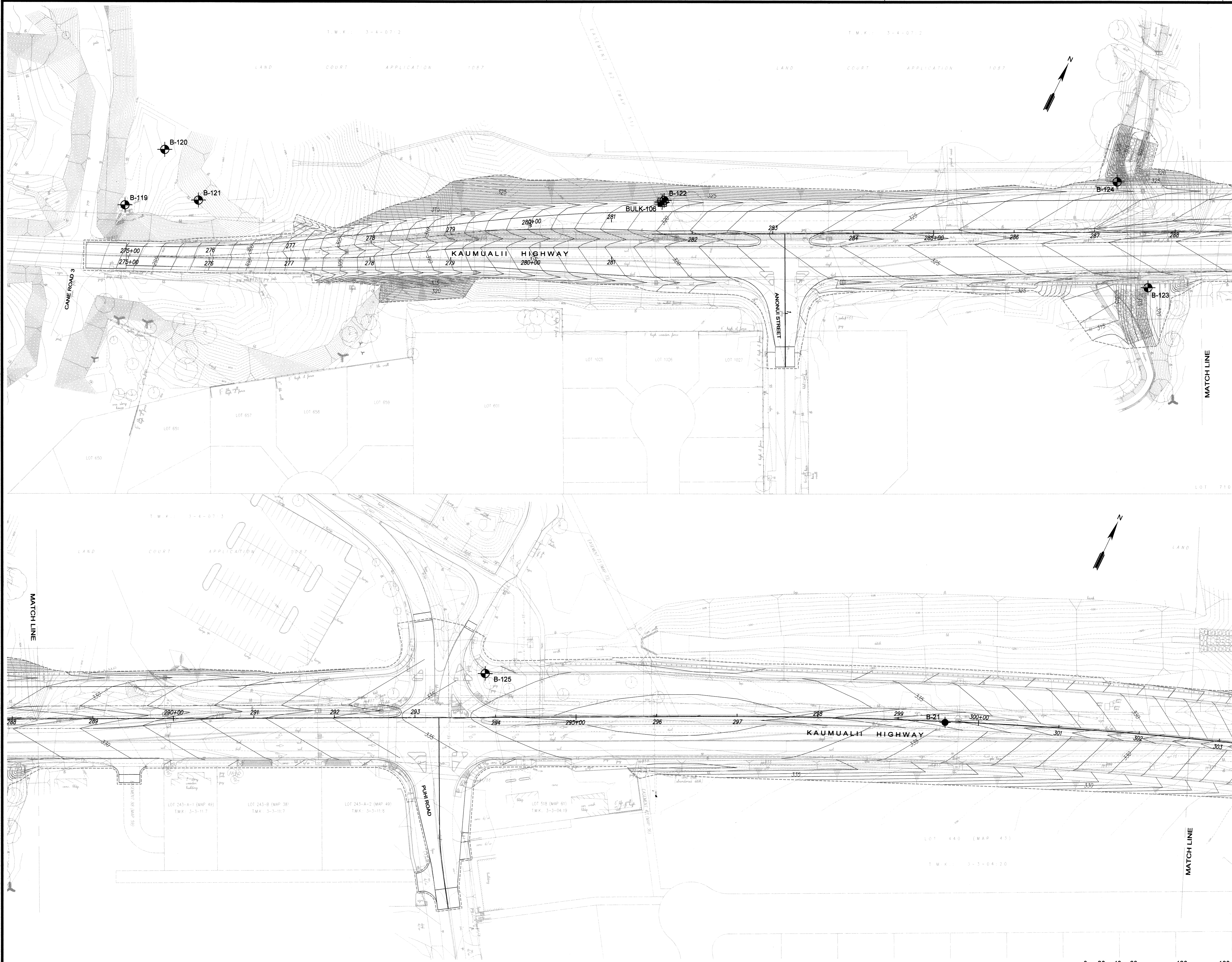


| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | NH-050-1(31) | 2009 | 305 | 452 |

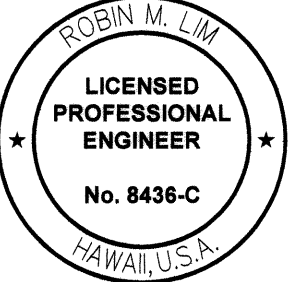
- LEGEND:
- APPROXIMATE BORING LOCATION
 - APPROXIMATE BULK SAMPLE LOCATION
 - APPROXIMATE BORING LOCATION (GEOLABS REPORT DATED 12/12/00)



| | |
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| SURVEY PLOTTED BY | DATE |
| DRAWN BY | |
| TRACED BY | |
| CHECKED BY | |
| NOTE BOOK | |
| NO. | |

T:\DRAFTING-9904\WORKING\3869-20\KAUMUALIIHIGHWAYWIDENING\3869-20\AS\SHEETS\PLANS\NOTES\TMSK.DWG

REFERENCE: TOPOGRAPHIC SURVEY MAP TRANSMITTED BY PAREN, INC. ON FEBRUARY 8, 2005. UPDATED BASE MAP TRANSMITTED BY PAREN, INC. ON APRIL 25, 2006.



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Robin M. Lim 4-30-10
SIGNATURE EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

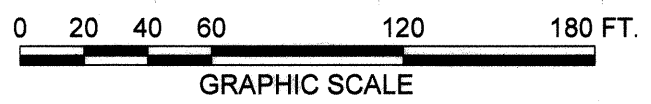
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOCATION PLAN - 1

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

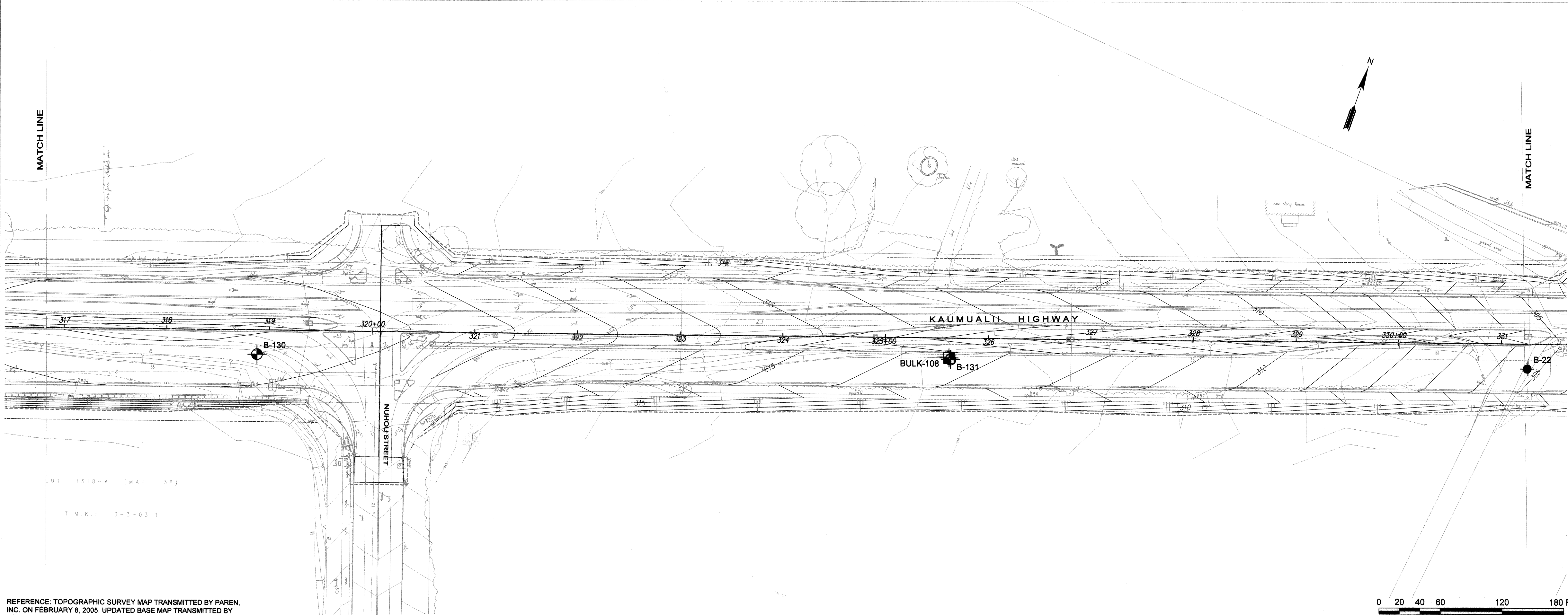
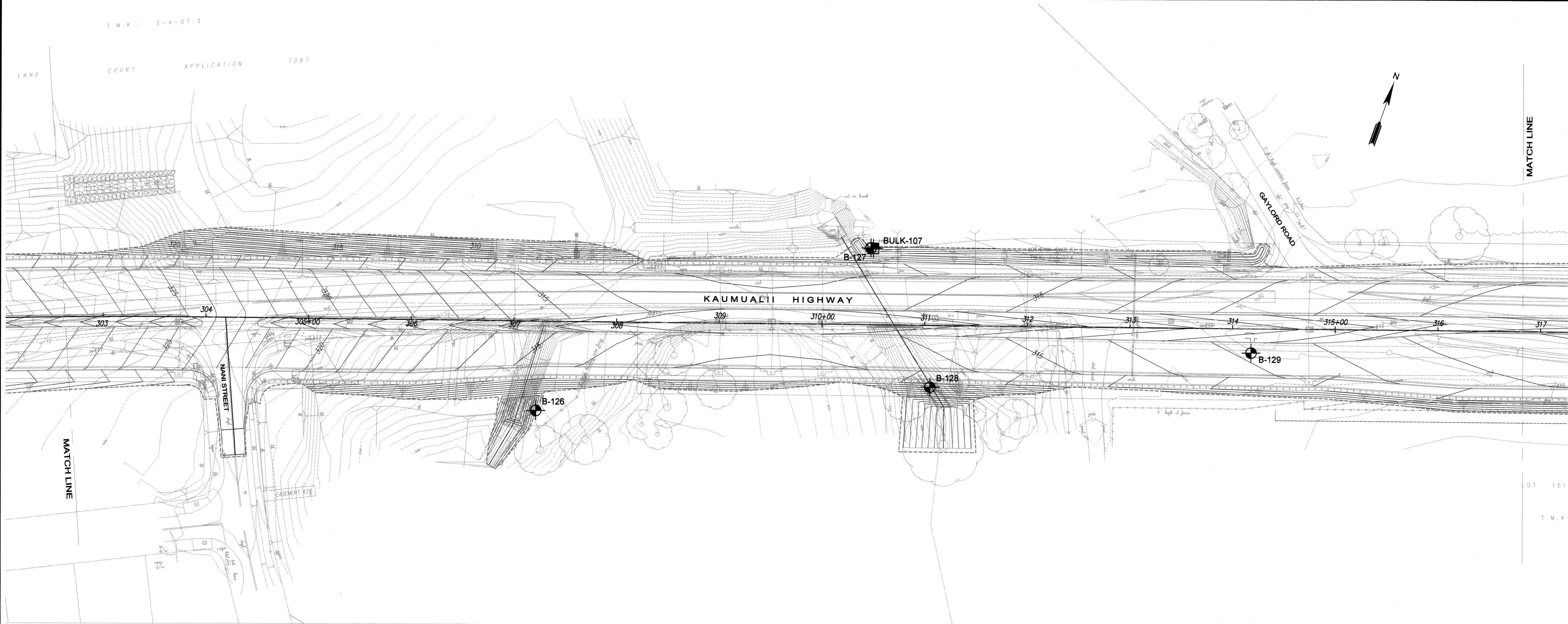
Scale: 1" = 60' Date: February 2009

SHEET No. G-1.01 OF G-1.05 SHEETS



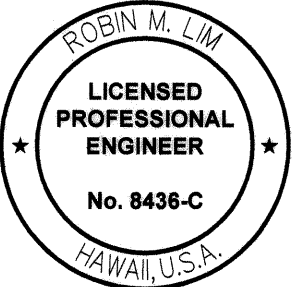
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | NH-050-1(31) | 2009 | 306 | 452 |

- LEGEND:
- APPROXIMATE BORING LOCATION
 - APPROXIMATE BULK SAMPLE LOCATION
 - APPROXIMATE BORING LOCATION (GEOLABS REPORT DATED 12/12/00)



| | | |
|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| NOTE BOOK | DRAWN BY | |
| | DESIGNED BY | |
| | QUANTITIES BY | |
| | CHECKED BY | |
| No. | | |

REFERENCE: TOPOGRAPHIC SURVEY MAP TRANSMITTED BY PAREN, INC. ON FEBRUARY 8, 2005. UPDATED BASE MAP TRANSMITTED BY PAREN, INC. ON APRIL 25, 2006.



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Robin M. Lim 4-30-10
 SIGNATURE EXPIRATION DATE OF THE LICENSE
 GEOLABS, INC.

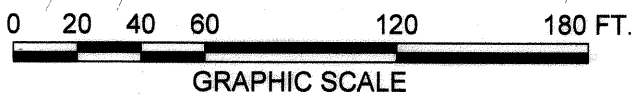
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOCATION PLAN - 2

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: 1" = 60'
Date: February 2009

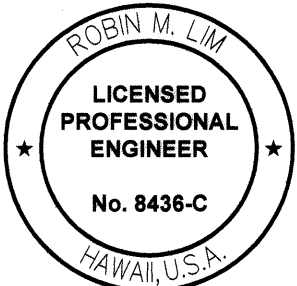
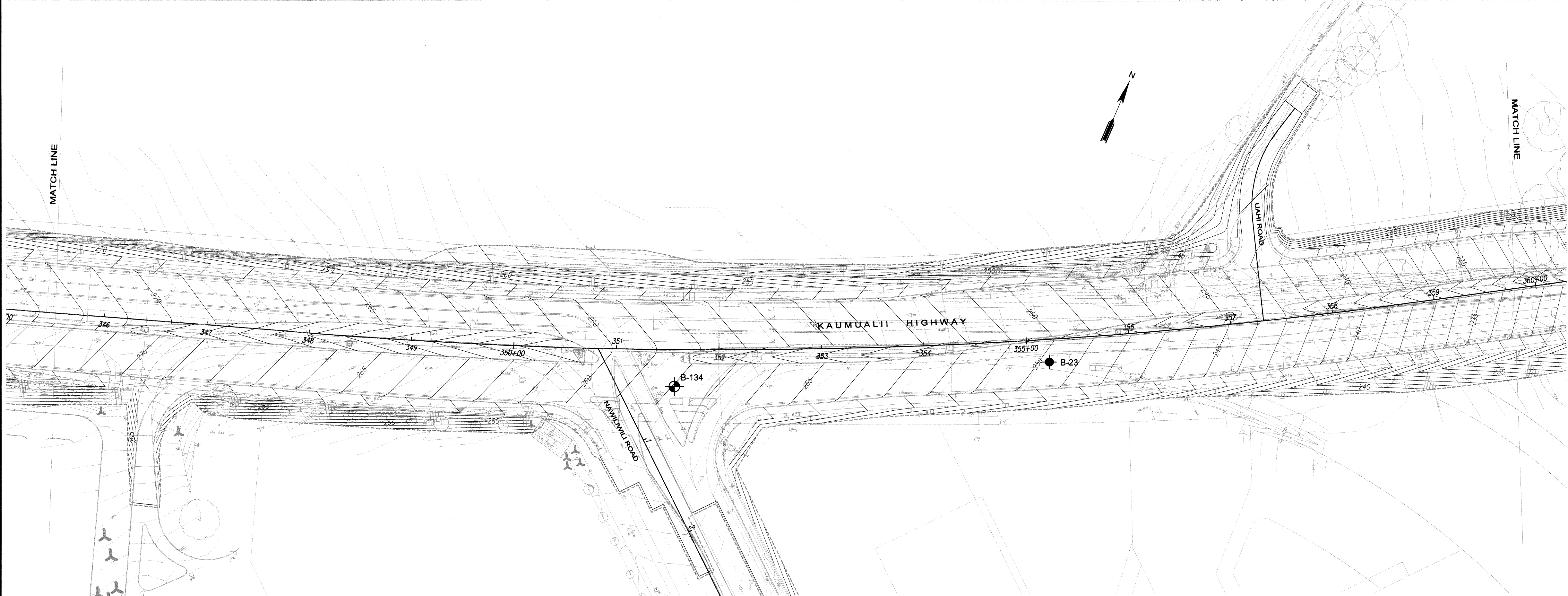
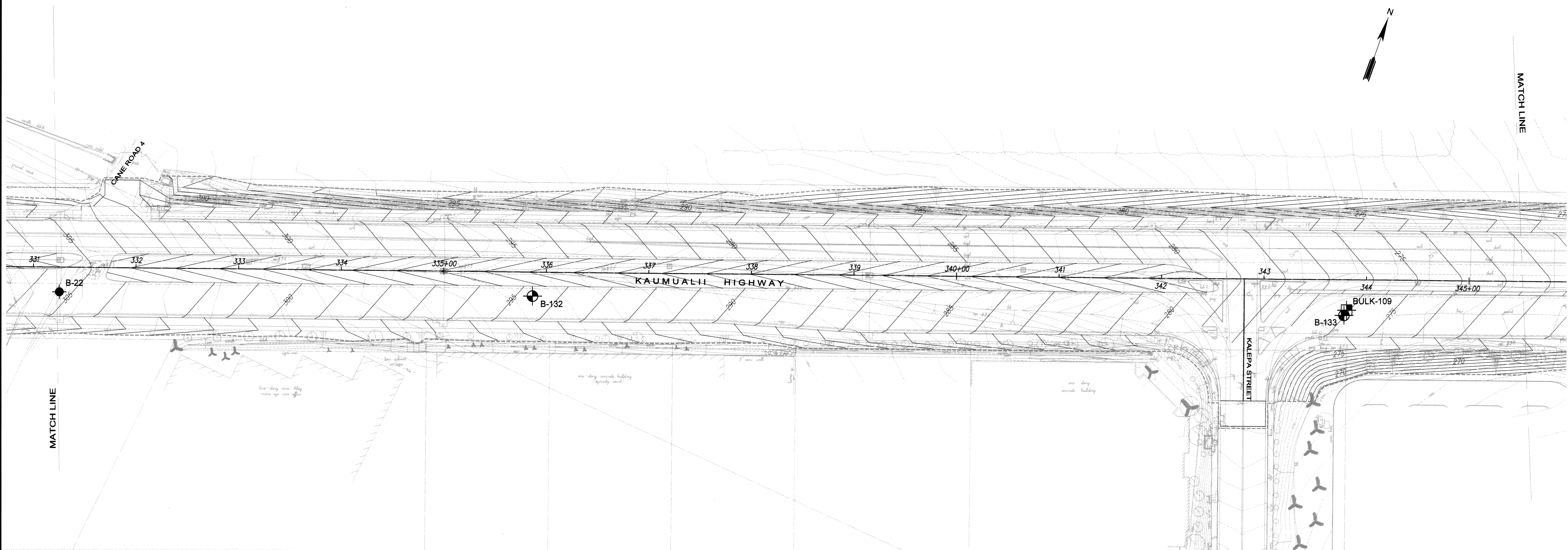
SHEET No. G-1.02 OF G-1.05 SHEETS



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | NH-050-1(31) | 2009 | 307 | 452 |

LEGEND:

- APPROXIMATE BORING LOCATION
- APPROXIMATE BULK SAMPLE LOCATION
- APPROXIMATE BORING LOCATION (GEOLABS REPORT DATED 12/12/00)



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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOCATION PLAN - 3

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: 1" = 60'

Date: February 2009

SHEET No. G-1.03 OF G-1.05 SHEETS

| | | |
|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| NOTE BOOK | DRAWN BY | |
| | TRACED BY | |
| | CHECKED BY | |
| | QUANTITIES BY | |
| | CHECKED BY | |

REFERENCE: TOPOGRAPHIC SURVEY MAP TRANSMITTED BY PAREN, INC. ON FEBRUARY 8, 2005. UPDATED BASE MAP TRANSMITTED BY PAREN, INC. ON APRIL 25, 2006.



