



TOWN OF OAKVILLE

SALT MANAGEMENT PLAN

2018

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1.0 INTRODUCTION

Road salts (primarily sodium chloride) are the conventional deicing/anti-icing chemicals for maintaining winter safety because of their cost, effectiveness and ease of handling. The amount of salt used is a function of level of service policies and budgets, the transportation network, weather conditions and operational practices.

The use of salt has adverse environmental impacts. A Salt Management Plan provides the means through which an organization commits to implementing salt best management practices as it fulfills its obligation to provide safe, efficient and cost-effective transportation systems. The Town of Oakville developed its first Salt Management Plan in 2005. Following that plan, the town continued to take actions towards implementing salt best management practices. With this updated Salt Management Plan, the town will continue to provide the public with the safe and efficient transportation systems they expect, while minimizing effects on the environment through prudent salt use.

1.1 Purpose of Plan

This Plan is intended to set out a framework for the town to continuously improve the management of road salt used in its winter maintenance operations. The plan demonstrates the town's commitment to reducing the environmental effects of excessive salt use, consistent with Environment Canada's stated objectives. As recognized by Environment Canada, any modifications to winter maintenance activities must be carried out in a way that provides road safety and user mobility consistent with the road and weather conditions experienced during the snow and ice control season.

The Plan should contain best management practices to protect the environment from the negative impacts of road salts. The Plan should include all areas where road salt is used such as roads, cycling infrastructure, sidewalks, parking lots and pathways. The Plan should apply to all winter maintenance personnel – both staff and hired contractors.

This Plan is dynamic and allows the town to phase-in new approaches and technologies in a way that is responsive to fiscal demands and the needs to ensure that roadway safety is not compromised.

A successful Salt Management Plan is based on the following principles (Transportation Association of Canada, 2013):

- It is activity based, with each activity being assessed at the outset against clearly established standards and/or objectives to determine how they can be carried out with minimal environmental impact.
- Deficiencies in current operations are identified and corrective action established and implemented.
- Required actions are documented in policies and procedures and communicated throughout the organization – including contractors hired to deliver snow and ice control.
- Activities are recorded, monitored, audited and reported periodically to assess progress and identify areas for further improvement.

- Gaps between actions and desired outcomes are identified and corrective actions are developed and implemented, with necessary modifications being made to policies and procedures and appropriate training.

1.2 Legislative Context

1.2.1 Code of Practice for the Environmental Management of Road Salts

Environment and Climate Change Canada (ECCC) released a “Code of Practice for the Environmental Management of Road Salts” (Environment and Climate Change Canada, 2004). As part of the Code of Practice, the town maintains a Salt Management Plan (SMP) and reports status annually. The content of this SMP is consistent with recommendations for SMP content found in the Code of Practice, and assesses current town practices against industry best practices.

1.2.2 Source Water Protection

The Clean Water Act, 2006 was enacted to ensure clean, safe and sustainable drinking water for Ontarians, by protecting sources of municipal drinking water including lakes, rivers and well water. Source Protection Plans (SPP) contain policies that recommend or require actions be taken to address activities identified as threats to drinking water. Oakville lies within two Source Protection Regions (SPR): the Halton-Hamilton SPR and a small portion of the Central Lake Ontario-Toronto Region-Credit Valley SPR, each having SPPs approved by the Ministry of the Environment and Climate Change.

The Central Lake Ontario-Toronto Region-Credit Valley SPP has no mandatory policies that apply to salt management within Oakville. The Halton-Hamilton SPP includes the following mandatory policies relating to salt use applicable to Oakville:

Halton-Hamilton SPP Policy	How Addressed in this SMP
1. SMP must identify the location of wellhead protection areas, issue contributing areas, and intake protection zones.	The location of wellhead protection areas, issue contributing areas, and intake protection zones is found within the Halton-Hamilton SPP: http://www.protectingwater.ca
2. The municipalities shall amend their salt management plans to enhance best management practices in identified vulnerable areas.	This SMP assess current practices against recommended best management practices and identifies opportunities for improvement. This SMP is reviewed annually and updated approximately every 5 years.
3. The municipalities shall advise the Source Protection Authority of revisions to the salt management plans when completed and provide a status update by February 1 of each year until completed.	Through Halton Region participants, Source Protection Authority will be notified of and provided this revised SMP. The Source Protection Authority will be updated on the status of annual SMP reviews.

