Welcome

Welcome to this year’s edition of the VTrans Fact Book and Annual Report.

Inside you’ll find a review of the Agency’s progress this past year, as well as quick answers to many of the perennial questions we receive from the media, the public and legislators.

This is the same tool that many of our staff uses internally when researching questions about our infrastructure and we hope you will appreciate the information it provides.

As we continue to develop more efficient ways to share our data directly, I encourage you to explore the VTrans website for even more up-to-date information about projects, maintenance activities, and the overall performance of our transportation system.

As always, your comments help us to improve this report each year and we look forward to hearing from you.

Sincerely,

Joe Flynn
Secretary of Transportation
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Vermont has an extensive multi-modal transportation system.

With oversight from the Vermont Legislature, the Vermont Agency of Transportation (VTrans) is responsible for planning, development, implementation, and maintenance of a variety of transportation infrastructure including but not limited to roads, bridges, state-owned railroads, airports, park and ride facilities, bicycle facilities, pedestrian paths, public transportation facilities and services, and Department of Motor Vehicles operations and motor carrier enforcement. VTrans serves the entire population of the State of Vermont.

VTrans has more than 1,300 employees organized in three divisions: Policy, Planning and Intermodal Development; Finance and Administration; and Highway. The Department of Motor Vehicles is also housed within the Agency of Transportation, with a main office in Montpelier and ten satellite offices statewide.

VTrans interacts with all State agencies, the United States Department of Transportation and other federal agencies, numerous regional and state governments, international jurisdictions and cross-border organizations, local governments, transit agencies, airports, railroads, and other private and non-profit entities engaged in transportation-related activities.

The Highway Division, which has the largest number of employees, is organized into five bureaus: Municipal Assistance, Construction and Materials, Maintenance and Operations, Project Delivery, Asset Management and Performance, and the Office of Highway Safety. Together, the Highway bureaus handle year-round maintenance of the road network; provide oversight for construction projects; ensure the quality of materials; provide grants and technical support for municipal projects; procure and maintain the fleet of trucks; provide information to the traveling public on road conditions; inspect and maintain bridges, culverts, signs, and signals; and is the lead entity on safety and training.

The Division of Policy, Planning and Intermodal Development (PPAID) manages public transit, aviation, and rail programs. In addition to providing statewide planning, policy, and research support, the division works with Vermont’s eleven Regional Planning Commissions and, in the Burlington region, the Metropolitan Planning Organization, to develop regional transportation plans and generate input on prioritizing transportation projects in the regions. The division’s work is supported by public input from the Rail Advisory Council, Aviation Advisory Council, and the Public Transit Advisory Council. PPAID also is the lead on research, mapping, development review, and public outreach.

The Division of Finance and Administration provides services across the Agency to support the delivery of VTrans’ mission, including contract administration, information technology, continuous improvement, accounting, budgeting, audit, civil rights, labor compliance, and recruitment. As in all aspects of our work, state and federal statutes provide the guidance and boundaries for Finance and Administration’s work.

The transportation budget is composed of Federal, State, and Local funds. Federal fund sources come from the Federal Highway Administration, Federal Transit Administration, Federal Railroad Administration, Federal National Highway Traffic Safety Administration, and the Federal Aviation Administration. State funds are appropriated from the State Transportation Fund. The State Transportation revenues are derived primarily from three sources: the gas tax, the purchase and use tax, and Department of Motor Vehicle fees.

To meet these various objectives, VTrans has established a set of five goals that act as guiding principles in everything the Agency does. These goals are:

- Provide a safe and resilient transportation system that supports the Vermont economy.
- Preserve, maintain and operate the transportation system in a cost effective and environmentally responsible manner.
- Provide Vermonters energy efficient travel options.
- Cultivate and continually pursue innovation, excellence and quality customer service.
- Develop a workforce to meet the strategic needs of the Agency.

The Burlington. Green Mountain Transit's new transfer station in downtown Burlington.
To achieve our vision, the Agency’s activities are focused on five strategic goals. Highlights related to each of these goals are provided below.

**GOAL ONE**

**Provide a safe and resilient transportation system that supports the Vermont economy**

Safety is the first consideration in everything that we do at VTrans. We strive every day to provide a safe transportation network for the users of our highways and for the women and men that work to build and maintain it.

Although Vermont has seen over a 25% reduction in major crashes in the last ten years, the work of VTrans and our many partners in highway safety is never done. When there is a loss of just one life on our highways, it impacts families and communities throughout our state. In 2016 we suffered 64 lives lost.

Work zones remain a high priority for highway safety. Speeding and distracted driving are two of the biggest factors. Even with new texting and cell phone laws and increased enforcement, there are still significant safety concerns in our work zones. Speeding and distracted drivers are putting at risk some of the most vulnerable users on our highways; pedestrians, bicyclists, and our state’s construction and maintenance workers. This year, we embarked on a pilot program with DMV Enforcement and the State Police to staff work zones with undercover officers to cite distracted drivers. The program was a great success and we anticipate more activity like this in the coming year.

At the heart of improving the safety of highways is our partnership with the Vermont Highway Safety Alliance. Through collective efforts, we are bringing more resources to bear and coordinating public and private entities to continue to bend the curve toward safer roads. This past year, we updated the Strategic Highway Safety Plan which is the guiding document for both infrastructure and behavioral effort throughout our state. This plan lays out the data, the critical emphasis areas, the goals, and the strategies that are necessary to continue reducing crashes.

As technology advances and cars get smarter, our infrastructure must keep pace. The way we build and maintain our highways must maximize the value of other safety enhancements. Improved pavement markings, smarter signals, and policies that match the new technology are all part of developing a system that eventually, even autonomous vehicles will be able to connect to. This is a challenge that is advancing on us with great speed, but we are working with our national partners and other DOTs to ensure that Vermont will be ready for the next generation of vehicles.

The transportation sector is a major contributor to greenhouse gas emissions and VTrans is committed to mitigating our overall carbon footprint through efficiencies in our fleet operations and buildings, as well as using appropriate sites on properties we control for generating renewable energy. To that end, the Agency completed a comprehensive solar plan in 2016 that will serve as a roadmap to help guide future decisions on solar deployment.

We continue to look at our transportation investments through the lens of economic development, targeting improvements to key corridors of commerce and helping downtowns become more business-friendly and pedestrian-friendly.

**GOAL TWO**

**Preserve, maintain, and operate the transportation system in a cost effective and environmentally responsible manner**

Asset management resides at the core of our efforts to implement the right treatments at the right time to balance safety with the need to get the longest possible life out of the components of our system. Making decisions based on data and consistent standards ensures that our system is as strong as it can be with the limited funds available.

Efficiency means ensuring that our internal processes are constantly reviewed and updated to match the current state of technology and the capabilities of our workforce. Our Performance, Innovation and Excellence section has championed the deployment of electronic signatures throughout the Agency and has trained a cadre of employees in “lean” techniques to shepherd process improvements.
The public-facing New England Compass Traveler Information System is the publicly visible part of an Advanced Traffic Management System (ATMS) that is the result of a collaborative effort between Maine, New Hampshire, and Vermont that will eventually expand to include other states in New England and beyond. The new ATMS makes it possible to remotely control signals, message boards, and other devices and allows other member states to provide operational backup for Vermont.

As part of our effort to keep the Agency’s plow trucks in good repair, Central Garage has outfitted a service truck to respond, with adequate tools and parts, to breakdowns. A quick response can get a truck back on the road to help keep the highways safe and open.

GOAL THREE
Provide Vermonters energy efficient travel options

Growing a multi-modal public transportation system is not as simple as “build it and they will come.” Anticipating demand and promoting ease of use, comfort, and reliability are important factors in developing a robust network in which the traveling public can have confidence in.

The grand opening of the downtown Burlington transit center capped decades of planning and now serves as a hub for the continued redevelopment of Burlington’s commercial core. As the flagship station for Green Mountain Transit (GMT), formerly CCTA, the new facility offers a more efficient and comfortable point of transfer between city buses and regional services.

In Rockingham, the new municipal Park and Ride now provides 47 spaces to serve commuters, offer’s level one electric vehicle charging stations, and serve’s as the new headquarters and maintenance facility for Southeast Vermont Transit.

New technology is being tested across the state to make transit easier than ever to ride. Fixed public transit routes throughout the state are now available on Google and other open source mapping apps making it easier to plan trips across multiple modes and service providers. GMT riders and riders in the White River Junction area can use an app to see where their bus is and get an estimated time of arrival.

Throughout the state, Park and Rides are being upgraded and the Agency continues to work with municipalities, regional planning commissions, and businesses to establish new transit options that serve more Vermonters. Plans are in the works to use technology to tap the excess capacity of demand response and para-transit services—dispatching small buses using an app like Uber—to fill critical gaps in under-served rural areas.

The Agency recently completed a study of commuter rail service between St. Albans and Montpelier and track upgrades continue along the Western Corridor in preparation for providing Amtrak service to Burlington's Union Station. The passage of pre-clearance in the United States Congress is another step on the way to restoring passenger services to Montreal. Amtrak added carry-on bicycle service on the Vermonter line and pets are now permitted on-board.

The VTrans On-Road Bicycle Plan is an effort to categorize State roads into high-, moderate- and low-use/priority corridors based on current and potential bicycle use. The completion of this plan, which included extensive public participation, will help VTrans prioritize on-road bicycle improvements on State roads and allow better integration of these improvements into Agency projects and activities.

GOAL FOUR
Cultivate and continually pursue innovation, excellence, and quality customer service

As a part of the implementation of the Agency’s Strategic Plan, VTrans completed a Customer Service Improvement Plan to assess current levels of internal customer service and to establish a road map for how to improve customer service culture within the Agency.

VTrans has created an Application Development and Support Information Technology (IT) plan to guide IT innovation investments for the next five years. Information from research of industry trends and best practices, coupled with existing initiatives within the Agency and statewide, are documented. The plan will be reviewed annually to reflect rapidly changing trends in technology and adjustment of priorities and will be the guiding document for annual work plans for IT.

This year we established the IT Project Management Office (IT PMO) to provide a consistent methodology for engaging the IT unit for Agency projects and help evaluate projects for alignment with the Agency’s vision and mission. This office will also coordinate interactions with Division of Information and Innovation for Agency IT activities with lifecycle costs exceeding $500K. By providing a consistent approach to IT activities, we can ensure an understanding of the scope and cost of the project is understood before a commitment is made.
Through its Performance, Innovation, and Excellence (PIE) Section, VTrans continued expansion of its Business Process Management (BPM) and Lean programs, and advanced the VTrans E-Sign initiative. The BPM Right-of-Way project, and numerous Lean Kaizen events helped participants identify and implement efficiencies in their everyday work. These activities have contributed to a culture of innovation and continuous improvement.

The Department of Motor Vehicles recently moved its Bennington office to a more convenient, downtown location and is in the process of rolling out an Automated Vehicle Inspection Program, providing more accurate and consistent inspections.

VTrans has been piloting the use of automatic vehicle location systems internally to improve our fleet management practices and aid in storm response. In 2016 all operational plow trucks were equipped with transmitters and the Agency soft-launched a plow truck location map that gives the history of each active plow truck for the previous hour, along with critical weather and road condition data.

Combining the 18 websites associated with the Agency of Transportation into a single portal has greatly improved information accessibility with enhanced search capabilities and a mobile-friendly interface. By integrating VTransparency, social media feeds, and other information resources, we can provide our customers a shorter path to answers. We continue to work with See Click Fix to improve work flows and communication with the public on maintenance issues and are looking for other opportunities to apply the mobile app.

Communicating with our customers as technology and expectations advance means embracing new tools for transparency but resisting the temptation to abandon more traditional methods. Big data and social media can work wonders, but they are no substitute for knocking on a door or attending a selectboard meeting. VTrans will continue to work to maintain strong relationships with the communities we serve.

GOAL FIVE
Develop a workforce to meet the strategic needs of the Agency

Significant focus was placed on recruitment activities this past year. As in previous years, we lost many experienced employees to retirement in 2016. The Department of Human Resources and our Civil Rights team has continued to support VTrans in reaching a wider, more qualified, and more diverse pool of applicants. We can be found at job fairs, business events, and at school campuses seeking out the next generation of VTrans workers while highlighting the value of public service. Launched in 2016, Build Vermont Pathway is a partnership between VTrans and Vermont State Colleges to create multiple pathways to education and a direct pathway to a fulfilling career through access to internships and job shadowing, as well as permanent employment.

2016 also saw the launch of our Respectful Workplace Commitment. We strive for a workplace that maintains an atmosphere of respect, collaboration, openness, safety and equality, and firmly established that all employees have the right to be treated with dignity and respect, and should be able to voice concerns without fear of retaliation. Training and resources were developed and delivered to support the adoption of this commitment.

The VTrans Training Center (VTTC) supports our employees by providing a variety of learning opportunities. Focused on employee productivity, development, and retention, employees can improve the skills they need for their current role and/or develop skills for future roles. Supervisory classes, safety classes, computer classes, and other technical training are some of the course offerings. Trainings are offered in the classroom or online and ensure compliance with Federal and State regulations and the Affirmative Action Plan (AAP). Mentoring and tools to assist in knowledge transfer in preparation for promotions or future retirements are a key priority. VTTC implemented a Learning Management System which was so successful that the rest of Vermont state government has adopted it, allowing all state employees and managers more access to learning opportunities.

A total of 43 project managers and design staff, and 12 Right-of-Way staff were trained in the BPM Right-of-Way application, enhancing their ability to streamline workflow. The VTrans Lean Training Program produced 147 White Belt, 58 Yellow Belt, and 36 certified Green Belt graduates.

Emergency management training remains a focus for the Agency with all staff required to complete incident command training annually to ensure everyone speaks the same language should disaster strike. Managers and other critical staff train at even higher levels and stand ready to support other agencies through Vermont Emergency Management.
1892
The first state supervision of roads in Vermont came with the establishment of a Highway Commission.

1898
The Highway Commission was supposed to conduct a two-year survey of the state’s roads, but it ended up as a six-year survey. As a result of the commission, Act 65 established a State Highway Commission, to supervise the state money to be paid out for permanent highway construction.

1921
Act 123 established the first State Highway Board, which operated through the Commissioner of Highways. The Board’s members were the Governor, who served as the chairman ex officio, and two others appointed with the advice and consent of the Senate.

1923
Act 7 established the Department of Highways, which was administered by the State Highway Board (the Governor, at this point, was no longer a member of the Board). The Department was responsible for administrative details and policy information.

1960
Act 329 brought an organizational change, and the Department of Highways was now made up of the Commissioner of Highways, the State Highway Board, and the Board of Public Works.

1973
Act 259 established a Transportation Advisory Board, whose duty it was to assess the various organizations and financing alternatives for transportation within Vermont and to submit a ten-year plan to the 1975 general assembly.

1975
Act 120 established the first Agency of Transportation. It included four departments: Aeronautics; Highways; Motor Vehicles; and Bus, Rail, Waterways and Motor Carrier services. Attached to the Agency was a seven-member Transportation Board that exercised functions of a policy making, regulatory, or quasi-judicial nature related to transportation.

1986
Act 269 established the current organization. The Agency is under the direction and supervision of a Secretary who is appointed by the Governor along with the advice and consent of the Senate. It is comprised of the Department of Motor Vehicles; the Divisions of Policy, Planning and Intermodal Development; Highway; Finance and Administration; and all other boards, councils, committees, or components assigned to or created within the agency. All transportation and transit authorities established by law or executive order are attached to the agency for administrative support.

1988
Act 150 established that the Agency shall also respond in writing to concerns raised during Transportation Board hearings and inform the Joint Transportation Oversight Committee of any anticipated loss or reduction of federal funding for transportation purposes.

1991
Act 175 granted the Secretary of the Agency of Transportation the power to create divisions within the agency, necessary to carry out laws. Directors appointed by the Secretary head each division.

