation Services, this may have occurred due to the following reasons:

1. Increased public awareness due to Transportation Services public information campaigns
2. Increase in the volume of bike lane kilometres greatly expanded during 2018-2019 and may have contributed to service requests.
3. 2019 weather conditions were significantly different than previous years and may have resulted in additional service requests.

Transportation Services' Performance Measurement Unit prepares monthly reports on service request resolution time, the priority assigned, and the issue type.

However, Transportation Services should also track whether the service requests were followed-up and what actions were taken. This can assist in decision-making, managing contractor performance, identifying deficiencies, and improving overall service delivery.

**Service request and claims data should be analyzed to assess contractor performance and improve service**

Of all the service requests received, identifying and analyzing the ones representing potential contractor issues can provide valuable insight into the effectiveness and efficiency of the winter maintenance program and whether there may be potential issues in achieving the required service levels.

**Recommendation:**

**22. City Council request the General Manager, Transportation Services Division, to analyze legal claims information and 311 service requests on a regular basis to provide additional indicators of where contractor performance needs closer monitoring.**

# Conclusion

**The recommendations will help improve the efficiency and effectiveness of the program, including resolving contractor performance issues, and measuring service levels**

There are opportunities for Transportation Services to strengthen the winter road maintenance program. By implementing the recommendations contained in this report, Transportation Services will improve the efficiency and effectiveness of the winter road maintenance program, including resolving contract management and contractor performance issues, and measuring and meeting Council-approved service levels.

A Phase Two audit of this program is being planned, which could include a cost-benefit analysis of contracting out versus in-house delivery of the winter services.

# Audit Objectives, Scope and Methodology

The Auditor General's 2019 Audit Work Plan included a review of the award and management of major winter maintenance contracts, including a review of contract compliance and contractor performance.

The objectives of this audit were to determine whether Transportation Services Division:

1. meets the council-approved service levels for winter road maintenance to provide a safe and reliable transportation network in the City of Toronto, and
2. manages contracts, evaluates contractor performance, and holds contractors accountable as per the contract terms.

Audit Methodology and Scope

To review the winter maintenance activities, including contract management and their impact on service levels, we reviewed operating and standby payments. We compared operating and salting logs against GPS records to validate the accuracy of contractor billings. We also assessed contractor performance by reviewing vehicle histories, stop times, breakdowns, etc.

**Randomly sampled 850 out of 1,100 vehicles from all 47 contracts**

We randomly selected a sample of 850 vehicles from a population of 1,100 winter maintenance vehicles across all 47 contracts. This audit covered the period between November 2018 and January 2020. The samples included plowing and salting activities as well as individual standby and operating payments for the selected vehicles. Our sample represents a 98 per cent confidence level, with an error rate of two per cent.

An example of an operating payment sample would include a single trip of a vehicle dispatched for salting or plowing activity. A standby payment sample would include a single day's standby payment for a selected vehicle. The audit sample coverage was designed to approximate an equivalent of a single day of winter road maintenance activities.

## Sample Summary and Coverage

| Number of vehicles reviewed for | Expressway, arterial & collector | Local roads | Sidewalk | Total |
|---|---|---|---|---|
| Standby charges | 87 | 79 | 51 | 217 |
| Operating charges | | | | |
| *Salting* | 90 | 32 | 9 | 131 |
| *Plowing* | 76 | 255 | 171 | 502 |
| Total | 253 | 366 | 231 | 850 |

Also, we reviewed service requests and claims data to understand the nature, type, volume of service requests and claims, and whether they are indicative of problems in service delivery.

We reviewed contract design and documentation to determine whether contractors complied with the requirements of the winter maintenance contracts.

Twenty-seven per cent (or 227) of the above 850 samples did not have GPS information available due to malfunctioning GPS units or vehicles operating without a GPS unit. As a result, we could not verify whether service levels were met by these vehicles or whether the contractor payments were correct, and neither could management. For these 227 samples, we performed other procedures such as verification of payment approvals, call-out time documentation, GPS inactivity durations, GPS billings, and reconciliation.

For the remaining 623 samples (395 plowing, 117 salting, and 111 standby) where we could corroborate the operational activities with GPS information, we performed all of our planned audit procedures.