1.2.3 Salt Vulnerable Areas

The Code of Practice: The Environmental Management of Road Salts, Environment and Climate Change Canada (ECCC), 2004, defines "vulnerable area" as an area particularly sensitive to road salts where additional salt management measures may be necessary to mitigate the environmental effects of road salts in that area. ECCC has the target of 95 % of road organizations having salt vulnerable areas identified and action plans prepared by 2024.

In 2007, a Salt Vulnerable Areas Study was commissioned by Halton Region and the four local municipalities, including Oakville. This study found that the vast majority of the town's geographic area was either moderately or highly vulnerable to salt use.

The Halton-Hamilton SPP noted above also identifies areas of vulnerability specifically relating to drinking water sources. See <http://www.protectingwater.ca> for mapping of these areas. Similar to the more general Salt Vulnerable Areas Study, the Halton-Hamilton SPP also identified the vast majority of Oakville's geographic area as vulnerable, either as part of an "intake protection zone" and/or a "highly vulnerable aquifer".

With the entire town largely identified as an area of salt vulnerability, specific management strategies are not practical. In addition, the expanding urban land use throughout the majority of Oakville directs salt-laden storm water and run-off from developed areas through existing watercourses. Therefore, the more practical approach for the town is to continue being progressive in general salt use management, as outlined in this plan, and continue to explore future alternatives to salt.

1.2.4 Guidelines on Snow Disposal and De-icing Operations in Ontario

Ontario Ministry of Environment and Climate Change (MOECC) released a "Guidelines on Snow Disposal and De-icing Operations in Ontario". These guidelines have been incorporated and are referenced within the Appendix to this plan, "Assessment of Salt Management Best Practices".

2.0 Policy, Scope and Commitment

2.1 Policy

This salt management plan is supported by the following Corporate Policies:

1. MS-CDV-002 Municipal Roads, "The design, construction and operation of municipal roads within the Town of Oakville (the town) shall be in accordance with all applicable Federal, Provincial and Municipal guidelines, adhere to all required legislation and conform to the established procedures.", and
2. EN-GEN-001 Environmental Sustainability, "The Corporation of the Town of Oakville (the town) shall promote environmental initiatives advancing Oakville as a sustainable community.

It is further supported by the following Strategic Goals within Council's Strategic Plan (2015-2018):

- To be accountable in everything we do
- To be innovative in everything we do
- To continuously improve our programs and services
- To be environmentally sustainable
- To be fiscally sustainable
- To be highly valued and widely celebrated for the innovative and outstanding way we satisfy the needs of our residents

The town's salt management principles are:

- Road safety is a top priority.
- The use of road salt is currently essential to maintaining roadway safety during the winter control season.
- The town will strive to optimize the amount of salt released to the environment through effective salt management practices.
- The town will show leadership locally, provincially and nationally in the area of road salt management by leading by example, and sharing knowledge and experience with others.

2.2 Scope

This Salt management Plan applies to public roads, bicycle infrastructure, sidewalks and parking lots for which the town undertakes winter maintenance.

2.3 Commitment

This Salt management Plan was adopted by Council on June 25, 2018 and applies to all employees and contractors involved in Winter Maintenance Operations for the Town.

2.4 Communication

The town is committed to informing all levels of the organization and the public on its road salt management policies and practices, including this plan. The Appendix contains details on the town's current and planned communications practices.

2.5 Plan Review and Update

The Salt Management Plan is reviewed annually for:

- consistency with corporate and winter maintenance policies and procedures,
- planning and implementation of identified opportunities for improvement , and
- incorporation of feedback.

A comprehensive review and update will occur every 5 years. This will include a re-evaluation of continuous improvement goals and update of best and current town practices.

