



GEOLITH CONSULTANTS

Consultants in the Applied Earth Sciences

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Tuesday April 7, 1998

City of Fremont
Development & Environmental Services Department
P.O. Box 5006
Fremont, CA 94537-5006

Attention: Mr. Richard A. Asimus, P.E.
City Engineer

RE: Revised Proposal to Perform
Preliminary Engineering Geologic Investigation
Mission Peak Landslide
Fremont, California

Dear Mr. Asimus:

Geolith Consultants, Inc. is pleased to present this proposal to perform a preliminary engineering geologic investigation of the Mission Peak Landslide above Grapevine Terrace in Fremont, California, which appears to have begun moving on Sunday March 22nd. Based upon our discussions with you and a visual reconnaissance last week, we feel that the work will necessarily be divisible into phases, each of which will be functioned by the results of the previous phase. The first phase will consist of activities designed to make short-term assessments of risk posed to adjacent private parcels by the recent land slippage. If the slide stops moving in the near future, it is possible that future phases of work may be minimized, or even eliminated.

PROPOSED SCOPE OF WORK

The proposed investigation will consist of various activities, split into phases. We envision that the first phase will be divisible into seven categories: 1) liaison activities with others involved in the project; 2) background research; 3) field investigations; 4) laboratory strength parameter testing; 5) assessment of collected information and preparation of hazard maps with accompanying report; 6) Preliminary evaluation of possible short-term mitigation measures; and 7) dissemination of information and ongoing evaluations. These activities are described below:

Task 1 - Liaison Activities

1. Coordinate liaison with scientists in the engineering geology group of the U.S. Geological Survey in Menlo Park, CA and Golden, CO and other consultants to the City, or neighbors, as directed by the City.
2. Engineering geologic input to coordination of orthophoto topographic mapping by private consultants (Hammond, Jensen and Wallen) and the U.S. Geological Survey, including input for set-up of photogrammetric survey monuments.
3. Engineering geologic input into coordination of ongoing monitoring of landslide-related earth movements, both within the active slide mass and around its margins.
4. Maintain liaison with USGS scientists, other consultants and City staff involved in the landslide investigation(s).
5. Coordinate various scientific investigative aspects of the landslide evaluation, as directed by City staff.

Task 2 - Background Research

6. Collect, register and evaluate historic rainfall data for the Mission Peak area.
7. Make an engineering geologic evaluation of historic land slippage in the area by reviewing historic stereopair aerial photographs.
8. Review of the published geologic literature pertaining to the Mission Peak area, including studies of bedrock geology, landslides, faults, groundwater information and seismicity.
9. Review of private consultant's reports for adjacent residential developments, to gain background understanding of subsurface geologic conditions, as ascertained from exploratory borings and wells (if any).

Task 3 - Field Exploration

10. Detailed field investigation to delineate and evaluate subsurface geologic conditions, particularly to begin evaluating cause-and-effects posed by various blocks of the landslide moving against one another. Some of this work will hopefully be carried out with assistance

from scientists with the engineering geology group of the U.S. Geological Survey in Menlo Park, CA and Golden, CO.

11. Supervision of a preliminary subsurface exploration program, consisting of about a dozen small diameter (continuous flight auger) borings and three large diameter (bucket auger) borings, aimed at evaluating the following information:
 - a. Determine the relative depth of active slippage on various portions of the lower slide mass, closest to residential development. This will hopefully be accomplished through the use of solid PVC pipes inserted in approximately 12 boreholes.
 - b. Determine the relative groundwater conditions within the lower third of the active slide mass, close to residential development. If borings exhibit free water, we will install well casings with screens at the appropriate horizons to enable preliminary evaluation of forced dewatering.
 - c. Advance approximately three large-diameter subsurface bucket auger borings to evaluate subsurface geologic conditions, and evaluate depth of active sliding, thickness of active slide zone, multiplicity of slip surfaces, character of affected ground versus unaffected ground (soil moisture content, lithology and density variances), evaluate hydrologic regimen within the affected slide mass, and provide a means of monitoring future movement along the exposed landslide slip surface (at depth, in the ground).

