

**GEOTECHNICAL ENGINEERING EXPLORATION  
INTERSTATE ROUTE H-1 AND H-201  
DESTINATION SIGN UPGRADE/REPLACEMENT, PHASE 3  
FEDERAL-AID PROJECT NO. NH-0300(144)  
ISLAND OF OAHU, HAWAII  
W.O. 7341-00    FEBRUARY 3, 2022**

**SUMMARY OF FINDINGS AND RECOMMENDATIONS**

Based on our field exploration and research of available geologic information, the geologic units that comprise the sign replacement sites include lava flows of the Koolau and Honolulu Volcanic Series, tuff and tuff cone deposits of the Honolulu Volcanic Series, and Quaternary alluvium. We encountered groundwater at Signs H1EBR-253, H1EB-305, H1WB-421 and H2NBR-722 sites at depths ranging from about 11 to 23 feet below the existing ground surface. It should be noted that groundwater levels encountered in the drilled borings are subject to change due to rainfall, time of year, seasonal precipitation, surface water runoff, and other factors.

In order to develop the required bearing and lateral load resistances for the new sign structures, we recommend supporting the sign structures on drilled shaft foundations having a minimum diameter of 48, 60, or 72 inches. Based on the anticipated structural loads and the subsoil conditions encountered at each site, the recommended shaft embedment lengths of the drilled shafts supporting the sign structures range between 14 and 30 feet.

The performance of the drilled shafts depends significantly upon the contractor's method of construction, construction procedures, and workmanship. Therefore, the contractor should review the recommendations and general guidelines presented in this report during the drilled shaft foundation construction.

Basalt rock and volcanic tuff formations were encountered at Signs H1EBR-253, 78WB-853, H1WB-421 and H1EB-104 sites. Cobbles and boulders were encountered at the Sign H2NBR-722 site. The drilled shaft subcontractor should have the appropriate equipment and tools to drill through the basalt rock, volcanic tuff, boulders, and cobbles, where encountered.

Alluvial deposits consisting of loose to medium dense silty gravel and silty sand were encountered at the Signs H1EB-305 and H2NBR-722 sites. These loose soils may likely cave-in and/or slough off during the drilling operations; therefore, the temporary casing may be required during the drilled shaft installation and/or the use of polymer drilling fluids (if accepted by Geolabs) may be necessary to maintain the integrity of the drilled hole during drilled shaft installation. The text of this report should be referred to for detailed discussion and recommendations.

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END OF SUMMARY OF FINDINGS AND RECOMMENDATIONS