

Salt Reduction Plan

Town of Lincoln, Massachusetts

June 30, 2023

Prepared For:

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Salt Reduction Plan Revision Log

Revision Date	Section(s) Revised	Revisions Made	Revisions Made by
June 30, 2023	All	Original Salt Reduction Plan prepared.	Comprehensive Environmental Inc.

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1 Introduction

The Environmental Protection Agency (EPA) regulates stormwater discharges from municipal systems through the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit program, applicable within regulated urbanized areas. This document for the Town of Lincoln, Massachusetts addresses permit requirements set forth in Appendix H Section IV of the Massachusetts Small MS4 General Permit due to discharges to waterbodies listed as impaired due to chloride.

Several waterbodies have been identified as impaired for chloride concentrations that exceed state water quality standards. Since chloride is not significantly removed by chemical reactions, evaporation, or vegetation, nearly all of the chloride applied as road salt will eventually end up in nearby surface waters or groundwater. This Salt Reduction Plan features Best Management Practices (BMPs) to help reduce the amount of chloride discharging to the Town's impaired waterbodies as shown on Figure 1 at the end of this Salt Reduction Plan, which include:

- Cambridge Reservoir, Upper Basin (Segment ID MA72156)
- Cambridge Reservoir (Segment ID MA72014)
- Hobbs Brook (Segment ID MA72-45)
- Unnamed Tributary (Segment ID MA72-47)

1.1 Municipally Maintained Facilities and Activities

The Town of Lincoln Department of Public Works is responsible for managing snow and ice control for approximately 51 miles of roadways, 15 miles of paved pathways, and municipal properties. Snow and ice control is normally performed by the Department of Public Works with additional help from hired drivers and hand crew if required. The Town performs a variety of maintenance activities to ensure safe winter driving conditions on its roads and parking lots and has incorporated activities to limit the amount of snow and/or deicing chemicals entering surface waters. These are described in Section 2 of this document.

1.2 Privately Maintained Facilities and Activities

Roadways and parking lots which are not maintained by the Town are classified as private. As required by Appendix H Section IV of the NPDES MS4 Permit, the Town requires that private property owners establish measures to prevent exposure of salt stockpiles to precipitation at commercial and industrial areas, minimize salt usage and develop procedures to limit salt application. The Town also provides a public education and outreach message prior to the winter months to commercial and industrial audiences to address salt storage and application. These are described in Section 3 of this document.

2 Actions or Enhanced BMPs for Municipally Maintained Surfaces

This section applies directly to municipally owned and maintained surfaces. This section provides information on how the amount of salt used will be tracked and also includes the different BMPs that will be used as part of this Salt Reduction Plan consistent with the Town of Lincoln Public Works Department Winter Road Maintenance Standard Operating Procedures (SOPs) included in Appendix A. This Salt Reduction Plan is meant to allow the Town to evaluate and phase-in any changes and BMPs in a fiscally sound manner.

2.1 Salt Tracking

The Town of Lincoln performs snow and ice removal and de-icing/abrasive placement within the Town limits on all Town accepted roadways and municipal roadways. The Town currently tracks all salt, brine, and magnesium chloride applied to all municipally owned and maintained surfaces using the Deicing Product Log included in Attachment 3 of the Town's Winter Road Maintenance Standard Operating Procedures included in Appendix A. The total salt use will also be reported in the MS4 annual reports. This data will be analyzed each year and used in planning winter maintenance for the next year.

2.2 BMPs for Salt Reduction

This section describes existing and proposed Town BMPs to reduce the amount of chloride discharged to impaired waterbodies.

2.2.1 Operational BMPs

Roadway Anti-Icing (Pretreatment)

Anti-icing is a proactive approach to roadway winter maintenance that can be the first of a series of practices to manage roadways during a snow/ice storm. It differs from deicing procedures because brine is applied to the roadways before precipitation begins. The intent is to apply freezing point depressants before the storm to prevent the bond from forming between the roadway surface and snow or ice. Low sodium chloride brine is the most effective choice for anti-icing. Research has shown that timely application of anti-icing materials can cut the cost of maintaining a safe road surface by 90% compare to traditional deicing. Brine is the most effective choice for anti-icing above 15° degrees Fahrenheit (F).

The Town of Lincoln currently does the following:

- Brine is used as an anti-icing agent prior to winter weather event when meteorological conditions call for the possibility of ice formation on the roadways.
- If pavement temperatures are too low, pretreatment will not be done.

Increasing Plowing Prior to De-Icing

Proper plowing of the road is essential to controlling the amount of deicer used. Snow plowing needs to remove as much snow as possible prior to the application of deicers. Snow

and ice that is left on the pavement will only work to dilute the deicer that has been applied and decrease the effectiveness. Applying more deicer will have little benefit if the snow is not adhering to the pavement surface, when plowing is appropriate operation. Therefore, it is best to remove as much snow as possible from the roads and parking lots before applying deicers.

The Town of Lincoln currently does the following:

- Snow removal equipment normally begins operation on paved roads after an accumulation of two inches of new snow.
- The Town follows nine designated plow routes. The first priority is the main roads including Route 126, Route 117, Lincoln Road, Bedford Road, and Trapelo Road. Then the secondary roads are maintained, which include Weston Road and Sandy Pond Road. Residential streets would be the next priority, but are typically included within the nine plow routes. Most pathways in town are plowed as soon as possible the days following the storm, but the pathway on Lincoln Road from Lincoln Mall to the Center is cleared as soon as possible (usually at the end of the storm).
- The Town also clears school complex, Transfer Station, Town Hall, 2 Commuter Lots, Cemetery, Bemis Hall, Church, Public Housing, and Pierce House.
- The Town uses sand and salt for snow and ice control. The Town also pretreats the roads before snow storms with a brine.
- The Department of Public Works strives to maintain an acceptable Level-of-Service to the Community during winter months to both vehicle and pedestrian traffic. This includes providing service that is as environmentally friendly as possible given the resources available and the effect of nature.

Monitoring of Road Surface Temperatures

The two most critical factors that can produce winter road hazards are pavement temperature and the dew point/precipitation rate. The pavement temperature directly effects the formation, development, and breaking of a bond between fallen or compacted precipitation and the road surface. The pavement temperature also determines the effectiveness of any applied chemicals.

The Town of Lincoln currently does the following:

- The Town subscribes to weather forecasting services in addition to monitoring television forecasts and weather.com.
- Road salt is only applied when pavement temperatures are above 10°F.
- The general roadway treatment application rates chart included in Attachment 2 of Appendix A of this Salt Reduction Plan is referenced during each storm event to select the appropriate treatment options. The Operations Supervisor, depending on actual conditions, may adjust rate of application depending on how the area treated reacts.
- The Town uses two primary weather forecasting services to monitor air temperatures and make the decisions of whether or not to initiate treatment as well as when to start and what treatment to apply.

- The Town of Lincoln ceases deicing when the pavement temperature reaches 15 degrees.

2.2.2 Equipment BMPs / Modifications

Automated Pre-Wetting Equipment Systems

Pre-wetting is a term referring to a liquid deicer that is applied to a solid-based deicer in order to create a quicker reaction time for the solid deicer to begin melting snow and ice. By introducing moisture into salt prior to application, the results are a quicker melting action, reduced bounce and scatter of material, and a reduced application rate.

