MOVED BY COUNCILLOR DODGE:

That the recommendation contained in the report from the Planning Services Department, Item Number 456 of the General Committee Minutes, September 8, 2008, be approved.

CARRIED FORTHWITH.

ITEM NO. 457
Report from the Transportation & Environmental Services Department
Dated: July 21, 2008
Re: Salt Management Plan
File(s): 68.81.9

Background

In 2004, Environment Canada published a *Code of Practice for the Environmental Management of Road Salts*. This code was developed by a multi-stakeholder group that consisted of members from various municipal and provincial road authorities, federal and provincial governments, industry, non-governmental environmental organizations and other related associations. The code was developed after an earlier assessment report prepared under the Canadian Environmental Protection Act concluded that high releases of road salts were having an adverse effect on the environment. The following excerpt outlines the main objective and recommendations contained in the code:

The main objective of the Code of Practice is to ensure environmental protection while maintaining roadway safety. There are two main recommendations in this Code:

1. *the development of salt management plans, based on a review of existing road maintenance operations, identification of means and goal-setting to achieve reduction of the negative impacts of salt releases; and*
2. *the implementation of best management practices in the areas of salt application, salt storage and snow disposal as outlined in the Transportation Association of Canada's (TAC)* ***Synthesis of Best Practices****.*

The code recommends that organizations that use more than 500 tonnes of salt per year develop a Salt Management Plan. To that end, over the last few years, the City has been working with Ecoplans Limited in developing a Salt Management Plan for St. Catharines. Ecoplans Limited has developed similar plans for numerous other road authorities across the country. An executive summary version of the City's Salt Management Plan is included as Appendix "P".

City Initiatives

Concurrent with the development of the City's Salt Management Plan, staff have undertaken a number of initiatives to minimize our use of road salt. As indicated above, one of the main recommendations of Environment Canada's *Code of Practice* is the implementation of best management practices (BMP's) as outlined by TAC's *Synthesis of Best Practices* in the areas of **salt application, salt storage** and **snow disposal**. The following points will briefly summarize recent City initiatives and proposed future works in those areas.

Salt Application

The primary mechanism by which road salt enters the environment is through its actual application on the roadways. It must be stressed that the use of salt is vital to providing safe roadways throughout the winter season. The main objective of proper salt application is to reduce salt's negative environmental impacts by delivering the right amount of salt at the right place at the right time. The underlying framework that determines the amount of salt that is utilized is the City's Level of Service (LOS) for Winter Control. Council's approved LOS provides for the application of salt as required only on the City's main routes and designated

secondary streets. Salt is typically not applied to the City's secondary or local streets which comprise approximately 70% of the total length of roadway that is maintained. Most complaints that are received during winter storms involve the public's desire to have local streets cleared to the same extent and timeliness as the main routes. Notwithstanding the significant cost implications involved (additional equipment, staff, etc), changing the City's LOS to accomplish this would essentially triple the amount of salt that is released into the environment from our winter control operations.

Salt has been used across North America for decades and continues to be the most effective and cost efficient material utilized for de-icing purposes. Salt melts ice by lowering the freezing point of water and is effective for temperatures down to approximately -12° C. As salt begins to melt, it creates a brine solution that prevents the formation of a bond between the road and the accumulating snow or ice. If the accumulation is minimal, the road remains bare and wet with the brine solution. If the accumulation continues, the presence of the brine solution at the interface with the pavement allows the snow to be plowed off the road more easily, eliminating the rutting and hard-packed snow that is quite often evident on secondary streets that do not receive any salting.

