ALABAMA DEPARTMENT OF TRANSPORTATION

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Kay Ivey
Governor

John R. Cooper
Transportation Director

May 23, 2025

TO: Whom It May Concern

FROM: Kaye C. Davis, P.E.
Deputy Materials & Tests Engineer

RE: Tapered Steel Friction Pile (TSFP) Testing
Mobile, AL Test Site

This letter documents the collaborative geotechnical investigation and load testing of the Tapered Steel Friction Piles (TSFP) conducted by The Loren Group (TLG), Browning Enterprise, Inc., Dr. Bengt Fellenius, Jordan Pile Driving, Scientific Applied Concepts Ltd. (SACL), and the Alabama Department of Transportation (ALDOT), with the goal of evaluating the piles' structural performance for potential use in Alabama transportation infrastructure. The TSFP has a tapered shape at the tip of the pile that is driven with conventional pile driving equipment and can be easily spliced to conventional round pipe sections through field welding, allowing for longer pile lengths. The tapered shape is expected to enhance load capacity while requiring less embedment depth into the bearing stratum, potentially reducing construction time and cost.

ALDOT had been approached by TLG, the manufacturer of the TSFP, about the possibility of using the piles in some of the structures around the state. ALDOT explained that additional testing was necessary to understand the benefits of the product over the types of piles currently specified by the Department. Mr. Jerry Hart of TLG requested assistance in how to start that process and where the testing could occur. With the early acquisition of the property from Austal USA, ALDOT had a well-suited site for the testing and could be involved in all facets of the process to fully vet the information received. ALDOT made the site available for TSFP pile driving and load testing as part of a mutually beneficial partnership to support innovation in foundation design.

The test site was acquired from Austal USA for the future construction of the Mobile River Bridge on Interstate 10 through Mobile, AL. Because the site was formerly a paved parking lot, it was well-suited for TSFP load testing due to the flat surface, ease of access, and minimal site preparation requirements. The ALDOT Statewide Drill Crew performed several borings and installed a monitoring well to characterize the site for design of the pile load testing program. An engineer from the Geotechnical Division of the Bureau of Materials and Tests, Ms. Stephanie Abbett, was on site during the site investigation and pile driving activities.

Although pile foundations have been used for centuries, there is limited research on tapered piles and their potential performance advantages. This rigorously designed load testing program and final report

of findings will be useful to ALDOT in determining the best location for use of this locally made product. The findings will also be useful for industry as the TSFP may provide a higher load carrying capacity at a shallower depth than conventional piles, thus providing cost savings to the project owner. As the TSFP continues to be utilized, the load carrying capacity of the piles can be further studied and taught in the academic sector as part of pile design curricula for engineering students in the future.

The views expressed in this letter are those of the author and do not necessarily reflect the official position or endorsement of the Alabama Department of Transportation. Further questions may be directed to the author at chancellork@dot.state.al.us or 334.206.2277.

ALDOT appreciates the collaboration of all parties involved in advancing this research and looks forward to further evaluation of the TSFP's performance in the field.

KCD
C: File