# VERMONT AGENCY OF TRANSPORTATION

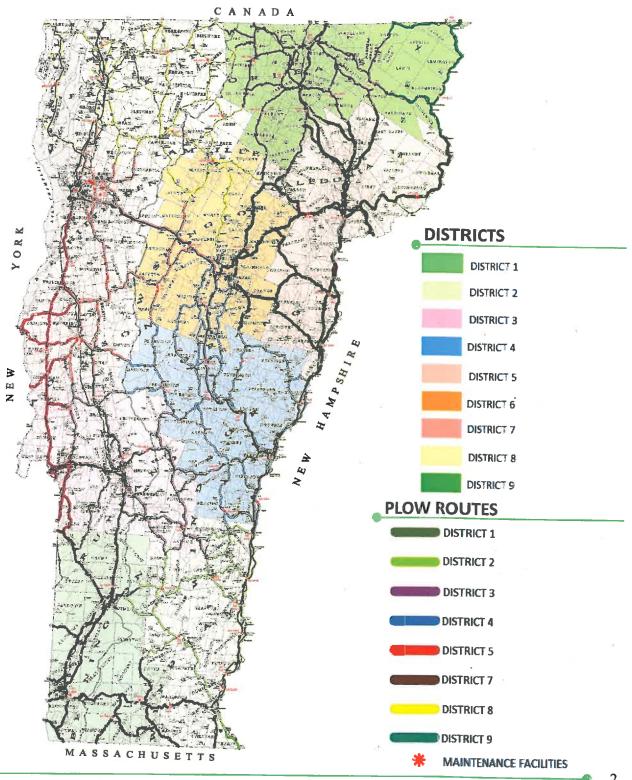
# WINTER SERVICE GUIDE

### **AND ANNUAL REPORT**



oubmitted by:	
	Maintenance Transportation Administrator
Date Submitted:	

# **MAINTENANCE DISTRICT MAP**



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# INTRODUCTION

ful.

The Vermont Agency of Transportation (VTrans) is responsible for nearly 3,313 miles of roads and 2,655 bridges statewide, which equates to 6,626 snow-lane miles. Standing at the ready to battle winter weather are 275 dump trucks with plows and wings, 41 pick ups with plows, and 68 loaders and graders, and 375 licensed department operators.

To help give our customers an inside look at winter operations and what you can do to prepare, VTrans offers this Winter Services
Guide. This guide gives some insight into how we do our job during winter operations along with useful statistics about winter operations over the past season. We hope that you find the winter driving tips and preparation steps to be use-



When winter weather strikes, VTrans has crews treating roadways around the clock our goal is to keep roads passable, but they will not be completely free of ice and snow at all times. That is why it is so important to know your own winter driving abilities as well as how your vehicle performs in the snow, ice, and rain before winter weather hits.

During heavy storms, our advice is to avoid travel unless absolutely necessary, but if you must travel be sure that you and your vehicle are prepared. Also, during even routine winter weather events, you should ask yourself "is travel an absolute necessity or can I wait until the winter weather has passed?"

Be sure to know before you go and log on to www.511vt.com before you head out. 511VT is your statewide source for winter road conditions and traffic tie-ups on more than 2,000 miles of state roads as well as access to more than 33 cameras around the state. Information on 511VT is also available by simply calling 511 from any phone.

Take steps today to prepare yourself and your vehicles for winter. Remember that preparations on our part and yours is key to successfully navigating Vermont's roads this winter. Be ready, be wise and be safe this winter!

# WINTER ROAD SAFETY

### **BEFORE YOU LEAVE HOME**

#### **GET YOUR VEHICLE READY**

#### Motorists should regularly check to ensure that:

- Fluid levels are full.
- Your wipers don't streak—you may want to consider installing winter wiper blades.
- Your heater and defroster are working properly.
- Your vehicle's radio is working properly so you can receive weather and traffic reports.
- All vehicle lights are working.
- Tires are properly inflated and have sufficient tread depth.
- If you live in an area prone to heavy snow, you may want to use dedicated snow tires on your vehicle or carry a set of chains. At a minimum, your all-weather tires should be mud and snow rated.
- Before the winter driving season, motorists should have a mechanic check the brakes, battery, hoses and belts.
- In the case of a problem, contact a mechanic immediately.





### Emergency Travel Kit... Don't Leave Home Without It!

- Flashlight and batteries
- Battery operated radio
- Jumper cables
- ♦ Cell phone and charger
- Snow shovel
- Matches and candles
- First aid supplies
- Extra warm clothing and gloves
- Blanket
- Ice Scraper
- Sand
- ♦ Bottled water
- Non-perishable food
- Anything else you may need to accommodate family traveling with you (special medications, baby supplies, pet food, etc...)



### If you must travel, during a winter storm, VTrans offers these Winter Driving Tips:

- Carry a winter emergency travel kit.
- Listen to weather and travel advisories and if you don't have to travel in bad weather, don't.
- Keep your gas tank at least half full.
- Slow down and increase following distance.
- Avoid sudden stops and starts.
- Beware of roads that may look wet, but are actually frozen, often referred to as "black ice".
- Use extra caution on bridges and ramps where ice can often form without warning.
- Carry a cell phone but do not text or talk while driving.
- Do not use cruise control while driving on snow-covered roads.
- ♦ It is recommended that you turn on your headlights when your wipers are on.
- Use your low beams in bad weather, especially in cases of heavy or blowing snow.
- Remove ice and snow from windows, mirrors, and all vehicle lights as often as possible.
- Remove snow and ice from your entire vehicle. Reducing chances of causing injury or death if snow and ice from your vehicle strikes another vehicle or person.
- Do not park or abandon your vehicle on snow emergency routes.
- Do not pass or get between trucks plowing in a plow lane (several trucks plowing side by side).
- Make sure someone else knows where you are going and when you expect to arrive. In case you run into an emergency and need assistance, someone will know where to look for you.
- If you do become stranded, it is better to stay with your vehicle until help arrives. Run the engine every hour or so, but make sure the tailpipe is clear and keep the downwind window open slightly.
- Do not drink and drive and always wear your seat belt
- Remember—Safe Roads at Safe Speeds. It is critically important to drive according to conditions. Your safety—and ours—depends on it.

# SNOW AND ICE CONTROL PLAN FOR STATE AND INTERSTATE HIGHWAYS

### **PURPOSE AND NEED**

The purpose of this plan is to define the operational procedures and best management practices (BMPs) for storing and utilizing snow and ice control materials, and for performing winter maintenance activities. It defines the levels of service that the Vermont Agency of Transportation (VTrans) will strive to provide at our facilities and on our highways. This plan allows for and provides guidance to help minimize leaching of salt-laden and other winter maintenance material runoff from state-owned paved surfaces and storage facilities into the ground or into surface waters.

Since storms vary dramatically across the state and occur over a variety of paved surfaces and traffic conditions, this Snow and Ice Control Plan (SIC Plan) is intended to be flexible. It is a guide structured to fit average conditions, but able to accommodate the wide variety of conditions that will be encountered by maintenance crews who are working to maintain safe roads at safe speeds.

