

Memo

To: David Stevens, Project Manager, Utah DOT, Research Division, email: davidstevens@utah.gov

From: Kyle Rollins, Prof. Civil & Environ. Engrg. Dept., 430 EB, email: rollinsk@byu.edu

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Re: Task 4 Memo reporting completion of cyclic lateral pile load testing.

We have completed cyclic lateral load tests on four 12.75 in. diameter pipe piles located at distances of 2, 3, 4, and 5 pile diameters (D) from the center of the pile to the back face of the MSE wall. We performed these tests at the simulated bridge abutment constructed at the point of the mountain. To create a virgin loading condition, without reconstructing the entire wall, the backfill soil was excavated to the top of the third layer of reinforcements or 6.25 ft. Because the lateral resistance of the piles near the MSE wall is primarily dominated by the soil stiffness and reinforcements in the shallow layers, this approach produced an MSE wall and backfill that was similar to the virgin condition. The original welded wire grid and ribbed strip reinforcements were destroyed in the excavation process but were replaced with new reinforcements with new strain gauges. Therefore, the tensile force distribution in the reinforcements could be measured during the lateral pile load testing. In addition to lateral load-deflection, bending moment was measured with depth in each pile. Furthermore, ground deflection, failure planes, and wall movement were measured during lateral pile loading.

The lateral load tests show that the lateral pile resistance when loading towards the wall was comparable to the resistance when loading away from the wall. Cyclic lateral loading produced a reduction of about 10 to 20% in lateral resistance after about 15 cycles.