

## TRANSPORTATION POOLED FUND PROGRAM QUARTERLY PROGRESS REPORT

Date: 06/30/2015

Lead Agency (FHWA or State DOT): Vermont Agency of Transportation

**INSTRUCTIONS:**

*Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.*

<p><b>Transportation Pooled Fund Program Project #</b> (i.e., SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX))</p> <p>TPF-5(222)</p>	<p><b>Transportation Pooled Fund Program - Report Period:</b></p> <p><input type="checkbox"/> Quarter 1 (January 1 – March 31)</p> <p><input checked="" type="checkbox"/> Quarter 2 (April 1 – June 30)</p> <p><input type="checkbox"/> Quarter 3 (July 1 – September 30)</p> <p><input type="checkbox"/> Quarter 4 (October 1 – December 31)</p>	
<p><b>Project Title:</b> New England Transportation Consortium (VI)</p>		
<p><b>Name of Project Manager(s):</b> Bill Ahearn</p>	<p><b>Phone Number:</b> 802-828-2561</p>	<p><b>E-Mail</b> <a href="mailto:Bill.Ahearn@state.vt.us">Bill.Ahearn@state.vt.us</a></p>
<p><b>Lead Agency Project ID:</b> CA0306</p>	<p><b>Other Project ID (i.e., contract #):</b> NETC 06-4 NETC 07-1 NETC 09-2 NETC 09-3 NETC 10-3 NETC 13-1 NETC 13-2 NETC 13-3 NETC 14-1 NETC 14-2</p>	<p><b>Project Start Date:</b> 9/16/13 7/1/13 9/1/13 9/1/13 9/16/13 9/1/14 6/1/14 12/1/14 3/1/15 2/1/15</p>
<p><b>Original Project End Date:</b> NETC 06-4 9/15/15 NETC 07-1 3/31/16 NETC 09-2 2/28/16 NETC 09-3 8/31/15 NETC 10-3 9/15/15 NETC 13-1 8/31/16 NETC 13-2 5/31/16 NETC 13-3 11/30/15 NETC 14-1 4/2/16 NETC 14-2 4/2/16</p>	<p><b>Current Project End Date:</b> 9/15/15 (NCE requested 9/15/16) 3/31/16 2/28/16 8/31/15, NCE to 12/31/15 9/15/15 4/2/16 (original proposal 8/31/16) 4/2/16 (original proposal 5/31/16) 3/31/16 4/2/16 (original proposal 8/31/16) 4/2/16 (original proposal 5/31/16)</p>	<p><b>Number of Extensions:</b> 0 (1 pending NCE for NETC) 0 0 1 (NCE approved 6/23/15) 0 0 (1 pending NCE for NETC) 0 (1 pending NCE for NETC) 1 0 (1 pending NCE for NETC) 0 (1 pending NCE for NETC)</p>

Project schedule status:

- On schedule  
  On revised schedule  
  Ahead of schedule  
  Behind schedule

Overall Project Statistics:

Total Project Budget		Total Cost to Date for Project	Percentage of Work Completed to Date
NETC 06-4	\$242,909	\$42,304.32	30%
NETC 07-1	\$198,154	\$116,054.34	75%
NETC 09-2	\$80,000	\$25,085.65	55%
NETC 09-3	\$165,000	\$110,168.38	81%
NETC 10-3	\$150,158	\$38,835.52	40%
NETC 13-1	\$174,923	\$39,016.86	35%
NETC 13-2	\$249,785	\$0	10%
NETC 13-3	\$100,000	\$13,847.91	20%
NETC 14-1	\$100,000	\$0	0%
NETC 14-2	\$205,554	\$0	15%

Quarterly Project Statistics:

Total Project Expenses and Percentage This Quarter			Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
NETC 06-4	\$42,304.32	5%	\$15,258.78	89.5% (based on 24 months)
NETC 07-1	\$116,054.34	12%	\$20,705.35	73% (based on 33 months)
NETC 09-2	\$20,415.38	0%	\$5802.67	80% (based on 30 months)
NETC 09-3	\$110,168.38	2%	\$712.10	78% (based on 28 months)
NETC 10-3	\$30,835.52	0%	\$10,386.24	89.5% (based on 24 months)
NETC 13-1	\$39,016.86	13%	\$8,585.86	41% (based on 24 months)
NETC 13-2	\$0	10%	\$0	50% (based on 24 months)
NETC 13-3	\$13,847.91	19%	\$13,847.91	25% (based on 12 months)
NETC 14-1	\$0	0%	\$0	22% (based on 18 months)
NETC 14-2	\$0	15%	\$0	20% (based on 24 months)

