

Quantifying the Impact that New Capital Projects Will Have on Roadway Snow and Ice Control Operations

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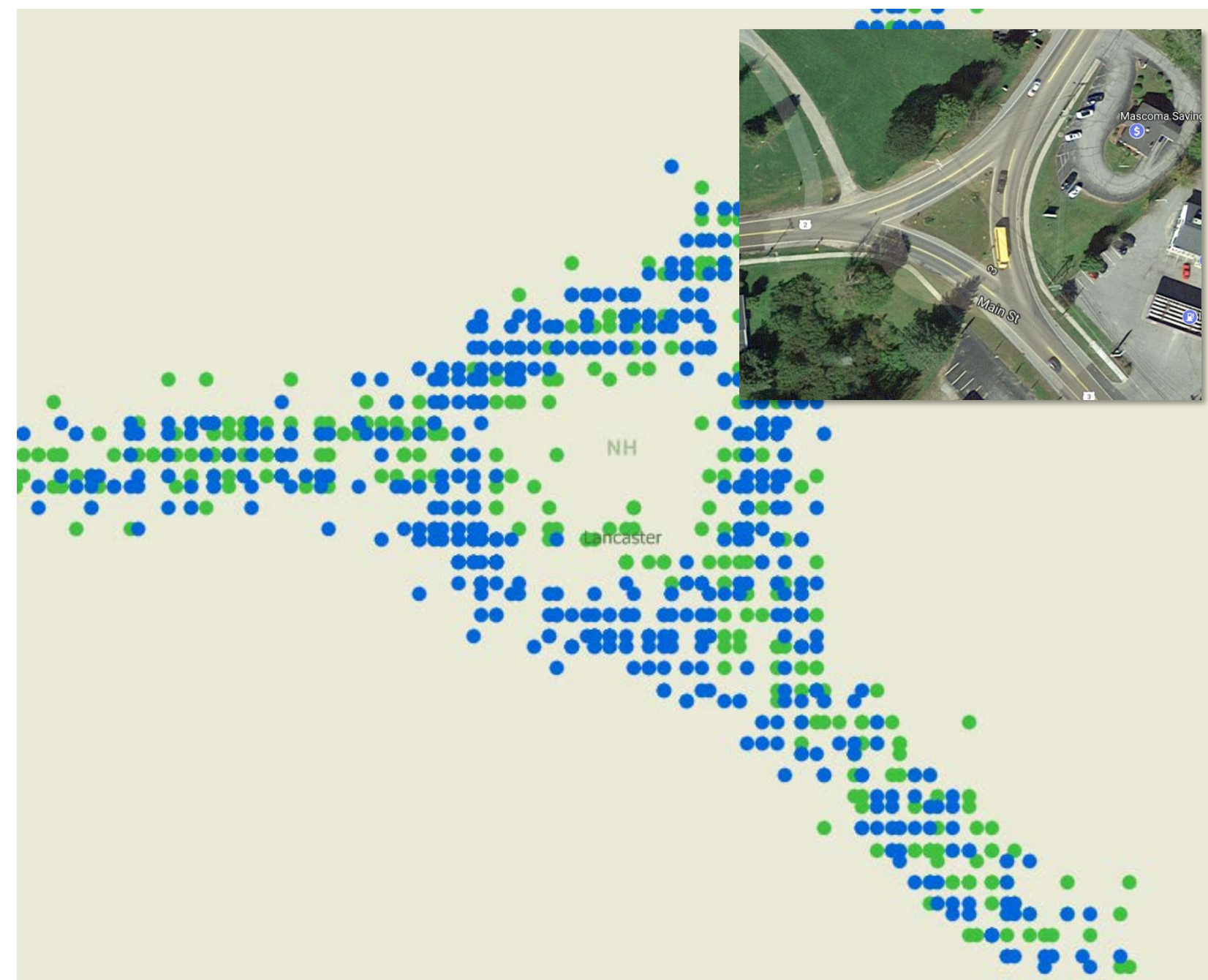
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Introduction

As Vermont adjusts to a climate that includes more severe and unpredictable weather events, it will become increasingly important to integrate the cost of roadway snow and ice control (RSIC) operations into project planning processes. Many states are already facing substantial budget