## Sample Breakdown by GPS Availability

| | Vehicles with GPS | Vehicles with no GPS | Total number of vehicles reviewed |
|---|---|---|---|
| Standby charges | 111 | 106 | 217 |
| Operating charges | | | |
| *Salting* | 117 | 14 | 131 |
| *Plowing* | 395 | 107 | 502 |
| Total | 623 | 227 | 850 |
| Percent | 73% | 27% | 100% |

**Compliance with generally accepted government auditing standards**

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

## Exhibit 1: Audit Sample Coverage and Summary of Issues

### Audit Sample Coverage

| Coverage | Plowing | Salting | Standby | Total |
|---|---|---|---|---|
| Contracts reviewed | 34 | 12 | 14 | 47* |

**Total 47 unique contracts reviewed (some contracts have both plowing and salting operations)*

| Samples | Plowing trips | Salting trips | Standby vehicles | Total |
|---|---|---|---|---|
| Total trips (or vehicles) reviewed | 502 | 131 | 217 | 850 |
| Trips with GPS information available | 395 | 117 | 111 | 623 |
| Trip hours reviewed | 4427 | - | - | 4427 |
| Trips with no GPS information available | 107 | 14 | 106 | 227 |
| Trips with no GPS information available (%) | 21% | 11% | 49% | 27% |

### Summary of Issues

| Audit observations | Plowing trips | Salting trips | Standby vehicles | Total | As % of trips with GPS info available | Estimated losses (stand-by, operating charge, LD, as applicable) | Projected loss over 5 years |
|---|---|---|---|---|---|---|---|
| Late starts | 76 | 7 | - | 83 | 16% | $62,800 | $3,807,500 |
| Contractors claimed more hours than worked | 171 | - | - | 171 | 43% | $19,500 | $1,181,000 |
| Excessive stop time (> 20% of Trip Time) | 178 | - | - | 178 | 45% | $20,900 | $1,274,700 |
| Vehicles not available for operations | 13 | - | 4 | 17 | 3% | $13,000 | $792,200 |
| Call-out time not documented on operating / salting sheet | 320 | 127 | - | 447 | 71% | - | - |
| (>=15% min either way) | 194 | 19 | - | 213 | 42% | - | - |
| Salt-spreader not recording usage | - | 65 | - | 65 | 56% | - | - |
| Salt spreader recorded different usage than | - | 48 | - | 48 | 41% | - | - |
| | | | | Total | | $116,200 | $7,055,400 |

Note: Audit samples coverage designed to include an equivalent of a single day of winter road maintenance activities

## Exhibit 2: Number of Samples with Issues (Out of 850 Samples) by Contractor

| Type of issue | Contractor* | | | | | | Total instances |
|---|---|---|---|---|---|---|---|
| | B | A | C | M | S | Others | |
| | Number of instances | | | | | | |
| Late start | 28 | 11 | 1 | 3 | 11 | 29 | **83** |
| Claimed more hours than worked | 44 | 25 | 32 | 6 | 1 | 63 | **171** |
| Excessive stop time (> 20% of trip time) | 20 | 32 | 13 | 6 | 13 | 94 | **178** |
| Vehicle not available for operations | 6 | 6 | | | 2 | 3 | **17** |
| GPS not working | 33 | 17 | 3 | 29 | 22 | 123 | **227** |
| Call-out time not documented | 97 | 43 | 37 | 46 | 14 | 210 | **447** |
| Inaccurate departure and return time | 56 | 27 | 31 | 7 | 20 | 72 | **213** |
| Route KM or route # not documented | 34 | 2 | 37 | | | 90 | **163** |
| Route not completed | | 6 | | | 2 | 11 | **19** |
| Salt spreader not working | | | | 16 | | 49 | **65** |
| Salting records not matching GPS records | | | | 9 | | 39 | **48** |
| **Total instances** | **318** | **169** | **154** | **122** | **85** | **783** | **1631** |

**Each contractor is assigned a letter of the alphabet to keep their name confidential. The letter does not represent the initials of a contractor's name.*

## Exhibit 3: Contractor Performance Metrics – Good Practices

**For contractor performance metrics to be effective, they should be:**

- relevant and specific to the design and targeted service levels of the winter maintenance program,
- clearly defined to avoid misinterpretation,
- standardized to avoid bias or errors and ensure reliability,
- based on accurate and readily available data, and
- readily available and reported to senior management and other stakeholders for decision making.

**A robust performance measurement framework incorporates input, output, and outcome-based performance metrics:**

- *Input-based* performance metrics can be used to measure resources spent or utilized to perform snow removal operations, including fuel usage, labour hours, machinery or equipment hours, and anti-icing materials.
- *Output-based* performance metrics should be used to quantify the physical accomplishment from the inputs mentioned above. For example, the outputs can be quantified in terms of lane kilometers per unit of time plowed, lane-kilometers de-iced, and truck plowing speed, material application rates, payments for winterizing, and other accomplishments.
- *Outcome-based* performance metrics are the most useful to measure the overall effectiveness of a winter road maintenance program. Examples of the outcome-based performance metrics relevant to Transportation Services winter operations may include safety improvements, mobility improvement (de-congestion, speed of traffic flow), user satisfaction, bare pavement regain time, and reduced friction levels.