### **LEVEL OF SERVICE - GENERAL INFORMATION**

VTrans Maintenance District snow and ice control operations are limited by the resources (budget, personnel, equipment and materials) available for winter maintenance. Consequently, VTrans' SIC Plan calls for "safe roads as safe speeds", and not "bare roads". This means that roads during a storm are plowed, sanded, and salted to allow safe travel at safe speeds, but that drivers should expect to see snow on the roadway during a storm. Most travel takes place during the day, so the majority of VTrans resources are used between 4 a.m. and 10 p.m. Motorists should anticipate reduced coverage and varying road conditions at night, and should drive accordingly.

#### **CORRIDOR PRIORITIES**

Three color-coded levels of service have been established and are shown on the attached "Corridor Priority Map". Priorities were established based on traffic volumes, roadway classification, and expected truck traffic. Note that critical areas such as intersections, areas of extreme curvature and problem grades may have to be treated differently to retain proper mobility and safety regardless of the corridor designation assigned to the balance of the route.

CORRIDOR PRIORITY 1 - HIGH TRAFFIC HIGHWAYS & TRUCK ROUTES (BLUE ROADS) Snow will be removed between 4 a.m. and 10 p.m. During off hours a skeleton crew will be used as needed. Materials noted under MATERIALS AND APPLICATION PROCEDURES will be applied as needed to keep the roads open for traffic and provide a safe surface on which to operate, though road surface may be snow covered at times during the storm. After the storm has subsided, a bare pavement shoulder to shoulder will be provided as soon as practical.

CORRIDOR PRIORITY 2 - MEDIUM TRAFFIC HIGHWAYS (GREEN ROADS)

Snow will be removed between 4 a.m. and 10 p.m. During off hours a skeleton crew will be used as needed. Materials noted under MATERIALS AND APPLICATION

PROCEDURES will be applied as needed to keep the roads open for traffic and provide a safe surface on which to operate, though road surface may be snow covered at times during the storm. During the next regular working day after the storm has subsided, a bare pavement shoulder to shoulder will be provided as soon as practical.

### CORRIDOR PRIORITY 3 - LOW TRAFFIC HIGHWAYS (YELLOW ROADS)

Snow will be removed between 4 a.m. and 10 p.m. During off hours a skeleton crew will be used as needed. Materials noted under MATERIALS AND APPLICATION PROCEDURES will be applied as needed to keep the roads open for traffic and provide a safe surface on which to operate, though road surface may be snow covered at times during the storm. During the next regular working day after the storm has subsided, one third bare pavement in the middle of the road will be provided as soon as practical. As soon thereafter as practical, a bare pavement shoulder to shoulder will be provided.

### PERFORMANCE MEASUREMENT & PROGRAM EFFECTIVENESS ASSESSMENT

Performance during and immediately following individual storm events will be periodically monitored to ensure VTrans is providing safe roads at safe speeds and performing snow and ice removal in accordance with established Corridor Priorities noted under CORRIDOR PRIORITIES.

To monitor performance the following information will be reviewed by the Director of Operations, the Maintenance Transportation Administrator (MTA) and the District Transportation Administrators (DTA's) annually to gauge program effectiveness:

- Material Application rates
- Vehicle speeds during and after storm events
- Condition of travel lanes and shoulders during and after storm events
- Storm data (precipitation, air temperature, road surface temperature, wind speed, etc.)
- Plowing frequency

Overall performance during and following the winter season will be measured by monitoring material usage, labor costs, and equipment costs with respect to the number of lane miles maintained and the number of storm events addressed. Assessments will be made based upon consideration of the resources used versus the winter severity encountered, as well as through comparisons between adjacent and nearby geographical areas that have encountered similar winter conditions. VTrans Operations Division will publish an annual report each spring which summarizes the previous winter and VTrans' performance according to the above mentioned metrics.

#### **MATERIALS AND APPLICATION PROCEDURES**

The materials in this section are those that are primarily used by VTrans for snow and ice control on highways throughout Vermont. This section describes the general purpose of each material, the typical use that is expected under normal conditions, and the application procedure. Choice of materials will depend on experienced consideration of the following variable: pavement temperature, nature of the particular snow and ice event, forecast storm conditions, air temperature and wind velocity, traffic volume, time of day/year, and the availability of resources.

Procedures for determining application rates and methods will be the responsibility of the District Personnel based on this SIC Plan, available material application technology, and other factors that vary across the state from region to region.

#### Salt (NaCl)

Unless otherwise designated for specific routes, salt is the primary material used on the majority of roads maintained by VTrans. Salt is used to prevent the bonding of snow and ice onto pavement surface, and to melt snow and ice that cannot be removed by plowing. Unless salt is pre-wetted with a liquid having a lower working temperature than sodium chloride, the lowest effective working temperature is approximately 15 degrees Fahrenheit.

Application Rates shall normally be selected from the Salt Application Quick Reference Guideline and shall be based upon the pavement temperature; snow-ice conditions encountered, and anticipated trends. Initial applications should normally be 25% higher than the average rate indicated by the chart. Generally, salt will be used when the pavement temperatures are 15 degrees Fahrenheit or higher. When pavement temperatures are less than 15 degrees Fahrenheit and not rising, winter sand may be used when necessary for temporary traction. During cold storms, when the pavements are dry and the snow is blowing off the travel lanes, the application of salt or winter sand is to be avoided for as long as possible since it will hasten the formation of ice on the pavement. When ice does begin to form under these conditions, considerable judgment will be required on whether to use salt that is pre-wetted with liquid or spot applications of winter sand.

#### **Winter Sand**

Winter sand shall consist of coarse, clean, angular sand or other granular material. Sand is generally used to provide traction at intersections and corners during icy conditions. When conditions warrant, salt may be mixed with sand to break the bond between the ice pack and road surface.

Sand should generally be used in the following situations:

- On hills, curves and intersections where the supervisor determines that temporary traction is needed.
- In situations where salt can not work fast enough (i.e. accident scenes involving excessive ice).
- When pavement temperatures are too low for salt to work properly.
- When wet pavements exist on lower-volume corridors and falling nighttime temperatures may cause glazing.

#### Liquids

A variety of liquids are used to either "pre-wet" solid materials that are applied from the plow trucks or to "anti-ice" the highways in advance of a storm event. The follow-

ing are descriptions of the types of liquids used by VTrans, and descriptions of the "anti-icing" and "pre-wetting" process:

**Salt Brine:** Salt Brine is a 23% solution of salt in water. It can be used to either "pre-wet" solid materials that are applied from the plow trucks or to "pre-treat" the highways in advance of a storm event. However, unless salt brine is mixed with additives, the effective working temperature is the same as salt in its solid form—approximately 15 degrees Fahrenheit or greater.

Chemical Additives: Chemical additives are used to pre-wet the solid materials that are applied by the plow trucks to lower the effective working temperature of salt and to help keep the solid materials on the road during the application process. Examples of such chemicals may include magnesium chloride (MgCl<sub>2</sub>), calcium chloride (CaCl) and a number of proprietary products.

