



City of St. Catharines

SALT

MANAGEMENT

PLAN

SUMMARY



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1.0 INTRODUCTION

1.1 Overview

The City of St. Catharines has about 1311 lane-kilometres of roads within the framework of a classification system, which provide for the safe, efficient and affordable means of surface transportation for road users. People rely on our roadway network throughout the year for transport to the workplace, to recreation and leisure facilities, for the transport of goods and services, and for emergency and security services.

Snow and ice conditions on the road system have a dramatic impact on public safety, roadway capacity, travel time and economic costs. User safety remains a priority within winter maintenance operations, practices and strategies contained in this Salt Management Plan.

Although there is ongoing research into the use of alternatives to road salt in winter maintenance, salt continues to be a cost-effective de-icer. However, because of the adverse effects that salt has on the environment, the Salt Management Plan strives to minimize the amount of salt entering the environment by including best salt management practices, and using new technologies to ensure its most effective use over the road system. At the same time, the City will continue to search out and use viable and cost-effective new technologies and chemicals to reduce the environmental impacts of winter maintenance activities.

In 2001, Environment Canada released an assessment report stating that road salts are entering the environment in large amounts and are posing a risk to plants, animals, birds, fish, lake and stream ecosystems and groundwater. Based on the assessment, Environment Canada determined that a strategy was required to manage the release of road salt into the environment. Environment Canada stated that this management strategy would not include a ban on road salts, but rather will encourage users to develop their own salt management strategy. *It must be noted that Health Canada stated that road salts are not harmful to humans.*

*Health Canada
stated that road salts
are not harmful to
human health.*

Environment Canada has released a “Code of Practice for the Environmental Management of Road Salts”. Road salt users, that meet the minimum requirements of the Code of Practice, have to prepare a Salt Management Plan to better manage their road salt use and report their progress.

The City of St. Catharines has developed this Salt Management Plan in accordance with Environment Canada’s Code of Practice for the Environmental Management of Road Salts. This will address growing concerns about the effect road salt is having on our natural environment and at the same time continue to provide for road safety by better managing our use of salt.

1.2 Purpose of the Plan

This Plan is intended to set out a policy and procedural framework for ensuring that the City of St. Catharines continuously improves the management of road salt used in its winter maintenance operations. The Plan demonstrates the City's commitment to reducing the environmental effects of excessive salt use, consistent with Environment Canada's stated objectives.

Any modifications to winter maintenance activities must be carried out in a way that provides roadway safety and user mobility consistent with the weather conditions experienced during the snow and ice control season.

This Plan is dynamic – allowing the City of St. Catharines 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.

1.3 Legislative Authority

The policies presented in this Plan are consistent with fulfilling the City's obligations under provincial and federal legislation.

1.4 The City of St. Catharines' Vision Statement

The Community Vision describes St. Catharines 10 years from today:

St. Catharines - The Garden City
A Welcoming and Nurturing Community

A city that:

- *is safe and secure*
- *thrives through innovative leadership and integrity*
- *stimulates and values a vibrant downtown core...the heart of our City*
- *embraces its culture and the diversity of its citizens*
- *celebrates its unique agricultural and historical assets*
- *works together to foster new business and employment opportunities*
- *promotes a healthy environment and ideal location*

Source: City of St. Catharines Strategic Plan Report, May 29, 2006

1.5 Responsibilities

Assistant Director of Transportation and Environmental Services - Has corporate responsibility for the City's Salt Management Plan.

Manager of Operations - Responsible for ensuring that the Salt Management Plan is developed, maintained, and implemented consistently across the City.

Manager of Physical Plant - Responsible for overseeing the maintenance and upgrading of the winter maintenance facilities in compliance with the Salt Management Plan.

Manager of Equipment Maintenance - Responsible for purchasing, maintaining and calibrating the winter maintenance fleet in compliance with the Salt Management Plan.

Manager of Environmental Services - Responsible for monitoring the change in environmental impacts associated with the Salt Management Plan.