3.0 Road Salt Use and Releases

Road salt may be released to the environment through a variety of activities and operations. The following is a list of the main activities and operations undertaken by winter maintenance through which road salts may be released to the environment:

- Application of road salt or liquid salt (brine) to roads, parking lots and sidewalks,
- Application of abrasives (most commonly sand), which are mixed with road salt, to roads, parking lots and sidewalks,
- Handling and storage of solid road salt, brine and abrasives,
- Snow storage and disposal, and
- Uncontrolled releases, such as leaching of road salt or abrasive piles, spills or equipment washing.

4.0 Road Salt Management Best Practices

The town maintains a Winter Control Plan is a detailed plan that outlines virtually all aspects of winter control operations within the road corridor. The Winter Control Plan executes the town's winter control service levels and policies, including this SMP, and is updated annually to reflect organizational, operational, policy, funding and service-level changes. There is a significant connection between content in this SMP and the Winter Control Plan.

The Appendix, "Assessment of Salt Management Best Practices" presents a detailed review of industry best management practices, largely based on the Transportation Association of Canada's (TAC) "Synthesis of Best Practices – Road Salt Management". The Appendix compares current Town practices and proposes opportunities for improvement.

Implementation of corrective actions are either planned for identified deficiencies (opportunities for improvement) or will guide future planning and budget proposals where restricted by current resources.

APPENDIX

Assessment of Salt Management Best Practices

1. Salt Management Plan			
Objective	To provide a vehicle through which a municipality commits to implementing salt best management practices as it fulfills its obligation to provide safe, efficient and cost-effective transportation system.		
Rationale	The amount of salt used is a function of local service level policies, the transportation system, snowfighting strategies and technique and weather conditions. Local weather conditions require salt management initiatives be developed and implemented locally by each organization.		
Source	Best Practice	Current Town Practice	
Environment Canada's Code of Practice (2017)	The Salt Management Plan should contain documentation of all policies and procedures applicable to the salt management plan.	The town maintains a Winter Control Plan which includes or refers to policies, procedures and guidelines relating to road salt management.	
	The development of salt management plans, based on a review of existing road maintenance operations, identification of means and goal setting to achieve reductions of the negative impacts of salt releases.	Salt Management Plan is assessed annually against leading practices to identify opportunities for operational improvements and to monitor effectiveness of existing practices in protecting the environment from the negative impacts of road salts.	
	Implement additional salt management measures within vulnerable areas including: using technologies to optimize salt use, using feasible alternatives to road salt, increase monitoring, locating salt and snow storage outside of areas, and considering vulnerable areas in road designs.	Vulnerable areas have been identified and referenced in this Salt Management Plan. The majority of Oakville's geographic area is defined as vulnerable, therefore salt optimization practices are generalized.	
	The Salt Management Plan should provide response procedures to react to uncontrolled releases of road salts the could result in environmental impacts.	A Spills Standard Operating Procedure exists and staff receive training.	
	The Salt Management Plan should ensure monitoring of actions to measure the plan's effectiveness.	The town maintains a Winter Control Plan which is reviewed and updated annually. The town tracks annual salt use and is implementing technology to improve detailed tracking of salt application by route.	
	The Salt Management Plan should include communication activities necessary to inform the organization and the public of the salt management plan and related policies and procedures.	To date, the town's Salt Management plan has not been widely communicated.	
	TAC Syntheses of Best Practices	A communication plan is in place for communicating the Salt Management Plan to internal and external stakeholders.	
Municipal senior management accountable for providing safe, efficient, and cost-effective transportation system, must commit to implementing and updating its salt management plan.		The town has maintained a Council-approved Salt Management Plan approved since 2003.	
Each salt management includes monitoring and reporting on implementation of the plan. These results should be reported annually to the senior executive responsible for the salt management plan.		Winter operations are reviewed annually with the participation of senior management.	
Opportunities for Improvement		Achievement Measure	Timing
1	Amend Salt Management Plan to include all areas where salt is applied including sidewalks, parking lots and pathways.	Inclusion of all areas where road salt is applied are included in this Salt Management Plan.	2018
2	Communicate the Salt Management Plan to external stakeholders.	Provide access to the Salt Management Plan on the town's website.	2018
3	Communicate the Salt Management Plan to internal stakeholders.	Develop and annually revise a Winter Control Plan based on and referencing the Salt Management Plan, where appropriate.	2018
4	Provide annually report to Halton Region outlining volume and location of salt application in salt vulnerable areas (including contractors).	Salt usage report provided to Halton Region Source Protection Group.	2018
5	Notify Source Protection Authority of updates to Salt Management Plan.	Source Protection Authority notified of Salt Management Plan updates.	2018