The Agency administers the provisions of Titles 5 (Aeronautics and Surface Transportation), 19 (Highways), and 23 (Motor Vehicles), as well as other related provisions of the law. The Agency has the authority and administrative jurisdiction to develop, promote, supervise, and support safe and adequate transportation services. It exercises general supervision of all transportation functions.
Infrastructure Inventory

- 16 Public-Use Airports
- 10 State-Owned Airports (Included in Total)
- 90+ Runway Lane Miles
- 305 Miles of State-Owned Operating Rail
- 295 Miles of Privately-Owned Railroads
- 145 Miles of State-Owned Rail-Banked Trail Facilities
- 392 Public Transit Vehicles
- 30 State-Owned/Maintained Park-and-Ride Facilities
- 5 State-Owned/Maintained Park-and-Ride Facilities with EV Level 1 or 2 Charging
- 1,525 Parking Spaces at State-Owned/Maintained Park-and-Ride Facilities
- 62 Municipal Park-and-Ride Facilities Funded with State Grants
- 1,221 Parking Spaces at Municipal Owned/Maintained Park-and-Ride Facilities
- 14,171 Total Miles of Local and State Roadway
- 772 Miles National Highway System (NHS)
- 2,331 Miles State Highway System (SHS)
- 139 Miles of Class 1 Town Highways
- 1,986 Miles of Guardrail
- 2,723 Inventory Local and State Long Bridges (Over 20 FT. Long)
- 1,089 Inventory Long Bridges on SHS (State-Owned/Maintained)
- 44 SHS Bridges Classified Structurally Deficient in 2016 (5.7%)
- 156 Traffic Signals
- 1,100 Roadway Lights
- 2,321 Official Business Directional Signs (OBDS)
- 274 Dump Trucks with Plows and Wings
- 72 Pickups with Plows
- 374 Licensed CDL Drivers
- 64 Garages Operated
- 151,676 Hours of Plowing in Winter 2015-2016
- 4.7 Million Public Transit Ridership in 2016
- 25.7% Decrease in Major Crashes Reported 2004-2015
- 17,430 Tons of Material Applied to Protect Banks and Slopes
- 73 Operational Stormwater Permits
- 23 Miles of Linear Stormwater Treatment
- 57 Acres of Area Stormwater Treatment
- 381 Tons of Trash Collected at a cost of $1,483,478
- 6.7 Million Tons of Rail Freight Shipped Each Year
- 16,596 Acres Mowed
- 121 Total Public Records Requests Processed
- 75.2% processed in 3 days
- 22.3% processed in 10 days
- 20,953 Pages of VTrans Records Delivered
- 186 Walk-in Requests Accommodated
- 27 Estimates Issued
The Department of Motor Vehicles (DMV) is responsible for issuing driver licenses, permits, motor vehicle registrations (including snowmobile and motorboat registrations), driver license suspensions and reinstatements, enforcement of motor-vehicle-related laws, and collecting motor fuel revenue for the state of Vermont. The department also manages several safety programs, including vehicle inspections, motor carrier safety, school bus safety and those related to motorcycle training. The Vermont DMV serves a resident population of over 626,000, as well as a significant number of nonresidents.

**Revenues FY2016** (fees, taxes and permits)

<table>
<thead>
<tr>
<th>Service</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Purchase &amp; Use Tax</td>
<td>$69,232,418</td>
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<tr>
<td>Registrations</td>
<td>$55,336,523</td>
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<td>Gas Tax</td>
<td>$39,313,297</td>
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<td>2013 Motor Fuel Assessment Fee</td>
<td>$34,303,341</td>
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<td>Tax - Up To 6,099</td>
<td>$16,998,603</td>
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<td>Diesel Tax</td>
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<td>Motor Fuel Assessment Fee TIB</td>
<td>$12,455,879</td>
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<td>License (Non-CDL)</td>
<td>$9,520,180</td>
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<tr>
<td>Tax - Up To 25,999</td>
<td>$8,886,270</td>
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<tr>
<td>Titles</td>
<td>$5,822,336</td>
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<td>IRP In State</td>
<td>$4,793,014</td>
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<td>Rental Vehicle Tax</td>
<td>$4,133,954</td>
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<td>Overweight Permit</td>
<td>$3,221,051</td>
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<td>Inspections</td>
<td>$3,015,333</td>
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<td>IFTA</td>
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<td>IRP To Foreign</td>
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<td>Diesel Fuel Assessment</td>
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<td>Tax - 26,000 And Over</td>
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<td>Sales Tax</td>
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<td>Other</td>
<td>$5,651,710</td>
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<td><strong>Total</strong></td>
<td><strong>$298,858,723</strong></td>
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**DMV Rates**

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<tr>
<td>Gas Tax, Assessments, and Clean Up Fee</td>
<td>$0.121 plus MFTIA plus MFTA plus $0.01 Clean Up Fee</td>
</tr>
<tr>
<td>Motor Fuel Transportation Infrastructure Assessment</td>
<td>$0.0396 per gallon or 2% of the adjusted retail price upon each gallon of motor fuel sold by the distributor, whichever is greater.</td>
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<tr>
<td>Motor Fuel Tax Assessment</td>
<td>$0.134 per gallon or 4% of the tax-adjusted retail price upon each gallon of motor fuel sold by the distributor not to exceed $0.18, whichever is greater</td>
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<td>Diesel Tax, Clean Up Fee, and Infrastructure Fee</td>
<td>$0.28 and $0.01 and $0.03</td>
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<td>Sales Tax, Purchase and Use Tax, Motor Homes, Trucks up to 10,099 lbs.</td>
<td>6%</td>
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<tr>
<td>Driver Training</td>
<td>$50 – $150</td>
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<tr>
<td>Clean Air Fund</td>
<td>$2/year</td>
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<tr>
<td>Conservation Plates</td>
<td>$26/pair, in addition to registration fee</td>
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<tr>
<td>Title Fees (Vehicle)</td>
<td>$35</td>
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<tr>
<td>Title Fees (ATV, Boats, Snowmobiles)</td>
<td>$22</td>
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<tr>
<td>Oversize Permits</td>
<td>$1 – $500</td>
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<td>Survey Fee</td>
<td>$300 – $10,000</td>
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DMV Contact Information

Montpelier
Washington County - Main Office
120 State Street
802-828-2000, 888-998-3766

Bennington
Bennington County - Branch Office
530 Main Street

Dummerston
Windham County - Branch Office
870 US Route 5

Middlebury
Addison County - Branch Office
7 Addison County Courthouse
Mahady Court, 2nd floor

Newport
Orleans County - Branch Office
100 Main Street

Rutland
Rutland County - Branch Office
101 State Place

Saint Albans
Franklin County - Branch Office
27 Fisher Pond Road

Saint Johnsbury
Caledonia County - Branch Office
1998 Memorial Drive

South Burlington
Chittenden County - Branch Office
4 Market Street

Springfield
Windsor County - Branch Office
100 Mineral Street, Suite 103

White River Junction
Windover County - Branch Office
226 Holiday Drive

Vehicle Registration

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<tr>
<th>Type</th>
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<tr>
<td>Cars</td>
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<tr>
<td>Trucks</td>
<td>148,103</td>
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<tr>
<td>Trailers</td>
<td>96,110</td>
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<tr>
<td>Motorboats</td>
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<td>Motorcycles</td>
<td>31,910</td>
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<td>Snowmobiles</td>
<td>12,772</td>
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<tr>
<td>ATVs</td>
<td>14,187</td>
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<td>Agriculture</td>
<td>2,907</td>
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Vehicle Licenses

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<th>Type</th>
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<tr>
<td>Motorcycle Endorsements</td>
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<tr>
<td>Non-Driver IDs</td>
<td>31,999</td>
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<td>Learner Permits</td>
<td>20,957</td>
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<tr>
<td>Junior Operators</td>
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Vermont Rider Education Program

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<tr>
<th>Course Information</th>
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<td>Courses Offered</td>
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<td>Training Sites Available</td>
<td>8</td>
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<tr>
<td>Students Registered</td>
<td>1,184</td>
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<td>Students Attending</td>
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<tr>
<td>Students Completing Program</td>
<td>1,055</td>
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<td>Students Passing Program</td>
<td>1,003</td>
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<td>No Shows</td>
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Vehicle Registrations Processed

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<td>Registration Renewals</td>
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<td>Vehicle Titles</td>
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<td>New Registrations</td>
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<td>Registration Transfers</td>
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<td>Duplicate Registrations</td>
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<td>Duplicate Titles</td>
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License Transactions Processed

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<td>Operator Renewals</td>
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<td>Duplicates</td>
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<td>New Operators</td>
<td>15,451</td>
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<td>New Learner Permits</td>
<td>9,169</td>
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<td>Junior Operators</td>
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<td>Learner Permit Renewals</td>
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</tbody>
</table>

Truck Legal Size and Load Limits

The maximum load on any vehicle axle shall not exceed a gross weight of more than 600 pounds per inch of tire width in conformity with the manufacturer’s designated width. Axle weight must conform to federal bridge formula.

DMV Contact Information

<table>
<thead>
<tr>
<th>Location</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montpelier</td>
<td>120 State Street</td>
</tr>
<tr>
<td>Bennington</td>
<td>530 Main Street</td>
</tr>
<tr>
<td>Dummerston</td>
<td>870 US Route 5</td>
</tr>
<tr>
<td>Middlebury</td>
<td>7 Addison County Courthouse</td>
</tr>
<tr>
<td>Newport</td>
<td>Orleans County - Branch Office</td>
</tr>
<tr>
<td>Rutland</td>
<td>Rutland County - Branch Office</td>
</tr>
<tr>
<td>Saint Albans</td>
<td>27 Fisher Pond Road</td>
</tr>
<tr>
<td>Saint Johnsbury</td>
<td>Caledonia County - Branch Office</td>
</tr>
<tr>
<td>South Burlington</td>
<td>Chittenden County - Branch Office</td>
</tr>
<tr>
<td>Springfield</td>
<td>100 Mineral Street, Suite 103</td>
</tr>
<tr>
<td>White River Junction</td>
<td>Windsor County - Branch Office</td>
</tr>
</tbody>
</table>

VTRANS FACT BOOK 2017
The Office of Highway Safety is comprised of the Highway Safety Data Unit, Governor’s Highway Safety Program, Infrastructure Safety Unit, and the Vermont Highway Safety Alliance.

Highway Safety Data Unit

The Highway Safety Data Unit collects and manages data related to highway system conditions, collects highway video, reports highway sufficiency rating data, manages the Crash, Fatality Analysis Reporting System (FARS), and the VT Highway Performance Monitoring System (HPMS) databases, and coordinates highway classification system reviews (both state and federal). Staff are actively involved in the Traffic Records Coordinating Committee and the Vermont Highway Safety Alliance and work closely with statewide law enforcement in the area of crash reporting.

Public Data Query Tool

Additional crash information is available at: app.vtrans.vermont.gov/CrashPublicQueryTool

Occupant Fatalities With No or Improper Restraint

Data source: VTrans in-house VCSG database or FARS. Data reflected as submitted by law enforcement. Where restraint is “None Used” (VCSG) or “No” (FARS). Includes “Improper Use” and “Non-DOT Compliant Helmet.”

Crashes Reported, by calendar year

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
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</thead>
<tbody>
<tr>
<td>2015</td>
<td>14,116</td>
</tr>
<tr>
<td>2014</td>
<td>12,726</td>
</tr>
<tr>
<td>2013</td>
<td>13,792</td>
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<td>11,641</td>
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<tr>
<td>2011</td>
<td>12,627</td>
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<td>2010</td>
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<td>2008</td>
<td>13,758</td>
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<tr>
<td>2007</td>
<td>14,414</td>
</tr>
<tr>
<td>2006</td>
<td>14,549</td>
</tr>
</tbody>
</table>

Fatalities, by calendar year

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>57</td>
</tr>
<tr>
<td>2014</td>
<td>44</td>
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<tr>
<td>2013</td>
<td>70</td>
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<td>2012</td>
<td>77</td>
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<td>2011</td>
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<td>73</td>
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<td>2008</td>
<td>73</td>
</tr>
<tr>
<td>2007</td>
<td>66</td>
</tr>
<tr>
<td>2006</td>
<td>87</td>
</tr>
</tbody>
</table>

Vehicle Miles of Travel: 1950 – 2015

VTRANS FACT BOOK 2017
5 Year Fatal Crash Map

Map Legend:
- 2015 Fatal Crashes
- 2014 Fatal Crashes
- 2013 Fatal Crashes
- 2012 Fatal Crashes
- 2011 Fatal Crashes

AOT Classification:
- Interstate Highway
- US Highway
- Vermont State Highway
- Class 1 Town Highway
- Class 2 Town Highway
- Class 3 Town Highway
- Class 4 Town Highway
Governor's Highway Safety Program

The Governor's Highway Safety Program (GHSP) awards federal highway safety grant funds to local, state, and non-profit agencies for projects to improve highway safety and reduce deaths and serious injuries due to crashes. The programs administered through GHSP are federally funded through the National Highway Traffic Safety Administration (NHTSA). GHSP programs are defined and approved each year through the Highway Safety Plan (HSP) and align with the State’s Strategic Highway Safety Plan (SHSP). The Federal Fiscal Year 2016 (FFY16) HSP was constructed by incorporating data from the Moving Ahead for Progress in the 21st Century Act (MAP-21). GHSP used data to identify persistent and emerging trends, promoting successful highway safety strategies, developing strong partnerships, and implementing performance-based solutions. The HSP is designed to educate drivers, passengers, pedestrians, bicyclists, and motorcyclists about highway safety. Our programs employ the use of countermeasures that focus primarily on the modification of driver behavior through enforcement and education.

Infrastructure Safety Unit

The Highway Safety Improvement Program (HSIP) focuses on roadway locations and characteristics that exhibit unusually high numbers of crashes. The HSIP develops and implements infrastructure changes to reduce crashes. This past summer, via construction contracts, VTrans restriped all roadways under its responsibility, and added miles of centerline rumble stripes in an effort to reduce run-off road crashes. In addition to these system wide efforts, VTrans reviewed 12 different sites using the Road Safety Audit Review multi-disciplinary format. Two major intersection improvement projects for the US 2 & Clay Point Rd, Colchester and US 2 & Bear Trap Rd, Milton intersections were completed this past summer. The US 302 paving project in Berlin installed a Road Diet configuration in order to facilitate mobility and safety for all roadway users.

Vermont Highway Safety Alliance

The Vermont Highway Safety Alliance (VHSA) is a network of like-minded private and public organizations working together to collect, share and use data to develop highway safety strategies integrating: road engineering and infrastructure; law enforcement and emergency medical services; and education and outreach. The VHSA is tasked with developing and carrying out the Agency’s Strategic Highway Safety Plan, which is updated every five years.

2017-2021 Strategic Highway Safety Plan Critical Emphasis Areas

1. Improve Infrastructure
   a. Minimize Lane Departure
   b. Improve the Design and Operation of Highway Intersection
2. Reduce Speeding and Aggressive Driving
3. Increase Use of Occupant Protection
4. Vulnerable Users and Motorcyclists Safety
   a. Increase Pedestrian Safety
   b. Increase Bicyclist Safety
   c. Increase Motorcyclist Safety
5. Age Appropriate Solutions
   a. Improve Younger Driver Safety (Under 25)
   b. Improve Older Driver Safety (65 and Over)
6. Reduce Impaired Driving
7. Curb Distracted and Inattentive Driving

Vermont Highway Safety Alliance Board and Federal Partners

Glen Button
Chair

Evelyn McFarlane
Coordinator/Secretary
Vermont Agency of Transportation

Lt. John Flannigan
Vice Chair
Vermont State Police

Sheriff Bill Bohnyak
Treasurer
Orange County Sheriff’s Department.

Board Members

Core Positions

Barbara Brody, Vermont Driver & Traffic Safety Association
Bill Mitchell, Ride Safe Vermont
Doug Masson, AARP
Mary Eversole, Vermont Insurance Agents Association
Dan Goodman, AAA Northern New England
Chrissy Keating, UVM Medical Center
Mitchell Jay, Vermont Automobile Distributors Association
Chief Frank Koss, VT Police Association
Emily Boedecker, Local Motion

Federal Partners

Scott Davidson, Governor’s Highway Safety Program
Jake Elowirta, Vermont Department of Motor Vehicles
Chris Bell, Vermont Department of Health
Kevin Marasha, Vermont Agency of Transportation

Federal Highway Administration
National Highway Traffic Safety Administration
Federal Motor Carrier Safety Administration

VTRANS FACT BOOK 2017
2015–16 Data

**Winter Maintenance**

- **2,496 CUBIC YARDS OF SAND USED**
- **64 GARAGES**
- **66,821 TONS OF SALT USED**
- **374 EMPLOYEES LICENSED TO RUN A SNOW PLOW**
- **6,511 WINTER LANE MILES**
- **63,912 GALLONS OF LIQUID DE-ICER USED**
- **1,579,627 GALLONS OF SALT BRINE USED**
- **TOTAL COST OF WINTER MAINTENANCE: $21,555,787**
- **98,946 HOURS OF PLOWING**
- **52,730 HOURS OF OVERTIME PLOWING**

### Five-Year Salt Price Comparison

<table>
<thead>
<tr>
<th>Location</th>
<th>FY2013 Price</th>
<th>FY2014 Price</th>
<th>FY2015 Price</th>
<th>FY2016 Price</th>
<th>FY2017 Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>District 1</td>
<td>$59.59</td>
<td>$53.79</td>
<td>$73.79</td>
<td>$76.74</td>
<td>$74.44</td>
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<td>$61.90</td>
<td>$58.65</td>
<td>$78.65</td>
<td>$81.80</td>
<td>$79.35</td>
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<td>District 3</td>
<td>$62.17</td>
<td>$54.02</td>
<td>$76.02</td>
<td>$79.06</td>
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<td>District 4</td>
<td>$62.67</td>
<td>$56.52</td>
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<td>$61.58</td>
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<td>$61.67</td>
<td>$78.44</td>
<td>$80.79</td>
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<tr>
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<td>$68.05</td>
<td>$67.95</td>
<td>$82.26</td>
<td>$84.73</td>
<td>$84.73</td>
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</table>
Salt Usage (in tons)
- FY2016: 66,821
- FY2015: 131,684
- 5-yr average: 114,607

Sand Usage (in cubic yards)
- FY2016: 2,496
- FY2015: 6,489
- 5-yr average: 5,530

Brine Usage (in gallons)
- FY2016: 1,579,628
- FY2015: 2,274,378

De-Icer Usage (in gallons)
- FY2016: 63,912
- FY2015: 159,284
Winter Maintenance Events

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.

