



TOWN OF RYE, NEW HAMPSHIRE

Appendix H – New Hampshire Small MS4 General Permit

MARCH 2022

Salt Reduction Plan

Salt Reduction Plan

Town of Rye, New Hampshire

March 2022

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List of Abbreviations

NHDES	New Hampshire Department of Environmental Services
MS4	Municipal Separate Storm Sewer System
SWMP	Stormwater Management Program
SOG	Standard Operating Guideline
NHDOT	New Hampshire Department of Transportation
BMP	Best Management Practice
MCM	Minimum Control Measure

Section 1 Introduction

This document was developed using the Salt Reduction Plan Template provided by the New Hampshire Department of Environmental Services (NHDES) on behalf of the regulated small municipal separate storm sewer system (MS4) communities in New Hampshire.

1.1 Background and Purpose

This Salt Reduction Plan addresses permit requirements set forth in Appendix H, Section IV of the 2017 New Hampshire Small MS4 General Permit based on the following permittee category:

- Permittee with discharges to waterbodies that are water quality limited due to chloride in Category 5.

The purpose of this Salt Reduction Plan is to reduce salt usage within the MS4 boundary by implementing various best management practices (BMPs) aimed at reducing the amount of chloride applied to the roadway, thus reducing the amount of chloride discharging to the impaired waterbody within the Town of Rye's MS4 boundary. This Salt Reduction Plan is a part of the Town of Rye's Stormwater Management Program (SWMP).

The Town of Rye performs a variety of maintenance activities to ensure safe winter driving conditions on its roads and parking lots as well as activities to limit the amount of snow and/or deicing chemicals entering surface waters. These are described under Section 2 of this plan.

The Town of Rye is also working towards requiring private property owners to reduce salt application and track salt usage. These efforts are described in Section 3 of this plan.

1.2 Chloride Impaired Waterbody in Rye

Eel Pond is an approximate 39-acre lake located adjacent to Route 1A/Ocean Boulevard in Rye and is shown on Figure 1 in Appendix A. Eel Pond is listed on the 2020/2022 New Hampshire 303(d) list as having a chloride impairment. Route 1A separates Eel Pond from Jenness and Sawyer Beaches; however, it should be recognized that Eel Pond is hydraulically connected to Sawyer Beach via two cross culverts located under Route 1A/Ocean Boulevard. The Town of Rye suspects the chloride impairment is associated with this hydraulic connection. Furthermore, none of the streams tributary to Eel Pond are listed as impaired by chloride.

1.3 Historic Winter Road Maintenance Activities

The Town of Rye conducts their own winter maintenance activities and does not contract any of it out with the goal to provide timely, efficient, and cost-effective winter maintenance, snow removal, and ice control for the safety and benefit of the residents and general motoring public. Each storm event is unique and has many inherent variables, including temperature, timing, intensity, and precipitation type. Each storm requires different effort and consideration, which together determine the overall winter maintenance strategy for a given storm. The Town of Rye's Snow & Ice Removal and Control is described in the Town of Rye's Standard Operating Guideline (SOG) #10.

The Town of Rye has historically been divided into four treatment routes and seven plow routes, which cover approximately 45 miles of roads. The Town of Rye treats the roads with sand and/or salt. Sand is used as an abrasive and is applied to the road to improve vehicle traction. Salt is applied as a deicing and anti-icing agent. The Town purchases salt treated with calcium chloride (pretreated salt) and untreated salt (bulk salt) from a supplier, as

needed, and stores it in the Town's covered salt shed located at the Public Works Facility. The salt shed consists of two bays, each capable of storing approximately 120 tons of material.

