

# 2019 UDOT RESEARCH PROBLEM STATEMENT

\*\*\* Problem statement deadline is Feb. 6, 2019. Submit statements to [UTRAC@utah.gov](mailto:UTRAC@utah.gov). \*\*\*

**Title:** Forensic Investigation of the Value Added to the Pavement Section Using Geogrids - Phase 2      **No. (Office Use):** 19.01.01

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**UDOT Champion (if different):**      **Email:**      **Phone:**

Select **ONE** Subject Area     Materials/Pavements     Maintenance     Traffic Mgmt/Safety     Structures/Geotech  
 Planning     Perf Mgmt/Data Analytics     Public Transportation     Other

## 1. Describe the problem to be addressed:

The use of geogrids within the Untreated Base Courses (UBC) and Granular Bases (GB) supporting pavement wearing surfaces has the potential to provide sufficient support so that the thicknesses of UBC, and GC can be substantially reduced, thereby potentially providing significant cost savings for the pavement system. To evaluate this potential use of geogrids, a section was constructed on SR-10 from Emery to Muddy Creek, MP 13.0 to 15.8, in which four different biaxial geogrids were used. Although the test section itself has performed well, the rest of the project is failing. This failure has created doubts that the geogrids used in this project have performed their intended function, which in turn has caused some hesitation for pavement design engineers to use geogrids on UDOT projects.

## 2. Write the project objective (25 words or less):

Forensically evaluate the test section and the rest of this project and determine why the test section is performing well but the rest is failing. Evaluate the performance of each of the four geogrids and determine if the geogrid added any benefit to the pavement system in this project. Develop methods to evaluate the use of geogrids on other projects.

## 3. Explain why this research is important:

(In response, consider addressing specific UDOT goals, applicability in Utah or other states, etc.)

- a. Innovation by showing the benefits of Geogrids to Pavement section. Build enough confidence in this benefit that it can be added to the Pavement Designers Tool Box.
- b. Evaluation of four different Geogrids would provide technical results to eliminate brands that failed and recommend the use of those brands that were successful.
- c. Report on the Geogrid Test Section along with methods develop to evaluate Geogrids for future designs.

## 4. List the major tasks:

1. Identify the locations and depths of the geogrid along the entire 2.8-mile long section of reconstructed roadway using ground penetrating radar (GPR) or other geophysical methods.
2. Obtain samples of native fill used at some locations and subgrade soils at all locations; perform laboratory tests to determine susceptibility to moisture-induced problems (wetting-induced collapse, reduction in modulus)
3. Conduct mineralogical tests to determine the source of plastic fines found in the UBC and GB at some locations (fines migration or borrow soil not meeting specifications)
4. Perform laboratory tests to study expected depth of fines migration and beneficial effect of geotextile separator
5. Install moisture sensors at each of the 14 test locations to determine changes in moisture within the UTB, GB, and subgrade soils throughout the year
6. Identify improved specifications for increasing performance of UTB and GB (e.g. requiring angular particles or number of fractured faces, limiting compaction to temperatures above 40°, more stringent specifications to ensure well-graded soils, reducing the allowable fines)
7. Perform additional moderate scale and large scale tests beyond those currently funded by the Mountain Plains Consortium (MPC) to study all factors in more depth, including the additional factors identified in Tasks 2 through 6

8. Write final report

**5. List the expected deliverables (reports, manual, specification, design method, training, etc.):**

1. Proposed interim specifications for UTB and GB
2. Improved design methods for geogrid-reinforced pavement systems
3. Final report

**6. Describe how the research results will be implemented:  
(In response, consider addressing UDOT leader support, process or standard improvement, etc.)**

1. Interim specifications will be adopted and monitored to determine if they are improving the engineering properties of the UTB and GB
2. Improved design methods will be provided to UDOT PMEs
3. Findings and results will be disseminated to interested state DOTs

**7. Requested from UDOT: \$50K  
(or UTA for Public Transportation)**

**Other/Matching Funds: \$40K**

**Total Cost: \$90K**

**8. Outline the proposed schedule, including start and major event dates:**

- Task 1 July-August 2019
- Tasks 2: August-September 2019
- Tasks 3: October 2019
- Task 4: October-November 2019
- Task 5: July 2019
- Task 6 December 2019
- Task 7: July 2019 – May 2020
- Task 8: June 2020