




**CITY OF HAMILTON**  
**PUBLIC WORKS DEPARTMENT**  
**Transportation Operations and Maintenance Division**

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| <b>TO:</b>                | Chair and Members<br>Public Works Committee  |
| <b>COMMITTEE DATE:</b>    | November 15, 2021  |
| <b>SUBJECT/REPORT NO:</b> | Salt Management Plan Update (TOE02129(b)) (City Wide)  |
| <b>WARD(S) AFFECTED:</b>  | City Wide  |
| <b>PREPARED BY:</b>       | Bob Paul (905) 546-2424 Ext. 7641  |
| <b>SUBMITTED BY:</b>      | Mike Field<br>Acting Director, Transportation, Operations & Maintenance<br>Public Works Department |
| <b>SIGNATURE:</b>         |                   |

**RECOMMENDATIONS**

- (a) That the 2021 City of Hamilton Salt Management Plan, attached to Report TOE02129(b) as Appendix "A", be approved as part of the City of Hamilton's Transportation Quality Management System; and
- (b) That staff be directed and authorized, subject to funding availability under operating budgets, to implement all aspects of the 2021 City of Hamilton Salt Management Plan.

**EXECUTIVE SUMMARY**

A Salt Management Plan (SMP) provides the means through which an organization commits to implementing salt best management practices as it fulfils its obligation to provide a safe, accessible and efficient transportation system for the movement of people, goods and services across the City of Hamilton (City). The SMP sets out a policy and procedural framework for ensuring that the City continuously improves on the effective delivery of winter maintenance services and the management of road salt used in winter maintenance operations, as outlined in Environment Canada's Code of Practice for the Environmental Management of Road Salts.

The City of Hamilton developed its first Salt Management Plan in 2003. Following the plan, the City continued to take actions toward implementing best practices for salt

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OUR Vision: To be the best place to raise a child and age successfully.

OUR Mission: To provide high quality cost conscious public services that contribute to a healthy, safe and prosperous community, in a sustainable manner.

OUR Culture: Collective Ownership, Steadfast Integrity, Courageous Change, Sensational Service, Engaged Empowered Employees.

**SUBJECT: Salt Management Plan Update (TOE02129(b))  
(City Wide) – Page 2 of 10**

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management. The updated Salt Management Plan enable the City with continuing to provide a safe and efficient transportation system, while minimizing effects on the environment through prudent salt use.

Notable changes within the 2021 Salt Management Plan are:

- Condensed, specific accountability and expectations, plans and measures;
- Requirements regarding the Source Water Protection Plan and specific location maps;
- Salt Vulnerable Areas and information regarding the Clean Water Act;
- Minimum Maintenance Standard amendments, declaration of a significant weather event by-law; and
- Increased training and awareness to staff and contractors.

Environment Canada developed a Code of Practice for the Environmental Management of Road Salts to manage the risks posed by road salts, which was a requirement under the Canadian Environmental Protection Act (CEPA 1999). A key component of the Code of Practice is the commitment or endorsement of the plan at the highest level in the organization, therefore the updated Salt Management Plan is being submitted for Council approval.

**Alternatives for Consideration – Not Applicable**

**FINANCIAL – STAFFING – LEGAL IMPLICATIONS**

Financial: The updated Salt Management Plan includes enhancements and other service delivery changes that may have a financial impact on the winter control program operating budget. The City of Hamilton currently allocates \$33.7 million each year for winter maintenance, including a winter material usage budget of \$6.8 million in 2021, consisting of brine, pre-wet beet-brine solution, salt, and sand/pickle. Any required budget changes to the winter control program as a result of this updated Salt Management Plan will be brought forward in accordance with the corporate process and policies followed for establishing the annual Tax Operating Budget.

Staffing: N/A

Legal: N/A

## **HISTORICAL BACKGROUND**

In 2001, Environment Canada released an assessment report indicating that road salts are entering the environment in large amounts and posing a risk to plants, animals, lake and stream ecosystems and groundwater. The report recommended that salt be designated toxic under the Canadian Environment Protection Act (CEPA). Road salt is not currently designated as a toxic substance and Environment Canada has not banned the use of road salts but have encouraged users to develop management strategies.

In 2003 Council approved Report TOE02129(a) - Road Salt Management Plan as part of the City's Integrated Management System. This report included information regarding training, material pre-wetting, weather service, and salt storage facilities. Subsequently several projects that were completed, including salt storage structures at the Rymal Road, Brock Road, and Shaver Road Public Works Yards in 2007, which allow for the entire City's salt and abrasive materials to be stored under cover and on impermeable storage and loading pads.

