Connecticut (3) 2
Project Information 2
Project Information 3
Project Information 4
Maine (2) 5
Project Information 5
Project Information 7
Maryland (1) 8
Project Information 8
New Hampshire (3) 10
Project Information 10
Project Information 11
Project Information 12
New Jersey (9) 13
Project Information 13
Project Information 15
Project Information 16
Project Information 17
Project Information 18
Project Information 19
Project Information 20
Project Information 21
Project Information 21
New York (1) 22
Project Information 22
Rhode Island (3) 23
Project Information 23
Project Information 24
Project Information 25

Connecticut (3)

Project Information	
High Value Research Title	Winter Highway Maintenance Operations: Connecticut
Project Number	CT-2289-F-15-1
Project Cost	$150,422
Project Duration	13 months
Web link	http://www.ctcase.org/summaries/winter-highway-2015-sum.pdf
Submitter	
Submitter Agency	Connecticut Department of Transportation
Submitter (Name, Address, Phone, Email)	Bradley Overturf
Research Program	
Sponsoring Agency Name	Connecticut Department of Transportation
Sponsoring Agency Contact (Name, Address, Phone, Email)	Bradley.Overturf@ct.gov
Research and Results	
Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	Ensuring the safety and mobility of the traveling public requires the most effective winter highway maintenance practices possible. This is a shared responsibility—to achieve comprehensive and sustainable success, competing factors must be considered, including safety; cost; corrosion; operating practices; materials and equipment; environmental and economic impacts; and communication with the general public, stakeholders, and government leaders. Balancing these factors presents a challenge that can be met through ongoing monitoring and continuous improvement based on evolving best practices. CTDOT winter highway maintenance operations are consistent with the practices of other states with similar weather conditions. The department engages in an ongoing process of monitoring current practices, identifying areas for improvement, and instituting improvements based on best practices to increase mobility, safety and overall roadway conditions while reducing the amount of deicing chemicals used. CTDOT has been proactive by testing new technologies and implementing those shown to be effective. Additionally, municipalities can benefit from CTDOT's experience with implementation of state-of-the-art technologies shown to be effective—providing opportunities for achieving higher levels of service to the traveling public. It is noted that while use of chloride-based deicing

	chemicals for winter highway maintenance has raised concerns regarding impacts on vehicles, infrastructure and the environment, alternative products also have environmental, corrosion and expense impacts. Although corrosion inhibitors are available for use with deicers, evidence of their effectiveness in the field based on literature reviewed was not found. Research is needed to confirm their effectiveness before considering use. Further, CTDOT's participation in national initiatives, and ongoing communication with neighboring states, Connecticut municipalities, and other stakeholders, should be continued and strengthened to help balance the competing factors by using the most effective practices.

Project Information

High Value Research Title	Connecticut Department of Transportation Safety Techniques Enhancement Plan
Project Number	CT-2287-F-15-4
Project Cost	$187,367
Project Duration	8 months
Web link	http://www.cti.uconn.edu/wp-content/uploads/2014/03/SPR-2287-Safety-Analysis-Strategic-Plan-Final.pdf

Submitter

Submitter Agency	Connecticut Department of Transportation
Submitter (Name, Address, Phone, Email)	Bradley Overturf

Research Program

Sponsoring Agency Name	Connecticut Department of Transportation
Sponsoring Agency Contact (Name, Address, Phone, Email)	Bradley.Overturf@ct.gov

Research and Results

Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	The Highway Safety Manual (HSM) defines a six-step cycle of safety management processes. This report evaluates the Conncituct Department on how well conform to the six safety management steps. The methods recommended in the HSM require additional skills and analytic tools that ConnDOT will need to acquire through training or external sources. In addition, the HSM (Part C) includes a description of Predictive Methods that ConnDOT should consider adopting for use in alternatives analysis

	and the design exception process of highway design. This Safety Techniques Enhancement Plan provides recommendations for improvement in each step of the safety management process and a strategic plan for achieving the vision established by the stakeholders: Connecticut has a rigorous, efficient, and automated safety management process coupled with experienced and expert staff that can use the results to improve decision-making on the entire transportation network. The document concludes with an Action Plan that shows the Goals, Objectives, Tasks, and steps to improving ConnDOT's safety analyses and decision-making processes. The Strategic Plan is designed for easy tracking and maintenance by the involved parties within ConnDOT so that a status report on all action items can be available at any time.

Project Information

High Value Research Title	Repair of Steel Beam/Girder Ends with Ultra High Strength Concrete
Project Number	CT-2282-F-15-2
Project Cost	$64,034
Project Duration	22 months
Web link	http://zaghi.engr.uconn.edu/wp-content/uploads/2016/03/CT-2282-F-15-2.pdf

Submitter

Submitter Agency	Connecticut Department of Transportation
Submitter (Name, Address, Phone, Email)	Bradley J. Overturf Transportation Supervising Planner Connecticut Department of Transportation Bureau of Policy and Planning Roadway Information Systems Unit 2800 Berlin Turnpike Newington, CT 06111 Phone: 860-594-2089 Fax: 860-594-2866 Email: Bradley.Overturf@ct.gov