The Town of Lincoln currently does the following:

- Salt is pre-wetted as required, either using available on-board systems or manually by wetting salt prior to or during loading into the truck.
- The Town will look into expanding automated pre-wetting systems as existing equipment is replaced.

Ground Speed Control Systems

Ground speed control systems accurately distribute the amount of material required given the storm conditions by adjusting the flow in proportion to ground speed. These systems have the potential to greatly reduce salt usage and limit impacts to impaired waterbodies.

The Town of Lincoln currently does the following:

- The Town of Lincoln has two vehicles installed with ground speed control systems. These controllers will have the ability to be calibrated to accurately dispense material, including salt and brine, regardless of vehicle speed.
- It is expected that ground speed controls will be installed on the remaining vehicles over the next five to ten years as current systems degrade and are replaced.

Routine Calibration Rates and Adjustments

The goal of calibrating is to know how much material is put down on a roadway or parking lot for every setting on the truck used. During winter operations, changes may occur in mechanical linkages, hydraulic systems and other components. Yearly calibration of equipment allows for better control of application rates for various gate heights/openings. Gate heights or gate openings should be adjusted to spread the desired chemical application rate for each set of unique conditions. Recalibration should be done if any changes are made to the equipment or if a different deicing material is used.

The Town of Lincoln currently does the following:

- Equipment is calibrated yearly to reduce and optimize salt use and ensure deicing agents are being used efficiently. Recalibration is completed if any service is done on a truck.
- All trucks are maintained using the manufacturer's recommendations to ensure accurate applications of snow and ice control materials.

- Salt application is optimized based on roadway characteristics, such as slope and nearby land use, and storm conditions, such as temperature, snow fall rate, etc. Spreaders are set to operate in a manner that will optimize these characteristics.
- A calibration chart used to inform operators of application rates of individual spreaders. All spreaders are maintained using the recommendations of the Salt Institute, including their chart for calibrating solid material spreaders with manual controllers to ensure accurate application of snow and ice control materials. Calibration procedures are included in Attachment 1 of the Town's Winter Road Maintenance Standard Operating Procedures included in Appendix A.

Calibrated settings will continue to be logged using a master sheet and stored inside the vehicle.

Equipment Cleaning and Maintenance

During winter operations, proper equipment cleaning and maintenance can help ensure equipment and machinery functions properly and maintains calibration measures for longer periods of time. Spreader maintenance is a year-round task that will help control costs and minimize impact on the environment.

The Town of Lincoln currently does the following, as outlined in **Appendix B**:

- Equipment is washed using proper procedures stated in the Town's Operation and Maintenance (O&M) Plan to prevent pollutants from entering the storm drain system and waterways.
- Designated wash areas are used for vehicle and equipment washing. The vehicle wash bay is located at 30 Lewis Street.
- Equipment is regularly inspected and maintained to reduce the potential for leaks.

2.2.3 Training and Public Education

Training

Training municipal personnel on best winter maintenance and salt reduction practices ensures the team is successful in reducing salt usage.

The Town of Lincoln currently does the following:

- Training is provided to municipal and contracted personnel each year to improve efficiency in salt use and storage procedures and practices.
- Training is provided on snow stockpiling and removal procedures and practices.
- Training is provided on proper vehicle and equipment maintenance, storing, and washing procedures and practices.
- Training is provided to municipal personnel each year to improve efficiency in salt use and storage procedures and practices.

Public Education

Educating the public can also be a good way to help reduce the amount of chloride that ends up in the permittee's waterbodies. By educating the public on various chloride/winter related issues, they can reduce their salt use as well.

The Town of Lincoln provides public education covering the following outreach topics:

- Modifications to driving behavior in winter weather;
- Methods to reduce salt use on private property; and
- Alternatives to traditional road salting practices.

The Town of Lincoln has also published their Winter Tips & FAQs on their website for the public. It answers common questions and provides tips for modifying driving and managing snow/ice on a resident's private property.

2.2.4 Application Rates for Roads and Parking Lots

The goal of winter operations is to maintain the specified level of service and safety to the public while using the minimum practical amount of deicer. Spreading rates and timing of application are decisions that need to be made based on variables in weather conditions. The success of application depends on five factors: pavement temperature, application rate, precipitation, beginning concentration, and chemical type.

The Town of Lincoln currently does the following:

- Application rates for anti-icing materials can be found in Attachment 2 of the Town's Winter Road Maintenance Standard Operating Procedures in Appendix A. The application rates are specified for the different types of storms as follows: snow, freezing rain, or snow and freezing rain at a range of temperatures. The application rates of deicers are also adjusted based on the type of agent used and the anti-icing and pre-wetting techniques used.
- Guidelines have been adopted within the Winter Road Maintenance Plan (Appendix A) to pre-treat roads with brine or magnesium chloride before storm events to help prevent ice from forming and to make plowing easier.
- The Town will continue to use the Application in Attachment 2. The Town's rates generally meet those outlined in the Winter Parking Lot and Sidewalk Maintenance Manual (Revised edition June 2008) and the Minnesota Snow and Ice Control: Field Handbook for Snow Operators (September 2021) referenced in the MS4 Permit and allow the Town to reduce the amount of chloride ending up back in up impaired waterbodies.

2.2.5 Designation of Low or Reduced Salt Areas

The Town is committed to reducing salt loadings to its waterbodies. Thus, the Town will implement snow and ice control procedures that minimize chloride use on town-wide basis, while maintaining safe driving conditions. Town personnel will use knowledge of the areas and experience to determine whether additional procedures, equipment, implementation of new technology, and/or other similar measures may be taken without compromising public safety. This review requires a careful consideration of slopes, frequency of travel, training of personnel and what level of chloride use would still be considered safe. Reviews will be

completed annually as part of the section on Salt Tracking outlined under Section 2.1 prior to the commencement of winter operations to see if additional changes may be implemented from the previous year.

2.2.6 Facility Modifications and Good Housekeeping BMPs

Snow Storage

Proper snow storage and good housekeeping can help reduce runoff and direct snowmelt from reaching nearby waterbodies and resources, which can minimize chloride loadings.

The Town of Lincoln currently does the following procedures to minimize pollutants:

- Identify sensitive ecosystems such as wetlands areas, vernal pools, or other similar areas prior to disposal and avoid snow disposal in these areas
- If possible, maintain a 100-foot vegetative or wooded buffer strip during the growth season between the disposal site and adjacent water bodies to filter pollutants out of the melt water
- Store snow on areas above groundwater level, on a flat, vegetated slope and in a location such that runoff will not drain to sensitive resource areas
- Remove trash/waste from snow disposal areas prior to using the site for snow disposal and as soon as possible after snow melt
- Securely place a silt fence or equivalent barrier on the down gradient side of a snow disposal site. A vegetated earthen berm is suitable alternative
- Do not dump snow into any water body, including rivers, streams, ponds, or wetlands
- Do not dump snow on top of storm drain catch basins or in stormwater drainage swales or ditches
- Do not dump snow near public or private water supply wells where road salt may contaminate water supplies
- Excess snow is not currently an issue for the Town and disposal areas are not specified. If a disposal area is needed in the future the disposal area will be prepared using the following procedures from the Town's Winter Road Maintenance Plan:
 - Securely install a silt fence or equivalent barrier on the downgradient side of the snow disposal site to reduce the potential for bulk pollutant migration as the snow melts
 - Maintain at least a 50-foot vegetative buffer strip during growing season for all disposal sites adjacent to waterbodies
 - Clear debris from site prior to snow disposal
 - Dispose of snow on or near a pervious surface so as to allow the natural infiltration and treatment of snow melt, and the removal of any associated debris in the spring
 - Clear snow disposal-related debris from site at the end of the snow season
 - Do not dispose of snow in salt marshes, vegetated wetlands, certified vernal pools, shellfish beds, mudflats, drinking water reservoirs and their tributaries, Zone IIs or Interim Wellhead Protection Areas (IWPAs) of public water

supply wells, Outstanding Resource Waters, or Areas of Critical Environmental Concern

- Do not dispose of snow where trucks may cause shoreline damage or erosion

Massachusetts has published Guidelines on Road Salt Storage that applies to all parties storing road salt or other chemical deicing agents. The components of an “environmentally friendly” roadway deicing salt storage facility include a flat site, adequate space for the piles, runoff collection/containment, stored on an impervious/paved area, and stored under a roof.