If the bucket auger holes can be cased above and below the active basal slip surface, the relationship between surface movements and slippage along the buried slide plane can be evaluated. Understanding this relationship would be key to future evaluations of slope stability and long term risk assessment.

Task 4 - Preliminary Laboratory Soil Strength Parameter Testing

12. Recover subsurface geologic samples for laboratory indices and strength parameter testing, including samples of the active landslide slip surfaces.

Task 5 - Assessment of Collected Information

13. Evaluation of orthophoto topographic map(s) prepared by private consultants.

14. Standing up of orthophoto topographic files onto TechBase/MineSoft three-dimensional software, for simultaneous tracking of landslide physical limits, movement of the various blocks, and monitoring of water levels.
15. Placement of TechBase/MineSoft mapping files onto a computerized Geographical Information Systems (GIS) format, as a base for geologic hazard maps.
16. The preparation of landslide hazard maps of the affected area and the adjacent ground around the active slide, indicating areas of active slippage, past land slippage, relative recency of occurrence and relative risk of future land slippage associated with such deposits; for a total of 4 maps. These maps would be suitable for public information, real estate disclosure, future development (if any) and emergency preparedness planning purposes. These map products would be subject to updating, as more information is developed over time.
17. Preparation of a report to accompany the hazard maps which includes an overview of the work performed, methods employed and preliminary conclusions. This would include detailed descriptions of the filed mapping, subsurface exploration, test results, generalized geometry and areal limits of the active slide areas.

Task 6 - Preliminary evaluation of possible short-term mitigation measures

18. Monitor piezometers and well casings installed in test borings. If meaningful quantities of free water are encountered, consider emplacement of temporary withdrawal wells.
19. Secure permits for well installation and/or abandonment, in accordance with Alameda County, and State Regional Water Quality Control Board (RWQCB) directives. Perform water quality tests as deemed appropriate by RWQCB (cost and scope cannot be estimated at this time).
20. Develop a system for pumping, conveying and discharge of pumped subsurface water, with a system to track volume, if possible.

Task 7 - Dissemination of Information and Ongoing Evaluations

21. Provide City staff with weekly updates of information, as it is developed.
22. Attend any meetings convened by City staff, as directed.
23. Handle interviews with various media organizations, as directed by City staff.

24. Participate in any public information meetings, as directed by City staff.
25. Prepare materials for City staff, news organizations, or interested public parties, as directed by City staff.

We would anticipate that some form of public meeting would be held to update interested citizens and real estate professionals about the landslide hazard maps, when such products are released. We will likely issue these in a "Open File format" similar to the USGS, subject to periodic revision, if new information becomes available. The precise form of the maps might be addressed in a subsequent phase if City staff requires a compatible GIS format, such as ArcInfo, AutoCad or Intergraph. The goal at this time is simply to delineate what area(s) are potentially dangerous, and provide some measure of public confidence to City-directed evaluation of slope stability hazards and risks along the Mission Peak area.

POSSIBLE USE OF SUBCONSULTANTS

In our attempt to provide the best possible professional service and evaluation of landslide hazards, Geolith Consultants, Inc. would prefer to utilize such subconsultants as we deem appropriate for help in various aspects of the project, provided City staff is apprised beforehand and approves of their involvement as subconsultants to Geolith. Requests usually are made in a letter format, accompanied by a detailed resume of the individual or firm's professional experience, reasons we would like to use such individuals/firms, and signed conflict-of-interest statements from such individuals.