In 2011, a new truck wash-bay with an oil/grit separator was constructed at the Rymal Road Public Works Yard. This was the first step taken in the City controlling the wash-water run off prior to the water entering the storm sewer system.

In 2018 Council approved Information Report PW18016 Where's My Plow, which provided an update regarding the feasibility of creating a Where's My Plow system to allow citizens to monitor the City's in-house and contracted snow removal services. In November of 2018, a website was implemented which provides public facing access.

On May 3, 2018, Ontario Regulation 239/02 - Minimum Maintenance Standards (MMS) for Municipal Highways was amended and included changes related to winter maintenance, specifically ice/snow accumulations/inspections on sidewalks, levels of service for bike lanes and the frequency of weather monitoring.

For the 2020/2021 winter season the City modified staffing to a three-shift model. This allowed for enhanced 24/7 coverage, Monday through Friday, and enhanced response times to winter events while reducing overtime pressures.

Additionally, beginning in the 2020/2021 winter season the Area Maintenance contract was tendered for competitive bidding, of which EMCON was the successful bidder replacing IMOS. The contractor is fully responsible for patrolling and winter maintenance activities in compliance with MMS and City levels of service on major roadways such as the Lincoln M. Alexander Parkway, Red Hill Valley Parkway, Highway 5 and Upper Centennial Parkway.

**SUBJECT: Salt Management Plan Update (TOE02129(b))  
(City Wide) – Page 4 of 10**

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In February of 2021, Council approved Report PW18096a - Maintenance Standards for Municipal Highways Policy, which affirmed the City's approach to the maintenance of transportation system infrastructure. The policy dictates levels of service for all maintenance activities including winter control.

**POLICY IMPLICATIONS AND LEGISLATED REQUIREMENTS**

The proposed 2021 City of Hamilton Salt Management Plan is in alignment with and supports the Canadian Environment Protection Act (CEPA), Source Protection Plan (SPP) Policies, Ontario Regulation 239/02 - Minimum Maintenance Standards (MMS) for Municipal Highways and Maintenance Standards for Municipal Highways Policy (PW18096a).

**RELEVANT CONSULTATION**

The following internal and external parties have been consulted in the development of this report:

City of Hamilton Departments/Divisions:

- Chief Road Official
- Hamilton Water - Water Wastewater System Planning;
- Transportation Operations & Maintenance: Business Initiatives; and
- Legal and Risk Management Services, Finance & Administration.

External:

- Conservation Halton - Source Water Protection; and
- Hamilton Conservation Authority.

**ANALYSIS AND RATIONALE FOR RECOMMENDATION**

Salt Management Plan

The SMP strives to minimize the amount of salt entering the environment by including best salt handling practices and new technologies to ensure its most effective use on roadways and sidewalks. Transportation Operations and Maintenance currently uses the following industry standard technologies and strategies in its approach to salt use and winter operations:

- Computerized Spreader Controllers - Electronic controllers ensure that a consistent amount of salt is being placed on roadways and provide data that permits salt use to be tracked.

**SUBJECT: Salt Management Plan Update (TOE02129(b))  
(City Wide) – Page 5 of 10**

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- Automatic Vehicle Location (AVL) - AVL systems are installed in plows and spreader equipment and aids in tracking salt usage, monitoring equipment location, operational speeds, and public concerns (<http://hamilton.plowtracker.com/>).
- Spreader Calibration - All plow truck spreaders are calibrated prior to the start of the winter season, and again during the winter season when a plow truck is in for maintenance. The pre-set spreader rate settings are verified during the calibration process. Effective placement of salt depends on accurate calibration of spreaders and ensures that the equipment is functioning properly.
- Onboard Pre-wetting - Pre-wetting of road salt with a pre-wetting agent helps the material to adhere to roadways by reducing bounce and scatter of material when discharged from spinners. Pre-wetting also assists in activating material faster and enhances salt melting capability thereby reduces usage needs. All City and contracted roadway plow trucks are equipped with onboard prewetting systems.
- Direct Liquid Application (DLA) – DLA, also known as ‘brining’, reduces the amount of sodium chlorides required by approximately 10 times by preventing formation of the bond between ice/snow and the pavement. DLA is also effective as a pre-treatment for frost events and to prevent black ice from forming.
- Weather Forecasting – Effective use of salt is dependent upon timely snow and ice control decision-making, which in turn depends on up to date weather information. Detailed weather data through a weather subscription provides real time and forecasts which enhances Transportation Operations & Maintenance’s ability to make efficient snow and ice control decisions.
- Winter Patrolling – Accurate monitoring of winter maintenance activities provides effective snow and ice control decisions leading to timely and efficient use of salt.
- Snow and Ice Control Training – Transportation Operations & Maintenance regularly provides training regarding the snow and ice control program for both internal and external resources.
- Regular Inspection of Salt Storage Facilities - All City yards are inspected at the beginning of each winter season to identify any defects in the storage facilities for repair.
- Coordinated Salt Delivery – Salt delivery is coordinated during non-inclement weather and stored in a way to minimize spillage and/or seepage.