Roads Foreman - Responsible for ensuring that winter maintenance activities are carried out in compliance with the Salt Management Plan.

Winter Maintenance Personnel – Responsible for ensuring that they carry out their winter maintenance duties in accordance with the policies and procedures set out in the Salt Management Plan as directed by their supervisor.

2.0 SALT MANAGEMENT OBJECTIVES

2.1 City of St. Catharines' Environmental Vision Theme

The City of St. Catharines Vision Theme 7:

- Promote a healthy environment and ideal location.

Goal:

To preserve, protect and enhance natural and environmentally significant areas

To provide for safe, diverse transportation alternatives

To provide a range of recreational activities for all ages

Objective:

Undertake actions to control, minimize and monitor local environmental pollution.

Action:

Implement the Winter Control Salt Management Plan.

Source: City of St. Catharines Strategic Plan Report, May 29, 2006

2.2 Transportation and Environmental Services Department Goals

1. To provide the necessary engineering services with optimum consideration for environmental protection and social interests at reasonable cost levels, and to develop an integrated engineering approach in the provision of these services.
2. To establish policies, practices and procedures for consistent deployment of resources and to initiate adequate communications with other levels of government to facilitate provision of these services.

3. To develop engineering training and staff development to provide for future needs.
4. To ensure constant review of operations to provide consistent, adequate, over-all service with emphasis on preventative maintenance, and to maximize utilization of resources on an integrated basis.
5. To develop the concept that local government in general, and the Transportation and Environmental Services Department in particular, shall have as their prime purpose service to the general public.
6. That the goal of each municipal employee shall be to carry out all directions of Council in an economic and efficient manner and to recommend to Council procedures to accomplish departmental purposes effectively.

Source: City of St. Catharines Transportation and Environmental Services Department web site.

2.3 Salt Management Policy

Within the City of St. Catharines' overall policy context, the following is the City's policy on the use and management of road salt.

- To comply with all applicable federal and provincial legislation regarding the storage and use of snow and ice control products.
- To use road salt in an environmentally responsible manner, and minimize the negative environmental effects of handling, storage and application of salt on the environment.
- In providing the stated Level of Service, the City of St. Catharines will conserve the use of salt by utilizing cost-effective technologies and practices.

2.3.1 Salt Management Principles

1. Road safety is a priority for the City of St. Catharines.
2. The use of road salt is essential to maintaining roadway safety during the snow and ice control season.
3. The City of St. Catharines will strive to reduce the amount of salt released to the environment through effective salt management practices.
4. The City of St. Catharines will share their knowledge and experiences with others.
5. This Salt Management Plan will be updated regularly.
6. The City of St. Catharines will provide the necessary training and encouragement to its winter maintenance personnel to allow them to be fully contributing partners in achieving an environmentally sound and safe winter maintenance program.
7. Performance will be measured and reported through appropriate public reporting vehicles.

2.3.2 Implementation Guidelines

This Salt Management Plan was developed in accordance with the following policy directions:

General:

- Salt Management Plans will embrace the concepts set out in the Salt Management Guide (TAC, 1999) and Syntheses of Best Practices (TAC, 2003) prepared by the Transportation Association of Canada (TAC) and subsequent revisions, and Codes of Practice issued by Environment Canada.

On-roadway Use:

- The City of St. Catharines will operate in accordance with clearly stated and documented level of service policies that promote safety and efficient salt use;
- The City of St. Catharines will give a priority to salt vulnerable areas when implementing strategies for reducing salt impacts;
- The City of St. Catharines will apply salt at rates that are consistent with best salt management practices; and
- The City of St. Catharines will strive to improve the efficiency of salt usage through better use of technology and application equipment.

Sand and Salt Storage:

- The City of St. Catharines will review current storage practices for salt and sand/salt blends and develop and implement strategies for cleaning up existing sites and minimizing salt loss to the environment from future operations;

Snow Storage & Disposal:

- The City of St. Catharines will carry out environmental reviews of snow storage areas to improve site selection and management of practices that impact the environment, including site drainage; and
- The City of St. Catharines will manage its snow disposal sites in a way that minimizes impacts to the environment.