**Liquid Chloride Blends:** Liquid Chloride Blends are used to stretch the working range of salt brine without incurring the full cost of a chemical product.

Anti-Icing: For anti-icing with salt brine, the application rates per lane mile may vary when pavement temperatures *during the storm* are anticipated to be 15 degrees Fahrenheit or greater. Application will generally occur on designated routes 6 to 8 hours prior to the timing of the storm. Anti-icing may also be used to spot treat bridge decks and other problem areas located on any priority corridor whenever weather forecasts indicate the possibility of glazing. When anti-icing the roads with a blend, application rates may be cut back.

**Pre-Wetting:** Pre-wetting is the application of liquids onto solid materials. In general, salt brine shall normally be used when the pavement temperatures are above approximately 15 degrees Fahrenheit and chemical additive or blend shall be used when below.

#### **EQUIPMENT**

#### Washing Equipment

Snow and ice control equipment are to be thoroughly washed during regular working hours as soon after use as practicable. Particular attention is to be paid to the areas of equipment in contact with sand, salt, and liquid chlorides. With heated power washers, truck washing will normally be accomplished outdoors in designated areas.

#### **Overnight Loads**

In general, trucks should not be left loaded overnight since it subjects the equipment to unnecessary wear. However, in the event that a winter storm is forecast at some point during the approaching night, a crew may load trucks to enable a quicker response to the storm. Such loading shall be in compliance with the following:

- Load size shall not exceed a level-load.
- If the storm does not occur, the truck(s) loaded in advance shall be unloaded and washed out the following work day.

#### **Spreaders**

Each spreading unit shall be calibrated annually, and after any spreader or hydraulic maintenance, to ensure that selected rates of application are attained.

#### **OPERATIONS**

### Mailboxes and Other Structures Within the Highway Right-of-Way

Occasionally mailboxes or other devices are damaged by snow plowing operations due to poor visibility, the mailbox being buried in a snow bank or the weight/volume of the snow being plowed. This damage is not deliberate and in most cases is unavoidable. VTrans is not responsible for damage and does not repair, replace, or re-erect boxes that are located within the highway right-of-way unless physically struck by a VTrans plow truck. In these cases, VTrans will replace the mailbox at no cost to the property owner with a generic United States Post Office approved box.

### **Widening or Pushing Back Snow Banks**

Following storms with heavy snowfall or when several storms result in substantial snow bankings, VTrans will undertake a roadway widening procedure, which will push back the snow banks. This is generally done during normal working hours, and is a necessary operation because it accomplishes the following:

- Provides room for future snow storage.
- Reduces or prevents melted snow from running out onto the roadway pavement and creating icing conditions.
- Increases safe sight distance at intersections and driveways.
- Maintains a uniform line by eliminating protrusions at driveways and intersections.

Unfortunately there is no way to prevent depositing snow in previously cleaned driveways or walkways except to leave a hazardous projecting mound of snow, With thousands of driveways of all sizes and descriptions along our highway system it is impossible to clear these individual drives as the cost would be prohibitive.

#### **Sidewalks**

The maintenance of the sidewalks, including snow removal, is the responsibility of the local community. This is firm and longstanding statewide. In addition, in those communities where on-street parking is permitted, snow removal from the parking areas, including plowing and or hauling away, is a local responsibility.

### STATE AND FEDERAL REGULATORY OVERSIGHT

Winter Maintenance Practices located within designated National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) areas, including watersheds of Sediment Impaired Waterways, and in the Lake Champlain Watershed Basin:

Winter maintenance activities in these areas have and will continue to be regulated and addressed under the VTrans MS4 Stormwater Management Plan. Please refer to the VTrans Operations Environmental Program website for more information regarding the above referenced designations as they may change from time to time and for information regarding the VTrans MS4 Storm water Management Plan. Link to this site at: <a href="http://www.aot.state.vt.us/ops/TechnicalServices/stormwater/MS4GP3-9014.htm">http://www.aot.state.vt.us/ops/TechnicalServices/stormwater/MS4GP3-9014.htm</a>

### Winter Maintenance Practices - Statewide Implementation and Jurisdiction:

VTrans SIC Plan has, and will continue to be, implemented across the state and will not be subject to ANR jurisdiction outside the designated MS4 & Lake Champlain Basin areas. The Operations Environmental Program will forward to the State Agency of Natural Resources (ANR) the SIC Plan as often as updates are made.

### BEST MANAGEMENT PRACTICES, TRACKING AND REPORTING

Best management practices associated with winter maintenance activities in conformance with the provisions of the VTrans SIC Plan include, but are not limited to:

- Normal winter maintenance will conform to the provisions of the current VTrans winter maintenance standards included in this SIC Plan.
- VTrans shall disseminate the SIC Plan statewide to employees involved in the application and storage of winter snow and ice control materials and train such employees in the proper performance of these standards. The Operations Environmental Program Manager will ensure that this information is posted on the VTrans website, kept current, and made available to ANR.
  - Low salt and no salt roads (zones) will be signed in the field accordingly.
- Weekly internal reporting of salt/sand usage will be completed by Operations Division staff commencing on the first week of November and terminating 26 weeks later, typically with the last week of April. VTrans shall make note of any single de-icing salt application in excess of 800 pounds per two-lane mile and report such incidents as part of the weekly reporting. The Director of Operations will make this information available to ANR upon request.
- VTrans shall fully cover with impervious materials all bulk salt storage areas under their control to reduce the amount and concentration of salt to the runoff of stormwater from these storage areas. All bulk salt storage shall be situated on an impervious material so as to minimize leaching of salt-laden runoff into the ground.
- VTrans shall locate sand piles at District Maintenance Facilities in areas that will not result in sediment-laden runoff into surface waters. If sand piles are located in close proximity to surface waters then VTrans shall install adequate erosion prevention and sediment control practices to ensure sediment-laden runoff will not impact surface waters.
- When it is desirable to charge sand piles with salt to prevent freezing (resulting in mixes or blends), the percentage of salt in the pile shall not exceed 5%.
- VTrans will implement these activities on a statewide basis in accordance with the protocols and best management practices established within the MS4 and Lake Champlain Basin areas for seamless operational efficiencies across the state and to support the stated purpose of the SIC Plan. The Operations Environmental Program will report on these tasks as a part of each annual MS4 report to ANR.

- VTrans will plan, organize and conduct an annual PR campaign associated with safe winter driving, as funding allows.
- Nothing in this SIC Plan shall preclude the Agency from utilizing experimental and new technologies to achieve higher efficiency in a cost effective and environmentally sensitive manner.