**SUBJECT: Salt Management Plan Update (TOE02129(b))  
(City Wide) – Page 6 of 10**

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Material Use

Based upon a 10-year average of material usage, the City uses approximately 61,346 tonnes of salt and 12,339 tonnes of sand/salt mix per winter season.

The following identifies seasonal tonnage of salt and abrasive material used per season between 2011 and 2021 winter control seasons. A winter control season is defined as running from November through April of the following year.

| Winter Season: | Salt Usage (tonnes): | Sand Mix Usage (tonnes): |
|----------------|----------------------|--------------------------|
| 2011-2012      | 39,988               | 8,370                    |
| 2012-2013      | 55,384               | 10,076                   |
| 2013-2014      | 110,173              | 27,804                   |
| 2014-2015      | 82,111               | 16,619                   |
| 2015-2016      | 51,500               | 6,678                    |
| 2016-2017      | 46,757               | 9,671                    |
| 2017-2018      | 69,280               | 17,536                   |
| 2018-2019      | 50,616               | 17,691                   |
| 2019-2020      | 52,710               | 5,243                    |
| 2020-2021      | 54,936               | 3,702                    |
| Total:         | 613,455              | 123,390                  |

The SMP aims to reduce the amount of salt required to achieve the City's Maintenance Standards for Municipal Highways Policy without compromising public safety and demonstrates Hamilton's commitment to be an environmentally responsible municipality.

Salt Management Plan Changes

An assessment of current practices against recommended best management practices was undertaken as part of the 2021 update of the SMP. The following initiatives and best practices were incorporated into the SMP:

- An additionally scheduled equipment calibration procedure to include a mid-season verification;
- Identification and review of salt vulnerable areas in order to remain current with technological and legislative changes;
- Additional internal training on new equipment and refresher training and evaluations;
- Review of current spreader control and current AVL/GPS for material usage;
- End of season review of route structure and examination for areas of service optimization and possible salt reduction;

**SUBJECT: Salt Management Plan Update (TOE02129(b))  
(City Wide) – Page 7 of 10**

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- Review of the pre-wet storage facilities and future needs for filtration systems in order to stay current with legislative changes;
- Review of potential locations for new fully regulated snow management disposal sites and development of a disposal site management plan; and
- Researching of a suitable location in the lower City, purchase of land and construction of a snow management facility.

Future costs associated with the initiatives and best practices in the 2021 Salt Management Plan will be identified in future Operating or Capital budget submissions.

The updated SMP will become a component of the overall Transportation Quality Management System (TQMS) Operational Plan. The TQMS is a framework that documents processes, procedures, and responsibilities to safely, effectively and efficiently maintain and operate the transportation system while meeting applicable legislative and regulatory requirements.

#### Environmental Impacts

While the use of road salt is critical to maintaining safe winter roadway conditions, its excessive use can have negative impacts on the environment. Road salt is environmentally impactful, and it is important to carefully manage and only apply in quantities that is necessary to achieve safe use of the transportation system.

Road salt eventually runs off roadways and into drainage systems. Stormwater runoff enters the environment through three primary pathways; overflow of combined sewer systems that discharge to nearby surface water, infiltration into the ground and spray caused by traffic and wind. As a result, the use of road salt during winter operations has the potential to impact the environment in a variety of ways.