**In our research of various jurisdictions, we identified some of the commonly used performance measures for winter maintenance operations:**

| Performance Measure | What it Measures |
|---|---|
| Post-storm bare lane regain time | Achievement of desired road conditions in a given time |
| Level of service based performance measures | Effectiveness of snow removal operations by road category |
| Surface traffic speed levels during a storm | Compares surface traffic speed in storm and dry conditions |
| Effective temperature and application rate of chemicals | Measures compliance with guidelines |
| Traffic and safety | Combines data from multiple sources (weather, road surface conditions, traffic, and maintenance) and relates those elements to accidents |
| Traffic speed, flow rate, density data and speed change patterns | Measures the road condition recovery time, speed recovery durations |
| Contract management reports using GPS data | Route completion, average snow plow speed, time to complete a route, amount of salt |

## Appendix 1: Management's Response to the Auditor General's Report Entitled: "Review of Winter Road Maintenance Program – Phase One: Leveraging Technology and Improving Design and Management of Contracts to Achieve Service Level Outcomes"

**Recommendation 1: City Council request the General Manager, Transportation Services Division, to fully utilize the GPS technology available, which includes real-time exception reports, notifications, and route completion and performance reports, to better monitor contractor performance.**

| **Management Response: ☒ Agree ☐ Disagree** |
|---|
| **Comments/Action Plan/Time Frame:**<br>Transportation Services proposes to: Review how GPS technology can be used to facilitate the Winter Operations. This is primarily related to data collection, and reorganizing how we operate. This will entail using GPS to provide data for payments, in the current GPS contract (if possible), and future Winter and GPS contracts, with an aim to review the existing operational model of operations for the Winter Program, and consider innovative opportunities on how best to utilize the current GPS functionality, including real-time exception reports, notifications, route completion and performance reports, to better monitor contractor performance. This will require an assessment of the current GPS Provider capabilities.<br>This will include a review of the Winter contracts, the potential creation of a new GPS contract if it better suits our needs, and the modification of existing processes or creation of new processes as required to support the Winter Program.<br><br>This action will be completed by: Existing Winter Maintenance Contracts Q3 2021<br>Future Winter Maintenance Contracts Q4 2022 (pending the start of new contracts) |

**Note: Recommendation 2 addressed to City Manager**

**Recommendation 3: City Council request the General Manager, Transportation Services Division, to prepare a plan with specific deliverables and timelines to modernize processes and integrate technology solutions with its GPS system.**

| **Management Response: ☒ Agree ☒ Disagree** |
|---|
| **Comments/Action Plan/Time Frame:**<br>Transportation Services proposes to: Review how GPS technology can be used to facilitate the Winter Operations. This is primarily related to data collection, and reorganizing how we operate. This will entail using GPS to provide data for payments, in the current GPS contract (if possible), and future Winter and GPS contracts, with an aim to modernize processes by integrating technology solutions, where possible, with contracted GPS systems. A plan with specific deliverables and timelines to modernize processes and integrate technology solutions with its GPS system will be delivered. This will require an assessment of the current GPS Provider. The Division will review how to best use digitization, GPS, and associated Standard Operating Procedures for tasks related to monitoring contractor performance, invoicing, documentation, and file storage. The procedures will ensure which roles are responsible and/or accountable.<br><br>Additionally, if it is determined that the existing corporate contract for GPS does not meet Transportation Services' needs then, in consultation with PMMD, Transportation Services will work on developing a new GPS contract that includes all the required functions, information, and reports that can address these required tasks.<br><br>This action will be completed by : Existing Winter Maintenance Contracts Q3 2021<br>Future Winter Maintenance Contracts Q4 2022 (pending the start of new contracts) |

Note: Recommendation 4 addressed to City Manager

**Recommendation 5: City Council request the General Manager, Transportation Services Division, to ensure staff use GPS information and reporting to monitor route completion, departure and return times, late starts, excessive stop times, and vehicle locations for operational as well as standby purposes, and assess liquidated damages where applicable.**

| **Management Response: ☒ Agree ☐ Disagree** |
|---|
| **Comments/Action Plan/Time Frame:**<br>Transportation Services proposes to: Review and investigate the output (including training) from the current GPS provider. We will create procedures to ensure staff effectively use GPS information to monitor route completion, departure and return times, late starts, excessive stop times, and vehicle locations for both operational and standby purposes. The procedures will identify who is responsible and/or accountable for those tasks.<br><br>Additionally, Transportation Services will review the AGO report and work on developing a new GPS contract (if required) that will include all the required functions, information, and reports that can address these same tasks.<br><br>This action will be completed by: Q3 2021 for assessment of current GPS Provider<br>Future Winter Maintenance Contracts Q4 2022 (pending the start of new contracts) |