Training:

- The City of St. Catharines will implement effective employee training and awareness for supervisors and operators.

Decision-Support:

- The City of St. Catharines will strive to increase staff focus on pavement temperatures; and
- The City of St. Catharines will strive to monitor and interpret weather forecasts.

Record Keeping:

- The City of St. Catharines will strive to improve record keeping to enable better tracking of salt use and salt-related impacts; and
- The City of St. Catharines will develop salt management performance criteria and related monitoring program. These will be integrated into any national salt management reporting program developed by Environment Canada.

3.0 WINTER MAINTENANCE CONTEXT

3.1 Overview

Chapter 3 of the Plan documents the City's snow and ice control standards.

The major activities related to winter maintenance are:

- salt and sand storage;
- salt spreading;
- sand spreading;
- snow plowing; and
- snow removal and disposal.

Details on the City's policy, material application rates (including salt, abrasives and liquids), snow removal, storage and disposal operations are summarized.

4.0 OPERATIONAL PRACTICES AND STRATEGIES

4.1 Overview

Chapter 4 of the Salt Management Plan presents a discussion of each of the key operational practices and strategies related to the effective management of road salt during winter maintenance activities.

Each subsection has a summary that presents a discussion of the objectives, environmental considerations, current situation, action plans (including target dates and responsibilities), performance measures and references (documents or tables).

It is important to recognize that the Salt Management Plan is dynamic and will take time to implement. Therefore, the purpose of Chapter 4 is to establish the goals of the Salt Management Plan and a strategy for achieving these goals.

4.2 Key Goals

Table 4.2.1 summarizes the action plans identified for the operational practices and strategies related to the effective management of road salt during winter maintenance activities.

Note: In the Responsibilities sections below:

- Assistant Director** refers to – Assistant Director of Transportation & Environmental Services
- Operations** refers to – Manager of Operations
- Oper Plan** refers to – Manager of Operations Planning
- Equipment** refers to – Manager of Equipment Services
- Environmental** refers to – Manager of Environmental Services
- Foreman** refers to – Operations and Roads Foreman

4.2.1 Summary of the Action Plans

Activity	Goals	Date	Who
LOS			
	Review the street priorities annually and update as needed.	Annually	Assistant Director
	Review the streets and classify them according to the MMSMH. Correlate the classifications to the City's priority classifications.	2008 - then every 3 years	Operations & Oper Plan
	Review the LOS policies. Ensure they include response and cycle time requirements and end of storm conditions.	2008	Assistant Director
	Consider the potential impacts of introducing new technologies.	Ongoing	Operations
	Obtain management and Council endorsement of the revised street priorities and LOS policies.	2008	Assistant Director
	Implement the revised policies and street priorities.	Ongoing	Operations
	Inform staff, management and the public on the intentions and expectations in service delivery.	Ongoing	Assistant Director
	Monitor and report on compliance with the LOS policy annually.	Annually	Assistant Director
Fleet Allocation/Optimization			
	Review routes and ensure that equipment is adequately allocated.	Ongoing	Operations
	Assess the need to develop alternate routing to handle typical and atypical storm events.	2009	Operations
	As new technologies are implemented, LOS is changed, new development is added or street priorities adjusted, affected combo, spreader, plow and anti-icing routes will be reviewed.	Ongoing	Assistant Director
Electronic Spreader Controls			
	All TES equipment used to apply abrasives, salt and liquids to the street network shall have electronic controllers with data storage and retrieval capabilities.	2011	Equipment
	Develop a system to better quantify the amount of material applied to sidewalks and parking lots by TES and RCS forces.	2008	Operations
	Data from the electronic controllers will be retrieved, reviewed and archived. The usefulness, benefits and applications of the data will be evaluated.	Ongoing	Operations
	Evaluate the merits of implementing an AVL/GPS ³ system and integrating it with the electronic controllers.	2008	Assistant Director

