

April 8, 1999

Mr. George Ghiragosian, P.E.
TEAC Consulting Engineers
3160 Crow Canyon Place, Suite 105
San Ramon, CA 94583

RE: Supplemental Recommendations
UBC-mandated Seismic Loading factors
Subdivision 8123 (Buttner Court)
Pleasant Hill, California

Dear Mr. Ghiragosian:

At the request of Walt McEnerney of Focus Realty Services, Geolith Consultants, Inc. is providing supplemental seismic loading factors mandated by the new 1997 Uniform Building Code (UBC) for the eight single-family homes to be constructed for the subject project. Our firm previously submitted a soils report for this project (to a prior owner) on March 11, 1998. In addition, we have provided ongoing plan review services and design consultations since the issuance of our report. The results of these additional services will be documented separately.

REGIONAL FAULTING AND SEISMICITY

The site is located in the central portion of the Coast Ranges Geomorphic Province of California. The structural and topographic grain of this region parallels that of the northwest-trending San Andreas transform and its related faults. Northwest-striking anticlinal and synclinal folds dominate the local geology. Crane and Lyon (1995) show a blind thrust fault beneath Reliez Valley Road, approximately ¼-mile southwest of the site, controlling the natural depression the alignment follows. However, neither the site itself, nor the surrounding properties are located within a recognized Earthquake Fault Zone (CDMG, 1993, revised). Such zones are designated by the State of California for active faults as defined by the Alquist-Priolo Earthquake Fault Zoning Act of 1972 (Chapter 7.5, Division 2 of the California Public Resources Code).

The primary seismic risk at the site is considered to be from strong ground shaking. There is also a moderate risk at the site related to ground lurching during potential major earthquake events on one or more of the active faults in the region. The known active faults capable of producing earthquakes that would cause the highest ground accelerations at the subject sites are

the northwest-trending Concord, Calaveras, Hayward, and Green Valley faults. Located approximately 3.5 miles to the northeast, the Concord fault is the closest active fault to the site. The portion of the Calaveras fault which has been zoned active is located approximately 7 miles south of the site. However, an unzoned portion of the Calaveras fault passes approximately 2.5 miles to the southwest of the property. The active Hayward fault is located approximately 12 miles to the west and the Green Valley fault is located approximately 12 miles north. In addition, strong ground shaking could also be expected during a great earthquake on one of the more distant faults, such as the San Andreas or the Rodgers Creek faults, located about 32 miles to the southwest and 32 miles to the northwest, respectively (Jennings, 1994).

Due to the proximity of these major faults, strong seismic ground shaking should be expected at the subject site during a moderate or major earthquake event, particularly on one of the nearby faults. The risk of ground lurching will be dependent on the epicentral distance for the source event and the stiffness of the earthen materials underlying a site.

The default seismic load factor decreed by the 1997 Uniform Building Code (UBC) requires consideration of near-field loading criteria, when sites are within 10 km of a known active fault(s), as described in: *Maps of Known Active Faults and Near-Source Zones in California and Adjacent Portions of Nevada*: Calif Div Mines & Geology, Structural Eng'rs Assn of California Seismology Committee, and the Int'l Conference of Building Officials. The controlling feature would appear to be the 66 km-long Concord and Green Valley faults, now considered a semi-continuous Type A fault. This right-lateral strike-slip fault system has been assigned a slip rate of at least 6 mm/year (+/- 3 mm/yr), capable of a maximum magnitude (M_L) 6.9 quake (M.D. Petersen, et al, 1996, *Probabilistic Seismic Hazard Assessment for the State of California*: Calif Div Mines & geology OFR 96-08 and US Geol Survey OFR 96-706). Chapter 16 in Volume 2 of the 1997 UBC spells out the various earthquake loading parameters that may be used absent a site specific dynamic response analysis, such as SHAKE 91.

The Seismic Zone Factor, **Z**, is given as **0.40** (for Zone 4 coastal California). We would estimate that the subject site is underlain by engineered fill on top of weathered rock (fill pads) and weathered rock (cut pads), approximated by the UBC-designation **Soil Type Sc**, meaning **shear wave velocities between 1,200 and 2,500 feet per second** could be expected. This assumes that any structure contemplated for this site will be founded on engineered fill or weathered bedrock. Using the parameters for dense soil and weathered bedrock, a series of default seismic load coefficients were determined from Vol. 2 of the 1997 UBC. These include: a **Seismic Coefficient $C_a = 0.40N_a$** ; **Seismic coefficient $C_v = 0.56N_v$** ; **Near-Source Factor, $N_a = 1.15$** ; and **Near-Source Factor, $N_v = 1.54$** . These values apply to Type A faults situated 5.8 km from sites being evaluated.

Mr. George Ghiragosian
April 8, 1999

Page 3

WARRANTY and CLOSURE

We have employed standard geotechnical engineering procedures, and our professional recommendations and opinions are made in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

We hope this letter provides you with the information which you require at this time. If you have any questions regarding the recommendations presented in this letter, please feel free to give us a call at your earliest convenience.

Very truly yours,

GEOLITH CONSULTANTS, INC.

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

Copies: Addressee (2)
Walter P. McEnerney, Focus Realty Services (1)