Research Program

Sponsoring Agency Name	Connecticut Department of Transportation
Sponsoring Agency Contact (Name, Address, Phone, Email)	Bradley.Overturf@ct.gov

Research and Results

Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research	A series of three tests were run in the UCONN Structures Laboratory on large-scale rolled girders. The goal was to perform a proof of concept of a novel method utilizing UHPC to rehabilitate corrosion damage. One girder was undamaged, to determine baseline bearing capacity. A second

Results	girder had section loss at the bearing to simulate severe corrosion damage to isolate the effect of corrosion on bearing capacity. A third girder had the same level and pattern of simulated corrosion damage, but included a repair with UHPC. This determined the capacity restored by the repair technique. Each of these tests was instrumented to record data to create a finite element model for use in an analytical study. The undamaged girder was found to fail due to the buckling of the web at a load of 180 kip. The simulated corrosion at the bottom of the web reduced the capacity of the girder to 43 kip. The failure was still considered to be buckling of the web, but it was isolated in the simulated corrosion. The girder did not fail with the addition of the concrete panel. Instead it experienced flexural yielding, and a maximum load of 230 kip. A finite element model was created from the experimental study. This model saw good agreement with the data collected from the large scale tests. The model was used to run full-scale simulations of rolled and plate girders. This was done to verify the performance of eight different repair methods on three configurations of bridge girders. All of the girders had extreme levels of corrosion damage to test the limits of this repair. All of the repair methods were found able to recover the initial capacity of the girders with limited panel thickness.

Maine (2)

Project Information	
High Value Research Title	Use of Remote Sensing and a Real Time Decision Support System for Seasonal Load Restriction Timing
Project Number	11-3
Project Cost	$690,000
Project Duration	24 months
Web link	http://slr.umassd.edu/dss#/sites
Submitter	
Submitter Agency	Maine Department of Transportation
Submitter (Name, Address, Phone, Email)	Dale Peabody MaineDOT 16 State House Station Augusta, ME 04333 207-624-3305 dale.peabody@maine.gov
Research Program	
No data entered for this section	
Research and Results	
Brief Summary of the	MaineDOT is partnering with the University of Massachusetts at

Research Project and Impact, or Potential Impact, of Implementing Research Results	Dartmouth (UMD) on two projects to develop a real time spring load restriction decision support system. During springtime the roadway thaws and is significantly weakened for carrying heavy truck loads. To minimize damage agencies often will limit the truck loads on hundreds of miles of roads. Although this action may prolong the road service life it creates hardship among the trucking industry that relies on these roadways for commerce. Current methods for when to apply these road load restrictions are based on visual observations and experience of the agency. More accurate, real time, engineering-based methods will enable agencies to better predict and time roadway load restrictions, saving the roads from springtime thaw damage and saving the trucking industry from unnecessary limitations. The initial project titled "Data Collection via Commercial Remote Sensing &Spatial Information Technology to Determine when to Impose SLR" was conducted by a team of scientists and engineers at UMass Dartmouth: Marguerite Zarrillo (PI), Heather Miller, Ram Balasubramanian and Honggang Wang. Two roadway data collection sites were installed in Maine and one site in New Hampshire. These sites used atmospheric and subsurface instrumentation to collect real-time conditions of the roadway and climate and reported via satellite and cellular to a decision support system (DSS) server at UMass Dartmouth. The data and results of the DSS were made available through a user-friendly graphical user interface on a web browser. The DSS also had data evaluation tools to automatically compute cumulative freezing index (CFI) and cumulative thawing index (CTI) values. Minnesota DOT (MnDOT, 2009) suggested that CFI and CTI threshold values can be used as indicators of when to apply winter weight premiums (WWPs) and spring load restrictions (SLRs), respectively. MaineDOT managers in two geographic regions began using the DSS as a tool to verify the application of spring load restrictions. Additionally, nearby subsurface data collection units were installed at shady areas along the roadways to determine the impacts of sun and shade to the frost-thaw conditions. This initial project was completed in September 2013. The second project titled "Expansion of Remote Sensing Using Radio Frequency Identification (RFID) Technology for Seasonal Load Restriction (SLR) Timing" is being conducted by Paul Fortier (PI), Heather Miller and Ram Balasubramanian of UMass Dartmouth. A roadway collection site has been installed in northern Maine using low cost RFID wireless technology at the site and low cost radio transmission to the department's Regional office. The real-time data is collected, analyzed and displayed on the DSS website. Using air temperature data from internet sources (www.wunderground.com) and the MnDOT recommended CTI threshold values confirmed in the initial project, additional locations for predicting thaw periods are now available on the DSS website, http://slr.umassd.edu/dss#/sites. Models for predicting

	frost and thaw depths beneath roadways have also been evaluated and will be incorporated on the DSS in the future. MaineDOT regional managers and engineers can now use the enhanced DSS website for validating decisions regarding posting load restrictions. Accurate and timely spring load restrictions will minimize roadway damage and impacts to the trucking industry and businesses.