<table>
<thead>
<tr>
<th>Total Winter Events, Three-Year Comparison</th>
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<tbody>
<tr>
<td>2015–2016</td>
</tr>
<tr>
<td>2014–2015</td>
</tr>
<tr>
<td>2013–2014</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Snowfall, Three-Year Comparison (in inches)</th>
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</thead>
<tbody>
<tr>
<td>2013–2014</td>
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<tr>
<td>2014–2015</td>
</tr>
<tr>
<td>2015–2016</td>
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</table>

<table>
<thead>
<tr>
<th>Average Winter Maintenance Event Days, Three-Year Comparison</th>
</tr>
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<tbody>
<tr>
<td>October</td>
</tr>
<tr>
<td>November</td>
</tr>
<tr>
<td>December</td>
</tr>
<tr>
<td>January</td>
</tr>
<tr>
<td>February</td>
</tr>
<tr>
<td>March</td>
</tr>
<tr>
<td>April</td>
</tr>
</tbody>
</table>

VTRANS FACT BOOK 2017
Equipment Performance Measures

**Plow/Dump Truck Availability**
Target: ≥ 90% Available; ≤ 2% Breakdowns

**Plow/Dump 12-month Average Service Cost**
Target: Minimize as practical

**Plow/Dump Truck Age**
Target: ≤ 15% Older than 8 years
### Southwest Region

#### District 1
- **359 Bowen Road, Bennington, VT 05201**
- **(802) 447-2791**
- **507 Lane Miles**

**District Transportation Administrator**
- Rob Faley

**General Maintenance Manager**
- William Leach Jr.

**Project Manager**
- Christopher Taft

**Facility Locations**
- Bennington
- East Dorset
- Readsboro
- Wilmington
- Marlboro

- **40 FULL TIME POSITIONS**
- **46 PIECES OF CENTRAL GARAGE ASSIGNED EQUIPMENT**

- **$1,827,218 WINTER MAINTENANCE COSTS**
  - **SALT (TONS)**
    - 4,470
  - **SAND (CUBIC YARDS)**
    - 242
  - **DE-ICER (GALLONS)**
    - 14,803
  - **BRINE (GALLONS)**
    - 317,216

#### District 3
- **61 Valley View, Suite 2, Mendon, VT 05701**
- **(802) 786-5826**
- **637 Lane Miles**

**District Transportation Administrator**
- Rob Faley

**General Maintenance Manager**
- Bruce Nichols

**Project Manager**
- Brian Sanderson

**Facility Locations**
- Brandon
- Castleton
- Clarendon
- Ludlow
- Mendon
- Rutland
- Sudbury

- **48 FULL TIME POSITIONS**
- **61 PIECES OF CENTRAL GARAGE ASSIGNED EQUIPMENT**

- **$2,375,963 WINTER MAINTENANCE COSTS**
  - **SALT (TONS)**
    - 8,875
  - **SAND (CUBIC YARDS)**
    - 161
  - **DE-ICER (GALLONS)**
    - 9,651
  - **BRINE (GALLONS)**
    - 201,380
Southeast Region

**District 2**

- **Address:** 870 US 5
  Dummerston, VT 05301
  (802) 254-5011
- **Lane Miles:** 658

**Facility Locations**
- Ascotney
- Chester
- Dummerston
- Jamaica
- Londonderry
- Rockingham
- Springfield

**District Transportation Administrator**
- Tammy Ellis

**General Maintenance Manager**
- Joseph Ruzzo

**Project Manager**
- Marc Pickering

**Winter Maintenance Costs**

<table>
<thead>
<tr>
<th>Material</th>
<th>Tons</th>
<th>Cubic Yards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt</td>
<td>6,677</td>
<td>0</td>
</tr>
<tr>
<td>Sand</td>
<td>0</td>
<td>4,090</td>
</tr>
<tr>
<td>De-Icer</td>
<td>831</td>
<td>10,262</td>
</tr>
<tr>
<td>Brine</td>
<td>4,090</td>
<td>51,723</td>
</tr>
</tbody>
</table>

**District 4**

- **Address:** 221 Beswick Drive
  White River Jct., VT 05002
  (802) 295-8888
- **Lane Miles:** 1,126

**Facility Locations**
- Fairlee
- Randolph
- Reading
- Rochester
- Royalton
- Sharon
- Thetford
- Tunbridge
- White River Jct.
- Windsor
- Williamstown
- Woodstock

**District Transportation Administrator**
- Tammy Ellis

**General Maintenance Manager**
- Trevor Starr

**Project Manager**
- Chris Bump

**Winter Maintenance Costs**

<table>
<thead>
<tr>
<th>Material</th>
<th>Tons</th>
<th>Cubic Yards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt</td>
<td>13,110</td>
<td>376</td>
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<tr>
<td>Sand</td>
<td>376</td>
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<tr>
<td>De-Icer</td>
<td>10,262</td>
<td>51,723</td>
</tr>
<tr>
<td>Brine</td>
<td>51,723</td>
<td>51,723</td>
</tr>
</tbody>
</table>

**Full Time Positions**

- **District 2:** 45
- **District 4:** 69

**Pieces of Central Garage Assigned Equipment**

- **District 2:** 49
- **District 4:** 86

**Total Winter Maintenance Costs**

- **District 2:** $1,702,651
- **District 4:** $3,481,247
Northwest Region

**District 5**
PO Box 168
Essex Jct., VT 05453
(802) 655-1580
952 Lane Miles

**District Transportation Administrator**
David Blackmore

**General Maintenance Manager**
Rejean Lafleche

**Project Manager**
Richard Hosking

**Facility Locations**
Chimney Corners
Colchester
Essex
Middlebury
New Haven
Waitsfield
Middlesex

**67 FULL TIME POSITIONS**

**82 PIECES OF CENTRAL GARAGE ASSIGNED EQUIPMENT**

**$2,800,230 WINTER MAINTENANCE COSTS**

<table>
<thead>
<tr>
<th>Salt (Tons)</th>
<th>Sand (Cubic Yards)</th>
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</thead>
<tbody>
<tr>
<td>7,426</td>
<td>532</td>
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<table>
<thead>
<tr>
<th>De-Icer (Gallons)</th>
<th>Brine (Gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,674</td>
<td>257,654</td>
</tr>
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</table>

**District 8**
680 Lower Newton Road
St. Albans, VT 05478
(802) 524-7927
939 Lane Miles

**District Transportation Administrator**
David Blackmore

**General Maintenance Manager**
Ernie Patnoe

**Project Manager**
Jim Cota

**Facility Locations**
Cambridge
Eden
Enosburg
Georgia
N. Hero
Highgate

**57 FULL TIME POSITIONS**

**73 PIECES OF CENTRAL GARAGE ASSIGNED EQUIPMENT**

**$3,590,226 WINTER MAINTENANCE COSTS**

<table>
<thead>
<tr>
<th>Salt (Tons)</th>
<th>Sand (Cubic Yards)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11,294</td>
<td>112</td>
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</table>

<table>
<thead>
<tr>
<th>De-Icer (Gallons)</th>
<th>Brine (Gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,650</td>
<td>477,177</td>
</tr>
</tbody>
</table>
Northeast Region

**District 7**

1068 US 5, Suite 2  
St. Johnsbury, VT 05819  
(802) 748-6670  
967 Lane Miles

**District Transportation Administrator**  
Dale Perron

**General Maintenance Manager**  
Kevin Gadapee

**Project Manager**  
Shauna Clifford

**Facility Locations**

- Bradford
- W. Danville
- Lunenburg
- Lyndon
- Newbury
- North Montpelier
- Orange
- St. Johnsbury

---

**District 9**

4611 US 5  
Newport, VT 05855  
(802) 334-7934  
736 Lane Miles

**District Transportation Administrator**  
Dale Perron

**General Maintenance Manager**  
Bill Jewell

**Project Manager**  
Shane Morin

**Facility Locations**

- Barton
- Bloomfield
- Canaan
- Derby
- Irasburg
- Island Pond
- Westfield
- Westmore

---

**59** FULL TIME POSITIONS  
**75** PIECES OF CENTRAL GARAGE ASSIGNED EQUIPMENT

**$3,176,051** WINTER MAINTENANCE COSTS

- **SALT** (TONS) 8,345
- **SAND** (CUBIC YARDS) 731
- **DE-ICER** (GALLONS) 11,208
- **BRINE** (GALLONS) 160,934

---

**47** FULL TIME POSITIONS  
**50** PIECES OF CENTRAL GARAGE ASSIGNED EQUIPMENT

**$2,354,811** WINTER MAINTENANCE COSTS

- **SALT** (TONS) 6,624
- **SAND** (CUBIC YARDS) 343
- **DE-ICER** (GALLONS) 2,835
- **BRINE** (GALLONS) 109,454
Statewide Services

Maintenance Operations Bureau Headquarters
One National Life Dr., Montpelier, VT 05633
(802) 828-2692

Director, Scott Rogers
Deputy Director, Wayne Gammell
Maintenance Engineer, Todd Law

Facility Locations
Berlin
Montpelier

Headquarters includes administrative support and oversight and the business office for maintenance and operations.

11 FULL TIME POSITIONS
25 PIECES OF DISTRICT OWNED EQUIPMENT

Tech Services
One National Life Dr., Montpelier, VT 05633
(802) 828-1776

Tech Services Engineer, Alec Portalupi

Services
Logistics/Facilities
Transportation System Management & Operations (TSMO)
Statewide Bridge Crew
Emergency and Engineering Support
Pavement
Environmental

66 FULL TIME POSITIONS

Central Garage
US 302 #31756, Berlin, VT 05602
(802) 828-1776

Superintendent, Ken Valentine

Facility Locations
Berlin
Colchester
Lyndonville
Rutland
White River Junction

54 FULL TIME POSITIONS
54 PIECES OF CENTRAL GARAGE OWNED EQUIPMENT

VTrans Training Center (VTTC)
1716 US 302, Berlin, VT 05633
(802) 828-3768

Program Manager, Christine Hetzel
Health & Safety, Camille Erwin
Employee Development, Colleen Montague
Finance & Logistics, Jo Ann Stevens
Technical, Lance Duquette

The VTrans Training Center (VTTC) provides a wide spectrum of health and safety and employee development training for VTrans staff to ensure regulatory compliance, a safe and respectful workplace and offers the necessary tools for employees to grow their careers at VTrans.

Vermont Local Roads
1716 US 302, Berlin, VT 05633
(802) 828-2537
localroads.vermont.gov

Branch Manager, Stu Johnson
Circuit Rider, Todd Eaton
Program Coordinator, Holly Hayden

The Vermont Local Roads Program provides information, training and technical assistance to cities, towns and villages in Vermont. This is done through seminars and workshops, distribution of materials, and technical assistance to fulfill service requests.
In conformance with the National Bridge Inventory (NBI), Vermont maintains a historical record of all bridges subject to the National Bridge Inspection Standards (NBIS). These standards establish requirements for inspection procedures, frequency of inspections, qualifications of personnel, inspection reports, and both the preparation and maintenance of a state bridge inventory. The NBIS apply to all structures defined as bridges that are longer than 20 feet in length and located on public roads. These assets are commonly referred to as long structures. Short structures are those having a span length of greater than six feet up to or equal to 20 feet.

**“Highway” Structure Population** (as submitted to FHWA in April 2016)

<table>
<thead>
<tr>
<th></th>
<th>Interstate</th>
<th>State Highway</th>
<th>Town Highway</th>
<th>Other</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Long Structures</strong></td>
<td>310</td>
<td>779</td>
<td>1,640</td>
<td>7</td>
<td>2,736</td>
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<td><strong>Short Structures</strong></td>
<td>210</td>
<td>1,055</td>
<td>*</td>
<td>*</td>
<td>1,265</td>
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<tr>
<td><strong>Totals</strong></td>
<td>520</td>
<td>1,834</td>
<td>1,640</td>
<td>7</td>
<td>4,001</td>
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**Long Structures**

<table>
<thead>
<tr>
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<th>Interstate</th>
<th>State Highway</th>
<th>Town Highway</th>
<th>Other</th>
<th>Totals</th>
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<tbody>
<tr>
<td>Above Ground</td>
<td>262</td>
<td>716</td>
<td>1,529</td>
<td>6</td>
<td>2,513</td>
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<tr>
<td>Buried</td>
<td>48</td>
<td>63</td>
<td>111</td>
<td>1</td>
<td>223</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>310</td>
<td>779</td>
<td>1,640</td>
<td>7</td>
<td>2,736</td>
</tr>
</tbody>
</table>

**Short Structures**

<table>
<thead>
<tr>
<th></th>
<th>Interstate</th>
<th>State Highway</th>
<th>Town Highway</th>
<th>Other</th>
<th>Totals</th>
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</thead>
<tbody>
<tr>
<td>Above Ground</td>
<td>0</td>
<td>174</td>
<td>*</td>
<td>*</td>
<td>174</td>
</tr>
<tr>
<td>Buried</td>
<td>210</td>
<td>881</td>
<td>*</td>
<td>*</td>
<td>1,091</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>210</td>
<td>1,055</td>
<td>*</td>
<td>*</td>
<td>1,265</td>
</tr>
</tbody>
</table>

Vermont’s “Off-Highway” Structure Population (as of April 2016)

<table>
<thead>
<tr>
<th></th>
<th>State Highway</th>
<th>Town Highway</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retaining Walls</td>
<td>160</td>
<td>**</td>
<td>160</td>
</tr>
<tr>
<td>Recreation Path Structures</td>
<td>0</td>
<td>121</td>
<td>121</td>
</tr>
<tr>
<td>Overhead Sign Support Structures</td>
<td>138</td>
<td>***</td>
<td>138</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>298</td>
<td>121</td>
<td>419</td>
</tr>
</tbody>
</table>

**DEFINITIONS**

**Long Structure**

Bridges having a span length greater than 20 feet in length and located on public roads.

**Short Structure**

Bridges having a span length of greater than six feet up to or equal to 20 feet and located on public roads.

* VTrans does not maintain an inventory of or inspect town highway or other short structures.

**Buried Structure**

These structures include metal culverts, concrete box culverts, frames, masonry arches, and concrete arches.

**Retaining Wall**

Height greater than 3 feet

**Recreation Path Structures**

Span length greater than 6 feet

**VTrans does not maintain an inventory of or inspect municipally-owned retaining walls or overhead sign support structure bases.**

*** This number is expected to change as inspection criteria are refined (i.e., minimum sign size, attachment, etc.).
Aging Bridge and Culvert Inventory

With 1927 flood-era bridges now over 80 years old and nearing the end of their useful design life, as well as the 1958-to-1978 Interstate-era bridges averaging around 50 years old and in need of repairs or rehabilitation, a wave of structures in need of major investment is quickly approaching.

- Interstate, State Highway, and Town Highway Long Structures
- Interstate and State Highway Short Structures
* Based on year of original build (as submitted to FHWA, April 2016). Does not include Division of Historic Preservation, rail or private bridges.

Structure Count by Age (in years*)

<table>
<thead>
<tr>
<th>Age</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9</td>
<td>206</td>
<td>46</td>
</tr>
<tr>
<td>10-19</td>
<td>169</td>
<td>23</td>
</tr>
<tr>
<td>20-29</td>
<td>192</td>
<td>32</td>
</tr>
<tr>
<td>30-39</td>
<td>277</td>
<td>75</td>
</tr>
<tr>
<td>40-49</td>
<td>402</td>
<td>199</td>
</tr>
<tr>
<td>50-59</td>
<td>349</td>
<td>275</td>
</tr>
<tr>
<td>60-69</td>
<td>206</td>
<td>217</td>
</tr>
<tr>
<td>70-79</td>
<td>265</td>
<td>100</td>
</tr>
<tr>
<td>80-89</td>
<td>361</td>
<td>166</td>
</tr>
<tr>
<td>90+</td>
<td>191</td>
<td>132</td>
</tr>
</tbody>
</table>

Restrictions

VTrans continually evaluates the most appropriate performance measures to target which structures are in highest need of repair or rehabilitation, weighed against what is either being lost or gained in terms of keeping our assets open and unrestricted for public travel.

