TRANSPORTATION POOLED FUND PROGRAM
QUARTERLY PROGRESS REPORT

Date: *April 10, 2012*

Lead Agency: *Montana Department 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.

Transportation Pooled Fund Program Project #:	**Transportation Pooled Fund Program – Report Period:**
TPF-5(251)	■ Quarter 1 (January 1 – March 31) ☐ Quarter 2 (April 1 – June 30) ☐ Quarter 3 (July 1 – September 30) ☐ Quarter 4 (October 1 – December 31)

Project Title:
Relative Operational Performance of Geosynthetics Used as Subgrade Stabilization

Name of Project Managers:	**Phone Numbers:**	**E-Mails**
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Lead Agency Project ID: *MDT Project #7712*	**Other Project ID:** *MSU/OSP: 4W3850*	**Project Start Date:** *December 1, 2011*
Original Project End Date: *November 30, 2013*	**Current Project End Date:** *November 30, 2013*	**Number of Extensions:** *0*

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
$581,726	*$42,800*	*7%*

Quarterly Project Statistics:

Total Project Percentage This Quarter	Total Amount of Funds Expended This Quarter	Total Percentage of Time Used to Date
7%	*$42,567*	*17%*

Project Description:

State departments of transportation (DOTs) routinely use geosynthetics for subgrade stabilization. This construction practice involves placing an appropriately specified geosynthetic on a weak subgrade prior to placement of roadway subbase. The geosynthetic provides stabilization of the subgrade by increasing the load-carrying capacity of the system and maintaining separation between the soft subgrade and subbase materials. Subgrade stabilization allows for a firm construction platform to be built with less aggregate and less construction time as compared to construction without the stabilization geosynthetic. There is a general consensus concerning the effectiveness of geosynthetics in this application; however, there is a lack of understanding and agreement on the material's properties needed for performance. Those properties should be specified in order to ensure its beneficial use and to allow a broad range of products to be considered. In order to provide for the most economical geosynthetic selection while minimizing conflicts and promoting competitiveness, MDT and other states are conducting a study to examine the performance of various geosynthetics for subgrade stabilization. The aim of the study is to relate this performance to material properties that can be incorporated into standard specifications to allow for broad and economical use of geosynthetic products for a specific application.

Progress this quarter:

Task 1 – Material Characterization

- *performed laboratory tests to establish CBR–vane shear correlation for subgrade soil*
- *identified multiple potential sources of base course aggregate and performed general characterization tests; sent samples to commercial laboratory for Proctor and resilient modulus testing*
- *prepared and evaluated bids, and executed a contract with GeoTesting Express for cyclic plate load test*
- *purchased LWD, vane shear, and DCP devices and CBR testing accessories*
- *obtained six geosynthetics, made arrangements to secure two more, and began procuring last four*

Task 2 – Setup Monitoring Equipment

- *borrowed a robotic total station to test accuracy and measurement time for rut measurements in the field*
- *purchased pore-water pressure, displacement and strain gage sensors*
- *determined instrumentation cable requirements and started collecting quotes*
- *purchased electronics for instrumentation boxes*

Task 3 – Planning and Construction

- *met with campus facilities/purchasing personnel and determined bidding schedule for site construction contract*
- *finalized construction specifications*

Task 4 – Install Instrumentation *– no progress on this task during this period*

Task 5 – Trafficking and Data Collection

- *secured a truck for trafficking with similar load capacity and dimensions as previous project*

Task 6 – Forensic Investigations

- *reserved rental of a vacuum excavator*

Task 7 – Data Analysis *– no progress on this task during this period*

Task 8 – Reporting

- *Task Report #1 was submitted March 30, 2012*
- *Progress Report #2 was written*

Anticipated work next quarter:

Task 1 – Material Characterization

- *additional laboratory tests of subgrade to finalize CBR–vane shear correlation*
- *conduct resilient modulus tests on potential base course aggregates*
- *finalize selection of base course aggregate source and send geomaterials to GeoTesting Express for cyclic plate load tests*
- *obtain final six geosynthetics and begin testing*
    - *cyclic plate load test*
    - *wide-width tension tests*
    - *cyclic tension tests*
    - *cyclic pullout tests*

Task 2 – Setup Monitoring Equipment

- *WTI will propose the adoption of a robotic total station as the field rut measurement device to the technical panel*
- *setup rut data storage and analysis spreadsheets*
- *set up data collection and storage for vane shear, DCP, LWD and in-field CBR field data*
- *calibrate LVDTs and pore water pressure sensors*
- *verify pore-water pressure response in laboratory simulation experiment*
- *program data acquisition system*
- *determine power requirements and plan power system for DAQ*
- *setup enclosures to house sensors for field data collection*
- *purchase components and build strain gage circuitry*

Task 3 – Planning and Construction

- *put construction contract out for bid*
- *write contracts to procure subgrade and base soils*

Task 4 – Install Instrumentation – *no progress anticipated on this task during this period*

Task 5 – Trafficking and Data Collection – *no progress anticipated on this task during this period*

Task 6 – Forensic Investigations – *no progress anticipated on this task during this period*

Task 7 – Data Analysis – *no progress anticipated on this task during this period*

Task 8 – Reporting

- *write Progress Report #3*

Significant Results:

The project is progressing as planned, with no significant results to be shown at this point.

Circumstance Affecting Project or Budget:

There are no known issues that will negatively impact the quality of the project, its timeline or budget at this time.

Potential Implementation:

It is anticipated that the information from this project will be useful to departments of transportation seeking to improve their specification of and use of geosynthetics for subgrade stabilization.