GEOTECHNICAL INVESTIGATION UPDATE

Dees & Associates, Inc.
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APPENDIX F

October 5, 2013

Project No. SCR-0720

SANTA CRUZ SEASIDE COMPANY
% Craig French
911 Center Street, Suite B
Santa Cruz, California 95060

Subject: Update to Geotechnical Investigation by Pacific Crest Engineering, Inc, Dated January 28, 2008

Reference: Proposed La Bahia Hotel
215 Beach Street
APN'S 007-214-01, 02
Santa Cruz, California

Dear Mr. French:

As requested, our firm has assumed geotechnical responsibility for the referenced project. The recommendations presented in Pacific Crest Engineering Inc. report, dated January 28, 2008 and the revisions and addendums presented in this report may be used for design and construction of the proposed improvements. This report shall be used where conflicting recommendations are encountered.

The Zinn Geology report should be considered a separate document and the client shall recognize that our firm has not assumed responsibility of the Zinn Geology report attached to the Pacific Crest Engineering, Inc. report. We recommend consulting directly with Zinn Geology for geology related issues, questions or updates.

Very truly yours,

DEES & ASSOCIATES, INC.

Rebecca L. Dees
Geotechnical Engineer
G.E. 2623

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GEOTECHNICAL UPDATE REPORT

Purpose

The purpose of our geotechnical update was to review the Pacific Crest Engineering, Inc. January 28, 2008 Geotechnical Investigation, update the geotechnical aspects of the report and develop addendum recommendations for stone column foundation systems.

Scope of Work

Our scope of work included a site reconnaissance and review of available data in our files regarding the site and region, review of the Steven Raas & Associates, Inc. September 2001 Geotechnical Investigation, review of the Pacific Crest Engineering, Inc. January 28, 2008 Geotechnical Investigation, review of the Zinn Geology January 27, 2008 Geologic Investigation, update the geotechnical aspects of the Pacific Crest Engineering, Inc. January 28, 2008 Geotechnical Investigation and develop updated geotechnical recommendations including stone column foundation alternatives for the proposed hotel project.

Site and Project Description

The project site is located at 215 Beach Street and is bordered by Beach Street to the south, Main Street to the west, First Street to the north and Westbrook Street to the east. The site is sloped at about a 10 to 15 percent slope gradient and has been extensively graded with cuts and fills up to 8 feet in thickness to accommodate the existing improvements. The site is currently developed with multiple one to three story structures and paved parking.

A geotechnical investigation for rehabilitating and adding a new addition to the existing hotel building was performed by Steven Raas & Associates, Inc. in September 2001. The project scope changed and now the project consists of removing the existing improvements and constructing a new hotel. The new hotel will be three to four stories high with two levels of underground parking. An updated geotechnical investigation was performed by Pacific Crest Engineering, Inc. on January 28, 2008 to address the change in the scope of the project and to provide detailed recommendations for the proposed project. Review of the documents provided to us indicate the building dimensions and floor elevations have changed since the 2008 geotechnical report was issued, however, the changes do not affect the geotechnical recommendations for the project.

Soil Conditions

The previous reports indicate the soils at the site consists of a thin layer of fill over native silty sand over sandstone bedrock with the exception of the soil adjacent to Beach Drive at the base of the slope, where inter-bedded clays and sands were encountered above the bedrock.

The depth to dense bedrock varies from 11 to 44 feet below grade with a general downward trend to the east-southeast. The bedrock is typically 18 to 24 feet across most of the site and dips steeply to the east about 60 feet west of east property line. Bedrock is 22 to 44 feet deep at the eastern property line. Note that Table No. 1 of the Pacific Crest report has two errors in the bedrock depth; the bedrock depth at EB-2 (1984) should be 21.0 feet and the bedrock depth at EB-4 (1984) should be 26 feet.

Two borings were drilled by our firm at 301 Beach Street, about 65 feet east of the property. Our borings encountered bedrock at a higher elevation than the bedrock at the eastern property line of the La Bahia site which indicates there is likely a bowl shaped depression in the vicinity of Westbrook Street. Review of the borings at the La Bahia site and the borings at 301 Beach Street across Westbrook Street indicate the inter-bedded clays are located in the southeast corner of the La Bahia site and the clays extend further inland at 301 Beach Street.

