



TOWN OF RICHMOND HILL



***2011 SALT
MANAGEMENT PLAN***

JANUARY 2011

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1.0 INTRODUCTION

1.1 Overview

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. The report recommended that salt be designated toxic under the Canadian Environmental Protection Act (CEPA). It should be noted that Health Canada stated that road salts are not harmful to humans. As of April 2003, the Minister still has not announced whether or not road salts are to be designated as CEPA-toxic. However, if Environment Canada designates road salts as toxic, they will not ban road salts, but rather they will encourage users to develop management strategies that encourage improvement of salt handling and salt reduction through the use of new technologies, and the initiation of salt management plans.

Road salts are used in Canada as de-icing and anti-icing chemicals for winter road maintenance, with some use as summer dust suppressants. The Government of Canada is not banning the use of road salts or proposing any measures that would compromise or reduce road safety. The environmental risk management strategy for road salts will focus on the development of best practices respecting storage, spreading and disposal, while ensuring that road safety is not negatively impacted. In response to Environment Canada's initiative to develop measures to manage the risks associated with road salts, the Town has prepared this document, which summarizes the Town's road salt management practice. The purpose of this document is to highlight key elements of the Town's current practice and identify plans for future implementation that will encompass the best management practices for road salt application and will comply with the proposed federal code of practice.

The Town has about 800 lane kilometres of paved roads and 600 kilometers of sidewalk. Winter maintenance procedures involve plowing, sanding and salting to maintain the roads in a safe state of repair. Plowing is the preferred method of removing snow from the road surface; however, plowing alone cannot remove ice that has become bonded to the pavement. Salt has been the de-icing chemical of choice to deal with this bond.

However, with the recent concerns that have been raised on the negative side effects that salt has on the environment, the Town looks for ways to reduce our salt dependency, while maintaining user safety. This remains the most important priority within winter maintenance operations. Although there is ongoing research into the use of alternatives to road salt (sodium chloride) in winter maintenance, it continues to be the most cost effective de-icer across Canada.

Due to the adverse effects that salt has on the environment, the Salt Management Plan is intended to minimize the amount of salt entering the environment. The Town has

been working at ways to minimize salt usage. There are new technologies such as Road Weather Information Systems (RWIS) and Global Positioning Systems (GPS) to help our Patrollers know when to use salt and provide the tool to review the work done. There have been advances in equipment with the introduction of Salt Brine Spreaders, electronic spreader controls, and a designated snow storage area. This use of a Salt Brine and good housekeeping will reduce a large amount of salt going into the environment, along with improved staff training, and documentation to track salt usage.

2.0 SALT MANAGEMENT POLICY

2.1 *Purpose and Objective of Document*

This Salt Management Plan is intended set out an operational and procedural framework for ensuring that the Town minimizes the amount of road salt entering the environment during winter maintenance operations.

Any modifications to the Town's 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.

The Town is committed to exploring new approaches and technologies in winter maintenance activities to reduce the amount of road salt entering the environment and to ensure that roadway safety is not compromised.

2.2 *Responsibilities*

Everyone within the Town connected to winter road maintenance has some responsibility for developing, implementing and reviewing the success of the Salt Management Plan. It is through a cooperative effort that the Town will reduce the environmental effects of its road salt while maintaining safe roads.

2.3 *Operational Practice*

The Town has a Quality Control Plan to ensure salt is only applied in a controlled and effective manner when required, in the right amount, at the right time and in the right place.

The plan includes the following major points:

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| Monitor salt use: | Application records are required each time material is applied to the road. |
| Application rates: | Rates are set for individual road conditions based on weather conditions. |
| Training of operators: | All equipment operators are trained on the procedures for material usage and winter plowing operations. |

2.4 Application

The Transportation Association of Canada has recommended that a Salt Management Plan should contain best management practices to protect the environment from the negative impacts of road salts, while it fulfills its obligation to provide safe efficient and cost-effective roadway systems. The guiding principles of the plan are outlined below:

- Salt Management Plan and Objectives
- Operational Practices
- Documentation
- Training
- Monitoring, Record Keeping, Reporting and Analysis
- Management Review

2.5 Uncontrolled Release of Road Salt

The Town's Spills Notification and Response Standard Operating Procedure layouts the framework for the process to mitigate environmental impacts as a result of the uncontrolled release of materials into the environment

The importance of spill response and containment is further reinforced as part of Public Works Operation Division's mandate to provide spills response training b- annually to staff.

