



## DEPARTMENT OF CONSERVATION

**CALIFORNIA GEOLOGICAL SURVEY**

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Mr. Jeffrey Kingston  
District Director of Facilities  
Chabot Las Positas Community College District  
5020 Franklin Drive  
Pleasanton, CA 94588

April 5, 2010

**Subject: Engineering Geology and Seismology Review for  
Las Positas Community College – New Science Technology Building  
3000 Campus Hill Drive, Livermore, CA  
CGS Application No. 01-CGS0167**

Dear Mr. Kingston:

In accordance with your request and transmittal of documents on December 28, 2009, the California Geological Survey reviewed the engineering geology and seismology aspects of the consulting report prepared for Las Positas Community College in Livermore, California. It is our understanding this project involves construction of a new 12,000 ft<sup>2</sup> footprint area two-story Science Technology building, and renovations to the existing Building 1800. This review was performed in accordance with Title 24, California Code of Regulations, 2007 California Building Code (CBC) and followed CGS Note 48 guidelines. We reviewed the following report:

**Geologic Hazards Assessment and Geotechnical Evaluation – Science Technology Phase II, Las Positas Community College, Livermore, CA:** Ninyo & Moore, 1956 Webster Street, Suite 400, Oakland, CA 94612, Project No. 401294018, report dated June 12, 2009, 59 pages, Plates and Appendices attached.

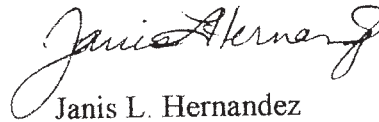
Based on our review of the data and reports referenced above, the consultants conducted an acceptable investigation of the geologic and seismic issues for the proposed project. The consultants report the site could experience strong ground shaking from earthquakes on nearby faults, and they report the near surface site soils have a **“high expansion potential”**. The consultants also performed a liquefaction evaluation and determined liquefaction hazard at the site is low. They also state total settlement is less than 1/2 inch, with differential settlement less than 1/4 inch between adjacent footings.

Finally, the consultants performed both a General Procedure and Site-Specific ground motion analysis for the site, and report the following Site-Specific ground motion values:

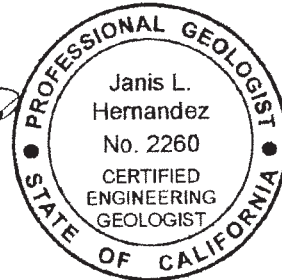
**$S_{DS} = 1.37g$  and  $S_{DI} = 0.71g$ ,  $S_{MS} = 2.05g$  and  $S_{MI} = 1.07g$ .**

In conclusion, *the engineering geology and seismology issues at this site are adequately assessed in the referenced report.* If you have any further questions about this review letter, please telephone the California Geological Survey at (213) 239-0893.

Respectfully submitted,



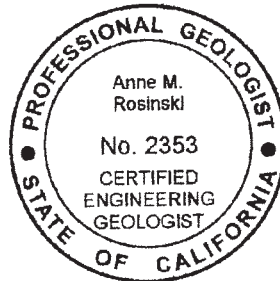
Janis L. Hernandez  
Engineering Geologist  
PG 7237, CEG 2260



Concur:



Anne M. Rosinski  
Senior Engineering Geologist  
PG 7481, CEG 2353



**Enclosures:**

Note 48 Checklist Review Comments

Keyed to: *Note 48 - Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings*

**Copies to:**

Karen Van Dorn, *Senior Architect*  
Division of State Architect, 1515 Clay Street, Suite 1201, Oakland, CA 94612

Mark Caruso, *Certified Engineering Geologist*, and Peter Connolly, *Registered Geotechnical Engineer*  
Ninyo & Moore, 1956 Webster Street, Suite 400, Oakland, CA 94612

Denis Henmi, *Architect in General Responsible Charge*  
Kwan Henmi Architects, 456 Montgomery Street, Suite 300, San Francisco, CA 94104

## **Note 48 Checklist Review Comments**

In the numbered paragraphs below, this review is keyed to the paragraph numbers of California Geological Survey Note 48 (October, 2007 edition), *Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings*.

### **Project Location**

1. Site Location Map, Street Address, County Name: Adequately addressed.
2. Plot Plan with Exploration Data with Building Footprint: Adequately addressed.
3. Site Coordinates: Adequately addressed. Latitude and Longitude provided in report: 37.7111°N, 121.8011°W.

### **Engineering Geology/Site Characterization**

4. Regional Geology and Regional Fault Maps: Adequately addressed.
5. Geologic Map of Site: Adequately addressed.
6. Subsurface Geology: Adequately addressed. The consultants report the site is underlain by a clay overbank deposit to depths of approximately 1 ½ feet, underlain by alluvium consisting of moderately plastic stiff to hard clay, and medium dense to very dense clayey sand to the total depth explored of 51.5 feet.
7. Geologic Cross Sections: Adequately addressed.
8. Active Faulting & Coseismic Deformation Across Site: Adequately addressed. The consultants report the site is not located in an Alquist-Priolo Earthquake Fault Zone. They also report there are no known active or potentially active faults on the site. The nearest fault is a potentially active fault located about 940 feet northwest of the site. Additionally, the consultants previously performed a fault trench study in 2007 to evaluate northwest-trending lineaments they observed in aerial photographs. The consultants report they found no evidence of faulting, and they consider the risk of surface rupture at this site to be “low”.
9. Geologic Hazard Zones (Liquefaction & Landslides): Adequately addressed. The consultants report the site is not located within a State of California Zone of Required Investigation (ZORI) for either liquefaction or landslides.
10. Geotechnical Testing of Representative Samples: Adequately addressed.
11. Geological Consideration of Grading Plans and Foundation Plans: Adequately addressed. The consultants recommend removal and replacement of the near surface soils in the building pad area to reduce the potential for differential movement due to the expansive soils. They also recommend the footings be extended into native soil to minimize settlement.

