QUANTUM GEOTECHNICAL INC.

Project No. J014.G
May 6, 2022

Ms. Samantha Hauser
Senior Vice President of Development
City Ventures
444 Spear Street, Suite. 200
San Francisco, CA 94105

Subject: Proposed Residential Development
Redwood Drive at Gravenstein Highway
Cotati, California
PRELIMINARY GEOTECHNICAL ASSESSMENT

Dear Ms. Hauser:

At your request, we have reviewed the referenced documents and performed a backhoe test pit investigation, to evaluate and assess the main geotechnical features of the site and identify if any geotechnical constraints exist on the site that may affect the proposed development.

PROJECT DESCRIPTION

It is our understanding that the proposed project consists of developing the site for a townhome development. Preliminary plans indicate that the development will consist of 32 three story townhome buildings and associated improvements. Some of the buildings may include ground floor retail units. The buildings are planned to be founded on a post-tensioned foundation system. Planned grading for the site, will consist of mainly fills to achieve the design grades.

PREVIOUS GEOTECHNICAL WORK

Based on information provided by you, the site has undergone some grading activities in the past and geotechnical investigations were previously performed.

In 1994, Monk & Associates prepared a Wetlands and Rare Plant Mitigation plan for the site (reference 1), for a proposed commercial retail center. In 1998, Monk & Associates prepared a permit application for the Mitigation Plan, and the Department of the Navy approved the permit on November 1998, to fill approximately 2.5 acres of seasonal wetlands to facilitate construction of the proposed commercial retail center. The Mitigation Plan indicated that the depth of planned filling in the wetland areas ranged from 14 to 18 inches, and included a pad fill area. Records of

the grading and backfilling such as lateral extent and compaction are unavailable, however, it is our understanding that the grading work was performed in 1999.

In 2000, Kleinfelder, Inc. performed a geotechnical investigation (reference 2) for a proposed business park, which included the subject site and the adjacent Lowe's hardware store property. Borings B-1 through B-5 of the 2000 report were drilled on the subject property. In 2003, Kleinfelder, Inc. performed a geotechnical investigation (reference 3) primarily for the Lowes' site and the subject site. Borings R-1 through R-7 of the 2003 report were drilled on the subject property. With regard to the subject site, the subsurface conditions essentially consisted of stiff and very stiff silty or sandy clays to the maximum depth explored of 31 feet, with some localized sandy layers and surface fill layers. The near surface soil is moderately to highly expansive. The previous investigations identified the presence of potentially collapsible soil and old fill within the upper 4 to 6 feet of the site.

During the 2000 investigation, groundwater was generally recorded at depths ranging from 8½ to 9½ feet below existing site grades. Two borings encountered a perched water table at depths of one foot and 2½ feet below existing site grades. During the 2003 investigation, groundwater was encountered in most of the borings drilled at depths ranging from 8 to 23 feet below existing site grades.

CURRENT GEOTECHNICAL WORK

The old fill and collapsible soil identified in the 2000 and 2003 investigations, would require mitigation to properly develop the site. The purpose of our current geotechnical study investigation is to identify the presence of potentially collapsible soil and evaluate the consistency of the previously placed fill area and the previously filled old wetland areas, and determine if any mitigation is needed for development.

On February 23, 2022, we advanced a total of eight test pits using a track mounted mini excavator. The test pits were excavated to depths ranging from 7 to 10.5 feet below the current ground surface. The locations of the test pits are shown on the attached Site Plan, Figure 1. Test pits were performed in areas of a previously filled pad area, in areas of previously filled wetland areas, and in native areas where no historic grading is known to have occurred. The sides of the test pits were logged by our geologist and representative samples of soil were collected for future laboratory

testing. At the northern part of the site, a large soil fill stockpile approximately 280 feet by 190 feet in plan area and approximately 12 feet high is present. A sample of the stockpile material was taken for future laboratory testing.

The conditions encountered in our test pits are summarized as follows.

Old Fill Pad Area

Test pits Tp-1 and TP-3 were excavated in the area of the previously filled pad. These test pits encountered approximately one foot (TP-3) to three feet (TP-1) of compact, dense fill material below the ground surface. This fill soil consisted of slightly moist, stiff sandy silt with sparse angular gravels. Native soil encountered below the fill consisted of stiff, moderately plastic silty clay of moderate moisture content.

