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March 31, 2011
2248-5A, L-29132

Mr. Scott Pacheco, Associate Planner
City of Orinda
22 Orinda Way
Orinda, CA 94563

RE: Response to Geotechnical and Geologic Review Comments
Geologic/Geotechnical Investigation for Tentative Map
Lavenida Lane, Subdivision 9260 (APN 271-120-011)
Orinda, California

Dear Mr. Pacheco:

As requested, we have reviewed the comments contained in the February 25, 2011 geotechnical and geologic review letter prepared for the City of Orinda by Cal Engineering and Geology (CE&G). The CE&G letter contained comments in regard to their review of our June 16, 2010 report titled "Geologic/Geotechnical Investigation for Tentative Map, Lavenida Subdivision (APN #271-120-011), Orinda, California." CE&G indicated in their letter that they concur with our assessment and recommendations for mitigation of the landslide hazards impacting the property. However, they requested some additional information/clarifications. The CE&G comments are repeated below in italics and are followed by our response.

Item 1

Comment: Figure 8 of the AKA report is a preliminary remedial grading plan for the project. It shows the recommended location of the keyway and temporary shoring piers required to mitigate the portion of Landslide B within the property. The plan does not show the recommended keyway subdrain and the location of the outfall line. It is recommended that this information be added to the remedial grading plan.

Response: The proposed buttress keyway extends across the upper portions of lots 5 through 8 and is intended to provide mitigation of the potential site impacts from Landslide B (see Figure 1 of our June 16, 2010 report for approximate location of Landslide B), to provide a buttress against other potential landslides encroaching into the improvement areas on the subject property from the golf course area upslope, and to intercept groundwater seepage that is believed to be flowing onto the site from the upslope golf course area. Figure 8 from our June 16, 2010 report has been modified to show a preliminary layout of the remedial grading subdrains and is attached. We have also attached Figure 8A, which shows the same subdrain layout on a conceptual development plan with possible house locations. Figure 6 (Geologic Cross Section A-A') from our June 16, 2010 report has been modified to show the proposed remedial grading keying/benching and subdrains on a cross section of existing topography and is also attached. As indicated on the modified Figures 8 and 8A this is a preliminary layout of remedial grading drain locations. Remedial grading excavations should be

evaluated and approved by the geotechnical engineer and/or engineering geologist in the field at time of construction. Additional drainage and/or re-alignment of drains may be recommended to account for exposed conditions. The as built locations of all subdrains should be field surveyed by the project civil engineer.

Item 2

Comment: Figure 8 of the AKA report also shows the limits of the remedial grading required to mitigate Landslide A. However, the preliminary plan does not show the recommended locations of the keyways, benches and subdrains required as part of the repair of Landslide A. It is recommended that Figure 8 be updated to include this information. This information is important as these items will likely extend beneath the proposed building envelopes for Lots 1, 2, 6, and 7 and could be impacted by house foundation systems.

Response: Refer to Item 1 response above.

Item 3

Comment: The AKA report recommends that temporary shoring be installed along the common property line within Landslide B. For layout and estimating purposes the AKA report provides preliminary dimensions and a steel reinforcement schedule for the shoring piers. However, the report does not provide the geotechnical design parameters required to actually engineer the temporary shoring wall. It is recommended that AKA provide geotechnical design parameters for the temporary shoring.

Response: In our June 16, 2010 report we recommended that approximately 475 lineal feet of temporary shoring be installed at the uphill property boundary directly upslope of the deeper portions of the proposed buttress keyway excavation with upslope drainage. The approximate extent of the shoring was illustrated on Figure 8 of our report. It was indicated in our report that the shoring may consist of individual piers spaced at no more than 6-foot on center and should be designed to retain approximately 12 to 15 feet of soil. For preliminary planning purposes it would be appropriate to assume shoring piers spaced at 6 feet on center and designed to retain 15 feet of soil. For structural design of the piers it can be assumed that for the short-term, temporary loading condition, the retained soil exerts an active equivalent fluid pressure of 40 pounds per cubic foot acting over the entire spacing between adjacent piers. Lateral loads on the piers may be resisted by passive pressures acting against the sides of the piers. We recommend an allowable passive pressure of 350 psf per foot of depth to a maximum value of 3500 psf (factor of safety ≈ 2). This value can be assumed to be acting against 2 times the diameter of the individual pier shafts starting at the base of the active zone.