PROJECTED COSTS

The estimated costs to complete the outlined scope of work are detailed on a per task basis, according to the attached Geolith Consultants, Inc. Schedule of Charges and Terms for 1998, as follows:

Cost of Task 1- Liaison Activities

Principal Engineering Geologist	80 hrs @ \$125/hr	=	\$ 10,000
Clerical/Typing	20 hrs @ \$ 50/hr	=	\$ 1,000
	Subtotal	=	\$ 11,000

Cost of Task 2 - Background Research

Principal Engineering Geologist	12 hrs @ \$125/hr	=	\$ 1,500
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Senior Engineering Geologist	12 hrs @ \$105/hr	=	\$ 1,260
Staff Engineer	20 hrs @ \$ 80/hr	=	\$ 1,600
Graphics Technician	8 hrs @ \$ 60/hr	=	\$ 480
Aerial Photographs		=	\$ 500
	Subtotal	=	\$ 5,340

Cost of Task 3 - Field Investigations

Engineering Geologic Mapping

Principal Engineering Geologist	40 hrs @ \$125/hr	=	\$ 5,000
Senior Engineering Geologist	40 hrs @ \$105/hr	=	\$ 4,200
Graphics Technician	40 hrs @ \$ 60/hr	=	\$ 2,400
Clerical/Typing	4 hrs @ \$50/hr	=	\$ 200
Photos		=	\$ 900
	Subtotal	=	\$ 12,700

Small Diameter Borings (approximately 12)

Senior Engineering Geologist	50 hrs @ 105/hr	=	\$ 5,250
Small Diameter Drilling Contractor	40 hrs @ 140/hr	=	\$ 5,600
Mileage	800 mi @ .50	=	\$ 400
Field Supplies	720 ft PVC pipe	=	\$ 360
	PVC glue	=	\$ 35
	PVC shears	=	\$ 25
	Liner casings	=	\$ 375
Water well tape	5 days @ \$50/day	=	\$ 250
Staff Engineer (field work)	40 hrs @ \$80	=	\$ 3,200
	Subtotal	=	\$15,495

Large Diameter Bucket Auger Borings (approximately 3)

Large Diameter Drill Rig	40 hrs @ \$250/hr	=	\$10,000
Drill Rig Mobilization	800 miles + 2 days	=	\$ 3,500
Drill Casing	250 ft @ \$35/ft	=	\$ 8,750
Principal Engineering Geologist	25 hrs @ \$125/hr	=	\$ 3,125
Senior Engineering Geologist	50 hrs @ \$105/hr	=	\$ 5,250

Mileage	400 miles @ .50	=	\$ 200
Field Supplies and Photos		=	\$ 300
	Subtotal	=	\$ 31,125

Cost of Task 4 - Preliminary Soil Strength Parameter and Indices Testing

Moisture/Density tests	140 @ \$20	=	\$ 2,800
Direct Shear tests	6 tests @ \$250	=	\$ 1,500
Atterberg Limits tests	6 tests @ \$120	=	\$ 720
	Subtotal	=	\$ 5,020

Cost of Task 5 - Assessment of Collected Information

Principal Engineering Geologist	96 hrs @ \$125/hr	=	\$12,000
Principal Engineer	50 hrs @ \$125	=	\$ 6,250
Senior Engineering Geologist	55 hrs @ \$105/hr	=	\$ 5,775
Graphics Technician	160 hrs @ \$60	=	\$ 9,600
Clerical/Typing	65 hrs @ \$50	=	\$ 2,675
Graphics Supplies		=	\$ 655
	Subtotal	=	\$36, 955

Cost of Task 6 - Preliminary Evaluation of Potential Short-Term Mitigation Measures

Principal Hydrogeologist	5 hrs @ \$125/hr	=	\$ 625
Senior Hydrogeologist	20 hrs @ \$105/hr	=	\$ 2,120
Staff Engineer	60 hrs @ \$ 85	=	\$ 5,100
Mileage	400 @ .50/mile	=	\$ 200
Water Quality Tests	[as required]		
	Subtotal		\$ 8,025

Cost of Task 7 - Dissemination of Information and Ongoing Evaluations

Principal Engineering Geologist	24 hrs @ \$125/hr	=	\$ 3,000
Clerical/Typing	24 hrs @ \$50/hr	=	\$ 1,200
	Subtotal		\$ 4, 200

This is an approximate estimate of the time required for this phase over the next 6 to 12 weeks. Once this estimate of time is exceeded, meetings will have to be charged on a time and materials basis, according to the attached Schedule of Charges and Terms.