Approved: 10/67/201/

Brian Searles, Secretary of Transportation

A	APPLICATION RATES VS. MILES YOU CAN TREAT											
Application Rate (Pounds Per Lane Mile)												
# of Tons	100	150	200	250	300	350	400					
10115		LANE MILES YOU CAN TREAT										
1	20.0	13.3	10.0	8.0	6.7	5.7	5.0					
2	40.0	26.7	20.0	16.0	13.3	11.4	10.0					
3	60.0	40.0	30.0	24.0	20.0	17.1	15.0					
4	80.0	53.3	40.0	32.0	26.7	22.9	20.0					
5	100.0	66.7	50.0	40.0	33.3	28.6	25.0					
6	120.0	80.0	60.0	48.0	40.0	34.3	30.0					
7	140.0	93.3	70.0	56.0	46.7	40.0	35.0					
8	160.0	106.7	80.0	64.0	53.3	45.7	40.0					
9	180.0	120.0	90.0	72.0	60.0	51.4	45.0					
10	200.0	133.3	100.0	80.0	66.7	57.1	50.0					

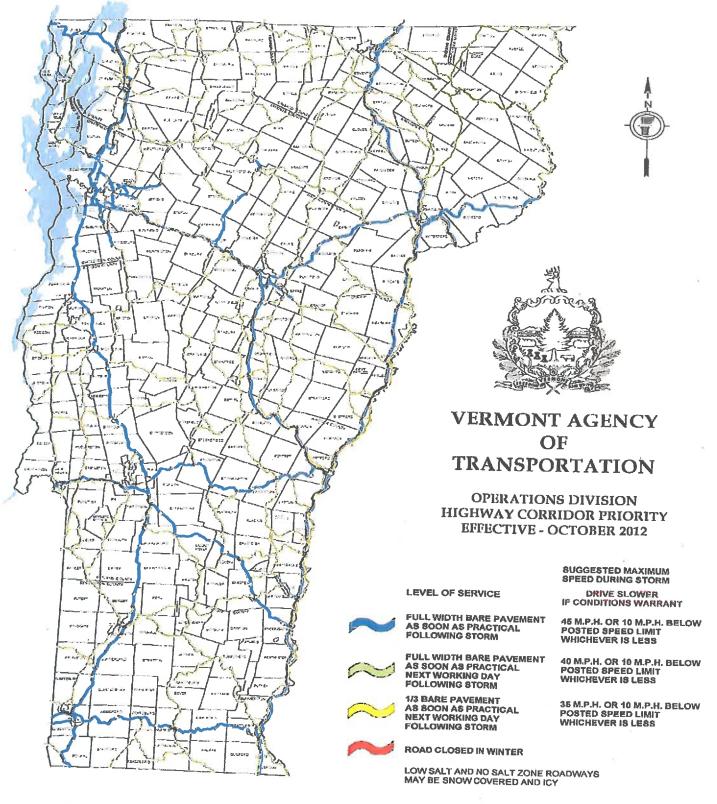
### **Salt Application Quick-Reference Guideline**

(\*\*Double these rates for centerline applications\*\*)

Pavement Temp. Range	Application Rate (#/ LM)	Pre-Wet Material	Comments		
Above 32°	0 to 100	Salt Brine or Blend	A little salt goes a long way when temperatures are near freezing.		
25° to 32°	100 to 200	Salt Brine or Blend	Salt is very effective here. Pre-wetting with a blend will allow lower application rates.		
20° to 25°	200 to 300	Salt Brine, Chemical, or Blend	Salt effectiveness is dropping off in this range. A blend or straight chemical will help.		
15° to 20°	300 to 400	Chemical or Blend	Pre-wetting is especially important. Your liquids will provide the extra boost needed.		
15° or Be- low	ing in this rapack exists,	ally dry and blow- ange. If no ice or , plow only – DO LY MATERIAL.	If necessary, spot treat icy patches with abrasives. If glazing occurs on high-volume, high-speed, sand will not last and higher salt applications, with prewetting, will be needed.		

#### **General Notes:**

- Application rates should be on the lower end when temperatures are on the higher side of the range or remaining steady. Falling temperatures, and temperatures on the lower side of the range, will require applications on the higher side, and possibly in the next range if dropping rapidly.
- In any of the ranges, if the snow is dry and blowing off the roadway, do NOT apply material.
- Pre-wetting under wet storm conditions is not required. In cases where the only pre-wetting liquid available is a high-performance chemical, it is better to save those products for the drier and colder conditions.
- This is a guideline only. Application rates will vary based on climatic conditions experienced in the field, as well as corridor priority.



# WINTER MAINTENANCE STATISTICS

**WINTER MAINTENANCE FACTS 2012-2013** 

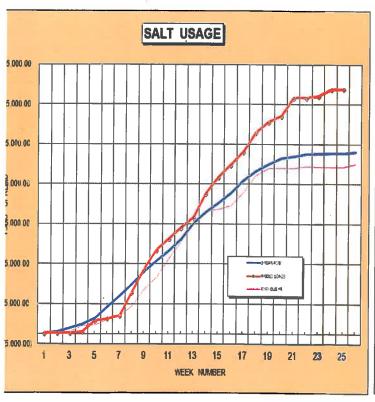


### **TWO YEAR SALT PRICES**

LOCATIONS	2012			20	13	
	<b>VENDOR</b>	PRICE		PRICE	T	OTAL
DISTRICT 1	CARGILL	\$61.10		AMERICAN	\$	59.59
DISTRICT 2	CARGILL	\$62.71		AMERICAN	\$	61.90
DISTRICT 3	CARGILL	\$63.68		AMERICAN	\$	62.17
DISTRICT 4	AMERICAN	\$64.77		. AMERICAN	\$	62.67
DISTRICT 5	CARGILL	\$62.18		CARGILL	\$	61.58
DISTRICT 6	AMERICAN	\$62.27		n/a		n/a
DISTRICT 7	CARGILL	\$65.46		CARGILL	\$	65.21
DISTRICT 8	CARGILL	\$63.70		CARGILL	\$	63.28
DISTRICT 9	CARGILL	\$67.29		CARGILL	\$	68.05