3.0 WINTER MAINTENANCE POLICIES

3.1 Introduction

The major activities related to winter maintenance are:

- Salt and sand storage
- Salt / sand spreading
- Anti-icing
- Salt and sand loading
- Snow storage
- Salt Brine Storage

3.2 Salt and Sand Storage

The Town currently has one (1) salt shed capable of storing under cover approximately 10,000 tonnes of material at the Operations Centre. Having the material under cover limits the amount of salt exposed to the environment caused by wind and storm water run off.

3.3 Salt/Sand Spreading

The Town utilizes electronic spreader controls in all of the Town's and contractor combination plow/sander trucks. These systems allow for accurate placement of sand and salt ensuring improved material application, downloading of activity information, and the programming of variable rate material applications, as conditions dictate.

3.4 Anti-icing

The Town has implemented an anti-icing program for the primary road network. This represents approximately 500 lane kilometres of the Town's road system.

The anti-icing program is designed to address the following types of winter storms and road conditions:

- Light snow storm
- Light snow storm with period(s) of moderate or heavy snow
- Moderate or heavy snow storm
- Frost or black ice
- Freezing rain storm
- Sleet storm

3.5 Pre-wetting

Pre-wetting of the salt as it is being spread onto the roadway more quickly activates the de-icing process and to reduce "bounce". Pre-wetting thus reduces loss of salt to the roadside and the transfer of road salt in excess amounts to general environment.

3.6 Salt Brine Storage

The Town does not produce its own salt brine and depends on outside sources to produce and deliver the material to the central storage area located at the Operation Center.

The Town currently has seven (7) poly vinyl 15,000 ltr salt brine tanks. The tanks are encircled by a one metre high concrete wall which acts as a containment vessel in the event of a tank rupture.

4.0 Operational Practices and Strategies

4.1 Overview

This section of the Plan presents operational practices and strategies related to the effective management of road salt during winter maintenance activities.

4.2 Weather Monitoring

The Town currently has two (2) RWIS stations (Road Weather Integration System). One is located in the south end of Town on Hi Tech Road and the other at the north end of Town on Old Colony Road. The RWIS sites provide real time information on road conditions to the Patrollers over the internet. The Patrol vehicles also have mobile road temperature sensors that read the surface temperatures of the road they are travelling over. This information enables staff to make informed decisions as to when and where winter operations should commence or end, including what material application rates will work best for the forecasted or actual conditions present.

RWIS station technology provides specific weather and precipitation forecasts. We are able to get real time site conditions including:

- Pavement temperature
- Pavement condition
- Wind speed and direction
- Atmospheric temperature and humidity

The RWIS system also provides internet access to current weather radar information and forecasting specific to Richmond Hill.

4.3 Anti-icing Program

This section presents general recommendations for successful anti-icing practices that can be employed for various combinations of precipitation and pavement temperature and traffic volumes.

Anti-icing is the application of a chemical solution (salt brine) to the pavement before a storm to prevent the bonding of ice or snow to the road surface. To accomplish this, salt brine is sprayed on the road surface, the water component of the brine then evaporates or is dried up by traffic, and only the salt component remains on the road surface. A pre-treatment can be made well in advance of a storm (up to two days) provided that the

storm does not start out with above freezing temperatures and rain, which will wash the chemical away. Anti-icing reduces the overall application of salt.

4.4 *Pre-wetting*

All contractor and Town combination trucks are equipped with on-board poly tanks. This enables these units to pre-wet salt as it is being applied to the roadway and significantly increase the efficiency of the salt. The net result is a reduction of overall salt usage.

4.5 *Winter Event*

This section presents general recommendations for successful winter operation practices that can be employed for various combinations of precipitation and pavement temperature and traffic volumes.