TOTAL ESTIMATED NOT-TO-EXCEED COST

\$ 129, 860

It should be noted that these costs include a great deal of field exploration work, such as drilling, grouting of holes, steel casing, downhole instruments and monitoring hardware that are usually charged out as separate items from the geotechnical consultant's "analysis & design" services. Actual costs may vary. In addition, we have not included any estimate for site access, which is usually charged on a time-and-materials basis by whichever grading contractor can provide the necessary bulldozer access paths for the drill rigs.

POSSIBLE FUTURE WORK

Depending on the future rate of movement, and the results of the preliminary investigations, additional phases might address three principal areas: 1) Possibility of developing longer-term mitigation measures, such as hydrauger drains, with appropriate monitoring; 2) Perform computerized limit equilibrium slope stability analyses, as deemed appropriate; 3) Provide additional rock slope stability analyses of the fractured headscarp area, if discrete movements are detected in that region through tension scarp monitoring; 4) Provide seismic slope stability assessments, if deemed appropriate; 5) Provide additional field exploration, subsurface sampling, and lab testing, if deemed appropriate; 6) Provide input for additional monitoring of slope movements, as deemed appropriate; 7) Provide additional public information support, as directed; 8) Provide written report(s) of ongoing investigations and analysis, as directed; 9) Provision of finalized landslide hazard maps, as deemed appropriate; 10) Provide ongoing liaison with City staff and USGS to monitor landslide area; 11) Provide consultations regarding long-term monitoring; and 12) Developing area-wide criteria for landslide hazard assessment suitable for City staff to implement, using the hazard maps, rainfall data, seismic data, and groundwater data, as available.

TERMS AND CONDITIONS

Geolith Consultants, Inc. Proposes to perform the above-described services according to the hourly rates and conditions shown on the attached Schedule of Charges and Terms with the projected costs for the work not-to-exceed \$129,860. Should there be any need for modification in the scope of work as a result of our continuing investigation, we will notify you as soon as possible so that we may

Richard A. Asimus
March 31, 1998

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come to an agreement. The project will be billed on a bi-weekly basis and payment is due upon receipt of invoices.

Geolith Consultants, Inc. Will employ accepted geotechnical engineering procedures, and our professional opinions and conclusions will be made in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

A copy of our standard Geolith Consultants, Inc. "Schedule of Charges and Terms for 1998" is attached. If these terms and our proposal are acceptable, please return a signed copy of the proposal to us.

Thank you for this opportunity to help you with this project. If you have any questions, please give us a call at (925) 682-7601.

Very truly yours,

GEOLITH CONSULTANTS, Inc.



J. David Rogers, Ph.D., R.G., C.E.G., C.H.G.
Principal

Approved by: _____

Date: _____

**GEOLITH CONSULTANTS, INC
SCHEDULE OF CHARGES AND TERMS
FOR 1998**

CHARGES

A. Lump Sum Agreement

If GeoLith Consultants, Inc. services are performed for a lump sum fee, the client agrees to pay the lump sum fee stated in the proposal letter. The work is begun upon receipt of a 50% retainer, unless there is an explicit agreement otherwise.

B. Time and Materials Agreement

If GeoLith Consultants, Inc. services are performed on a time and materials basis, the Client agrees to pay GeoLith Consultants, Inc. in accordance with the following schedule of charges:

1. Personnel

Principal-in-Charge	\$180/Hr.	Staff Engineer/Geologist	\$ 80/Hr.
Court/Deposition	\$250/Hr.*	Forensic Scientist	\$ 80/Hr.
Deposition Preparation	\$200/Hr.	Engineering Technician	\$ 65/Hr.
Principal Engineer/Geologist	\$125/Hr.	Graphics Technician	\$ 60/Hr.
Senior Engineer/Geologist	\$105/Hr.	Administrative	\$ 55/Hr.
Project Engineer/Geologist	\$ 90/Hr.	Clerical	\$ 50/Hr.