Project Information

High Value Research Title	Use of Hamburg Wheel Tracker to Quantify Effects of Aggregate Loss Distress
Project Number	14-16
Project Cost	$50,000
Project Duration	23 months
Web link	

Submitter

Submitter Agency	Maine Department of Transportation
Submitter (Name, Address, Phone, Email)	Dale Peabody 207-624-3305 dale.peabody@maine.gov

Research Program

No data entered for this section

Research and Results

Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	In recent years a new distress mechanism has been causing premature failure in Hot-Mix Asphalt (HMA) pavements in Maine. A significant loss of aggregate from HMA surface and base courses has been observed. The loss of material from the HMA surface is typically exaggerated in the wheelpaths but is evident across the entire lane width. The phenomenon was initially observed in the Northern portion of the state 3-5 years ago but it has now been seen in projects across the entire State. The distress was initially identified as stripping and or rutting of the HMA surface, however it was concluded that the observed distress did not exhibit the typical mechanisms of either. The distress was therefore identified as aggregate loss or HMA erosion. It is estimated that the aggregate loss distress has caused over $12 million loss in pavement service life of the projects paved in 2010 alone.

	The scope of work for this study consists of a 2014 winter-spring laboratory study to first determine the rutting susceptibility of MaineDOT HMA mix design in the Hamburg Wheel Tracker Device (HWTD). Recent testing by Materials personnel has found that the HWTD can potentially measure susceptibility of HMA mixtures to the aggregate loss distress. As of November 2015, over 400 HWT runs have been conducted by MaineDOT labs resulting in a total of 863 HWT data points for use in the study. One third of all samples tested reached 20,000 passes without failure as defined by 1/2" or greater rutting. The remaining samples are nearly uniformly distributed from 2,500 passes to 20,000 passes. The distribution of the Stripping Inflection Point (SIP) data was different, with over 25% of samples having no SIP identified. Very few samples had a SIP identified after 15,000 passes (2.9%). The overall distribution for SIP appears to be shifted to lower pass values, which is expected given that stripping must be identified prior to the failure point of the test. The results suggest that a majority of the samples tested would not meet a criteria of 20,000 passes and a SIP no earlier than 15,000 passes. In 2016 MaineDOT will begin implementation of HWTD testing on higher volume and high priority corridors. The steps outlined in the draft report will move the current HMA specification even further towards a performance-related specification, especially in regards to durability. The pavement management data shows a clear decline in HMA service life in recent years, partly due to the effects of the HMA erosion distress. The trend shows that the current specification and mix design requirements is not fully effective in ensuring that the HMA used on MaineDOT's projects are durable and capable of long service lives. The addition of a performance test for rutting and moisture damage is a positive step to improving the quality of pavements long-term. The investment to make Maine's pavements more durable will pay long term dividends in the form of longer service lives, more cost effective treatments, and reduced impact to the travelling public.

Maryland (1)

Project Information	
High Value Research Title	Sustainable Landscaping Practices for Enhancing Vegetation Establishment
Project Number	SP209B4S
Project Cost	$100,000
Project Duration	46 months

Web link	

Submitter

Submitter Agency	Maryland Department of Transportation
Submitter (Name, Address, Phone, Email)	Hua Xiang 707 N. Calvert St. Mail Stop C-412 Baltimore, MD 20142 410-545-2953 hxiang@sha.state.md.us

Research Program

Sponsoring Agency Name	Maryland State Highway Administration
Sponsoring Agency Contact (Name, Address, Phone, Email)	707 N Calvert Street Baltimore MD USA 21202

Research and Results

Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	Compacted soils within highway medians and roadsides result in limited capacity to support healthy vegetation, storm water infiltration, and afforestation efforts. The Maryland State Highway Administration (SHA) has begun to explore the use of alternative, sustainable practices to improve soil structure within existing medians and former project staging areas along the roadside. This research supports the integration of new practices and procedures to improve soil structure that will help turf, meadow, forest and landscape plantings to thrive. The project established experimental test plots in Taneytown, Maryland, and field-scale soil decompaction and amendment practices were evaluated alongside standard SHA practices for turf establishment. The Taneytown site was heavily compacted in the old MD 853 roadbed, and has been identified for a future afforestation project. Replicate treatments with suburban subsoiling (the combination of deep soil ripping and compost amendment) were compared to standard SHA turf establishment. Replicate plots were also treated by planting forage radish to explore the feasibility of bio-drilling to loosen and improve compacted soils on the site. Plots were prepared and planted in Fall 2014 and reseeded in Summer 2015. Soil characteristics including texture, bulk density, organic matter, soil strength as measured with a cone penetrometer, and infiltration capacity, were evaluated both prior to and after treatment. The results demonstrated significant improvements to the compacted soils on the project site, resulting in more successful turf establishment and dramatic increases in storm water infiltration. (1) Suburban subsoiling resulted in a permeable soil profile with higher organic matter and infiltration compared to standard turf establishment practices. The median soil strength (a surrogate for compaction) with

	depth for the two treatments was shown in below figure. A soil strength above 200 PSI is generally considered to be limiting and above 300 PSI restrictive for vegetation growth. Suburban subsoiling improved stormwater infiltration and the success of vegetation and afforestation efforts. (2) The mature deer compost used in this project provided stable soil carbon with nutrients and minimized the risk of nutrient losses or leaching when properly applied and soil-incorporated. (3) The significant radish development on plots with successful germination demonstrated the potential for biodrilling as a multi-year strategy to mitigate compaction. These findings are appropriate to apply to SHA projects as a low cost, low risk approach to revitalizing compacted soils. Abandoned roadbeds of sufficient size and scale will benefit from subsoiling and biodrilling techniques to ameliorate soil compaction prior to planting or revegetating the site. Application of forage radishes will be more suitable for existing meadows and other appropriate roadside landscape management areas. Cultivating deep permeable organic soil profiles by adapting these land development practices will result in reduced life-cycle costs for green asset maintenance. SHA can include these techniques in the designer's toolbox for consideration on a site by site basis to promote long term landscape sustainability.