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | NH-050-1(31) | 2009 | 308 | 452 |

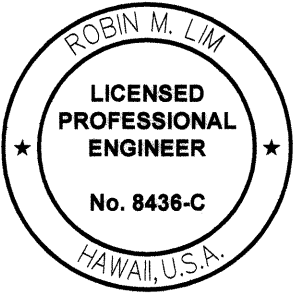
LEGEND:

- APPROXIMATE BORING LOCATION
- APPROXIMATE BULK SAMPLE LOCATION
- APPROXIMATE BORING LOCATION (GEOLABS REPORT DATED 12/12/00)



| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
|---------------|---------------------|-------|
| NO. _____ | DRAWN BY _____ | _____ |
| | TRACED BY _____ | _____ |
| | QUANTITIES BY _____ | _____ |
| | CHECKED BY _____ | _____ |

REFERENCE: TOPOGRAPHIC SURVEY MAP TRANSMITTED BY PAREN, INC. ON FEBRUARY 6, 2006. UPDATED BASE MAP TRANSMITTED BY PAREN, INC. ON APRIL 25, 2006.



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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOCATION PLAN - 4

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

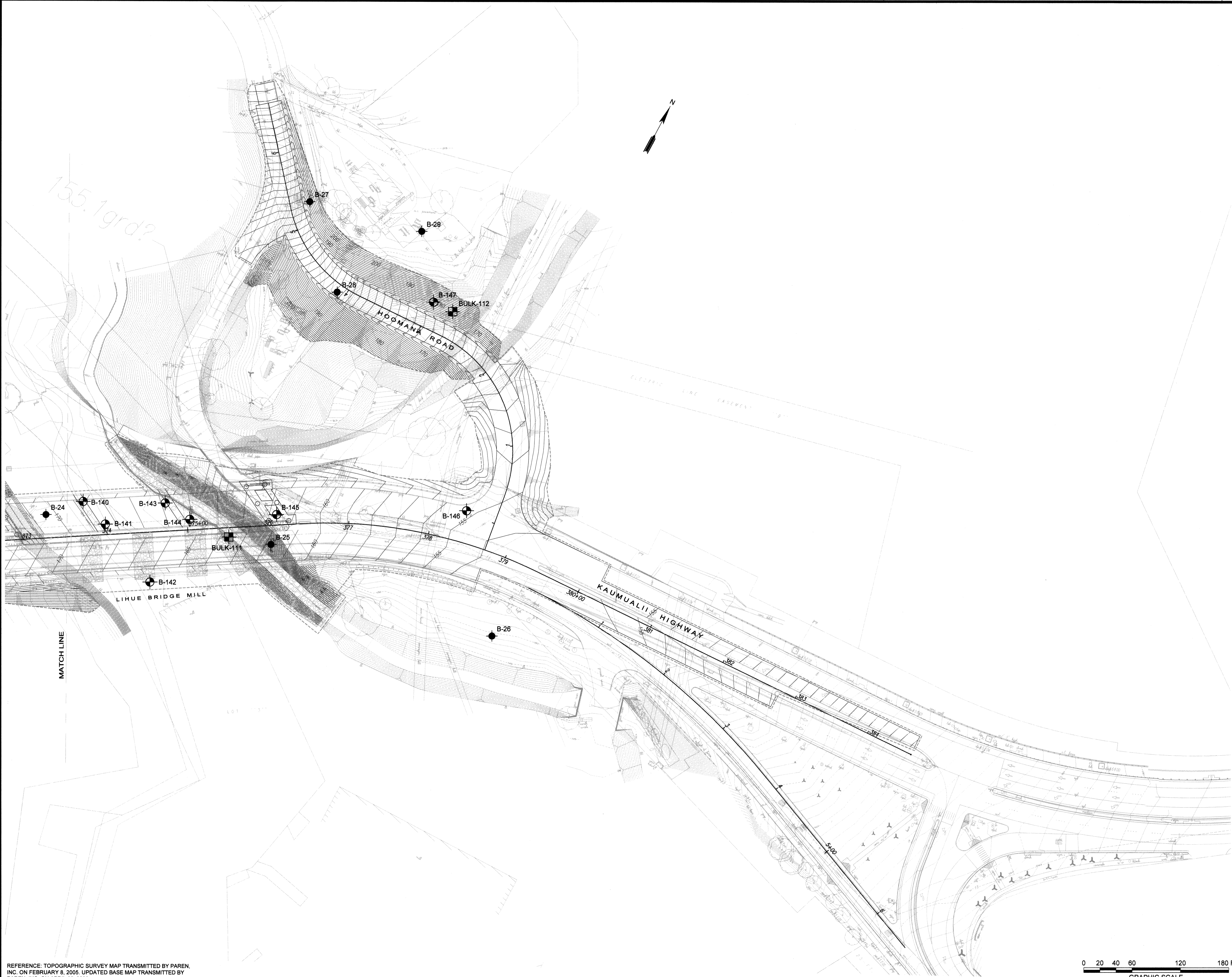
Scale: 1" = 60' Date: February 2009

SHEET No. G-1.04 OF G-1.05 SHEETS



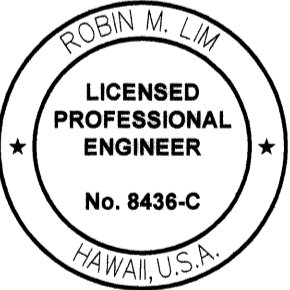
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | NH-050-1(31) | 2009 | 309 | 452 |

- LEGEND:
- APPROXIMATE BORING LOCATION
 - APPROXIMATE BULK SAMPLE LOCATION
 - APPROXIMATE BORING LOCATION (GEOLABS REPORT DATED 12/12/00)



| | | |
|--------------------------------------|-------------------|------|
| ORIGINAL PLAN NOTE BOOK No. | SURVEY PLOTTED BY | DATE |
| | DRAWN BY | " " |
| | TRACED BY | " " |
| | CHECKED BY | " " |

REFERENCE: TOPOGRAPHIC SURVEY MAP TRANSMITTED BY PAREN, INC. ON FEBRUARY 8, 2004. UPDATED BASE MAP TRANSMITTED BY PAREN, INC. ON APRIL 25, 2006.



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 GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOCATION PLAN - 5

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: 1" = 60' Date: February 2009

SHEET No. G-1.05 OF G-1.05 SHEETS



Boring Log Legend

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

| MAJOR DIVISIONS | | | USCS | | TYPICAL DESCRIPTIONS |
|-------------------------------------------------------|------------------------------------------------------------|---------------------------|------|----|--------------------------------------------------------------------------------------------------------------------|
| COARSE-GRAINED SOILS | GRAVELS | CLEAN GRAVELS | | GW | WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES |
| | | LESS THAN 5% FINES | | GP | POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES |
| | MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE | GRAVELS WITH FINES | | GM | SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES |
| | | MORE THAN 12% FINES | | GC | CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES |
| MORE THAN 50% OF MATERIAL RETAINED ON NO. 200 SIEVE | SANDS | CLEAN SANDS | | SW | WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES |
| | | LESS THAN 5% FINES | | SP | POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES |
| | 50% OR MORE OF COARSE FRACTION PASSING THROUGH NO. 4 SIEVE | SANDS WITH FINES | | SM | SILTY SANDS, SAND-SILT MIXTURES |
| | | MORE THAN 12% FINES | | SC | CLAYEY SANDS, SAND-CLAY MIXTURES |
| FINE-GRAINED SOILS | SILTS AND CLAYS | LIQUID LIMIT LESS THAN 50 | | ML | INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY |
| | | | | CL | INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS |
| | | | | OL | ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY |
| 50% OR MORE OF MATERIAL PASSING THROUGH NO. 200 SIEVE | SILTS AND CLAYS | LIQUID LIMIT 50 OR MORE | | MH | INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS |
| | | | | CH | INORGANIC CLAYS OF HIGH PLASTICITY |
| | | | | OH | ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS |
| HIGHLY ORGANIC SOILS | | | | PT | PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS |

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

LEGEND



2-INCH O.D. STANDARD PENETRATION TEST



3-INCH O.D. MODIFIED CALIFORNIA SAMPLE



SHELBY TUBE SAMPLE



GRAB SAMPLE



CORE SAMPLE

LL

LIQUID LIMIT

PI

PLASTICITY INDEX

TV

TORVANE SHEAR (tsf)

PEN

POCKET PENETROMETER (tsf)

UC

UNCONFINED COMPRESSION (psi)



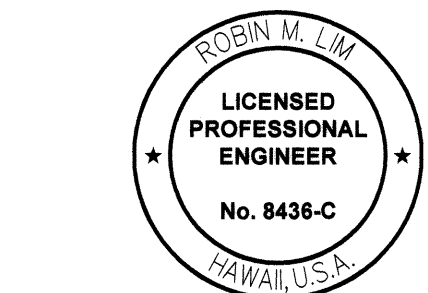
WATER LEVEL OBSERVED IN BORING

GEOTECHNICAL NOTES

- A geotechnical engineering report entitled "Geotechnical Engineering Exploration, Kaumualii Highway Widening, Phase 1A, Vicinity of Anonui Street to Lihue, Island of Kauai, Hawaii" dated July 17, 2008 has been prepared by Geolabs, Inc. A copy of the report is on file at the office of the Engineer for review by the Contractor.
- For boring locations, see Sheet Nos. G-1.01 thru G-1.05.
- The information presented in the logs of borings depict the subsurface conditions encountered at that specified location and at the time of the field exploration only. Variations of subsoil conditions from those depicted in the logs of borings may occur between and beyond the borings.
- The penetration resistance shown on the logs of borings indicate the number of blows required for the specific sampler type used. The blow counts may need to be factored to obtain the Standard Penetration Test (SPT) blow counts.
- The data given is for general information only. Bidders shall examine the site and the boring data and draw their own conclusions therefrom as to the character of materials to be encountered. The Engineer will not assume responsibility for variations of subsoil quality or conditions other than at the boring locations shown and at the time the borings were taken.

| | | |
|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| NOTE BOOK | DRAWN BY | |
| | CHECKED BY | |
| | QUANTITIES BY | |
| | CHECKED BY | |
| No. | | |

T:\DRAWING-994\WORKING\3869-20\KAUMUALII HIGHWAY WIDENING\3869-20\A\SHEETS\BORING LOGS-119-147.DWG



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GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG LEGEND AND NOTES

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS Date: February 2009

SHEET No. G-2 OF G-2 SHEETS

| | | | |
|------------------------|--|------------------------------------------|--|
| Date Started: 4/6/98 | | Drill Rig: Mobile B-80 | |
| Date Completed: 4/6/98 | | Drilling Method: 4" Auger | |
| Logged By: J. Chen | | Driving Energy: 140 lb. wt., 30 in. drop | |
| Total Depth: 21.5 feet | | | |

| Depth, ft | FIELD | | LABORATORY | | | Other Data | Pen, tsf | DESCRIPTION |
|-----------|--------|---------------------------|-----------------|--------------------|------------------------|------------|----------|--------------------------------------------------------------------|
| | Sample | Penetra. Resist. Blows/ft | Dry Density pcf | Moisture Content % | Compress. Strength ksf | | | |
| | | | | | | | | Approximate Surface Elevation (ft): 336* |
| 5 | 75 | 93 | 27 | | | | 4.0 | 3-inch ASPHALT CONCRETE |
| | 29 | 78 | 33 | | | | 2.5 | Tannish brown SANDY GRAVEL (GW) with silt, very dense, damp (fill) |
| | 40 | 90 | 34 | | | | 4.5 | Reddish brown CLAYEY SILT (MH), very stiff, moist |
| 10 | 25 | 80 | 35 | | | | 4.2 | |
| 15 | 19 | 68 | 51 | | | | 1.2 | grades to stiff, very moist |
| 20 | 16 | 68 | 52 | | | | 1.7 | |
| | | | | | | | | Boring terminated at 21.5 feet |
| | | | | | | | | Groundwater not encountered |

tk

GEOLABS, INC.
Geotechnical Engineering

WORK ORDER NO. 3869-00 KHN Dec 00

LOG OF BORING 21

KAUMUALII HIGHWAY WIDENING

LIHUE TO WEST OF MALUHIA ROAD

ISLAND OF KAUAI, HAWAII

| | | | |
|------------------------|--|------------------------------------------|--|
| Date Started: 4/6/98 | | Drill Rig: Mobile B-80 | |
| Date Completed: 4/6/98 | | Drilling Method: 4" Auger | |
| Logged By: J. Chen | | Driving Energy: 140 lb. wt., 30 in. drop | |
| Total Depth: 21.5 feet | | | |

| Depth, ft | FIELD | | LABORATORY | | | Other Data | Pen, tsf | DESCRIPTION |
|-----------|--------|---------------------------|-----------------|--------------------|------------------------|----------------|----------|-------------------------------------------------------|
| | Sample | Penetra. Resist. Blows/ft | Dry Density pcf | Moisture Content % | Compress. Strength ksf | | | |
| | | | | | | | | Approximate Surface Elevation (ft): 304* |
| | 39 | 78 | 39 | | | | 3.8 | 1.5-inch ASPHALT CONCRETE |
| | 57 | 81 | 35 | | | LL=79 PI=51 | 3.4 | 6-inch gray SANDY GRAVEL (GW), damp (fill) |
| 5 | 70 | 79 | 40 | | | | 4.0 | Reddish brown SILTY CLAY (CH), very stiff, very moist |
| | | | | | | | | grades with trace gravel |
| 10 | 28 | 72 | 47 | | | | 2.8 | |
| 15 | 26 | 71 | 51 | | | | 3.4 | |
| 20 | 16 | 72 | 44 | | | | 0.8 | grades to stiff |
| | | | | | | | | Boring terminated at 21.5 feet |
| | | | | | | | | Groundwater not encountered |

tk

GEOLABS, INC.
Geotechnical Engineering

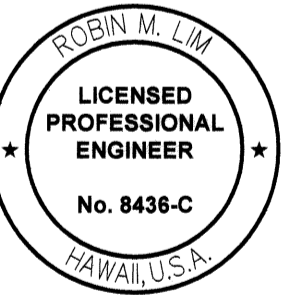
WORK ORDER NO. 3869-00 KHN Dec 00

LOG OF BORING 22

KAUMUALII HIGHWAY WIDENING

LIHUE TO WEST OF MALUHIA ROAD

ISLAND OF KAUAI, HAWAII



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Robin M. Lim
SIGNATURE EXPIRATION DATE OF THE LICENSE: 4-30-10
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 1

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS Date: February 2009

| | | | |
|------------------------|--|------------------------------------------|--|
| Date Started: 4/6/98 | | Drill Rig: Mobile B-80 | |
| Date Completed: 4/6/98 | | Drilling Method: 4" Auger | |
| Logged By: J. Chen | | Driving Energy: 140 lb. wt., 30 in. drop | |
| Total Depth: 21.5 feet | | | |

| Depth, ft | FIELD | | LABORATORY | | | Other Data | Pen, tsf | DESCRIPTION |
|-----------|--------|---------------------------|-----------------|--------------------|------------------------|------------|----------|--------------------------------------------|
| | Sample | Penetra. Resist. Blows/ft | Dry Density pcf | Moisture Content % | Compress. Strength ksf | | | |
| | | | | | | | | Approximate Surface Elevation (ft): 248* |
| 5 | 119 | 77 | 32 | | | | >4.5 | Reddish brown CLAYEY SILT (MH), hard, damp |
| | 56 | 81 | 32 | | | | >4.5 | grades to moist |
| | 49 | 78 | 38 | | | | 4.2 | |
| 10 | 20 | 68 | 50 | | | | 2.0 | grades to very stiff, very moist |
| 15 | 21 | 74 | 45 | | | | | |
| 20 | 25 | 75 | 40 | | | | | |
| 25 | | | | | | | | Boring terminated at 21.5 feet |
| 30 | | | | | | | | Groundwater not encountered |
| 35 | | | | | | | | |

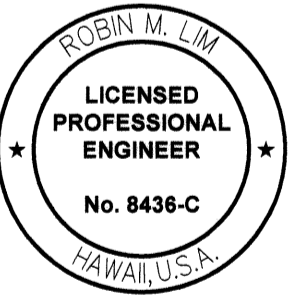
| | | | |
|-----------------------------------|--|-------------------------------|--|
| tk | | LOG OF BORING 23 | |
| Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING | |
| WORK ORDER NO. 3869-00 KHN Dec 00 | | LIHUE TO WEST OF MALUHIA ROAD | |
| | | ISLAND OF KAUAI, HAWAII | |

| | | | |
|-------------------------|--|------------------------------------------|--|
| Date Started: 4/10/98 | | Drill Rig: Mobile B-80 | |
| Date Completed: 4/13/98 | | Drilling Method: 4" Auger, HQ Coring | |
| Logged By: J. Chen | | Driving Energy: 140 lb. wt., 30 in. drop | |
| Total Depth: 102.5 feet | | | |

| Depth, ft | FIELD | | LABORATORY | | | Other Data | Pen, tsf | DESCRIPTION |
|-----------|--------|---------------------------|-----------------|--------------------|------------------------|------------|----------|---------------------------------------------------------------------------------|
| | Sample | Penetra. Resist. Blows/ft | Dry Density pcf | Moisture Content % | Compress. Strength ksf | | | |
| | | | | | | | | Approximate Surface Elevation (ft): 148* |
| 5 | 49 | 74 | 24 | | | | 1.5 | Brown and yellow CLAYEY SILT (ML) with sand and gravel, very stiff, damp (fill) |
| | 15 | 76 | 35 | | | | 0.8 | Tannish brown SANDY SILT (ML), very stiff, damp |
| | 11 | 79 | 29 | | | | | Reddish brown CLAYEY SILT (MH), soft to medium stiff, moist to very moist |
| 10 | 7 | 68 | 52 | | | | | |
| 15 | 3 | 46 | 115 | | | | | Dark gray ORGANIC SILTY CLAY (CH/OH), soft |
| 20 | 10 | 72 | 52 | | | | | |
| 25 | 57 | 71 | 54 | | | | 1.5 | Gray and brown CLAYEY SILT (MH) with gravel, soft to medium stiff |
| | | | | | | | | Yellowish brown SANDY SILT (ML) with gravel, stiff |
| 30 | 17 | 68 | 53 | | | | 2.2 | grades to grayish brown with clay |
| 35 | | | | | | | | |

| | | | |
|-----------------------------------|--|-------------------------------|--|
| geo12 | | LOG OF BORING 24 | |
| Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING | |
| WORK ORDER NO. 3869-00 KHN Dec 00 | | LIHUE TO WEST OF MALUHIA ROAD | |
| | | ISLAND OF KAUAI, HAWAII | |

| | |
|---------------|------|
| ORIGINAL PLAN | DATE |
| DRAWN BY | |
| TRACED BY | |
| NOTED BY | |
| CHECKED BY | |



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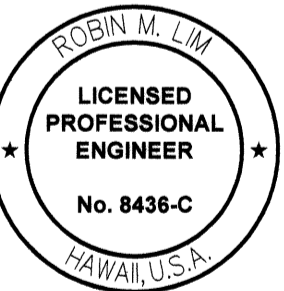
SIGNATURE: *[Signature]* EXPIRATION DATE OF THE LICENSE: 4-30-10
GEOLABS, INC.

| Depth, ft | FIELD | | LABORATORY | | | Other Data | Pen, tsf | DESCRIPTION |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------|-----------------|--------------------|------------------------|-------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Sample | Penetra. Resist. Blows/ft | Dry Density pcf | Moisture Content % | Compress. Strength ksf | | | |
| | | | | | | | | (Continued from previous plate) |
| | 40 | 73 | 50 | | | | 2.6 | Gray to reddish brown SANDY SILT (ML) with clay and gravel, very stiff |
| 40 | 37 | | 47 | | | | 1.6 | |
| 45 | 50 | | 49 | | | | 3.5 | |
| 50 | | | | | | RUN 1 REC=67% RQD=0% | | Brown vugular BASALT, severely fractured, highly to extremely weathered, soft with seams of clay (weathered basalt formation) |
| 55 | | | | | | RUN 2 REC=47% RQD=0% | | |
| 60 | | | | | | RUN 3 REC=72% RQD=25% | | |
| 65 | | | | | | RUN 4 REC=98% RQD=85% | | Gray vesicular BASALT, moderately fractured, moderately weathered, medium hard (basalt formation) Gray dense BASALT, slightly fractured, slightly weathered, hard (basalt formation) |
| 70 | | | | | | RUN 5 REC=100% RQD=100% | | |
| 75 | | | | | | RUN 6 REC=97% RQD=60% | | |
| <div>GEOLABS, INC. Geotechnical Engineering WORK ORDER NO. 3869-00 KHN Dec 00</div> <div>LOG OF BORING 24 KAUMUALII HIGHWAY WIDENING LIHUE TO WEST OF MALUHIA ROAD ISLAND OF KAUAI, HAWAII</div> | | | | | | | | |

| Depth, ft | FIELD | | LABORATORY | | | Other Data | Pen, tsf | DESCRIPTION |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------|-----------------|--------------------|------------------------|--------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| | Sample | Penetra. Resist. Blows/ft | Dry Density pcf | Moisture Content % | Compress. Strength ksf | | | |
| | | | | | | | | (Continued from previous plate) |
| 80 | | | | | | RUN 7 REC=98% RQD=48% | | Gray and tan vugular BASALT, closely to severely fractured, highly weathered, soft to medium hard (basalt formation) grades to moderately fractured |
| 85 | | | | | | RUN 8 REC=100% RQD=50% | | |
| 90 | | | | | | RUN 9 REC=100% RQD=92% | | Gray vesicular BASALT, slightly fractured, moderately to slightly weathered, medium hard (basalt formation) grades to dark gray |
| 95 | | | | | | RUN 10 REC=100% RQD=100% | | Gray vesicular BASALT, slightly fractured to massive, moderately weathered, hard grades to slightly weathered |
| 100 | | | | | | RUN 11 REC=100% RQD=93% | | |
| 105 | | | | | | | | Boring terminated at 102.5 feet Groundwater level at: Depth Hours Date 8.2 ft 0800 4/13/98 |
| 110 | | | | | | | | |
| 115 | | | | | | | | |
| <div>GEOLABS, INC. Geotechnical Engineering WORK ORDER NO. 3869-00 KHN Dec 00</div> <div>LOG OF BORING 24 KAUMUALII HIGHWAY WIDENING LIHUE TO WEST OF MALUHIA ROAD ISLAND OF KAUAI, HAWAII</div> | | | | | | | | |

| | | |
|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| NOTE BOOK | DRAWN BY | |
| | TRACED BY | |
| | QUANTITIES BY | |
| | CHECKED BY | |
| | No. | |

T:\UPRATING-3869\WORKING\3869-20\KAUMUALIIHIGHWAYWIDENING\3869-20\313SHEETS\BORINGLOGS21-147.DWG



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SIGNATURE: *[Signature]* EXPIRATION DATE OF THE LICENSE: 4-30-10
GEOLABS, INC.