Due to recent public attention on the condition of our bridges, many believe Vermont has more restricted bridges than it did 10 years ago. In fact, prior to 2012 (which showed an increase as a result of infrastructure damage caused by Tropical Storm Irene), the state trend had been decreasing. As large storms become more frequent and infrastructure continues to age, downward trends will become more difficult to maintain in the future.

Restricted Structures (as submitted to FHWA April, 2016)

Restrictions—a limitation of or inability to use a structure—come in four basic categories:
- Closed  Bridge closed to all traffic.
- Temporary  Open but with a temporary structure in place to carry legal loads while original structure is closed and awaiting replacement or rehabilitation.
- Posted  Reduced maximum allowed weight. Posted structures may include other restrictions such as temporary bridges which are load posted.
- Restricted  Posted for other load capacity restrictions such as speed, number of vehicles, vertical clearance, etc.

<table>
<thead>
<tr>
<th>Year</th>
<th>State</th>
<th>Local</th>
<th>Total</th>
<th>State</th>
<th>Local</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>13</td>
<td>13</td>
<td>70</td>
<td>1</td>
<td>1</td>
<td>34</td>
</tr>
<tr>
<td>2011</td>
<td>(2)</td>
<td>(4)</td>
<td>(5)</td>
<td>(0)</td>
<td>(0)</td>
<td>34</td>
</tr>
<tr>
<td>2016</td>
<td>(1)</td>
<td>5</td>
<td>(69)</td>
<td>(1)</td>
<td>7</td>
<td>151</td>
</tr>
</tbody>
</table>

*Includes Town Highway bridges owned by others.
Guided by federal requirements, all bridges in excess of a 20-foot span and located on public roads receive regular, biennial inspections by qualified personnel to ensure safety of the traveling public. Short structures, those greater than 6 feet and up to 20 feet in span length, located on either the interstate or state highway systems are inspected once every 60 months. Bridge safety is taken very seriously. If deemed necessary because of deteriorating conditions, bridges are inspected more frequently.

FHWA recently strengthened oversight of bridge inspections and maintenance with the introduction of a new bridge initiative using systematic, data-driven, and risk-based reviews and analysis to improve oversight of how states are performing their bridge inspections. This new process, using and reporting on key metrics, each linked directly to NBIS requirements, will help identify opportunities for improvement in achieving consistent compliance with the National Bridge Inspection Standards (NBIS).

The new process is based on objective, statistical data, providing for greater consistency in bridge inspections nationwide and more strategic approaches to identifying problem areas. Key metrics include inspection records; determination of bridge load limits; qualifications of inspection personnel; procedures for underwater, fracture-critical, and complex bridge inspections; and inspection frequency.

Through periodic safety inspections, data is collected on the condition of each structure’s primary components. Condition ratings are collected for the following bridge components:

**Deck**
The portion of a bridge that provides a surface for vehicular or pedestrian traffic

**Superstructure**
The portion of a bridge above the substructure that supports the deck, including beams, girders, trusses, and bearing devices which support traffic and transfer the loads to the substructure

**Substructure**
The portion of a bridge below the bearing device, built to support the superstructure and transmit loads to the foundation

The culvert condition rating describes all structural elements of culvert designs which do not have a distinct deck, superstructure or substructure and are buried under fill. The channel and the channel protective system are also rated, describing the physical conditions of slopes, as well as the channel or water flow through the bridge.

Bridge inspectors utilize a point system from zero to nine, where nine indicates an excellent condition and zero indicates a failed condition. Inspectors visually assess the ratings based on engineering expertise, training, and experience. These ratings form the basis for assessing the structural condition of the bridge.

Recommendations for maintenance or repair needs, load restrictions, posting, or closure originate with, and are based on, inspection findings. Inspection provides a visual record of structural health—including deterioration—and the consequent determination of a structure’s ability to continue to perform in a safe manner.

The challenges faced in the northeast—having an older and aging infrastructure, seasonal limitations on performing inspections, extensive use of deicing salts and accelerated corrosion rates—are among the more demanding and the importance of routine inspections cannot and should not be underestimated.
Structurally Deficient and Functionally Obsolete

The Agency is evaluating a number of performance measures by which to judge how well we are maintaining our structure assets. Measures such as bridge health index; averaged condition; worst condition; numbers and deck area of structurally deficient and functionally obsolete bridges; and the number of restricted, posted, closed, or temporary bridges are all being considered.

For many years, the Federal Highway Administration (FHWA) has used structural deficiency and functional obsolescence measures. Similarly, VTrans has used percent bridges structurally deficient by system (interstate, state highway, and town highway).

Where do the terms structurally deficient and functionally obsolete come from and how are they defined? Both are terms FHWA uses to classify bridges “according to serviceability, safety, and essentiality for public use” to meet the requirements of Title 23 of the United States Code (23 U.S.C. 144). The technical definitions are as follows (source: 23 C.F.R. 650D):

**Structurally Deficient (SD)**
A bridge becomes structurally deficient when at least one of six items from the National Bridge Inventory (NBI) reaches a set threshold. The criteria are a Deck Condition Rating, Superstructure Condition Rating, Substructure Condition Rating, or Culvert Condition Rating of 4 (Poor Condition) or less, or a Structural Evaluation Appraisal Rating or Waterway Adequacy Appraisal Rating of 2 (basically intolerable, requiring a high priority of corrective action) or less. Any bridge that is classified structurally deficient is excluded from the functionally obsolete category.

**Functionally Obsolete (FO)**
A bridge becomes functionally obsolete when at least one of five items from the National Bridge Inventory reaches a set threshold. The criteria are a Deck Geometry Appraisal Rating, Underclearances Appraisal Rating, Structural Evaluation Appraisal Rating or Waterway Adequacy Appraisal Rating of 3 (basically intolerable, requiring a high priority of corrective action) or less. Any bridge that is classified structurally deficient is excluded from the functionally obsolete category.

Highway bridges classified as functionally obsolete are not structurally deficient, but according to federal standards their design is outdated. They may have lower load carrying capacity, narrower shoulders, or less clearance underneath than bridges built to the current federal standard. Vermont, due to the historic nature of its bridges as well as environmental concerns associated with bridge widening, has established state standards that differ from federal standards. As a result, it is possible for a new bridge built in Vermont to be classified as functionally obsolete. Also, Vermont does not always “modernize” its functionally obsolete bridges. An example is the state’s covered bridges, which are functionally obsolete, but no one wants them altered.

While functional obsolescence is not one of our performance measures, we report it here as a federal measure. It is important to note that when structural repairs are made to structurally deficient bridges the functional obsolescence count may rise.

The fact that a bridge is structurally deficient (SD) or functionally obsolete (FO) does not mean the bridge is inherently unsafe. The VTrans inspection unit takes bridge safety very seriously. If unsafe conditions are identified during an inspection, the structure will be restricted or closed.

### Functional Obsolescence/Deficient (FO) and Structural Deficiency (SD) Population

(as of or reported to FHWA, April 2016)

<table>
<thead>
<tr>
<th></th>
<th>FO</th>
<th>% FO</th>
<th>SD</th>
<th>% SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate “Long” Structures</td>
<td>95</td>
<td>30.65%</td>
<td>6</td>
<td>1.94%</td>
</tr>
<tr>
<td>State Highway “Long” Structures</td>
<td>93</td>
<td>11.94%</td>
<td>44</td>
<td>5.65%</td>
</tr>
<tr>
<td>Town Highway “Long” Structures</td>
<td>370</td>
<td>22.56%</td>
<td>96</td>
<td>5.85%</td>
</tr>
<tr>
<td>On-System “Short” Structures</td>
<td>N/A</td>
<td>N/A</td>
<td>79*</td>
<td>6.25%</td>
</tr>
<tr>
<td>System Total</td>
<td>558</td>
<td>—</td>
<td>225</td>
<td>—</td>
</tr>
</tbody>
</table>

* FO and SD are federal definitions not applied to “short” structures. This number represents “short” structures having a condition rating of poor or less.
Performance Goals and Measures

In the past, VTrans relied on the Federal Highway Administration’s measures of structural deficiency and functional obsolescence to evaluate bridge condition. Vermont, however, is evaluating new performance measures that VTrans believes better model the average condition of Vermont’s bridge network. The federal measures do not do a good job evaluating a bridge’s true condition, so VTrans is exploring the use of measures that better quantify critical conditions.

VTrans is not doing away with the federal measures and the agency will continue to supply FHWA data for these determinations.

With the passage of MAP-21, the federal transportation bill, government created a performance measure stipulating in law a minimum condition level requirement. National Highway System (NHS) bridge deck area on SD bridges must not exceed 10% of total NHS bridge deck area for that state, and national measures, with targets set by the state, must be established.

Still being used, the previous federal measures—Structural Deficiency and Functional Obsolescence—imply but do not really tell us anything about the bridge’s overall condition, nor do they tell us how bad a particular bridge component is. The federal measures only indicate that one or more bridge components have deteriorated to a point where they are within a range that requires assessment. They may or may not need treatment.

For example, our interest in fitting bridges into the historic Vermont landscape—all covered bridges and many historic truss bridges are considered functionally obsolete—lead to the development of Vermont specific standards that allow us to design bridges narrower than the federal standards. Many of Vermont’s new designs and rehabilitations are considered functionally obsolete though they function very well.

To better evaluate our structures, VTrans, together with Maine and New Hampshire, is working to develop and implement a more holistic approach to measuring the condition and performance of our structures. Although these efforts are still in development, Vermont and our partner states see promise in utilizing a condition index as an effective management tool that can be compared across state lines.

Bridge condition index (BCI), percent structurally deficient by deck area and the national deficiency comparison (number of SD/FO bridges) are all measures being used and evaluated at the tri-state level (Maine, New Hampshire, and Vermont). The goal is to develop a network measure which reflects the relative health of our bridge population.

As the Agency moves to new performance measures, structural deficiency performance goals will continue.

- 6% on the interstate system (18 bridges)
- 10% on the state highway system (77 bridges)
- 12% on the town highway system (195 bridges)
- 10% on interstate/state highway system culverts (126 culverts)

The following chart represents the change in percent of structural deficiency by system over a 10-year period.

---

**Structural Deficiency Over Time by System**

* 2006, 2011 and 2016 represent year data submitted to FHWA

---

**Deficiency Status (%)**

<table>
<thead>
<tr>
<th>System</th>
<th>2006 %SD</th>
<th>2011 %SD</th>
<th>2016 %SD</th>
<th>System Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>12.8</td>
<td>11.2</td>
<td>10.0</td>
<td>10.2</td>
</tr>
<tr>
<td>State Highway</td>
<td>6.7</td>
<td>6.0</td>
<td>5.9</td>
<td>6.0</td>
</tr>
<tr>
<td>Town Highway</td>
<td>16.3</td>
<td>13.4</td>
<td>12.0</td>
<td>10.2</td>
</tr>
<tr>
<td>State Shorts</td>
<td>17.6</td>
<td>12.8</td>
<td>6.2</td>
<td>10.0</td>
</tr>
</tbody>
</table>

---

*WAITSFIELD.* Accelerated bridge construction in Waitsfield utilized innovative approaches by using partial depth deck panels as opposed to full depth panels. These lightweight panels reduced the risk of conflicts during placement and were much easier to lift into place.
Interstate Structure Trends

<table>
<thead>
<tr>
<th>Submittal Year</th>
<th>Functionally Obsolete</th>
<th>Structurally Deficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>89</td>
<td>35</td>
</tr>
<tr>
<td>2008</td>
<td>88</td>
<td>32</td>
</tr>
<tr>
<td>2009</td>
<td>93</td>
<td>22</td>
</tr>
<tr>
<td>2010</td>
<td>93</td>
<td>81</td>
</tr>
<tr>
<td>2011</td>
<td>95</td>
<td>13</td>
</tr>
<tr>
<td>2012</td>
<td>97</td>
<td>13</td>
</tr>
<tr>
<td>2013</td>
<td>96</td>
<td>8</td>
</tr>
<tr>
<td>2014</td>
<td>97</td>
<td>8</td>
</tr>
<tr>
<td>2015</td>
<td>95</td>
<td>5</td>
</tr>
<tr>
<td>2016</td>
<td>95</td>
<td>6</td>
</tr>
</tbody>
</table>

State Highway Structure Trends

<table>
<thead>
<tr>
<th>Submittal Year</th>
<th>Functionally Obsolete</th>
<th>Structurally Deficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>85</td>
<td>157</td>
</tr>
<tr>
<td>2008</td>
<td>87</td>
<td>158</td>
</tr>
<tr>
<td>2009</td>
<td>88</td>
<td>156</td>
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<tr>
<td>2010</td>
<td>99</td>
<td>86</td>
</tr>
<tr>
<td>2011</td>
<td>100</td>
<td>78</td>
</tr>
<tr>
<td>2012</td>
<td>97</td>
<td>72</td>
</tr>
<tr>
<td>2013</td>
<td>100</td>
<td>64</td>
</tr>
<tr>
<td>2014</td>
<td>101</td>
<td>57</td>
</tr>
<tr>
<td>2015</td>
<td>98</td>
<td>51</td>
</tr>
<tr>
<td>2016</td>
<td>93</td>
<td>44</td>
</tr>
</tbody>
</table>

Town Highway Structure Trends

<table>
<thead>
<tr>
<th>Submittal Year</th>
<th>Functionally Obsolete</th>
<th>Structurally Deficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>287</td>
<td>305</td>
</tr>
<tr>
<td>2008</td>
<td>289</td>
<td>304</td>
</tr>
<tr>
<td>2009</td>
<td>336</td>
<td>255</td>
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<td>2010</td>
<td>336</td>
<td>215</td>
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<tr>
<td>2011</td>
<td>355</td>
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</tr>
<tr>
<td>2012</td>
<td>352</td>
<td>182</td>
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<td>2013</td>
<td>357</td>
<td>154</td>
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<td>2014</td>
<td>371</td>
<td>128</td>
</tr>
<tr>
<td>2015</td>
<td>361</td>
<td>123</td>
</tr>
<tr>
<td>2016</td>
<td>370</td>
<td>96</td>
</tr>
</tbody>
</table>
Structures and Hydraulics
The Structures and Hydraulics Section (SHS) is responsible for the delivery of bridge and culvert rehabilitation and replacement projects including project initiation, hydraulic analyses, design, and construction support. SHS staff streamline the project delivery process and reduce construction duration and associated traffic impacts through public engagement, customer service, resiliency to future flood events, effective collaboration with partners, and innovative construction and contracting methods.

Expediting Project Delivery
In 2013, the SHS was the recipient of a $250,000 grant from the Strategic Highway Research Program 2 (SHRP2) program to apply strategies to expedite project delivery. Over the past three years, the grant has been applied to both the Project Initiation and Innovation Team (PIIT) and Accelerated Bridge Program (ABP) to improve collaboration, coordination, project delivery processes, and internal and external customer satisfaction. This multifaceted initiative included over 100 interdisciplinary participants from within and outside of VTrans including three neighboring state DOTs. Significant accomplishments include creating a team approach to delivering projects, encouraging meaningful public engagement, improvements to transfer of knowledge, a more standardized approach to project delivery, and efficiency gains in project scheduling.

Preserving Bridge Infrastructure
Bridge and culvert preservation is the act of applying a cost-effective treatment to retard deterioration, maintain or improve functional condition and/or extend the remaining service life at a lower lifetime cost (also known as the “right treatment at the right time”). With nearly 4000 bridges in the state of Vermont, it is critical to seek a balanced approach between preservation and replacement. Focusing only on replacing deficient bridges and culverts is inefficient and cost-prohibitive.

The Asset Management and Performance Bureau (AMP) and SHS partnered to create a “Deck Replacement Program” to extend the service life of 10 bridge decks located along our interstates, state routes, and town highways. The 10 projects were programmed with a goal of advertising several for the upcoming construction season, which decreased the typical 24-month design phase to only 6 months. This was accomplished by eliminating project impacts along with heightened coordination with resource groups and other project stakeholders (like the construction section and contract specialists), and expediting the design process. Other innovative approaches included 60-day road closures for conventional construction, to a 10-day short term closure utilizing pre-cast deck panels, to creative measures for managing traffic control such as temporary access to the interstate.

2D Modeling for Bridge Hydraulic Analysis
Historically, hydraulic analysis has been performed using a one-dimensional model which assumes that key variables like channel velocities and depth only change in one direction along the centerline of the channel. One-dimensional models are best suited for small streams, in-channel flows, and when floodplain flows are minor. With two-dimensional modeling, hydraulic engineers can model steams and flood flows in two directions as opposed to one providing a significant improvement in calculating hydraulic variables at bridges and culverts. The Hydraulics Unit successfully completed its first two dimensional hydraulic model using SRH-2D. The software is currently being promoted by FHWA as an innovation in the state of practice. It was used on a project in Leicester where backwater from the Otter Creek and very flat grades made older one dimensional models less accurate.