**Recommendation 6: City Council request the General Manager, Transportation Services Division, to develop clear guidelines and allowances for acceptable stop times, break times, and the valid operational reasons for taking these stops and breaks.**

| **Management Response: ☒ Agree ☐ Disagree** |
|---|
| **Comments/Action Plan/Time Frame:**<br>Transportation Services proposes to: Create a standard operating procedure with relevant guidelines that can be applied to the current contracts to enable staff to make decisions on what are acceptable stop times, break times, and what are valid operational reasons supported by the current contracts.<br><br>Transportation Services will also incorporate the AGO report recommendations into the next round of winter service contracts, and develop contract language along with both clear guidelines and allowances for acceptable stop times, break times, and operational reasons for such stops and breaks in consultation with PMMD and Legal Services.<br><br>This action will be completed by : Existing Winter Maintenance Contracts Q3 2021<br>Future Winter Maintenance Contracts Q4 2022 (pending the start of new contracts) |

**Recommendation 7: City Council request the General Manager, Transportation Services Division, to improve how it documents and tracks vehicle breakdowns and the deployment of spare vehicles.**

| **Management Response: ☒ Agree ☐ Disagree** |
|---|
| **Comments/Action Plan/Time Frame:**<br>Transportation Services proposes to: Create processes and procedures that documents and tracks both vehicle breakdowns and the deployment of spare vehicles using GPS technology. The procedures will identify who is responsible and/or accountable for each task. |

Additionally, Transportation Services will work with PMMD in developing updated contract specifications and clauses that will provide direction to the Contractor on how they are to provide information in a forthright and timely manner about spare vehicles, and what could dis-incentives or liquidated damages could be applied if information is not forthcoming.

This action will be completed by : Existing Winter Maintenance Contracts Q2 2021
Future Winter Maintenance Contracts Q4 2022 (pending the start of new contracts)

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**Recommendation 8: City Council request the General Manager, Transportation Services Division, to:**

a. **ensure all vehicles, including spares, are properly marked with vehicle identification numbers,**

b. **conduct daily physical verification of contractor vehicles on standby, including spares, and document and compare the observations to contractor standby logs, and**

c. **require the contractor to obtain prior approval from the contract administrator when a vehicle needs to go off-site for any reason and document the expected return date.**

**Management Response:** ☒ **Agree** ☐ **Disagree**

Comments/Action Plan/Time Frame:
a) Transportation Services proposes to: Ensure all vehicles within a contract are properly marked with vehicle identification numbers. The supervisors of the contracts will be both responsible and accountable for this task.

This action will be completed by Q4 2020.

b) Transportation Services proposes to: Update processes and procedures for the verification of Contractor vehicle daily standby entitlement. The procedure will identify who is responsible and accountable for each task, as well as outline what information is required to substantiate daily standby.

Transportation Services will also investigate the capability of utilizing GPS technology to implement this recommendation, for example: geofencing with daily pings to ensure vehicles are on standby, coupled with weekly physical checks to verify the vehicle readiness.

This action will be completed by: Q2 2021

c) Transportation Services proposes to: Create a process that ensures that prior to any vehicle being moved off-site, permission is both granted by the Contract Administrator and documented on the standby sheet with the expected return date. The process will utilize geofencing system reports that will advise when vehicles have been removed from a site. The process and procedure will identify who is responsible and/or accountable for the tasks.

Additionally, the future contract will be updated with clauses that list the valid reasons for a vehicle to be moved off-site with expected return timeframes. Disincentives are an option for vehicles that are off-site for longer than expected.

This action will be completed by : Existing Winter Maintenance Contracts Q4 2021
Future Winter Maintenance Contracts Q4 2022 (pending the start of new contracts)

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**Recommendation 9: City Council request the General Manager, Transportation Services Division, to:**

a. **improve documentation of assigned routes (and kilometers) and completed routes by contractor, as well as ensure explanations are documented for when routes are not fully completed, and**

b. **examine the cases where routes do not appear to be completed for potential valid operational reasons and evaluate whether related issues need to be addressed.**