**Project Description:**

- 06-4 Preventative Maintenance and Timing of Applications
- 07-1 In-Place Response Mechanisms of Recycled Layers Due to Temperature and Moisture Variations
- 09-2 Effective Establishment of Native Grasses on Roadsides
- 09-3 Advanced Composite Materials: Prototype Development and Demonstration
- 10-3 Low Temperature and Moisture Susceptibility of RAP Mixtures with Warm Mix Technology
- 13-1 Development of High-Early Strength Concrete for Accelerated Bridge Construction Closure Pour Connections
- 13-2 HMA Mixtures Containing Recycled Asphalt Shingles (RAS): Low Temperature and Fatigue Performance of Plant-Produced Mixtures
- 13-3 Improved Regionalization of Quality Assurance (QA) Functions
- 14-1 Measuring the Effectiveness of Competency Models for Job-Specific Professional Development of Engineers & Engineering Technicians
- 14-2 Investigation of Northern Long Eared Bat Roosting Sites on Bridges

**Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):**

NETC 06-4, Work continued on the literature review for this project (Task 2). The research team recently evaluated each of the projects provided by the participant states and the corresponding data in order to identify two suitable

projects for optimal timing analysis and case study illustration. A memo was prepared and submitted to the project committee for review and comments.

NETC 07-1, This quarter was focused on FWD testing at the NH and ME sites and analysis of the data. Regular FWD testing has been conducted at all four sites through the spring thaw and recovery period. Several additional FWD tests will be conducted to capture full recovery into the summer period. Analysis of the FWD data has focused on the adjusted center deflection (ACD) and various parameters that can be calculated directly from the deflection measurements. The frost – thaw depth plots with the adjusted center deflection measurements during the spring thaw and recovery period show the deflections increase to a maximum value shortly after full thaw occurs for each section. Gradual recovery has been observed in the Auburn and Warren Flats sites with the analysis that has been completed to date. The analysis for the Kancamagus site has not yet been completed.

NETC 09-2, The following activities were implemented during this reporting period:

Survey and Interviews:

- The write-up of the interviews of the 5 New England DOTs is in progress.

Establishment of the new demonstration sites along Rt. 6:

- April 2015: CT DEEP was contacted to assist with the Truax drill and to provide an operator for the establishment of one demonstration site.
- May 7, 2015 and May 15, 2015 – new demonstration sites were sprayed with RoundUp non-selective herbicide
- May 21, 2015 – some demonstration sites were mowed and raked
- May 22, 2015 – a new trial for the establishment of the little bluestem with was planted using topsoil, hydromulch, straw, clayballs and sawdust at the site #1 along Rt.6.
- May 28, 2015 – a site #2 was planted with the Truax seed drill
- May 22, 2015 all sites along Rt. 6 were visited with Rebecca Brown (University of Rhode Island) to consult about the establishment of native grasses.
- By-weekly site inspections were conducted throughout June to observe the germination and establishment rates.

NETC 09-3,

- Two teleconferences were held with the Project Technical Committee on May 20<sup>th</sup> and June 24<sup>th</sup>.
- The installation of FRP drains was documented at the Union Street westbound overpass bridge in Bangor, ME on June 3<sup>rd</sup>. The bridge visit was coordinated with the AASHTO Domestic Scan Team.
- A Dropbox folder was setup to share technical information with the Project Technical Committee.
- Task 4- Product validation: baseline mechanical properties and durability performance based on coupon tests for three vendors were reviewed with the Technical Committee.
- Tasks 5 and 6 - Document installation of FRP drains in bridges. Contacted MaineDOT to coordinate the inspection of FRP drains installation in three bridges: 1) Westbrook Bridge, 2) Howland-Enfield Bridge, and 3) Union Street Eastbound Overpass Bridge. Develop an inspection protocol for FRP bridge drains.

NETC 10-3, UMASS Dartmouth contacted Tilcon CT about reproducing the mixtures produced in October 2014 that did not meet the required volumetric properties. UMASS Dartmouth contacted the other contractor (Palmer Paving) who agreed to produce mixture for this study. This contractor stated that they will produce the mixtures in April or May 2015. An additional contractor was contacted (PJ Keating) to determine if they would help with producing the mixtures for this study in the event one of the selected contractors cannot supply the mixtures.