All roads, with the exception of gravel roads and reduced salt roads, are treated with an application rate of up to approximately 400 pounds of salt per lane mile. According to SOG #10, this treatment is necessary to develop a slurry of brine on the road surface under the accumulating snow, to ensure accumulating snow does not adhere or bond to the road surface. Salt is applied to the center of the roadway, where traffic will work the brine across the roadway. The industry accepted standard or actual working limit of salt on roads for deicing is 19 degrees Fahrenheit. Treated salt will work in temperatures below 19 degrees, but is not effective below 10 degrees; therefore, no salt is applied when the pavement temperature is below 10 degrees. Sand is applied on an as needed basis. The main function of application of sand is to assist motorists in obtaining traction on ice or snow-covered roads. Sand is used as an abrasive for traction when temperatures are too cold to apply salt. Additionally, the Town of Rye treats gravel roads and reduced salt roads with sand only. Equipment is calibrated annually.

It should be noted that Route 1A (Ocean Boulevard) runs adjacent to the full length of Eel Pond and is maintained by the New Hampshire Department of Transportation (NHDOT). Winter maintenance of Route 1A (Ocean Boulevard), including plowing and salt application, is the responsibility of NHDOT.

Section 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 includes the different best management practices (BMPs) that will be used as part of this Salt Reduction Plan.

2.1 Salt Tracking

The Town of Rye tracks salt applied to municipally owned and maintained surfaces. Salt usage is reported using the NHDES Annual Salt Usage Report form.

2.2 BMPs for Salt Reduction

This section describes BMPs to help reduce the amount of chloride discharge to the waterbodies within the Town of Rye, including the chloride-impaired waterbody. The Town of Rye currently uses a number of activities related to winter maintenance and salt reduction which include the BMPs and action items listed under the following subsections.

2.2.1 Operational BMPs

2.2.1.1 Purchase and Apply Pretreated Salt

Pretreating is a term referring to applying a liquid deicer (i.e., brine) directly to a solid-based deicer (i.e., salt) to create a quicker reaction time for the solid deicer to begin melting snow and ice. Salt does not work until it is in solution; therefore, pretreating dry salt allows for a faster activation and also lowers the working temperature of salt. By introducing moisture into salt prior to application, this results in quicker melting action, reduced bounce and scatter of material, and a reduced application rate. With a quicker melting action, the application rate of pretreated salt can be decreased by approximately 20 percent over dry salt, which saves money, increases level of service, and reduces chloride in the environment.

The Town of Rye currently does the following:

- Approximately one third of the salt purchased is pretreated salt (treated with calcium chloride), which is an alternative to bulk rock salt.
- Pretreated salt is applied to road surfaces when the pavement temperature is below 20 degrees Fahrenheit.

2.2.1.2 Increase Plowing Prior to Deicing

Proper plowing of the road is essential to controlling the amount of deicer used. As much snow as possible should be removed from the roadway prior to the application of deicers. Plowing should be conducted early and often to avoid compaction. Snow and ice that is left on the pavement will only work to dilute the deicer that has been applied and decrease its effectiveness. Applying more deicer will have little benefit if the snow is not removed from the pavement surface, when plowing is the appropriate operation.

The Town of Rye currently does the following:

- Removes as much snow as possible using mechanical means, such as plowing, blowing, or shoveling before deicing agents are applied to reduce the need for road salt or other deicing chemicals.

2.2.1.3 Evaluate Roadway Anti-icing (Pretreatment of Roadway Using Brine)

Anti-icing is a proactive approach to roadway winter maintenance and 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; however, anti-icing in general requires a capital investment in equipment, such as saddle tanks for trucks, and decisions regarding whether the Town will purchase and store the brine or make and store the brine. It is estimated that the use of anti-icing (pretreatment of roadway using brine) in advance of storms can result in a 20 percent reduction in salt use per storm.

The Town of Rye will do the following:

- Evaluate the purchase of brine equipment to allow the Town to pretreat roadways with anti-icing agents, such as brine, prior to precipitation to prevent the formation of bonded snow and ice to the roadway surface.
- As part of the evaluation, consider whether the Town would buy and store the brine versus make and store the brine. The Town will also consider prewetting the salt as it is applied to the road in future equipment purchases.