The proposed foundation recommendations appear to address the geologic conditions at the site; however, CGS reviewers are not engineers and cannot review the foundation design recommendations.

## Seismology & Calculation of Earthquake Ground Motion

12. Evaluation of Historic Seismicity: Adequately addressed.
13. Mapped Spectral Acceleration Parameters: Adequately addressed. The consultants report:  
 $S_S = 1.53g$  and  $S_1 = 0.60g$
14. Classify the Geologic Subgrade (Site Class): Adequately addressed. The consultants classify the site soil profile as Site Class D, Stiff Soil.
15. Site Coefficients and Adjusted Maximum Considered Earthquake (MCE) Spectral Response Acceleration Parameters: Adequately addressed. The consultants report the following values, based on Table 11 of the report:  
 $F_a = 1.0$ ,  $F_v = 1.5$ ,  $S_{MS} = F_a * S_S = 1.53g$ , and  $S_{M1} = F_v * S_1 = 0.90g$ .  
*The consultants are reminded to report the General Procedure values, based on ASCE 7-05, Chapter 11, and report the Site-Specific Ground Motion values, based on the requirements of ASCE 7-05, Chapter 21.*
16. Design Acceleration Parameters: Adequately addressed. The consultants report the following values, based on Table 11 of the report:  
 $S_{DS} = 2/3 * S_{MS} = 1.019g$ , and  $S_{D1} = 2/3 * S_{M1} = 0.60g$ .  
These values appear to be in accordance with the requirements of ASCE 7-05, Chapter 11, as stated in review item 15 above.
17. Seismic Design Category: Not Applicable.  $S_1 < 0.75$
18. Deaggregated Seismic Source Parameters: Adequately addressed. The consultants performed a deaggregation analysis and determined the controlling faults are the Mount Diablo thrust and Greenville North faults.
19. Site-Specific Ground Motion Analysis: Adequately addressed. The consultants provided a thorough analysis which includes 1997-era attenuation relationships. The probabilistic and deterministic MCE spectra appear reasonable, based on comparison with the State-Wide Model (from Peterson and others, 1996, CGS Open-File Report 96-08; updated by Cao and others, 2003). The complete spectra are presented for Site Class D on Figure 6. The results of the consultant's analyses show the following site-specific design acceleration parameters:  
 $S_{DS} = 1.37g$  and  $S_{D1} = 0.71g$ ,  $S_{MS} = 2.05g$  and  $S_{M1} = 1.07g$ .  
These values appear to be in compliance with the requirements of ASCE 7-05, Chapter 21, and are acceptable for the proposed development.
20. Time-Histories of Earthquake Ground Motion: Not Applicable.

## Liquefaction/Seismic Settlement Analysis

21. Geologic Setting for Occurrence of Seismically Induced Liquefaction: Adequately addressed. The consultants reasonably characterize highest historical groundwater levels deeper than 50 feet at the site and site soils as clay and sandy clay alluvial soil conditions. The data appear to support the consultants' conclusion that liquefaction potential at the site is low.
22. Liquefaction Calculations: Not Applicable.
23. Seismic Settlement of the entire Soil Column: Adequately addressed. The consultants report total settlement is less than 1/2 inch, with differential settlement less than 1/4 inch between adjacent footings. These values appear reasonable given the data presented.
24. Potential for Lateral Spreading: Not Applicable.

25. Mitigation Options for Liquefaction: Not Applicable.

### **Slope Stability Analyses**

26. Landslide Mapping: Adequately addressed. The consultants report the site is gently sloping to the southwest and no evidence of slope instability is present. They also report no landslides are mapped at the site.
27. Determination of Static and Dynamic Strength Parameters: Not Applicable.
28. Determination of Pseudo-Static Coefficient ( $K_{eq}$ ): Not Applicable.
29. Identify Critical Slip Surfaces for Static and Dynamic Analyses: Not Applicable.
30. Dynamic Site Conditions: Not Applicable.
31. Mitigation Options/Other Slope Failure: Not Applicable.

### **Other Geologic Hazards or Adverse Site Conditions**

32. Expansive Soils: Adequately addressed. The consultants report the expansion potential of the near surface clay overbank deposits is “moderate to highly expansive”.
33. Corrosive/Reactive Geochemistry of the Geologic Subgrade: Adequately addressed. The consultants report sulfate exposure to concrete is negligible, and the soils are “mildly corrosive” to buried ferrous metals.
34. Conditional Geologic Assessment: Selected geologic hazards addressed by the consultants are listed below:
- C. Flooding: The consultants state the site is located outside of the FEMA 100-year and 500-year flood hazard zone. Additionally, they report the site is not located within a dam inundation area.
  - D. Tsunami and Seiche Inundation: The consultants state the site is located inland, and not near enclosed water bodies; therefore, the risk for tsunami and seiche hazard is not significant.

### **Report Documentation**

35. Geology, Seismology, and Geotechnical References: Adequately addressed.
36. Certified Engineering Geologist: Adequately addressed.  
Mark R. Caruso, Certified Engineering Geologist #2064
37. Registered Geotechnical Engineer: Adequately addressed.  
Peter C. Connolly, Registered Geotechnical Engineer #2707