NETC 13-1, The following activities were performed during this reporting period:

- Task 1: Literature Search: Progressed on written summary of the literature review including main findings of relevant research reports, technical papers and survey responses. Performed additional literature review to obtain research reports and technical papers to assist in further development of mix design trial batches.
- Task 3: Develop Mix Design: Tested 7 concrete mix design trial batches initially based off of a state-of-practice mix design, and compared test results using compressive strength tests on 4 by 8 in. cylinders and workability. The adjustments made to the state-of-practice mix design throughout the 7 trial batches include decreased

maximum coarse aggregate size, elimination of fly ash, modification of admixture quantities and variation of the water-to-cement ratio. Developed new base mix design using proportioning specified in ACI 211.4-R: Guide for Selecting High-Strength Concrete Using Portland Cement and Other Cementitious Materials.

- Task 4: Test Mixture: Shrinkage test (AASHTO PP 34-99) setup has been fully designed and fabricated nearly to completion.

NETC 13-2, 1) UMass Dartmouth continued to contact several producers of asphalt mixtures in New England about their availability and willingness to participate in the study. Finally, one contractor stated that his company will help the research team with the study. 2) the literature review for this project is almost complete.

NETC 13-3, During this past quarter good progress was made in this study. The researchers reviewed a number of specifications and QA process documents from various New England State DOTs as well as continued the literature review on the topic. The project kick-off meeting was held at University of New Hampshire on April 30<sup>th</sup>. The meeting aided in refining the research activities and also aided in making initial contact with the various DOT personnel involved with the study. The meeting also helped refine the interview questionnaire prepared by researchers.

Co-PI of the project is also involved in developing inspector training course for NETTCP for PCE/PSE. The pilot for this course was taught during this quarter and was attended by the student working on the project.

During this quarter the researchers visited three DOTs (NH, ME and RI) as part of the QA process reviews through interview of DOT engineers and QA inspectors. All interviews have already been transcribed and the information is being processed towards developing a common acceptance standard for PCE/PSE.

NETC 14-1, Notice to proceed letter sent to PI on May 22, 2015. No progress reported this quarter.

NETC 14-2

- Kick-off meeting on May 18, 2015
- Literature review completed including searches in databases, web searches and contact with researchers and relevant organizations
- Phone interviews with Fishery and Wildlife, DOT and other organization personnel completed
- Joined and posted inquiries regarding bats in bridges to relevant listserv groups
- Acoustic monitoring equipment ordered and partially received
- Infra-red camera ordered and received
- Miscellaneous supplies purchased for field work
- Advertising, interviewing and hiring of two undergraduate research assistants completed
- Training by Alyssa Bennett completed for Scott Civjan, Angela Berthaume and Helen Yurek
- Initial use of acoustic monitoring equipment at VT bridge site known to have active bat roosting.
- GIS software set up to integrate maps with National Bridge Inventory to determine routes for visual screening and instrumentation
- Rapid visual screening of over 70 bridges in VT, NH, RI and MA to evaluate for signs of roosting to narrow down instrumented structures

**Anticipated work next quarter:**

NETC 06-4, Continue work on the literature review. Compile and tabulate survey responses for Task 3&4. Commence work on Task 5&6.

NETC 07-1, A few additional FWD tests will be conducted this quarter. The research team will complete the analysis of the FWD results in combination with the measurements from the in-place instrumentation. Pavement evaluation and back calculation of modulus values from the FWD testing will begin this quarter.

NETC 09-2, Complete the interview analyses and write-up. Continue writing a chapter about the establishment of the

demonstration plots along Rt. 6. Evaluate the plots installed last fall. Establish additional experimental plots in May.

NETC 09-3, Submit draft report for Task 4 summarizing test data and discussing compliance with specifications. Generate feedback from manufacturers on minimum allowable baseline and durability values for mechanical properties, and assurance on field performance and durability. Coordinate with DOTs inspection and documentation of bridge drain installations.

NETC 10-3, UMass Dartmouth will attempt to obtain and begin testing the plant produced mixtures.

NETC 13-1, Task 1: Continue work on the written summary of the literature review including main findings of relevant research reports, technical papers and survey responses. Continue literature search as required. Task 2: Adjust existing concrete mix design specifications based on feedback from the NETC Project Technical Committee (pending feedback from committee). Task 3: Adjust the newly proportioned mix design (ACI 211.4R proportions) to obtain required strength and sufficient workability. Test preliminary concrete mixtures that reach compressive strength goal and qualitatively acceptable workability for remaining initial short-term performance criteria (set time, air content and slump). Task 4: complete fabrication of shrinkage test (AASHTO PP 34-99) setup. Execute practice tests using the test setup. Begin design and fabrication of bar pullout test (ASTM A944) setup.