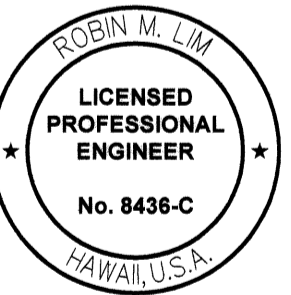
| Depth, ft | FIELD | | LABORATORY | | | | Other Data | Pen, tsf | DESCRIPTION |
|--------------------------------------------------------------------------------|--------|---------------------------|-----------------|--------------------|------------------------|-------------------------------|------------|----------|----------------------------------------------------------------------------------------------------------------|
| | Sample | Penetra. Resist. Blows/ft | Dry Density pcf | Moisture Content % | Compress. Strength ksf | | | | |
| 80 | | | | | | RUN 10 REC=90% RQD=0% | | | Brown vesicular BASALT, severely fractured, highly weathered, soft to medium hard (weathered basalt formation) |
| 85 | | | | | | RUN 11 REC=100% RQD=0% | | | |
| 90 | | | | | | RUN 12 REC=77% RQD=20% | | | |
| 95 | | | | | | RUN 13 REC=100% RQD=93% | | | Gray vugular BASALT, moderately to closely fractured, moderately weathered, medium hard (basalt formation) |
| 100 | | | | | | RUN 14 REC=89% RQD=63% | | | grades to vesicular, slightly fractured, slightly weathered, medium hard |
| 105 | | | | | | | | | Boring terminated at 100 feet |
| 110 | | | | | | | | | Groundwater level at: Depth Hours Date 9.2 ft. 1000 4/10/98 |
| 115 | | | | | | | | | |
| GEOLABS, INC. Geotechnical Engineering WORK ORDER NO. 3869-00 KHN Dec 00 | | | | | | | | | LOG OF BORING 25 KAUMUALII HIGHWAY WIDENING LIHUE TO WEST OF MALUHIA ROAD ISLAND OF KAUAI, HAWAII |

| | | | |
|-------------------------|--|------------------------------------------|--|
| Date Started: 5/12/98 | | Drill Rig: Mobile B-80 | |
| Date Completed: 5/12/98 | | Drilling Method: 4" Auger | |
| Logged By: J. Chen | | Driving Energy: 140 lb. wt., 30 in. drop | |
| Total Depth: 45.0 feet | | | |

| Depth, ft | FIELD | | LABORATORY | | | | Other Data | Pen, tsf | DESCRIPTION |
|-----------|--------|---------------------------|-----------------|--------------------|------------------------|--|------------|----------|---------------------------------------------------------|
| | Sample | Penetra. Resist. Blows/ft | Dry Density pcf | Moisture Content % | Compress. Strength ksf | | | | |
| 5 | | 76 | 89 | 12 | | | | 3.9 | 2-inch GRASS LAWN |
| | | 42 | 75 | 44 | | | | >4.5 | Brown CLAYEY SILT (MH-ML) with gravel, very stiff, damp |
| | | 47 | 69 | 39 | | | | >4.5 | grades to reddish brown, moist |
| 10 | | 22 | 67 | 45 | | | | 3.2 | grades to very moist |
| 15 | | 22 | 62 | 54 | | | | 2.0 | |
| 20 | | 16 | 63 | 54 | | | | 1.5 | Brown CLAYEY SILT (MH-ML) with fine sand, stiff |
| 25 | | 17 | 66 | 53 | | | | 0.8 | |
| 30 | | 14 | 66 | 57 | | | | 1.5 | grades to tannish brown |
| 35 | | | | | | | | | |

geo12 [LJ/KAL/01/09/08.F]

| | | |
|-------------------------------------------|--|------------------------------------------------------------------------------------------------------------|
| GEOLABS, INC. Geotechnical Engineering | | LOG OF BORING 26 KAUMUALII HIGHWAY WIDENING LIHUE TO WEST OF MALUHIA ROAD ISLAND OF KAUAI, HAWAII |
| WORK ORDER NO. 3869-00 KHN Dec 00 | | |



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SIGNATURE: *Robin M. Lim* EXPIRATION DATE OF THE LICENSE: 4-30-10
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 5

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS Date: February 2009

| Depth, ft | FIELD | | LABORATORY | | | Other Data | Pen, tsf | DESCRIPTION |
|-----------|------------|---------------------------|-----------------|--------------------|------------------------|------------|----------|----------------------------------------------------------------------|
| | Sample | Penetra. Resist. Blows/ft | Dry Density pcf | Moisture Content % | Compress. Strength ksf | | | |
| | | 25 | 64 | 58 | | | 1.0 | (Continued from previous plate) |
| | | | | | | | | Brown CLAYEY SILT (MH-ML) with fine sand and basalt fragments, stiff |
| 40 | | 86 | 80 | 42 | | | | Brown and gray BASALT, hard |
| 45 | 40/0' Ref. | | | | | | | Boring terminated at 45 feet |
| | | | | | | | | Groundwater level at: Depth Hours Date 11.5 ft 1130 5/13/98 |
| 50 | | | | | | | | |
| 55 | | | | | | | | |
| 60 | | | | | | | | |
| 65 | | | | | | | | |
| 70 | | | | | | | | |
| 75 | | | | | | | | |

GEOLABS, INC.
Geotechnical Engineering
WORK ORDER NO. 3869-00 KHN Dec 00

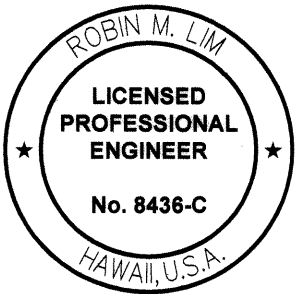
LOG OF BORING 26
KAUMUALII HIGHWAY WIDENING
LIHUE TO WEST OF MALUHIA ROAD
ISLAND OF KAUAI, HAWAII

| | | | |
|-------------------------|--|------------------------------------------|--|
| Date Started: 7/26/99 | | Drill Rig: Mobile B-63 | |
| Date Completed: 7/26/99 | | Drilling Method: 4" Auger | |
| Logged By: Y. Chiba | | Driving Energy: 140 lb. wt., 30 in. drop | |
| Total Depth: 51.5 feet | | | |

| Depth, ft | FIELD | | LABORATORY | | | Other Data | Pen, tsf | DESCRIPTION |
|-----------|----------------------|---------------------------|-----------------|--------------------|------------------------|----------------|----------|--------------------------------------------------------------------------------------------------------------------------|
| | Sample | Penetra. Resist. Blows/ft | Dry Density pcf | Moisture Content % | Compress. Strength ksf | | | |
| | | 41 | 99 | 31 | | | 4.0 | Approximate Surface Elevation (ft): 208.2* Reddish brown mottled with brown CLAYEY SILT (MH), very stiff, damp (fill) |
| 5 | 52/.5' + 45/.3' Ref. | 79 | 37 | | | LL=80 PI=41 | >4.5 | grades to brown mottled with brownish orange, very hard (residual) |
| 10 | | 39 | 105 | 32 | | | 4.0 | Brownish orange mottled with brown CLAYEY SILT (MH), very stiff, damp |
| 15 | | 32 | 72 | 39 | | LL=68 PI=30 | 4.0 | grades to grayish brown with multi-color mottling |
| 20 | | 52 | 78 | 44 | | | 3.5 | grades to moist |
| 25 | | 58 | 77 | 48 | | | >4.5 | grades to reddish brown, very hard |
| 30 | | 66 | 68 | 69 | | | 3.0 | Bright reddish brown SILTY CLAY (CH), very hard, damp to moist |
| 35 | | | | | | | | grades to brownish orange, damp |

GEOLABS, INC.
Geotechnical Engineering
WORK ORDER NO. 3869-00 KHN Dec 00

LOG OF BORING 27
KAUMUALII HIGHWAY WIDENING
LIHUE TO WEST OF MALUHIA ROAD
ISLAND OF KAUAI, HAWAII



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Robin M. Lim
SIGNATURE EXPIRATION DATE OF THE LICENSE: 4-30-10
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 6

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS Date: February 2009

SHEET No. G-3.06 OF G-3.26 SHEETS

| Depth, ft | FIELD | | LABORATORY | | | Other Data | Pen, tsf | DESCRIPTION |
|-----------|--------|---------------------------|-----------------|--------------------|------------------------|------------|----------|------------------------------------------------------------------------|
| | Sample | Penetra. Resist. Blows/ft | Dry Density pcf | Moisture Content % | Compress. Strength ksf | | | |
| | | | | | | | | (Continued from previous plate) |
| | 80 | 105 | 41 | | | | 4.0 | Brownish orange SILTY CLAY (CH), very hard, moist |
| 40 | 18 | 59 | 64 | | | | 0.5 | Brownish gray with multi-color mottling CLAYEY SILT (MH), stiff, moist |
| 45 | 20 | 89 | 56 | | | | 1.5 | grades to reddish brown with multi-color mottling |
| 50 | 29 | 70 | 49 | | | | 1.5 | Boring terminated at 51.5 feet Groundwater not encountered |
| 55 | | | | | | | | |
| 60 | | | | | | | | |
| 65 | | | | | | | | |
| 70 | | | | | | | | |
| 75 | | | | | | | | |

GEOLABS, INC.
Geotechnical Engineering

LOG OF BORING 28
KAUMUALII HIGHWAY WIDENING
LIHUE TO WEST OF MALUHIA ROAD
ISLAND OF KAUAI, HAWAII

WORK ORDER NO. 3869-00 KHN Dec 00

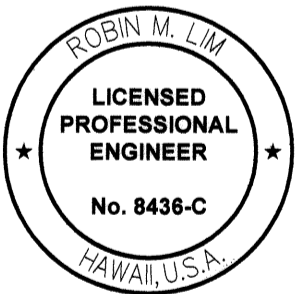
| | | | |
|-------------------------|--|------------------------------------------|--|
| Date Started: 7/27/99 | | Drill Rig: Mobile B-53 | |
| Date Completed: 7/28/99 | | Drilling Method: 4" Auger | |
| Logged By: Y. Chiba | | Driving Energy: 140 lb. wt., 30 in. drop | |
| Total Depth: 51.5 feet | | | |

| Depth, ft | FIELD | | LABORATORY | | | Other Data | Pen, tsf | DESCRIPTION |
|-----------|--------|---------------------------|-----------------|--------------------|------------------------|----------------|----------|----------------------------------------------------------------------------------------|
| | Sample | Penetra. Resist. Blows/ft | Dry Density pcf | Moisture Content % | Compress. Strength ksf | | | |
| | | | | | | | | Approximate Surface Elevation (ft): 212* |
| | 11 | 64 | 37 | | | | 3.5 | 2-inch ASPHALT CONCRETE |
| | | | | | | | | Dark brown SILTY SAND (SM), medium dense, damp |
| | | | | | | | | Brown SILTY CLAY (CH), stiff, damp |
| 5 | 41 | 101 | 40 | | | | 4.0 | grades to mottled with orange |
| 10 | 28 | 81 | 37 | | | | >4.5 | |
| 15 | 22 | 76 | 38 | | | | 4.0 | Tannish brown mottled with grayish brown and orange CLAYEY SILT (MH), very stiff, damp |
| 20 | 35 | 75 | 42 | | | | 2.5 | grades to tannish gray with multi-color mottling, damp to moist |
| 25 | 43 | 89 | 43 | | | LL=69 PI=30 | 3.5 | |
| 30 | 31 | 77 | 45 | | | | 4.0 | grades to dark brown with multi-color mottling |
| 35 | | | | | | | | Reddish brown SILTY CLAY (CH), very hard, moist |

GEOLABS, INC.
Geotechnical Engineering

LOG OF BORING 29
KAUMUALII HIGHWAY WIDENING
LIHUE TO WEST OF MALUHIA ROAD
ISLAND OF KAUAI, HAWAII

WORK ORDER NO. 3869-00 KHN Dec 00



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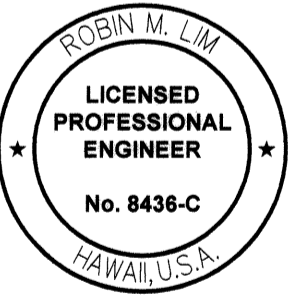
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | NH-050-1(31) | 2009 | 319 | 452 |

| Depth, ft | FIELD | | LABORATORY | | | | Other Data | Pen, tsf | DESCRIPTION |
|-----------|--------|---------------------------|-----------------|--------------------|------------------------|---------------------------------|------------|----------|--------------------------------------------------------------------|
| | Sample | Penetra. Resist. Blows/ft | Dry Density pcf | Moisture Content % | Compress. Strength ksf | (Continued from previous plate) | | | |
| | X | 78 | 84 | 41 | | | | >4.5 | Reddish brown SILTY CLAY (CH), very hard, moist |
| 40 | X | 48 | 69 | 47 | | | | 3.0 | |
| 45 | X | 30 | 91 | 56 | | | | 2.0 | Gray with multi-color mottling CLAYEY SILT (MH), very stiff, moist |
| 50 | X | 40 | 66 | 55 | | | | 0.5 | Boring terminated at 51.5 feet Groundwater not encountered |
| 55 | | | | | | | | | |
| 60 | | | | | | | | | |
| 65 | | | | | | | | | |
| 70 | | | | | | | | | |
| 75 | | | | | | | | | |

| | | |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--|
| GEOLABS, INC. <i>Geotechnical Engineering</i> | LOG OF BORING 29 KAUMUALII HIGHWAY WIDENING LIHUE TO WEST OF MALUHIA ROAD ISLAND OF KAUAI, HAWAII | |
| WORK ORDER NO. 3869-00 KHN Dec 00 | | |

| | | |
|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| NOTE BOOK | DRAWN BY | |
| | TRACED BY | |
| | CHECKED BY | |
| | QUANTITIES BY | |
| | CHECKED BY | |

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OR UNDER MY SUPERVISION AND
CONSTRUCTION OF THIS PROJECT
WILL BE UNDER MY OBSERVATION.

Robin M. Lim 4-30-10
SIGNATURE EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION


BORING LOGS - 9

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)







Scale: NTS Date: February 2009

SHEET No. G-3.09 OF G-3.26 SHEETS

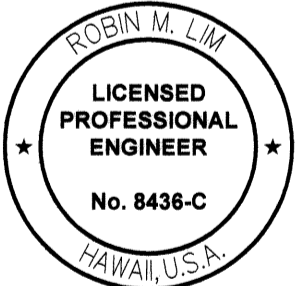
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | NH-050-1(31) | 2009 | 320 | 452 |

|  | | GEOLABS, INC. Geotechnical Engineering | | | | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | Log of Boring 119 | |
|-----------------------------------------------------------------------------------|--|-------------------------------------------|-----------------------|-------------------|----------|-------------------------------------|-------------------------------------------------------|----------------------------------------------------------|----------------|-------|-------------------------------------------------------------------------------------------------------------|--|
| Other Tests | | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 270 * | |
| | | | | | | | | | | | Description | |
| LL=250 PI=155 | | | | | | Wt. of Hammer | | | | MH-OH | Dark grayish brown CLAYEY ORGANIC SILT, very soft (alluvium) | |
| | | 83 | 54 | | | 2 | 0.0 | 5 | | | grades with sand and gravel | |
| | | 79 | 50 | | | 4 | 0.0 | 10 | | | | |
| | | 52 | | | | 13 | | 15 | | | | |
| | | | | | | 41 | | 20 | | | | |
| | | 50 | 73 | | | 50/.4' Ref. | | 25 | | | Brownish gray BASALT, severely fractured, highly weathered, soft to medium hard (basalt formation) | |
| | | | | 100 81 | 50 31 | 85/.0' | | 30 | | | grades to moderately fractured, slightly weathered, very hard | |
| | | | | 48 | 25 | | | 35 | | | | |
| | | 46 | | | | 50/.5' Ref. | | 40 | | | Reddish brown BASALT, closely fractured, highly weathered, soft (basalt formation) | |
| | | | | | | 75 | 42 | 45 | | | Brownish gray dense BASALT, moderately fractured, slightly to moderately weathered, hard (basalt formation) | |
| | | | | | | | 50 | | | | Boring terminated at 50 feet | |
| | | | | | | | 55 | | | | | |
| | | | | | | | 60 | | | | | |
| | | | | | | | 65 | | | | | |
| | | | | | | | 70 | | | | | |
| | | | | | | | 75 | | | | | |
| Date Started: October 19, 2004 | | | | | | | | Water Level: ∇ 0.1 ft. 10/19/04 1755 HRS | | | | |
| Date Completed: October 19, 2004 | | | | | | | | 0 ft. 10/20/04 1755 HRS | | | | |
| Logged By: S. Latronic | | | | | | | | Drill Rig: CONCORE | | | | |
| Total Depth: 50 feet | | | | | | | | Drilling Method: 3" Auger, Drag Bit & Casing & NQ Coring | | | | |
| Work Order: 3869-20 | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | |

| GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | | Log of Boring 121 | | | |
|-------------------------------------------|----------------------|-------------------------------------------------------|-------------------|---------|-------------------------------------|-------------------|--------------|-----------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------|--|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 279 * | |
| | | | | | | | | | | Description | |
| | 100 | 44 | | | 2 | 0.0 | | | MH | Dark brown CLAYEY SILT with some gravel and organics, very soft (alluvium) | |
| | 65 | 64 | | | 2 | | 5 | | | grades with some sand | |
| | 58 | | | | 20 | 1.0 | 10 | | MH | Grayish brown CLAYEY SILT, stiff (residual soil) | |
| | 53 | 68 | | | 48 | 3.5 | 15 | | | grades with some sand, very stiff | |
| | 64 | | | | 13 | 1.5 | 20 | | | grades to stiff to very stiff | |
| | 46 | | | | 45 | 2.5 | 25 | | | | |
| | 46 | | | | 28 | 2.5 | 30 | | | | |
| | 44 | | 100 | 50 | 50/.5' Ref. | | 35 | | | Gray dense BASALT, moderately fractured, slightly weathered, very hard (basalt formation) | |
| | | | 22 | 10 | | | 40 | | | Reddish brown BASALT, severely fractured, highly weathered, soft (basalt formation) | |
| | 55 | | 58 | 8 | 53 | >4.5 | 45 | | | grades to medium hard | |
| | | | 95 | 27 | | | 50 | | | Brownish gray BASALT, closely to moderately fractured, moderately weathered, medium hard (basalt formation) | |
| | | | | | | | 55 | | | grades to hard | |
| | | | | | | | | | | Boring terminated at 55.5 feet | |
| | | | | | | | 60 | | | | |
| | | | | | | | 65 | | | | |
| | | | | | | | 70 | | | | |
| | | | | | | | 75 | | | | |
| Date Started: October 21, 2004 | | | | | | | | Water Level: 5 ft. 10/21/04 1815 HRS | | | |
| Date Completed: October 22, 2004 | | | | | | | | 0.5 ft. 10/22/04 1135 HRS | | | |
| Logged By: S. Latronic | | | | | | | | Drill Rig: CONCORE | | | |
| Total Depth: 55.5 feet | | | | | | | | Drilling Method: 3" Casing, 3" Drag Bit & NQ Coring | | | |
| Work Order: 3869-20 | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | |














| GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | Log of Boring 122 | | | | |
|-------------------------------------------|----------------------|-------------------------------------------------------|-------------------|---------|-------------------------------------|-------------------|----------------------|-------------------------------------------------------------------------------------|------|--------------------------------------------------------|-------------------------------------------------|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 330 * | Description |
| | 36 | | | | 13 | 3.0 | |  | MH | | Brown CLAYEY SILT, stiff, moist (residual soil) |
| | 37 | 86 | | | 40 | 4.0 | 5 |  | | | grades to stiff to very stiff |
| | 47 | | | | 14 | 2.3 | 10 |  | | | |
| | 52 | 73 | | | 13 | 1.0 | 15 |  | | | grades to medium stiff, very moist |
| | 58 | | | | 8 | 1.0 | 20 |  | | | |
| | 58 | 66 | | | 18 | 2.5 | 25 |  | | | grades to stiff |
| | | | | | | | | | | | Boring terminated at 26 feet |
| | | | | | | | | | | | |
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| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
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| | CHECKED BY | |
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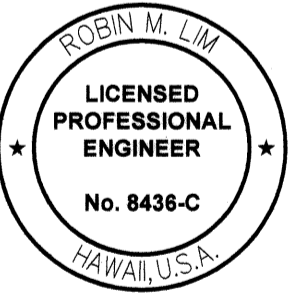
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

SIGNATURE: *Robin M. Lim* EXPIRATION DATE OF THE LICENSE: 4-30-10
GEOLABS, INC.