2016 Celebration of Success
Overall Program
- 31 bridge replacement, rehabilitation and preventative maintenance projects were under construction during 2016 totaling $87 million dollars.
- 34 projects were advertised in 2016 representing a 76% success rate of advertising on-time. Of the 34 projects, 50% (17 projects) are state highway projects, 38% (13 projects) are town highway projects, and 12% (4 projects) are interstate.

Accelerated Bridge Program (ABP)
- 5 projects were designated into the ABP in 2016, all state highway projects.
- 7 ABP projects were advertised in 2016. Of the 7 projects, 71% (5 projects) were advertised within 24 months. The remaining 2 projects were delivered in 27 and 28 months.
- All 7 ABP projects advertised in 2015 were successfully constructed during 2016 construction season.

Conventional Project Delivery
- 10 projects were designated into the conventional project delivery program in 2016. 40% (4) are interstate projects, 50% (5) are state highway projects, and 10% (1) is town highway.
- 11 projects were advertised in 2015.
- 10 bridge projects were under construction during the 2015 construction season.

Hydraulics
- The Hydraulic Unit sized approximately 100 culverts for towns and 55 culverts on state routes for the Maintenance and Operations Bureau in addition to working on 40 programed projects from the Project Delivery Bureau.
## Paving Mileage Summary

(Two-lane miles, rounded to the nearest mile)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>33</td>
<td>18</td>
<td>32</td>
<td>55</td>
<td>53</td>
<td>25</td>
</tr>
<tr>
<td>Carried forward from previous year</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>31</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Incomplete, to be carried forward</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>31</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Rut Filling (single lane miles)</td>
<td>0</td>
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<td>0</td>
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<td>0</td>
</tr>
<tr>
<td>Surface Treatments</td>
<td>52</td>
<td>64</td>
<td>50</td>
<td>61</td>
<td>37</td>
<td>44</td>
<td>45</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>Carried forward from previous year</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>31</td>
<td>0</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Incomplete, to be carried forward</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>31</td>
<td>0</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>State Highway</td>
<td>68</td>
<td>67</td>
<td>18</td>
<td>44</td>
<td>59</td>
<td>43</td>
<td>39</td>
<td>87</td>
<td>50</td>
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<tr>
<td>Carried forward from previous year</td>
<td>37</td>
<td>22</td>
<td>20</td>
<td>13</td>
<td>7</td>
<td>0</td>
<td>3</td>
<td>27</td>
<td>0</td>
</tr>
<tr>
<td>Incomplete, to be carried forward</td>
<td>0</td>
<td>37</td>
<td>22</td>
<td>20</td>
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<td>0</td>
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<td>*</td>
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<td>Incomplete, to be carried forward</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>11</td>
<td>13</td>
<td>*</td>
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<td>Class 1 Town Highway</td>
<td>10</td>
<td>4</td>
<td>4</td>
<td>11</td>
<td>6</td>
<td>10</td>
<td>6</td>
<td>8</td>
<td>9</td>
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<tr>
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<td>5</td>
<td>7</td>
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<td>8</td>
<td>5</td>
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<td>Crack Seal</td>
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<td>220</td>
<td>361</td>
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<td>161</td>
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<td>290</td>
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<td>Preventive Maintenance Total (items in gray)</td>
<td>375</td>
<td>2688</td>
<td>458</td>
<td>468</td>
<td>298</td>
<td>232</td>
<td>167</td>
<td>153</td>
<td>206</td>
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</table>

## Paving Mileage Summary (as per table above)
Performance Measures
Automated surveys are conducted annually to determine pavement conditions across the state. Each segment of road is rated on a scale of 1 to 100 based on rutting, cracking, and roughness. These are then weighted by their respective traffic volumes. The VTrans goal for this performance measure is 70.

Percent of Network in “Very Poor” Condition
While the “Travel Weighted Average Network Condition” graph measures VTrans performance for the majority of road users, the “Conditions Over Time, Unweighted” graph measures the agency’s performance for all users, including those on low volume roads. The VTrans goal for the percentage of roads in very poor condition is no more than 25%.

Pavement Condition Descriptions
- **Good**
  Like new pavement with few defects perceived by drivers
  Composite Pavement Condition Index 80-100

- **Fair**
  Slight rutting, and/or cracking, and/or roughness become noticeable to drivers
  Composite Pavement Condition Index 65-79

- **Poor**
  Multiple cracks are apparent, and/or rutting may pull at the wheel, and/or roughness causes drivers to make minor corrections
  Composite Pavement Condition Index 40-64

- **Very Poor**
  Significant cracks may cause potholes, and/or rutting pulls at the vehicle, and/or roughness is uncomfortable to occupants. Drivers may need to correct to avoid defects.
  Composite Pavement Condition Index 0-39
Network Pavement Structural Types

The “Pavement Type Distribution” chart represents the breakdown of the various pavement structural types a motorist will encounter throughout the Agency’s highway network. This information provides a sense of how the network structures vary, and how that can pose a challenge from a management perspective.

Interstate travel provides a motorist the best example of an engineered pavement/highway. Engineered pavement is designed and constructed from the bottom up with the expectation that if maintained properly over time, the pavement will stand up very well to Vermont’s harsh climate for 40 years or more. About 36 percent of the state’s pavements are engineered, and it is these pavements which can be managed the most effectively, both in terms of cost and serviceability.

About 55 percent of the network is composed of non-engineered pavements. A non-engineered pavement is a structure that has been built-up over the years based on minor treatments and maintenance activities. The end result is a highway evolving from what may have once been a logging road into what is now a paved roadway. Some of these pavements perform reasonably well over time. Fortunately, 41 percent of the network’s pavements respond in this manner and are considered non-engineered Strong. It is the remaining percent—the 14 percent of the network that is non-engineered weak pavements—that pose the greatest challenge to the agency. A significant investment is required to keep these pavements in good condition for a reasonable amount of time.

The last pavement structure classification is Asphalt on Concrete. These comprise 9 percent of the state highway network pavements, and they are a challenge to manage effectively. Often times they are discernible to the untrained eye where cracks reflect through the asphalt revealing the slabs beneath. While strong, problems exist where a lane has been widened beyond the slab’s edge because the additional pavement will distress or settle differently creating a poor ride. Unfortunately, these structures are typically maintenance intensive and do not perform well with a conventional resurfacing treatment.

The VT100 bridge project in Waitsfield is the first use of Ultra-High Performance Concrete in Vermont. UHPC provides added resilience over traditional concrete.

Resurfacing of US 7 in Highgate Springs.
2016 Paving Accomplishments

2016 PAVING
2016 PREVENTIVE MAINTENANCE
2016 DISTRICT PAVING

0 5 10 15 20 Miles

BELVIDERE-BERKSHIRE
STP SURF(53) VT118

JOHNSON-HYDE PARK
STP SURF(52) VT100C

ST GEORGE-WILLISTON
STP FPAV(4) VT12A

STARKSBORO-BUELS GORE
STP FPAV(5) VT17

BETHEL-RANDOLPH
STP 2921(1) VT12

KILLINGTON-WOODSTOCK
ER NH 020-2(38) US4

MANCHESTER-RUTLAND TOWN
NH SURF(50) US7

JAY-TROY
STP 2915(1) VT105

LEMINGTON-CANAAN
STP 2723(1) VT102, VT114, VT253

WORCESTER-ELMORE
STP 2954(1) VT12 BERLIN
NH STP 2938(1) VT62 BERLIN
NH STP 2947(1) US302 BERLIN
STP 2935(1) BERLIN S.H.

BRADFORD-RYEGATE
STP 2920(1) US5, US302, NEWBURY S.H.

THETFORD
STP 2221(1) S VT113

WOODSTOCK-BARNARD
STP FPAV(3) VT12

CHESTER-SPRINGFIELD-ROCKINGHAM WINDSOR
STP 2952(1) US5, VT11, VT44, VT103, VT106

VTRANS FACT BOOK 2017
2017 Proposed Paving Program
National Highway System Pavement Conditions
National Highway System Pavement History
State Highway System Pavement Conditions
State Highway System Pavement History
Introduction

Vermonters depend on VTrans to be good stewards of the State’s transportation, environmental and financial resources. This trust is something that VTrans does not take lightly; VTrans has consistently and diligently worked hard to build accountability for its actions and gain credibility with the public and the Legislature. In 2013, the message to the Legislature was that VTrans has renewed its commitment to asset management and that “asset management was going to change how VTrans conducts its business.” In 2016 these words continue to have a transformative impact on VTrans’ plans and operations. VTrans is in development of its initial Transportation Asset Management Plan or TAMP. At 60% complete the TAMP will outline a plan to manage the Agency’s assets; starting with pavements and bridges.

Asset management is and has always been tightly woven into VTrans’ culture. Asset management encompasses the planning, programming, design, construction and maintenance phases of an asset’s lifecycle and is supported by all Agency employees.

Asset Management Philosophy

Asset management is the strategy that allows VTrans to invest the right amount of funds in the right asset at the right time. Asset management, when fully implemented, will allow the Agency to monitor asset status and condition, determine appropriate customer service levels performance and determine the level of unmet needs. The primary goal of VTrans Asset Management is to conduct effective and efficient decision-making processes based on a combination of quality data and well-defined performance objectives, enabling VTrans to effectively program construction and maintenance activities at strategic points in an asset’s life. Asset management at VTrans represents a best practices approach to managing infrastructure performance that is both strategic and proactive. In addition, asset management seeks to identify risks across the Agency and managing these risks to reduce threats while increasing innovations and opportunities. Effective management of infrastructure risks increases the likelihood that the Agency will achieve its strategic goals and associated performance objectives.

Fiscal Management

Asset management is a collection of best practices targeted at utilizing available funding strategically and efficiently. VTrans asset management practices are performed with a “preservation first” principle rather than “worst first.” The Agency applies this principle by optimally balancing regular preventive maintenance activities with construction of carefully planned and programmed rehabilitation and replacement projects. These activities are performed with the intent of increasing the asset’s useful life. Typically, an asset with a long useful life requires multiple intervention points including a combination of repair and maintenance activities. The strategic timing of these intervention points effectively optimizes the balance between the asset’s useful life and its overall lifecycle costs, thereby maximizing the value of the Agency’s financial resources.

VTrans’ Asset Management and Performance Bureau coordinates the management of effective and realistic scopes, accurate cost estimates, and reliable schedules for these activities. The Bureau is committed to providing these services at an acceptable level of risk to the Agency and within current forecasted revenue projections while delivering customer service levels that the public expects and decision makers require. Maintaining our highways at a fair, good or very good condition is more cost-effective than allowing it to erode to a poor or very poor condition where replacement costs dramatically increase. VTrans utilizes asset management, performance management and risk management principles to effectively manage both the physical and financial condition of its assets to achieve its strategic objectives. This renewed commitment and focus on asset management complements the Agency’s customer service focus.

<table>
<thead>
<tr>
<th>Asset Management Best Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asset Inventory</strong></td>
</tr>
<tr>
<td>Identify and prepare an accurate asset inventory database, represented spatially on a GIS platform</td>
</tr>
</tbody>
</table>

**EXAMPLES**

- Interactive GIS map of asset locations with “pop-up” information of asset condition.
- Condition Target: Maintain a minimum of 75% of pavements above a “Very Poor” Condition.
- Analyze freight corridors for bridge restrictions and economic impacts. Develop strategies to remove restrictions.
- Apply the right treatment, using the right materials, at the right location and at the right time.
- Manage customer expectations in a fiscally responsible and environmentally sensitive manner for present and future generations.
Customer Service Levels
Assets provide services to our customers by providing them with the ability to get where they need to go in a safe and timely manner. VTrans’ customers are Vermont residents, businesses and visitors who rely on VTrans to manage the needs of our transportation system in a cost-effective, efficient, safe and sustainable manner. Through asset management and its commitment to the stewardship of public resources, VTrans manages the condition and performance of highway assets by minimizing life cycle costs through the timely programming of capital improvement projects and maintenance activities. Simply stated, VTrans is developing an initial asset inventory and documenting where it is located while at the same time evaluating the asset’s condition and understanding the financial costs required to maintain the State’s infrastructure at an acceptable condition state to maintain a required level of customer service.

These actions form the foundation of VTrans’ commitment to providing quality customer service, for both present and future customers. VTrans is currently engaging stakeholders in discussions of customer service levels. Recent progress in this area has resulted in the Maintenance and Operations Bureau collaborating with the Asset Management and Performance Bureau to develop customer service levels based on VTrans’ current understanding of customer expectations and past policies.

Risk Based—Performance Driven
Asset management is risk-based and performance driven; driven by policy goals and performance objectives outlined in the Agency’s Strategic Plan. Asset management represents an approach to managing infrastructure that is both strategic and proactive, and places a premium on quality data and information. Many of these objectives have time frames that span several years. Failure to acknowledge, measure and manage both short and long term uncertainties is to overlook obvious risks that affect the credibility and success of the Agency’s decisions. Thus the effective management of VTrans’ highway assets must rely on risk management to enhance its decision making processes.

In 2016, VTrans continued a journey that it began in 2014; to develop an Agency-wide risk registry that will ultimately enhance its decision making processes by documenting internal and external risks that may affect its performance objectives. These risks have and will continue to be identified at the enterprise level and across Agency programs, projects and activities. Both performance and risk management play an integral role in supporting asset management activities towards the achievement of the Agency’s strategic goals.

To summarize, the risks and challenges to manage transportation infrastructure assets in a fiscally responsible and sustainable manner has led VTrans to emphasize an asset management policy and incorporate business processes that ensure that quality decisions are made based on accurate data and analysis while mitigating identified risks.

Asset Management Framework and the TAMP
Currently there are significant efforts being expended to develop a transportation asset management plan (TAMP). The TAMP is the tactical plan for managing the Agency’s assets and one of its primary objectives is to support the Agency’s Strategic Plan. This effort is being coordinated through the Agency’s Transportation Asset Management Plan Working Group (TAMP-WG). This group is comprised of 27 individuals representing asset management functions across VTrans; they are participating and leading 9 task forces that are focused on developing different parts of the overall plan.

The collective efforts of the TAMP-WG combined with the energy and on-going activities of the Asset Management and Performance Bureau team are synergistically developing an asset management framework to support the Agency’s asset management efforts to comply with future MAP-21 requirements and Vermont State Statute 19 V.S.A §10k. The components of this framework reflect the recommendations of the Federal Highway Administration (FHWA), MAP-21 and best practices of the international community.

VTrans’ asset management framework is designed to support the Agency’s policies and goals related to accountability, mobility, resiliency, safety, sustainability and transparency. The proposed framework is envisioned to include a continuous cycle of asset condition and inventory, performance, and risk and cost assessments. These activities will provide data and information that asset managers can use to develop, implement and support the TAMP.

Conclusion
The Asset Management and Performance Bureau is committed to measuring and monitoring the Agency’s performance relative to its assets and provision of those assets to VTrans’ customers. VTrans believes that through education and effective communication that it can provide its customers with a deeper understanding of the costs and benefits of individual functions (asset maintenance, resurfacing, rehabilitation and replacement) and how these costs impact overall Agency programs and budgets. In return, the customers (the public) can then use this information to communicate more clearly to the decision-makers (the legislators) the level of infrastructure investment, maintenance and condition they expect. The decision-makers can then use this information in partnership with VTrans to collaboratively make the decisions they believe reflect the best stewardship of the public resources.

In summary, VTrans is in the process of adopting asset management policies and processes consistent with internationally accepted best practices to maximize the value of its infrastructure assets and to guide its decision-making processes. VTrans is committed to responding proactively to Vermont’s transportation needs and is responsible for ensuring that Vermont’s transportation system remains in a state of good repair; regardless of its age.
As stewards of Vermont’s highway infrastructure, the Agency of Transportation is responsible for understanding the components of the State’s transportation system and how asset improvements to these components can be budgeted to preserve the integrity of our highway system in a cost effective and efficient manner. To support this understanding, several Asset Management projects have been undertaken across the Agency.

**Small Culvert Inventory**

In response to several maintenance and safety issues associated with aging culverts, the Agency has dedicated significant resources to generating an inventory of small culverts with diameters ranging between 12 and 72 inches. Through a collaborative effort between the Asset Management and Performance Bureau (AMP) and the Maintenance and Operations Bureau (MOB), crews have been working over the last several years to locate drainage structures within the highway right-of-way, storing location and inspection information in a centralized GIS database. In 2016 the initial effort is now complete; resulting in a database of over 50,000 small culverts statewide. With the initial inventory complete, the focus of the small culvert inventory project now moves into a secondary phase including the reinspection of 20% of the culvert inventory on an annual basis.

These reinspection activities will maintain current asset information as well as ensure the utilization of the small culvert data to prioritize maintenance and repair activities.