2. Training			
Objective	A comprehensive salt management training program that demonstrates the purpose and value of new procedures and ensures that personnel are prepared and competent to carry out their duties.		
Rationale	To achieve effective implementation of a road salt management, staff and contractors responsible for winter maintenance must obtain the knowledge and understanding of road salt management. Education / training provides opportunity to learn new ideas, technologies, and skills to enhance existing road salt management practices.		
Source	Best Practice	Current Town Practice	
Environment Canada's Code of Practice (2017)	The Salt Management Plan should contain a training program for all personnel when managing or performing winter maintenance activities involving the use of road salts.	The town maintains a Winter Control Plan which includes annual training and contractor orientation plans. Section 10 of this Appendix includes plans to have town staff and contractors servicing town Parking Lots, Facilities, Bus pads, etc. receive Smart-About-Salt training and/or certification.	
TAC Syntheses of Best Practices	Deliver an annual training program for operators staff to ensure that the appropriate learning goals are taught, reinforced and tested.	The town annually delivers a variety of winter control training initiatives to operators based on knowledge/experience.	
	Training should cover salt management learning goals as outlined in Table 1: Learning Goals (2.0 Training) in TAC Syntheses of Best Practices Road Salt Management.	Training initiative curriculums cover the goals outlined in Table 1: Learning Goals (2.0 Training) in TAC Syntheses of Best Practices Road Salt Management.	
	Training programs include testing or a minimum passing grade for verification of knowledge transfer and to provide a medium to assess the quality of the instruction and the analysis of the results.	Training initiatives include a testing component, where appropriate.	
	Up-to-date files are maintained of all training provided.	Paper-based training records are maintained and the town is implementing a Learning Management System that will improve the planning, recording and tracking of training provided to staff.	
Ontario Good Roads Association	Annual training is provided to winter road patrollers including road patrol guidelines, level of service requirements, record keeping, weather and road condition assessments and related equipment i.e. RWIS and infrared thermometers.	A Winter Road Patrol Standard Operating Procedure exists and patrol staff are trained annually.	
	Develop a storm response guide to support decisions related to storm events to ensure a consistent and effective snow and ice control response.	Storm response decisions are made based on staff experience and past practice. The Winter Control Plan support decision-making by providing general guidelines.	
	Conduct pre and post storm analysis to identify opportunities for improvements and ensure compliance with snow and ice policies.	Pre and post storm event meetings are held, as appropriate, with staff to plan/review event responses, successes and opportunities for improvement.	
	An emergency response program exists that includes a communication response protocol and spill response plans on roads and at the yards which is including in existing training program.	A Spills Standard Operating Procedure exists and staff receive training.	
Opportunities for Improvement		Achievement Measure	Timing
1	Internal certification utilized to provide an assurance of minimum competency levels.	Review/pilot a town 'qualification" program for contracted operators.	2018
2	Training programs ensure that salt is effectively managed everywhere, including in salt vulnerable areas.	Halton Region Source Protection group contributes to town winter training/orientation programs.	2018
3	Training records are digitally stored.	Training records are entered and maintained within a database and available for querying.	2019