Groundwater Conditions

Groundwater was encountered 9.5 to 24 feet below existing grade, although the Pacific Crest report indicates the groundwater levels were 8 to 24 feet below grade. Post construction groundwater depths will range from the ground surface to a depth of about 19 feet below the ground surface.

Liquefaction and Lateral Spreading

Liquefaction occurs when saturated fine grained sands, silts and sensitive clays are subjected to shaking during an earthquake and the water pressure within the pores builds up leading to loss of strength. The Pacific Crest Engineering report indicates there is a liquefaction potential in some soil zones above the bedrock.

The Pacific Crest report used a peak ground acceleration of 0.73g in their analysis, however, R*ecommended Procedures For Implementation Of DMG Special Publication 117 Guidelines For Analyzing And Mitigating Liquefaction In California* recommends using the median (50 percentile) or median plus one standard deviation (84 percentile) acceleration plus one dispersion when performing liquefaction analyses. The maximum median plus one standard deviation provided in the Zinn Geology report is 0.71g.

Pacific Crest Engineering has estimated settlements to be on the order of 1.2 to 7.8 inches, however, their liquefaction analysis indicates the zone of liquefaction extends into the sandstone bedrock and clay layers that are not susceptible to liquefaction. Our firm has recalculated the liquefaction potential for two of the soil profiles assuming the bedrock and clay do not liquefy and using a median plus one standard deviation of 0.71g. Our updated analysis indicates the maximum settlement from liquefaction would be 7.6 inches, which is still in the unacceptable range for development.

Liquefaction Mitigation

Drilled Piers

To mitigate liquefaction settlement and lateral spreading, the Pacific Crest Engineering, Inc. report provided recommendations to penetrate the liquefiable soils with drilled piers embedded into sandstone bedrock. Drilled piers would support the structure and mitigate liquefaction induced settlements and lateral spreading. Piers would support the structure but the soils around the piers may settle. This can result in damage to utilities, pavements, walkways and any other improvements not supported on the piers.

Vibro-Displacement Stone Columns

As an alternative to drilled piers, vibro-displacement stone columns can be used to densify the soil, increase bearing capacity and provide liquefaction mitigation. This would eliminate the need for deep piers, reduce the volume of soil that has to be hauled off the site, eliminate settlement and lateral loads from liquefaction and eliminate the need to incorporate utilities into the foundation of the structure. The use of flexible connections for utilities at the boundary of the stone columns is still recommended as utilities located off site will still be susceptible to liquefaction induced settlements and lateral displacements.

Vibro-displacement stone columns are a ground improvement technique that constructs dense aggregate columns by means of a crane supported downhole vibrator. The placement of stone into the ground displaces the adjacent soil creating denser soil condition between the columns. Stone columns provide additional load bearing capacity and mitigate excessive pore pressures that lead to soil liquefaction.

Stone columns need to penetrate the liquefiable soil and be embedded at least 1 foot into sandstone bedrock. Assuming the garage floor slab is at an elevation of about 14 feet, most of the stone columns would be less than 25 feet in depth. The bedrock along the east and south edges of the site is much deeper and stone column depths up to 45 feet should be anticipated in these areas.

Vibro displacement methods will cause the ground to vibrate and there are structures on the adjacent properties. The contractor should take precautionary measures to minimize vibration during ground modification operations. It is the contractor's responsibility to determine the means and methods of vibratory measurement and ensure the construction process does not impact adjacent structures.

Stone column design is beyond the scope of our investigation, however, for estimating purposes 30 inch diameter stone columns with a triangular center to center spacing of 10 feet may be assumed. The soil engineer, architect, structural engineer and specialty ground modification contractor should work closely with each other in the design process and the development of construction specifications and inspection requirements.