New Hampshire (3)

Project Information	
High Value Research Title	Instrumentation, Digital Image Correlation, and Modeling to Monitor Bridge Behavior and Condition Assessment
Project Number	SPR 15680L
Project Cost	$137,680
Project Duration	48 months
Web link	http://www.nh.gov/dot/org/projectdevelopment/materials/research/projects/documents/15680L-FINALREPORT.pdf
Submitter	
Submitter Agency	New Hampshire Department of Transportation
Submitter	Elizabeth Klemann, PE NHDOT Bureau of Materials and Research 5 Hazen Drive Concord,

(Name, Address, Phone, Email)	NH 03302 603-271-8995 eklemann@dot.state.nh.us

Research Program

Sponsoring Agency Name	New Hampshire DOT
Sponsoring Agency Contact (Name, Address, Phone, Email)	Ann Scholz 5 Hazen Drive P.O. Box 483 Concord, NH 03302-0483 603-271-3151 ascholz@dot.state.nh.us

Research and Results

Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	The bridge in Durham, New Hampshire was fitted with both strain gauges and GoPro® cameras to determine if off-the-shelf digital cameras could provide accurate measurement of bridge movements. Strain gauges are sensors that measure how the bridge responds to a load. Bridge maintainers were concerned with the need to remove a small area of protective paint to attach the gauges. Cameras are easily clamped onto the bridge and removing them requires no paint repairs. The strain gauge data were compared to measurements from the camera images. There was correlation of image and strain measurements proving that this technology can be used for structural health monitoring.

Project Information

High Value Research Title	Improve the Quality and Service Life of Water-based Pavement Marking Paints on Pavements with High-Iron Aggregates
Project Number	SPR 15680J
Project Cost	$46,132
Project Duration	45 months
Web link	http://www.nh.gov/dot/org/projectdevelopment/materials/research/projects/documents/15680J-FINALREPORT.pdf

Submitter	
Submitter Agency	New Hampshire Department of Transportation
Submitter (Name, Address, Phone, Email)	Elizabeth Klemann, PE NHDOT Bureau of Materials and Research 5 Hazen Drive Concord, NH 03302 603-271-8995 eklemann@dot.state.nh.us

Research Program	
Sponsoring Agency Name	New Hampshire DOT
Sponsoring Agency Contact (Name, Address, Phone, Email)	Ann Scholz 5 Hazen Drive P.O. Box 483 Concord, NH 03302-0483 603-271-3151 ascholz@dot.state.nh.us

Research and Results	
Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	Airports use white pavement paint marking on airport runways and yellow paint on taxiways to allow pilots to distinguish landing strips. When the white paint was discolored by rust-like staining, it made it difficult for pilots to distinguish the runways from the taxiways. This study determined the cause of the discoloration was from the ferrous minerals found in the pavement aggregates. 50% of New Hampshire airports experience staining of the white pavement markings. The staining can be removed by pressure washing but will reoccur with six months to a year. The most cost-effective solution is to modify the specification for type TT-P-1952E paints to include a rust inhibitor.

Project Information

High Value Research Title	Validating Pollutant Load Estimates from Highways and Roads
Project Number	SPR 15680Y
Project Cost	$77,000
Project Duration	36 months
Web link	

Submitter	
Submitter Agency	New Hampshire Department of Transportation
Submitter (Name, Address, Phone, Email)	Elizabeth Klemann, PE NHDOT Bureau of Materials and Research 5 Hazen Drive Concord, NH 03302 603-271-8995 eklemann@dot.state.nh.us
Research Program	
Sponsoring Agency Name	New Hampshire DOT
Sponsoring Agency Contact (Name, Address, Phone, Email)	Ann Scholz 5 Hazen Drive P.O. Box 483 Concord, NH 03302-0483 603-271-3151 ascholz@dot.state.nh.us
Research and Results	
Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	Roadway runoff can potentially carry pollutants to nearby waterways and wetlands. NHDOT uses the "Simple Method", a spreadsheet based calculation, created by the NH Department of Environmental Services (NHDES), for comparing pre-development to post-development pollutant loads. This method uses factors and ratios and does not involve complex routing of flows or pollutants. This study compared actual pollutant loading at three roadway locations to the historical event mean concentrations used by NHDES. The historical concentrations were slightly higher than the measured concentrations for all three pollutants (e.g. TSS, TP, TN). Continued use of historical concentrations to estimate pollutant loads provides a factor of safety in designing filtering systems that treat runoff and provide better water quality of the stormwater before entering our rivers, lakes, and wetlands..