**Maintenance Assets**

The Agency is exercising its performance management muscles by focusing AMP and MOB energies on its core maintenance activities. Historically, the Agency has done an excellent job of reporting its maintenance activities and asking “How much work is being done?” but now the question of “How much of each activity should we be doing?” is being asked as well.

To answer the second question, the Agency has focused on several core maintenance activities and is developing asset inventories, thereby enhancing its capabilities to report on infrastructure condition. This year the Agency continued to focus on developing its guardrail inventory, pavement markings, and mowing areas. An inventory of each of these assets is being developed and integrated into VTrans’ mapping systems and maintenance management system. Once these inventories are complete, the Agency will analyze the cyclical, routine and major maintenance needs to understand how much work needs to be done on an annual basis to achieve Agency performance measures.

**Statewide Roadway Data Inventory**

Roadway data collection technology and tools have developed over the years and as the capabilities of the data have expanded over time so too has the desire for this data to assist different programs within the Agency. Information about the highway surface and roadway geometry is used by several groups within the Agency and has been historically acquired through various means. In recent years the collection of roadway data has been continually consolidated into one contract. In 2016, the consolidation of these data needs continued with the inclusion of pavement conditions, forward facing photography, lane width, shoulder width and bike lanes, all within a singular vendor contract. This consolidation has decreased data acquisition and administrative overhead costs while greatly reducing the need for data integration across the Agency.

The AMP continues to investigate new tools and technology like the rolling wheel deflectometer to increase the quality of its pavement data inventory. The collection of the statewide roadway data will provide the Agency with effective corridor management tools and technology increasing its ability to ensure that the right asset is being treated at the right time.
In compliance with 19 V.S.A. paragraph 10b(c), a priority ranking system was developed for each asset type.

**Structures**

<table>
<thead>
<tr>
<th>Category</th>
<th>Maximum Points</th>
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<td>Bridge Condition</td>
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<td>Remaining Life</td>
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<td>Functionality</td>
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<tr>
<td>Load Capacity and Use</td>
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<tr>
<td>Waterway Adequacy and Scour</td>
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<tr>
<td>Susceptibility</td>
<td>10</td>
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<tr>
<td>Project Development and Momentum</td>
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<tr>
<td>Regional Input and Priority</td>
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<tr>
<td>Asset—Benefit Cost Factor</td>
<td>10</td>
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</table>

Points are then summarized for each program, with the highest score receiving the top ranking. Rankings will change from year to year as projects are completed, as bridges change in condition, or as regional planning commissions’ priorities change. These priorities are used in developing the capital program, help in deciding which bridges to advance next, and have enabled us to clear a backlog of projects in a defined, documented, and efficient manner.

Selection for proposed rehabilitation and reconstruction projects will continue to utilize the priority system. To become a project and have design initiated, the bridge will need to be among the highest ranked.

The bridge priority system, which is used to rank major bridge replacement and rehabilitation projects, will continue to be used for project selection and determining funding needs. However, this system is not inclusive as it does not rank short structures or maintenance needs, both preventive and routine.

Bridge replacement and rehabilitation projects progress through the VTrans Project Development Process. With its current reorganization, the Structures Section is aggressively looking for opportunities to streamline project delivery while reducing project scope, impacts and costs.

Scope reduction can be achieved by various methods: reducing approach work, minimizing or eliminating enhancements, phased construction or road closures. Although inconvenient for a community, the elimination of a temporary bridge reduces timelines, cost, need for significant right-of-way acquisition and resource impacts. Swiftness of construction and improved safety conditions are benefits of road closures.

Where appropriate, accelerated bridge construction (ABC) and materials are utilized. The technique minimizes traffic disruptions and congestions, improves work-zone safety, and lessens environmental impacts. Additionally, prefabrication can improve constructability, increase quality, and lower life-cycle costs.

The establishment of the bridge maintenance program gave us a start, enabling us to perform much-needed preventive maintenance on a limited number of bridges, but it was just the beginning. Preventive maintenance is not a high-profile activity; if done on a routine schedule, however, its benefits will be obvious as it will extend service life and delay the rate at which our bridges become structurally deficient. The agency has substantially grown the program from its origins and has now integrated it into the regular program.

Focusing efforts toward preventive maintenance activities will slow, but not reduce, the number of bridges becoming structurally deficient. Preventive maintenance does not correct existing structural deficiencies, but instead retards deterioration so that a bridge’s lifespan can be extended, thus preventing the structure from becoming structurally deficient. To this end, preventive maintenance is essential to slowing the rate at which structural deficiencies evolve over time.

The value of preventive maintenance will be appropriately demonstrated in the future through new performance measures that evaluate a bridge’s overall core unit condition or network health.

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**VTRANS FACT BOOK 2017**

Waitsfield. Construction of a replacement bridge over the Mad River along VT100 in Waitsfield. The new bridge is being constructed using Accelerated Bridge Construction methods to minimize the length of the bridge closure.
Pavement
Asset Condition (PCI)
Pavement Condition Index
• Combination of: Ride, Rut, Cracking
• Scoring structured to recognize need to address roads in very poor condition regardless of traffic

Project Economics (Benefit Cost)
Benefit Cost Ratio
• Benefit compares condition difference between the selected treatment and doing nothing on the project section over the lifespan of the treatment
• Benefits are weighted by traffic volume
• Cost is present value financial cost to the state
• Measures the “Bang for the buck” amongst candidate projects

Regional Planning Commission (RPC) Rank
Regional Importance
• Allows RPCs to address socio-economic, cultural/local importance and impact on local economy of candidate projects
• Scoring structure helps create a geographically distributed program

Roadway
Highway System (40 points)
This factor looks at the Highway Sufficiency Rating and the network designation. Interstates are held to the highest standard, followed by non-Interstate primary and then off-primary roads. The Highway Sufficiency Rating considers traffic, safety, width, subsurface road structure, and more.

Cost per vehicle mile (20 points)
This is the project cost divided by the estimated number of miles vehicles will travel on the project. This is a relatively easy method to get a benefit/cost ratio for comparing similar projects.

Regional Priority (20 points)
The top RPC Roadway project is assigned 20 points. The score is reduced for lower RPC priorities. Projects listed as priority #10 and lower get two points.

Project Momentum (20 points)
This factor considers where the project is in the development process and anticipated problems such as right of way or environmental permitting. Some projects are so far along that they must be completed or the Agency would have to pay back federal funds.

Designated Downtown project
Per 19 V.S.A. § 10g(l)(3), VTrans awards ten bonus points to the base score for projects within a designated downtown development district established pursuant to 24 V.S.A. § 2793.

Traffic Design
Intersection Capacity (40 points maximum)
This factor is based on Level of Service (LOS) for the intersection and the number of intersections that are in the coordinated system. Projects with a lower LOS and that are part of a larger coordinated system receive higher scores for this category.

Accident Rate (20 points maximum)
This factor is based on the critical-accident ratio for the intersection. Projects with higher critical-accident ratios receive higher scores for this category.

Cost per Intersection Volume (20 points maximum)
This factor uses the estimated construction cost and average-annual-daily traffic through the intersection. VTrans calculates the construction cost of the project for each anticipated user through the intersection. Projects with lower costs per intersection volume receive higher scores for this category.

Regional Input and Priority (20 points maximum)
This factor is based on the ranking of projects from the RPCs/MPO. The RPCs/MPO rank the projects based on criteria they develop. Projects with higher regional rankings receive higher scores for this factor.

Project Momentum (10 points maximum)
This factor considers:
• Where the project is in the development process
• Anticipated problems such as right of way or environmental permitting
• Funding
Aviation

The Aviation Program manages 90 runway lane miles at 10 state-owned airports in Vermont, providing a safe environment for users of the system, preserving the publicly-owned infrastructure, promoting aviation-related activities, and expanding travel opportunities.

In 2016, Rutland Southern Vermont Regional Airport (RSVR) had over 6,000 enplanements including regular passenger service offered via Cape Air. 1,500,000 pounds of cargo moved through RSVR in 2016 and 545,000 pounds moved through Knapp State Airport in Berlin.

Airport Contact Information

MUNICIPAL AIRPORTS
Burlington International
Kelly Colling
(802) 863-2874

STATE AIRPORTS
Caledonia County
Daniel Freeto
(802) 626-3353
Edward F. Knapp
John Roberti
(802) 223-2221

Franklin County
Cliff Coy
(802) 868-2822

Hartness
Larry Perry
(802) 886-7500

John H. Boylan
Jennifer Davis
(802) 272-3574

Middlebury
Cisco Herrera
(802) 505-8479

Morrisville-Stowe
Cody Long
(802) 253-2332

Newport
Dan Gauvin
(802) 334-5001

Rutland Southern Vermont Regional
Chris Beitzel
(802) 786-8881
William H. Morse
Rob Luther
(802) 595-5830

PRIVATE AIRPORTS
Basin Harbor
Robert Beach, Jr.
(802) 475-2311

Mt. Snow
Jim Barnes
(802) 457-3151

Post Mills
Brian Boland
(802) 333-9254

Shelburne
Ray Magee
(802) 985-2100

Warren-Sugarbush
Rick Hanson
(802) 496-2290

NEWPORT. Completed runway extension to the Northeast Kingdom International Airport and the ongoing taxiway project.
Passenger Rail Service

The State of Vermont partners with Amtrak to provide intercity rail service for Vermonters and visitors to the Green Mountain State.

The Amtrak Vermonter runs on the New England Central Railroad (NECR/GWI) from Saint Albans to Brattleboro, continues through Massachusetts and Connecticut, and then down the Northeast Corridor to New York City and Washington, DC. In 2015, the Vermonter route in Massachusetts was changed to run along the Connecticut River Line to New Haven, reducing track miles and travel times, and providing a much smoother ride over brand-new rails. To learn more visit: www.amtrak.com/vermonter-train

Amtrak’s Ethan Allen Express runs on the Clarendon and Pittsford Railroad (CLP) from Rutland to Whitehall, New York, and from there continues south to Albany and on to New York City. To learn more visit: www.amtrak.com/ethan-allen-express-train

Amtrak Vermonter or Ethan Allen Express reservations:
1-800-USA-RAIL (1-800-872-7245)
TDD/TTY (1-800-523-6590)
www.AMTRAK.com

2016 Ridership and Revenue

<table>
<thead>
<tr>
<th>Lines</th>
<th>Ridership</th>
<th>% Change</th>
<th>Revenue</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vermonter</td>
<td>89,318</td>
<td>-3.6%</td>
<td>$5,718,268</td>
<td>-1.8%</td>
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<tr>
<td>Ethan Allen Express</td>
<td>50,717</td>
<td>-3.5%</td>
<td>$2,873,155</td>
<td>-2.8%</td>
</tr>
</tbody>
</table>

Federal Grants

TIGER V
Awarded in 2013, work is nearly complete

Award total: $9 million Federal Railroad Administration grant
Project total: $11.2 million
Work includes: 10.12 miles of Continuous Welded Rail (CWR) upgrades
11 farm crossings
1 siding
9 switches

TIGER VII
Awarded in 2015, work began in 2016

Award total: $10 million Federal Railroad Administration grant
Project total: $26.4 million
Work includes: $9.8 + 6.33 = 11.31 miles of CWR upgrades
Rutland and Burlington Wye
Florence and Leicester siding
Bridge, crossing, and platform upgrades
Public Transportation

The Public Transit Section is responsible for the planning, administration, funding and oversight of the statewide network of public transit providers. Transit providers operate multiple types of service including fixed-route, commuter runs, demand response, health care and shopping shuttles, winter seasonal routes, ADA complimentary transit, special services for the state’s elderly and disabled citizens and intercity bus services. Transit services provide vital access to communities, local businesses, educational institutions, employment, national bus connections, adult day services, medical services, and tourism destinations.

www.connectingcommuters.org/bus-info/city-to-city/

Public Transit Providers

- **Addison County Transit Resources (ACTR)**
  Jim Moulton / jim@actr-vt.org
  Phone (802) 388-1946 / Fax: (802) 388-1888

- **Advance Transit, Inc.**
  Van Chesnut / van@advancetransit.com
  Phone: (802) 295-1824 / Fax:(802) 295-3010

- **Green Mountain Community Network (GMCN)**
  Donna Baker / dbaker@greenmtncn.org
  Phone: (802) 447-0477 / Fax: (802) 447-2550

- **Green Mountain Transit (GMT/CCTA):**
  Karen Walton / kwalton@cctaride.org
  Phone: (802) 223-7287 / Fax (802) 223-6236

- **Marble Valley Regional Transit District (MVRTD; The Bus)**
  Minga Dana / minga@thebus.com
  Phone: (802) 773-3244 / Fax: (802) 773-0840

- **Rural Community Transportation, Inc. (RCTI)**
  Mary Grant / marygrant.rct@gmail.com
  Phone: (802) 748-8170 x301 / Fax: (802) 748-5275

- **Southeast Vermont Transit - Current and Moover Division**
  Randy Schoonmaker / randys@moover.com
  Phone: (802) 464-8487 / Fax: (802) 464-0164

- **Stagecoach Transportation Services, Inc. (STSI)**
  Jim Moulton / jim@actr-vt.org
  Phone: (802) 728-3773 / Fax: (802) 728-6232

Intercity Bus Service Providers:

- **Vermont Translines**
  Info@vttranslines.com
  Phone: (802) 888-7267
  www.vttranslines.com

- **Greyhound Bus Lines**
  ifsr@greyhound.com
  Phone: (800) 231-2222
  www.greyhound.com

**Total Ridership**

<table>
<thead>
<tr>
<th>Year</th>
<th>Ridership</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>4,715,154</td>
</tr>
<tr>
<td>2015</td>
<td>5,014,211</td>
</tr>
<tr>
<td>2014</td>
<td>4,840,525</td>
</tr>
<tr>
<td>2013</td>
<td>4,947,409</td>
</tr>
<tr>
<td>2012</td>
<td>4,808,103</td>
</tr>
<tr>
<td>2011</td>
<td>4,578,370</td>
</tr>
</tbody>
</table>
Ridership Trends
Statewide public transit ridership continues to grow steadily in general. In SFY 2016, Vermont’s public transit systems provided over 4.7 million trips. Most routes and categories had modest increases in ridership but the poor skiing season dramatically reduced ridership on tourism routes and caused an overall ridership decline of 6% from SFY 2015.

Statewide non-tourism transit ridership saw a modest increase, but the ski season decrease has reduced the 6-year increase to about 3%. Just over half of those rides are provided in the Chittenden County region, and the other half is spread throughout the rest of the State.

There are many types of riders and VTrans is proud to serve the spectrum of the population from those needing one on one volunteer rides to medical appointments to commuters riding coach buses.

Route Performance
The Public Transit Section has established route categories based on the type of service provided. Transit providers submit monthly Service Indicator Reports for each route and all services reflecting total cost, ridership, miles, etc. and each service category is compared to VT and comparable routes in other states. This data reveals overall route performance and trends. Routes that are underperforming or losing ridership over time will be changed or canceled. VTrans looks for areas to add more routes where ridership is likely to be high and seeks to provide technical support to improve ridership on low-performing routes.

Intercity Bus Service
VTrans has entered into partnerships with commercial bus services to bring more connectivity and travel options to the state. In addition to ongoing services provided by Greyhound, Megabus, and Yankee Trails, two new intercity routes were developed with Vermont Translines in 2014 and bus service now includes routes between Burlington to Albany, NY and/or Rutland and White River Junction. All intercity routes connect to national bus networks. All intercity service and routes can be found at the Go Vermont website or by calling 1-800-685-RIDE.

Farebox Revenue & Local Share
VTrans has an established statewide goal of 20% local share participation for public transportation adopted as part of the 2012 Public Transit Policy Plan. Local share includes fare revenue, private contributions, contracts from outside agencies, payments from cities and towns and in-kind contributions.

The local share analysis found that 27% of statewide transit funding comes from local sources including fares. Of 8 agencies in the state, seven charge fares on at least some routes. Other routes are offered fare-free because of local contributions from towns and institutions. Total fare revenue collected statewide in SFY2016 was $3.325 million. Fare recovery ratios (% of operating costs covered by fares) range from roughly 1% on some rural routes to 69% on the Montpelier-Burlington LINK Express. The average among all routes that collect fares is 12%. Fare revenue makes up between 20% and 25% of the operating budget for CCTA.
Elders and Persons with Disabilities “E&D” Program

In SFY 2016, the total amount spent on the E&D program in Vermont was $3.5 million, 80% of which ($3.87 million) was federal money. Overall, 158,431 E&D trips were provided in Vermont, with GMTA accounting for the largest share at 27%. While GMTA provided a majority of the E&D trips, SEVT had the highest percent of cost (23%). STSI had the highest cost per mile at $2.38 while RCT had the lowest at $1.08. GMCN had the highest cost per hour at $65.26 while SEVT had the lowest cost per hour at $34.32. STSI had the highest cost per passenger at $36.06 while GMTA had the lowest cost per passenger at $18.87.