The Town of Lincoln will ensure that:

- All snow and ice removal materials are stored in a covered shed at the municipal DPW facility.
- All materials are covered at all times except when actively delivering or loading salt into trucks.
- Salt and sand are loaded onto vehicles outside on an impervious area that is away from sensitive areas.
- Loading areas and yards are swept periodically to help prevent product buildup and runoff.
- Storage areas are inspected for leaks on a regular basis, for evidence of runoff such as salt stains, and for evidence of lumping or water contamination. De-icing tank leaks are repaired immediately.

Salt Stockpile BMPs & Protection from Precipitation and Runoff

Proper snow storage and good housekeeping can help reduce runoff and direct snowmelt from reaching nearby waterbodies and resources which can minimize chloride loadings.

The Town of Lincoln currently ensures that:

- All snow and ice materials are stored in a covered shed at the DPW facility.
- All material piles are covered at all times except when actively delivering or loading salt into trucks.
- Salt and sand are loading into vehicles on an impervious area that is away from sensitive areas.
- Loading areas and yards are swept periodically to help prevent product buildup and runoff.

2.3 Estimate of Annual Salt Usage Reductions

Depending on the severity of the weather, each winter the Department of Public Works uses between 1,000 and 2,000 tons of salt with an average yearly usage of 1,500 tons. The Town has incorporated and currently implements several salt reduction techniques as part of its Winter Road Maintenance Standard Operating Procedures. These are summarized in Table 1 along with the estimated reduction in salt use associated with each of the techniques. These

reductions are already accounted for in the Town's current salt use, therefore are only listed as a percentage in Table 1.

Table 1. Estimated Salt Reduction for Existing Salt Reduction BMPs

BMP or Activity	Estimated % Reduction per storm¹
Pre-wetting salt	20%
Roadway anti-icing (Pre-treatment)	20%
Monitoring road surface temperatures and Adapting Application Rates to Temperatures	5%
Proper calibration	5%
Proper equipment cleaning and maintenance	5%

1. Estimated percent salt reductions associated with each BMP are taken from the NH Small MS4 Salt Reduction Plan Template. Salt reductions are already accounted for in the Town's current salt use quantities.

Table 2. Estimated Salt Reduction for Future Planned BMPs

BMP or Activity	Estimated Salt Loading per storm (tons)¹	Estimated % Reduction per storm²	Estimated Reduction per storm (tons)	Estimated Storms per year (#)³	Estimated Salt Reduction Total per year per BMP (tons)
Upgrade to Ground Speed Control Systems	325	5%	16	20	325
Estimated Salt Reduction for Future Planned BMPs:					750

1. Estimated salt loading per storm is based on historic average annual salt usage assuming 20 storms per year and accounts for existing salt reduction BMPs used by the Town. Actual usage varies depending on the number and type of storms.
2. Estimated percent salt reductions associated with each BMP are taken from the NH Small MS4 Salt Reduction Plan Template.
3. An estimated 20 storms per year is used to illustrate potential annual salt reductions. The actual number of storms will vary from year to year.

3 Actions for Privately Maintained Facilities and Surfaces

This section applies directly to privately owned and maintained surfaces. This section provides information on how the Town regulates and educates private commercial and industrial developments within the watershed, including salt storage and application procedures.

3.1 Regulatory Mechanism Updates

The Town of Lincoln is working on incorporating a General Bylaw that outlines regulations governing salt storage at commercial and industrial properties. Regulations will in part require salts to be stored on an impermeable surface with runoff directed away from the pile, as well as covered at all times with an impermeable membrane maintained in good condition. A copy of the draft General Bylaw is provided in **Appendix C**. The Town plans to have this adopted by Spring 2024.

3.2 Public Education and Outreach

The Town of Lincoln includes supplemental information in its Commercial/Industrial education program with an annual message to private road salt applicators and commercial and industrial site owners on the proper storage and application rates of winter deicing material. The educational materials are disseminated in the November/December timeframe and describe steps that can be taken to minimize salt use and protect local waterbodies. Messages are typically made available on the Town's website, as well as distributed to approximately thirty local businesses. Education and outreach materials are provided in **Appendix D**.

3.3 Stormwater Management in New and Redevelopment

The Town of Lincoln is working on incorporating updates to its Stormwater Management Rules and Regulations to address require private commercial and industrial sites to prevent exposure of salt stockpiles to precipitation and runoff, as well as require procedures and requirements to minimize salt usage. Based on local knowledge, bulk, uncovered, outdoor salt storage at privately-owned properties within the regulated area is expected to be very minimal, if any. However, applicable draft language is as follows.

Under requirements for the Stormwater Management Plan:

For privately-owned commercial and industrial sites that store salt, brine, or similar materials outdoors for the purpose of treating roadways, parking lots, walkways, sidewalks, or similar surfaces during winter months, include all proposed measures to minimize salt usage and/or utilize salt alternatives, as well as measures to prevent exposure of any salt stockpiles to precipitation and runoff.

Under requirements for the Operations and Maintenance Plan:

For privately-owned commercial and industrial sites that store salt or similar materials outside for use during winter months, provide a Maintenance Schedule that includes routine inspection along with routine and non-routine maintenance tasks associated with outdoor salt stockpiles to prevent exposure to precipitation and runoff.

All requirements for commercial and industrial sites will be determined by a licensed P.E. as part of the Stormwater Management Permit application process for properties that will disturb one or more acres. A copy of relevant sections of proposed updates to the Stormwater Management Rules and Regulations are provided in Appendix C. The Town plans to have this adopted by Spring 2024.