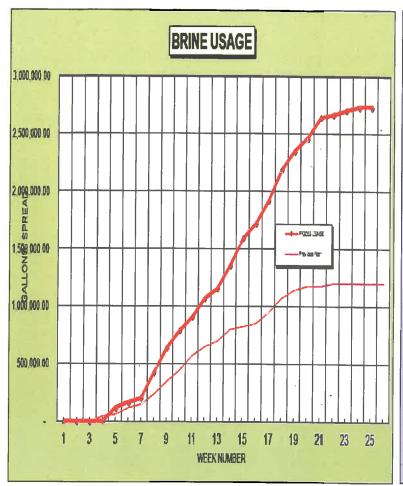
# VAOT WINTER SERVICES GUIDE 2012-2013 FY 2012 TO FY 2013 SALT AND SAND REPORT

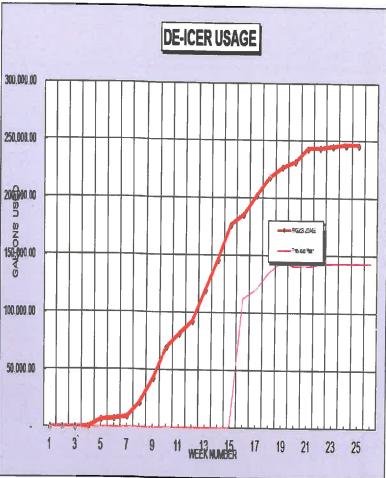
	DISTRICT									
	1	2	3	4	5	6	7	8	9	TOTAL
WEEKLY TOTAL - SPREAD							···			. <del></del>
Salt (tons)	1.0	0.0	4.5	5.0	1.0	0.0	0.0	21.0	19.0	51.
Sand (cy)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Liquid De-Icers (gals)	0.0	0.0	0.0	0.0	60.0	0.0	0.0		0.0	96.0
Brine (gal)	0.0	0.0	0.0	0.0	540.0	0.0	0.0		0.0	1,614.0
YEAR TO DATE TOTALS - SE	PREAD									
Salt (tons)	9.059.6	12,245.4	14,027.6	20,595.3	15,926.2	0.0	19,886.6	18.585.6	12,373.0	122,699.2
Sand (cy)	486.0	30.5	280.0	95.0	319.0	0.0	1.039.2	15.0	544.0	2,808.7
Liquid De-Icers (gals)	9,140.0	4,807.0	48,333.6	24,936.2	59,489.4	0.0	16,017.3	78,154.9	6,064.0	246,942,4
Brine (gal)	193,019.0	0.0	441,559.4	9,449.0	1,024,076.0	0.0	5,910.1	1,032.096.0	28,398.0	2,734,507.5
SALT APPLICATION - YEAR	TO DATE									
Avg lbs. / Two Lane Miles	180.77	314.2	231.92	297.35	241.77	0.00	246.99	283.51	225.93	252.70
Total Tons / One Lane Miles	16.32	18.72	21.30	18.39	16.68	0.00	20.83	20.22	17.81	18.84





### VAOT WINTER SERVICES GUIDE 2012-2013







### WINTER MAINTENANCE STATISTICS

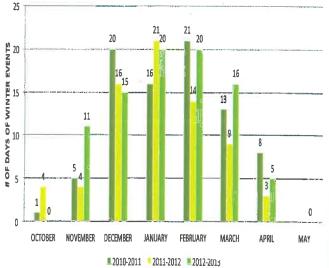
### WINTEREVENTS 2012-2013

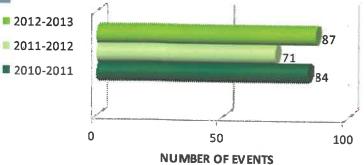


A Winter Maintenance Event is defined as one in which three or more districts are engaged in winter maintenance activities requiring snow plowing, salting or sanding. These can last anywhere from a few hours to several days.

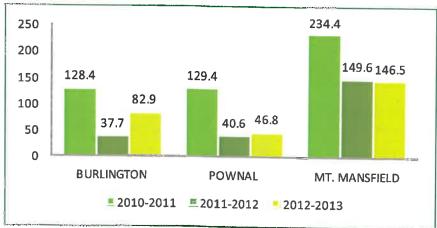
# 3 YEAR COMPARISON OF TOTAL WINTER EVENTS

# 3 YEAR AVERAGE OF WINTER MAINTENANCE EVENT DAYS





### 3 YEAR COMPARISION OF SNOWFALL



# WINTER MAINTENANCE STATTICS WINTER EVENTS 2012-2013



Currently working with The University of Vermont on a way to identify performance based measures for winter maintenance practices and optimization of snow.

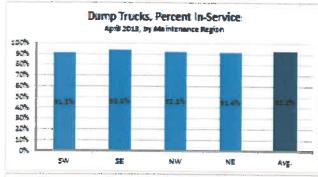


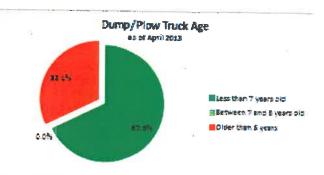


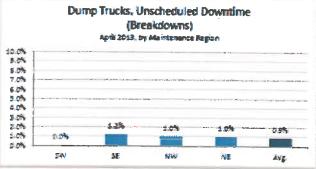
# WINTER MAINTENANCE STATISTICS EQUIPMENT PERFORMANCE MEASURES 2012-2013

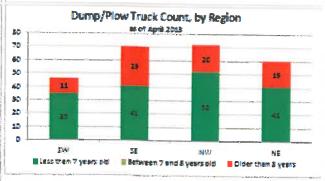
### **Dump/Plow Truck Performance Measures**

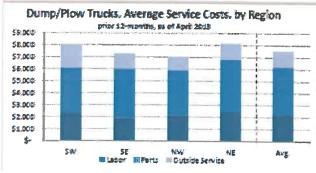
April, 2013











### **DISTRICT 1**

- BENNINGTON
- EAST DORSET
- READSBORO
- WILMINGTON
- MARLBORO

AOT 359 Bowen Road Bennington, VT 05201

(802) 447-2791

District Transportation Administrator (D1 & D3)

Nelson Blanchard

General Maintenance Manager

William Leach Jr.

Project Manager

Robert Faley



555 LANE MILES

9,058.6 TONS OF SALT USED

486.0 CUBIC YARDS OF SAND USED

9,140.0 GALLONS OF LIQUID DE-ICERS USED

193,019 GALLONS OF BRINE USED

WINTER MAINTENANCE COSTS: \$2,080,901.26

- 1 ADMINISTRATIVE ASSISTANT B
- 1 TECHNICIAN IV
- 3 AREA MAINTENANCE SUPERVISORS
- 2 MOTOR EQUIPMENT MECHANIC III
- **4 MAINTENANCE EQUIP. SPECIALISTS**
- 1 MAINTENACE WORKER V
- 1 MAINTENANCE WORKER II

- 1 TECHNICIAN VI
- 1 DIT III
- **3 SENIOR MAINTENANCE WORKERS**
- 2 BRIDGE MAINTENANCE MECHANIC III
- 1 MAINTENANCE WORKER VI
- 18 MAINTENANCE WORKER IV

#### **42 TOTAL FULL TIME POSITIONS**

1 FULL SIZED VAN

- 1 2WD ½ TON OR COMPACT PICK-UP
- 8 TANDEM AXLE PLOW TRUCKS
- 14 SINGLE AXLE PLOW TRUCKS
- 3 4WD 1 TON WITH BODY/PLOW
- 4 4WD ¾ TON WITH PLOW

1 GRADER

1 TRACTOR/MOWER

4 4x4 LOADERS

- 1 EXCAVATOR
- 3 FLATBED TRAILERS
- 1 BACKHOE

- 1 FORK LIFT
  - 43 TOTAL PIECES OF CENTRAL GARAGE ASSIGNED EQUIPMENT

- ASCUTNEY
- CHESTER
- DUMMERSTON
- JAMAICA
- LONDONDERRY
- MARLBORO
- ROCKINGHAM
- SPRINGFIELD
- WESTMINSTER

AOT 870 US Route 5

Dummerston, VT 05301

(802) 254-5011

**DISTRICT 2** 

District Transportation Administrator (D2 & D4)