2.2.1.4 Monitor Road Surface Temperature

The two most critical factors that can produce winter road hazards are pavement temperature and the dew point/precipitation rate. Pavement temperature, not air temperature, is the deciding factor for treatment type and duration. 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 Rye currently does the following:

- Monitors and tracks both the ambient and road surface temperatures using truck-mounted road temperature sensors during storm events to determine the appropriate treatment options for those certain circumstances.
- Applies rock salt when pavement temperatures are above 20 degrees Fahrenheit and applies pretreated salt when pavement temperatures are below 20 degrees Fahrenheit.
- References the New Hampshire Road Salt Application Rates for Deicing Roads and Parking Lots charts during storm events to determine the appropriate treatment options.

2.2.2 Equipment BMPs / Modifications

2.2.2.1 Routine Calibration Rates and Adjustments

The goal of calibrating is to know how much material you are putting down on a roadway or parking lot for every setting on your truck that you use. Calibrating your equipment is the first step to reducing salt use. During winter operations, changes may occur in mechanical linkages, hydraulic systems, and other components. Annual 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 Rye currently does the following:

- Uses ground-speed controllers linked to the spreaders.
- Calibrates equipment yearly to reduce and optimize salt use and ensure deicing agents are being used efficiently.
- Tracks and documents equipment calibration.
- Maintains a calibration chart in the Public Works files.
- Recalibrates equipment if any service is done on a truck that would affect the calibration or as needed.

2.2.2.2 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. This may require washing equipment on a more routine basis which can produce wash-water or runoff with higher levels of chloride or sand. For this reason, washing and maintenance procedures should be completed following carefully planned procedures and in proper locations.

The Town of Rye currently does the following:

- Washes equipment using proper procedures stated in the Town's SWMP under Minimum Control Measure (MCM) 6 to prevent pollutants from entering the stormwater system.
- Shovels/sweeps up residuals that are left on the ground after washing.
- Washes equipment after every storm, and stores equipment inside during the winter months.
- Washes equipment in designated wash area that does not discharge from the facility (the site is internally draining).
- Inspects and maintains equipment regularly to reduce the potential for leaks.

2.2.3 Facility Modification and Good Housekeeping BMPs

2.2.3.1 Snow Storage

Proper snow storage and good housekeeping can help reduce and direct snowmelt from reaching nearby waterbodies and resources, which can minimize chloride loadings. The Town of Rye rarely relies on snow storage; however, there are two designated snow storage locations (one at the Public Works Facility and one at the Public Safety Complex). These two facilities are shown on Figure 2 in Appendix B.

The Town of Rye will ensure:

- Snow is not pushed or dumped into waterbodies or wetlands, into stormwater drainage swales or ditches, or on top of catch basins.
- Snow is not stored near drinking water areas, waterbodies, or wetlands.
- Snow storage is not located in areas that are unstable, areas of potential erosion, or high points where snow may melt and collect debris as runoff before it enters the stormwater system.

2.2.3.2 Salt Stockpile BMPs and Protection from Precipitation and Runoff

It is important to manage how salt piles are stored and handled. Salt storage facilities can contribute to both surface water contamination, and the location should not be in an area that is environmentally sensitive. Ideally deicing material storage facilities should be completely enclosed, with storage and working areas on impervious

surfaces such as asphalt or coated concrete. Buildings should have concrete foundations and be covered. It should be noted that the Town of Rye's salt shed is located within the recharge area for a Rye Water District well; however, there is no evidence of impact on the well from the salt storage shed.

The Town of Rye will ensure:

- Salt storage piles are located at the Public Works Facility and are under cover in a three-sided (open front) shed. [A small quantity of sand for municipal winter-road maintenance is stored outside under a tarp. This pile is not treated with salt. A small pile of sand/salt mix for public use is also located under cover.]
- Salt storage piles are stored in areas that will not impact surface water resources.
- Salt storage areas have adequate drainage controls to prevent runoff from entering the stormwater system.
- Appropriate loading and unloading procedures are used, such as not overfilling trucks with deicing materials, to reduce the chances of spills.
- Unloading/loading of trucks is performed on impervious surfaces whenever possible.
- Storage/loading areas are frequently swept to reduce the amount of salt and sand tracked out.