Activity			
	Goals	Date	Who
Pre-wetting and Anti-icing Equipment			
	Ensure that the optimum amount of equipment used to apply material has on-board pre-wetting capabilities.	2011	Operations & Equipment
	Review the results of the pre-wetting and anti-icing experience to-date (in-house and other jurisdictions) and revise the operational practices where needed.	Ongoing	Operations
	Develop a pre-wetting guideline that addresses preferred application rates and expected performance on the road.	2007	Operations
	Identify areas that have a liquid anti-icing priority and integrate this into the equipment plan.	2008	Operations & Equipment
	Evaluate the merits of alternative liquids or mixtures and identify the most cost-effective long-term supply of the chosen liquid (e.g. in-house production and storage of salt brine vs. importing of proprietary liquids).	2008	Assistant Director
	Ensure staff is knowledgeable in liquid use and handling.	Ongoing	Operations
Spreader Calibration			
	All equipment used to apply material will be properly calibrated (including material rate of application) prior to each season. This includes sidewalk and RCS parking lot equipment	Annually	Equipment & Operations
	A calibration history for all spreaders will be maintained and reviewed annually.	Ongoing	Equipment & Operations
	Benchmark all routes (determine the quantity of material applied at a given application rate) to ensure that the correct amount of material is being applied. Material applied will be periodically checked against the benchmark to verify calibration.	2007	Operations & Foreman
	Equipment will be recalibrated after any repair that affects the material delivery system.	Ongoing	Equipment
Equipment Washing			
	Develop a Washwater Management policy and Guideline.	2008	Operations
	Investigate and, if needed, implement options for additional washwater management.	2008	Assistant Director
Material Ordering and Delivery			
	In consultation with the other partners in the Regional Materials Tender, review, and if needed, update material specifications in light of potential changes in material ordered, storage facilities and application technologies.	Ongoing	Operations
	Ensure delivered bulk material is tested periodically and meets the specifications.	2008	Foreman
	Review the City's brine supply to ensure an optimal liquid is being produced by the Region.	Ongoing	Operations

Activity	Goals	Date	Who
Material Application Rates			
	Review the operational material application rates and document them.	2006	Operations
	Develop and document liquid application rates for pre-wetting and anti-icing.	2006	Operations
	Develop guidelines to ensure application rates are adjusted for pavement temperatures and precipitation types.	2008	Operations
	As new technologies and materials are introduced and experience grows review and update the material application rates.	Ongoing	Operations
	All operators shall be knowledgeable in the approach adopted.	Ongoing	Operations & Foreman
Sand/Salt Blends			
	To limit the amount of salt in stockpiled sand/salt blend to a maximum of 5% by volume to prevent freezing of the sand (contingent upon having a covered stockpile).	2010 (or sooner if covered)	Operations
	Review and update operator training to reflect the operational use of abrasives.	Ongoing	Operations
Salt Storage / Handling			
	All salt will be stored indoors on an impermeable pad not exposed to the elements.	Ongoing	Foreman
	Any new salt storage facilities will be designed with regard to the principles set out in TAC's Syntheses of Best Practices Road Salt Management.	Ongoing	Assistant Director
	Data from the electronic controllers will be retrieved, reviewed and archived. The usefulness, benefits and applications of the data will be evaluated.	Ongoing	Operations
	The salt storage and loading area shall be improved and include an appropriate drainage water management system (contingent upon possible yard re-construction plans). Consider recycling the drainage water into brine production.	2009 (Contingent upon yard re-construction)	Operations, Assistant Director