| **Management Response: ☒ Agree ☐ Disagree** |
|---|
| **Comments/Action Plan/Time Frame:**<br>a) Transportation Services proposes to: Create a process that addresses the documentation of both assigned routes and kilometers to vehicles and contractors, as well as explanations for when routes are not fully completed. These documents will be both managed and tracked. The process and procedure will identify who is responsible and/or accountable for the tasks.<br><br>Additionally, The division will review the AGO report and work on developing a new winter contract that will include clauses to address expectations of the contractor. We will request the winter maintenance contractors to document, advise City staff, and take steps to address within a set timeframe when streets are not completed for operational accessibility reasons including:<br>-mechanical breakdown of contracted winter maintenance vehicles,<br>-parked/stopped vehicles impeding winter maintenance vehicle access,<br>-construction,<br>-obstructions i.e. garbage/recycling bins,<br>-other accessibility reasons<br><br>b) Transportation Services proposes to: Create a process that addresses when further investigation is required when routes do not appear to be completed. The investigation (including a valid operational reason), and the evaluation of the impacts on payment shall be documented. The process and procedure will identify who is responsible and/or accountable for the tasks.<br><br>Additionally, the division will review the AGO report and work on developing a new winter contract that will include clauses to address both documentation and evidence requirements supporting invoices, and dis-incentives to the contractor for lack of valid reasons.<br><br>This action will be completed by : Existing Winter Maintenance Contracts Q4 2021<br>Future Winter Maintenance Contracts Q4 2022 (pending the start of new contracts) |

**Recommendation 10: City Council request the General Manager, Transportation Services Division, to clarify wording in future winter maintenance contracts concerning:**

a. **contractor's obligation to detect and report GPS device malfunctioning within a set timeframe,**

b. **reasonable stop and break times,**

c. **preventing vehicle swapping between routes and locations to ensure GPS device information is accurate, and**

d. **provisions for the assessment and enforcement of liquidated damages including clarifying the expectation for when the work commences.**

| Management Response: ☒ Agree ☐ Disagree |
|---|
| **Comments/Action Plan/Time Frame:**<br>For the current contracts, Transportation Services will work with Legal to review the feasibility of a Legal Agreement amendment if required for our Winter Contracts. Processes will be created to ensure these tasks are checked and verified. The procedure will ensure which role is responsible and/or accountable. Additionally:<br><br>a) Transportation Services proposes to: Review the AGO report and work on developing a new contract that will include clarification, definition, and parameters for the items noted in this report, including the contractor's obligation to both detect and report GPS device malfunctions within a set timeframe.<br><br>b) Transportation Services proposes to: Review the AGO report and work on developing a new contract that will include clarification, definition, and parameters for items noted in this report, including defined stop and break times, and what would be acceptable reasons for additional stop and/or break times.<br><br>c) Transportation Services proposes to: Review the AGO report and work on developing a new winter contract that will include clauses directing contractors to not swap vehicles between routes and locations.<br><br>d) Transportation Services proposes to: Review the AGO report and work on developing a new contract that will include clarification, definition, and parameters for assessing and enforcement of disincentives and liquidated damages for various scenarios, activities, and lack of activity as required, including the clarification the expectation for when work commences. For example, if vehicles are off-site for repairs (or another pre-defined reason) for more than five days, disincentives could be used.<br><br>This action will be completed by : Existing Winter Maintenance Contracts Q2 2021<br>Future Winter Maintenance Contracts Q4 2022 (pending the start of new contracts) |

**Recommendation 11: City Council request the General Manager, Transportation Services Division, to reassess and document the rationale for liquidated damages amounts in the next contract cycle taking into account past claims against the City and other potential losses, to ensure that the liquidated damages amounts are fair and supportable.**

| Management Response: ☒ Agree ☐ Disagree |
|---|
| **Comments/Action Plan/Time Frame:**<br><br>Transportation Services proposes to: consult with Legal Services to reassess and document the rationale for liquidated damages amounts in the next contract cycle. The analysis will take into account past claims related to liquidated damages, to ensure the amounts are fair and supportable. Transportation Services will also review other contractual and financial instruments and protocols that either incentivizes or disincentivizes contractor performance.<br><br>This may also require the creation of a new process with procedures. The procedure will ensure which roles are responsible and/or accountable for these regular checks.<br><br>This action will be completed by : Existing Winter Maintenance Contracts Q3 2021<br>Future Winter Maintenance Contracts Q4 2022 (pending the start of new contracts) |

**Recommendation 12: City Council request the General Manager, Transportation Services Division, to coordinate with the City Manager to discuss and make improvements to the contract with the GPS vendor related to GPS repairs and turn-around time for devices.**

| **Management Response: ☒ Agree ☐ Disagree** |
|---|
| **Comments/Action Plan/Time Frame:**<br>Transportation Services proposes to: Coordinate with the City Manager to discuss and make improvements needed in the current contract with the GPS vendor related to GPS repairs and turn-around time for devices used in winter maintenance contractors' devices.<br><br>Additionally, a procedure will be created to ensure that GPS repairs and turn-around times are followed up by the appropriate party with documentation. The procedure will ensure which roles are responsible and/or accountable.<br><br>This action will be completed by Q2 2021. |