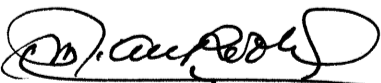
|  GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | | | Log of Boring 123 | | |
|------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------|-------------------|---------|-------------------------------------|-------------------|----------------------------------------------|-------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------|--|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 318 * | |
| | | | | | | | | | | Description | |
| | 24 | 91 | | | 50/.2' | >5.0 | |  | MH | Reddish brown CLAYEY SILT, hard, damp (residual soil) | |
| | 38 | | | | 18 | | |  | | grades to stiff to very stiff, moist | |
| | 50 | 75 | | | 37 | 1.5 | 5 |  | | | |
| | 57 | | | | 17 | | 10 |  | | | |
| | 70 | 59 | | | 17 | | 15 |  | | | |
| | 58 | | | | 4 | | 20 |  | | grades to soft | |
| | 65 | 63 | | | 7 | | 25 |  | SM | Reddish brown SILTY SAND, loose (residual soil) | |
| | 62 | | | | 4 | | 30 |  | MH | Reddish brown CLAYEY SILT, soft (residual soil) | |
| | 65 | | | | 41 | | 35 |  | | grades to stiff to very stiff | |
| | 57 | | | | 15 | | 40 |  | | grades with gravel | |
| | 69 | 57 | | | 32 | | 45 |  | | | |
| | 60 | | | | 26 | | 50 |  | | Boring terminated at 51.5 feet | |
| | | | | | | | 55 | | | | |
| | | | | | | | 60 | | | | |
| | | | | | | | 65 | | | | |
| | | | | | | | 70 | | | | |
| | | | | | | | 75 | | | | |
| Date Started: August 18, 2004 | | | | | | | Water Level: ∇ 7 ft. 8/19/04 1400 HRS | | | | |
| Date Completed: August 19, 2004 | | | | | | | 14 ft. 8/23/04 0855 HRS | | | | |
| Logged By: B. Bachelder | | | | | | | Drill Rig: CONCORE | | | | |
| Total Depth: 51.5 feet | | | | | | | Drilling Method: 4" Auger | | | | |
| Work Order: 3869-20 | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | |








|  GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | | Log of Boring 124 | | | |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------|-------------------|---------|-------------------------------------|-------------------|--------------|---------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------------------|--|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 320 * | |
| | | | | | | | | | | Description | |
| LL=60 PI=16 | 31 | 71 | | | 11 | 2.7 | |  | MH | Reddish brown CLAYEY SILT, medium stiff to stiff, moist (residual soil) | |
| | 31 | | | | 12 | >5.0 | |  | | grades to very stiff to hard | |
| | 27 | 81 | | | 49 | 3.2 | 5 |  | | grades with multi-color mottling and sand, medium stiff | |
| | 49 | | | | 11 | | 10 |  | | Grayish brown with orange mottling CLAYEY SILT, stiff to very stiff, very moist (residual soil) | |
| | 58 | 60 | | | 13 | 4.0 | 15 |  | MH | Reddish brown CLAYEY SILT, medium stiff (residual soil) | |
| | 57 | | | | 8 | | 20 |  | MH | Reddish brown CLAYEY SILT, medium stiff (residual soil) | |
| | 58 | 61 | | | 8 | | 25 |  | | grades with gravel | |
| | 57 | | | | 13 | | 30 |  | | grades with gravel | |
| | 21 | | | | 10 | | 35 |  | | grades with gravel | |
| | 49 | | | | 19 | | 40 |  | | grades with gravel | |
| | 58 | | | | 9 | | 45 |  | | grades with gravel | |
| | 56 | | | | 9 | | 50 |  | | Boring terminated at 51.5 feet | |
| | | | | | | | 55 | | | | |
| | | | | | | | 60 | | | | |
| | | | | | | | 65 | | | | |
| | | | | | | | 70 | | | | |
| | | | | | | | 75 | | | | |
| Date Started: August 17, 2004 | | | | | | | | Water Level: ∇ 19 ft. 8/17/04 1240 HRS | | | |
| Date Completed: August 17, 2004 | | | | | | | | | | | |
| Logged By: B. Bachelder | | | | | | | | Drill Rig: CME-75 | | | |
| Total Depth: 51.5 feet | | | | | | | | Drilling Method: 4" Auger | | | |
| Work Order: 3869-20 | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | |

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| SURVEY PLOTTED BY | DATE |
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| TRACED BY | " " |
| QUANTITIES BY | " " |
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| ORIGINAL PLAN | |
| NOTE BOOK | |
| No. | |















THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION AND
CONSTRUCTION OF THIS PROJECT
WILL BE UNDER MY OBSERVATION.

 4-30-10
SIGNATURE EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

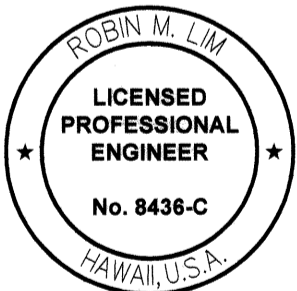
|  | | GEOLABS, INC. Geotechnical Engineering | | | | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | Log of Boring 125 | |
|-----------------------------------------------------------------------------------|----------------------|-------------------------------------------|-------------------|---------|-------------------------------------|-------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------------------------------------------------|----------------------|--|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 336 * | | |
| | | | | | | | | | | Description | | |
| | 39 | 75 | | | 21 | 1.5 | |  | MH | Brown CLAYEY SILT with some gravel, stiff, moist (fill) | | |
| | 36 | | | | 13 | 2.0 | |  | MH | Brown CLAYEY SILT, stiff, moist (residual soil) | | |
| | 37 | 86 | | | 29 | 3.5 | 5 |  | | grades to very stiff | | |
| | 44 | | | | 5 | 1.0 | 10 |  | | grades to medium stiff | | |
| | 54 | 63 | | | 9 | 1.0 | 15 |  | | grades with weathered gravel | | |
| | 54 | | | | 11 | 0.8 | 20 |  | | grades to very moist | | |
| | | | | | | | | | | Boring terminated at 21 feet | | |
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BORING LOG DOT 3869-20 (P.1) GEOLABS GDT 7/007

|  | | GEOLABS, INC. Geotechnical Engineering | | | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | Log of Boring 126 | |
|-------------------------------------------------------------------------------------|----------------------|-------------------------------------------|-------------------|----------------|-------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------|--------------------------------------------------------------------------------------|--|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 307 * | |
| | | | | | | | | | | Description | |
| LL=74 PI=31 | 32 | 88 | | | 22 | >5.0 | |  | MH-OH | Reddish brown CLAYEY SILT with organics, very stiff, moist (alluvium) | |
| | 39 | | | | 16 | | | | | | |
| | 39 | 77 | | | 29 | | 5 |  | | | |
| | 43 | | | | 10 | | 10 |  | MH | Reddish brown CLAYEY SILT, medium stiff (alluvium) | |
| | 71 | | | | 6 | | 15 |  | | grades to soft | |
| | 66 | | | | 4 | | 20 |  | | | |
| | 47 | 72 | | | 29 | | 25 |  | MH | Reddish brown CLAYEY SILT with weathered gravel, stiff to very stiff (residual soil) | |
| | 64 | | | | 12 | | 30 |  | | | |
| | 40 | 69 | | | 30 | | 35 |  | | | |
| | 56 | | | | 30 | | 40 |  | MH | Bluish gray with black mottling CLAYEY SILT, very stiff (residual soil) | |
| 50 | | | | 19/.5' +35/.3' | >5.0 | 45 |  | | grades to hard | | |
| 63 | | | | 19 | 0.5 | 50 |  | | grades to stiff | | |
| | | | | | | | | | | Boring terminated at 51.5 feet | |
| | | | | | | | | | | | |
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BORING LOG DOT 3869-20 (P.2) GEOLABS GDT 7/007













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| ORIGINAL PLAN NOTE BOOK | SURVEY PLOTTED BY | | DATE |
| | DRAWN BY | | " |
| | DESIGNED BY | | " |
| | CHECKED BY | | " |

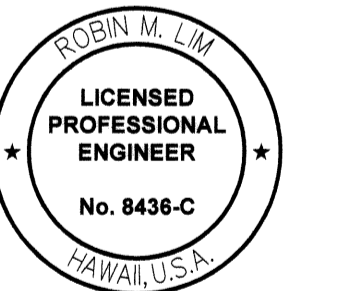


THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

Robin M. Lim 4-30-10
SIGNATURE EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

|  GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | | | Log of Boring 127 | | |
|------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------|-------------------|---------|-------------------------------------|-------------------|--------------|-----------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------|--|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 315 * | |
| | | | | | | | | | | Description | |
| | 34 | 92 | | | 59 | >4.5 | |  | MH | Brown CLAYEY SILT with gravel, very stiff, moist (fill) | |
| | 29 | | | | 32 | 3.5 | |  | | | |
| | 28 | | | | 41 | >4.5 | 5 |  | MH | Brown CLAYEY SILT, very stiff, moist (residual soil) | |
| | | | | | | | |  | | BASALTIC BOULDER | |
| | 39 | | | | 18 | 2.5 | 10 |  | | grades to stiff | |
| | | | | | | | |  | | grades to medium stiff | |
| | 65 | 58 | | | 5 | 0.8 | 15 |  | MH | Brown CLAYEY SILT, soft (residual soil) | |
| | 72 | | | | 5 | 0.5 | 20 |  | | | |
| | 70 | 62 | | | 13 | | 25 |  | ML-GM | Brown/gray SANDY SILT with weathered basaltic gravel, medium stiff (saprolite) | |
| | 61 | | | | 11 | 0.5 | 30 |  | | grades with more gravel | |
| | 68 | 57 | | | 19 | | 35 |  | | | |
| | 57 | | | | 22 | | 40 |  | | | |
| | 25 | 85 | | | 18 | | 45 |  | | grades with clay at 46 feet | |
| | | | | | | | |  | MH | Grayish brown CLAYEY SILT with weathered basaltic gravel, medium stiff (residual soil) | |
| | 61 | | | | 8 | 0.8 | 50 |  | | Boring terminated at 51 feet | |
| | | | | | | | 55 | | | | |
| | | | | | | | 60 | | | | |
| | | | | | | | 65 | | | | |
| | | | | | | | 70 | | | | |
| | | | | | | | 75 | | | | |
| Date Started: February 9, 2005 | | | | | | | | Water Level: ∇ 14 ft. 2/9/05 1040 HRS | | | |
| Date Completed: February 9, 2005 | | | | | | | | 13.8 ft. 2/9/05 1230 HRS | | | |
| Logged By: S. Latronic | | | | | | | | Drill Rig: CME-55 | | | |
| Total Depth: 51 feet | | | | | | | | Drilling Method: 4" Auger | | | |
| Work Order: 3869-20 | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | |


|  | | GEOLABS, INC. | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | Log of Boring 128 | | |
|-------------------------------------------------------------------------------------|----------------------|-----------------------|-------------------|-------------------------------------------------------|-------------------------------------|-------------------|--------------|---------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------|--|
| Geotechnical Engineering | | | | | | | | | | | |
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 302 * | |
| | | | | | | | | | | Description | |
| | 33 | 73 | | | 22 12 | >5.0 | |  | MH | Reddish brown with orange mottling CLAYEY SILT, very stiff to hard, moist (alluvium) | |
| | 44 | 76 | | | 29 | 2.7 | 5 |  | | grades to soft to medium stiff | |
| | 57 | | | | 4 | 1.0 | 10 |  | | Dark brown CLAYEY SAND, loose to medium dense (alluvium) | |
| | 67 | 57 | | | 6 | | 15 |  | SC | Dark brown CLAYEY SAND, loose to medium dense (alluvium) | |
| | 43 | | | | 42 | | 20 |  | MH | Reddish brown CLAYEY SILT with weathered gravel, very stiff (residual soil) | |
| | 61 | 62 | | | 30 | | 25 |  | | Reddish brown CLAYEY SILT with weathered gravel, very stiff (residual soil) | |
| | 65 | | | | 7 | | 30 |  | MH | Reddish brown with black mottling CLAYEY SILT, medium stiff (residual soil) | |
| | 65 | 54 | | | 11 | | 35 |  | | Reddish brown with black mottling CLAYEY SILT, medium stiff (residual soil) | |
| | | | | | 35 | | 40 |  | MH | Reddish brown with black mottling CLAYEY SILT, stiff to very stiff (residual soil) | |
| | 62 | 64 | | | 14 | | 45 |  | | Reddish brown with black mottling CLAYEY SILT, stiff to very stiff (residual soil) | |
| | 57 | | | | 18 | | 50 |  | MH | Bluish gray with multi-color mottling CLAYEY SILT, stiff (residual soil) | |
| | | | | | | | 55 | | | Boring terminated at 51.5 feet | |
| | | | | | | | 60 | | | | |
| | | | | | | | 65 | | | | |
| | | | | | | | 70 | | | | |
| | | | | | | | 75 | | | | |
| Date Started: August 18, 2004 | | | | | | | | Water Level: ∇ 9 ft. 8/18/04 1310 HRS | | | |
| Date Completed: August 18, 2004 | | | | | | | | | | | |
| Logged By: B. Bachelder | | | | | | | | Drill Rig: CME-75 | | | |
| Total Depth: 51.5 feet | | | | | | | | Drilling Method: 4" Auger | | | |
| Work Order: 3869-20 | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | |





THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION AND
CONSTRUCTION OF THIS PROJECT
WILL BE UNDER MY OBSERVATION.


Robin M. Lim
SIGNATURE EXPIRATION DATE OF THE LICENSE: 4-30-10
GEOLABS, INC.

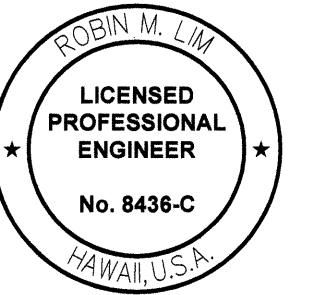
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | NH-050-1(31) | 2009 | 325 | 452 |

|  | | GEOLABS, INC. Geotechnical Engineering | | | | | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | Log of Boring 129 | |
|-----------------------------------------------------------------------------------|----------------------|-------------------------------------------|-------------------|---------|-------------------------------------|-------------------|--------------|-------------------------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------|--|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 314 * | | | |
| | | | | | | | | | | Description | | | |
| LL=58 PI=20 | 34 | 78 | | | 24 | 4.0 | | ✖ | MH | Brown CLAYEY SILT, stiff, moist (fill) | | | |
| | 46 | | | | 16 | 2.5 | | ▼ | MH | Brown CLAYEY SILT, stiff to very stiff, moist (residual soil) | | | |
| | 41 | 80 | | | 31 | 3.0 | 5 | ✖ | | | | | |
| | 38 | | | | 9 | 1.0 | 10 | ▼ | | grades to medium stiff, very moist | | | |
| | 56 | 67 | | | 16 | 1.5 | 15 | ✖ | | | | | |
| 52 | | | | | 7 | 1.0 | 20 | ▼ | MH | grades with weathered gravel Brown and black CLAYEY SILT with sand and weathered basaltic gravel, medium stiff, very moist to wet (saprolite) | | | |
| | | | | | | | | | | Boring terminated at 21 feet | | | |
| | | | | | | | 25 | | | | | | |
| | | | | | | | 30 | | | | | | |
| Date Started: February 10, 2005 | | | | | | | | | Water Level: ∇ 17.8 ft. 2/10/05 0940 HRS | | | | |
| Date Completed: February 10, 2005 | | | | | | | | | | | | | |
| Logged By: S. Latronic | | | | | | | | | | | | | |
| Total Depth: 21 feet | | | | | | | | | | | | | |
| Work Order: 3869-20 | | | | | | | | | | | | | |
| | | | | | | | | | Drill Rig: CME-55 | | | | |
| | | | | | | | | | Drilling Method: 4" Auger | | | | |
| | | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | |

|  | | GEOLABS, INC. Geotechnical Engineering | | | | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | Log of Boring 131 | |
|-------------------------------------------------------------------------------------|----------------------|-------------------------------------------|-------------------|---------|-------------------------------------|-------------------|-------------------------------------------------------|--------|---------|------------------------------------------|---------------------------------------------------------------|----------------------|--|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample | Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 311 * | | |
| | | | | | | | | | | | Description | | |
| | 37 | 78 | | | 26 | 3.0 | | ✖ | | MH | Brown CLAYEY SILT, stiff, moist (fill) | | |
| | 35 | | | | 21 | 2.5 | | ▼ | | MH | Brown CLAYEY SILT, stiff to very stiff, moist (residual soil) | | |
| | 33 | 92 | | | 41 | 2.5 | 5 | ✖ | | | | | |
| | 36 | | | | 20 | 1.5 | 10 | ▼ | | | grades to stiff, very moist | | |
| | 52 | 66 | | | 9 | 1.0 | 15 | ✖ | | | grades with light brown mottling, medium stiff | | |
| | 49 | | | | 20 | 1.0 | 20 | ▼ | | | Boring terminated at 21 feet | | |
| | | | | | | | 25 | | | | | | |
| | | | | | | | 30 | | | | | | |
| Date Started: February 10, 2005 | | | | | | | | | | Water Level: ∇ Not Encountered | | | |
| Date Completed: February 10, 2005 | | | | | | | | | | | | | |
| Logged By: S. Latronic | | | | | | | | | | Drill Rig: CME-55 | | | |
| Total Depth: 21 feet | | | | | | | | | | Drilling Method: 4" Auger | | | |
| Work Order: 3869-20 | | | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | |

|  | | GEOLABS, INC. | | | | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | Log of Boring 130 | |
|-------------------------------------------------------------------------------------|----------------------|-----------------------|-------------------|---------|-------------------------------------|-------------------|-------------------------------------------------------|------------------------------------------|---------|------|---------------------------------------------------------------------------------|----------------------|--|
| Geotechnical Engineering | | | | | | | | | | | | | |
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample | Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 319 * | | |
| | | | | | | | | | | | Description | | |
| | 32 | 94 | | | 52 | >4.5 | | ✖ | | MH | Brown SILTY CLAY with some gravel and organics, very stiff to hard, damp (fill) | | |
| | 33 | | | | 26 | >4.5 | | ✖ | | | | | |
| | 38 | 83 | | | 48 | >4.5 | 5 | ✖ | | | | | |
| | | | | | | | | | | MH | Brown CLAYEY SILT, very stiff, moist (residual soil) | | |
| | 36 | | | | 13 | 2.5 | 10 | ▼ | | | grades to stiff | | |
| | | | | | | | | | | | grades to very moist | | |
| | 45 | 71 | | | 15 | 2.5 | 15 | ✖ | | | grades with black mottling | | |
| | | | | | | | | | | | | | |
| | 47 | | | | 12 | 1.5 | 20 | ▼ | | | Boring terminated at 21 feet | | |
| | | | | | | | | | | | | | |
| | | | | | | | 25 | | | | | | |
| | | | | | | | 30 | | | | | | |
| Date Started: February 10, 2005 | | | | | | | | Water Level: ∇ | | | | Not Encountered | |
| Date Completed: February 10, 2005 | | | | | | | | | | | | | |
| Logged By: S. Latronic | | | | | | | | Drill Rig: CME-55 | | | | | |
| Total Depth: 21 feet | | | | | | | | Drilling Method: 4" Auger | | | | | |
| Work Order: 3869-20 | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | | |

|  | | GEOLABS, INC. Geotechnical Engineering | | | | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | Log of Boring 132 | |
|---------------------------------------------------------------------------------------|----------------------|-------------------------------------------|-------------------|---------|-------------------------------------|-------------------|-------------------------------------------------------|--------|---------|------------------------------------------|-------------------------------------------------------------|----------------------|--|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample | Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 293 * | | |
| | | | | | | | | | | | Description | | |
| | 34 | 90 | | | 58 | 4.0 | | ✖ | | MH | Brown CLAYEY SILT with some gravel,very stiff, moist (fill) | | |
| | 35 | | | | 21 | 2.5 | | ✖ | | | | | |
| | 36 | 86 | | | 40 | 4.0 | 5 | ✖ | | MH | Brown CLAYEY SILT, very stiff, moist (residual soil) | | |
| | 43 | | | | 16 | 2.5 | 10 | ▼ | | | grades with gray mottling | | |
| | 56 | 67 | | | 13 | 2.5 | 15 | ✖ | | | grades to stiff, very moist | | |
| | 54 | | | | 7 | 1.0 | 20 | ▼ | | | grades to medium stiff | | |
| | | | | | | | | | | | Boring terminated at 21 feet | | |
| | | | | | | | 25 | | | | | | |
| | | | | | | | 30 | | | | | | |
| Date Started: February 14, 2005 | | | | | | | | | | Water Level: ∇ Not Encountered | | | |
| Date Completed: February 14, 2005 | | | | | | | | | | | | | |
| Logged By: S. Latronic | | | | | | | | | | Drill Rig: CME-55 | | | |
| Total Depth: 21 feet | | | | | | | | | | Drilling Method: 4" Auger | | | |
| Work Order: 3869-20 | | | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | |



THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION AND
CONSTRUCTION OF THIS PROJECT
WILL BE UNDER MY OBSERVATION.