3. Road, Bridge, and Facility Design			
Objective	Infrastructure designers are aware of the importance of winter operations and consider basic principles from the outset, including the techniques, materials, configurations and design parameters to reduce the amount of snow and ice accumulation.		
Rationale	Proper facility design can reduce the need for (and cost of) snow and ice control.		
Source	Best Practice	Current Town Practice	
TAC Syntheses of Best Practices	The planning and design of new or improvements to roads, parking lots, facilities and cycling infrastructure references the TAC Synthesis of Best Practices and consults winter control operations staff for consideration of materials and techniques, effective drainage, adequate snow storage, sufficient cross-fall, and accommodation for effective plowing.	Roads, parking lots, facilities and cycling infrastructure are designed in accordance to applicable standards and legislation with some consideration given to snow storage and ice control.	
	A drift control policy / guideline exists, including an inventory of drift control locations.	Drifting is monitored and addressed, mostly in rural areas, as required, on a generalized basis.	
Opportunities for Improvement		Achievement Measure	Timing
1	Roads & Works Operations is represented on committee reviewing town engineering and related standards.	Representation Established	2018
2	Include section on drifting within the annual Winter Control Plan, including mapping of areas prone to drifting and control guidelines.	Section added within the Annual Winter Control Plan	2018
3	Include reference to and consideration of TAC Synthesis of Best Practices - Road Salt Management (3.0 - Road, Bridge and Facility Design) within check-list and standard specifications for internal and external designs, town Development Engineering Procedures & Guidelines Manual, and town Facility Design standard specifications.	Reference/Clause added	2019

4. Drainage			
Objective	Principles to aid in the design of drainage works for existing or new roadways and parking lots, and provides a framework to identify the specific practices that can be implemented to minimize potential effects of salt on the surrounding environment.		
Rationale	Most of the salt that is placed on a pavement during snow and ice control operations eventually runs off with the pavement drainage. This drainage enters the environment.		
Source	Best Practice	Current Town Practice	
TAC Syntheses of Best Practices	Pavement drainage systems are implemented to ensure that there is minimal impact to the infiltration characteristics, water quality, erosion potential, and flood risk of the receiving drainage system.	Roads, parking lots, facilities and cycling infrastructure are designed in accordance to applicable standards and legislation with some consideration given to snow storage and ice control.	
Opportunity for Improvements		Achievement Measure	Timing
1	Include reference to and consideration of TAC Synthesis of Best Practices - Road Salt Management (4.0 -Drainage) within check-list and standard specifications for internal and external designs, town Development Engineering Procedures & Guidelines Manual, and town Facility Design standard specifications.	Reference/Clause added.	2019

5. Pavement and Salt Management			
Objective	To provide pavement designers with information on methods to mitigate the environmental and pavement impact of road salt through proper pavement design and to provide maintenance staff with information on pavement related salt management considerations.		
Rationale	Pavement design impacts the melting performance of road salt and therefore, the way in which winter maintenance is carried and the amount of salt used.		
Source	Best Practice	Current Town Practice	
TAC Syntheses of Best Practices	The pavement designer should make every effort to provide pavement designs that serve to support the minimizing of the use of salt for deicing purposes.	Roads, parking lots and cycling infrastructure are designed in accordance to applicable standards and legislation with some consideration given to snow storage and ice control.	
	Pavement temperature trends should be recorded and snow and ice control decision-making should be based on pavement temperatures rather than air temperatures.	The town monitors and records pavement temperatures using truck-mounted sensors and Road Weather Information Systems (RWIS), and uses this information in decision-making.	
	Pavement related factors should be included in a Salt Management training program.	Training initiative curriculums cover the factors outlined in Section 6.0 - Pavement and Salt Management in TAC Syntheses of Best Practices Road Salt Management.	
	Pavement temperature monitoring equipment should be tested at least annually to ensure that they are operating correctly.	Truck mounted units are repaired/replaced as issues are identified. Halton Region managed RWIS stations are inspected/calibrated annually.	
Opportunities for Improvement		Achievement Measure	Timing
1	Include reference to and consideration of TAC Synthesis of Best Practices - Road Salt Management (5.0 - Pavement and Salt Management) within check-list and standard specifications for internal and external designs, town Development Engineering Procedures & Guidelines Manual, and town Facility Design standard specifications.	Reference/Clause added.	2019
2	Inspect/calibrate truck-mounted pavement sensors and RWIS stations (Halton Region) annually.	Process adopted.	2019