Structures located over stone columns could be supported on structural mat foundations or a grid of reinforced spread footings. The top 3 feet of soil will need to be removed and replaced as compacted engineered fill reinforced with geotextile fabric equivalent to Mirafi 500X to accommodate mat slab or spread footing foundations. Specific recommendations for foundations founded upon stone column should be developed in conjunction with the design of the stone columns.

Seismic Design Considerations

The seismic design parameters presented in the Pacific Crest Engineering, Inc. report are outdated and seismic coefficients changed with the 2010 CBC. The following ground motion parameters may be used in seismic design and were determined using the USGS Ground Motion Parameter Calculator in accordance with the 2010 CBC: Ss, Site Class B (0.2 sec) = 1.500g; S1, Site Class B (1.0 sec) = 0.600g; SMs, Site Class D (0.2 sec) = 1.500g; SM1, Site Class D (1.0 sec) = 0.900g; SDs, Site Class D (0.2 sec) = 1.000g; SD1, Site Class D (1.0 sec) = 1.600g. The Seismic Design Category (SDC) is "D".

The underlying soils are classified as a "Site Class F" because the soils are liquefiable. However, the structure will be supported on piers that are founded below the liquefiable soil or on stone columns that mitigate liquefaction. Therefore, a "Site Class D" may be used in design.

Slabs-on-Grade

The use of sand over the moisture barrier below slabs is no longer considered acceptable where water can get into the sand and pond on the membrane. Due to the presence of high groundwater and the potential for water to become trapped on the membrane, we recommend not using the sand on top of the membrane and placing the concrete directly on top of the membrane. A specialist in the area of concrete curing should be consulted if differential shrinkage is a concern due to the impermeable membrane at the lower contact of the concrete slabs.

Pavements

The prime coat recommended in the Pacific Crest report only needs to be used if the asphalt overlying the aggregate base section will be delayed and contamination of the baserock surface or damage from inclement weather is anticipated.