**Recommendation 13: City Council request the General Manager, Transportation Services Division, to establish a formal process to:**

a. **ensure GPS devices are installed and functioning in all contractor vehicles, including spares,**

b. **track all GPS devices and monitor them regularly to ensure the devices are functioning properly,**

c. **periodically reconcile GPS billings,**

d. **monitor and ensure GPS functionality issues are being reported to the GPS vendor and repaired on a timely basis, and**

e. **monitor the calibration and functionality of salt spreaders.**

| **Management Response: ☒ Agree ☐ Disagree** |
|---|
| **Comments/Action Plan/Time Frame:**<br>a) Transportation Services proposes to: Create a process that directs staff to manually check that the vehicle's GPS is functional, independent of the vehicle physical yard check. This tasks/procedure relates to providing courses of action should GPS not be installed or functioning on a piece of equipment, with timelines for responses if required. The procedures will ensure which roles are responsible and/or accountable.<br><br>Additionally, Transportation Services will review the AGO report to ensure clauses are included in future contracts which explicitly state what are the requirements expectations to install and operate functional GPS devices, and what dis-incentives may be applied for non-compliance.<br><br>b) Transportation Services proposes to: Create a process that directs staff to both track all GPS devices and monitor those regularly using exception reports and other tools available via GPS. This will also ensure that the devices are functioning properly. This procedure will also outline what action should be taken when a GPS unit is not functioning and what response timelines are required. The procedure will identify which roles are responsible and/or accountable for corresponding tasks.<br><br>Additionally, Transportation Services will review the AGO report to ensure clauses are included in future contracts that explicitly state what the requirements are, and what dis-incentives may be applied for non-compliance.<br><br>c) Transportation Services proposes to: Create a process that directs staff to reconcile GPS billings for vehicles |

being charged against the current active fleet. This action is currently in process and will address issues where the GPS provider is charging for vehicles and units that are out of service. Reports should include status updates on outstanding units. This can include audit checks against GPS by on the ground observation of the activity. This should happen periodically, or when an issue arises. The procedure will ensure which roles are responsible and/or accountable.

Additionally, Transportation Services will review the AGO report to ensure clauses are included in future GPS contracts that explicitly state what the requirements are, and what disincentives may be applied for non-compliance.

d) Transportation Services proposes to: Create a procedure that directs staff to monitor and ensure GPS functionality issues are being reported to the GPS Vendor and being repaired on a timely basis. The procedure will ensure which roles are responsible and/or accountable.

Additionally, Transportation Services will review the AGO report and work on developing a new GPS contract that will include timelines on both repair and responsiveness with appropriate disincentive clauses.

e) Transportation Services proposes to: Create a procedure that directs staff to monitor the calibration and functionality of salt spreaders with a regular monthly Fleet maintenance schedule. This can include audit checks against GPS by on the ground observation of the activity. This should happen periodically, or when an issue arises. The procedure will ensure which roles are responsible and/or accountable.

This action will be completed by : Existing Winter Maintenance Contracts Q2 2021
Future Winter Maintenance Contracts Q4 2022 (pending the start of new contracts)

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**Recommendation 14: City Council request the General Manager, Transportation Services Division, to:**

a. **develop a policy and procedure manual for winter operations, including best practices for contract management, and best practices for assessing and charging liquidated damages,**

b. **standardize processes and forms for monitoring contractor performance and for assessing and charging liquidated damages, and**

c. **ensure staff verify and review contractors' operating and standby logs, using GPS data, for accuracy of timing and services provided before approving payment.**

**Management Response:** ☒ **Agree** ☐ **Disagree**

**Comments/Action Plan/Time Frame:**

a), b) Transportation Services proposes to: Develop a policies and procedure Winter Operations Manual that documents a Contract Management Training Curriculum and outlines expectations for managing Winter Maintenance Contracts. This can supplement the current policies and procedures that are ingrained in the Salt Management Plan and Snow School that has been provided for over seven years.

Training on the new manual will be delivered to staff and will focus on areas identified within the AG report, contract management best practices, policies, procedures, approvals on payments quantities, delivery of services, use of GPS technology, inspection, contract administration, file management, and closing of contracts. The training and follow up will be conducted by brand new units in Transportation that were formed as part of a re-organization. These units are a key partner in drafting policies, providing processes, and ensuring compliance, and are a key tool moving forward.