2.2.4 Training, Outreach, and Regulations

2.2.4.1 Training and Certifications

The Green SnowPro certification is a program managed by NHDES to improve efficiency in salt use, such that the least amount of salt is used to ensure safe conditions on surfaces traveled by pedestrians and vehicles in winter conditions; reduce the amount of salt used by commercial applicators (as measured in tons of salt per acre per year) over time while maintaining safe conditions for pedestrians and vehicles in winter conditions; and establish a voluntary system for commercial salt applicators to track their salt use and provide information annually to the salt accounting system.

Training municipal personnel on best winter maintenance and salt reduction practices is an effective practice to reduce salt usage. There are a variety of options for training, including training offered through the Green SnowPro Program (both a full course and a refresher course). The full course is a four-hour course with an exam, and the refresher course is a two-hour course, and reviews basic practices, with a focus on certain aspects of salt reduction such as brine, calibration, and application rates.

The Town of Rye currently does the following:

- Provides training to municipal personnel through the Green SnowPro certification program that is managed by NHDES to improve efficiency in salt use.
- Provides additional or independent in-house training to municipal personnel to improve efficiency in salt use.

2.2.4.2 Adoption of Guidelines for 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. By adopting NHDES's application rates the Town can save money on salt usage and also help to reduce the amount of chloride ending up in waterbodies, including chloride impaired waterbodies.

The Town of Rye currently does the following:

- Adopted guidelines of NHDES’s application rates to apply enough deicer so that plows can remove the snow and ice. The Town’s current, general application rate of salt is 175-200 pounds per lane mile. The application rate of deicers will be adjusted based on the type of storm, type of agent used, and any anti-icing and pre-wetting techniques used. The current strategy for anti-icing is pre-treating the roads prior to a storm event with either bulk salt or pre-treated salt. NHDES’s application rates can be viewed at: <https://www4.des.state.nh.us/nh-ms4/wp-content/uploads/2020/11/Application-Rate.pdf>.
- Adopted procedures to pre-treat roads before storm events to help prevent ice from forming and to make plowing easier.

2.2.4.3 Designation of Low Salt and No Salt Roads

The Town of Rye has designated the following road as a low salt road:

- Garland Road

The Town of Rye has designated the following roads as no salt roads:

- Cedar Run
- Signature Drive
- Autumn Lane
- Marjorie Way

Low and no salt roads are shown on Figure 2 in Appendix B.

2.2.4.4 Public Education

Educating the public can also be a good way to help reduce the amount of chloride ending up in the Town’s waterbodies. By educating the public on various chloride/winter related issues, salt usage can be reduced as well.

The Town of Rye will provide public education covering various outreach topics. Potential outreach topics include:

- Impacts of salt use
- Methods to reduce salt use on private property
- Modifications to driving behavior in winter weather
- Other educational information about salt/winter maintenance

The Town will utilize resources provided and/or to be provided by the NHDES on the following webpage:

https://www4.des.state.nh.us/nh-ms4/?page_id=54.

2.3 Estimate of Annual Salt Usage Reductions

Salt usage is highly dependent on the characteristics of the individual storm events. A five-year average of actual tonnage of salt applied per year and the five-year average of the number of storm events per year shown in Table 1 was used to estimate the salt reduction in Table 2.

Table 1 Annual Tonnage of Salt Used and Number of Storm Events

Year	Salt Usage (Tons)	# of Events
2021	775	20
2020	493	13
2019	1,444	25
2018	794	15
2017	1,240	25
Average	949 tons per year	20 events per year

Table 2 Estimated Salt Reduction

BMP or Activity	Estimated Loading per storm (tons)	Estimated Reduction per storm (%)	Estimated Reduction per storm (tons)	Estimated Storms per year (#)	Estimated Salt Reduction Total per year per BMP (ton)
Purchase and Apply Pretreated Salt	48	5	2.4	20	48
Monitoring Road Surface Temperatures	48	5	2.4	20	48
Routine Calibration Rates and Adjustments (Spreader Calibration)	48	10	4.8	20	96
Routine Calibration Rates and Adjustments (Ground-Speed Controls)	48	5	2.4	20	48
Pre-treat roads with salt (Anti-icing)	48	10	4.8	20	96
Estimated Salt Reduction Total (ton) ¹ :					336

¹ Based on the five-year average of salt usage and the five-year average of number of events (2017-2021). Reductions will vary based on actual storm usage and number of events, driven by the characteristics of the storm.