Tammy Ellis

**General Maintenance Manager** 

Joseph Ruzzo Project Manager John Alexander



654 LANE MILES

12,245 TONS OF SALT USED

30.5 CUBIC YARDS OF SAND USED

4,807 GALLONS OF LIQUID DE-ICERS USED

**0 GALLONS OF BRINE USED** 

WINTER MAINTENANCE COSTS: \$2,183,363.81

- 1 ADMINISTRATIVE ASSISTANT B
- 1 TECHNICIAN IV
- **4 AREA MAINTENANCE SUPERVISORS**
- 2 MOTOR EQUIPMENT MECHANIC III
- 1 BRIDGE MAINTENANCE MECHANIC II
- 1 MAINTENANCE WORKER VI
- 15 MAINTENANCE WORKER IV
- 2 MAINTENANCE WORKER II

- 1 TECHNICIAN VI
- 1 TECHNICIAN III
- **6 SENIOR MAINTENANCE WORKERS**
- 1 BRIDGE MAINTENANCE MECHANIC III
- **5 MAINTENANCE EQUIPMENT SPECIALISTS**
- 2 MAINTENANCE WORKER V
- 2 MAINTENANCE WORKER III

#### **48 TOTAL FULL TIME POSITIONS**

- 1 2WD ½ TON OR COMPACT PICK-UP
- 7 TANDEM AXLE PLOW TRUCKS
- 1 4WD ¾ TON PICK-UP
- 6 4WD ¾ TON WITH PLOW
- 1 TRACTOR/MOWER
- 2 EXCAVATORS

- 3 2WD % TON PICK-UP
- 18 SINGLE AXLE PLOW TRUCKS
- 1 4WD 1 TON WITH BODY/PLOW
- 1 GRADER
- 6 4x4 LOADERS
- **3 FLATBED TRAILERS**

- 1 BACKHOE
  - 51 TOTAL PIECES OF CENTRAL GARAGE ASSIGNED EQUIPMENT

Tom Roberts

- BRANDON
- CASTLETON
- CLARENDEN
- LUDLOW
- MENDON
- RUTLAND
- SUDBURY

### **DISTRICT 3**

AOT 122 State Place Rutland, VT 05701

(802) 786-5826

District Transportation Administrator (D1 & D3)

Nelson Blanchard

General Maintenance Manager

Bruce Nichols

Project Manager



659 LANE MILES

14,027 TONS OF SALT USED

280 CUBIC YARDS OF SAND USED

48,333 GALLONS OF LIQUID DE-ICERS USED

441,559 GALLONS OF BRINE USED

WINTER MAINTENANCE COSTS: \$2,830,947.70

- 1 ADMINISTRATIVE ASSISTANT B
- 1 TECHNICIAN VI
- **5 AREA MAINTENANCE SUPERVISORS**
- 5 MAINTENANCE EQUIP. SPECIALISTS
- 1 VEHICLE EQUIPMENT TECHNICIAN II
- 2 BRIDGEMAINTENANCE MECHANIC III
- 2 MAINTENANCE WORKER V
- 1 MAINTENANCE WORKER II

- 1 ADMINISTRATIVE ASSISTANT A
- 1 TECHNICIAN IV
- 6 SENIOR MAINTENANCE WORKERS
- 1 DISTRICT STORE KEEPER
- 1 MOTOR EQUIPMENT MECHANIC III
- 3 MAINTENANCE WORKER VI
- 15 MAINTENANCE WORKER IV

### 48 TOTAL FULL TIME POSITIONS

- 12 TANDEM AXLE PLOW TRUCKS
- 4 4WD % TON PICK-UP
- 1 BABY DUMP PLOW TRUCK
- 1 GRADER
- 7 4x4 LOADERS
- 1 EXCAVATOR

- 13 SINGLE AXLE PLOW TRUCKS
- 4 4WD 1 TON WITH BODY/PLOW
- 6 4WD ¾ TON WITH PLOW
- 2 TRATCOR/MOWER
- 1 MINI EXCAVATOR
- **3 FLATBED TRAILERS**

- FAIRLEE
- RANDOLPH
- REEADING
- ROCHESTER
- ROYALTON
- SHARON
- THETFORD
- TUNBRIDGE
- WHITE RIVER JCT.
- WINDSOR
- WILLIAMSTOWN
- WOODSTOCK

### **DISTRICT 4**

AOT 221 Beswick Drive White River Jct., VT 05002

(802) 295-8888

District Transportation Administrator (D2 & D4)

Tammy Ellis

**General Maintenance Manager** 

Trevor Starr Project Manager Chris Bump



1.202 LANE MILES

20,595 TONS OF SALT USED

95 CUBIC YARDS OF SAND USED

24,936 GALLONS OF LIQUID DE-ICERS USED

9,449 GALLONS OF BRINE USED

WINTER MAINTENANCE COSTS: \$4,147,925.19

- 1 ADMINISTRATIVE ASSISTANT B
- 1 TECHNICIAN IV
- 6 AREA MAINTENANCE SUPERVISORS
- 4 MAINTENANCE EQUIP. SPECIALISTS
- 2 MOTOR EQUIPMENT MECHANIC III
- 1 MAINTENANCE WORKER V
- 7 MAINTENANCE WORKER III

- 1 TECHNICIAN VI
- 2 TECHNICIAN II
- 8 SENIOR MAINTENANCE WORKERS
- 1 DISTRICT STORE KEEPER
- 1 MAINTENANCE WORKER VI
- 31 MAINTENANCE WORKER IV
- 2 MAINTENANCE WORKER II

#### 70 TOTAL FULL TIME POSITIONS

- 1 FULL SIZED VAN
- 1 4WD ½ TON PICK-UP
- 34 SINGLE AXLE PLOW TRUCKS
- 1 4WD 1 TON WITH BODY/PLOW
- 8 4WD ½ TON WITH PLOW
- 2 TRACTOR/MOWER
- 2 EXCAVATOR
- 2 BACKHOE

- 1 2WD % TON PICK-UP
- 9 TANDEM AXLE PLOW TRUCKS
- 5 4WD % TON PICK-UP
- 1 BABY DUMP PLOW TRUCK
- 1 GRADER
- 9 4x4 LOADERS
- **4 FLATBED TRAILERS**
- 1 TOW PLOW
- 82 TOTAL PIECES OF CENTRAL GARAGE ASSIGNED EQUIPMENT

- BRIDPORT
- CHIMNEY COR-**NERS**
- COLCHESTER
- ESSEX
- N. FERRISBURGH
- MIDDLEBURY
- **NEW HAVEN**
- WAITSFIELD
- MIDDLESEX

