SECTION 2. SITE CHARACTERIZATION

The Island of Oahu was formed by the extrusion of basalt and basaltic lavas from the Waianae and Koolau shield volcanoes. The older Waianae Volcano is estimated to be middle to late Pliocene in age and forms the bulk of the western one-third of the island. The younger Koolau Volcano is estimated to be late Pliocene to early Pleistocene (Ice Age) in age and forms the majority of the eastern two-thirds of the island. As volcanic activity in Waianae Volcano ceased, lava flows from Koolau Volcano banked against its eroded eastern slope forming a broad plateau, known as Schofield Plateau.

Following the extrusion of lavas in the early Pleistocene Epoch, the island underwent a long cycle of erosion and weathering forming the prominent ridgelines and summits we know today. During the erosion period, the Island of Oahu began to slowly subside by more than 1,200 feet in elevation, resulting in the drowning and sedimentation of the valleys and the formation of the steep Koolau Pali. Coral reefs continued to grow in the surrounding shallow waters of the island.

The project site is located along the southern flank of the Koolau Mountain Range. The geomorphology and subsurface conditions at the site are related directly to the glacio-eustatic fluctuations of the sea level during the Pleistocene Epoch and the genesis of Pearl Harbor and the Honolulu Coastal Plain. These glacio-eustatic fluctuations resulted in stands of the sea that were both higher and lower relative to the present sea level of Oahu.

The subsurface conditions vary along the project alignment and are primarily underlain by geologic units consisting of Honolulu Volcanic Series – Dense Basalt and Recent Alluvium. The approximate delineation of these stratigraphic units are presented on the Geologic Map, Plate 4.

2.1 Site Description

The project is located on Interstate Route H-1 between Kapiolani Interchange and Ainakoa Avenue in the Honolulu District on the Island of Oahu, Hawaii. The project extends approximately 2.3 miles along Interstate Route H-1 between project Station Nos. 52+00 and 175+62.5.

The existing Interstate Route H-1 between the project limits generally consists of three and four traffic lanes in each direction and is covered with concrete pavement. Asphaltic concrete pavement covers the last 0.25 miles of the project which terminates at Ainakoa Avenue. Several overpasses, underpasses, and pedestrian bridges traverse the freeway at 2nd Avenue, 4th Avenue, 6th Avenue, 7th Avenue, 10th Avenue, Koko Head Avenue, 16th Avenue, Harding Avenue, 19th Avenue, Waialae Avenue, 21st Avenue, Hunakai Street, and Kilauea Avenue.

Based on available topographic data, the existing ground surface along the freeway within the project limits vary with elevations ranging from about +32 to +188 feet Mean Sea Level (MSL).

2.2 Subsurface Conditions

Our field exploration program consisted of drilling and sampling eleven borings, designated as Boring Nos. 1 through 11, extending to depths ranging from about 10.0 to 16.5 feet below the existing ground surface. The approximate boring locations are shown on the General Site Plan, Plate 2, and Site Plans, Plates 3.1 through 3.6.

Our borings generally encountered 9.0 to 12.0 inches of concrete pavement underlain by 6 to 10 inches of aggregate base course material, with the exception of Boring Nos. 10 and 11, where 4.0 and 11.0 inches of asphaltic concrete pavement overlying 12 to 24 inches of aggregate base material was encountered. Variable subsurface conditions were encountered below the pavement sections along the project alignment, generally consisting of fills, alluvium, and basalt formations extending to the maximum depth explored of about 16.5 feet below the existing ground surface.

The fills consisted of medium dense to very dense silty/clayey sand, sandy gravel, gravel, cobbles, and boulders; and medium stiff to very stiff clay and sandy/silty clay. The residual soil and weathered rock were comprised of very stiff clayey silt and medium dense to dense sand, gravel, and silty cobbles with some boulders, respectively. The basalt rock formation was medium hard to very hard.

In Boring Nos. 10 and 11, alluvial deposits were encountered below the fill layer. The alluvium consisted of soft sandy clay and medium dense to dense clayey gravel and sandy cobbles.

We did not encounter groundwater in the drilled borings except for one of the borings at the time of our field exploration. For Boring No. 11, groundwater was encountered at about 13 feet below the existing ground surface. However, groundwater levels can vary significantly depending on rainfall, temperature, surface runoff, and other factors.

Based on the subsurface conditions encountered in our borings along the project alignment, anticipated subsurface conditions at the new structure locations were generalized as either soil or rock conditions and are presented in the table below.

ANTICIPATED SUBSURFACE CONDITIONS AT NEW STRUCTURES

NEW STRUCTURE	STRUCTURE LOCATION		ANTICIPATED SUBSURFACE CONDITIONS	REFERENCE BORING
	Site ID	Station Nos.		
Guardrail to Wall and Concrete Barrier	1IB	55+00 to 60+00	Soil	B-1
Concrete Barrier	2OB	59+00 to 60+00	Soil	B-1
Guardrail Connection	2IB	65+80 to 66+40	Soil	B-2
Concrete Barrier	3OB	66+10 to 67+10	Soil	B-2
Concrete Barrier	3IB	66+10 to 67+10	Soil	B-2
Guardrail to Abutment	4OB	76+70	Soil	B-3
Guardrail to Abutment	5IB	77+10	Soil	B-3
Guardrail to Abutment	5OB	81+40	Rock	B-4
Guardrail to Wall and Abutment	6IB	80+00, 81+50, 82+90, 84+90	Rock	B-4
Railings Structure	6OB	94+60 to 95+30	Soil	B-5
Railings Structure	7IB	94+60 to 95+25	Soil	B-5
Guardrail to Abutment	7OB	108+40	Rock	B-6

ANTICIPATED SUBSURFACE CONDITIONS AT NEW STRUCTURES				
NEW STRUCTURE	**STRUCTURE LOCATION**		**ANTICIPATED SUBSURFACE CONDITIONS**	**REFERENCE BORING**
	Site ID	**Station Nos.**		
New Lights	8OB & 9IB	109+00 to 115+00	Rock	B-6 & B-7
New Lights	9OB & 10IB	110+00 to 124+50	Rock	B-7
New Lights	10OB & 11IB	124+50 to 132+70	Soil & Rock	B-8
Impact Attenuator	10OB	128+40 to 129+30	Soil	B-8
IB – Inbound (Westbound) OB – Outbound (Eastbound)				

Detailed descriptions of our field exploration methodology and the Logs of Borings are presented on Plates A-1 through A-11 of Appendix A. Results of the laboratory tests performed on selected soil and rock core samples retrieved from our field exploration are presented in Appendix B. Photographs of the core samples are presented in Appendix C.

END OF SITE CHARACTERIZATION