The manual will include all processes, procedures, and forms to be used in the monitoring of performance, application, and justification for liquidated damages and/or other dis-incentives.

c) Transportation Services proposes to: Create processes and procedures for the verification of operating time and work performed, using existing GPS data, prior to any payment being issued. The procedure will be explicit in explaining who is responsible and/or accountable. This will require an assessment of the current GPS provider capabilities and reporting output.

These actions will be completed by: Q4 2021

**Recommendation 15: City Council request the General Manager, Transportation Services Division, to provide additional training to ensure staff have an up-to-date and clear understanding of their roles and responsibilities, as well as strong knowledge of winter maintenance contract management policies and procedures.**

**Management Response: ☒ Agree ☐ Disagree**

**Comments/Action Plan/Time Frame:**

Transportation Services proposes to: Implement a Contract Management Training Curriculum to provide strong knowledge for managing Winter Maintenance Contracts. The training objective is to ensure conformance to AG recommendations, contract management best practices, policies, procedures, approvals on payments quantities, delivery of services, the use of GPS technology, inspection, contract administration, file management, and closing of contracts.

The Curriculum is to include Modules such as:

- Scoping – Contract Initiation (Development and Design, etc.)
- Planning – Contract Procurement (Vendor Solicitation, Selection, Award, Contract Agreement Execution, etc.)
- Managing – Contract Administration (Vendor on-boarding, contract execution, change order management, substantial completion, ongoing payments, etc.)
- Closing – Contract Close-out (final payments, adjudication, warranty management, etc.)

The Curriculum will also consider:

- Service Contracts – Management, Inspection, Invoicing, and Payment Approvals.
- Operating Model – SOPs, RACI depicting roles and/or responsibilities, processes, tasks, and activities that describes how to operate the contract, and how to perform certain tasks (a comprehensive set of SOPs).

We are planning to have both the Curriculum framework completed and for priority training for the existing contracts to start by Q4-2020

**Recommendation 16: City Council request the General Manager, Transportation Services Division, to consult Legal services in relation to the approach to take on the definition and charging of standby payments for the remainder (two years) of the current contract cycle.**

**Management Response: ☒ Agree ☐ Disagree**

**Comments/Action Plan/Time Frame:**

Transportation Services proposes to: consult with Legal Services and industry to discuss and document an approach in order to clarify the definition and application of standby payment for the remainder of the current contract cycle.

This action will be completed by Q1 2021.

**Recommendation 17: City Council request the General Manager, Transportation Services Division, to work together with Legal services on a detailed review of the contract documents and Request for Quote for the next contract cycle, and make the necessary improvements to ensure internal consistency, consistent use of terminology and defined terms, and simplification for implementation.**

| **Management Response: ☒ Agree ☐ Disagree** |
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| **Comments/Action Plan/Time Frame:**<br>Transportation Services proposes to: work closely work closely with Legal Services and Transportation Services' Contract Development & Controls Unit (created in 2018 to support AG recommendations concerning contract management) in order to provide a detailed review of all contract documents for the next contract cycle. The review will focus on making improvements to ensure internal consistency, consistent use of terminology and defined terms, and simplifying the contract language, where required, for implementation.<br><br>This action shall be completed by: Future Winter Maintenance Contracts Q4 2022 (pending the start of new contracts) |

**Recommendation 18: City Council request the General Manager, Transportation Services Division, to ensure that the management and payment for services is consistent with the express terms of the contract for the next contract cycle.**

| **Management Response: ☒ Agree ☐ Disagree** |
|---|
| **Comments/Action Plan/Time Frame:**<br>Transportation Services proposes to: Create processes, procedures and forms as needed in order to ensure the contract management and payment for services is consistent with the express terms of the contract for the next contract cycle.<br><br>Staff will be provided a training session from the Transportations' Contract Development & Controls Unit on the new contract terms and conditions. Additionally, the Corporate Compliance Unit (created in 2018 to support AG recommendations concerning contract management) will follow up in order to confirm that staff are aware of the terms and conditions of the contract as well as associated processes and procedures.<br><br>This action shall be completed by: Future Winter Maintenance Contracts Q4 2022 (pending the start of new contracts) |

**Recommendation 19: City Council request the General Manager, Transportation Services Division, to perform a cost-benefit analysis of in-house versus outsourced delivery of its winter road maintenance program, to determine whether it would be beneficial or not to increase the level of in-house delivery.**

| **Management Response: ☒ Agree ☐ Disagree** |
|---|
| **Comments/Action Plan/Time Frame:**<br><br>Transportation Services proposed to: Complete an ongoing cost-benefit review of various components of the winter road maintenance program to assess the operational, financial and service level impacts to either maintain or increase the level of in-house delivery for sidewalk and local road services.<br><br>This action will be completed by Q1 2021. |

