

GEOTECHNICAL INVESTIGATION

KEAAU-PAHOA ROAD IMPROVEMENTS – ROUTE 130

KEAAU TO PAHOA, HAWAII

INTRODUCTION

This report presents the results of our geotechnical investigation performed for the proposed improvements to Keaau-Pahoa Road, from near its intersections with Shower Drive to Ainaloa Boulevard, in Keaau to Pahoa, Hawaii. Our scope of services for this study included the following:

- A visual reconnaissance of the site and its vicinity to observe existing conditions which may affect the project. The general location of the project site is shown on the enclosed Location Map, Plate A2.1.
- A review of available in-house soils information pertinent to the site and the proposed project.
- Drilling and sampling 24 exploratory borings to depths ranging from about 4 to 16 feet. A description of our field investigation is summarized on Plates A1.1 through A1.3. The approximate exploratory boring locations are shown on the enclosed Boring Location Plans, Plates A2.2 through A2.8, and the soils encountered in the borings are described on the Boring Logs, Plates A4.1 through A4.24.
- Drilling and testing four percolation test holes to depths of approximately 6 to 7 feet. The approximate test hole locations are shown on Plates A2.2, A2.3, A2.5, and A2.7. Falling head percolation tests were performed in the four test holes and results are presented on the Department of Health Site Evaluation/ Percolation Test forms, Plates A5.1 through A5.4.
- Laboratory testing of selected soil samples. Testing procedures are presented in the Description of Laboratory Testing, Plates B1.1 and B1.2. Test results are presented on the Boring Logs (Plates A4.1 through A4.24), Direct Shear Test reports (Plates B2.1 through B2.3), Modified Proctor Test reports (Plates B3.1 and B3.2), CBR Test reports (Plates B4.1 through B4.3), Sieve Analysis Test reports (Plates B5.1 and B5.2), and R-Value Test reports (Plates B6.1 through B6.3).
- Engineering analyses of the field and laboratory data.

- Preparation of this report presenting geotechnical recommendations for the design of retaining wall foundations, including seismic considerations, resistance to lateral pressures, flexible pavement, and site grading.

PROJECT CONSIDERATIONS

Information regarding the proposed project was provided by your office.

The proposed project consists of improvements to Keaau-Pahoa Road, from near its intersection with Shower Drive to about 700 feet southeast of its intersection with Ainaloa Boulevard. The proposed improvements will consist of widening the existing roadway on both sides of the highway to create a four-lane roadway. Additional improvements will include new traffic signals, construction of a roundabout at the intersection with Ainaloa Boulevard, and bus pull-out areas.

The roadway widening will require both cuts and fills to provide a level grade for the proposed roadway. Based on information provided by your office, a retaining wall is planned along the northeast side of Keaau-Pahoa Road between Shower Drive and Pohaku Place, and near the east corner of its intersection with Kaloli Drive. A retaining wall is also planned near Pohaku Circle to retain a cut condition. The retaining walls will have heights of about 2 to 10 feet.

SITE CONDITIONS

The project site is located along Keaau-Pahoa Road, from near its intersection with Shower Drive to about 700 feet southeast of its intersection with Ainaloa Boulevard, in Keaau to Pahoa, Hawaii. Hawaiian Paradise Park subdivision is located on the northeast side of Keaau-Pahoa Road, while Orchidlands Estates subdivision is located on the southwest side. Single family residences and vacant lots, along with overhead utility lines and poles, extend along both sides of the roadway.

The roadway has one lane traveling in each direction, with left-turn storage and acceleration lanes, and right-turn acceleration and deceleration lanes. The roadway

is generally bordered by paved shoulders and no curbs. At the time of our field investigation, the roadway appeared to be in a fair to good condition, with occasional longitudinal cracking observed.

SOIL CONDITIONS

Borings B1 through B20 were drilled on the roadway, while borings B21 through B24 were drilled offset from the roadway. The following is a summary of the pavement sections of borings B1 through B20, and the surface gravel in borings B21 through B24.

Boring	Asphaltic Concrete	Base or Gravel Material
B1	6.5"	29.5"
B2	7.0"	-
B3	7.5"	10.5"
B4	7.0"	5.0"
B5	7.5"	6.0"
B6	6.0"	32.0"
B7	7.5"	10.5"
B8	6.0"	24.0"
B9	9.0"	-
B10	8.5"	41.5"
B11	8.5"	21.5"
B12	8.0"	10.0"
B13	9.0"	9.0"
B14	9.0"	15.0"
B15	9.0"	27.0"
B16	9.0"	21.0"
B17	8.5"	3.5"
B18	6.5"	5.5"
B19	9.0"	15.0"
B20	8.5"	5.0"
B21	-	12.0"
B22	-	6.0"
B23	-	12.0"
B24	-	12.0"

With the exceptions of borings B2 and B9, gray to brownish gray gravel, ranging from poorly graded gravel with silt and sand to well-graded gravel with sand, in a

dense condition was encountered directly below the asphaltic concrete. The gravel could not be distinguished from base material, if any. Pockets of volcanic ash should be anticipated within the onsite gravels as a bulk sample obtained from near boring B6 encountered a higher content of volcanic ash.

Underlying the gravel and directly below the pavement section in borings B2 and B9 was gray, moderately to slightly weathered basalt. The basalt was in a hard and vesicular condition, extending to the maximum depths drilled. NX coring in borings B21 through B24 resulted in core recoveries ranging from 80 to 100 percent, and RQD values ranging from 47 to 98 percent.

Neither groundwater nor seepage water was encountered in our exploratory borings.