- Aquatic Habitat - High concentration of chlorides during spring runoff and continuous levels of chloride present in the groundwater discharging may adversely impact aquatic habitat.
- Vegetation - High concentrations of salt in soil, groundwater and salt spray from roadways can damage roadside vegetation such as trees, shrubs and grass.
- Soil Impacts - The sodium in road salt can react with soil and can cause increased hardness, increased pH and reduced permeability for some soil types. These characteristics in the roadside soils can adversely affect the fertility of the soils and their ability to grow plants.
- Wetlands - Swamps, marshes and other types of wetlands can be impacted where runoff is directed to adjacent natural vegetation features. The runoff may

**SUBJECT: Salt Management Plan Update (TOE02129(b))  
(City Wide) – Page 8 of 10**

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- enter the wetland through a natural course or roadside ditch and with high chloride levels there is the possibility of a reduction in the overall diversity of the wetland.
- Wildlife - Pondered runoff can serve as a salt source for wildlife. These animals are often attracted to the roadside where there is a high spring salt concentration. The presence of wildlife near roadways is hazard for both wildlife and road users.

#### Source Water Protection Group

Hamilton Water monitors and tests for chlorides in the raw drinking water supply from Lake Ontario, with increased sampling since 2017.

The Halton-Hamilton and the Grand River Source Protection Plans have Policies related to the application, handling and storage of road salt in vulnerable areas. The Source Water Protection group, through the City's Risk Management Office, implements the Source Protection Plan (SPP) Policies.

In addition to the SPP policies related to screening proposals for salt storage facilities and establishment of Risk Management Plans, there are requirements for the development of education and outreach campaigns for the private, public sector and general public about the impacts of road salt on drinking water sources and the use of best management practices. The Source Water Protection group is implementing these requirements through general information and updates on the City's website - <https://www.hamilton.ca/source-water-protection> - and also through targeted awareness sessions.

The Source Water Protection group provided winter operations onboarding road salt training in the fall of 2018 and 2019. The objective was to provide awareness to area maintenance contractors and front-line operators in Transportation Operations & Maintenance about the Clean Water Act, Source Protection Plans, water quality vulnerable areas and Wellhead Protection Areas (WHPA's) on the impacts on drinking water sources from handling, storage and application of road salt.

#### Salt Management Reporting and Metrics

In December 2014, Environment and Climate Change Canada set seven performance indicators and national targets in order to monitor the effectiveness of the Code of Practice for the Environmental Management of Road Salts. The seven performance indicators with six targets set for 2019 and one for 2024 that fall under four main activities of the Code of Practice; adoption of the Code, salt storage, salt application and salt-vulnerable areas are as follows:



**SUBJECT: Salt Management Plan Update (TOE02129(b))  
(City Wide) – Page 9 of 10**

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- Performance indicator 1: “Submission of annual reports” represents the number of road organizations reporting regularly. The purpose of this indicator is to increase the level of implementation of the Code and best practices in road salt management.
- Performance indicator 2: “Annual review of salt management plan” represents the percentage of road organizations that annually review their salt management plan.
- Performance indicator 3: “Storage of road salts” represents the percentage in tonnes of road salts stored under a permanent roof and on impermeable pads.
- Performance indicator 4: “Storage of treated abrasives” represents the percentage in tonnes of treated abrasives (blended sand and salt) that are stored under cover, either under a tarp or under a permanent roof.
- Performance indicator 5: “Groundspeed electronic controllers” represents the percentage of vehicles equipped with groundspeed electronic controllers.
- Performance indicator 6: “Optimization of salt application” indicates if organizations are adopting practices that enhance their salt application techniques to optimize their use of salt either by using pre-wetting or pre-treated salts.
- Performance indicator 7: “Salt-vulnerable areas” indicates if organizations have identified salt-vulnerable areas and if an action plan has been prepared with the purpose of protecting those areas that are particularly sensitive to road salts.

The City of Hamilton currently satisfies performance indicators 1 through 6 and Transportation Operations & Maintenance will work with the City’s Watershed Management group, particularly the Source Water Protection group, on performance indicator 7, which is nearing completion on identifying all salt vulnerable areas.

The 2020 Environment and Climate Change Canada report can be accessed at the following link:

<https://www.canada.ca/en/environment-climate-change/services/pollutants/road-salts/code-practice-environmental-management-overview-data-2014-2019.html>

## **ALTERNATIVES FOR CONSIDERATION**

N/A

**ALIGNMENT TO THE 2016 – 2025 STRATEGIC PLAN**

**Healthy and Safe Communities**

Hamilton is a safe and supportive City where people are active, healthy, and have a high quality of life.

**Clean and Green**

Hamilton is environmentally sustainable with a healthy balance of natural and urban spaces.

**Built Environment and Infrastructure**

Hamilton is supported by state of the art infrastructure, transportation options, buildings and public spaces that create a dynamic City.

**APPENDICES AND SCHEDULES ATTACHED**

Appendix “A” to Report TOE02129(b) – 2021 City of Hamilton Salt Management Plan