2.4 Schedule of Planned Activities / BMPs

The Town of Rye has developed a schedule for implementation of this Salt Reduction Plan based on the BMPs described in Section 2.2. The anticipated schedule with milestone tracking dates is summarized in the Table 3.

Table 3 **Schedule of Planned Activities**

BMP or Activity	Dates(s) to be Implemented	Date(s) to be Completed
Purchase and Apply Pretreated Salt	Current	Ongoing
Increase Plowing Prior to Deicing	Current	Ongoing
Evaluate Roadway Anti-icing (Pretreatment of Roadway Using Brine)	2022-2027	2027
Monitor Road Surface Temperature	Current	Ongoing
Routine Calibration Rates and Adjustments	Current	Ongoing
Equipment Cleaning and Maintenance	Current	Ongoing
Snow Storage	Current	Ongoing
Salt Stockpile BMPs and Protection from Precipitation and Runoff	Current	Ongoing
Training and Certifications	Current	Ongoing
Adoption of Guidelines for Application Rates for Roads and Parking Lots	Current	Ongoing
Designation of Low Salt and No Salt Roads	Current	Ongoing
Public Education	2023	Ongoing

Section 3 Actions or Enhanced BMPs for Privately Maintained Facilities Draining to the MS4

The Appendix H of the 2017 New Hampshire Small MS4 General Permit requires permittees to implement requirements aimed at reducing salt usage at certain privately-owned parking lots and privately owned streets by requiring property owners and operators to hire commercial salt applicators who are trained and certified in accordance with Env-Wq 2203 (i.e., Green SnowPro). The Town does not currently have approvals or agreements requiring existing private property owners to comply with this requirement; however, the Town will encourage existing property owners to voluntarily comply and will work on adopting requirements for new development and redevelopment to reduce salt usage.

3.1 Identification of Private Parking Lots

The Town of Rye will identify a list of privately-owned parking lots with 10 or more parking spaces draining to the MS4. This exercise will focus on parking lots draining to the MS4 that discharge to Eel Pond (chloride impaired waterbody). When parking lots meeting these criteria are identified, a map and/or listing will be added to Appendix C.

3.2 Requirements for Existing Private Parking Lots and Private Streets

The municipality will encourage property owners of existing privately-owned parking lots with 10 or more parking spaces and privately-owned streets draining to the MS4 that discharge to Eel Pond (chloride impaired waterbody) to voluntarily hire commercial salt applicators who are Green SnowPro certified. The Town of Rye will do this by mailing a letter and salt reduction brochure to applicable property owners requesting their participation.

