FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1(51)	2007	18	106

GENERAL ROCKFALL MITIGATION NOTES:

1. ALL WORK RELATED TO THE ROCKFALL IMPACT BARRIER SHALL BE PERFORMED IN ACCORDANCE WITH SPECIAL PROVISIONS SECTION 662 – ROCKFALL IMPACT BARRIERS.

2. VERIFY AND CHECK ALL DIMENSIONS AND DETAILS ON THE CONTRACT DOCUMENTS AND SPECIFICATIONS FOR DISCREPANCIES. DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION BEFORE PROCEEDING WITH THE WORK.

3. WORK INCIDENTAL TO THE CONTRACT AND NECESSARY TO COMPLETE THE PROJECT, ALTHOUGH NOT SPECIFICALLY REFERRED TO IN THE CONTRACT DOCUMENTS, SHALL BE FURNISHED AND PERFORMED BY THE CONTRACTOR.

4. IN PERFORMING ALL WORK, THE CONTRACTOR SHALL EXERCISE DUE CARE AND CAUTION NECESSARY TO AVOID DAMAGE TO AND IMPAIRMENT IN THE EXISTING UTILITY LINES. ANY DAMAGE INFLICTED ON EXISTING UTILITY LINES SHALL BE IMMEDIATELY REPAIRED OR RESTORED AS DIRECTED BY THE ENGINEER AT THE CONTRACTOR'S EXPENSE.

5. IN PERFORMING ALL WORK, THE CONTRACTOR SHALL NOT ENCROACH ON PRIVATE PROPERTY. ALL WORK INCLUDING THE PLACEMENT OF MATERIAL STOCKPILE SHALL BE CONDUCTED WITHIN THE STATE RIGHT-OF-WAY.

6. ACCESS FOR PERSONNEL AND MATERIALS TO THE WORK AREA LOCATED ON THE SLOPE SHALL BE FROM THE BOTTOM OF THE SLOPE ONLY.

7. THE CONTRACTOR AGREES THAT HE/SHE WILL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR THE JOB SITE AND CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND SHALL NOT BE LIMITED ONLY TO NORMAL WORKING HOURS. THE CONTRACTOR SHALL INDEMNIFY AND HOLD THE STATE AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF THE WORK ON THE PROJECT.

8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A SAFE WORKING ENVIRONMENT ON THE PROJECT SITE MEETING ALL APPLICABLE FEDERAL, STATE, AND THE LOCAL REQUIREMENTS WHILE EXECUTING THE WORK CONTAINED IN THE CONTRACT DOCUMENTS.

9. ALL CONSTRUCTION LINES, GRADES, AND SURVEY MONUMENT STAKEOUT, WHERE REQUIRED, SHALL BE PERFORMED BY A LICENSED SURVEYOR.

10. UNDERGROUND UTILITY LINES KNOWN TO EXIST BY THE ENGINEER ARE INDICATED ON THE PLANS. LOCATION OF THE EXISTING UTILITY LINES SHOWN ON THE PLANS ARE APPROXIMATE; THEREFORE, NO ASSURANCE CAN BE PROVIDED THAT THE ACTUAL LOCATIONS WILL BE PRECISELY AS SHOWN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF THE FACILITIES AND EXERCISE PROPER CARE WHEN EXCAVATING IN THE AREA.

11. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITY LINES, WHETHER SHOWN ON THE PLANS OR NOT, AND SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF SAME IN THE EVENT OF DAMAGES RESULTING FROM THE CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL COORDINATE HIS/HER WORK WITH THE RESPECTIVE UTILITY COMPANIES OR AGENCIES.

12. THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR UTILITIES SUCH AS WATER, ELECTRICITY, ETC., REQUIRED FOR THE CONSTRUCTION ACTIVITIES AND ALL COSTS SHALL BE BORNE BY THE CONTRACTOR.

13. NO CONSTRUCTION EQUIPMENT SHALL BE PARKED WITHIN THE HIGHWAY SUCH THAT THE EQUIPMENT WILL OBSTRUCT THE NORMAL MOVEMENT AND SIGHT DISTANCE OF THE MOTORISTS.

14. THE CONTRACTOR SHALL CONDUCT ALL TESTS AS REQUIRED IN THE CONTRACT DOCUMENTS OR AS REQUESTED BY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE EXPENSES INCURRED IN CONDUCTING THE TESTS.

15. WIRE ROPES FOR THE WIRE CABLE ANCHOR (1-INCH DIAMETER WIRE ROPE) SHALL COMPLY WITH OR EXCEED FEDERAL SPECIFICATIONS RR-W-410D. GALVANIZED WIRE ROPE SHALL HAVE A BLACK COLORED PVC COATING THAT IS BONDED PROPERLY TO THE WIRE ROPE SUCH THAT THE PVC COATING WILL NOT SLIP OFF THE WIRE ROPE.