New Jersey (9)

Project Information	
High Value Research Title	Compatibility of Highway Railroad Crossing Gates with Overhead Catenary System High Voltage Power for Trains
Project Number	FHWA-NJ-2012-008
Project Cost	$256,787
Project Duration	23 months
Web link	http://www.state.nj.us/transportation/refdata/research/reports/FHWA-NJ-2012-008.pdf
Submitter	
Submitter Agency	New Jersey Department of Transportation

Submitter (Name, Address, Phone, Email)	Bureau of Research 1035 Parkway Avenue Trenton, NJ 08625 609-530-5966 Research.Bureau@dot.nj.gov

Research Program

No data entered for this section

Research and Results

Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	Compatibility of Highway Railroad Crossing Gates with Overhead Catenary System High Voltage Power for Trains Historically, there have been some incidents where there has been contact between crossing gate arms and the overhead catenary system (OCS) in electrified portions of the New Jersey Transit rail system. The high voltage of the OCS potentially makes such contact a potential risk. This study evaluates each crossing in electrified territory for potential of contact, and makes recommendations to remediate grade crossings with the potential for contact. Background: New Jersey Transit operates several lines and branches that are electrified and utilize overhead catenary systems (OCS) to power trains. The catenary lines are electrified to a nominal 25 kV potential. In addition, signal power lines have a nominal 6.7 kV potential, and neutral or static lines are also present. Contact between these overhead lines and crossing gate arms have occurred in the past, sometimes leading to significant damage. Research Objectives and Approach: The purpose of this study was to evaluate grade crossings in electrified territory for the possibility of contact between crossing gates and overhead lines, to identify ways to prevent these events, and to reduce the consequences of these events. Records of previous incidents were analyzed, and case studies of crossings with histories that suggested problems were performed. All of the crossing gate arms were evaluated for the potential to contact catenary, signal power, or static lines. Recommendations were made for all crossing gates identified as having the potential to contact overhead lines. Findings: An essential aspect of the findings for this report is the need to maintain a balance between the potential for contact with catenary lines, and the fundamental purpose of crossing gate arms: to prevent grade crossing accidents. A summary of the findings is as follows: • The project identified 75 crossing gate arms with the possibility of contacting catenary lines, and 47 crossing gate arms with the possibility of contacting signal power or static lines. • The most serious condition, contact with catenary lines, can only occur with a complex series of events, beginning with an automobile striking a gate arm in the down position. Because of this, these are rare events.

	• Ensuring that the catenary lines are on the far side of tracks will reduce the number of gates with a possibility of contact from 75 to 42. • Doble testing of crossing gate arms in various states suggest there is no way to insulate a gate arm to allow for safe contact with a catenary line, as rainwater will provide a path for electrical conductivity. • The use of gatesavers, possibly modified with failsafe switches that cut power when a gate arm is in the down position, is the best solution to prevent contact between gate arms and the overhead catenary lines. • Ongoing efforts to reduce grade crossing fatalities, e.g., Operation Lifesaver, should be encouraged, as vehicles striking crossing gate arms are the first step in possible contact with catenary lines.

Project Information

High Value Research Title	Hot Mix Asphalt (HMA) Pay Adjustment
Project Number	FHWA-NJ-2015-007
Project Cost	$236,310
Project Duration	30 months
Web link	http://www.state.nj.us/transportation/refdata/research/ReportsDB.shtm

Submitter

Submitter Agency	New Jersey Department of Transportation
Submitter (Name, Address, Phone, Email)	Camille Crichton-Sumners 1035 Parkway Avenue Trenton NJ 08625 609-530-2419

Research Program

No data entered for this section

Research and Results

Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	Background: In the current New Jersey Department of Transportation (NJDOT) specifications, hot-mix asphalt (HMA) pavement is tested and price adjusted for in-place air voids, total thickness, and ride quality compliances. The current pay factors in the specifications are based on empirical field data and engineering experience. The logical and defensible method to develop pay adjustments should be based on the difference between the life-cycle-cost value of the as-constructed pavement and that of the as-designed pavement. A number of states have begun to implement longitudinal joint specifications, and most are based on determinations of density. However, distress at the joint is caused by the ability of air and water to enter the pavement structure, which is also related to permeability. This

	study will recommend the specification limits for air voids at the longitudinal joint based on density and permeability testing results and perform risk analysis for the proposed pay equations. The requirement on interface bonding strength has not been specified in the construction specification before. The interface bonding between asphalt layers are affected by many factors, such as tack coat type and rate, surface roughness, and testing conditions. Therefore, analysis is needed to determine the minimum requirement of interface bonding strength to withstand the interface stress caused by vehicular loading. Potential Impact or Implementation The following recommendations were made to implement the developed longitudinal joint specification: •Provide contractors opportunities to obtain joint cores for quality control purpose, even projects that do not include the pay adjustment for joint density •Apply a proportion of bonus/penalty during the first year after implementing the joint density specification •Offer training in longitudinal joint construction to contractors before implementing the specification with pay adjustment Monitoring joint deterioration using pavement condition data taken from the NJDOT Pathway vehicle and relate pavement performance at the longitudinal joint to the air voids measured at the joint