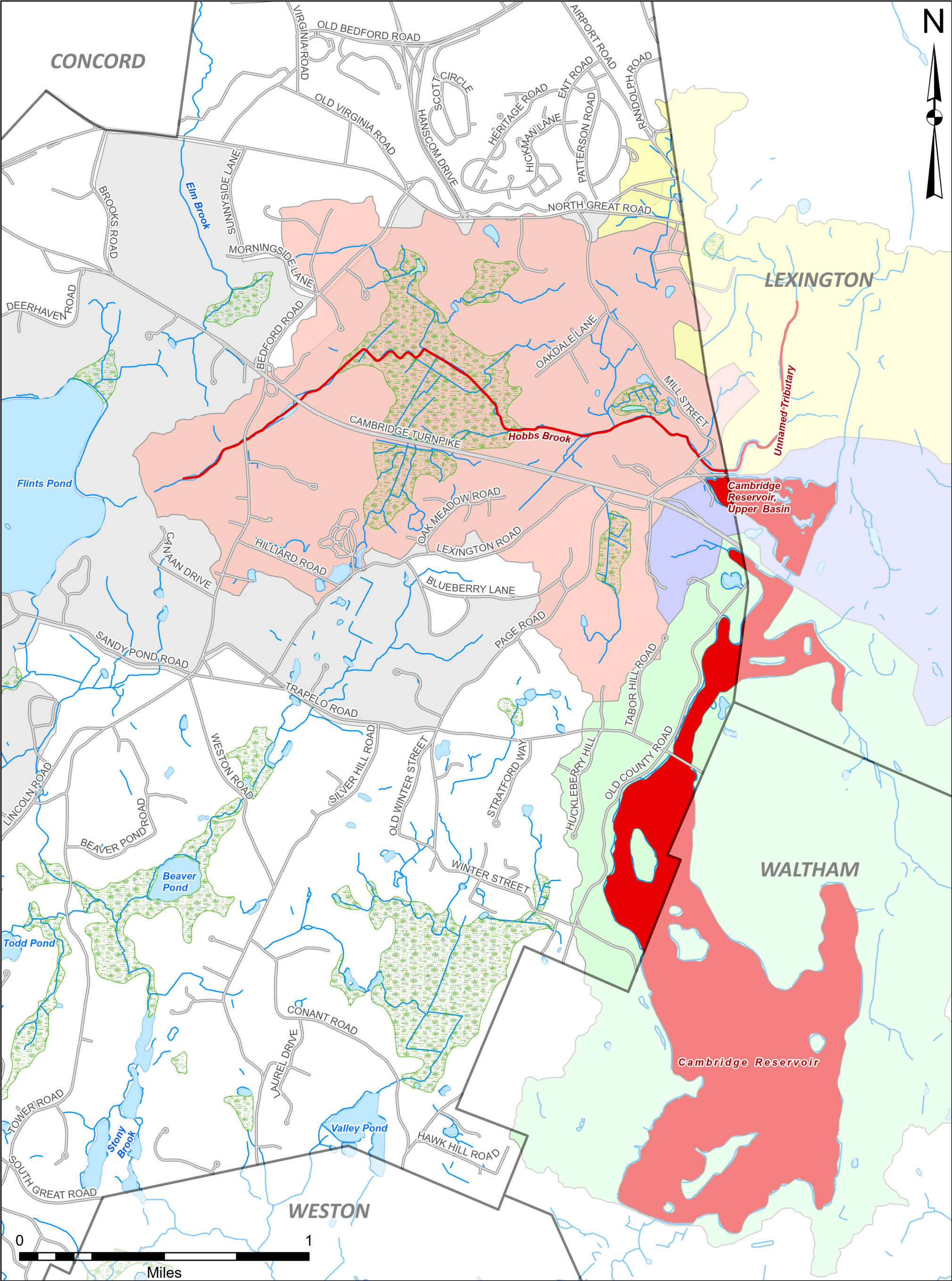
4 Schedule of Planned Activities / BMPs

The Town of Lincoln has developed a schedule for implementation of this Salt Reduction Plan based on the BMPs listed above. The anticipated schedule with milestone tracking dates is summarized as Table 3.

Table 3. Schedule of Planned Activities Table

BMP or Activity	Date(s) Implemented:	Date(s) Completed:
Salt tracking	Annually, pre-2018	Ongoing
Annual training	Annually, pre-2018	Ongoing
Expand automated pre-wetting	Starting as equipment is replaced	Ongoing
Upgrade to Ground Speed Control Systems	Within the next 5 to 10 years	
Create new general bylaws to address salt storage at commercial and industrial facilities	Spring 2024	
Public education – do winter public education at commercial and industrial facilities	Fall 2022	Ongoing
Update Stormwater Management Regulations to require best practices at new or redeveloped commercial and industrial facilities that store salt	Spring 2024	

Under MCM 4, permittees are required to implement and enforce a program to reduce pollutants in stormwater runoff discharged to the MS4 from all construction activities that result in a land disturbance of greater than or equal to 1 acre within the regulated area. This program shall also regulate disturbances less than 1 acre if they are part of a larger common plan of development or sale that would disturb 1 or more acres. A summary of the required Construction Site Stormwater Runoff Control Program activities and timelines are provided below:



Legend

Chloride Impaired Watersheds

Lincoln, MA

- Chloride Impaired River
- Chloride Impaired Waterbody
- Chloride Impaired Watersheds:
- Cambridge Reservoir, Upper Basin (MA72156)
- Cambridge Reservoir (MA72014)
- Hobbs Brook (MA72-45)
- Unnamed Tributary (MA72-47)
- Roads
- Lake, Pond, Reservoir
- Wetland, Marsh, Swamp
- Stream, Brook
- Non-Urban Area



Comprehensive
Environmental
Incorporated

Appendix A

Winter Road Maintenance SOPs

MI-9, Snow Stockpiling / Removal

Snow piles can contain trash, sediment, salt and other pollutants that can be carried into the storm drain network or waterways when it melts. The storage of large snow piles can contribute concentrated amounts of these pollutants in one location. This SOP outlines procedures for stockpiling and removing snow to minimize pollutant loads to waterways.

Procedures and Practices

- Identify sensitive ecosystems such as wetland areas, vernal pools, or other similar areas prior to disposal and avoid snow disposal in these areas.
- If possible, maintain a 100-foot vegetative or wooded buffer strip during the growth season between the disposal site and adjacent water bodies to filter pollutants out of the melt water.
- Store snow on areas above groundwater level, on a flat, vegetated slope and in a location such that runoff will not drain to sensitive resource areas.
- Remove trash/waste from snow disposal areas prior to using the site for snow disposal and as soon as possible after snow melt.
- Securely place a silt fence or equivalent barrier on the down gradient side of a snow disposal site. A vegetated earthen berm is a suitable alternative.
- Do not dump snow into any water body, including rivers, streams, ponds, or wetlands.
- Do not dump snow on top of storm drain catch basins or in stormwater drainage swales or ditches.
- Do not dump snow near public or private water supply wells where road salt may contaminate water supplies.

Inspection and Maintenance

- Check snow piles for debris that could be windblown.
- Contain sediments as snow melts and removed every spring from snow storage areas. This includes sweeping roadways and parking lots or other impervious areas where snow is accumulated.
- Ensure staff are trained in proper snow stockpiling and removal procedures and practices.



MI-10, Winter Road Maintenance

This SOP outlines procedures for the storage and application of brine and salt to roadways to control snow and ice and was prepared to meet the requirements of the 2016 MA Small MS4 General Permit (2016 MS4 Permit). The 2016 MS4 Permit requires the municipality to:

- Establish procedures for the storage of salt;
- Establish procedures to minimize the use of sodium chloride and other salts;
- Evaluate the use of alternative materials; and
- Ensure that snow disposal activities do not result in disposal of snow into waters of the United States.

Responsible Personnel

This Winter Road Maintenance Plan is intended to be used by Town of Lincoln staff and hired subcontractors who are responsible for snow and ice removal.