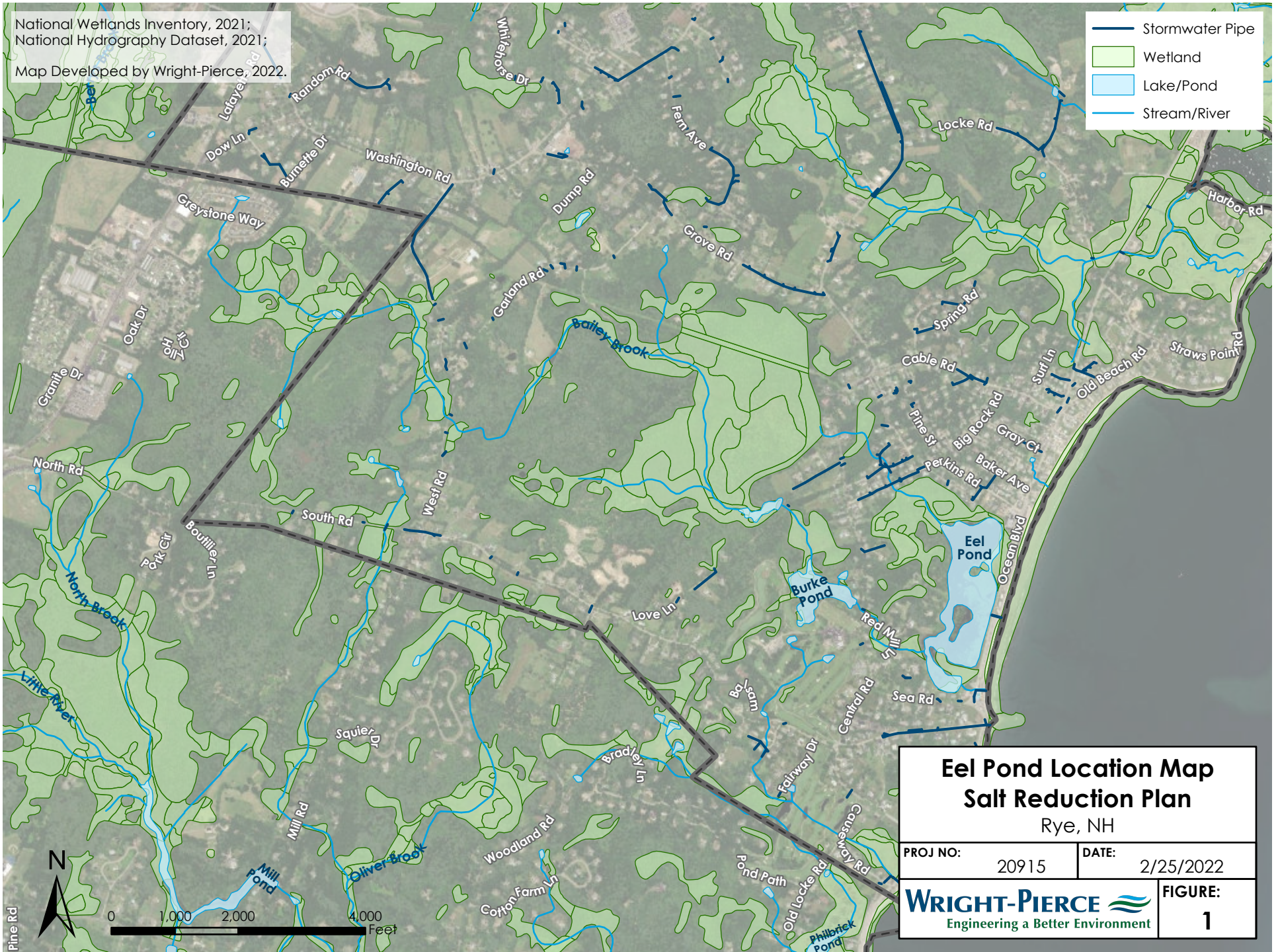
3.3 New Development and Redevelopment

The Town of Rye will adopt requirements for new development and redevelopment to minimize salt usage and to track and report amounts used using the UNH Technology Transfer Center online tool (<http://www.roadsalt.unh.edu/Salt>). The Town will work on this requirement in conjunction with the NHDES and the Seacoast Stormwater Coalition communities.