6. Vegetation Management			
Objective	To effectively implement salt management practices to reduce the amount of salt entering the environment and potential negative impact to vegetation.		
Rationale	Road salt has the potential to negatively impact vegetation (including agricultural crops).		
Source	Best Practice	Current Town Practice	
TAC Syntheses of Best Practices	Salt use is optimized to reduce the vegetative impacts of winter operations.	The town follows Best Practices as identified within other sections of this plan.	
	Road authorities identify salt vulnerable vegetation and agricultural operations and implement appropriate practices on roadways adjacent to these areas.	No specific agricultural or vegetative impacts from road salt have been identified.	
	Plan and design roadways to avoid areas where vegetation and agricultural areas are salt sensitive, use species tolerant of salt laden runoff and be selective of planting locations.	Roads, parking lots, facilities and cycling infrastructure are designed in accordance to applicable legislation with some consideration given to the impacts of salt on vegetation.	
Opportunities for Improvement		Achievement Measure	Timing
1	Include reference to and consideration of TAC Synthesis of Best Practices - Road Salt Management (6.0 -Vegetation within check-list and standard specifications for internal and external designs, town Development Engineering Procedures & Guidelines Manual, and town Facility Design standard specifications.	Reference/Clause added	2019

7. Design and Operation of Maintenance Yards			
Objective	To provide salt management and environmental considerations that should be taken into account when locating, designing, operating and maintaining maintenance yards.		
Rationale	Salt loss into the environment can occur in the form of airborne salt dust, brine runoff, wastewater discharge from vehicle washing, runoff from salt storage or simple loss from improper handling practices.		
Source	Best Practice	Current Town Practice	
MOECC "Guidelines on Snow Disposal and De-icing Operations in Ontario".	De-icing chemicals or sand/salt stockpiles shall always be protected from precipitation or surface runoff. The storage facility should be underlain with an impervious apron (preferably asphalt) and dyked to prevent the seepage of salt leachate from the storage area.	Central Ops - indoor storage of sufficient capacity with concrete floor. North Ops - indoor storage of sufficient capacity with concrete floor. South East Depot - indoor storage of sufficient capacity with concrete floor.	
TAC Syntheses of Best Practices	Salt and blended abrasives should be stored inside storage facilities with sufficient capacity and with low permeability flooring.		
	Salt management principles within the TAC Synthesis of Best Practices - Road Salt Management (7.0 - Design, Maintenance and Operation of Maintenance Yards) are taken into account when planning, locating and designing maintenance yards.	New maintenance yards are planned considering TAC Syntheses of Best Practices -Road Salt Management (7.0 - Design, Maintenance and Operation of Maintenance Yards).	
	Salt/abrasive loading/unloading and mixing occurs on a paved area, ideally indoors, that provides for the interception and management of salt impacted drainage. If unloaded outside, salt is immediately moved into the storage facility.	Central Ops - paved area with drainage directed through Oil grit separator to the storm water system. Loading/unloading and mixing occurs outdoors on paved area and delivered material immediately moved indoors. North Ops - paved area with drainage captured for use in the production of brine. Loading/unloading and mixing occurs indoors. South East Depot -paved area with drainage directed to the storm water system. Loading/unloading and mixing occurs outdoors on paved area and delivered material immediately moved indoors.	
	Spreaders are washed indoors following use and the wash water directed to a sanitary sewer. If no sanitary sewer is available, the wash water should be directed to a properly designed storm water management pond.	Central Ops - spreaders are washed indoors after use and wash water passes through Oil Grit Separator (OGS) before entering the storm water system. North Ops - spreaders are washed indoors after use and wash water passes through an OGS before entering the sanitary system. South East Depot -spreaders are not washed at this location.	
	Liquid storage containers should be protected from vehicle impacts and provided with spill containment around both the storage tank and liquid transfer point where appropriate. Where practical, secondary containment should be provided.	Central Ops - outdoor brine storage with no crash protection or secondary containment. North Ops - indoor brine storage with crash protection and secondary containment dyke.	
	The amount of material used during the year is monitored and reconciled.	Salt usage is monitored and reconciled at the end of the season.	
	Compliance with good housekeeping policies is monitored.	Currently no formal good housekeeping policy.	
	Prior to each winter season, staff handling salt receive training focusing on learning goals found within TAC Synthesis of Best Practices - Road Salt Management (7.0 - Design, Maintenance and Operation of Maintenance Yards).	Training initiative curriculums cover some the goals outlined in TAC Synthesis of Best Practices - Road Salt Management (7.0 - Design, Maintenance and Operation of Maintenance Yards).	
Implementing a regular groundwater monitoring program.	Currently no facility groundwater monitoring program exists.		
Opportunities for Improvement		Achievement Measure	Timing
1	Develop a good housekeeping standard operating procedure for salt handling activities and incorporate into existing training program.	Procedure developed and training curriculum(s) updated.	2018
2	Address lack of secondary containment and vehicle impact protection at the Central Ops yard.	Measures Implemented	2021