Equipment

Inventory

The Town owns and maintains the ice control and snow removal equipment and hired contractors provide some additional equipment. General equipment maintenance is conducted in accordance with the *Vehicle & Equipment Storage & Maintenance SOP (VM-1)*. Vehicle washing is conducted in accordance with the *Vehicle & Equipment Washing SOP (VM-2)*.

Make	Equipment Description	Additional Equipment	Primary Use



Calibration

All trucks are maintained using the manufacturer's recommendations to ensure accurate application of snow and ice control materials. Salt application is optimized based on roadway characteristics, such as slope and nearby land use, and storm conditions, such as temperature, snow fall rate, etc. Spreaders are set to operate in a manner that will optimize these characteristics. Calibration procedures are included in **Attachment 1**.

Materials and Storage**Materials**

Lincoln uses salt and sand for snow and ice control. The Town also pretreats roads before snow storms with a brine. Types and approximate amounts of snow removal materials used each year are listed below.

Type of Material	Source	Approximate amount per year (based on three-year average)
Sand		
Salt		
Brine		
Magnesium Chloride		
Other		

Storage

All snow and ice removal materials are stored in a covered shed at the DPW facility. All material piles are covered at all times except when actively delivering or loading salt into trucks. Salt and sand are loaded onto vehicles outside on an impervious area that is away from sensitive areas. Loading areas and yards are swept periodically to help prevent product buildup and runoff.

Snow Removal Route

The Town follows 9 designated plow routes. The first priority is the main roads in Town including Route 126, Route 117, Lincoln Road, Bedford Road, and Trapelo Road. Then the secondary roads are maintained, which include Weston Road and Sandy Pond Road. Residential streets would be the next priority, but are typically included within the 9 plow routes. Most pathways in town are plowed as soon as possible the days following the storm, but the pathway on Lincoln Road from Lincoln Mall to the Center is cleared as soon as possible (usually at the end of the storm).

The Town also clears snow from the Town's Transfer Station, public schools, town buildings, public housing, and cemeteries.

Record Keeping and Documentation

- Maintain a master schedule of prioritized snow and salting routes and the miles or roads plowed or sanded.
- Keep copies of manufacturer's recommendations for equipment calibration, plowing speed, and salt/sand application rates.
- Keep records of the amounts of salt, liquid deicer, and salt alternatives applied per season.
- Keep a list of employee training performed.

Winter Road Maintenance Procedures

Prior to the Start of the Snow Season

- Mark islands, fire hydrants, catch basins, manholes, sidewalk segments, and other infrastructure that could be obscured by snow or cause a hazard to the plow and the operator.
- Existing conditions of the above infrastructure, or any infrastructure that might be damaged by winter maintenance activities, should be noted for comparison with post-season conditions and evaluation of any damage done.
- Conduct recertification training for all Town staff responsible for ice and snow removal.
- Ensure all snow equipment is in good working order and conduct maintenance as needed (Vehicle & Equipment Storage & Maintenance SOP (VM-1)).
- Install snow plows, spreaders, and brine applicators, as applicable on vehicles.
- Calibrate all snow equipment to ensure efficiency and to minimize salt use. Calibration procedures are outlined in **Attachment 1**.
- Ensure road crews are familiar with mapped plowing routes to efficiently cover the entire municipality. Prioritize primary roads and heavily traveled local roads.

Prior to Leaving the Facility

- Speak with supervisor to determine special circumstances of storm (i.e. heavy rain, temperature conditions). These circumstances will determine if pre-treatment will occur.
- Inspect all vehicles. Check fluid levels and fill to proper levels. Ensure lights are in working order. Document any repairs made to the vehicle.
- Load all necessary materials on impervious surfaces. Sweep storage areas and their surroundings after loading/unloading or after spillage.

Snow Treatment and Removal

- If anti-icing with brine will be conducted, apply brine before the storm event.
- Salting will not be done when pavement temperatures are too low. When used, the material will be applied using **Attachment 2** for general application rates based on temperature and weather.
- As the storm develops and 2 inches of snow has accumulated, all of the drivers and available equipment will begin to plow their assigned routes.
 - Avoid plowing, pushing, blowing, or storing excess snow, deicer, or other debris in or near creeks, watercourses, or storm drain systems.



- Reduce plowing speed in sensitive areas to prevent materials from entering waterways.
- Excess snow is not currently an issue for Lincoln and disposal areas are not specified. If a snow disposal area is needed in the future:
 - Securely install a silt fence or equivalent barrier on the downgradient side of the snow disposal site to reduce the potential for bulk pollutant migration as the snow melts.
 - Maintain at least a 50-foot vegetative buffer strip during growing seasons for all disposal sites adjacent to waterbodies.
 - Clear debris from site prior to snow disposal.
 - Dispose of snow on or near a pervious surface so as to allow the natural infiltration and treatment of snowmelt, and the removal of any associated debris in the spring.
 - Clear snow disposal-related debris from site at the end of the snow season.
 - Do not dispose of snow in salt marshes, vegetated wetlands, certified vernal pools, shellfish beds, mudflats, drinking water reservoirs and their tributaries, Zone IIs or Interim Wellhead Protection Areas (IWPAs) of public water supply wells, Outstanding Resource Waters, or Areas of Critical Environmental Concern.
 - Do not dispose of snow where trucks may cause shoreline damage or erosion.

Upon Return to Facility

- Wash vehicle following the *Vehicle & Equipment Washing SOP (VM-2)*.
- Before parking any truck or equipment after use, check all fluid levels. Note any minor repairs conducted and other repairs that may be needed. Follow the *Vehicle & Equipment Storage & Maintenance SOP (VM-1)*.
- Report amount of snow removal materials used to supervisor using the log in **Attachment 3**.



Attachment 1: Calibration Procedures**Spreader Calibration Procedure****Equipment Needed**

1. Scale for weighing.
2. Canvas or bucket/collection device.
3. Chalk, crayon or other marker.
4. Watch with second hand.

Calibration Steps

1. Warm truck's hydraulic oil to normal operating temperature with spreader system running.
2. Put partial load of salt on truck.
3. Mark shaft end of auger or conveyor.
4. Dump salt on auger or conveyor.
5. Rev truck engine to operating RPM (at least 2000 RPM)/
6. Count number of shaft revolutions per minute at each spreader setting, and record.
7. Collect salt for one revolution & weigh, deducting weight of container. For greater accuracy, collect salt for several revolutions and divide by this number of turns to get the weight for one revolution. This can be accomplished at idle or very low engine RPM.
8. Multiply shaft RPM (Column A) by discharge per revolution (Column B) to get discharge rate in pounds per minute (Column C), then multiply discharge rate by minutes to travel one mile at various truck speeds to get pounds discharged per mile. For example, at 20 MPH with 30 Shaft RPM and 7 lbs discharge – $30 \times 7 = 210 \times 3.00 = 630$ lbs. per mile.

Calibrating Automatic Controls**Equipment Needed**

1. Scale for weighing.
2. Canvas or bucket/collection device.
3. Chalk, crayon or other marker.
4. Watch with second hand.

Calibration Steps

1. Remove or turn off spinner.
2. Set auger on given number, such as No. 2.
3. Tie sack or heavy canvas under discharge chute.
4. Mark specific distance, such as 100 or 1,000 feet.
5. Drive that distance with spreader operating.
6. Weigh salt collected in sack or canvas.
7. Multiply weight of salt by 5.2 (in case of 1,000 feet) or 52.8 (in case of 100 feet). This will be the amount of salt discharge per mile, which remains constant regardless of speed, but calibration must be done for each control setting.