E&D Trips by Mode

Approximately 15% of E&D trips are provided by bus or by the use of a bus pass, 37% by van, and 4% by taxi. Volunteer drivers operating their personal vehicles account for the largest percentage of E&D trips provided at 44%. This is an increase of 8% since FY15.

Go Vermont Program

Go Vermont is a resource for Vermonters who want to reduce the costs and environmental impact of driving alone. Services provided through the Go Vermont program include automated matching for carpools, a public/private vanpool program, links to all public transit routes, and an emergency ride home service. In addition, we offer program development and transportation demand management program (TDM) assistance to Vermont employers. Our one-click/one-call clearinghouse of transportation-related resources allows Vermonters to examine their travel options and make educated transportation choices.

VTrans’ Public Transit Section administers the Go Vermont program in-house with the assistance of the ride matching software, Zimride, and the Vermont Energy Investment Corporation, which provides a call center service with live operations and a messaging service. In order to raise the profile of Go Vermont, VTrans is implementing an intensive statewide marketing plan, promoting efficient modes of transportation.

Go Vermont continues to expand its services through contracts with existing Transportation Management Associations to bring employer assistance to any interested employer in the state. An example of this is Capital Commuters, a pilot project for state employees to Montpelier. The goal of this plan is to reduce the parking pressures in downtown Montpelier and provide incentives for efficient commuting options. Incentives include 50% discounted bus passes, preferential parking for carpools and vanpools, and bike/walk “rewards.” All registrants are eligible for the Guaranteed Ride Home Program, where VTrans will reimburse an individual for up to $70 for alternative transportation (taxi, rental car, bus) home in the event of an emergency.

Capital Commuters

2015 Funding and Local Share by Transit System

<table>
<thead>
<tr>
<th>Transit System</th>
<th>Local Funding</th>
<th>State and Federal Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTR</td>
<td>14%</td>
<td>41%</td>
</tr>
<tr>
<td>AT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTTA</td>
<td>44%</td>
<td>15%</td>
</tr>
<tr>
<td>SEVT</td>
<td>15%</td>
<td>14%</td>
</tr>
<tr>
<td>GMCN</td>
<td>14%</td>
<td>10%</td>
</tr>
<tr>
<td>GMA</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>MVRTD</td>
<td>18%</td>
<td>13%</td>
</tr>
<tr>
<td>RCT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STSI</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Elders and Persons with Disabilities “E&D” Trips by mode, SFY 2016

- **Volunteer Driver**: 44%
- **Bus Pass**: 12%
- **Van**: 37%
- **Bus**: 3%
- **Taxi**: 4%
- **Sedan**: 0%

VTRANS FACT BOOK 2017
Park and Ride Locations

- State Park & Rides
- Municipal Park & Rides
- EV Charging Station

http://parkandrides.vermont.gov/
Regional Planning

The Policy and Planning section coordinates and collaborates with all agency divisions, other state agencies, regional planning commissions, the public and other stakeholders as it considers all modes of travel in the context of broader economic, land use, environmental, energy and equity goals.

Through the Transportation Planning Initiative (TPI), VTrans provides grants to Vermont's 11 Regional Planning Commissions (RPCs) for transportation planning and to facilitate collaboration between municipalities and the agency.

Transportation Planning Coordinators

- **CCRPC, LCPC, NRPC**
  - Amy Bell
  - (802) 828-2678, amy.bell@vermont.gov
  - CCRPC: Chittenden County Regional Planning Commission
  - LCPC: Lamoille County Planning Commission
  - NRPC: Northwest Regional Planning Commission

- **NVDA**
  - Matthew Langham
  - (802) 828-5578, matthew.langham@vermont.gov
  - NVDA: Northeastern Vermont Development Association

- **CVRPC**
  - Amy Bell
  - (802) 828-2678, amy.bell@vermont.gov
  - CVRPC: Central Vermont Regional Planning Commission

- **SWRPC, TRORC, WRC**
  - Jackie Cassino
  - (802) 272-2368, jackie.cassino@vermont.gov
  - SWRPC: So. Windsor County Regional Planning Commission
  - TRORC: Two Rivers-Ottawaquechee Regional Commission
  - WRC: Windham Regional Commission

- **ACRPC, BCRC, RRPC**
  - Sommer Bucossi
  - (802) 828-3884, sommer.bucossi@vermont.gov
  - ACRPC: Addison County Regional Planning Commission
  - BCRC: Bennington County Regional Commission
  - RRPC: Rutland Regional Planning Commission

### 2016 Transportation Planning Initiative Objectives and Accomplishments

- **Cooperation & Coordination between VTrans, RPCs, and Municipalities**
  - 88 Transportation Advisory Committee (TAC) Meetings

- **Conformance with Act 200 & Facilitation of Decentralized Decision-Making**
  - 11 Regional Transportation Plans

- **Provide Transportation Planning Support to Municipalities**
  - 35% of TPI Budget Spent on Local Technical Assistance

- ** Counts: Traffic, Bike/Ped, Park and Ride**
  - 583

- **Act 250 Hearings with Transportation Comments**
  - 28

- **Scoping Studies Completed**
  - 39

- **Inventories: Bridge, Culvert, Erosion, Sidewalk, Sign**
  - 104

- **Safety Forums, Standards, Road Foreman, Other Meetings**
  - 150

- **Accelerated Bridge Project Meetings**
  - 16
Civil Rights

The Civil Rights Section is responsible for ensuring compliance by VTrans with all federal and state requirements regarding equal employment opportunity, contract compliance, and the participation of disadvantaged, minority and women-owned businesses on contracts and grants awarded by VTrans. Civil Rights works to ensure equal opportunity and access for all VTrans employees, job applicants, contractors and the public, and to promote inclusion, fairness and equity, and a culture of dignity and respect.

Employment Opportunity

Recruitment
In 2016, the Civil Rights Section worked closely with the Agency’s hiring managers to coordinate participation in over 30 job fairs, career panels, conferences, and other outreach and recruitment events. Agency employees are the best ambassadors to promote VTrans as an employer of choice.

Youth Outreach
Today’s students represent the pool of workers from which the transportation industry will recruit its future work force. VTrans promotes year-round youth outreach to expose students to rewarding and diverse careers in the transportation industry. The Agency’s participated in numerous career fairs, panels, and conferences; serves as a host site for students engaged in Community Based Learning or short term job shadows; and provided an annual summer residential program for high school students as part of FHWA’s National Summer Transportation Institute (NSTI). In 2016, 26 high school students participated in the VTrans NSTI Program.

Partnerships - Build Vermont Pathway Program
Civil Rights networks extensively with other state agencies, academic institutions, trade groups, and community based organizations to build a robust applicant pool and to build a workforce that thrives and embraces the VTrans culture of respect, teamwork, safety and innovation. In 2016, VTrans partnered with the Vermont State Colleges (VSC) to launch the Build Vermont Pathway program, with the goal of promoting internships and permanent jobs at VTrans to students at Vermont Technical College and other VSC schools.

Training
Civil Rights supports the Agency’s goal of welcoming all new employees, providing them with the tools to be successful through New Employee Orientation - 241 new employees participated in 2016. Additionally, Civil Rights works in collaboration with the VTrans Training Center and the Vermont Department of Human Resources to develop and deliver training that promotes the Agency’s Respectful Workplace Commitment. Since 2013, more than 1,100 employees have received Ouch! training.

Economic Opportunity

Federal law requires all state departments of transportation to maintain a Disadvantaged Business Enterprise (DBE) Program and a Small Business Program to ensure that minority, women, and small business owners have an equal opportunity to participate in federally funded projects. These programs help to develop and promote historically disadvantaged businesses, to assist eligible businesses in becoming certified, and to encourage their participation in government contracting and procurement opportunities.

In addition to meeting its federal mandate, VTrans promotes the DBE and Small Business Programs as an affirmative means to fulfill the philosophy that all business, regardless of ownership, should be allowed equal freedom and opportunity to compete for contracts. VTrans is committed to policies and procedures that ensure nondiscrimination in the award and administration of all contracts.

Approximately 200 women and minority owned businesses are currently certified as DBEs by VTrans, performing a wide range of transportation related services, from bridge and highway construction to engineering and design services, environmental consulting, marketing and public relations, information technology, community participation and outreach, and transportation planning.

In FY 2016, certified DBEs were awarded 9.92% of all VTrans federally-funded contracts, totalling more than $19.5 million in DBE awards and commitments, out of approximately $200 million in prime contract awards.
Resources

Additional reports available from the Agency of Transportation include:

Vermont Strategic Highway Safety Plan
VTrans On-Road Bicycle Plan: Phase 1 Report
Vermont State Rail Plan
Public Transit Route Performance Reviews
Annual Report to the State Aviation Council
Tri-State Performance Measures Annual Report

http://vtrans.vermont.gov/docs
Agency of Transportation Organizational Chart

Joe Flynn
Secretary
joe.flynn@vermont.gov

Vacant
Deputy Secretary

John Dunleavy
Legal Section
john.dunleavy@vermont.gov

Robert Ide
Motor Vehicles Department
robert.ide@vermont.gov

Kevin Marshia
Highway Division
kevin.marshia@vermont.gov

Michele Boomhower
Policy, Planning and Intermodal Development Division
michele.boomhower@vermont.gov

Wayne Gammell
Transportation Board
wayne.gammell@vermont.gov

Jo Maguire
Private Secretary
joann.maguire@vermont.gov

John Zicconi
Transportation Board
john.zicconi@vermont.gov

New Motor Vehicle Arbitration Board

1. Vehicle Registration/Titling
2. Driver License Exams/Issue
3. Tax Collection Services
4. Oversize/Overweight Permits
5. Driver Improvement
6. Branch Offices/Mobile Vans
7. Driver Training
8. Motor Carrier Safety
9. Dealer and Inspection Stations
10. Criminal Investigations
11. Pupil Transport Oversight
12. Commercial Vehicle Enforcement
13. Vermont Rider Education Program (Motorcycle Training)

1. Engineering
2. Roadway Program
3. Structures Program
4. Construction
5. Pavement Program
6. Highway Safety & Design
7. Office of Highway Safety
8. Governors Highway Safety Program
9. Municipal Assistance Bureau
10. Environmental Permitting & Hydraulics
11. Materials Testing & Certification
12. Geotechnical Engineering
13. ROW / Utilities / Survey
14. Asset Management
15. Better Roads & Vermont Local Roads
16. Maintenance Districts
17. Business Offices
18. VTrans Training Center (VTTC)
19. Central Garage
20. Technical Services
21. Transportation Systems Management and Operations (TSMO)
22. Water Quality / Stormwater

1. Policy, Planning, & Research Bureau
2. Development Review & Permitting Services
3. Transportation Mapping
4. Community Outreach
5. Rail
6. Public Transit
7. Aviation

1. Information Technology
2. Contract Administration
3. Audit
4. Budget Operations
5. Financial Operations
6. Civil Rights & Labor Compliance
7. Performance, Innovation, & Excellence
Boards and Councils

**Transportation Board**
- John Zicconi: Executive Secretary
- Vanessa Kittell: Chair
- David Coen
- Richard Bailey
- Larry Bruce
- William Tracy Carris
- Wendy Harrison
- Faith Terry

**Motor Vehicle Arbitration Board**
- Pauline Liese: Lemon Law Administrator
  (802) 828-2943
  LemonLaw@vermont.gov
- Mitchell Jay, Chair
  New Car Dealer Member
- David Baker, Vice-Chair
  Technician Member
- David Curtis
  Citizen Member
- Peter Hood
  Citizen Member
- John Manahan
  Citizen Member

**Alternates**
- Vacant
  Technician Member
- Gina Germond
  Citizen Member
- Michael Loschiavo
  New Car Dealer Member

**Vermont Traffic Committee**
- Joe Flynn: Secretary, Agency of Transportation
- Robert Ide: Commissioner, Department of Motor Vehicles
- Tom Anderson: Commissioner, Department of Public Safety

**Public Transit Advisory Council**
- Joe Flynn: Secretary, Agency of Transportation
  Michele Boomhower, Director of Policy, Planning & Intermodal Development (VTrans) is his designee
- Mary Grant
  Rural Community Transportation
- Randy Schoonmaker
  South East Vermont Transit
- Jim Moulton
  Addison County Transit Resources
- Karen Walton
  Chittenden County Transportation Authority
- Al Gobeille
  Secretary, Agency of Human Services
- Lindsay Kurle
  Secretary, Department of Labor
- Mike Schirling
  Secretary, Agency of Commerce and Community Development
- Peter Johnke
  Vermont Center for Independent Living
- Lee Cattaneo
  Council of Vermont Elders (COVE)
- John Sharrow
  Mountain Transit
- Bob Young
  Premier Coach
- Katherine Otto
  Southern Windsor County Regional Planning Commission
- Karen Horn
  Vermont League of Cities and Towns
- Bethany Whitaker
  Citizen, Vermont Energy Investment Corp.
- Senator Jane Kitchel of Danville
- Rep. Mollie Burke of Brattleboro

**Aviation Council**
- Joe Flynn: Secretary, Agency of Transportation, Chair
- Russell Barr
- Paul Carroccio
- Kelly Colling
- George Coy
- Robert Flint
- Janice Peaslee
- Edward Peet
- William Rozensky
- Patricia Sears
- Douglas White
- James MacKay

**Rail Council**
- Joe Flynn: Secretary, Agency of Transportation, Chair
- David Allaire
- Christopher Andreasson
- Arthur Whitman
- Joann Erenhouse
- Carl Fowler
- Charles Hunter
- David Wulfson
- Jan Eastman
- Charlie Moore
- Rick Moulton
- Jeff Munger
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, 72 pickups with plows, and 68 loaders and graders, along with 375 licensed department operators.

**Purpose and need**

The purpose of the Snow and Ice Control 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 VTrans will strive to provide at our facilities and on our highways. This plan allows for and encourages improvement in operational efficiency in providing the desired levels of service. It also 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 at safe speeds,” and not “bare roads.” This means that roads during a storm are maintained 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 am and 10 pm. During those hours, the average plow routes will be between 2 to 2 ½ hours. However, motorists should anticipate reduced coverage and varying road conditions at night, and should drive accordingly.

**Corridor priorities**

Four color-coded levels of service have been established and are shown on the “Corridor Priority Map” (see page 28). Priorities were established based on winter 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**

*Interstate and limited access highways (orange roads)*

Snow will be removed between 3 am and 10 pm. Equipment such as tow plows and graders will be utilized to facilitate snow removal activities. During off hours, resources will be shifted to prioritize coverage on these routes. Materials noted under Section E 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, bare travel lanes shall be provided as soon as practical. The suggested maximum travel speed for “Orange Roads” is 50 mph, or 10 mph below the posted speed limit, whichever is less.

**Corridor priority 2**

*High traffic highways & truck routes (blue roads)*

Snow will be removed between 4 am and 10 pm. During off hours a skeleton crew will be used as needed. Materials noted under Section E 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. The suggested maximum travel speed for “Blue Roads” is 45 mph, or 10 mph below the posted speed limit, whichever is less.

**Corridor priority 3**

*Medium traffic highways (green roads)*

Snow will be removed between 4 am and 10 pm. During off hours a skeleton crew will be used as needed. Materials noted under Section E 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. The suggested maximum travel speed for “Green Roads” is 40 mph, or 10 mph below the posted speed limit, whichever is less.

**Corridor priority 4**

*Low traffic highways (yellow roads)*

Snow will be removed between 4 am and 10 pm. During off hours a skeleton crew will be used as needed. Materials noted under Section E will be applied as needed to keep the roads open for traffic and provide a safe surface on which to operate. Road surface may be snow covered during and immediately following 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
Performance measurement and program effectiveness assessment

Performance during and immediately following individual storm events will be periodically monitored by the Director of Operations, the Maintenance Transportation Administrator (MTA) and the District Transportation Administrators ("DTAs") 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

In addition, to monitor performance, the following information will be reviewed by the District General Manager and the Area Maintenance Supervisors to ensure VTrans is providing safe roads at safe speeds and performing snow and ice removal in accordance with established priorities noted under “Corridor Priorities.”

Procedures for determining application rates and methods will be the responsibility of 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 the 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 F.

Application Rates shall normally be selected from the “Salt Application Quick Reference Guideline” and shall be based on experienced consideration of the following variables: 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.