8. Snow Storage and Disposal		
Objective	To assist in the responsible development of snow handling, storage and disposal procedures and sites.	
Rationale	The snow that is stored at snow disposal facilities contains contaminants that are deposited on the ground or carried away with the meltwater as the snow melts.	
Source	Best Practice	Current Town Practice
MOECC "Guidelines on Snow Disposal and De-icing Operations in Ontario".	Snow disposal operations follow MOECC "Guidelines on Snow Disposal and De-icing Operations in Ontario".	The town consolidated snow storage at the Central Operations facility in 2000 under guidelines current at the time. New snow disposal sites or mechanical melting operations will be planned considering MOECC "Guidelines on Snow Disposal and De-icing Operations in Ontario".
TAC Syntheses of Best Practices	New snow disposal sites are located using guiding principles described in TAC Syntheses of Best Practices -Road Salt Management (8.0 - Snow Storage and Disposal).	New snow disposal sites will be planned considering TAC Syntheses of Best Practices -Road Salt Management (8.0 - Snow Storage and Disposal).
	Site drainage and meltwater should be directed to a meltwater collection pond designed for that purpose.	Meltwater runs overland to a settling pond and then discharged to the municipal storm sewer.
Opportunities for Improvement	Achievement Measure	Timing
None identified.		

9. Winter Maintenance Equipment and Technologies			
Objective	To help winter maintenance personnel understand: snow and ice control strategies and methods available to them; pavement and weather conditions that exist, that are forecasted and that need to be acted upon; equipment and material availability, capability and limitations.		
Rationale	To optimize salt use, it is important to look continually at new and innovative technologies as they are a valuable option.		
Source	Best Practice	Current Town Practice	
MOECC "Guidelines on Snow Disposal and De-icing Operations in Ontario".	Reduce salt application rates to the minimum amount necessary to successfully do the job.	Solid and liquid application rates are periodically reviewed and compared with other agencies and refined with experience.	
	Employ rate controlled salt distribution equipment which operates independently of the vehicle's speed.	All town and contracted spreaders are equipped with electronic controllers.	
	Salt only main thoroughfares and critical sections of other roadways, such as inclines, intersections, crosswalks, etc.	The town typically only applies salt to primary and secondary roads.	
	Where salt and sand mixtures are applied incorporate into the admixture only enough salt to achieve the desired results.	Target of 5% salt is added to sand to prevent freezing and clumping. Mix ratios is periodically reviewed and compared with other agencies and refined with experience.	
	Accurate records of salt application be maintained. The type of deicing agent employed, the rate of application, the frequency of application, and road areas covered should be recorded.	The town maintains detailed records of salting operations and is implementing technology to improve detailed tracking of salt application by route.	
TAC Syntheses of Best Practices	Use of Road Weather Information Systems (RWIS) to improve understanding of pavement temperature forecasts and trends can improve the accuracy of decision-making.	Trained staff utilize Halton Region managed RWIS to assist with the forecasting of and response to weather events. Forecasts from localized commercial forecasts, public weather stations, and Canada/USA RADAR, are also utilized.	
	Use of IRT to improve understanding of pavement temperature forecasts and trends can improve the accuracy of decision-making.	Truck-mounted IRT devices are used to monitor surface, air, and dew point temperature to aid in storm responses.	
	Pavement friction information can be used to improve decisions about material application.	Pavement friction information is not currently collected.	
	Winter response procedures aim to prevent the bond of snow and ice to the road, and to mechanically remove as much snow and ice as possible.	Winter response procedures aim to prevent bonding to pavement. Mechanical removal is utilized whenever practical.	
	A variety of mechanical snow and ice removal equipment types and blades is considered for snow plowing.	Staff maintain a current knowledge of the plowing equipment marketplace.	
	Alternative de-icing liquids, including bio-based liquids, and solids are considered to supplement the use of salt.	Alternative liquids are continually considered but not currently utilized. The town participated in a bio-based liquids study in 2010. Staff maintain a current knowledge of alternative materials available and used by other agencies.	
	Direct Liquid Application (DLA) techniques are utilized in priority areas including primary and secondary roads in vulnerable areas.	Direct Liquid Application (DLA) techniques are used on primary roads.	
	Salt pre-wetting is utilized to improve performance and keep material on the pavement by reducing the effects of bouncing, blowing and sliding of the salt or sand particles.	All town and contracted spreaders have pre-wetting capability and pre-wetting is typically utilized when snow/slush is not present on the road.	
	Equip all spreaders with electronic spreader controls that can be accurately calibrated, regulated to ground speed and generate salt-use data in order to optimize salt use.	All town and contracted spreaders are equipped with electronic controllers.	
	Spreaders are calibrated before the start of the season, recalibrated during the season and following repairs.	Spreaders are calibrated before the start of the season.	
	Solid and liquid application rates are optimized for efficacy and to minimize impacts.	Solid and liquid application rates are periodically reviewed and compared with other agencies and refined with experience.	
	Automatic Vehicle Location (AVL) equipment is used to provide operational support and enhance the monitoring of salt usage.	All equipment is tracked using AVL and salt data, including contractors.	
	Route optimization performed to rationalize and ensure efficient routes.	Computerized route rationalization study undertaken to review/adjust salt routes (2016/2017).	
Provide annual training on the operation and maintenance of all winter maintenance related equipment.	The Town provides annual training to staff on the operation and maintenance of winter maintenance equipment.		
Opportunities for Improvement	Achievement Measure	Timing	
1	Develop and implement a calibration policy to ensure spreaders are re-calibrated mid-season and following repairs.	Calibration procedure has been established and implemented for both Town staff and contractors.	2019
2	Investigate practicality of Direct Liquid Application (DLA) techniques on secondary roads.	Investigation performed	2019
3	Investigate use of pavement friction data.	Investigation/pilot project performed.	2020