Activity	Goals	Date	Who
Blended Sand Storage / Handling			
	<ul style="list-style-type: none"> All blended sand will be stored covered on impermeable pads, not exposed to the elements (contingent upon yard re-construction plans). 	2009 (Contingent upon yard re-construction)	Assistant Director
	<ul style="list-style-type: none"> Any new blended sand storage facilities will be designed with regard to the principles set out in TAC's Syntheses of Best Practices Road Salt Management. 	Ongoing	Assistant Director
	<ul style="list-style-type: none"> Data from the electronic controllers will be retrieved, reviewed and archived. The usefulness, benefits and applications of the data will be evaluated. 	Ongoing	Operations
	<ul style="list-style-type: none"> The blended sand loading areas shall be paved and include appropriate drainage water management systems (contingent upon yard re-construction plans). 	2009 (Contingent upon yard re-construction)	Operations
Liquid Storage / Handling			
	Determine the best option for supplying liquids for winter maintenance needs (contracted supply, in-house production, etc.).	2007	Operations
	Any new liquid storage facilities will be designed with regard to the principles set out in TAC's Syntheses of Best Practices Road Salt Management.	2008	Operations
	All liquid storage and handling facilities shall have drainage water management systems.	2008	Operations
	Based on the results of the pre-wetting and DLA trials develop Guidelines and application rates for liquids.	Ongoing	Operations
	Ensure staff is knowledgeable in the use and handling of liquids.	Ongoing	Operations
Good Housekeeping Practices			
	Develop a Good Housekeeping Practices Policy. Ensure it includes Salt Management Best Practices.	2008	Operations
	Ensure staff is knowledgeable on the Good Housekeeping Practices.	Ongoing	Foreman
	Conduct periodic audits of the yards and operations to ensure Good Housekeeping Practices are followed.	Ongoing	Operations
Weather Forecasting			
	Make arrangements to obtain appropriate weather forecasts before the start of each season.	Ongoing	Operations
	Ensure staff is knowledgeable in the use of weather information.	Ongoing	Operations
	Investigate the use of technology to improve delivery of weather information to the decision makers.	Annual	Operations

Activity			
	Goals	Date	Who
Road Weather Information Systems (RWIS)			
	Provide access to MTO and Regional RWIS forecasts and information to staff.	2006	Assistant Director
	Evaluate the merits of installing RWIS or FAST sites within the City and/or partnering with the Region.	2008	Assistant Director
	Ensure staff is knowledgeable in the use and interpretation of RWIS forecasts and information.	Ongoing	Operations
Infrared Thermometers (ITR's)			
	All Supervisor vehicles shall be outfitted with IRT's.	Ongoing	Equipment
	Every pre-wetting and anti-icing capable vehicle shall have an IRT.	2010	Equipment
	Ensure staff is knowledgeable in the use of IRT's.	Ongoing	Operations
	Verify the accuracy of every IRT annually.	Annually	Equipment
Storm Response Approaches			
	Develop the current operational procedures for dealing with storm events into an Expert Guide to Snow and Ice Control. Ensure that the Guide covers typical and atypical storm responses.	2009	Operations
	As new technologies are introduced, review and update the Expert Guide.	Ongoing	Operations
Winter Road Patrol			
	Continue with the current Winter Road Patrol program.	Ongoing	Operations
	Improve the documentation relating to the two types of patrolling currently being done.	2009	Operations
Drift Control			
	Review and update the snow drift problem area inventory annually.	Ongoing	Operations
	Review the effectiveness of the City's snow drift control program. Identify appropriate improvements and alternative methods.	Ongoing	Operations
Snow and Ice Control Training			
	Review and update the training program to ensure it addresses the appropriate subject areas set out in TAC's Syntheses of Best Practices Road Salt Management – Training.	Ongoing	Operations
	Present the training in the fall of each year to all operators, supervisors and managers.	Annually	Operations