Item 4

Comment: The AKA report indicates that gravity type retaining walls will likely be required as part of the construction of the bioretention/detention basins. The report does not contain geotechnical design parameters for the gravity retaining walls system. It is recommended that this information be provided.

Response: Mechanically Stabilized Earth (MSE) type walls, are anticipated in the area of the bioretention/detention basins. Preliminary geotechnical design parameters for MSE walls at the site are given below. These recommendations should be considered preliminary and should be reviewed once design level grading plans with wall layouts have been prepared.

Minimum Foundation Embedment Depth: MSE walls should maintain a minimum foundation embedment depth of 18-inches plus 10 percent of the wall height. Walls constructed on and/or within 10 feet of the crest of a slope with a downward gradient of 4:1 (horizontal to vertical) or steeper should be evaluated for global stability and may require modification of embedment depth.

Terraced Walls: Terraced walls should be designed for surcharge effects and evaluated for global stability on a case specific basis.

Allowable Foundation Bearing Pressure: At the minimum foundation embedment depth, an allowable bearing pressure of 2000 pounds per square foot (psf) for dead loads, 3000 psf for dead plus live loads and 4000 psf for all loads, including wind and seismic can be assumed.

Select Granular Fill for Reinforced Zone: Select granular backfill used in the MSE wall reinforced zone should be reasonably free of organics and deleterious material, have a Plasticity Index no greater than 10, and conform to the following gradational limits.

U.S. Sieve Size	Percentage Passing
2"	100
#40	0-60
#200	0-35

The reinforced zone fill should be placed in lifts and compacted to a minimum relative degree of compaction of 90% as determined by ASTM Test Designation D1557-latest revision.

Retained Soil: The MSE walls are anticipated to retain compacted engineered fill generated from on site excavations. This material is anticipated to be predominately clay of medium to high plasticity. For MSE wall design purposes, the engineered fill can be assumed to have an effective friction angle of 22 degrees and a moist unit weight of 120 pcf. Retained engineered fill should be placed in lifts and compacted to a minimum relative degree of compaction of 90% as determined by ASTM Test Designation D1557-latest revision.

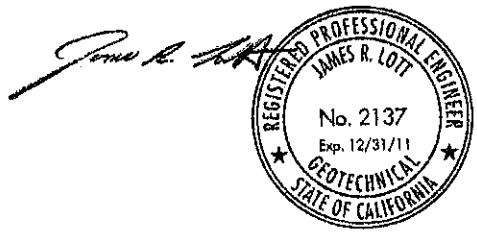
MSE Wall Drainage

In addition to the unit drainage fill (typically ¾-inch drainrock placed within and immediately behind the MSE wall facing elements), a vertical chimney drain should be provided at the rear of the reinforced zone for walls in excess of 3 feet in height. The subdrain may consist of either 3/4-inch drainrock wrapped in an approved, non-woven, polyester geotextile such as Mirafi 140N or 140NL, or a 4-ounce equivalent or alternatively may consist of Class II Permeable Material conforming to CalTrans specifications. The chimney drain should be at least one foot in width and should extend for at least 70 percent of the wall height. The drainage material should be capped with on-site, compacted, relatively impervious soils (an impermeable plug). A perforated drain pipe (4-inch minimum diameter) should be bedded in 2 to 3 inches of gravel at the base of the subdrain in order to convey collected water. Schedule 40 PVC, SDR 35 PVC or ABS, Contech A-2000 PVC drainpipe, or equivalent should be used for the drain system. The subdrain pipe should be connected to a system of closed pipes (non-perforated) that lead to a suitable discharge facility. At the location where the perforated subdrain pipe connects with the solid discharge drainpipe, drainrock backfill should be discontinued. A "clay plug" should be constructed out of relatively impervious soils to direct collected water into the perforated pipe and minimize the potential for water collecting around the solid drainpipe and saturating the adjacent soils.

The opinions and recommendations presented in this letter are made in accordance with generally accepted geotechnical engineering principles and practices. No other warranty, either expressed or implied, is made.

If you have any questions concerning this letter, please call us.

Very truly yours,



James R. Lott, G.E.
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