



# MEMORANDUM

Missouri Department of Transportation  
Project Manager  
Saint Louis District

**TO:** Eric Schroeter  
Interim State Design Engineer

**CC:** Jim Smith - de

**FROM:** Tim Schroeder  
Transportation Project Manager

**DATE:** September 27, 2013

**SUBJECT:** Route 370, St. Charles County  
Bridge Approach Stabilization Project - Job No. J6P2126  
Proprietary Item (Uretek Deep Injection)  
Public Interest Finding Request

**I do hereby certify that in accordance with the requirements of 23 CFR 635.411(a)(2), no equally suitable alternate exists for this patented or proprietary item.**

  
Kathryn P. Harvey, State Design Engineer

With respect to the above named project, we request approval of a finding in the public interest to use the Uretek Deep Injection process.

This project includes pavement improvements to the bridge approach slabs at five bridge locations along Missouri Route 370, between I-70 and Elm Point Industrial Drive. The bridge approaches on Route 370 were built with five feet or more of sand fill underneath the approach slabs. These approaches have experienced repeated settlement following attempted repairs utilizing cementitious grout (mud-jacking) and polyurethane soil stabilization. These previous attempts have failed and resettlement has occurred. Adding asphalt wedges have also failed and perhaps even caused further settlement with the added weight.

### Testing of current conditions

Dynamic cone penetrometer (DCP) testing was performed on the approach slabs, at four of the five bridge locations, to determine soil densities and locate any weak zones within the subgrade. Note that one location was not tested due to the presence of a petroleum pipeline. We found that while most of the locations had reasonable soil densities, some showed weakness only in the first five feet and three of the locations demonstrated problems much deeper. The existing asphalt wedges have reflective cracks at the PCCP joints below it; an indication the PCCP slabs are not sufficiently supported.

We believe that water is infiltrating the existing sand layer. Some of the sand then evacuates the area with the traveling water, leaving voids. Additionally, the wet sand is less stable and provides less support for the pavement system allowing movement in the pavement system. The proposed solution is to inject each approach at a depth of five feet with an expansive polymer to lock up the sand. This injection will dramatically strengthen the support for the system by turning the sand layer essentially into sandstone. It will also dramatically reduce the ability of water to travel through the system.

On the three locations that demonstrated looseness at further depths, we need a secondary injection at ten feet. Because the expanding polymers are extremely lightweight, a minimal amount of additional overburden weight is introduced into the already distressed subgrade soil environment.

Discussion of Alternatives

Many of the alternatives researched have already been tried and have proven to fail at these locations. Mud-jacking was tried, and settlement still occurred. Polyurethane soil stabilization was tried, and settlement still occurred. Asphalt wedging was tried, and settlement still occurred, causing reflective cracking at the underlying PCCP joints. DCP testing has revealed that voids exist up to 10 ft below the surface of the bridge approach slabs, causing continual settlement. A deep injection process is needed to fill in the voids and provide a stable subgrade for the bridge approach slabs to rest upon.

In conclusion, I certify that no suitable alternative exists.

Project Schedule

This project is scheduled for a January 2014 bid opening.