

SECTION 1. GENERAL

1.1 Introduction

This report presents the results of our geotechnical engineering analyses for the *Rehabilitation of Pali Highway* project from Waokanaka Street in Honolulu to Kamehameha Highway in Kaneohe on the Island of Oahu, Hawaii. The project location and general vicinity are shown on the Project Location Map, Plate 1.

This report summarizes the findings from our field exploration and laboratory testing, and presents our geotechnical recommendations derived from our analyses for the design of pavement rehabilitation and/or reconstruction, and light pole foundations. The findings and recommendations presented herein are subject to the limitations noted at the end of this report.

1.2 Project Considerations

The highway pavement rehabilitation project is along the Pali Highway (Hawaii Route 61) between about Waokanaka Street (Sta. 26+88.3 or Mile Post 2.64) in Honolulu and Kamehameha Highway (Sta. 203+55.26 or Mile Post 7.68) in Kaneohe on the Island of Oahu, Hawaii. The project encompasses a distance of about 5 miles. The approximate limits of the highway pavement rehabilitation project are shown on the General Site Plan, Plate 2.

The existing highway within the project limits is generally a four-lane divided highway (two lanes of traffic in each direction separated by a concrete median) with turn lanes and pockets that was originally constructed in the 1950s. The highway has an additional right lane with concrete pavements extending from Waokanaka Street to Nuuanu Pali Drive in the outbound direction. In addition, the highway widened from two to four lanes (including turn lanes) in the outbound direction near the intersection with Kamehameha Highway. The purpose of the project is to assess the existing pavement condition to determine pavement rehabilitation and reconstruction recommendations in accordance with the State of Hawaii – Department of Transportation, Highways Division (HDOT)'s requirements.

A pavement condition survey was conducted to evaluate specific areas requiring repair. Special attention was given to the potential presence of near-surface soft and/or loose soils, which may be a contributing factor to the pavement failures observed at some locations of the roadway under consideration. The findings obtained from our field exploration and laboratory testing programs will be used as a basis to formulate geotechnical engineering recommendations for the pavement rehabilitation and/or reconstruction for the project roadway. Our pavement repair recommendations will be based on the severity of distress, existing pavement thickness, and construction limitations due to the limited working hours on the highway. We understand that rehabilitation/reconstruction of the right lane with concrete pavements extending from Waokanaka Street to Nuuanu Pali Drive is specifically excluded from the project scope of work.

1.3 Purpose and Scope

The purpose of our geotechnical engineering services was to obtain information of the surface and subsurface conditions along the roadway alignment through literature research, past project experience, site reconnaissance, and borehole drilling. The findings and information obtained were used to formulate geotechnical engineering recommendations for the design of pavement rehabilitation and/or reconstruction, and light pole foundations. The work was performed in general accordance with the scope of services outlined in our fee proposal dated February 5, 2013. The scope of our work for this project included the following tasks and work efforts:

1. Review of available pavement data and as-built drawings for the pavement construction and subsequent overlays along the highway alignment provided by HDOT, Highways Division and Wesley R. Segawa & Associates, Inc.
2. Research and review of available in-house soils and boring data from the project vicinity.
3. Coordination with the State of Hawaii – Department of Transportation, Highways Division to obtain the necessary excavation permits and with the various utility companies for toning of the boring locations.
4. Boring stake-out and coordination with various utility companies for toning of the boring locations.

5. Provision of traffic control and safety devices during our field exploration program.
6. Performance of a visual pavement condition survey by our engineers.
7. Mobilization and demobilization of a truck-mounted drill rig and operators to and from the site.
8. Drilling and sampling of twenty borings along the roadway alignment extending to depths of about 3.5 to 12.5 feet below the existing pavement surface for a total of approximately 181.5 lineal feet of exploration.
9. Coring of the existing pavement section to depths of about 1 to 5.4 feet below the pavement surface at thirty locations along the roadway alignment.
10. Collection of twelve bulk samples of the in-situ soils underlying the AC pavements for laboratory testing to evaluate their swelling potential and pavement support characteristics.
11. Performance of dynamic cone penetration tests at twenty-one selected boring/coring locations.
12. Coordination of the field exploration and logging of the borings by our geologist.
13. Laboratory testing of selected soil samples obtained during the field exploration as an aid in classifying the materials and evaluating their engineering properties.
14. Analyses of field and laboratory data to formulate geotechnical engineering recommendations for the design of pavement rehabilitation and/or reconstruction and light pole foundations.
15. Preparation of this report summarizing our work on the project and presenting our findings and design recommendations for pavements and light pole foundations.
16. Coordination of our overall work on the project by our senior engineer.
17. Quality assurance of our work on the project and client/design team consultation by our principal engineer.
18. Miscellaneous work efforts such as drafting, word processing, and clerical support.

Detailed descriptions of our field exploration and the Logs of Borings are presented in Appendix A. Field logs of the Dynamic Cone Penetration tests are included in Appendix B for reference. Results of the laboratory tests performed on selected soil samples are presented in Appendix C. The pavement design and calculations are provided in Appendix D. Photographs of the AC cores from the existing pavements are provided in Appendix E. Photographs depicting some of the pavement distresses along the roadway are presented in Appendix F.

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