* 4-hour minimum

2. Mobile Field Equipment

Nuclear Density/Moisture Gauge	\$50.00/day (1/2 day minimum)
Slope Indicator Probe	\$100.00/day (1/2 day minimum)
Mileage	\$.50/mile

3. Miscellaneous Charge

Drilling and backhoe services, special and consultant fees, permits, bridge tolls, insurance, fares, telegrams, shipping, special equipment rental, printing, reproduction, and other similar project-related costs are billed at cost plus 20 percent.

RELATIONSHIP BETWEEN CLIENT AND GEOLITH CONSULTANTS, INC

GeoLith Consultants, Inc. is retained by the Client to investigate the surface and subsurface soil conditions and to consult with him regarding his project or problem. GeoLith Consultants, Inc. services are for the benefit of the Client, but the extent of those services is limited by the funds made available by the Client for the investigation. GeoLith Consultants, Inc. has a public responsibility to perform work in conformance with the accepted standards of professional care, but beyond that must make evaluations of cost versus risk. Where deemed appropriate, GeoLith Consultants, Inc. will present these evaluations to the Client so that he may choose the degree of risk appropriate to his own economic evaluations. Whether or not such consultation between the Client and GeoLith Consultants, Inc. takes place, it is recognized that, since the cost savings belong to the Client, so must the risks belong to the Client. Both the Client and GeoLith Consultants, Inc. recognize that, due to the practical economic limitations on the scope of the investigation, factors that might have affected some of the decisions may remain undiscovered.

WARRANTY

The Client recognizes the inherent risks connected with construction. In performing their professional services, GeoLith Consultants, Inc. will use that degree of care and skill ordinarily exercised, under similar circumstances, by reputable members of their profession practicing in the same or similar locality. No other warranty, expressed or implied, is made or intended by the proposal for consulting services or by furnishing oral or written reports of the findings made.

LIABILITY

The owner agrees to limit GeoLith Consultants, Inc. liability to the owner and all construction contractors and subcontractors on the project arising from GeoLith Consultants, Inc. professional acts, errors or omissions, such that the total aggregate liability of GeoLith Consultants, Inc. to all those named shall not exceed \$50,000 or GeoLith Consultants, Inc. total fee for the services rendered on this project, whichever is greater. The owner further agrees to require of the contractor and his subcontractors an identical limitation of GeoLith Consultants, Inc. professional acts, errors, or omissions. Neither the contractor nor any of his subcontractors assumes any liability for damages to others which may arise on account of GeoLith Consultants, Inc. professional acts, errors or omission.

In the event the Client makes a claim, at law or otherwise, against GeoLith Consultants, Inc. for any alleged error, omission, or other acts arising out of performance of our professional services, and the Client fails to prove such claim upon final adjudication, then the Client shall pay all costs incurred by GeoLith Consultants, Inc. in defending themselves against the claim, including but not limited to, personnel-related costs, attorney's fees, court costs, and all other claim-related expenses.

It is agreed that GeoLith Consultants, Inc. will not be liable for damage, or injury arising from damage, to subterranean structures (pipes, tanks, telephone cable, etc.), the locations of which are not called to our attention and correctly shown on the plan furnished to us in connection with the work performed by us. Since subsurface conditions can vary appreciably within a few feet of a test hole or trench, it is further agreed that GeoLith Consultants, Inc. will not be liable in any fashion with respect to subsurface conditions not encountered during our exploration.

INVOICES

Invoices for our services will be submitted, at our option, on a monthly basis or when work is completed. Invoices will be due immediately, but will not be delinquent if paid within 10 days from which the invoice is dated. If payment is not so made, a service charge will be due on the amount of the invoices at the maximum rate permissible by law from the date of the invoice until the same is paid. If suit is filed, a reasonable attorney's fee to be set by the court, and other costs incurred in collecting any delinquent account shall be included in any judgement in favor of GeoLith Consultants, Inc.

SOIL AND ROCK SAMPLES

All samples of soil and rock will be disposed of from the laboratory 30 days after issuance of the report unless the Client advises GeoLith Consultants, Inc. otherwise. Upon request, GeoLith Consultants, Inc. will deliver the samples to the Client, charges collect, or will store them for an agreed storage charge