[Signature]
SIGNATURE EXPIRATION DATE OF THE LICENSE
GEOLABS, INC. 4-30-10

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 15








KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)








Scale: NTS Date: February 2009












SHEET No. G-3.15 OF G-3.26 SHEETS

| | | |
|------------------|-------------|------|
| ORIGINAL PLAN | DATE | |
| | DESIGNED BY | DATE |
| | CHECKED BY | DATE |
| | NO. | |

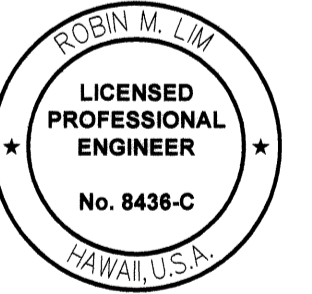
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | NH-050-1(31) | 2009 | 326 | 452 |

|  | | GEOLABS, INC. | | | | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | Log of Boring 133 | |
|-----------------------------------------------------------------------------------|----------------------|-----------------------|-------------------|---------|-------------------------------------|-------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------|------|-------------------------------------------------------------------|--|----------------------|--|
| Geotechnical Engineering | | | | | | | | | | | | | |
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 276 * | | | |
| | | | | | | | | | | Description | | | |
| | 36 | 79 | | | 58 | 3.5 | |  | MH | Brown CLAYEY SILT with traces of gravel, very stiff, moist (fill) | | | |
| | 36 | | | | 22 | 2.5 | |  | MH | Brown CLAYEY SILT, very stiff, moist (residual soil) | | | |
| | 38 | 83 | | | 36 | 3.5 | 5 |  | | | | | |
| | 45 | | | | 22 | 2.0 | 10 |  | | | | | |
| | 52 | 70 | | | 18 | 2.5 | 15 |  | | grades with tan mottling | | | |
| | 52 | | | | 12 | 1.5 | 20 |  | | grades to stiff, very moist | | | |
| | | | | | | | 25 | | | Boring terminated at 21 feet | | | |
| | | | | | | | 30 | | | | | | |
| Date Started: February 14, 2005 | | | | | | | | Water Level: ∇ Not Encountered | | | | | |
| Date Completed: February 14, 2005 | | | | | | | | | | | | | |
| Logged By: S. Latronic | | | | | | | | Drill Rig: CME-55 | | | | | |
| Total Depth: 21 feet | | | | | | | | Drilling Method: 4" Auger | | | | | |
| Work Order: 3869-20 | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | | |

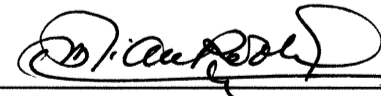
|  | | GEOLABS, INC. | | | | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | Log of Boring 134 | |
|-------------------------------------------------------------------------------------|----------------------|--------------------------|-------------------|---------|-------------------------------------|-------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------|------|-----------------------------------------------------------------|--|----------------------|--|
| | | Geotechnical Engineering | | | | | | | | | | | |
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 258 * | | | |
| | | | | | | | | | | Description | | | |
| | 34 | 80 | | | 28 | 4.0 | |  | MH | Brown CLAYEY SILT with traces of sand, very stiff, moist (fill) | | | |
| | 30 | | | | 12 | | |  | | grades to stiff | | | |
| | 39 | 87 | | | 28 | 2.5 | 5 |  | MH | Brown CLAYEY SILT, stiff to very stiff, moist (residual soil) | | | |
| | 35 | | | | 17 | 2.5 | 10 |  | | | | | |
| | 44 | 72 | | | 39 | 3.5 | 15 |  | | | | | |
| | 40 | | | | 17 | 2.0 | 20 |  | | Boring terminated at 21 feet | | | |
| | | | | | | | 25 | | | | | | |
| | | | | | | | 30 | | | | | | |
| Date Started: February 16, 2005 | | | | | | | | Water Level: ∇ Not Encountered | | | | | |
| Date Completed: February 16, 2005 | | | | | | | | | | | | | |
| Logged By: S. Latronic | | | | | | | | Drill Rig: CME-55 | | | | | |
| Total Depth: 21 feet | | | | | | | | Drilling Method: 4" Auger | | | | | |
| Work Order: 3869-20 | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | | |

|  | | GEOLABS, INC. | | | | | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | | Log of Boring 135 | |
|-------------------------------------------------------------------------------------|----------------------|--------------------------|-------------------|---------|-------------------------------------|-------------------|--------------|-------------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|----------------------|--|
| | | Geotechnical Engineering | | | | | | | | | | | | | |
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 228 * | | | | | |
| | | | | | | | | | | Description | | | | | |
| LL=62 PI=22 | 38 | 81 | | | 24 | 2.5 | |  | MH | Brown CLAYEY SILT with rootlets, stiff, moist (topsoil/fill) | | | | | |
| | 35 | | | | 15 | 2.5 | |  | MH | Brown CLAYEY SILT, stiff, moist (residual soil) | | | | | |
| | 35 | | | | 62 | 4.0 | 5 |  | | grades to very stiff | | | | | |
| | 40 | | | | 26 | 3.0 | 10 |  | | | | | | | |
| | 40 | 82 | | | 31 | 4.0 | 15 |  | | | | | | | |
| | 52 | | | | 13 | 1.5 | 20 |  | | grades with light gray mottling grades to stiff, very moist | | | | | |
| | 49 | 73 | | | 38 | 2.5 | 25 |  | MH | grades with weathered basaltic gravel Gray CLAYEY SILT with some weathered basaltic gravel, stiff to very stiff, very moist (saprolite) | | | | | |
| | 44 | | | | 31 | 2.5 | 30 |  | | grades with weathered basaltic gravel at 25.5 feet | | | | | |
| | 52 | 73 | | | 34 | 1.5 | 35 |  | | | | | | | |
| | 59 | | | | 10 | 1.5 | 40 |  | | grades to medium stiff | | | | | |
| | | | | | | | 45 | | | Boring terminated at 41 feet | | | | | |
| | | | | | | | 50 | | | | | | | | |
| Date Started: February 16, 2005 | | | | | | | | | | Water Level: ∇ 31.3 ft. 2/16/05 1125 HRS | | | | | |
| Date Completed: February 16, 2005 | | | | | | | | | | | | | | | |
| Logged By: S. Latronic | | | | | | | | | | Drill Rig: CME-55 | | | | | |
| Total Depth: 41 feet | | | | | | | | | | Drilling Method: 4" Auger | | | | | |
| Work Order: 3869-20 | | | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | | |

| | | | | |
|------------------|-------------------------|--|------------|--|
| ORIGINAL PLAN | SURVEY PLOTTED BY _____ | | DATE _____ | |
| | DRAWN BY _____ | | " _____ | |
| | CHECKED BY _____ | | " _____ | |
| | NOTED BY _____ | | " _____ | |
| NOTE BOOK | QUANTITIES BY _____ | | " _____ | |
| | DESIGNED BY _____ | | " _____ | |
| | TRACED BY _____ | | " _____ | |
| | DRAWN BY _____ | | " _____ | |
| No. _____ | CHECKED BY _____ | | " _____ | |



THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION AND
CONSTRUCTION OF THIS PROJECT
WILL BE UNDER MY OBSERVATION.


SIGNATURE EXPIRATION DATE OF THE LICENSE: 4-30-10
GEOLABS, INC.


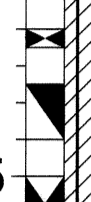
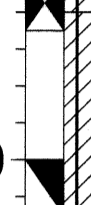
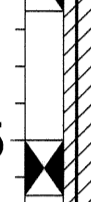





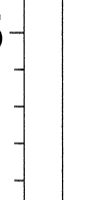
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 16



















KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS Date: February 2009

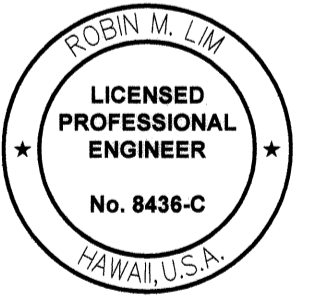
SHEET No. G-3.16 OF G-3.26 SHEETS

|  | | GEOLABS, INC. | | | | | KAUMUALII HIGHWAY WIDENING | | | | | Log of Boring | |
|-----------------------------------------------------------------------------------|----------------------|--------------------------|-------------------|---------|-------------------------------------|-------------------|------------------------------------------|-------------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------|--|---------------|--|
| | | Geotechnical Engineering | | | | | ISLAND OF KAUAI, HAWAII | | | | | 138 | |
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 167 * | | | |
| | | | | | | | | | | Description | | | |
| | 38 | | | | 20/0' Ref. | | |  | MH | Dark brown CLAYEY SILT with roots and organics, medium stiff, moist (fill) | | | |
| | 43 | 75 | | | 9 18 | 2.5 | 5 |  | MH | Brown with reddish brown mottling CLAYEY SILT, very stiff, moist (residual soil) | | | |
| | 47 | | | | 9 | 1.5 | 10 |  | | grades to medium stiff to stiff | | | |
| | 46 | | | | 16 | 1.0 | 15 |  | MH | Brown with reddish brown mottling CLAYEY SILT, medium stiff to stiff (residual soil) | | | |
| | 60 | | | | 7 | 0.8 | 20 |  | | | | | |
| | | | | | 15 | 0.8 | 25 |  | | | | | |
| | 74 | | | | 11 | 1.0 | 30 |  | | | | | |
| | 63 | 64 | | | 28 | 1.5 | 35 |  | | grades with weathered basaltic gravel grades to stiff to very stiff | | | |
| | 68 | | | | 32 | 1.0 | 40 |  | | Boring terminated at 41.5 feet | | | |
| | | | | | | | 45 | | | | | | |
| | | | | | | | 50 | | | | | | |
| Date Started: February 16, 2005 | | | | | | | Water Level: ∇ 17.5 ft. 2/16/05 1645 HRS | | | | | | |
| Date Completed: February 16, 2005 | | | | | | | | | | | | | |
| Logged By: S. Latronic | | | | | | | Drill Rig: CME-55 | | | | | | |
| Total Depth: 41.5 feet | | | | | | | Drilling Method: 4" Auger | | | | | | |
| Work Order: 3869-20 | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | | | |

BORING LOG DOT 3869-20 (P) GEOLABS, INC. 7/07

|  | | GEOLABS, INC. Geotechnical Engineering | | | | | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | Log of Boring 139 | |
|-------------------------------------------------------------------------------------|--|-------------------------------------------|-----------------------|-------------------|---------|-------------------------------------|-------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------|--|
| Other Tests | | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 173 * | | |
| | | | | | | | | | | | Description | | |
| | | 34 | | | | 9 | | |  | MH | Brown CLAYEY SILT with gravel, medium stiff, moist (fill) | | |
| | | | | | | 13 | 2.5 | 5 |  | MH | Reddish brown CLAYEY SILT, stiff, moist (residual soil) | | |
| | | 43 | | | | 14 | 2.0 | 10 |  | | | | |
| | | 43 | 76 | | | 38 | >4.5 | 15 |  | | grades to very stiff | | |
| | | 45 | | | | 11 | 2.0 | 20 |  | | grades to stiff | | |
| | | 44 | 75 | | | 10 | | 25 |  | MH | Brown with multi-color mottling CLAYEY SILT with weathered basaltic gravel, medium stiff, very moist (saprolite) | | |
| | | 59 | | | | 12 | 1.0 | 30 |  | | grades with decomposed basaltic gravel at 23.5 feet | | |
| | | | | 100 | | | | 35 |  | | | | |
| | | | | 100 | | | | 40 |  | | | | |
| | | 60 | | | | 13 | 1.0 | 45 |  | | | | |
| | | | | 60 | | | | 50 |  | | | | |
| | | 64 | | | | 17 | 1.0 | 55 |  | | | | |
| | | | | 100 | | | | 60 |  | MH | Brown with gray mottling CLAYEY SILT, very stiff (saprolite) | | |
| | | 49 | | | | 46 | 2.5 | 65 |  | | | | |
| | | | | 50 | | | | 70 |  | | | | |
| | | 50 | | | | 34 | | 75 |  | | Brown/gray BASALT, severely fractured, extremely weathered, soft (basalt formation) | | |
| | | | | 100 | 0 | | | |  | | | | |
| Date Started: February 17, 2005 | | | | | | | | | | Water Level: ∇ 23.5 ft. 2/17/05 1050 HRS | | | |
| Date Completed: February 17, 2005 | | | | | | | | | | 24.1 ft. 2/17/05 1525 HRS | | | |
| Logged By: S. Latronic | | | | | | | | | | Drill Rig: CME-55 | | | |
| Total Depth: 85 feet | | | | | | | | | | Drilling Method: 4" Auger & HQ Coring | | | |
| Work Order: 3869-20 | | | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | |

BORING LOG DOT 3869-20 (P) GEOLABS, INC. 7/07



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SIGNATURE: *[Signature]* EXPIRATION DATE OF THE LICENSE: 4-30-10
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 18


KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS Date: February 2009





















SHEET No. **G-3.18** OF **G-3.26** SHEETS

| | | |
|------------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| | DRAWN BY | |
| | DESIGNED BY | |
| | CHECKED BY | |
| NOTE BOOK | QUANTITIES BY | |
| | CHECKED BY | |
| No. | | |

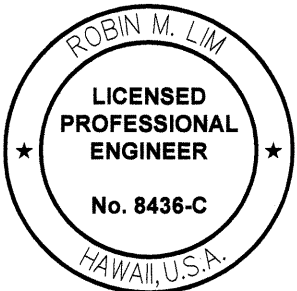
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | NH-050-1(31) | 2009 | 329 | 452 |

|  GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | | | Log of Boring 139 | |
|------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------|-------------------|---------|-------------------------------------|-------------------|-----------------------------------------------------------------------|----------------|----------------------|------------------------------------------------|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | (Continued from previous plate) Description |
| | | | 50 | 0 | | | | | | |
| | | | 50 | 0 | | | 80 | | | grades to soft to medium hard |
| | | | | | | | 85 | | | Boring terminated at 85 feet |
| | | | | | | | 90 | | | |
| | | | | | | | 95 | | | |
| | | | | | | | 100 | | | |
| Date Started: February 17, 2005 | | | | | | | Water Level: ∇ 23.5 ft. 2/17/05 1050 HRS 24.1 ft. 2/17/05 1525 HRS | | | |
| Date Completed: February 17, 2005 | | | | | | | | | | |
| Logged By: S. Latronic | | | | | | | Drill Rig: CME-55 | | | |
| Total Depth: 85 feet | | | | | | | Drilling Method: 4" Auger & HQ Coring | | | |
| Work Order: 3869-20 | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | |

BORING LOG 3869-20.GPJ GEOLABS.GDT 7/26/07

|  GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | | | Log of Boring 140 | | |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------|-------------------|---------|-------------------------------------|-------------------|--------------------------------------------------|---------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------|--|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 147 * | |
| | | | | | | | | | | Description | |
| | 27 | | | | 15 | 2.0 | |  | MH | Brown CLAYEY SILT with gravel, stiff, moist (fill) | |
| | 37 | | | | 8 | 1.0 | 5 |  | | grades to medium stiff | |
| | 61 | 63 | | | 3 | 0.0 | 10 |  | | grades to soft | |
| | 54 | | | | 2 | | |  | CH-OH | Dark brown to gray ORGANIC CLAY with gravel, very soft (alluvium) | |
| | | | | | | | 15 |  | | grades with less gravel | |
| | 102 | 45 | | | 4 | | |  | SM | Brownish gray SILTY SAND, loose (alluvium) | |
| | 56 | | | | 12 | 1.5 | |  | MH | Grayish brown CLAYEY SILT with sand, stiff to very stiff (saprolite) | |
| | 52 | 75 | | | 29 | 2.0 | |  | | grades with weathered gravel | |
| | 50 | | | | 18 | 2.3 | |  | | | |
| | 41 | 79 | | | 28 | | |  | | | |
| | 55 | | | | 28 | | |  | | | |
| | 46 | | | | | | |  | | Gray vugular BASALT, moderately fractured, slightly weathered, hard to very hard (basalt formation) | |
| | | 100 | 58 | | 50/.5' Ref. | | |  | | Brownish gray vesicular BASALT, closely fractured, highly weathered, soft to medium hard (basalt formation) | |
| | | 40 | 17 | | | | |  | | grades to moderately fractured, moderately weathered, medium hard to hard | |
| | | 95 | 48 | | 20/.0' Ref. | | |  | | Gray dense BASALT, slightly fractured, slightly weathered, hard to very hard (basalt formation) | |
| | | 90 | 48 | | | | |  | | | |
| | | 100 | 88 | | | | |  | | | |
| | | 83 | 70 | | | | |  | | | |
| | | | | | | | 75 |  | | | |
| Date Started: September 21, 2004 | | | | | | | Water Level: ∇ 9 ft. 9/21/04 1010 HRS | | | | |
| Date Completed: September 22, 2004 | | | | | | | 8.1 ft. 9/22/04 1415 HRS | | | | |
| Logged By: S. Latronic | | | | | | | Drill Rig: CME-55 | | | | |
| Total Depth: 100.5 feet | | | | | | | Drilling Method: 4" Auger, 3" Casing & HQ Coring | | | | |
| Work Order: 3869-20 | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | |

BORING LOG 3869-20.GPJ GEOLABS.GDT 7/26/07



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

[Signature]
SIGNATURE EXPIRATION DATE OF THE LICENSE
GEOLABS, INC. 4-30-10

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION


BORING LOGS - 19












KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS Date: February 2009

SHEET No. **G-3.19** OF **G-3.26** SHEETS

| | | |
|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| NOTE BOOK | DRAWN BY | |
| | DESIGNED BY | |
| | QUANTITIES BY | |
| | CHECKED BY | |
| No. | | |

|  GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | | Log of Boring 140 | | |
|------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------|-------------------|---------|-------------------------------------|-------------------|--------------------------------------------------|----------------------|------|------------------------------------------------------------------------------------------------------------|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | (Continued from previous plate) Description |
| | | | 85 | 0 | | | 3.5 | | | Reddish brown and gray BASALT, severely fractured, highly weathered, soft (basalt formation) |
| | | | 52 | 0 | | | 80 | | | |
| | | | 87 | 7 | | | 85 | | | grades to medium hard |
| | | | 100 | 45 | | | 90 | | | Brownish gray vesicular BASALT, moderately fractured, moderately weathered, medium hard (basalt formation) |
| | | | 100 | 100 | | | 95 | | | Gray dense BASALT, massive, slightly weathered, very hard (basalt formation) |
| | | | | | | | 100 | | | Boring terminated at 100.5 feet |
| | | | | | | | 105 | | | |
| | | | | | | | 110 | | | |
| | | | | | | | 115 | | | |
| | | | | | | | 120 | | | |
| Date Started: September 21, 2004 | | | | | | | Water Level: ∇ 9 ft. 9/21/04 1010 HRS | | | |
| Date Completed: September 22, 2004 | | | | | | | 8.1 ft. 9/22/04 1415 HRS | | | |
| Logged By: S. Latronic | | | | | | | Drill Rig: CME-55 | | | |
| Total Depth: 100.5 feet | | | | | | | Drilling Method: 4" Auger, 3" Casing & HQ Coring | | | |
| Work Order: 3869-20 | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | |

|  GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | | Log of Boring 141 | | |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------|-------------------|---------|-------------------------------------|-------------------|--------------|---------------------------------------------------------------------------------------|-------|--------------------------------------------------------------------------------------------------|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 147 * |
| | | | | | | | | | | Description |
| LL=55 PI=17 | 31 | 93 | | | 45 | 3.5 | |  | MH | Brown CLAYEY SILT with gravel, very stiff, moist (fill) |
| | 30 | | | | 9 | | 5 |  | | grades with sand, medium stiff |
| | 34 | | | | 4 | | 10 |  | | grades to soft |
| | 64 | 65 | | | 4 | 0.1 | 15 |  | MH-OH | Dark brown to gray CLAYEY ORGANIC SILT, very soft (alluvium) |
| | 81 | | | | 2 | 0.3 | 20 |  | | |
| LL=67 PI=31 | | | | | | | | | | grades with some gravel |
| | 57 | 66 | | | 13 | 1.0 | 25 |  | MH | Reddish brown CLAYEY SILT with sand and gravel, medium stiff to stiff (saprolite) |
| | 64 | | | | 8 | 1.0 | 30 |  | | |
| | | | | | | | | | | grades with weathered gravel |
| | 47 | 75 | | | 35 | 4.0 | 35 |  | | grades to stiff to very stiff |
| | 46 | | | | 17 | 1.5 | 40 |  | | |
| | 38 | | 53 | 0 | 50/3' Ref. | | 45 |  | | Grayish brown BASALT, severely fractured, highly to extremely weathered, soft (basalt formation) |
| | | | | | | | | | | grades to medium hard |
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| ORIGINAL PLAN | SURVEY PLOTTED BY _____ | | DATE _____ |
| | DRAWN BY _____ | | _____ |
| | CHECKED BY _____ | | _____ |
| | NOTED BY _____ | | _____ |



THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION AND
CONSTRUCTION OF THIS PROJECT
WILL BE UNDER MY OBSERVATION.

Michael S. Lim
SIGNATURE EXPIRATION DATE OF THE LICENSE
GEOLABS, INC. 4-30-10

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 20

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

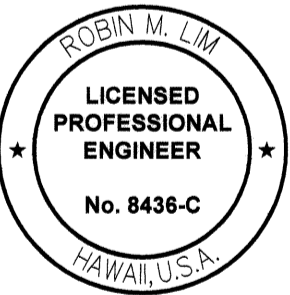
Scale: NTS Date: February 2009

SHEET No. **G-3.20** OF **G-3.26** SHEETS

| GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | Log of Boring 141 | |
|-------------------------------------------|----------------------|-------------------------------------------------------|-------------------|--------------------------------------------------|-------------------------------------|----------------------|--------------|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) |
| | | | 50 | 0 | | | |
| | | | 85 | 7 | | | 80 |
| | | | 92 | 58 | | | 85 |
| | | | 100 | 97 | | | 90 |
| | | | 100 | 100 | | | 95 |
| | | | | | | | 100 |
| | | | | | | | 105 |
| | | | | | | | 110 |
| | | | | | | | 115 |
| | | | | | | | 120 |
| Date Started: September 22, 2004 | | | | Water Level: 8.7 ft. 9/22/04 1425 HRS | | | |
| Date Completed: September 23, 2004 | | | | 7.5 ft. 9/23/04 1310 HRS | | | |
| Logged By: S. Latronic | | | | Drill Rig: CME-55 | | | |
| Total Depth: 101 feet | | | | Drilling Method: 4" Auger, 3" Casing & HQ Coring | | | |
| Work Order: 3869-20 | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | |

| GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | Log of Boring 142 | |
|-------------------------------------------|----------------------|-------------------------------------------------------|-------------------|-----------------------------------------------------------|-------------------------------------|----------------------|--------------|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) |
| | 17 | | | | 27 | 2.5 | |
| | 62 | 62 | | | 6 | 0.5 | 5 |
| | 59 | | | | 2 | | 10 |
| | 61 | 62 | | | 9 | 2.0 | 15 |
| | 69 | | | | 5 | 0.8 | 20 |
| | 65 | | | | 9 | 1.3 | 25 |
| | 56 | | | | 10 | 1.3 | 30 |
| | 59 | | | | 18 | 1.5 | 35 |
| | 66 | | | | 6 | | 40 |
| | | | | | | | 45 |
| | 52 | 19 | 0 | | 12 | 1.0 | 50 |
| | 41 | 100 | 53 | | 50/4' Ref. | | 55 |
| | | 100 | 75 | | | | 60 |
| | | 100 | 60 | | | | 65 |
| | 60 | 20 | | | | | 70 |
| | | | | | | | 75 |
| Date Started: November 3, 2004 | | | | Water Level: 5.2 ft. 11/3/04 1330 HRS | | | |
| Date Completed: November 4, 2004 | | | | 5.5 ft. 11/4/04 1335 HRS | | | |
| Logged By: S. Latronic | | | | Drill Rig: CME-55 | | | |
| Total Depth: 100.5 feet | | | | Drilling Method: 4" Auger & Casing, 3" Casing & HQ Coring | | | |
| Work Order: 3869-20 | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | |

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|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| NOTE BOOK | DRAWN BY | |
| | TRACED BY | |
| | QUANTITIES BY | |
| | CHECKED BY | |
| No. | | |



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

SIGNATURE: [Signature] EXPIRATION DATE OF THE LICENSE: 4-30-10
GEOLABS, INC.


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 20

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)


















Scale: NTS Date: February 2009

SHEET No. G-3.21 OF G-3.26 SHEETS

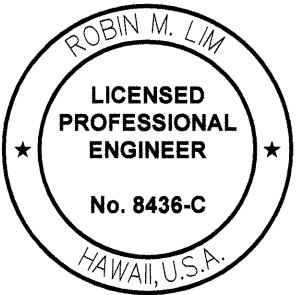
|  GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | | Log of Boring 142 | | |
|-----------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------|-------------------|---------|-------------------------------------|-------------------|---------------------------------------------------------------------|----------------------|------|----------------------------------------------------------------------------------------------------|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | (Continued from previous plate) Description |
| | | | 50 | 0 | | | | | | Grayish brown BASALT, severely fractured, highly to extremely weathered, soft (basalt formation) |
| | | | 75 | 13 | | | 80 | | | grades to medium hard |
| | | | 100 | 87 | | | 85 | | | Grayish dense BASALT, slightly fractured, slightly weathered, hard to very hard (basalt formation) |
| | | | 100 | 100 | | | 90 | | | grades to vugular, massive |
| | | | 100 | 87 | | | 95 | | | grades to vesicular |
| | | | | | | | 100 | | | Boring terminated at 100.5 feet |
| | | | | | | | 105 | | | |
| | | | | | | | 110 | | | |
| | | | | | | | 115 | | | |
| | | | | | | | 120 | | | |
| Date Started: November 3, 2004 | | | | | | | Water Level: ∇ 5.2 ft. 11/3/04 1330 HRS 5.5 ft. 11/4/04 1335 HRS | | | |
| Date Completed: November 4, 2004 | | | | | | | | | | |
| Logged By: S. Latronic | | | | | | | Drill Rig: CME-55 | | | |
| Total Depth: 100.5 feet | | | | | | | Drilling Method: 4" Auger & Casing, 3" Casing & HQ Coring | | | |
| Work Order: 3869-20 | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | |

BORING LOG 3869-20.GPJ - GEOLABS GDT 7/2007

| | | |
|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| NOTE BOOK | DRAWN BY | |
| | DESIGNED BY | |
| | QUANTITIES BY | |
| | CHECKED BY | |
| No. | | |

|  | | GEOLABS, INC. | | | | | KAUMUALII HIGHWAY WIDENING | | | | | Log of Boring |
|-------------------------------------------------------------------------------------|----------------------|--------------------------|-------------------|---------|-------------------------------------|-------------------|--------------------------------------------------|---------------------------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------|--|---------------|
| | | Geotechnical Engineering | | | | | ISLAND OF KAUAI, HAWAII | | | | | 143 |
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 145 * | | |
| | | | | | | | | | | Description | | |
| TV=0.05 | 44 | 79 | | | 10/5' +20/3' Ref. | 1.0 | |  | MH | Reddish brown with multi-color mottling CLAYEY SILT with sand and gravel, stiff, moist (fill) | | |
| | 43 | | | | 4 | <0.5 | 5 |  | MH | Reddish brown with multi-color mottling CLAYEY SILT, soft, moist (fill) | | |
| | 57 | 69 | | | 6 | | 10 |  | CH-OH | Grayish brown SILTY ORGANIC CLAY with sand, very soft, very moist (alluvium) | | |
| | 129 | | | | 2 | | 15 |  | ML | Greenish gray with multi-color mottling SANDY SILT with clay and weathered gravel, soft (saprolite) | | |
| | 67 | 57 | | | 4 | | 20 |  | MH | Tan with multi-color mottling CLAYEY SILT with sand, stiff (saprolite) | | |
| | 53 | | | | 5 | | 25 |  | | grades to reddish brown | | |
| | 49 | | 34 | 0 | 18/5' +20/1' Ref. | | 30 |  | | grades to brown, very stiff | | |
| | 55 | | 36 | 0 | 15 | | 35 |  | | Gray vesicular BASALT, moderately fractured, highly weathered, medium hard (basalt formation) | | |
| | 56 | | 7 | 0 | 10 | | 40 |  | | grades to slightly fractured, moderately weathered, very hard | | |
| | 45 | | | | 33 | | 45 |  | | Brownish tan with multi-color mottling BASALT, severely fractured, highly to extremely weathered, soft (basalt formation) | | |
| | | | 62 | 0 | | | 50 |  | | grades to orangish brown | | |
| | | | 53 | 0 | | | 55 |  | | grades to orangish brown | | |
| | | | 87 | 42 | | | 60 |  | | grades to orangish brown | | |
| | | | 100 | 90 | | | 65 |  | | grades to orangish brown | | |
| | | | 60 | 27 | | | 70 |  | | grades to orangish brown | | |
| | | | 50 | 0 | | | 75 |  | | grades to orangish brown | | |
| Date Started: November 8, 2004 | | | | | | | Water Level: 13.8 ft. 11/8/04 1012 HRS | | | | | |
| Date Completed: November 8, 2004 | | | | | | | 14.6 ft. 11/9/04 0834 HRS | | | | | |
| Logged By: Y. Chiba | | | | | | | Drill Rig: CME-55 | | | | | |
| Total Depth: 100.5 feet | | | | | | | Drilling Method: 4" Auger, 4" Casing & HQ Coring | | | | | |
| Work Order: 3869-20 | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | | |


BORING LOG 3869-20.GPJ - GEOLABS GDT 7/2007




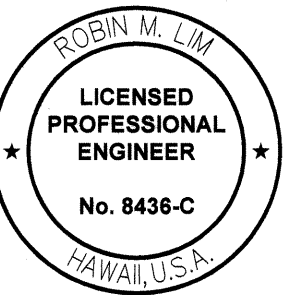
THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION AND
CONSTRUCTION OF THIS PROJECT
WILL BE UNDER MY OBSERVATION.

[Signature] 4-30-10
SIGNATURE EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | NH-050-1(31) | 2009 | 333 | 452 |

|  GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | Log of Boring 143 | |
|------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------|--------------------------------------------------|---------|-------------------------------------|-------------------|----------------------|-----------------------------------------------------------------------------------------------------------------|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | (Continued from previous plate) Description |
| | | | 100 | 0 | | | 78 | grades to reddish brown |
| | | | 97 | 13 | | | 80 | grades to closely fractured, medium hard |
| | | | 65 | 50 | | | 85 | Dark gray with multi-color mottling BASALT, moderately fractured, moderately weathered, hard (basalt formation) |
| | | | 100 | 100 | | | 90 | grades to slightly fractured |
| | | | 100 | 93 | | | 95 | |
| | | | | | | | 100 | grades to slightly weathered, very hard |
| | | | | | | | 100.5 | Boring terminated at 100.5 feet |
| | | | | | | | 105 | |
| | | | | | | | 110 | |
| | | | | | | | 115 | |
| | | | | | | | 120 | |
| Date Started: November 8, 2004 | | | Water Level: ∇ 13.8 ft. 11/8/04 1012 HRS | | | | | |
| Date Completed: November 8, 2004 | | | 14.6 ft. 11/9/04 0834 HRS | | | | | |
| Logged By: Y. Chiba | | | Drill Rig: CME-55 | | | | | |
| Total Depth: 100.5 feet | | | Drilling Method: 4" Auger, 4" Casing & HQ Coring | | | | | |
| Work Order: 3869-20 | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | | |

|  GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | Log of Boring 144 | |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------|--------------------------------------------------|---------|-------------------------------------|-------------------|----------------------|---------------------------------------------------------------------------------------------------------------------|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Approximate Ground Surface Elevation (feet MSL): 145 * Description |
| | 31 | | | | 24 | 2.5 | 5 | MH Brown CLAYEY SILT with gravel, very stiff, moist (fill) |
| | 31 | 89 | | | 25 | 2.0 | 5 | grades with sand |
| | 72 | | | | 3 | 0.1 | 10 | grades to soft, very moist |
| LL=189 PI=96 | | | | | 6 | 0.1 | 15 | Dark brown to gray SILTY ORGANIC CLAY, soft, very moist (alluvium) |
| | 69 | | | | 3 | 0.3 | 20 | |
| | 64 | 62 | | | 6 | | 25 | MH Brown CLAYEY SILT with gravel, soft to medium stiff (alluvium) |
| | 47 | | | | 50/5' Ref. | | 30 | grades with boulder and cobbles |
| | | 50 | 0 | | | | 30 | MH Grayish brown CLAYEY SILT with sand and gravel, very stiff to hard (saprolite) |
| | | 57 | 7 | | | | 35 | |
| | | 68 | 0 | | | | 40 | |
| | | 33 | 0 | | | | 45 | |
| | | | | | | | 50 | Gray vugular BASALT, moderately fractured, slightly to moderately weathered, medium hard to hard (basalt formation) |
| 40 | | 100 | 33 | | 92 | | 55 | grades to very hard |
| | 85 | 45 | | | | | 60 | |
| | 95 | 65 | | | | | 65 | grades to slightly fractured, slightly weathered |
| | 100 | 93 | | | | | 70 | Grayish brown BASALT, severely fractured, moderately to highly weathered, soft to medium hard (basalt formation) |
| | 65 | 13 | | | | | 75 | grades to extremely weathered, soft |
| | 70 | 7 | | | | | | |
| Date Started: September 29, 2004 | | | Water Level: ∇ 11.6 ft. 9/29/04 1035 HRS | | | | | |
| Date Completed: September 30, 2004 | | | | | | | | |
| Logged By: S. Latronic | | | Drill Rig: CME-55 | | | | | |
| Total Depth: 102 feet | | | Drilling Method: 4" Auger, 3" Casing & HQ Coring | | | | | |
| Work Order: 3869-20 | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | | |



THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION AND
CONSTRUCTION OF THIS PROJECT
WILL BE UNDER MY OBSERVATION.

Robin M. Lim
SIGNATURE EXPIRATION DATE OF THE LICENSE
GEOLABS, INC. 4-30-10

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 23

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)


















Scale: NTS Date: February 2009

SHEET No. G-3.23 OF G-3.26 SHEETS

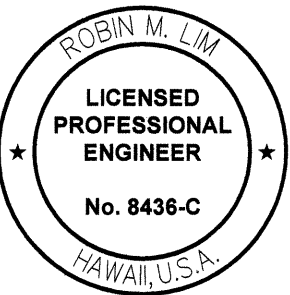
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | NH-050-1(31) | 2009 | 334 | 452 |

| GEOLABS, INC. Geotechnical Engineering | | | | | | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | Log of Boring 144 | |
|-------------------------------------------|----------------------|-----------------------|-------------------|---------|-------------------------------------|-------------------|-------------------------------------------------------|--------|---------|------|-------------------------------------------------------------------------------------------------------|--|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample | Graphic | USCS | (Continued from previous plate) Description | |
| | | | 80 | 15 | | | 80 | | | | grades to highly weathered, soft to medium hard | |
| | | | 100 | 42 | | | 85 | | | | Brownish gray BASALT, moderately fractured, slightly to moderately weathered, hard (basalt formation) | |
| | | | 100 | 73 | | | 90 | | | | grades to slightly fractured, very hard | |
| | | | 100 | 100 | | | 95 | | | | | |
| | | | 100 | 82 | | | 100 | | | | | |
| | | | | | | | 105 | | | | Boring terminated at 102 feet | |
| | | | | | | | 110 | | | | | |
| | | | | | | | 115 | | | | | |
| | | | | | | | 120 | | | | | |
| Date Started: September 29, 2004 | | | | | | | Water Level: ∇ 11.6 ft. 9/29/04 1035 HRS | | | | | |
| Date Completed: September 30, 2004 | | | | | | | | | | | | |
| Logged By: S. Latronic | | | | | | | Drill Rig: CME-55 | | | | | |
| Total Depth: 102 feet | | | | | | | Drilling Method: 4" Auger, 3" Casing & HQ Coring | | | | | |
| Work Order: 3869-20 | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | | |

BORING LOG DOT 3869-20 G-1 GEOLABS G-17 7/9/07

|  | | GEOLABS, INC. | | | | | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | Log of Boring | |
|-------------------------------------------------------------------------------------|----------------------|--------------------------|-------------------|---------|-------------------------------------|-------------------|--------------|---------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------|--|--|---------------|--|
| | | Geotechnical Engineering | | | | | | | | | | | 145 | |
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 161 * | | | | |
| | | | | | | | | | | Description | | | | |
| | 23 | | | | 48 | 2.0 | |  | MH | Brown CLAYEY SILT with gravel, very stiff, moist (fill) | | | | |
| | 41 | 75 | | | 11 | 1.5 | 5 |  | | grades to stiff, very moist | | | | |
| | 39 | | | | 11 | | 10 |  | | | | | | |
| | 50 | 62 | | | 22 | 1.0 | 15 |  | MH | Brown with gray mottling CLAYEY SILT, stiff, moist (residual soil) | | | | |
| | 57 | | | | 10 | 0.8 | 20 |  | | grades to medium stiff, very moist | | | | |
| | 64 | 60 | | | 15 | 1.0 | 25 |  | | grades more saprolitic | | | | |
| | 62 | | | | 16 | 0.8 | 30 |  | MH | Brown CLAYEY SILT with sand and weathered basaltic gravel, medium stiff (saprolite) | | | | |
| | 50 | 74 | | | 31 | 0.5 | 35 |  | MH | Brown CLAYEY SILT, stiff (saprolite) | | | | |
| | 49 | | | | 23 | 2.5 | 40 |  | | | | | | |
| | 47 | | | | 92 | 3.0 | 45 |  | | grades to very stiff | | | | |
| | 55 | | | | 30 | 2.0 | 50 |  | | | | | | |
| | | | | | | | 55 |  | | | | | | |
| | | | | | | | 60 |  | | Brownish gray vesicular BASALT, closely fractured, slightly to moderately weathered, medium hard to hard (basalt formation) | | | | |
| | | | | | | | 65 |  | | | | | | |
| | | | | | | | 70 |  | | Grayish brown BASALT, severely fractured, extremely weathered, soft (basalt formation) | | | | |
| | | | | | | | 75 |  | | | | | | |
| Date Started: February 10, 2005 | | | | | | | | | | Water Level: ∇ 26.5 ft. 2/10/05 1045 HRS | | | | |
| Date Completed: February 10, 2005 | | | | | | | | | | 25.5 ft. 2/11/05 1200 HRS | | | | |
| Logged By: S. Latronic | | | | | | | | | | Drill Rig: CME-55 | | | | |
| Total Depth: 80 feet | | | | | | | | | | Drilling Method: 4" Auger, 3" Casing & HQ Coring | | | | |
| Work Order: 3869-20 | | | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | |

BORING LOG DOT 3869-20 G-2 GEOLABS G-17 7/9/07



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

[Signature] 4-30-10
SIGNATURE EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION



BORING LOGS - 24

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)













Scale: NTS Date: February 2009

SHEET No. G-3.24 OF G-3.26 SHEETS

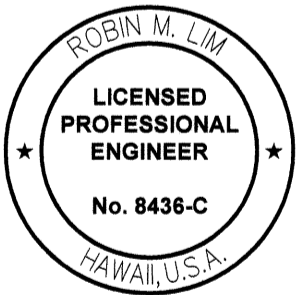
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|--------------------------------------------|-------------------------|--|------------|
| ORIGINAL PLAN NOTE BOOK No. _____ | SURVEY PLOTTED BY _____ | | DATE _____ |
| | DRAWN BY _____ | | DATE _____ |
| | CHECKED BY _____ | | DATE _____ |
| | QUANTITIES BY _____ | | DATE _____ |

|  GEOLABS, INC. Geotechnical Engineering | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | | | Log of Boring 145 | | |
|------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------|-------------------|---------|-------------------------------------|-------------------|--------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------------------|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | (Continued from previous plate) Description |
| | | | 100 | 45 | | | 80 |  | | Gray dense BASALT, moderately fractured, slightly weathered, hard to very hard (basalt formation) |
| | | | | | | | 85 | | | Boring terminated at 80 feet |
| | | | | | | | 90 | | | |
| | | | | | | | 95 | | | |
| | | | | | | | 100 | | | |
| Date Started: February 10, 2005 | | | | | | | Water Level: ∇ 26.5 ft. 2/10/05 1045 HRS | | | |
| Date Completed: February 10, 2005 | | | | | | | 25.5 ft. 2/11/05 1200 HRS | | | |
| Logged By: S. Latronic | | | | | | | Drill Rig: CME-55 | | | |
| Total Depth: 80 feet | | | | | | | Drilling Method: 4" Auger, 3" Casing & HQ Coring | | | |
| Work Order: 3869-20 | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | |

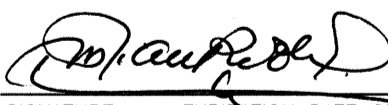
BORING LOG DOT 3869-20 (P. 1) GEOLABS GDT 7/9/07

|  | | GEOLABS, INC. | | | | | KAUMUALII HIGHWAY WIDENING | | | | | Log of Boring |
|-------------------------------------------------------------------------------------|----------------------|--------------------------|-------------------|---------|-------------------------------------|-------------------|------------------------------------------|---------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------|--|---------------|
| | | Geotechnical Engineering | | | | | ISLAND OF KAUAI, HAWAII | | | | | 146 |
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 155 * | | |
| | | | | | | | | | | Description | | |
| LL=60 PI=29 | 15 | 104 | | | 24 | 1.5 | 5 |  | MH | Brown CLAYEY SILT with gravel, stiff to very stiff, moist (fill) | | |
| | 18 | | | | 38 | 4.0 | | | | | | |
| | 42 | 78 | | | 18 | 2.5 | 5 |  | | | | |
| | 49 | | | | 2 | 0.3 | 10 |  | MH/ OH | Dark gray CLAYEY ORGANIC SILT, soft, very moist (alluvium) | | |
| | 47 | 77 | | | 12 | 0.0 | 15 |  | | | | |
| | 45 | | | | 19 | 3.0 | 20 |  | MH | Brown CLAYEY SILT, stiff (residual soil) | | |
| | 63 | 66 | | | 18 | 2.0 | 25 |  | | grades with weathered basaltic gravel | | |
| | 58 | | | | 13 | 1.0 | 30 |  | | | | |
| | 56 | 60 | | | 26 | | 35 |  | | | | |
| | 56 | | | | 19 | 2.5 | 40 |  | | grades with gray mottling, very stiff | | |
| | 50 | 76 | | | 39 | 2.5 | 45 |  | | | | |
| | 55 | | | | 25 | 2.0 | 50 |  | | | | |
| | | | | | | 51.5 | | | | Boring terminated at 51.5 feet | | |
| | | | | | | 55 | | | | | | |
| | | | | | | 60 | | | | | | |
| | | | | | | 65 | | | | | | |
| | | | | | | 70 | | | | | | |
| | | | | | | 75 | | | | | | |
| Date Started: February 18, 2005 | | | | | | | Water Level: ∇ 14 ft. 2/18/05 0920 HRS | | | | | |
| Date Completed: February 18, 2005 | | | | | | | | | | | | |
| Logged By: S. Latronic | | | | | | | Drill Rig: CME-55 | | | | | |
| Total Depth: 51.5 feet | | | | | | | Drilling Method: 4" Auger & 3" Casing | | | | | |
| Work Order: 3869-20 | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | | |











BORING LOG DOT 3869-20 (P. 2) GEOLABS GDT 7/9/07



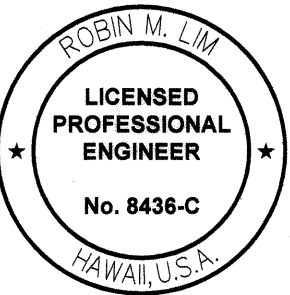
THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION AND
CONSTRUCTION OF THIS PROJECT
WILL BE UNDER MY OBSERVATION.

 4-30-10
SIGNATURE EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.


| | | |
|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| NOTE BOOK | DRAWN BY | |
| | TRACED BY | |
| | QUANTITIES BY | |
| | CHECKED BY | |

|  | | GEOLABS, INC. Geotechnical Engineering | | | | | KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII | | | | Log of Boring 147 | |
|-----------------------------------------------------------------------------------|----------------------|-------------------------------------------|-------------------|---------|-------------------------------------|-------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------|------|---------------------------------------------------------------|----------------------|--|
| Other Tests | Moisture Content (%) | Dry Unit Weight (pcf) | Core Recovery (%) | RQD (%) | Penetration Resistance (blows/foot) | Pocket Pen. (tsf) | Depth (feet) | Sample Graphic | USCS | Approximate Ground Surface Elevation (feet MSL): 195 * | | |
| | | | | | | | | | | Description | | |
| LL=73 PI=32 | 29 | 72 | | | 25 | 2.5 | 2 |  | MH | Brown CLAYEY SILT with rootlets, very stiff, moist (fill) | | |
| | 35 | | | | 33 | >4.5 | 5 |  | MH | Brown CLAYEY SILT, very stiff to hard, moist (residual soil) | | |
| | 32 | 83 | | | 82 | >4.5 | 10 |  | | grades with gray mottling perched groundwater ? | | |
| | 57 | | | | 32 | 2.0 | 15 |  | MH | Reddish brown CLAYEY SILT, very stiff to hard (residual soil) | | |
| | 38 | 79 | | | 50/3' Ref. | >4.5 | 20 |  | | | | |
| | 42 | | | | 62 | 2.5 | 25 |  | | | | |
| | 67 | | | | 11 | 1.0 | 30 |  | MH | Grayish brown CLAYEY SILT, stiff (residual soil) | | |
| | 51 | 69 | | | 26 | 2.0 | 35 |  | | grades to very stiff | | |
| | 53 | | | | 13 | 1.0 | 40 |  | | grades to stiff | | |
| | | | | | | | 40.5 | | | Boring terminated at 40.5 feet | | |
| | | | | | | 45 | | | | | | |
| | | | | | | 50 | | | | | | |
| | | | | | | 55 | | | | | | |
| | | | | | | 60 | | | | | | |
| | | | | | | 65 | | | | | | |
| | | | | | | 70 | | | | | | |
| | | | | | | 75 | | | | | | |
| Date Started: September 1, 2004 | | | | | | | | Water Level: ∇ 10.4 ft. 9/2/04 1120 HRS | | | | |
| Date Completed: September 2, 2004 | | | | | | | | Dry ft. 9/10/04 1110 HRS | | | | |
| Logged By: S. Latronic | | | | | | | | Drill Rig: CONCORE | | | | |
| Total Depth: 40.5 feet | | | | | | | | Drilling Method: 3" Casing, 3" Drag Bit | | | | |
| Work Order: 3869-20 | | | | | | | | Driving Energy: 140 lb. wt., 30 in. drop | | | | |

| | | | | |
|-----------------------------------|-------------------------|--|------------|--|
| ORIGINAL PLAN NOTE BOOK No. | SURVEY PLOTTED BY _____ | | DATE _____ | |
| | DRAWN BY _____ | | DATE _____ | |
| | CHECKED BY _____ | | DATE _____ | |
| | QUANTITIES BY _____ | | DATE _____ | |



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CONSTRUCTION OF THIS PROJECT
WILL BE UNDER MY OBSERVATION.


SIGNATURE EXPIRATION DATE OF THE LICENSE 4-30-10
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

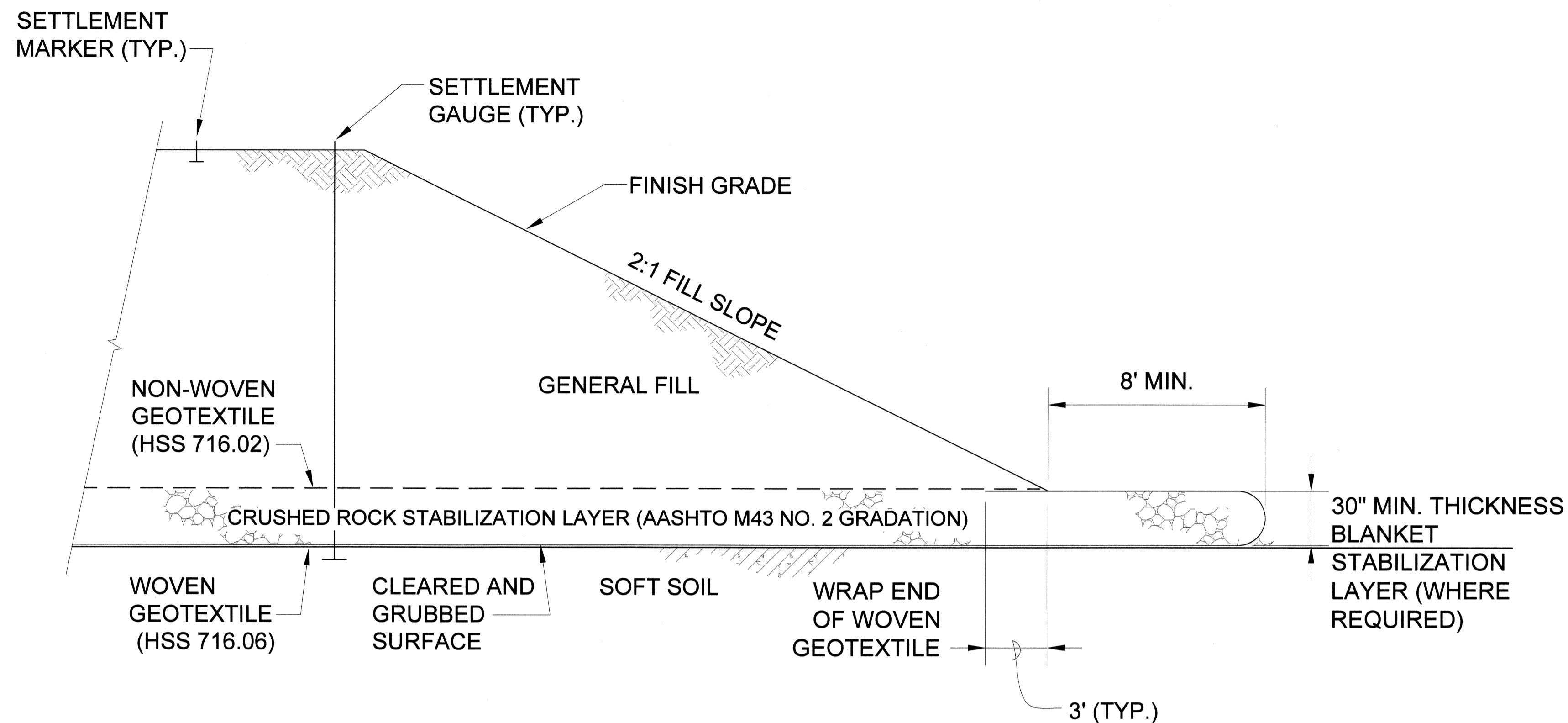
BORING LOGS - 26

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS Date: February 2009

SHEET No. G-3.26 OF G-3.26 SHEETS

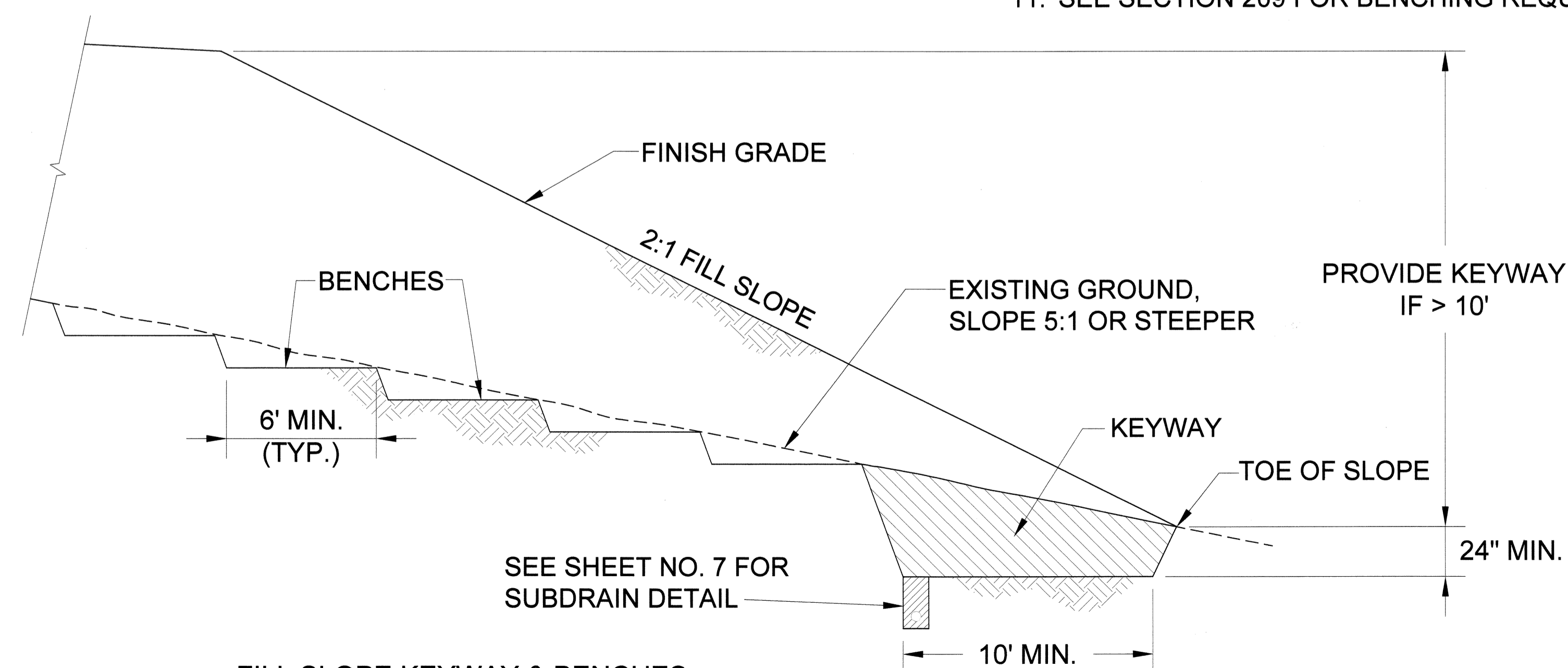
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|------------------------|-------|-----------------------|----------------|--------------|-----------------|
| HAWAII | HAW. | NH-050-1(31) | 2009 | 337 | 452 |



TYPICAL EMBANKMENT IN SETTLEMENT MONITORING AREAS
NOT TO SCALE

GENERAL EMBANKMENT NOTES IN SETTLEMENT MONITORING AREAS

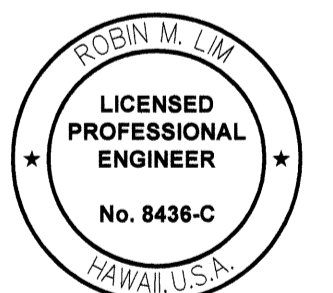
1. FOR INFORMATION REGARDING SOIL CONDITIONS IN GENERAL AREAS OF WORK, SEE BORING LOGS SHOWN ON SHEETS G-3.01 THRU G-3.17. THE LOCATIONS OF THE BORING LOGS ARE SHOWN ON SHEETS G-1.01 THRU G-1.05. ALSO SEE GEOTECHNICAL ENGINEERING REPORT ENTITLED "GEOTECHNICAL ENGINEERING EXPLORATION, KAUMUALII HIGHWAY WIDENING, PHASE IA, VICINITY OF ANONUI STREET TO LIHUE, ISLAND OF KAUAI, HAWAII" PREPARED BY GEOLABS, INC. DATED JULY 17, 2008. A COPY OF THE REPORT IS ON THE FILE AT THE OFFICE OF THE ENGINEER FOR REVIEW BY THE CONTRACTOR.
2. AREAS REQUIRING SETTLEMENT MONITORING ARE SHOWN ON SHEETS GP1 THRU GP11.
3. BLANKET STABILIZATION LAYER SHALL BE PROVIDED PRIOR TO FILLING IN AREAS WHERE PUMPING CONDITIONS OCCUR.
4. THE CONTRACTOR SHALL CONSTRUCT EMBANKMENT SUCH THAT FINISHED GRADE ELEVATIONS ARE AS SHOWN ON PLANS.
5. THE CONTRACTOR SHALL INSTALL DRAINAGE FACILITIES SUCH THAT FINISHED GRADE ELEVATIONS ARE AS SHOWN ON PLANS. FOR REMOVAL AND REPLACEMENT OF SOFT SOILS UNDER DRAINAGE FACILITIES, SEE SHEETS G-5.01 AND G-5.02.
6. FILL HEIGHTS ARE ELEVATION DIFFERENCES BETWEEN TOP OF FILLS AND TOE OF FILLS.
7. FOR FILL SLOPE KEYWAY AND BENCHING DETAIL, SEE DETAIL ON THIS SHEET.
8. FOR SETTLEMENT GAUGE/MARKER DETAILS, SEE SHEET G-4.02. ALSO REFER SECTION 664.
9. FOR EROSION CONTROL REQUIREMENTS, SEE SHEETS 5 THRU 9.
10. FILL SLOPE FACE SHALL BE TRACK-ROLLED WITH A BULLDOZER PER BMP MANUAL.
11. SEE SECTION 209 FOR BENCHING REQUIREMENTS.



FILL SLOPE KEYWAY & BENCHES
NOT TO SCALE

NOTES:

1. PROVIDE BENCHES FOR ALL EMBANKMENTS TO BE CONSTRUCTED ON EXISTING GROUND SLOPES 5:1 OR STEEPER MEASURED PERPENDICULAR TO THE ROADWAY CENTERLINE.
2. PROVIDE KEYWAY WITH SUBDRAIN AT THE TOE OF ALL KEYED EMBANKMENTS WITH A VERTICAL HEIGHT GREATER THAN 10 FEET.



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OR UNDER MY SUPERVISION AND
CONSTRUCTION OF THIS PROJECT
WILL BE UNDER MY OBSERVATION.
SIGNATURE: [Signature] EXPIRATION DATE OF THE LICENSE: 4-30-10
GEOLABS, INC.