NETC 13-2, Complete Literature Review. The contractor (PJ Keating) will deliver the virgin materials (asphalt binder, aggregates, and shingles) that will be used in producing the mixture to UMass. UMass will start developing mixture designs.

NETC 13-3, Interview with DOT engineers and QA inspectors for CT, MA and VT; Visit of PCE/PSE facility and interview of fabricator(s) as well as New England PCI; Development of draft common acceptance standards

NETC 14-1, Kick-off meeting with project Technical Committee.

NETC 14-2

- Rapid visual screening of bridges in Western MA, ME and Northern NH
- Acoustic monitoring and thermal imaging of at least nine bridges during maternity roosting season
- Acoustic monitoring and thermal imaging of at least nine bridges during post-maternity roosting season
- Initial evaluation of data
- Initial reporting of bridge characteristics including signs of structural causes of staining and signs of possible bat roosting

#### **Significant Results:**

None as of this reporting period.

**Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might affect the completion of the project within the time, scope and fiscal constraints set forth in the agreement, along with recommended solutions to those problems).**

NETC 06-4, Current End Date for this project is 9/15/15. UMass Dartmouth requested a no-cost time extension (September 2014) in order to include more new pavement preservation projects ongoing in the New England states to this study, investigate and purchase the needed testing devices, and to allow more time for field evaluation of the preservation projects included in the study. The requested time extension was for one year with a new end date of 9/15/2016. New End Date is beyond NETC contract end-date. NCE approval is waiting for NETC contract NCE approval.

NETC 07-1, None during the current period.

NETC 09-2, No problems were encountered during this reporting period.

NETC 09-3, None during the current period.

NETC 10-3, In September 2014, UMass Dartmouth formally requested a no additional cost time extension for this project of twelve month (new end date 9/15/2016). The basis of the request is that the contractors have not produced or provided the mixtures required for this study. The Technical Committee did not approve the NCE request, and decided to hold off on submitting the NCE request until after samples were received from the contractors. NETC 10-2 has 2.5 months remaining of the 24 month project. The percent of work completed is 40%. The End Date is now less than 90 days. The NETC Coordinator contacted the Technical Committee and is awaiting a recommendation for the future of this project.

NETC 13-1, No problems encountered to date. The proposed project period was 24 months. However, the NETC coordinator's contract end date is 4/2/16, and the project cannot be contracted past that end date. The project will require a NCE for end date 8/31/16 as soon as the NETC contract NCE is approved.

NETC 13-2, The project period is 50% complete with only 10% of the project tasks completed, and no expenses have been invoiced to date. The proposed project period was 24 months. However, the NETC coordinator's contract end date is 4/2/16, and the project cannot be contracted past that end date. The project will require a NCE for end date 5/31/16 as soon as the NETC contract NCE is approved

NETC 13-3, None during the current period.

NETC 14-1, Notice to proceed was received three months past the project start date. The proposed project period was 18 months, ending 8/31/16. However, the NETC contract end date is 4/2/16. The project will require a NCE for end date 8/31/16 as soon as the NETC contract NCE is approved.

NETC 14-2

- Notice to proceed was three months past the project start date. The project relies on data collected during summer months, requiring work during summer 2016 to complete the project.
- Project notice to proceed precludes any 2015 data from early season (pre-maternity roosting).
- Interactions with Fish and Wildlife, DOT and other organization personnel did not identify any new bridges with known or likely bat presence (per Tasks 1 and 3). Therefore more effort than anticipated will be involved in rapid visual screening of bridges to identify specific bridges for monitoring program. Currently over 70 bridges have been screened in VT, NH, RI and MA by the project team while awaiting equipment. Based on these initial interviews it is expected that the scope of Task 3 will need to be revised.
- Acoustic monitoring equipment was on backorder, most received in late June.
- External battery cables and Sonobat software are still not received by UMass.
- Personnel on project will differ from proposed. Two undergraduate research assistants have been hired to assist a graduate student (funded by NSF scholarship) working on the project. This will be re-evaluated for the second year.
- The proposed project period was 24 months, ending 5/31/16. However, the NETC contract end date is 4/2/16. The project will require a NCE for end date 8/31/16 as soon as the NETC contract NCE is approved.

**Potential Implementation:**

The 7 research projects listed above are still in progress. Implementations of the results of those projects are not anticipated in the near future.