16. AN ASSEMBLY OF THE PVC COATED WIRE ROPE WITH WIRE ROPE CLIPS CLAMPED ONTO THE PVC COATED WIRE ROPE (FOR THE WIRE CABLE ANCHOR) SHALL BE FABRICATED AND TESTED. A PULLOUT TEST SHALL BE CONDUCTED TO FAILURE OF THE PVC COATED WIRE ROPE ASSEMBLY. THE PULLOUT TEST OF THE PVC COATED WIRE ROPE ASSEMBLY SHALL MEET OR EXCEED THE TENSILE STRENGTH OF THE WIRE ROPE. RESULTS OF THE PVC COATED WIRE ROPE ASSEMBLY PULLOUT TEST SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND ACCEPTANCE.

17. THE CONTRACTOR SHALL ANTICIPATE VARIABLE GROUND CONDITIONS AT THE ROCKFALL IMPACT BARRIER FOUNDATIONS AND ANCHOR LOCATIONS. BOTH BASALT ROCK AND TALUS DEPOSITS (A MIXTURE OF BOULDERS AND COBBLES IN CLAYEY AND SANDY MATRIX) SHALL BE ANTICIPATED.

EROSION CONTROL NOTES AND BEST MANAGEMENT PRACTICES FOR ROCKFALL MITIGATION PLAN

1. MEASURES TO CONTROL EROSION AND OTHER POLLUTANTS SUCH AS TEMPORARY STORMDRAIN PROTECTION SHALL BE IN PLACE BEFORE ANY CONSTRUCTION WORK IS INITIATED. THESE MEASURES SHALL BE PROPERLY CONSTRUCTED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.

2. PROTECT ALL CATCH BASINS IN THE CONSTRUCTION AREA WITH A SEDIMENT EROSION FILTER.

3. TEMPORARY SILT FENCE SHALL BE CONSTRUCTED AT THE DESIGNATED LOCATIONS.

4. ALL EROSION CONTROL MEASURES SHALL BE CHECKED AND REPAIRED OR REPLACED AS NECESSARY.

5. ADEQUATE PROVISIONS SHALL BE MADE TO PREVENT SURFACE WATERS FROM DAMAGING THE CUT/FILL SLOPES.

6. ALL SLOPES AND EXPOSED AREAS INCLUDING THE ENTIRE LOWER ELEVATION TALUS SLOPE AND THE REINFORCED BACKFILL SLOPE SHALL BE MULCHED AND/OR SODDED AS SOON AS THE GRADING AND ROCKFALL IMPACT BARRIER INSTALLATION HAVE BEEN COMPLETED.

7. TEMPORARY EROSION CONTROL SHALL NOT BE REMOVED BEFORE PERMANENT EROSION CONTROL MEASURES ARE IN PLACE AND ESTABLISHED.

8. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED BY THE CONTRACTOR AFTER COMPLETION OF THE PROJECT PRIOR TO FINAL ACCEPTANCE OR AS DIRECTED BY THE ENGINEER IN THE FIELD.

ROCKFALL IMPACT BARRIER DESIGN PARAMETER

1. THE ROCKFALL IMPACT BARRIER INFRASTRUCTURE COMPONENTS WERE DESIGNED BASED ON THE FOLLOWING DESIGN LOADS.
   A. POST FOUNDATIONI: 32 KIPS (LATERAL LOAD)
   B. LATERAL ANCHOR AND SUPPORT ROPE ANCHOR: 52 KIPS (TENSILE LOAD)
   C. UPSLOPE RETAINING ANCHOR: 38 KIPS (TENSILE LOAD).

2. IF THE ROCKFALL IMPACT BARRIER SYSTEM HAS DESIGN LOADS GREATER THAN THE VALUES INDICATED IN NOTE 1, THEN THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REDESIGN OF THE INFRASTRUCTURE COMPONENTS. THE REDESIGN SHALL BE RESUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL. THE REDESIGN SUBMITTAL SHALL BE STAMPED BY LICENSE STRUCTURAL ENGINEER AND CIVIL ENGINEER SPECIALIZING IN GEOTECHNICAL ENGINEERING IN THE STATE OF HAWAII.

3. ALLOWABLE DESIGN LOAD OF MICROPILE IS 25 KIPS.

ROBIN M. LIM
LICENSED PROFESSIONAL ENGINEER
No. 8436-C
HAWAII, U.S.A.

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

4-30-08

SIGNATURE — EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GEOTECHNICAL NOTES

Kalanianaole Highway Improvements
Retaining Wall at Makapuu, Oahu
Federal-Aid Project No. NH-072-1(51)

Scale: As Noted — Date: April 2007

SHEET No. G-1 OF 8 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY ____ DATE ____
NOTE BOOK	DRAWN BY ____ " ____
	TRACED BY ____ " ____
	DESIGNED BY ____ " ____
No.____	QUANTITIES BY ____ " ____
	CHECKED BY ____ " ____