10. Salt Use on Private Roads, Parking Lots			
Objective	Important principles of salt use are understood by site owners/managers and contractors and are used in snow and ice control operations so that safety can be maintained and salt use reduced.		
Rationale	Equivalent or safer conditions can be achieved with limited salt through the use of proper winter maintenance practices.		
Source	Best Practice	Current Town Practice	
TAC Syntheses of Best Practices	Parking lot and sidewalk owners, contractors and operators understand the principles of salt use and consider the 4 R's - Right Material, Right Amount, Right Place, Right Time.	The Town considers the 4 R's in sidewalk event responses and incorporates in training for sidewalk operators. No current program or requirement for town staff or contractors maintaining parking lots or facilities.	
	Parking lots and sidewalks are plowed to remove as much snow as possible before salt is applied.	The town mechanically removes snow or ice whenever practical.	
	Operators know how much salt they are applying and relate actual performance to site conditions. Various salt application rates are established for different conditions and periodically compared against actual salt usage and refined.	Formal use of various rates is limited and typically based on operator knowledge/experience.	
	Direct Liquid Application and pre-wetting are utilized to reduce the amount of materials required.	Direct Liquid Application and pre-wetting are not currently utilized.	
	Thorough record-keeping practices exist.	Limited operational records are maintained.	
Opportunities for Improvement	Achievement Measure	Timing	
1	Require contractors servicing town Parking Lots, Facilities, Bus pads, etc. to be Smart-About-Salt Certified.	Specification added to tender documents	2019
2	Town staff responsible for overseeing winter control at town Parking Lots, Facilities, Bus pads, etc. receive Smart-About-Salt training for Facility Managers.	Training Achieved	2020
3	Town staff responsible for performing winter control at town Parking Lots, Facilities, Bus pads, etc. receive Smart-About-Salt training for Operators.	Training Achieved	2020