The prime objective in applying salt on the road surface is to prevent the formation of ice rather than to melt an accumulation. Therefore, salting must be timely. The exact effective range of salt varies, being dependent on many factors. Salt applied at the beginning of a storm will prevent packing so that the plows can remove nearly all the snow. During a storm where plowing is continuous, further salt applications after each clean sweep of the plow will prevent ice formation. Salt applied in the early morning immediately after the clean sweep of the plow will have the advantage of any morning sunshine and traffic to aid the salting process. Traffic volume increases the effectiveness of salt. Speed and safety with a controlled distribution of salt are the important factors in efficient salting.

4.6 Snow Storage Disposal Site

The Town has constructed a snow disposal site which is located behind the Operation's Centre on Elgin Mills Road East. This is a four acre facility specifically designed for the disposal of snow. Some of the design features are as follows:

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| Impervious Deck: | Protect ground water from the melt water |
| Stormseptor: | Separates grit from the melt water |
| Water Quality Pond: | Provides secondary layer of grit separation;
Dilution of melt water;
Cools melt water |
| Storm System: | The water quality pond flows into a closed storm system which provides secondary cooling of melt water prior to entry into a tributary of the Rouge. |

5.0 MONITORING AND UPDATING THE SALT MANAGEMENT PLAN

5.1 Overview

The Salt Management Plan will be reviewed and updated as required each year, with new technologies and progressive advances added.

5.2 Vehicle Global Positioning Systems (GPS):

The Town has GPS installed in all of its winter maintenance vehicles. The use of the GPS system enables our staff to monitor these vehicles. This keeps track of the location and application rate of all the road salt material spread. Along with making sure all the Town Roads are covered, more importantly it helps to monitor where the material is spread.

In the future, it is intended to control the application rates relative to the truck location (i.e. salt sensitive areas). This will ensure that reduced salt application rates are achieved in these areas. This will contribute to the Town ability to control the amount of road salt used on the road surface.

The GPS allows for the recording and analysis of the following data:

- Truck speed
- Vehicle location
- Start and finish
- Spreader on, spreader off
- Application rate

5.3 Equipment Calibrations

Electronic spreader distribution systems are on all of the Town's winter operations vehicles are calibrated at the start of season, and again mid way through the season, and whenever material analysis shows abnormal material application. On average, an application rate of 75 kgs per lane km with a 50/50 salt/sand mix results in a salt application rate of 37 kg / lane km.

5.4 Improved Record Keeping

The Town's Public Works Operation's Division staff and contractors are committed to recording where and when all of their material is used, as well as the amounts that are taken out with each trip. This information is used to calculate and keep track of salt usage and distribution over the whole road system.

5.5 Operator Training

To be eligible to operate winter maintenance equipment the operator must be on the approved operators list. To be placed on this list they must have a valid DZ driver's licence or higher and have attended the Town's comprehensive winter control training seminar prior to the start of the winter season.

The Town's winter control training seminar consists of the following topics:

- Preseason preparation
- Weather basics
- Snow and Ice control
- Equipment Operations
- Salt Properties and Environmental Impacts

5.6 Future Initiatives

In future years, the Town will be implementing the following initiatives:

1. Work with Water resources protection to identify areas that are more vulnerable to road salts such as:
 - Groundwater recharge areas
 - Areas with exposed or shallow water tables
 - Sources of drinking water
 - Salt sensitive wetlands
 - Salt sensitive kettle lakes
 - River's with low flows
 - Salt sensitive habitats for species at risk

Once these areas are identified the Public Works Operation's Division will develop a plan to mitigate the impacts of road salts on these locations.

2. Enhancements on staff training as opportunities arise.
3. Enhanced data collecting.

6.0 Summary

With the need to develop and implement the Town's Salt Management Plan, the trial of new materials, equipment, and technologies has provided a positive step towards reducing our salt usage, while maintaining the same level of service the public has come to expect.

The Public Works Operations Division will continue to measure and evaluate these benefits for operational improvement, cost savings, and environmental benefits on a yearly basis or as need dictates.