Project Information

High Value Research Title	Offshore Wind Development Research
Project Number	FHWA-NJ-2014-008
Project Cost	$214,998
Project Duration	21 months
Web link	http://www.state.nj.us/transportation/refdata/research/ReportsDB.shtm

Submitter

Submitter Agency	New Jersey Department of Transportation
Submitter (Name, Address, Phone, Email)	Camille Crichton-Sumners 1035 Parkway Avenue Trenton, NJ 08625 609-530-2419

Research Program

No data entered for this section

Research and Results

Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	Offshore wind (OSW) development is a new undertaking in the US. This project is a response to New Jersey's 2011 Energy Master Plan that envisions procuring 22.5% of the state's power originating from renewable sources by 2021. The Offshore Wind Economic Development Act called for at least 1,100 MW of Offshore Wind generations to be subsidized by an Offshore Wind Renewable Energy Certificate program. The overreaching goal of this research is to provide information and recommendations for the maritime aspects, both vessel and port interface. The study, using the European experience, identifies vessel types, vessel installation methods, needs and operating characteristics through all phases of OSW development. It also identifies regulatory or legislative requirements and/or other road blocks to the use of particular vessels. The study seeks competitive advantages and disadvantages of vessel acquisition, lease, construction or other alternatives. The study proposes solutions and recommendations that best position the State of New Jersey to be the national leader in OSW development, including potential interstate or cooperative endeavors. Financial aspects and considerations of vessel acquisition are presented. The research also proposes a port/OSW industry interface strategy for short-, mid-, and long-term industry development. In general, the study identifies the maritime port life-cycle requirements for installation, construction, operation and maintenance based on geographic factors, and the potential for multi-use development at New Jersey's East Coast ports. Finally, the study highlights the economic impact of OSW development on the state population and the energy-generating industry. The study recommends the development of a clear OSW policy with a commitment of budgets and in partnerships with industry and other stakeholders.

Project Information

High Value Research Title	Landfill closure with Dredged Materials - Desktop Analysis
Project Number	FHWA-NJ-2014-012
Project Cost	$96,183
Project Duration	27 months
Web link	http://www.state.nj.us/transportation/refdata/research/ReportsDB.shtm
Submitter	
Submitter Agency	New Jersey Department of Transportation
Submitter (Name, Address, Phone, Email)	Camille Crichton-Sumners 1035 Parkway Avenue Trenton, NJ 08625 609-530-2419
Research Program	

No data entered for this section

Research and Results	
Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	The report is designed to analyze the potential for closure of New Jersey landfills using dredge material from existing Confined Disposal Facilities (CDF). The project included an update of the existing New Jersey Department of Environmental Protection (NJDEP) landfill database, the development of a rating system to identify sites with the highest potential to utilize dredged material for their closure, and the identification and preliminary investigation of the top five candidate landfills based on this rating system. Due to information developed during the project it was determined that all but four of the landfills assessed or closure were considered unsuitable for closure as a result only four landfills were selected and investigate further. The results of this project can be used by the NJDOT to facilitate the efficient closure of selected landfills, the beneficial reuse of the materials in Confined Disposal Facilities CDFs, and the continued use of the state's CDFs and dredging activities.

Project Information

High Value Research Title	Impacts of EPA 2012 Commercial Pump-Out Regulation
Project Number	FHWA-NJ-2012-006
Project Cost	$237,342
Project Duration	19 months
Web link	http://www.state.nj.us/transportation/redata/research/ReportsDB.shtm

Submitter	
Submitter Agency	New Jersey Department of Transportation
Submitter (Name, Address, Phone, Email)	Camille Crichton-Sumners Bureau of Research 1035 Parkway Avenue Trenton, NJ 08625 609-530-2419

Research Program
No data entered for this section

Research and Results	
Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research	The US EPA issued the Vessel General Permit (VGP) for managing vessel discharges, under the Clean Water Act. As a result, commercial vessels operating in the New York/New Jersey Harbor and at Delaware River will be required to comply, including additional conditions

Results	imposed by the state. This will affect maritime commerce in terms of cost and operation to meet the VGP requirements. The objectives of this research are to (1) determine how this rule would affect maritime commerce in New Jersey, (2) perform an analysis of the US EPA standards and the VGP rules and determine their impacts on New Jersey maritime operations, and (3) determine what New Jersey needs to do to be prepared. To carry out the project tasks, information on vessels registered under the VGP Notice of Intent and vessels arrivals were solicited from the US EPA and US Coast Guard, respectively, and analyzed. A stakeholder committee was formed where key and urgent issues were discussed in several meetings. New Jersey ports and onshore storage and treatment facilities were investigated. A cost analysis of alternative methods and facilities for pump-out of the discharge, storage, transport to a treatment facility, and waste treatment was performed. A protocol was developed for the maritime industry for filing VGP compliance and reporting. With the 2008 VGP expiration date approaching, US EPA is proposing new, more stringent numeric technology-based effluent limitations for ballast water in the 2013 VGP. A draft sVGP for small vessels is also issued. Finally, the impact on New Jersey and commendations to the maritime industry are presented.