Truck No.				Spreader No.									
Date:				By:									
Gate Opening _____ (inches) (Hopper Type Spreaders)				POUNDS DISCHARGED PER MILE									
Control Setting	A	B	C	MINUTES TO TRAVEL ONE MILE									
	Shaft RPM (Loaded)	Discharge Per Revolution (constant)	Discharge Rate (lbs/min)	5 mph x 12.00	10 mph x 6.00	15 mph x 4.00	20 mph x 3.00	25 mph x 2.40	30 mph x 2.00	35 mph x 1.71	40 mph x 1.5	45 mph x 1.33	
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

Note: Different materials will spread at different rates at the same setting, so spreaders must be calibrated with the material that will be used.



Attachment 2: General Roadway Treatment Application Rates

Pavement Temp. (°F) And Trend (↑ ↓)	Weather Condition	Maintenance Actions	-----Application Rate (lbs./per lane mile)-----			
			Salt Prewetted/Pre-Treated with salt brine	Salt Prewetted/Pre-Treated with other blends	Dry salt	Winter Sand
>30 ↑	Snow	Plow, treat intersections only	150	125	150	Not Recommended
	Frz. Rain	Apply chemical	175	150	200	Not Recommended
30 ↓	Snow	Plow & apply chemical	175	150	200	Not Recommended
	Frz. Rain	Apply chemical	200	175	225	Not Recommended
25-30 ↑	Snow	Plow & apply chemical	200	175	225	Not Recommended
	Frz. Rain	Apply chemical	225	200	225-275	Not Recommended
25-30 ↓	Snow	Plow & apply chemical	250	200	275	Not Recommended
	Frz. Rain	Apply chemical	275	250	275-300	450
20-25 ↑	Snow or Frz. Rain	Plow & apply chemical	275	275	275-300	450 for Frz. Rain
20-25 ↓	Snow	Plow & apply chemical	275	250	300-325	Not Recommended
	Frz. Rain	Apply chemical	300	275	325-400	450
15-20 ↑	Snow	Plow & apply chemical	300	275	325	Not Recommended
	Frz. Rain	Apply chemical	300-375	275-350	325-400	450
15-20 ↓	Snow or Frz. Rain	Plow & apply chemical	325	300	350	450 for Frz. Rain
0-15 ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not Recommended	300-350	Not Recommended	600 and spot treat as needed
< 0	Snow	Plow, treat with blends, sand hazardous areas	Not Recommended	350-500	Not Recommended	600 and spot treat as needed

Source: UNH Technology Transfer Center

Note: The Operations Supervisor, depending on actual conditions, may adjust rate of application depending on how the area treated reacts.



Attachment 3: Deicing Product Log

Date: _____ Weather Event: _____ Precipitation (in): _____

Material	Target Application Rate (lbs/lane miles)	Amount Used (lbs)	Lane Miles Treated (lane miles)	Actual Application Rate (lbs/lane miles)	Difference in Target and Actual Rates (lbs)
	A	B	C	D	E
Salt					
Magnesium Chloride					

Deicing Product Log Instructions:

1. Record the target application rate based on the weather conditions present in column A.
2. Weigh deicing material as it is loaded into distribution vehicles. Weigh any leftover material once snow removal operations have ceased. Subtract the weight of leftover materials from the initial load weight to calculate the weight of material applied to roads. Record the result in column B.
3. Track the lane miles treated prior to or during snow removal operations and record the result in column C.
4. Divide the weight of material used by the lane miles treated during snow removal operations to calculate the actual application rate of the equipment, and enter the result in column D.
5. Subtract column D from column A to calculate the difference in target and actual application rates and record the result in column E.
6. Review results and make changes to the target application rates and/or vehicle spreader calibrations as needed.



Appendix B

Operation and Maintenance SOPs

SOP. VM-1 Vehicle & Equipment Storage & Maintenance

VM-1, Vehicle & Equipment Storage & Maintenance

Vehicle and equipment maintenance can contribute pollutants such as oil, grease, and metals to stormwater runoff. This SOP outlines practices for storing and maintaining vehicle to minimize contact of pollutants with stormwater runoff.

Procedures and Practices

- Store vehicles and equipment indoors whenever possible to minimize their potential to pollute stormwater.
- If indoor storage of equipment is not possible, store on impervious surfaces.
- If vehicles or equipment are stored outside and not used regularly, store on impervious areas, cover vehicles or equipment to minimize exposure to precipitation, and place a drip pan underneath vehicles and equipment to catch incidental leaks.
- If vehicles or equipment are leaking, store indoors or within containment until repairs are performed.
- Clean equipment and vehicles prior to placing in storage. Equipment should be washed in an approved area per SOP VM-2 where wash water is collected and treated or discharged to a pervious surface, away from wetlands and storm drains.
- Never store or perform maintenance on leaking vehicles over a storm drain.
- Never dispose of spent cleaners down the floor drains, sinks, storm drains, on the ground, or into the air.
- Properly store all liquid materials to prevent spills and leaks. Don't leave drip pans or other open containers lying around where they can wash off and pollute stormwater.
- Ensure all new and used materials are properly labeled with container contents.
- Recycle or properly dispose of all fluids, oil filters, oil cans, rags, and clean-up supplies in accordance with SOP SR-1.
- All pads and absorbent materials will be taken to the proper location using the proper contractual vendor for either remediation or disposal.

Inspection and Maintenance

- Regularly inspect vehicles and equipment for leaks and repair immediately.
- Identify locations of floor drains and catch basins and know where they discharge to.
- Floor drains should be connected to a holding tank, and catch basins should be connected to the stormwater drainage system.
- Sweep the maintenance area on a regular basis. Wipe up spills with rags and other absorbent material immediately. Do not hose down the area to a storm drain.
- Keep ample supplies of spill cleanup materials onsite in quantities suitable for cleaning up a moderately sized spill. Clean up all spills immediately, no matter how small.
- Ensure staff are trained in proper vehicle and equipment maintenance procedures and practices.



VM-2, Vehicle & Equipment Washing

Vehicle wash water can contain hydrocarbons, oils, greases, nutrients, phosphates, heavy metals and suspended solids. This SOP outlines the procedures for washing vehicles to prevent discharge of pollutants to the storm drain system and waterways.

Procedures and Practices

- Perform vehicle/equipment washing in designated areas (indoors when possible) or using a commercial car wash.
- Operate a closed system with wastewater disposal/recycling (e.g., floor drain to a holding tank – requires Industrial Wastewater Holding Tank registration/permit under 314 CMR 18.00), or
- Discharge to a municipal sanitary sewer (may require local permit/pretreatment), or
- Obtain a groundwater discharge permit in accordance with 314 CMR 5.00 or surface water discharge permit in accordance with 314 CMR 3.00, or
- Discharge to a registered Underground Injection Control (UIC) Class V well or direct wash water to a vegetated area also registered under the UIC program (310 CMR 27.00) and allow it to infiltrate through the ground, if
 - The wash water is generated from rinsing vehicles with detergent free, solvent-free water under low pressure for the sole purpose of removing surface dust from a vehicle,
 - The vehicle washing does not include undercarriage or engine washing, boat bottom washing nor washing of vehicles and other equipment exposed to contamination such as vehicles at a fire, at a spill site or vehicles used to transport hazardous material,
 - Discharges to a vegetated ground surface are not in a Zone A, Zone I or Zone II drinking water source protection area, wetlands, wetlands resource areas or areas defined in the wetlands regulations (310 CMR 10.00), and
 - Discharges to a vegetated ground surface must be spread out with the use of a level spreader, where applicable, to prevent concentrated, erosive flows and to enhance infiltration.
- Discharges to storm drains and Title V septic systems are not allowed.
- If washing must take place on a hard surface, direct wash water away from areas that drain to surface waters. Direct water to a grassy area where it can infiltrate.
- If vehicles or equipment are leaking, do not rinse or wash, as this may flush pollutants into the stormwater system. Store vehicles and equipment as outlined in SOP VM-1.
- Use hoses with nozzles that automatically turn off when left unattended. Use high-pressure, low-volume sprays.
- If using soap, use phosphate-free, biodegradable detergents sparingly.
- Filter and recycle wash water if possible.