### DISTRICT 5

AOT P.O. Box 168 Essex Jct., VT 05453

(802) 655-1581

District Transportation Administrator (D5 & D8) David Blackmore

General Maintenance Manager

Art Danyow III **Project Manager** Richard Hosking



937 LANE MILES

15,926 TONS OF SALT USED

319 CUBIC YARDS OF SAND USED

59,429 GALLONS OF LIQUID DE-ICERS USED

1,024,076 GALLONS OF BRINE USED

**WINTER MAINTENANCE COSTS:** \$3,902,789.63

- 1 ADMINISTRATIVE ASSISTANT B
- 1 DIT II
- 6 SENIOR MAINTENANCE WORKER
- 2 BRIDGE MAINTENANCE MECHANIC III
- 1 ELECTRICAL MAINTENANCE SPECIALIST II
- 1 MOTOR EQUIPMENT MECHANIC II
- 2 MAINTENANCE WORKER V
- 7 MAINTENANCE WORKER III

- 1 TECHNICIAN VI
- 5 AREA MAINTENANCE SUPERVISORS
- 5 MAINTENANCE EQUIP. SPECIALISTS
- 1 BRIDGE MAINTENANCE MECHANIC II
- 1 MOTOR EQUIPMENT MECHANIC III
- 2 MAINTENANCE WORKER VI
- 20 MAINTENANCE WORKER IV
- 5 MAINTENANCE WORKER II

#### **64 TOTAL FULL TIME POSITIONS**

- 1 2WD % TON PICK-UP
- 24 SINGLE AXLE PLOW TRUCKS
- 3 BABY DUMP PLOW TRUCK
- 1 GRADER
- **4 FLATBED TRAILERS**
- 6 4x4 LOADERS
- 2 WATER TANKER

- 14 TANDEM AXLE PLOW TRUCKS
- 5 4WD 1 TON WITH BODY/PLOW
- 5 4WD % TON WITH PLOW
- 3 TRACTOR/MOWER
- **2 EXCAVATORS**
- 1 BACKHOE
- 1 FORK LIFT
- 1 AERIAL BUCKET TRUCK

### **DISTRICT 6**

- BERLIN
- VERMONT LEARNING CAMPUS

AOT 186 Industrial Lane Barre, VT 05641

(802) 828-2692

Maintenance Transportation Administrator
Wayne Gammell
Assistant Maintenance Transportation Administrator

George McCool Statewide Bridge Project Manager William Sargent

Statewide Paving Project Manager Edward (Ted) Domey

- 1 ADMINISTRATIVE ASSISTANT B
- 1 DISTRICT PROJECT MANAGER
- 1 PROGRAM TECHNICIAN II
- 1 ADMINISTRATIVE SERVICES TECHNICIAN
- 1 MANAGER IV
- 1 SPECIAL PROJECTS MANAGER
- 1 TECHNICIAN II

11 TOTAL FULL TIME POSITIONS

### WINTER MAINTENANCE COSTS 104,954,39

- 3 MAN LIFTS
- **6 TRAILER MOUNTED ATTENUATORS**
- 1 PORTABLE SCREEN PLANT
- 6 Portable Traffic Signals

**DISTRICT OWNED EQUIPMENT** 

#### BOLTONVILLE

- BRADFORD
- · W. DANVILLE
- LUNENBURG
- LYNDON
- NEWBURY
- NORTH MONTPELIER
- ORANGE
- ST. JOHNSBURY

**DISTRICT 7** 

AOT 1068 US Route 5 Suite 2 St. Johnsbury, VT 05819

(802) 751-0210

District Transportation Administrator (D7 & D9)

Dale Perron

**General Maintenance Manager** 

Tom Lewis **Project Manager** Shauna Clifford



965 LANE MILES

19,886 TONS OF SALT USED

1,039 CUBIC YARDS OF SAND USED

16,017 GALLONS OF LIQUID DE-ICERS USED

5,910 GALLONS OF BRINE USED

WINTER MAINTENANCE COSTS: \$3,913,971.95

- 1 ADMINISTRATIVE ASSISTANT B
- 1 DIT I
- **6 SENIOR MAINTENANCE WORKERS**
- 1 DISTRICT STOREKEEPER
- 1 BRIDGE MAINTENANCE MECHANIC II
- 1 MAINTENANCE WORKER VI
- 31 MAINTENANCE WORKER IV

- 1 TECHNICIAN VI
- **6 AREA MAINTENANCE SUPERVISORS**
- 7 MAINTENANCE EQUP. SPECIALISTS
- 1 BRIDGE MAINTENANCE MECHANIC IV
- 2 MOTOR EQUIPMENT MECHANIC III
- 1 MAINTENANCE WORKER V
- 1 MAINTENANCE WORKER III

#### **64 TOTAL FULL TIME POSITIONS**

- 1 FULL SIZED VAN
- ....
- 3 2WD % TON PICK-UP
- 1 4WD ½ TON PICK-UP
- 16 TANDEM AXLE PLOW TRUCKS
- 20 SINGLE AXLE PLOW TRUCKS
- 1 BABY DUMP PLOW TRUCK
- 6 4WD ¾ TON WITH PLOW
- 1 GRADER

8 4x4 LOADERS

**2 MINI EXCAVATOR** 

1 EXCAVATOR

5 FLATBED TRAILERS

- 1 BACKHOE
  - 66 TOTAL PIECES OF CENTRAL GARAGE ASSIGNED EQUIPMENT

- CAMBRIDGE
- EDEN
- ENOSBURG
- GEORGIA
- N. HERO
- HIGHGATE
- MONTGOMERY
- MORRISVILLE
- ST. ALBANS

DISTRICT 8

**AOT** 

680 Lower Newton Road St. Albans, VT 05478

(802) 524-7927

District Transportation Administrator (D5 & D8)

David Blackmore

**General Maintenance Manager** 

Randall Reed Project Manager Jim Cota



960 LANE MILES

18,585 TONS OF SALT USED

15 CUBIC YARDS OF SAND USED

78,154 GALLONS OF LIQUID DE-ICERS USED

1,032,096 GALLONS OF BRINE USED

WINTER MAINTENANCE COSTS: \$4,120,403.67

- 1 ADMINISTRATIVE ASSISTANT B
- 1 TECHNICIAN II
- **5 AREA MAINTENANCE SUPERVISORS**
- 5 MAINTENANCE EQUIP. SPECIALISTS
- 1 BRIDGE MAINTENANCE MECHANIC III
- 1 VEHICLE AND EQUIP. TECHNICIAN II
- 5 MAINTENANCE WORKER VI
- 1 MAINTENANCE WORKER II

- 1 TECHNICIAN VI
- 1 DIT II
- **8 SENIOR MAINTENANCE WORKERS**
- 1 DISTRICT STOREKEEPER
- 1 BRIDGE MAINTENANCE MECHANIC II
- 1 MOTOR EQUIPMENT MECHANIC II
- 22 MAINTENANCE WORKER IV

#### 57 TOTAL FULL TIME POSITIONS

- 3 2 WD % TON PICK-UP
- 21 SINGLE AXLE PLOW TRUCKS
- 2 BABY DUMP PLOW TRUCKS
- 2 4WD ¾ TON WITH PLOW
- 1 GRADER
- 6 4x4 LOADERS
- 4 FLATBED TRAILERS
- 1 WATER TANKER