Project Information

High Value Research Title	Impact of EPA 2012 Pump-Out Regulations - Implimentation
Project Number	FHWA-NJ-2014-007
Project Cost	$118,426
Project Duration	12 months
Web link	http://www.state.nj.us/transportation/refdata/research/ReportsDB.shtm

Submitter

Submitter Agency	New Jersey Department of Transportation
Submitter (Name, Address, Phone, Email)	Camille Crichton-Sumners 1035 Parkway Avenue Trenton NJ 08625 609-530-2419

Research Program

No data entered for this section

Research and Results

Brief Summary of the Research Project and	With the 2008 VGP expiration date approaching, US EPA issued the 2013 VGP. There are changes in the 2013 VGP, requiring compliance by

Impact, or Potential Impact, of Implementing Research Results	vessel owners and operators. As a result, the new requirements will impact the commercial vessels operating in the NY/NJ Harbor and Delaware River. Another concern was an issue related to black water discharge. Therefore, the objectives of this study were to (1) perform an analysis of the 2013 VGPs and determine the impacts to New Jersey's maritime operations; (2) determine and recommend what New Jersey needs to do to be prepared to implement the 2013 VGP; and (3) study issues related to black water discharge and No Discharge Zones in New Jersey. To carry out the project tasks, information and data were collected from the US EPA, US Coast Guard, National Ballast Information Clearinghouse, Tugboat Enthusiasts Society of the American, and the Research and Innovative Technology Administration and analyzed. Meetings of the project stakeholders committee were held and key issues discussed. The findings related to the new requirements of the 2013 VGP, ballast water and non-ballast water discharge limitations, administrative report changes, as well as issues concerning black water discharges arendiscussed in detail and recommendations made for compliance.

Project Information

High Value Research Title	Oversize/Overweight Permitting Practices Review - Phase I (NJ-2011-002)
Project Number	NJ-2011-002
Project Cost	$57,249
Project Duration	13 months
Web link	http://www.state.nj.us/transportation/refdata/research/ReportsDB.shtm

Submitter

Submitter Agency	New Jersey Department of Transportation
Submitter (Name, Address, Phone, Email)	Camille Crichton-Sumners 1035 Parkway Avenue Trenton, NJ 08625 609-530-2419

Research Program

No data entered for this section

Research and Results

Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research	This study explores the experiences and best practices of oversize/overweight (OS/OW) permitting agencies in the United States and offers insight into potential opportunities available to improve OS/OW permitting in the State of New Jersey. The study provides a

Results	cursory review of OS/OW permitting practices for the lead permitting agencies in all 50 states and a detailed review of OS/OW activities within Delaware, Maryland, New York, Pennsylvania, and Virginia, and relates these experiences to New Jersey's existing practices.

Project Information

High Value Research Title	Oversize/Overweight Permitting Practices Review - Phase II
Project Number	NJ-2013-001
Project Cost	$100,000
Project Duration	15 months
Web link	http://www.state.nj.us/transportation/refdata/research/ReportsDB.shtm

Submitter

Submitter Agency	New Jersey Department of Transportation
Submitter (Name, Address, Phone, Email)	Camille Crichton Sumners 1035 Parkway Avenue Trenton, NJ 08625 609-530-2419

Research Program

No data entered for this section

Research and Results

Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	This study explores a more detailed analysis of the permitting process in the Mid-Atlantic Region and delves into operational practice, and theory and history of the practice among states. The states practices examined in greater detail include Connecticut, Delaware, Maryland, New Jersey, New York, Pennsylvania, and Virginia. Information previously gathered in Phase I provided a starting point for this more comprehensive analysis in Phase II including an extensive regulatory review and analysis for each of the states in the study including fee structure, fine structure, escort policy, non-interstate road jurisdiction, and routing considerations. A summary of findings and a series of recommended actions and implementation steps have been provided to assist New Jersey DOT in more closely aligning their regulations and operations to those of the surrounding states in an effort to support industry needs while continuing to prioritize safety in the state of New Jersey.

Project Information

High Value Research Title	Oversize/Overweight Public Documentation Benchmarking and Effectiveness Study
Project Number	NJ-2015-005
Project Cost	$54,040
Project Duration	10 months
Web link	http://www.state.nj.us/transportation/refdata/research/ReportsDB.shtm
Submitter	
Submitter Agency	New Jersey Department of Transportation
Submitter (Name, Address, Phone, Email)	Camille Crichton-Sumners 1035 Parkway Avenue Trenton, NJ 08625 60-530-5157
Research Program	
No data entered for this section	
Research and Results	
Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	Operating commercial vehicles in the United States reguires an understanding of complex Federal and State regulations and policies which often differ from state to state and even at the municipal level within a state. Operators of oversize and overweight vehicles face additional regulations and requirements that are often presented in dense , legal documents that are difficult to read and understand. Due to these issues, this reseach attempts to identify national best practices for information dissemination on size and weight limits and recommends both material and methods that can be employed by state DOTs to better educate operators, and thus increase compliance with regulations.