Discharge and Disposal

- Obtain applicable permits/registrations as outlined above.
- Wash water collected in a holding tank requires disposal at an approved facility.

Inspection and Maintenance

- Inspect catch basins and oil/water separators every 6 to 12 months per SOP MI-2 and SOP MI-7.
- Ensure staff are trained on proper vehicle and equipment washing procedures and practices.



BF-6, Sand & Salt Storage

This SOP outlines procedures for storing sand and salt to minimize contact with stormwater runoff.

Procedures and Practices

- Salt should be stored indoors if possible.
- All salt loading should be conducted indoors if possible.
- If stored outdoors, cover sand and salt piles with waterproof tarp when not actively in use, particularly during rain events.
- If stored outdoors, locate salt piles on an impervious surface away from areas subject to flooding.
- Locate sand piles on a pervious surface away from areas subject to flooding.
- Locate sand and salt piles at the top of a rise to minimize stormwater run-on.
- Ideally, salt should not be stored in a water supply Zone II or within a 100-year floodplain.
- Use diversion berms to minimize run-on to storage areas.
- Direct stormwater runoff away from areas where salt and sand is stored by using buffers to diffuse runoff before entering waterbodies.
- Avoid loading/unloading sand and salt in the rain if possible.
- Use calibrated salt application equipment when spreading salt on all equipment.

Inspection and Maintenance

- If using a salt storage shed, inspect weekly for roof leaks on a regular basis. Repair any leaks.
- Inspect sand and salt application equipment including calibration equipment and spreaders.
- Adjust calibration rates and levels as necessary to ensure proper application rates.
- Inspect salt regularly for lumping or water contamination.
- Inspect surface areas for evidence of runoff, such as salt stains on the ground near and around the salt storage shed, loading area, or areas downgradient.
- Sweep outside storage unit doorways after loading/unloading occurs. Ensure this is done before the next rainfall event.
- Ensure staff are trained in proper sand and salt storage procedures and practices.



Appendix C

Relevant Bylaw and Regulatory Components

(19) For privately-owned commercial and industrial sites that store salt, brine, or similar materials outdoors for the purpose of treating roadways, parking lots, walkways, sidewalks, or similar surfaces during winter months, include all proposed measures to minimize salt usage and/or utilize salt alternatives, as well as measures to prevent exposure of any salt stockpiles to precipitation and runoff. Future plans, procedures, inspection and maintenances schedules, etc. shall also be addressed in the OMP as outlined in Section 8.

~~(19)~~(20) Documents must be stamped and certified by a qualified licensed P.E.;
and,

~~(20)~~(21) Any other information requested by the Permit Granting Authority.

7.3. Stormwater Management Standards (“Standards”). Projects shall meet the following Standards:

- (1) No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or Waters of the Commonwealth.
- (2) Low Impact Development (LID) site planning and design strategies must be implemented unless determined Infeasible by the PGA to reduce the discharge of stormwater from development sites;
- (3) Stormwater management system design shall be consistent with, or more stringent than, the requirements of the latest version of the Massachusetts DEP Stormwater Handbook;
- (4) Stormwater management systems on New Development shall be designed to meet an average annual pollutant removal equivalent to 90% of the average annual load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND 60% of the average annual load of Total Phosphorus (TP) related to the total post-construction impervious surface area on the site.
 - (a) Average annual pollutant removal requirements in 7.3.(4) are achieved through one of the following methods:
 - i. Installing BMPs that meet the pollutant removal percentages based on calculations developed consistent with US EPA Region 1’s BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by US EPA Region 1, where available. If US EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or State-approved BMP design guidance or performance standards (e.g., State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance; or
 - ii. Retaining the volume of runoff equivalent to, or greater than, 1.0 inch multiplied by the total post-construction impervious surface area on the new development site; or
 - iii. Meeting a combination of retention and treatment that achieves the above standards; or
 - iv. Utilizing offsite mitigation that meets the above standards within the same USGS HUC12 as the new development site.

- (2) Maintenance agreements that specify:
- (a) Names, addresses, telephone numbers, and email addresses of the person(s) responsible for operation and maintenance
 - (b) The person(s) and their contact information responsible for financing maintenance and emergency repairs.
 - ~~(c)~~ (c) A Maintenance Schedule that includes routine inspection along with routine and non-routine maintenance tasks for each BMP.
 - ~~(d)~~ (d) For privately-owned commercial and industrial sites that store salt or similar materials outside for use during winter months as outlined in Section 7.2, a Maintenance Schedule that includes routine inspection along with routine and non-routine maintenance tasks associated with outdoor salt stockpiles to prevent exposure to precipitation and runoff.
 - ~~(e)~~ (e) A list of easements, if applicable, with the purpose and location of each.
 - ~~(e)~~ (f) The signature(s) of the owner(s).
 - ~~(f)~~ (g) Estimated operation and maintenance budget.
 - ~~(g)~~ (h) The responsible party shall:
 - i. Maintain a log of all operation and maintenance activities for the last three years including inspections, repair, replacement, and disposal (the log shall indicate the type of material and the disposal location);
 - ii. Make this log available to the Permit Granting Authority and the Commonwealth of Massachusetts upon request; and,
 - iii. Allow Massachusetts DEP and the Town of Lincoln to inspect each BMP to determine whether the responsible party is implementing the Operation and Maintenance Plan.
- (3) Stormwater Management Easement(s).
- (a) Stormwater management easements shall be provided by the property owner(s) if the Permit Granting Authority deems necessary for:
 - i. Access for facility inspections and maintenance;
 - ii. Preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the 100-year storm event; and,
 - iii. Direct maintenance access by heavy equipment to structures requiring regular cleanout.
 - (b) The purpose of each easement shall be specified in the maintenance agreement signed by the property owner.
 - (c) Stormwater management easements are required for all areas used for off-site stormwater control unless a waiver is granted by the Permit Granting Authority.
 - (d) Easements shall be recorded by the Owner with the Middlesex South Registry of Deeds prior to issuance of a Certificate of Completion.
- (4) Changes to Operation and Maintenance Plans.
- (a) The owner(s) of the stormwater management system must notify the Permit Granting Authority of changes in ownership or assignment of financial responsibility.

Article XXXV SALT STORAGE AT COMMERCIAL AND INDUSTRIAL PROPERTIES

Section 1. Purpose and Objectives

The United States Environmental Protection Agency has identified salts from winter operations as sources of water pollution. The purpose of this Bylaw is to regulate outdoor storage of salts at commercial and industrial facilities within the Town of Lincoln.