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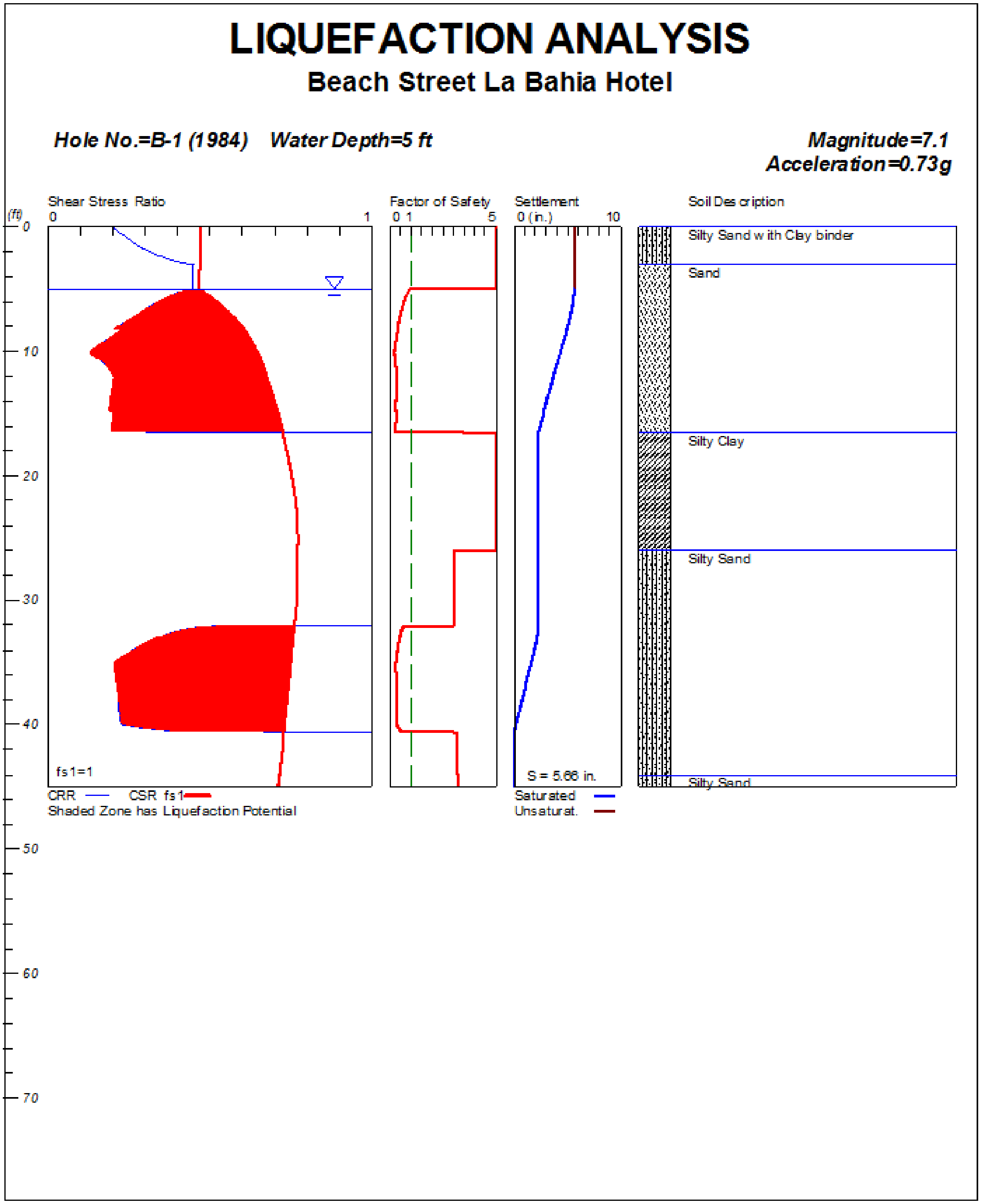
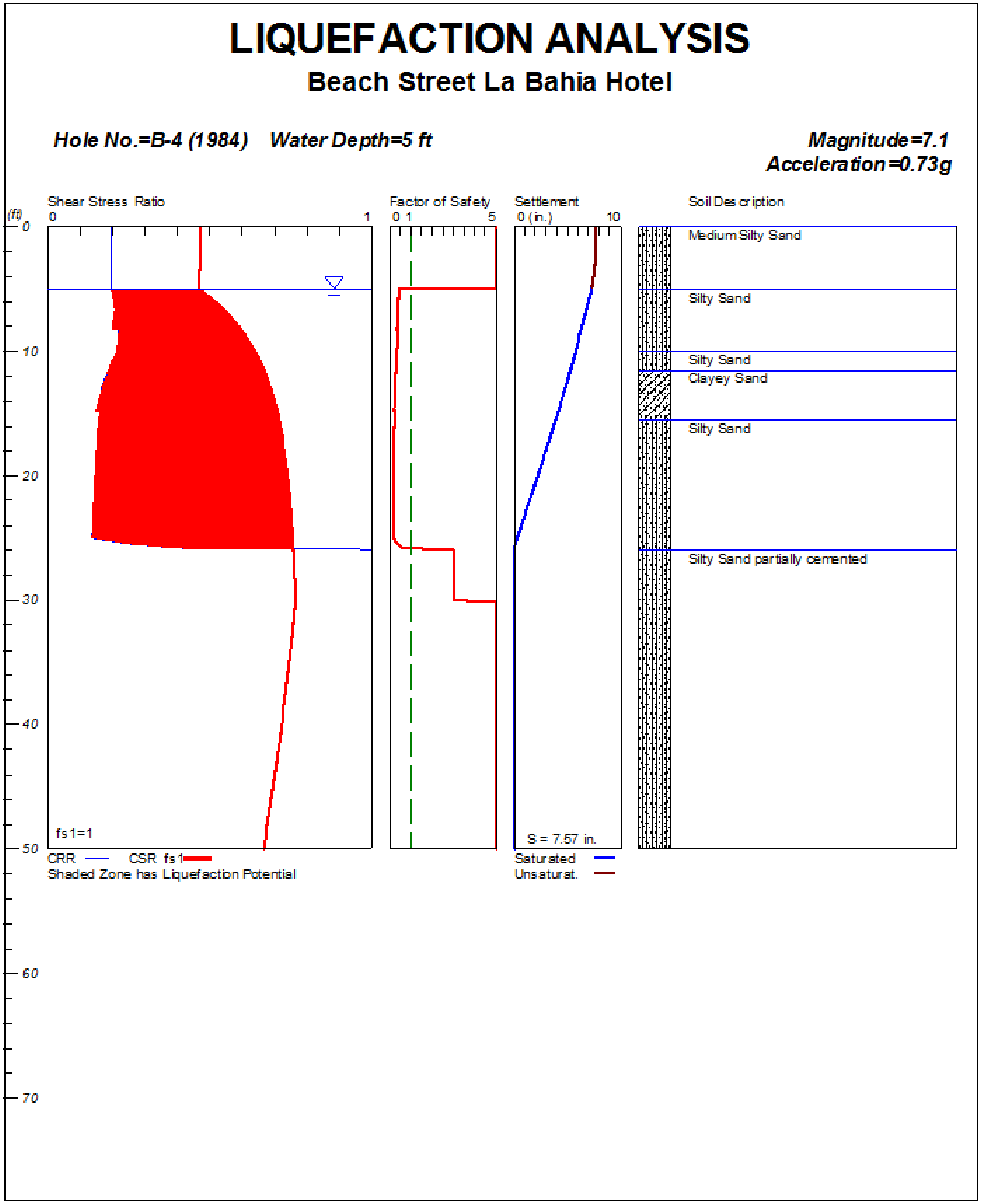
APPENDIX F