Appendix A

Eel Pond Location Map



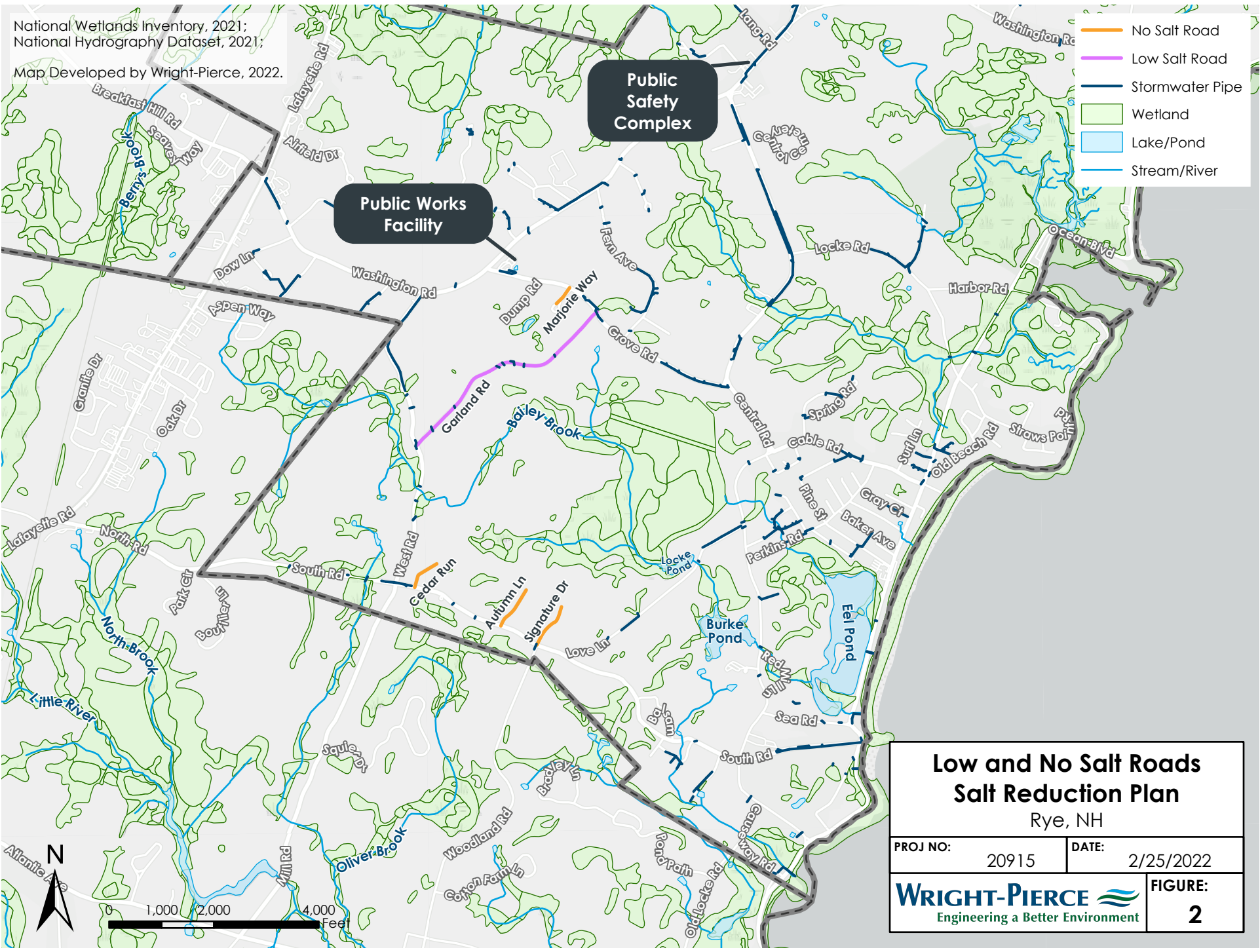


Appendix B

Low and No Salt Roads Map

JDM W:\GIS_Development\Projects\NH\Rye\2015_MS4Assistance\MXDs\Figures-SaltReductionPlan.aprx - Figure2-LowNoSaltRoads-8x11

National Wetlands Inventory, 2021;
National Hydrography Dataset, 2021;
Map Developed by Wright-Pierce, 2022.



Low and No Salt Roads Salt Reduction Plan Rye, NH

PROJ NO:	20915	DATE:	2/25/2022
WRIGHT-PIERCE Engineering a Better Environment			FIGURE: 2



Appendix C

Privately-Owned Parking Lots Meeting Criteria



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