Section 2. Regulations Governing Salt Storage at Commercial and Industrial Properties

- A. Salt includes solids such as sodium chloride (NaCl), potassium chloride (KCl), calcium chloride (CaCl₂), and magnesium chloride (MgCl₂). It also includes mixtures of the same substances with abrasives such as sand, cinder, slag, etc.
- B. Salt shall be stored on an impermeable surface.
- C. Salt shall be covered at all times to prevent dispersion by runoff and to control wind dispersal.
- D. When not using a permanent roof, a waterproof impermeable, flexible cover must be placed over all storage piles to protect against precipitation and surface water runoff. The cover must prevent runoff and leachate from being generated by the outdoor storage piles. The cover must be secured to prevent removal by wind or other storm events.
- E. Any roof leaks, tears or damage should be temporarily repaired during winter to reduce the entrance of precipitation. Permanent repairs shall be completed prior to the next winter season.
- F. Storage areas shall be graded to direct surface drainage away from the storage area. In no case shall the surface drainage be allowed to flow through the base of the storage piles.

Appendix D

Salt and Winter Public Education Materials



TOWN OF LINCOLN

CONSERVATION COMMISSION

CONSERVATION DEPARTMENT
16 LINCOLN ROAD
LINCOLN CENTER, MA 01773
781-259-2612
CONSERVATION@LINCOLNTOWN.ORG

MEMO TO: Business Owners and Property Managers

FROM: Michele Grzenda, Lincoln Conservation Director

DATE: December 20, 2021

RE: **Snow and Ice Management Strategies for Businesses**

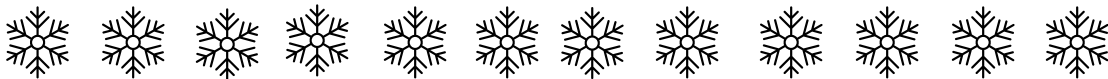
Protecting public safety in icy conditions is a common concern. This often leads businesses and snow removal contractors to liberally apply salt products to ice-covered sidewalks and parking lots. The hidden costs of over-application are often borne by the environment. When road salt dissolves in water, the chloride molecules easily move with water flow and are not retained by the soil. Chemical reactions, evaporation and vegetation do not remove chloride in significant quantities. Therefore, nearly all of the chloride applied as road salt will eventually end up in the nearby surface waters or groundwater.

We are asking for your help this winter season in protecting Lincoln's wetlands, ponds, and rivers. Please review the attached [Snow Removal Tips Flyer](#). When hiring contractors for snow management or planning your own winter snow and ice management, here are some strategies to consider:

- **There May be Restrictions on the Type of Deicing Allowed on Your Property**
All businesses should have an Operation and Maintenance Plan which identifies best management practices for maintaining parking areas, drainage systems, snow storage, and de-icing strategies. Some businesses, when they were being constructed, went through wetland permitting and may have perpetual maintenance requirements or prohibition on the use of certain chemicals. Contact the Conservation Department at 781-259-2612 if you would like more information about any possible restrictions/requirements about your property.
- **Anti-icing:** Anti-icing using brine or an alternative product is an efficient and popular means of preventing ice-pavement bonding. Salt, sitting on the paved surface, is inert unless moisture is introduced and comes in contact with the granular rock salt. Once it starts to snow, the moisture causes the salt to dissolve into solution. The resulting salt brine prevents ice and snow from bonding with the pavement surface. Since no bonding takes place, once plowing operations commence the snow or slush is easily removed. This leaves a cleaner surface than if you plow the site after the snow and ice has bonded to the pavement. **Anti-icing can reduce the amount of salt used in a storm by half!**

- Make your own brine or ask your contractor to make and apply brine - Add enough salt (roughly 2.5lb salt per gallon of water) to produce a 23.3% solution, which freezes at around 0 degrees. Mix the brine until all of the salt is dissolved.
- Using a masonry sprayer, apply the liquid several hours before a storm. Try an application rate of 0.25-0.5 gallons to a 10' by 50' area and adjust the application rate based on the performance. Use a stream nozzle instead of a fan tip and have a filter in your dispersal system to prevent blockages.
- **Timing is Crucial:** Ideally, brine is sprayed as an anti-icing treatment prior to the storm's arrival. If that is not possible, then salt should be spread as soon as a storm begins in order to prevent bonding of snow or ice to the pavement. The salt will quickly produce brine or keep snow at a texture that allows for efficient plowing. The melting action of salt applied early in a storm works from the pavement surface up so snow and ice do not form hardpack.
- **Salt Storage:** Uncovered storage of salt is forbidden by Massachusetts General Law Chapter 85, section 7A in areas that would threaten water supplies. The Drinking Water Regulations, 310 CMR 22.21(2)(b), also restrict deicing chemical storage within wellhead protection areas (Zone I and Zone II) for public water supply wells "unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff or leachate." Components of an "environment-friendly" roadway deicing salt storage facility include
 - A flat site with adequate space for salt piles.
 - A storage on a pad (impervious/paved area).
 - Storage under a roof and runoff collection/containment.
- **Equipment Calibration:** Application equipment must be calibrated regularly to ensure operation is safe and sustainable. Ask to see your contractor's calibration chart. Spreaders should be calibrated with the material to be used.

As a business owner, property manager, or landowner, you are responsible for pollutants that leave your property. You play a big role in keeping our waterways clean and healthy! Please follow these tips provided to properly store and handle materials like salt and maintain your drainage infrastructure to protect your property from flooding and limit any pollution entering our streams and rivers.





SNOW REMOVAL TIPS: KEEP LINCOLN'S WETLANDS HEALTHY

As a business owner, property manager, or landowner, you are responsible for pollutants that leave your property. You play a big role in keeping our waterways clean and healthy! Follow these tips to properly store and handle materials like salt (deicers) and maintain your drainage infrastructure to protect your property from flooding and limit any pollution entering our streams and rivers.

DO



- Always cover salt piles or store in a building / shed.
- Use the least amount of deicer necessary to break the ice/pavement bond.
- Keep storm drains, catch basins, and stormwater structures clear of snow, litter, and leaves. They clog these structures.
- Maintain stormwater infrastructure (remove debris collected in catch basins, swales, etc.) **annually** or in accordance with your Operations & Maintenance Plan. Keep a maintenance log.

Don't



- Don't leave salt and ice melt uncovered or open to rain and snow.
- Do not apply deicer near wetlands, waterways, or vegetation.
- Don't dump oil, grease or ANYTHING into a storm drain, or other stormwater structure. Doing so negatively impacts the environment and has the potential to cause localized flooding.

Why is this necessary?

Rain that falls on the paved surfaces of your property picks up oil, trash and dirt as it drains into our municipal drainage system. This stormwater runoff ends up in our lakes, rivers, and streams. It's the fastest growing type of water pollution in Massachusetts. Stormwater pollution is bad business for our state's waterways. It harms fish and wildlife, makes our water unsafe to drink, and can spoil outdoor activities.

For more information on Lincoln's stormwater management programs go to:

<https://www.lincolntown.org/1010/Stormwater-and-Climate-Resiliency>

Business owners can do their part to keep Massachusetts' waterways clean.

Find more tips like these at www.ThinkBlueMassachusetts.org.