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

<table>
<thead>
<tr>
<th>Pavement Temp. Range</th>
<th>Application Rate (#/LM)</th>
<th>Pre-Wet Material</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above 32˚</td>
<td>0 to 100</td>
<td>Salt Brine or Blend</td>
<td>A little salt goes a long way when temperatures are near freezing.</td>
</tr>
<tr>
<td>25˚ to 32˚</td>
<td>100 to 200</td>
<td>Salt Brine or Blend</td>
<td>Salt is very effective here. Pre-wetting with a blend will allow lower application rates.</td>
</tr>
<tr>
<td>20˚ to 25˚</td>
<td>200 to 300</td>
<td>Salt Brine, Chemical, or Blend</td>
<td>Salt effectiveness is dropping off in this range. A blend or straight chemical will help.</td>
</tr>
<tr>
<td>15˚ to 20˚</td>
<td>300 to 400</td>
<td>Chemical or Blend</td>
<td>Pre-wetting is especially important. Liquids will provide the extra boost needed.</td>
</tr>
<tr>
<td>15˚ or Below</td>
<td>Snow is usually dry and blowing in this range. If no ice or pack exists, plow only--DO NOT APPLY MATERIAL.</td>
<td></td>
<td>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 pre-wetting, will be needed.</td>
</tr>
</tbody>
</table>

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.
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 F or higher. When pavement temperatures are less than 15 degrees F 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.

“Application Rates vs. Miles You Can Treat” is provided as a quick reference guide for maintenance workers and supervisors.

**Winter Sand**
Winter sand shall consist of coarse, clean, sharp 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 cannot 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. Following 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 F 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 (MgCl2), calcium chloride (CaCl) and a number of proprietary products including an "Organic Based Performance Enhancer". Chemical additives shall include a corrosion inhibitor. A 3% solution of the corrosion inhibited chemical product shall have a corrosion value at least 70% less than that of a 3% solution of sodium chloride.

**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 F or greater. Application will generally occur on designated routes 6 to 8 hours prior to the projected start of the storm, however, up to 12 hours may be permissible based on 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 F and chemical additive or blend shall be used when below 15 degrees F.

### Salt Application Rates vs. Miles You Can Treat

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<td>80.0</td>
<td>66.7</td>
<td>57.1</td>
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</tbody>
</table>
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 working day.

Spreaders
Each spreading unit shall be calibrated annually, and after any spreader or hydraulic maintenance, to insure 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 banks, 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 drive-ways;
- 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.

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:

1. Normal winter maintenance will conform to the provisions of the current VTrans winter maintenance standards included in this SIC Plan.

2. 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 Web Site, kept current, and made available to ANR.

3. Low salt and no salt roads (zones) will be signed in the field accordingly.

4. 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.

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 web site for more information regarding the above referenced designations as they may change from time to time and for information regarding the VTrans MS4 Stormwater Management Plan.
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.

5. VTrans shall fully cover with impervious material 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.

6. 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.

7. 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%.

8. 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 this SIC Plan. The Operations Environmental Program will report on these tasks as a part of each annual MS4 report to ANR.

9. VTrans will plan, organize and conduct an annual public outreach campaign associated with safe winter driving, as funding allows.

10. 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. VTrans actively supports innovation and promotes the idea of finding new and better ways to reach our goals.
# Rail Projects

## Maintenance Projects Completed in 2016

<table>
<thead>
<tr>
<th>Project Name &amp; Number</th>
<th>Line</th>
<th>DOT Crossing #</th>
<th>Project Type</th>
<th>Asset</th>
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</thead>
<tbody>
<tr>
<td>Berlin</td>
<td>WACR M&amp;B</td>
<td>837-333R</td>
<td>Maintenance</td>
<td>Crossing</td>
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<td>Barton</td>
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<td>850-892W</td>
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<td>Burlington</td>
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## Standard and Emergency Projects Completed in 2016

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<th>Asset</th>
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## Highway Projects

Regular Projects Substantially Completed in 2016

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<td>ARLINGTON STP 0114(4)</td>
<td>Legion Road</td>
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<tr>
<td>BARRE CITY STP 026-1(42)</td>
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<tr>
<td>BELVIDERE-BERKSHIRE STPSURF(53)</td>
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<td>BENNINGTON BRF 1000(16)</td>
<td>Benmont Ave</td>
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<td>BENNINGTON-MT. TABOR BF BPNT(16)(RE-ADVERTISED)</td>
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<td>US 302</td>
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<td>BETHEL-RANDOLPH STP 2921(1)</td>
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<td>JAY-TROY STP 2915(1)</td>
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VTRANS FACT BOOK 2017
Regular Projects Substantially Completed in 2016, continued

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<td>New Culvert, Slope Stabilization and Drainage Improvements</td>
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<td>MIDDLEBURY WCRS(9)</td>
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<td>MILTON HES 028-1(27)</td>
<td>US 2, TH 58</td>
<td>Install New Roadway Delineation and New Dynamic Warning Signs</td>
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<td>MORRISTOWN BF 0239(3)</td>
<td>Cadys Falls</td>
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<td>NORTH HERO-GRAND ISLE BF EWP(1)</td>
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<td>ROCKINGHAM IM 091-1(71)</td>
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<td>RUTLAND-LEICESTER FRTII(024)</td>
<td>VTR</td>
<td>Continuous Welded Rail</td>
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<td>RUTLAND-BURLINGTON VTRY(5)</td>
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<td>RYEAGATE STP CULV(10)</td>
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<td>ST. GEORGE-WILLISTON STP FPAV(4)</td>
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<td>STATEWIDE STP CRAK(34)</td>
<td>VARIOUS</td>
<td>Crack Sealing</td>
</tr>
<tr>
<td>STATEWIDE SW REGION STPG SIGN(51)</td>
<td>VT 17, Bus. US 4</td>
<td>Install New Traffic Signs</td>
</tr>
<tr>
<td>STOWE BRF 0235(15)</td>
<td>VT 108</td>
<td>Replace Bridge 3</td>
</tr>
<tr>
<td>STOWE-BERKSHIRE STPG SIGN(49)</td>
<td>VT 108</td>
<td>Install New Traffic Signs</td>
</tr>
<tr>
<td>THETFORD STP 2221(1)</td>
<td>VT 113</td>
<td>Reclaim and Resurfacing</td>
</tr>
<tr>
<td>WAITSFIELD BRF 013-4(39)</td>
<td>VT 100</td>
<td>Replace Bridge 177</td>
</tr>
<tr>
<td>WARDSBORO BRF 013-1(15)</td>
<td>VT 100</td>
<td>Replace Bridge 68</td>
</tr>
<tr>
<td>WESTON BF 013-2(13)</td>
<td>VT 100</td>
<td>Replace Bridge 98</td>
</tr>
<tr>
<td>WINOOSKI HES 5100(13)</td>
<td>US 7</td>
<td>Circulator Improvements</td>
</tr>
<tr>
<td>WOODSTOCK BRF 0151(21)</td>
<td>VT 106</td>
<td>Replace Bridge 24</td>
</tr>
<tr>
<td>WOODSTOCK-BARNARD STP FPAV(3)</td>
<td>VT 12</td>
<td>Resurfacing</td>
</tr>
<tr>
<td>WORCESTER-ELMORE STP 2954(1)</td>
<td>VT 12</td>
<td>Reclaim and Resurfacing</td>
</tr>
</tbody>
</table>
**Municipally Managed Projects**
**Scoping Projects Substantially Completed in 2016**

<table>
<thead>
<tr>
<th>Project Name &amp; Number</th>
<th>Description of Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bennington TAP TA13(12)</td>
<td>Study for multi-modal improvements on Franklin Lane</td>
</tr>
<tr>
<td>Burke TAP TA14(11)</td>
<td>Study for Bike/Ped improvements on E. Darling Hill Rd.</td>
</tr>
<tr>
<td>Dover STP BP14(16)</td>
<td>Study for Bike/Ped improvements on VT 100</td>
</tr>
<tr>
<td>Enosburgh Falls BP14(19)</td>
<td>Study for sidewalk on Elm St. from VT108 to Pleasant St.</td>
</tr>
<tr>
<td>Enosburgh Falls TAP TA15(7)</td>
<td>Study for a sidewalk/bike facility along Duffy Hill Rd.</td>
</tr>
<tr>
<td>Essex SSMG(74)</td>
<td>Flow restoration plan for Indian and Sunderland Brooks</td>
</tr>
<tr>
<td>Hartford TAP TA14(13)</td>
<td>Study for pedestrian and bicycle accommodations on VT 14 and the Quechee-West Hartford Rd.</td>
</tr>
<tr>
<td>Huntington STP BP13(17)</td>
<td>Study for bicycle and pedestrian alternatives in Huntington Lower Village</td>
</tr>
<tr>
<td>Hyde Park STP BP14(12)</td>
<td>Study on Bike/Ped connectivity between schools and trail networks</td>
</tr>
<tr>
<td>Hyde Park TAP TA13(11)</td>
<td>Study on streetscape and stormwater assessment for various routes</td>
</tr>
<tr>
<td>Jericho BP14(17)</td>
<td>Study for safety improvements at intersection of VT 15 and Lee River Rd.</td>
</tr>
<tr>
<td>Killington TAP TA14(15)</td>
<td>Study for a walkway connecting existing walkway at Killington Rd. to the Killington Ski Resort</td>
</tr>
<tr>
<td>Milton STP BP14(18)</td>
<td>Study for sidewalk along Railroad St.</td>
</tr>
<tr>
<td>Montgomery STP EH12(16)</td>
<td>Study for restoring the Longley covered bridge on TH 4 over the Trout River</td>
</tr>
<tr>
<td>Montgomery TAP TA15(6)</td>
<td>Study for relocating and restoring the Hectorville covered bridge</td>
</tr>
<tr>
<td>Morristown STP EH10(16)</td>
<td>Study for bike/ped improvements on VT 100</td>
</tr>
<tr>
<td>Springfield TAP TA14(12)</td>
<td>Study for sidewalk improvements for Elm School area</td>
</tr>
<tr>
<td>St. Albans SSMG(77)</td>
<td>Flow restoration plan for Rugg Brook</td>
</tr>
<tr>
<td>St. Albans Town STP BIKE(56)</td>
<td>Study for bicycle and pedestrian improvements to Collins Perley Sports Center</td>
</tr>
<tr>
<td>St. Johnsbury STP BP14(14)</td>
<td>Study to improve bicycle and pedestrian safety at the intersection of US Route 5, Main Street and South Main Street.</td>
</tr>
<tr>
<td>Sunderland STP BP14(21)</td>
<td>Study for safety improvements on Sunderland Hill Rd and Hill Farm Road</td>
</tr>
<tr>
<td>Woodstock STP SRIN(43)</td>
<td>Study for improvements to School St.</td>
</tr>
</tbody>
</table>
## Construction Projects Substantially Completed in 2016

<table>
<thead>
<tr>
<th>Project Name &amp; Number</th>
<th>Description of Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burlington STP ST EH00(16)</td>
<td>Burlington Intervale improvements with kiosk, signs and other amenities</td>
</tr>
<tr>
<td>Dover STP EH12(3)</td>
<td>Sidewalk and pedestrian bridge along VT 100</td>
</tr>
<tr>
<td>Enosburg Falls STP BP14(9)</td>
<td>Sidewalk along Pleasant St.</td>
</tr>
<tr>
<td>Essex Jct. STP SDWK(17)</td>
<td>Shared-use path between North St. and Central St.</td>
</tr>
<tr>
<td>Essex Jct. TAP TA13(6)</td>
<td>Shared-use path between North St. and Central St.</td>
</tr>
<tr>
<td>Guilford STP EH11(4)</td>
<td>Restoration of the Green River Covered Bridge on TH 1</td>
</tr>
<tr>
<td>Johnson STP EH10(2)</td>
<td>Pedestrian improvements along School St. and College Hill Rd.</td>
</tr>
<tr>
<td>Killington STP EH11(7)</td>
<td>Pedestrian walkway along Killington Rd.</td>
</tr>
<tr>
<td>Lake Champlain SB VT06(004)</td>
<td>Signage, interpretive information and improvements for multi-modal travel on the Lake Champlain Scenic Byway</td>
</tr>
<tr>
<td>Middlebury STP SRIN(39)</td>
<td>Shared path and sidewalk along Creek Rd.</td>
</tr>
<tr>
<td>Middlebury SB VT04(006)</td>
<td>Wayfinding, interpretive signs, and planning for future interpretive facility</td>
</tr>
<tr>
<td>Milton STP BP13(3)</td>
<td>Sidewalk along McMullen Rd. from Hobbs Rd. to Railroad St.</td>
</tr>
<tr>
<td>Montpelier STP EH08(8)</td>
<td>Crosswalks and pedestrian amenities at various locations</td>
</tr>
<tr>
<td>Morristown ST PRDP(154)</td>
<td>New park and ride facility</td>
</tr>
<tr>
<td>Pittsford STP EH09(3)</td>
<td>Sidewalk along Pleasant St.</td>
</tr>
<tr>
<td>Poultney STP BIKE(55)</td>
<td>Sidewalk along York St. from York St. Ext. to Wilson Ave.</td>
</tr>
<tr>
<td>Putney STP SRIN(16)</td>
<td>Sidewalks and radar speed signs on Westminster Rd. near school entrance</td>
</tr>
<tr>
<td>Rockingham (Bellows Falls) STP EH10(22)</td>
<td>Rehabilitation of bridge over the canal on Bridge St.</td>
</tr>
<tr>
<td>Rockingham STP SRIN(31)</td>
<td>Sidewalk, bus drop-off lane and other improvements from the school to the village</td>
</tr>
<tr>
<td>Shaftsbury BP13(1)</td>
<td>Sidewalk, pedestrian safety improvements and street lighting along VT 7A and Church St.</td>
</tr>
<tr>
<td>Shaftsbury STP EH10(3)</td>
<td>Sidewalk from the Shaftsbury Graded School to the High School</td>
</tr>
<tr>
<td>Shires of Vermont Byway SB VT12(2)</td>
<td>Signage, interpretive panels and information kiosk on the Shires of Vermont Scenic Byway</td>
</tr>
<tr>
<td>Stamford STP EH07(2)</td>
<td>Sidewalks in the village along VT 100</td>
</tr>
<tr>
<td>Stone Valley Byway SB VT12(003)</td>
<td>Multi-modal access and interpretive information along the Stone Valley Scenic Byway</td>
</tr>
<tr>
<td>Waterbury-Stowe SB VT11(002)</td>
<td>Green Mountain Byway interpretive program</td>
</tr>
<tr>
<td>Weathersfield PLH MAPL(1)</td>
<td>Reconstruction of Maple St.</td>
</tr>
<tr>
<td>Williston TAP TA13(3)</td>
<td>Shared-use path and bridge over Allen Brook to the New Alliance Church, parallel to VT 2A</td>
</tr>
<tr>
<td>Williston TAP TA14(3)</td>
<td>Sidewalk along Harvest Lane</td>
</tr>
<tr>
<td>Better Roads Projects</td>
<td>Municipal Mitigation projects at various locations statewide</td>
</tr>
<tr>
<td>Westford ST PRDP(127)</td>
<td>New park and ride facility</td>
</tr>
<tr>
<td>Williston STP SDWK(15)</td>
<td>Sidewalk along VT 2A</td>
</tr>
<tr>
<td>Windsor STP SRIN(22)</td>
<td>Sidewalk improvements along VT 44</td>
</tr>
<tr>
<td>Better Back Roads Projects</td>
<td>Municipal Mitigation projects at various locations statewide</td>
</tr>
</tbody>
</table>
## Highway Safety Improvement Program Projects

**Infrastructure Safety Projects Substantially Completed in 2016**

<table>
<thead>
<tr>
<th>Route Number</th>
<th>Description of Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>US 2</td>
<td>New signs, markings and beacons to convert US 2/VT 78 intersection to 4-way stop</td>
</tr>
<tr>
<td>VT 100</td>
<td>New signs, markings and beacons to convert VT 100/Main St intersection to 4-way stop</td>
</tr>
<tr>
<td>VT 131</td>
<td>Install a double arrow behind rail facing Weathersfield Traffic</td>
</tr>
<tr>
<td>VT 131</td>
<td>Clear trees, cut back the bank and do some slope work on the south side of VT 131 to improve corner sight distance</td>
</tr>
<tr>
<td>US 7</td>
<td>Southwest corner of US 7 and Leicester Whiting Road. Remove selected trees to improve corner sight distance</td>
</tr>
<tr>
<td>US 7</td>
<td>Relocate the intersection signs closer to the intersection</td>
</tr>
<tr>
<td>VT 78</td>
<td>Relocate the curve/intersection sign closer to the intersection, add a left hand stop sign, move the street name sign, and a distance plaque under the hill sign</td>
</tr>
<tr>
<td>VT 100</td>
<td>Install a speed feedback sign at the school as well as at the NB 35 MPG transition on VT 100.</td>
</tr>
<tr>
<td>VT 7a</td>
<td>Install an interactive flashing beacon on the existing NH intersection advance warning sign. Radar detection will be installed on the stop sign at Houghton Lane.</td>
</tr>
</tbody>
</table>
We hope you’ve enjoyed this year’s edition of the Fact Book. There’s always something new happening here at VTrans. For all the latest on what’s going on, we encourage you to visit our website where you can download many other reports, statistics, maps and other information about Vermont’s transportation network at http://vtrans.vermont.gov.

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