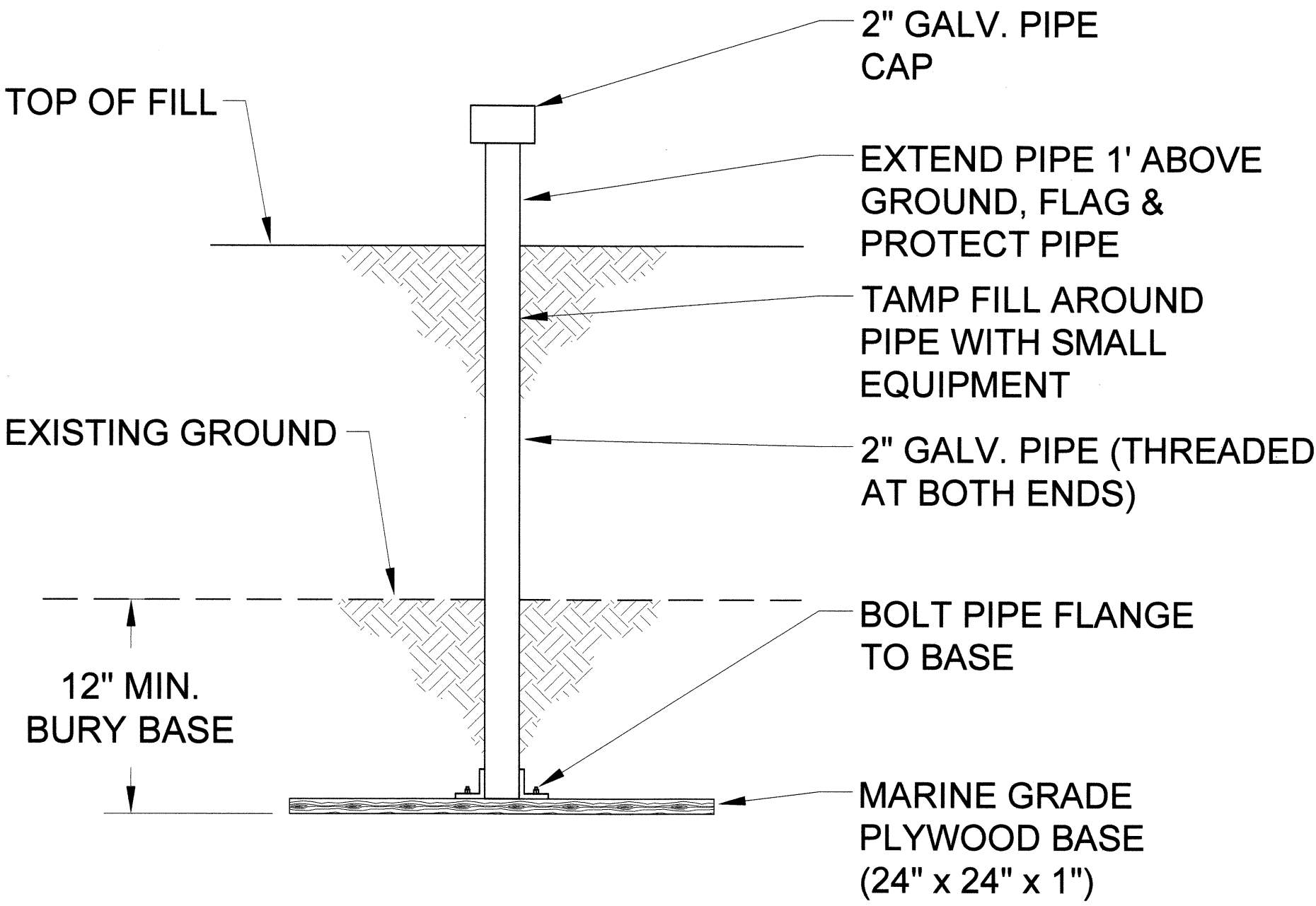
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EMBANKMENT IN SETTLEMENT MONITORING AREAS - 1

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS Date: February 2009

SHEET No. G-4.01 OF G-4.02 SHEETS



NOTE: SETTLEMENT GAUGES SHALL BE SET INTO EXISTING GROUND AS DETAILED. SETTLEMENT MARKERS SHALL BE SET INTO THE TOP OF FILL AT THE BEGINNING OF THE SETTLEMENT WAITING PERIOD.

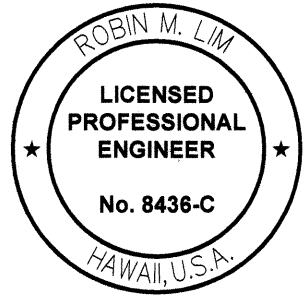
SETTLEMENT GAUGE / MARKER
NOT TO SCALE

SETTLEMENT MONITORING NOTES:

1. FOR GENERAL EMBANKMENT NOTES IN SETTLEMENT MONITORING AREAS, SEE SHEET G-4.01.
2. SETTLEMENT WAITING PERIOD SHALL BE OBSERVED IN AREAS DESIGNATED ON SHEETS GP1 THRU GP11 PRIOR TO FINAL GRADING AND CONSTRUCTION OF PAVEMENT STRUCTURES, DRAINAGE STRUCTURES AND OTHER APPURTENANCES. ACTUAL DURATION OF SETTLEMENT WAITING PERIODS SHALL BE BASED ON MEASURED SETTLEMENT RATES. SETTLEMENT WAITING PERIODS MAY BE ADJUSTED AS DETERMINED BY THE ENGINEER. FOR SETTLEMENT MONITORING AND WAITING PERIOD REQUIREMENTS, SEE GEOTECHNICAL ENGINEERING REPORT ENTITLED "GEOTECHNICAL ENGINEERING EXPLORATION, KAUMUALII HIGHWAY WIDENING, PHASE IA, VICINITY OF ANONU I STREET TO LIHUE, ISLAND OF KAUAI, HAWAII" PREPARED BY GEOLABS, INC. DATED JULY 17, 2008 AND SPECIAL PROVISIONS SECTION 664. A COPY OF THE REPORT IS ON THE FILE AT THE OFFICE OF THE ENGINEER FOR REVIEW BY THE CONTRACTOR.
3. SETTLEMENT WAITING PERIODS MAY BE REDUCED BY SURCHARGING FILL EMBANKMENT OR OTHER METHODS. CONTRACTOR SHALL SUBMIT CONSTRUCTION DETAILS, INCLUDING HEIGHT OF SURCHARGING, FOR REVIEW AND ACCEPTANCE BY THE ENGINEER PRIOR TO EMBANKMENT CONSTRUCTION.
4. SETTLEMENT GAUGE/MARKER SHALL BE PROTECTED BY ERECTING ORANGE PLASTIC FENCE WITH POSTS.

SETTLEMENT MONITORING AREAS

| AREA NO. | SHEET NO. | MAX. FILL HEIGHT (FEET) | ESTIMATED SETTLEMENT WAITING PERIOD (MONTHS) | NO. OF SETTLEMENT GAUGES | NO. OF SETTLEMENT MARKERS |
|----------|-----------|-------------------------|----------------------------------------------|--------------------------|---------------------------|
| 1 | GP2/GP3 | 10 | 4 - 6 | 1 | 2 |
| 2 | GP2/GP3 | 15 | 4 - 6 | 1 | 2 |
| 3 | GP3/GP4 | 6 | 1 - 2 | 2 | 0 |
| 4 | GP4 | 13 | 4 - 6 | 1 | 2 |
| 5 | GP5 | 12 | 4 - 6 | 1 | 2 |
| 6 | GP5/GP6 | 6 | 1 - 2 | 2 | 0 |
| 7 | GP6/GP7 | 3 | 1 - 2 | 3 | 0 |
| 8 | GP11 | 17 | 4 - 6 | 1 | 2 |



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SIGNATURE: *[Signature]* EXPIRATION DATE OF THE LICENSE: 4-30-10
GEOLABS, INC.

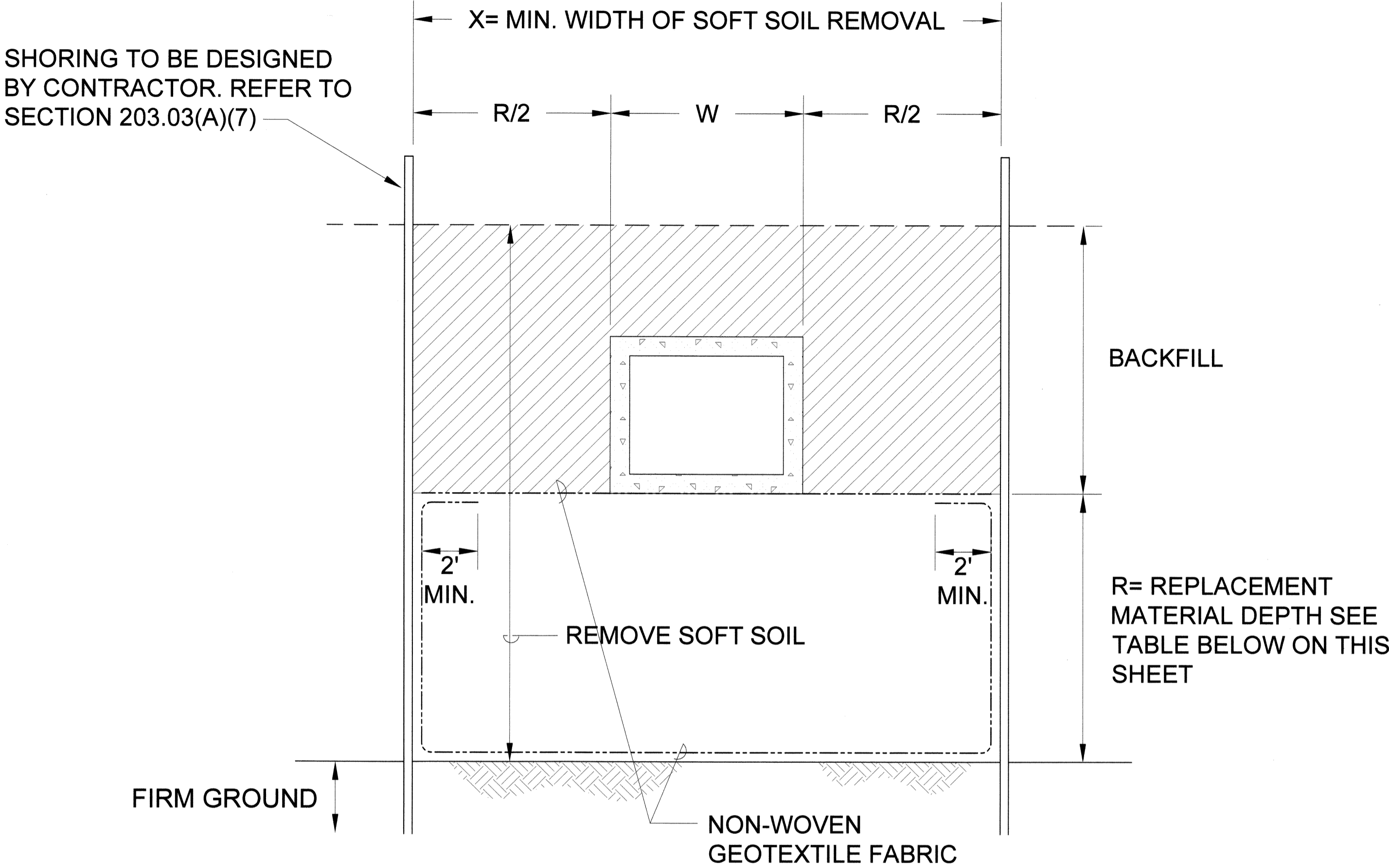
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**EMBANKMENT IN SETTLEMENT
MONITORING AREAS - 2**

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS Date: February 2009

SHEET No. G-4.02 OF G-4.02 SHEETS



REMOVE AND REPLACE SOFT SOIL UNDER BOX CULVERT DETAIL
NOT TO SCALE

BOX CULVERT CONSTRUCTION NOTES:

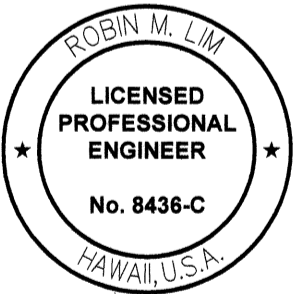
1. CONTRACTOR SHALL REMOVE AND REPLACE ALL SOFT SOILS UNDER BOX CULVERT AS SHOWN ON "REMOVE AND REPLACE SOFT SOILS UNDER BOX CULVERT DETAIL" ON THIS SHEET. A STABILIZATION LAYER CONSISTING OF CRUSHED ROCK (AASHTO M43 NO. 2 GRADATION) WRAPPED AROUND BY NON-WOVEN GEOTEXTILE FABRIC (HSS SECTION 716.02) SHALL BE PROVIDED AT BOTTOM OF EXCAVATION, IF NECESSARY, PRIOR TO BACKFILLING WITH SUITABLE REPLACEMENT MATERIAL.
2. FOR BIDDING PURPOSES, CONTRACTOR SHALL ASSUME REPLACEMENT MATERIAL DEPTH AS SHOWN ON THIS SHEET. ACTUAL DEPTH OF SOFT SOIL REMOVAL SHALL BE DETERMINED IN THE FIELD. WIDTH OF SOFT SOIL REMOVAL SHALL BE AS INDICATED ON THIS SHEET REGARDLESS OF ACTUAL DEPTH OF SOFT SOIL REMOVAL. LENGTH OF SOFT SOIL REMOVAL SHALL BE AS INDICATED ON SHEETS D1.11, D1.12, AND D1.13 REGARDLESS OF ACTUAL LENGTH OF SOFT SOIL REMOVAL.
3. CONTRACTOR SHALL NOTIFY ENGINEER A MINIMUM OF 48 HOURS PRIOR TO BACKFILLING EXCAVATION. ENGINEER SHALL OBSERVE BOTTOM OF EXCAVATION. CONTRACTOR SHALL COMMENCE WITH BACKFILLING ONLY UPON REVIEW AND ACCEPTANCE OF ENGINEER.
4. REPLACEMENT MATERIALS SHALL BE CRUSHED ROCK (AASHTO M43 NO. 2 GRADATION), WRAPPED ON ALL SIDES WITH NON-WOVEN GEOTEXTILE (HSS SECTION 716.02). SEAMS OF GEOTEXTILE SHALL BE STITCHED.
5. FOR INFORMATION REGARDING SOIL CONDITIONS IN GENERAL AREAS OF WORK, SEE BORING LOGS SHOWN ON SHEETS G-3.01 THRU G-3.17. THE LOCATIONS OF THE BORING LOGS ARE SHOWN ON SHEETS G-1.01 THRU G-1.05. ALSO SEE GEOTECHNICAL ENGINEERING REPORT ENTITLED "GEOTECHNICAL ENGINEERING EXPLORATION, KAUMUALII HIGHWAY WIDENING, PHASE IA, VICINITY OF ANONUI STREET TO LIHUE, ISLAND OF KAUAI, HAWAII" PREPARED BY GEOLABS, INC. DATED JULY 17, 2008. A COPY OF THE REPORT IS ON THE FILE AT THE OFFICE OF THE ENGINEER FOR REVIEW BY THE CONTRACTOR.

| | |
|-------------------|------|
| SURVEY PLOTTED BY | DATE |
| DRAWN BY | |
| DESIGNED BY | |
| QUANTITIES BY | |
| CHECKED BY | |

| | |
|---------------|-----|
| ORIGINAL PLAN | NO. |
| NOTE BOOK | |

T:\DRAWING-9904\WORKING\3809-20\KAUMUALII HIGHWAY WIDENING\3809-20\G-5 SHEET DETAILS\G-5.01 ARMS-02.DWG

| ESTIMATED SOFT SOIL REMOVAL UNDER BOX CULVERTS | | | | |
|------------------------------------------------|-------------|----------|----------|----------|
| DRAIN LINE NO. | STATION NO. | R (FEET) | W (FEET) | X (FEET) |
| 5 | 287+50 | 20 | 10 | 30 |
| 7 | 307+30 | 17 | 6 | 23 |
| 8 | 310+60 | 17 | 12 | 29 |



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

[Signature] 4-30-10
SIGNATURE EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**TYPICAL CULVERT DETAILS
OVER SOFT SOILS**

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS Date: February 2009

SHEET No. G-5.01 OF G-5.02 SHEETS

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII | HAW. | NH-050-1(31) | 2009 | ADD.340 | 452 |

DRAIN LINE FACILITIES WITHIN SETTLEMENT MONITORING AREA NOTES:

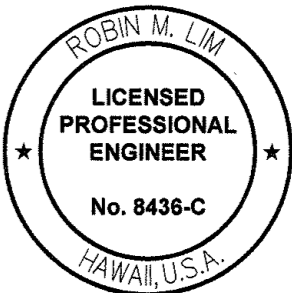
1. WHERE NEW DRAIN LINE FACILITIES ARE LOCATED WITHIN OR NEAR SETTLEMENT MONITORING AREAS, SETTLEMENT WAITING PERIOD SHALL BE OBSERVED PRIOR TO CONSTRUCTION OF NEW DRAIN LINE FACILITIES. ESTIMATED SETTLEMENT WAITING PERIODS ARE SHOWN ON SHEET G-4.02. ACTUAL DURATION OF SETTLEMENT WAITING PERIODS SHALL BE BASED ON MEASURED SETTLEMENT RATES. FOR DETAILS OF SETTLEMENT MONITORING REQUIREMENTS, SEE GEOTECHNICAL ENGINEERING REPORT ENTITLED "GEOTECHNICAL ENGINEERING EXPLORATION, KAUMUALII HIGHWAY WIDENING, PHASE IA, VICINITY OF ANONUI STREET TO LIHUE, ISLAND OF KAUAI, HAWAII" PREPARED BY GEOLABS, INC. DATED JULY 17, 2008 AND SHEETS G-4.01 AND G-4.02. A COPY OF THE REPORT IS ON THE FILE AT THE OFFICE OF THE ENGINEER FOR REVIEW BY THE CONTRACTOR.
2. AFTER EMBANKMENT FILL HAS SETTLED, CONTRACTOR SHALL INSTALL NEW DRAIN LINE FACILITIES.
3. DRAIN LINES REQUIRING SETTLEMENT MONITORING PRIOR TO CONSTRUCTION ARE SUMMARIZED ON THE TABLE ON THIS SHEET AND SHOWN ON SHEETS D1.1 THRU D1.10. A COPY OF THE REPORT IS ON THE FILE AT THE OFFICE OF THE ENGINEER FOR REVIEW BY THE CONTRACTOR.



| DRAIN LINES REQUIRING SETTLEMENT MONITORING PRIOR TO CONSTRUCTION | | | |
|-------------------------------------------------------------------|----------------|------------------------|---------|
| SETTLEMENT MONITORING AREA NO. | DRAIN LINE NO. | DRAIN LINE STATION NO. | |
| | | BEGIN | END |
| 1 | F1 | 0+00 | 0+63.7 |
| 2 | F1 | 0+63.7 | 2+93.8 |
| 2 | F2 | 0+00 | 0+53 |
| 4 | G1 | 1+63 | 5+23.1 |
| 4 | G5 | 0+00 | 0+53 |
| 4 | G6 | 0+00 | 0+40.8 |
| 5 | G1 | 0+00 | 0+33 |
| 5 | H1 | 0+00 | 1+22.9 |
| 6 | H1 | 3+73.2 | 4+21.2 |
| 7 | J1 | 42+93.4 | 51+19.5 |
| 7 | J3 | 0+00 | 1+80 |
| 7 | J4 | 0+00 | 0+46 |
| 7 | J6 | 0+00 | 0+48 |

| | | |
|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| NOTE BOOK | DESIGNED BY | |
| | TRACED BY | |
| | DESIGNED BY | |
| | QUANTITIES BY | |
| | CHECKED BY | |

T:\DRAWING-1900\WORKING\3869-20\KAUMUALIIHIGHWAYWIDENING\3869-20\G5SHEETDETAILSG-5.01ANDG5.02.DWG



THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION AND
CONSTRUCTION OF THIS PROJECT
WILL BE UNDER MY OBSERVATION.

4-30-10

SIGNATURE EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

| 7/10/09 | <div></div> Revised Table and Notes 1 and 2 |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| DATE | REVISION |
| STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION | |
| TYPICAL DRAIN LINE DETAILS OVER SOFT SOILS | |
| KAUMUALII HIGHWAY WIDENING Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge FEDERAL-AID PROJECT NO. NH-050-1(31) | |
| Scale: NTS | Date: July 2009 |

SHEET No. G-5.02 OF G-5.02 SHEETS