

GEOTECHNICAL ENGINEERING EXPLORATION
INTERSTATE ROUTE H-1 (EB) IMPROVEMENTS
OLA LANE OVERPASS TO KALIHI STREET INTERCHANGE
HONOLULU, OAHU, HAWAII
W.O. 8049-00 & 10(B) NOVEMBER 21, 2022

TABLE OF CONTENTS

	Page
SUMMARY OF FINDINGS AND RECOMMENDATIONS.....	iv
1. GENERAL	1
1.1 Project Considerations.....	1
1.2 Purpose and Scope	2
2. SITE CHARACTERIZATION.....	4
2.1 Regional Geology	4
2.2 Existing Site Conditions	5
2.3 Subsurface Conditions.....	5
2.4 Seismic Design Considerations	8
2.4.1 Earthquakes and Seismicity	8
2.4.2 Liquefaction Potential.....	10
2.4.3 Soil Profile Type for Seismic Design	11
3. DISCUSSION AND RECOMMENDATIONS	13
3.1 Gulick Avenue Overpass	14
3.1.1 Lateral Load Resistance	15
3.1.2 Foundation Settlements	17
3.1.3 Drilled Shaft Construction Considerations.....	17
3.1.3.a Obstructions, Boulders, and Basalt Rock Formation	17
3.1.3.b Shallow Groundwater & Artesian Groundwater Conditions	18
3.1.4 Method Shaft Program	19
3.1.5 Non-Destructive Integrity Testing	19
3.1.6 Wall Drainage.....	21
3.2 Gulick Avenue Overpass – Center Pier	21
3.3 Gulick Avenue Traffic Signal Pole Foundations	23
3.3.1 Lateral Load Resistance	25
3.3.2 Foundation Settlements	26
3.3.3 Drilled Shaft Construction Considerations.....	26
3.4 Kalihi Stream/Richard Lane Bridge – Deep Foundations.....	28
3.4.1 Lateral Load Resistance	29
3.4.2 Foundation Settlements	30
3.4.3 Drilled Shaft Construction Considerations.....	30
3.4.3.a Cobbles, Boulders, and Basalt Rock Formation	31
3.4.3.b Shallow Groundwater Conditions	31
3.4.4 Non-Destructive Integrity Testing	32

	Page
3.5 Kalihi Stream/Richard Lane Bridge – Shallow Foundations.....	33
3.6 Kalihi Stream/Richard Lane Bridge – Probing and Grouting.....	35
3.7 Retaining Walls.....	36
3.7.1 Retaining Wall Foundations	37
3.7.2 Static Lateral Earth Pressures.....	39
3.7.3 Dynamic Lateral Earth Pressures.....	42
3.7.4 Drainage	43
3.8 Gulick Avenue Overpass Barrier Retaining Walls.....	44
3.9 Instrumentation and Monitoring	45
3.10 Temporary Pedestrian Bridge Foundations	45
3.11 Site Grading.....	46
3.11.1 Site Preparation	46
3.11.2 Fills and Backfills.....	47
3.11.3 Fill Placement and Compaction Requirements	48
3.11.4 Excavation	48
3.12 Underground Utility Structures.....	49
3.12.1 Underground Utility Structure Foundations	49
3.12.2 Static Lateral Earth Pressures.....	52
3.12.3 Dynamic Lateral Earth Pressures.....	53
3.13 Underground Utility Lines.....	53
3.14 Corrosion Potential	54
3.15 Design Review.....	55
3.16 Post-Design Services/Services During Construction	55
4. LIMITATIONS.....	56
CLOSURE.....	58
PLATES	
Project Location Map.....	Plate 1
Overall Site Plan.....	Plate 2
Site Plans	Plates 3.1 and 3.2
Generalized Geologic Cross Sections	Plates 4.1 thru 4.4
APPENDIX A	
Field Exploration.....	Pages A-1 and A-2
Soil Log Legend	Plate A-0.1
Soil Classification Log Key	Plate A-0.2
Rock Log Legend	Plate A-0.3
Logs of Borings	Plates A-1 thru A-18
APPENDIX B	
Seismic Shear Wave Velocity Tests.....	Page B-1
Seismic Shear Wave Velocity Test Data.....	Plates B-1.1 thru B-2.6
APPENDIX C	

	Page
Laboratory Tests.....	Pages C-1 and C-2
Laboratory Test Data.....	Plates C-1 thru C-66
APPENDIX D	
Photographs of Core Samples.....	Plates D-1 thru D-27
APPENDIX E	
Eurofins Environment Testing America Analytical Report (14 pages)	