The technology for the application of salt has evolved significantly over the last few years. Some of the recent developments include:

- **Electronic Spreader Controls.** Traditionally, dry rock salt was applied to the roadway at the beginning of a storm from trucks equipped with mechanical spreaders. Newer electronic controllers provide for consistent application rates that are tied to the truck's speedometer. Information from electronic controllers (such as the time, application rate, total amount of material placed) can be saved and downloaded for future analysis. Approximately 75% of the City's fleet of 20 trucks has electronic controls – the remaining trucks will be equipped as they are replaced.
- **Automated Vehicle Location.** Global positioning systems (GPS) can be utilized for automated vehicle location (AVL) capabilities. When combined with electronic controls, GPS/AVL systems allow staff to monitor the deployment of the fleet to not only determine what streets they are or have been on, but also whether or not the trucks have been plowing, salting or sanding and at what application rate. This information can be utilized in "real time" during the storm to monitor progress and confirm if any streets have been missed. The information can also be used after the storm to track material usage, confirm route coverage and provide evidence in the case of any possible litigation. Staff are currently investigating various GPS/AVL systems for inclusion in the 2009 budget. The chosen system may be expanded to the rest of the City's fleet of vehicles for monitoring other operations.
- **Pre-Wetting**. To improve its effectiveness, road authorities have begun "pre-wetting" the salt with a liquid salt brine solution as the salt is applied to the road. Pre-wetting the salt not only helps to keep the material on the roadway by reducing the amount that is lost from either bouncing or blowing off the road but it also helps to activate the salt (creating the brine solution) more quickly. Trucks that have been purchased since 2003 have been equipped with pre-wetting capabilities. Approximately 45% of the City's fleet has pre-wetting capabilities – this will increase to 100% as the remaining trucks are replaced.
- **Anti-icing.** Another BMP that is increasingly being utilized under certain conditions is direct liquid application or "anti-icing" which involves the application of the liquid brine solution directly to the bare pavement in advance of a storm. This allows more of the main routes to be pre-treated prior to the onset of a storm, thereby improving the timeliness of the initial response. Currently, four trucks in the City's fleet have anti-icing capability. Last season was the first season that we utilized anti-icing and the results were positive. We are looking to ultimately equip 8 trucks with anti-icing capabilities in order to effectively cover all of our main routes in an 8 hour shift.
- **Information and Decision Making Tools.** In the field, hand held or truck mounted infrared thermometers (IRT's) allow staff to determine the pavement temperature of the road (which is actually more critical than the air temperature) and adjust their operations accordingly. For this upcoming season, the City is purchasing IRT's for installation in all supervisory vehicles – ultimately, all vehicles involved in winter control will be equipped with IRT's. In the office, access to current meteorological

information (both forecasts and radar images) has improved significantly over the last few years allowing staff to make better informed decisions as to when a storm will start, how intense it will be and when it will stop. Some road authorities have installed road weather information systems (RWIS) at remote sites on their road network. These systems monitor a wide variety of atmospheric and pavement conditions (temperature, dew point, wind speed/direction etc) at the site and can be accessed through the internet to provide current information. Although the City does not have any RWIS stations of our own, we do have access to the Region of Niagara's Public Works Web Portal which provides access to weather observations and forecasts for a network of five RWIS stations installed throughout Niagara, specialized operations forecasts for distinct micro-climate areas in the Niagara Region, links to camera images throughout the area, Canadian and American weather radar, and Environment Canada Weather Warnings.

Salt Storage

Salt for City operations is stored in a salt dome located at the Lake Street Service Centre (LSSC). Sand, which is used as an abrasive for traction control on secondary streets (and on main routes when temperatures are below -12° C), is stored outside at the LSSC and also at the City's Merritton yard located off of Glendale Avenue. The sand that is used is blended with approximately 5-10% salt by weight to prevent the sand mixture from freezing.

Current BMP guidelines for salt and sand storage and handling recommend that all operations be undertaken indoors on an impermeable surface. The main purpose of this is to minimize the amount of salt needlessly lost to the environment (through dust or runoff) from exposure to the elements. The City's current operating procedures do not completely follow those guidelines as salt is only stockpiled under cover – many aspects of the current operation are undertaken outside, including:

- stockpiling and mixing of the sand/salt blend
- initial delivery and stockpiling of the salt
- loading of the trucks before and during a storm
- unloading of the trucks after or during a storm (ie – to switch from salt to sand)

Staff recognize the shortcomings of our current operations and have included monies in the approved 2008 Capital Budget for the construction of a new salt and sand storage facility to replace the existing salt dome. The new facility will also include an attached drive-through wash bay and will allow for the following operations to be undertaken indoors:

- delivery, unloading, mixing and stockpiling of both sand and salt
- loading of trucks before and during a storm (trucks will be able to drive straight through the loading area, minimizing the need for backing-up operations and the associated noise from the warning beepers)
- unloading of trucks during and after a storm
- manufacturing, storage and loading of trucks with liquid brine (liquid brine for pre-wetting and anti-icing operations is currently obtained from one of the Region of Niagara's local yards)
- washing of the vehicles through an attached drive-through double wash-bay

In addition to minimizing the release of salt into the environment from our salt and sand storage and handling operation, the new facility will also greatly reduce the amount of noise associated with the operation as all of the loading and unloading activity will take place indoors and the vehicular traffic flow patterns will be altered in order to minimize backing-up operations. Design of the facility is being completed this fall, with construction planned for 2009 so that the facility will be operational for the 2009/2010 winter season.

Snow Disposal

The City operates one snow disposal facility located on City-owned land off of Renown Road (below the Burgoyne Bridge). This site has been used for snow disposal for over 25 years. Snow from the City's arenas (with the exception of the Seymour-Hannah Complex) is hauled to

and disposed of at this site. In an average year, it is estimated that approximately 75% of the volume of snow dumped at this site comes from the City's arenas – this snow would not contain any salt.

A few times each season, the City may haul snow from bridge decks and parking lots and dispose of it at the Renown Road site. In addition, in instances of extreme accumulation, the City will haul snow to this site from the downtown core in order to establish better access for pedestrians and on-street parking. These removal and hauling operations are typically done at night since they can involve significant traffic control measures, including temporary road closures. Although it is infrequent, this nighttime work has resulted in a few complaints from some of the residents in the vicinity of the site.

Although the Renown Road snow disposal site has some drawbacks (proximity to the Twelve Mile Creek and the residential area), there are no other viable sites close to the downtown core, from where most of the snow haulage would occur. The City has undertaken a number of improvements to the site in recent years, including:

- The site was fenced off and an electronic gate was installed approximately 5 years ago – prior to this, the site was being utilized by private contractors to dump snow from parking lots that they had cleared. This has resulted in an estimated 80% reduction in the amount of snow at the site.
- In 2006, improvements were made to the site's driving and dumping areas to reduce rutting and infiltration. Improvements were also made to the site drainage to improve the flow and quality of the meltwater.

Although the site's proximity to the Twelve Mile Creek is not ideal, the assimilative capacity of the Twelve Mile Creek is quite substantial due to its consistently high volume of flow. In addition, the percentage of salt that is contained in the snow that is hauled from the downtown is questionable as most of the salt would have already melted. Staff will continue to monitor the Renown Road snow disposal site and formalize guidelines on the use and maintenance of the site.

Another underlying City initiative that is common to all three areas outlined above is training for City staff. Training of both supervisory and operational staff is critical for the successful implementation of the City's Salt Management Plan. For many years, all staff involved with the City's winter control operations have received annual training in the fall of the year. The training involves review of equipment, operating procedures, route changes and health and safety issues. Over the last few seasons, this annual training has also included aspects of the City's Salt Management Plan to give all staff a better appreciation their role in helping to minimize salt's impact on the environment while maintaining roadway safety.