- 13 TANDEM AXLE PLOW TRUCKS
- 1 4WD 1 TON WITH BODY/PLOW
- 6 4WD ¾ TON PICK-UP
- 2 4WD ½ TON PICK-UP
- 1 TRACTOR/MOWER
- 2 EXCAVATORS
- 4 BACKHOE
- 1 FORKLIFT TOW PLOW

- BARTON
- **BLOOMFIELD**
- CANAAN
- DERBY
- **IRASBURG**
- ISLAND POND
- WESTFIELD
- WESTMORE

**DISTRICT 9** 

AOT 4611 US Route 5 Newport, VT 05855

(802) 334-7934

District Transportation Administrator (D1 & D9)

Dale Perron

**General Maintenance Manager** 

Bill Jewell **Project Manager** Scott Keysar



695 LANE MILES

12,373 TONS OF SALT USED

544 CUBIC YARDS OF SAND USED

6,064 GALLONS OF LIQUID DE-ICERS USED

28,398 GALLONS OF BRINE USED

WINTER MAINTENANCE COSTS: \$2,784,442.78

- 1 ADMINISTRATIVE ASSISTANT B
- 2 TECHNICIAN VI
- **5 AREA MAINTENANCE SUPERVISORS**
- **5 MAINTENANCE EQUIP. SPECIALISTS**
- 2 MOTOR EQUIP. MECHANIC III
- 2 BRIDGE MAINTENANCE MEHANIC II
- **4 MAINTENANCE WORKER V**
- 2 MAINTENANCE WORKER III

- 1 TECHNICIAN IV
- 1 DIT II
- 6 SENIOR MAINTENANCE WORKERS
- 1 DISTRICT STOREKEEPER
- 2 BRIDGE MAINTENANCE MECHANIC III
- 1 MAINTENANCE WORKER VI
- 15 MAINTENANCE WORKER IV

#### **52 TOTAL FULL TIME POSITIONS**

- 1 2WD 1 TON PICK-UP WITH BODY
- 1 2WD ½ TON OR COMPACT PICK-UP
- 16 SINGLE AXLE PLOW TRUCKS
- 4 4WD % TON PICK-UP
- 1 GRADER
- 1 MINI EXCAVATOR
- **3 FLATBED TRAILERS**
- 1 FORK LIFT

- 1 2WD % TON PICK-UP
- **8 TANDEM AXLE PLOW TRUCKS**
- 11 4WD 1 TON WITH BODY/PLOW
- 4 4WD % TON WITH PLOW
- 7 4x4 LOADERS
- 1 EXCAVATOR
- 1 BACKHOE

TRAFFIC SHOP

- BERLIN
- COLCHESTER
- · MENDON

AOT US Route 302 #1756 Berlin, VT 05602

(802) 828-2680

Traffic Operations Manager
Russell Velander



- 1 ADMINISTRATIVE ASSISTANT B
- **3 TRAFFIC SHOP CREW SUPERVISORS**
- 6 PAVEMENT MARKING AND SIGN CREW SPECIALIST II
- 1 ELECTRIC MAINTENANCE SPECIALIST II
- 1 ELECTRIC MAINTENANCE SPECIALIST I

13 TOTAL FULL TIME POSITIONS

- 1 2WD 1 TON PICK-UP WITH BODY
- 1 2WD ½ TON OR COMPACT PICK-UP
- 5 PAINT TRUCK
- 1 AUGER TRUCK
- 2 FORK LIFT

- 1 2WD ¾ TON PICK-UP
- **6 STAKEBODY TRUCK**
- 1 AERIAL BUCKET TRUCK
- 3 SIGN TRUCK

**CENTRAL GARAGE** 

BERLIN

AOT US Route 302 #31756 Berlin, VT 05602

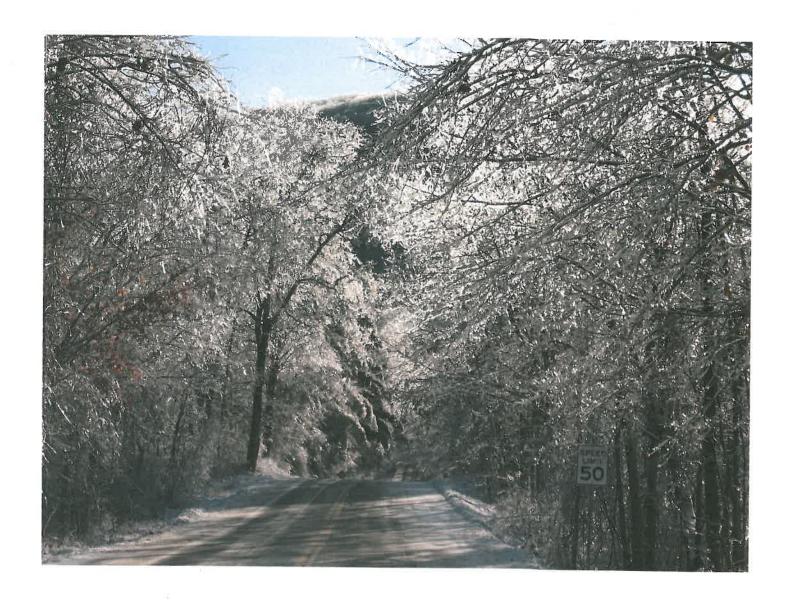
(802) 828-1776

Superintendent Ken Valentine



1 BUSINESS SYSTEMS ANALYST	1 PARTS SPECIALIST III				
2 PARTS SPECIALIST II	3 DISTRICT STOREKEEPERS				
1 FINANCIAL TECHNICIAN II	1 FINANCIAL SPECIALIST II				
1 FINANCIAL ADMINISTRATOR II	4 VEHICLE AND EQUIP. TECHNICIAN I				
9 VEHICLE AND EQUIP. TECHNICIAN II	4 VEHICLE AND EQUIP. MECHANIC II				
3 MOTOR EQUIP. MECHANIC III	4 CENTRAL GARAGE REGIONAL SUPERVISOR				
1 FLEET OPERATIONS SUPERVISOR	1 MAINTENANCE MECHANIC II				
1 MAINTENANCE MECHANIC I	1 GARAGE MAINTENANCE SUPERVISOR				
39 TOTAL FULL TIME POSITIONS					

16	SPARE DUMP TRUCKS (TWO IN EACH DISTRICT)					
1	SPARE GRADER					
1	SERVO LIFT					
	18 TOTAL PIECES C	F EQUPMENT AT CENTRAL GARAGE				
43	DISTRICT 1	51 DISTRICT 2				
55	DISTRICT3	81 DISTRICT 4				
73	DISTRICT 5	0 DISTRICT 6				
66	DISTRICT 7	70 DISTRICT 8				
61	DISTRICT 9	21 TRAFFIC SHOP				
521	TOTAL PIECES OF C	NTRAL GARAGE ASSIGNED EQUIPMENT				
539	TOTAL PIECES OF C	NTRAL GARAGE OWNED EQUIPMENT				
27	DUMP TRUCKS PUR	CHASED AND WAITING FOR DELIVERY				



# DRIVE SAFELY!