**TRANSPORTATION POOLED FUND PROGRAM**

**QUARTERLY PROGRESS REPORT**

**Lead Agency: Utah 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.*

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| **Transportation Pooled Fund Program Project #**  **TPF-5(381)** | | **Transportation Pooled Fund Program - Report Period:**  \_ Quarter 1 (January 1 – March 31, 2018)  **x Quarter 2 (April 1 – June 30, 2018)**  \_ Quarter 3 (July 1 – September 30, 2018)  \_ Quarter 4 (October 1 – December 31, 2018) | |
| **Project Title:**  Evaluation of Lateral Pile Resistance Near MSE Walls at a Dedicated Wall Site – Phase 2 | | | |
| **Name of Project Manager(s):**  David Stevens | **Phone Number:**  801-589-8340 | | **E-Mail**  [davidstevens@utah.gov](mailto:davidstevens@utah.gov) |
| **Lead Agency Project ID:**  FINET 42085, ePM PIN 16761  UDOT PIC No. UT17.404 | **Other Project ID (i.e., contract #):**  UDOT Contract No. pending | | **Project Start Date:**  Contract start date pending |
| **Original Project End Date:** | **Current Project End Date:** | | **Number of Extensions:** |

Project schedule status:

**X** On schedule \_ On revised schedule \_ Ahead of schedule \_ Behind schedule

Overall Project Statistics:

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| **Total Project Budget** | **Total Cost to Date for Project** | **Percentage of Work**  **Completed to Date** |
| Pending (current contract)  $220,000.00 (total commitments) | $0.00 | 0% |

***Quarterly*** Project Statistics:

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| **Total Project Expenses**  **and Percentage This Quarter** | **Total Amount of Funds**  **Expended This Quarter** | **Total Percentage of**  **Time Used to Date** |
| 0% | $0.00 | 0% |

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| **Project Description**:  Bridge abutment piles are frequently surrounded by mechanically stabilized earth (MSE) walls rather than a soil slope. Piles near MSE walls must be designed for lateral loads from earthquakes and thermal expansion/contraction. In the TPF-5(272) Phase 1 study involving several state DOTs, a series of 31 tests on free-head piles provided p-multipliers as a function of pile spacing which can be used to account for reduced lateral soil resistance due to the presence of an MSE wall. Equations were also developed to compute the induced force developed in the reinforcements by the lateral pile loading. However, a number of questions came up when the results of the Phase 1 study were presented to engineers and those responsible for code changes. These issues involve (a) the effect of cyclic loading when previous testing was monotonic, (b) the effect of pile head fixity because previous tests were on free-head piles while most abutment piles are “fixed-head”, (c) the effect of pile group loading when previous tests were for single piles, and (d) the effect of pile diameter on the p-multiplier and induced force equations because previous tests were all for piles about 12 inches in diameter.  Objective: To provide closure relative to the outstanding issues described above, a series of additional tests will be conducted as a Phase 2 follow-up to the original test series.  The Phase 1 study included construction of a dedicated MSE wall site in Utah with instrumented piles behind the 20-ft high wall. Prior to the Phase 2 testing, the top 6.5 ft of backfill behind the MSE wall will be excavated, new instrumented reinforcements will be placed, and the backfill will be re-compacted.  Tasks for this Phase 2 study include:  1. Conduct cyclic lateral pile load testing.  2. Conduct fixed-head lateral pile load testing.  3. Conduct lateral pile load testing of larger-diameter piles (18- or 24-inch diameter), to be newly placed between cut-off existing piles.  4. Conduct lateral pile load testing of a pile group.  5. Analyze the Phase 2 lateral pile load testing results, compare these with the Phase 1 results, and update the design procedures and numerical model from Phase 1 as applicable.  6. Submit a final report that documents the Phase 2 research effort.  7. Make presentations at AASHTO bridge engineers’ committee meetings and TRB events to aid in national efforts to implement the study results.  Dr. Kyle Rollins of BYU is the Principal Investigator for this research project. The technical advisory committee (TAC) for the study currently includes representatives from UT, FL, KS, MN, NY, and WI state DOTs. |

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| **Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):**  **Task 1** – Not started.  **Task 2** – Not started.  **Task 3** – Not started.  **Task 4** – Not started.  **Task 5** – Not started.  **Task 6** – Not started.  **Task 7** – Not started.  **Contract** – The TAC members met with Dr. Rollins via web conference in April on the completing Phase 1 study and the proposed scope for the new Phase 2 study. UDOT prepared for the contract with internal project setup and communication with partner states regarding transferring funding commitments. |
| **Anticipated work next quarter**:  **Task 1** – Prepare the site and start the testing.  **Task 2** – Prepare the site and start the testing.  **Task 3** – Prepare the site and start the testing.  **Task 4** – Prepare the site and start the testing.  **Task 5** – None planned.  **Task 6** – None planned.  **Task 7** – None planned.  **Contract** – Dr. Rollins will update the testing plan and cost estimate for this new phase of the study. UDOT will share this with the TPF-5(381) TAC members for their review and will coordinate on the contract preparation with Dr. Rollins and BYU. The contract will be executed and the project will begin. |

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| **Significant Results:**  The research contract preparation is underway. Dr. Rollins has begun lining up instrumentation, suppliers, and subcontractors to help with the site preparation and testing.  It was suggested in the April TAC web conference that a survey of all states could be done regarding their design practices relating to piles behind MSE walls. This could help with better background and understanding of how different states approach this issue. We will consider having BYU draft a few questions that could be used for the survey. Then UDOT would assist with sending out the survey and collecting responses, possibly through the AASHTO RAC or SCOBS. |
| **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).** |

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| **Potential Implementation:** |