New York (1)

Project Information	
High Value Research Title	Designing, Developing and Implementing a Living Snow Fence Program for New York State
Project Number	C-06-09
Project Cost	$436,624
Project Duration	83 months
Web link	https://www.dot.ny.gov/divisions/engineering/technical-services/trans-r-and-d-repository/C-06-09_Final%20Report_0.pdf
Submitter	

Submitter Agency	New York State Department of Transportation
Submitter (Name, Address, Phone, Email)	Gary Frederick NYSDOT 50 Wolf Rd Albany NY 12232 518-457-4645 gary,frederick@dot.ny.gov
Research Program	
No data entered for this section	
Research and Results	
Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	This study found that Living Snow Fence (LSF) of various vegetation types can create snow trapping potential equal to the annual quantity of blowing snow at an average site in NYS as early as three years after planting, much earlier than the seven to twenty years or longer often described in the literature. Related to this, as LSF grow and increase in height, they continue to add snow storage capacity. As fence snow storage capacity continues to exceed the quantity of blowing snow at the site by larger and larger amounts, this reduces the length of the downwind drift that forms around the fence during the snow season. These findings show LSF can be effective much sooner than previously assumed and can be safely situated nearer the road than previously assumed, due to reduced setback requirements resulting from reduced drift lengths caused by large storage snow capacity. Applying these design standards along with installation and maintenance best practices developed in this project can increase LSF feasibility and effectiveness. Well designed and managed LSF yield economic, safety and environmental benefits to transportation agencies and the public. Much of this project was focused on training and technology transfer. With the training, the intention was that class participants could use the protocols and best practices developed and disseminated to address blowing snow problems in various locations around the state. The technology transfer included consultations with NYSDOT staff outside the training and overview presentations to groups such as the Cornell Local Roads program.

Rhode Island (3)

Project Information	
High Value Research Title	Coupling GPR and IR Thermography to Detect Damage in Reinforced Concrete Bridge Decks
Project Number	SPR-2(34)-2367
Project Cost	$66,927

Project Duration	11 months
Web link	
Submitter	
Submitter Agency	Rhode Island Department of Transportation
Submitter (Name, Address, Phone, Email)	Colin A. Franco, P..E RI Department of Transportation Two Capitol Hill, Room 018 Providence, RI 02903 (401) 222-2524 x4110 colin.franco@dot.ri.gov
Research Program	
No data entered for this section	
Research and Results	
Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	This project will correlate data from ground penetrating radar and infrared thermography to increase the confidence over the results from either method on its own. It will also provide guides to collect and evaluate the data to facilitate the use of the information. This will assist bridge inspectors and engineers in assessing hidden damage to structures to better assess the overall condition and provide more accurate ratings. The data will also allow designers to determine the level of work required to repair/rehabilitate structural elements and make better estimates for quantities when developing plans for projects.

Project Information

High Value Research Title	Using Urban Organic Residuals to Improve Soil Function on Roadsides
Project Number	SPR-2(32)-2332
Project Cost	$136,052
Project Duration	44 months
Web link	
Submitter	
Submitter Agency	Rhode Island Department of Transportation
Submitter (Name, Address, Phone, Email)	Colin A. Franco, P..E RI Department of Transportation Two Capitol Hill, Room 018 Providence, RI 02903 (401) 222-2524 x4110 colin.franco@dot.ri.gov

Research Program	
No data entered for this section	
Research and Results	
Brief Summary of the Research Project and Impact, or Potential Impact, of Implementing Research Results	This project grew out of a study to identify salt tolerant grasses. During its course, it was discovered that the greater impediment to longevity was the level of nutrients in the soil. This looked at how to improve the survivability of roadside grasses, using nutrient sources that are available as waste products. A blend of materials at different rates were used to identify the optimum. The identified blend and rate is expected to address the "browning" of the grasses that often occurs early in the desired life span. Aside from making the roadsides more appealing, the healthy grasses are expected to contribute to more stable embankments. In addition, since this is a waste product with limited use otherwise (concerns exist regarding contamination of foodstuffs), the cost is expected to be more constrained.

Project Information

High Value Research Title	Stimulating Transformational Thinking for Long Term Resilience Planning: Port of Providence (RI) Demonstration Project
Project Number	SPR-2(33)-2360
Project Cost	$119,123
Project Duration	20 months
Web link	
Submitter	
Submitter Agency	Rhode Island Department of Transportation
Submitter (Name, Address, Phone, Email)	Colin A. Franco, P..E RI Department of Transportation Two Capitol Hill, Room 018 Providence, RI 02903 (401) 222-2524 x4110 colin.franco@dot.ri.gov
Research Program	
No data entered for this section	
Research and Results	
Brief Summary of the	This project looks at planning and assessing the impacts of storm events

Research Project and Impact, or Potential Impact, of Implementing Research Results	on port facilities. It evaluates tools for visualization of the impacts at various levels, with the ability to vary parameters such as category levels for hurricanes in real time. It has brought together a wide variety of stakeholders (federal, state, local and private) in the port to represent a range of perspectives and look at options for promoting the resilience of the facilities. This approach promotes improved communication between stakeholders about the effects of storm events on elements of the ports, with possible approaches based on the impact levels of storms. This will help improve consensus among the group. This in turn will assist decision makers in determining the best approaches to keep ports functioning or failing that, to bring the ports back on-line. Although this targets coastal areas, it's important to anyone who depends on ports to ship and receive goods and materials.