Activity		Date	Who
Goals			
Snow Removal and Disposal Guidelines			
	Develop a snow removal and disposal policy and guidelines for snow loading, hauling and disposal operations.	2009	Operations
	Assess the existing snow disposal site.	2006	Assistant Director
Snow Disposal Site Improvement Criteria			
	Use TAC's Syntheses of Best Practices Road Salt Management - Snow Storage and Disposal as a guide to developing any improvements to the snow storage and disposal site.	Ongoing	Assistant Director & Environmental
	Based on the assessment of the existing site and future snow disposal needs prepare recommendations for improvements to the existing site.	2007	Assistant Director & Environmental
Snow Disposal Site Monitoring and Maintenance			
	To maintain and monitor the City's snow disposal site following TAC's Syntheses of Best Practices Road Salt Management - Snow Storage and Disposal.	Ongoing	Foreman & Environmental
	To continue the monitoring program that includes chloride levels in surface water.	Ongoing	Environmental
Technology Transfer Review			
	To ensure the latest technologies are studied, reviewed, tested and adopted as appropriate.	Ongoing	Assistant Director
	To participate in conferences and forums geared to the development of salt best management practices.	Ongoing	Assistant Director
Communications			
	Review the City's Communication Program. Ensure it informs the Council, public and local regulatory agencies about the actions being taken by the City to manage road salt use, and the City's winter maintenance program annually.	Ongoing	Assistant Director
	Notify Environment Canada upon completion of the Salt Management Plan and update them annually about the status of Salt Management activities (as per Annex C of the Code of Practice for the Environmental Management of Road Salts).	Ongoing	Assistant Director
Salt Vulnerable Areas			
	Work with other agencies (particularly the Region) to identify and map salt vulnerable areas in the City.	2007	Environmental
	Identify and document strategies to reduce salt impacts to salt vulnerable areas.	Ongoing	Operations



**SALT MANAGEMENT PLAN
SUMMARY**

Activity	Goals	Date	Who
Material Usage Record Keeping			
	Data from the electronic controllers will be regularly retrieved, reviewed and archived.	Ongoing	Foreman
	Material usage by other departments and for the salt bins will be monitored and recorded.	2007	Operations
	All material usage data will be compared and used to reconcile with deliveries.	Annually	Oper Plan
	Information from the operator and patroller/foreman logs along with forecast and future system information will be retrieved, reviewed and archived along with the material usage data.	Ongoing	Oper Plan
	Salt, sand and liquid delivery records and end-of-season residual will be logged to allow for year-end reconciliation of bulk material use.	Annually	Foreman & Oper Plan
	Periodic comparisons of usage by route will be carried out to identify and address any inconsistencies.	Ongoing	Foreman
	Develop a Material Usage Tracking Procedure and record-keeping system.	2009	Assistant Director
	Ensure staff is knowledgeable in the Material Usage Tracking System and record-keeping.	Ongoing	Operations
Storm Response Record Keeping			
	Review the Record Keeping Policy and what records are kept. Ensure the policy includes a standard methodology to report/summarize storm response.	2008	Assistant Director
	Information from the forecasts, logs and future systems will be retrieved, reviewed and archived along with the material usage records.	2007	Operations
	Ensure staff is knowledgeable in the Record Keeping Policy.	Ongoing	Operations
Monitoring Program			
	Monitor developments at the National level with respect to monitoring requirements for salt management plans.	Ongoing	Environmental
	Work with the Region, the Conservation Authority and in-house staff to develop a monitoring program to monitor the impact of salt on the environment. Ensure it is integrated with the snow storage and disposal site program.	Ongoing	Environmental
Emergency Response Program			
	Develop a Response Plan Policy for salt spills.	2008	Operations
	Ensure staff is knowledgeable in the potential hazards and the Response Plan.	Ongoing	Operations

5.0 MONITORING

5.1 Overview

The City of St. Catharines is committed to ensuring that the City's roads are properly maintained in accordance with its Level of Service Policy. While doing so, the City is committed to reducing the impacts that snow and ice control chemicals, such as salt, have on the environment.

The City has developed a comprehensive Salt Management Plan that it is committed to implementing over the next few years. The Salt Management Plan will be reviewed annually. Progress on achieving the Salt Management goals will be monitored using the performance measures listed in Chapter 5 of the Salt Management Plan. An annual report to Environment Canada will be submitted according to Annex C of the Code of Practice. The City will also update and improve the plan as more salt management techniques become available.