LIQUEFACTION ANALYSIS RESULTS



CivilTech Corporation SCR-0720 Plate A-1



CivilTech Corporation SCR-0720 Plate A-1

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December 3, 2013 Project No. SCR-0720

SANTA CRUZ SEASIDE COMPANY
% Craig French
911 Center Street, Suite B
Santa Cruz, California 95060

Subject: Liquefaction Mitigation Alternatives

Reference: Proposed La Bahia Hotel
215 Beach Street
APN'S 007-214-01, 02
Santa Cruz, California

Dear Mr. French:

Our letter dated October 5, 2013 recommended vibro-displacement stone columns as an alternative liquefaction mitigation for the proposed hotel project. We understand the vibrations associated with the vibro-displacement stone columns are a concern for the existing buildings that will be retained and incorporated into the proposed hotel complex. This letter provides alternative recommendations for liquefaction mitigation both under existing and proposed structures.

There are several methods that can be used to modify the soil without causing excess vibrations to the retained buildings, such as compaction grouting, jet grouting and deep soil mixing.

Compaction grouting consists of staged injection of low slump grout into the ground to densify the soil. Compaction grouting creates bulbs of grout that stack on top each other to form a column. Columns of grout are created to form a primary grid then secondary columns are placed between the primary columns to densify the soil. Compaction grouting can be done with small portable equipment and there are several ways compaction grouting can be performed below existing buildings; the building can be raised to allow access under the building, openings can be made through the first floor of the building to allow injection of the grout into the ground or the first floor could be removed to allow access to the ground below.

Jet grouting consists of mixing cement with the soil to form "soilcrete" columns placed in a grid pattern. Jet grouting does not densify the soil to the same extent as compaction grouting although some compaction is achieved; jet grouting is primarily used to transfer loads to more competent ground below the potentially liquefiable soil layers. Jet grouting could be performed under the existing buildings in the same manner as compaction grouting.

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Deep soil mixing consists of mixing cement with soil to create walls of “soilcrete” that forms a lattice type structure beneath the ground surface. The lattice structure forms boxes that contain liquefiable soil to prevent lateral spreading and provide vertical load support. Deep soil mixing to mitigate liquefaction is an emerging technology and is not well understood at this time, although there are multiple case studies where soil mixing was effective in mitigating damage to structures overlying liquefiable soils. Deep soil mixing does not appear to be practical below existing structures but could be used under new structures.

Very truly yours,

DEES & ASSOCIATES, INC.

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