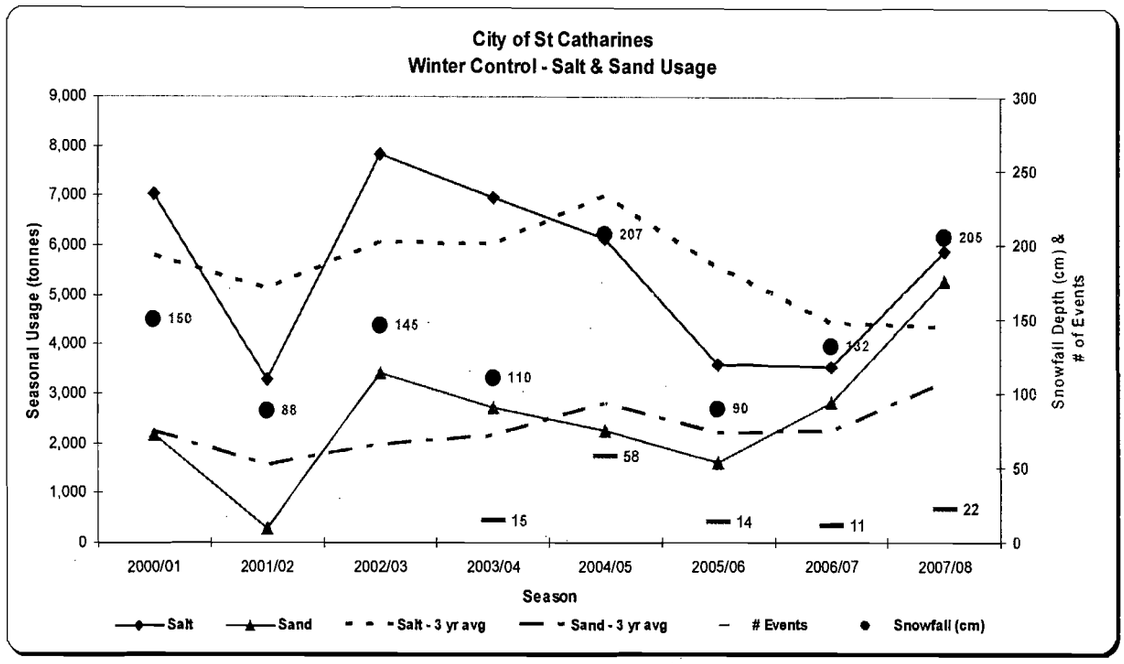
Summary

In recognition of the fact that high releases of road salts are having an adverse effect on the environment, Environment Canada published a *Code of Practice* in 2004 to be used by road authorities across Canada as a guide to reducing the amount of salt entering the environment from their winter control operations. Integral to this code is the recommendation that road authorities develop a Salt Management Plan for their organization in order to provide the framework for achieving that goal. The code also recommended that road authorities submit annual reports to Environment Canada so that they can compile data on salt usage trends. The City has submitted an annual report for the past four seasons. A review of the effectiveness of the Code of Practice will be undertaken in 2010 by Environment Canada.

The City has been developing our Salt Management Plan over the last few years while simultaneously undertaking a number of initiatives that are in keeping with many of the BMP's outlined by TAC's *Synthesis of Best Practices* in the areas of salt application, salt storage and snow disposal.

It is difficult to compare salt usage from year to year due to the variability of our winter seasons. While there is some correlation between total snow accumulation and salt usage, the number and type of storm events is also a consideration – as an example, much more salt may be applied to combat four smaller storms of 10cm each than would be applied for one large storm with the

same total accumulation of 40cm. Nevertheless, as presented in the graph below, there appears to be a general downward trend in salt usage over the last several seasons. While some of this is attributable to the severity of the winters, staff believe that some of this general reduction in salt usage is the result of measures that have been undertaken over the last few seasons.



RECOMMENDATION

That City Council approve the City's Salt Management Plan as outlined in the report from the Transportation and Environmental Services Department dated July 21, 2008. FORTHWITH

MOVED BY COUNCILLOR GILL:

That the recommendation contained in the report from the Transportation and Environmental Services Department, Item Number 457 of the General Committee Minutes, September 8, 2008, be approved.

CARRIED FORTHWITH.

ITEM NO. **458**
Report from the **Transportation & Environmental Services Department**
Dated: **September 10, 2008**
Re: **Petition from Residents of Fir Avenue Re: Snow Removal**
File(s): **68.81.3**

Background

At its meeting of March 31, 2008, Council, through a motion from Councillor Burch, directed Staff to "... report on what action is being taken with respect to a petition respecting snow removal submitted by the residents of Fir Avenue". The petition in question was received on March 18, 2008 and was signed by 29 residents representing 19 addresses on Fir Avenue and outlined general concerns about the perceived lack of winter control activities on Fir Avenue in general and specifically for the period of time from March 7-14, 2008.