**Recommendation 20: City Council request the General Manager, Transportation Services Division, to:**

a. **develop meaningful Key Performance Indicators (KPIs) to measure the achievement of Council-approved service levels,**

b. **develop performance metrics for the next contract cycle to measure and monitor contractor performance,**

c. **improve processes and documentation to have relevant and readily available information to measure the KPIs, and**

d. **publicly report on the KPIs on at least an annual basis.**

**Management Response:** ☒ **Agree** ☐ **Disagree**

**Comments/Action Plan/Time Frame:**

a) Transportation Services proposes to: Develop meaningful outcome-based KPIs that can be used to measure the achievement of Council-approved service levels. The division has begun reviewing KPIs using the Results Based Accountability (RBA) methodology that was introduced by the City Manager's Office to develop outcome-based performance measures. These KPIs will be derived from a variety of data sources, and a robust internal control and process will be used in order to ensure that outcomes are accurately measured in a meaningful way. The procedure will clearly identify the different roles and the associated tasks that they are responsible and accountable for.

b) Transportation Services proposes to: Create performance measures that will be used to track project and contract management performance, as well as metrics to be used to monitor both contractor performance and operational performance. Procedures will be created and documented to ensure both regular and periodic data collection.

c) Transportation Services proposes to: Document and use an improved process that will ensure that relevant information is readily available to allow for outcome-based measures to be reported and tracked on a regular basis. The Results Based Accountability (RBA) methodology will be applied to measure the performance of the winter maintenance program. RBA is a corporate performance management and accountability framework to measure and improve the effectiveness of its programs. Simply put, RBA is a step-by-step iterative process to develop meaningful outcome-based performance measures. RBA provides answers to three common questions:

- How much did we do?
- How well did we do?
- Is anyone better off?

Development of the winter operations outcome-based performance measures will follow a phased approach, starting with use of existing data. A robust system will be introduced to validate the existing data before they are used for performance measure reporting. In parallel, a data development agenda will be developed to outline future data collection and validation requirements to ensure higher quality of data. These processes will be reviewed on a regular basis for iterative improvement to KPIs being reported.

d) Transportation Services proposes to: Create both a regular and periodic process to publicly report on outcome-based KPIs on at least an annual basis. A dashboard shall be created in order to ensure the relevant KPIs are published on an ongoing basis, which can be followed by an annual end-of the season report.

These actions will be completed by: Q4 2021

**Recommendation 21: City Council request the General Manager, Transportation Services Division, to work with the GPS vendor to configure the:**

a. **route completion report to provide accurate information, and develop other GPS reports for measuring contractor performance and service levels, and**

b. **GPS system's geofencing feature to monitor contractors' adherence to their designated routes.**

| **Management Response:** ☒ **Agree** ☐ **Disagree** |
|---|
| **Comments/Action Plan/Time Frame:**<br>a) Transportation Services proposes to: Co-ordinate with the City Manager to discuss and make needed improvements in the current contract with the GPS vendor related to route completion reports, as well as developing other reports form GPS data that can both help measure contractor performance and provide information relating to Service levels.<br><br>Additionally, a procedure will be created to ensure that those reports are both regularly reviewed and analyzed in order to better monitor both contractor performance and address Service Level concerns. The procedure will ensure which roles are responsible and/or accountable.<br><br>b) Transportation Services proposes to: Co-ordinate with the City Manager to discuss and make needed improvements in the current contract with the GPS vendor related to geofencing in order to monitor contractor adherence to designated beat routes, ensuring contract vehicles (both spares and otherwise) are where they are supposed to be.<br><br>Additionally, a procedure will be created to ensure that those exception reports are both regularly reviewed and analyzed in order to better monitor contractor performance and address Service Level concerns. The procedure will ensure which roles are responsible and/or accountable.<br><br>This action will be completed by: Q2 2021 |

**Recommendation 22: City Council request the General Manager, Transportation Services Division, to analyze legal claims information and 311 service requests on a regular basis to provide additional indicators of where contractor performance needs closer monitoring.**

| **Management Response:** ☒ **Agree** ☐ **Disagree** |
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| **Comments/Action Plan/Time Frame:**<br>Transportation Services proposes to: Continue analysing Service requests and generating heat maps in order to review hot spots. Substantiating claims, where possible, will provide further clarity as to the nature and reasons for the SR's. Where possible, involve the Permits & Encroachments Section to target the enforcement of City By-laws pertaining to winter maintenance.<br><br>Additionally, a process will be created to ensure that these reports are regularly both reviewed and analyzed in order to better monitor the contractor performance and address Service Level concerns. The procedure will ensure which roles are responsible and/or accountable.<br><br>This action will be completed by: Q2 2021 |