**TRANSPORTATION POOLED FUND PROGRAM**

**QUARTERLY PROGRESS REPORT**

Lead Agency (FHWA or State DOT): \_FHWA\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**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 #***(i.e, SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX)**TPF-5(461)* | **Transportation Pooled Fund Program - Report Period:**□Quarter 1 (January 1 – March 31) 2024🗹Quarter 2 (April 1 – June 30) 2024□Quarter 3 (July 1 – September 30) 2024□Quarter 4 (October 1 – December 31) 2024 |
| **Project Title:**Soil and Erosion Testing Services for Bridge Scour Evaluations |
| **Name of Project Manager(s):***Kornel Kerenyi* | **Phone Number:***(202) 493-3142* | **E-Mail***kornel.kerenyi@dot.gov* |
| **Lead Agency Project ID:** | **Other Project ID (i.e., contract #):** | **Project Start Date:**  |
| **Original Project End Date:** | **Current Project End Date:** | **Number of Extensions:** |

Project schedule status:

🗹 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** |
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***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** |
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| **Project Description**:

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| **Objectives:**The objective of these pooled funds is to provide and/or support soil and erosion testing services for bridge projects over water crossings managed or coordinated by State DOTs, to provide technical assistance to design, fabricate, and install erosion testing devices to support and seek to broaden the use of erosion testing devices among State Department of Transportations, and to compile and analyze the collected soil and erosion testing data in a broader research effort to more accurately estimate reliable scour design depths given the soil conditions and hydraulic load during a given storm event. |
| **Scope of Work:**Task 1: Soil Erosion Test in the Turner Fairbank Highway Research Center (TFHRC) Hydraulics and/or Geotechnical Lab for various bridge projects: The Hydraulics and Geotechnical Lab staff will conduct soil and erosion tests utilizing the Ex-situ Scour Testing Device (ESTD) and/or Erosion Function Apparatus (EFA) on soil samples shipped to the Laboratories for bridge projects managed or coordinated by State DOTs.Task 2: Soil Erosion Test in the field for various bridge projects: The Hydraulics Lab staff will conduct soil erosion tests in the field using the In-Situ Scour Testing Device (ISTD) or Portable Scour Testing Device (PSTD) and collect samples for ESTD and/or EFA tests in the TFHRC Hydraulics Laboratory for projects managed or coordinated by State DOTs.Task 3: Laboratory and In-situ Soil Testing: The TFHRC Geotechnical Lab staff will conduct index testing (e.g. particle-size distribution, unit weight, moisture content, Atterberg limits, etc.) and other, more specialized laboratory soil tests (e.g. undrained shear strength, consolidation, etc.) in the TFHRC Geotechnical Laboratory to determine key soil parameters that may impact erosional resistance. Geotechnical Lab staff will coordinate Cone Penetration Testing at the site with the State DOTs.Task 4: Fabrication of an Erosion Testing Device: The TFHRC Hydraulics Lab staff will design and fabricate an Erosion Testing Device (e.g. ISTD or PSTD) to conduct soil erosion tests for projects managed or coordinated by State DOTs.Task 5: Soil Erosion Tests Support. TFHRC Hydraulics Lab staff will provide technical assistance for conducting and analyzing soil erosion tests in the field or in a Laboratory for projects managed or coordinated by State DOTs.Task 6: Laboratory and In-situ Soil Testing Support. TFHRC Geotechnical lab staff will provide technical assistance for conducting and analyzing ex- and in-situ soil testing for projects managed or coordinated by State DOTs.Task 7: Scour along Longitudinal Structures: This task will use NextScour principles (hydraulic loading functions versus soil erosion resistance), Computational Fluid Dynamics (CFD), Flume Experiments and Case Studies to research scour prediction for various flow conditions on longitudinal structure types and configurations in a riverine environment.   |

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| **Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):*** Successfully presented the TPF technical assistance update to MDOT on the US-23 Bridge replacement project near Ann Arbor, MI: completed 2D and 3D CFD flow simulations and preliminary scour estimates
* Completed all bridge/culvert CAD drawings and started the CFD simulations for the MSDOT Lynch Creek bridge scour project
* Successfully presented the shear stress decay function to Five state DOTs through the Peer Exchange and demonstrated estimating scour depths combing the decay function and erosion resistance of multiple-layer soils
* Advanced the method of predicting the lower-bound critical shear stress (τc,design) of clay using τc fitting equation and the ratio between measured and calculated τc
* Completed the pressure abutment scour flume tests and drafted the TechNote
* Designed 3D flume-scale models of the longitudinal scour and started the CFD flow simulations to determine scenarios to be tested in the flume
* Continued finalizing the FDOT riprap study report
* Provided technical assistance to IL on the ISTD and PSTD units: replacing LVDT sensors in the erosion heads
* Coordinated with ODOT on testing clay erosion resistance for a few sites
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| **Anticipated work next Quarter**:* Present the progress and successful case studies of the TPF on 2024 NHEC
* Present the method of predicting lower-bound critical shear stress (τc,design) of clay on 2024 NHEC
* Draft the TechNote on calculating τc,design of clay
* Collect field soils and conduct the erosion tests for the US-23 bridge placement project
* Collect field soil samples from ODOT and conduct erosion tests to determine the critical shear stresses
* Continue technical assistance to the MSDOT Lynch Creek Bridge project and the TNDOT I-55 Bridge project
* Continue working on the FDOT riprap study report
* Activate the clay flume and prepare scour tests with pier, abutment and longitudinal walls in clay
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| **Significant Results:**VDOT joined the TPF supporting the research of longitudinal scour |
| **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).**None to report. |