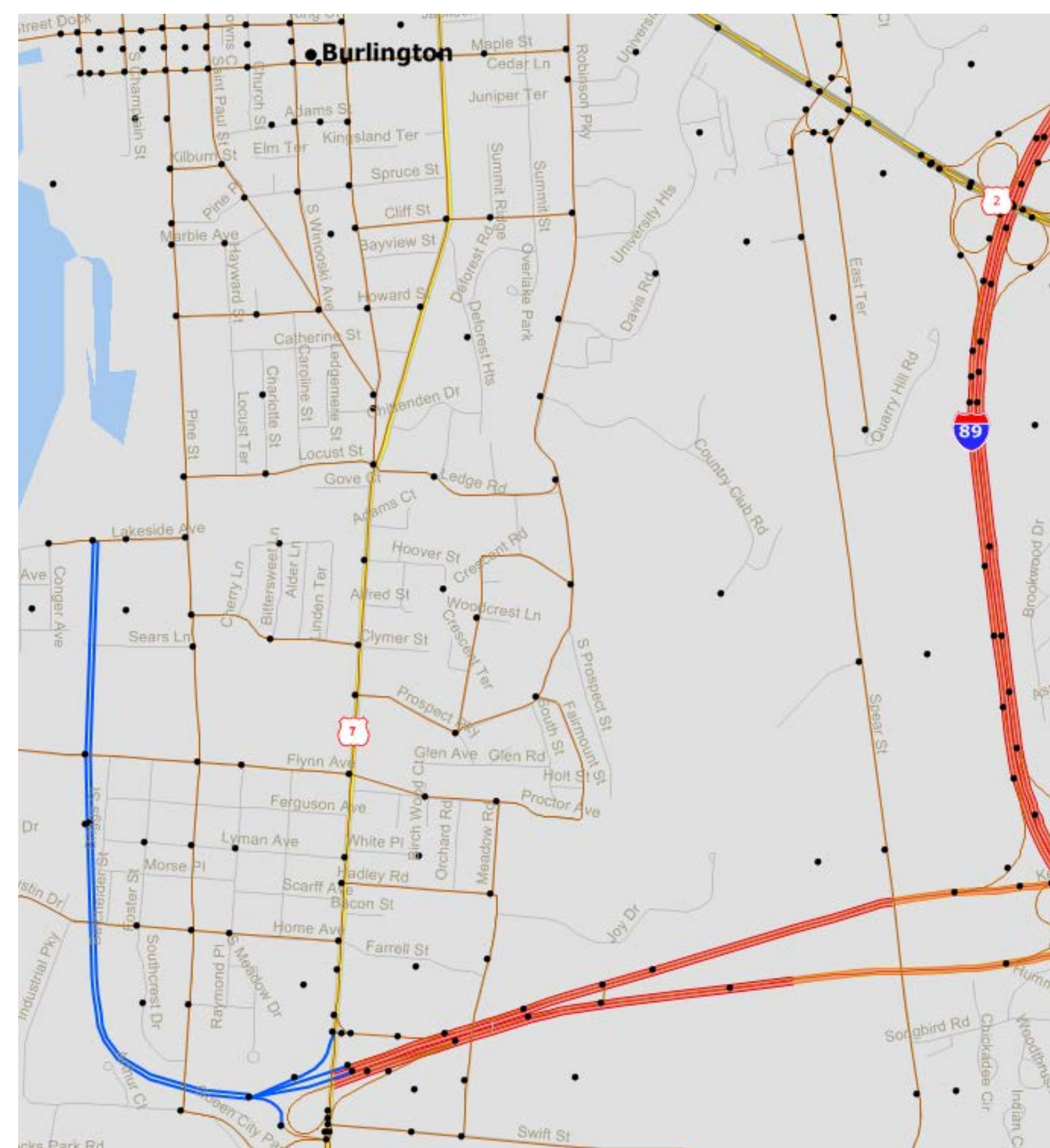
the project development process, leaving winter maintenance staff without the necessary resources to meet RSIC performance targets and creating a negative impact on both safety and mobility outcomes.



Second-by-second RSIC activity prior to (green) and after (blue) converting a stop- and yield-controlled intersection in New Hampshire (inset) into a roundabout

Methodology

The goal of this project was to quantify the expected impact that new capital projects will have on RSIC burden. From July 2015 to October 2017, the research team examined a series of common project types for their impact on RSIC operations. The team used a combination of field data collection and computer simulation to quantify the impact on vehicle-minutes of travel (VMTs), salt use, service time, and equipment for the RSIC fleet.



Roadways representing the Champlain Parkway project (in blue), as added to the routing network (brown)

constraints, struggling to meet RSIC performance targets, so capital projects like new roadways and lane expansions are likely to increase stress on RSIC operations. The RSIC burden associated with these projects is rarely quantified and is typically not considered during

Results

Project Type	Quantity	Unit	Region Type	Low-Salt Storm	High-Salt Storm	Average Unit Increase in VmTs	
New roadway, 1-lane either direction	0.55	miles	suburban	168	125	266	per mi.
New roadway, 1-lane either direction	3.56	miles	urban	182	411	83	per mi.
New left-turn lanes, 2 of 4 approaches	2	approach	rural	245	248	123	per approach
New roadway, 1-lane either direction	3.26	miles	rural	-48	-175	-34	per mi.
Highway lane addition, from 1 to 2 in both directions	9.20	miles	rural	356	63	23	per mi.
Conversion of stop- and yield-controlled intersection to a roundabout	1	each	rural	-1	8	4	per intx

Conclusions

The primary outcome of this research is an easy-to-use cost calculation tool that estimates the monetary impact of a variety of project types on RSIC burden. The monetary impact is calculated from the combination of vehicle-hours, salt, fuel, and equipment. An additional service-time impact is also calculated, representing the loss of service quality that needs to be considered when evaluating impacts. The findings attest to the need to consider RSIC in the development process for major capital projects. The tool will help RSIC

managers make a case for appropriate RSIC resources that are consistent with the construction of different types of new capital projects.

Acknowledgments

The research team thanks the Clear Roads Research Program for funding this work. Clear Roads is a research consortium focused on testing winter maintenance materials, equipment and methods. Since 2004, Clear Roads has grown to include 35 member agencies including VTrans, whose technical representative to the program is State Maintenance Engineer Todd Law.