Previously Filled Wetland Areas

Test pits TP-2, TP-5, and TP-7 were advanced fully to partially within the areas of previously filled wetlands of approximate depth 14 inches. Within these test pits, we encountered dense sandy to silty sand fill soil to depth 12-16 inches below the existing ground surface. Below this material, we encountered native soils ranging from stiff lean silty clay to medium stiff and soft fat clay overlying stiff clayey silt.

Native Areas

Test pits TP-4, TP-6, and TP-8 were excavated in areas mapped as not having been graded in the past. In test pit TP-4 we encountered 4.5 feet of soft to medium stiff fat clay soil below the ground surface, and underneath we encountered stiff silty fine sand. In test pit TP-6, we encountered 2.0 feet of soft fat clay soil overlying 3 feet of stiff clayey silt, followed by a thin, lenticular deposit of fine silty sand, and finally stiff clayey silt at depth 9.0 feet. In test pit TP-8, we encountered 6-7 feet of stiff, dense sand to lean sandy silt, which graded to stiff clayey silt at depth 7.0 feet.

ASSESSMENT AND CONCLUSIONS

Based on our subsurface investigation, the fill placed in the pad fill area and old wetland areas, was clean of any deleterious material, was placed on clean native soil (stripped of vegetation), and was at least medium dense or stiff in consistency. The depth of fill in the wetland areas was consistent with the depths of 14 to 18 inches presented in the wetland mitigation plan (reference 1).

In the native areas, the near surface soil was found to be generally consistent with the conditions encountered in references 2 and 3, with the exception that no potentially collapsible silt material was encountered. The near surface soil was soft and may require mitigation by subexcavation of 2 feet and recompaction as engineered fill, where soft soil is encountered. Depending on conditions at the time of grading, the depth of soft soil to be mitigated may vary and actual depths will be determined at the time of grading.

The near surface soil varies across the site from a sandy fill soil, sandy clay fill soil, and native highly expansive clay soil. This variation in soil types will lead to variable performance and will require mitigation depending on the thickness of planned fills required for design grades. If the thickness of fill is more than 2 feet, we recommend that beyond any soft soil mitigation discussed above, the current site surface be ripped to a depth of 12 inches, moisture conditioned and compacted to a relative compaction ranging from 88% to 92% relative compaction at a moisture content of at least 4% over optimum. If less than 2 feet of fill soil is needed to raise the site to design grade we recommend that beyond any soft soil mitigation discussed above, the upper 18 inches of native soil be subexcavated, the exposed subgrade ripped, moisture conditioned and compacted to the compaction requirements stated above. The subexcavated soil can then be reused as fill and recompacted to the compaction requirements stated above. Once a preliminary grading plan is prepared we can provide definition of areas requiring the specific subexcavation or site preparation recommendations.

Planned utility trenches deeper than 8 feet below current grade may encounter groundwater, and the underground contractor must provide measures to control the groundwater from impacting utility construction.

The liquefaction potential for the site is low.

The near surface soil is corrosive to buried metal pipes and fittings. A corrosion engineer should be consulted to provide corrosion protection measures.

Post-tensioned slabs are an acceptable foundation system to support planned structures. Post-tensioned slab foundations may not be appropriate for buildings that contain commercial/retail units and a spread footing with slab-on-grade floor system is preferred. Due to the highly expansive soil present on site, for these buildings we recommend that the upper 2 feet of the building pad consist of import non-expansive soil.

Should there be any questions or should you require any additional information, please contact our office at your convenience.

Sincerely,
Quantum Geotechnical Inc.

Simon Makdessi, P.E., G.E.
President

Attachment: Figure 1, Site Plan.

REFERENCES

1. Monk & Associates (1994), Wetlands and Rare Plant Mitigation Plan, Wine Country Retail Outlet Mall, Cotati, California, Dated May 30, 1994.

2. Kleinfelder (2000), Geotechnical Investigation Report, South Sonoma Business Park, Cotati, California, Kleinfelder Job No.: 41-4584-01, Dated June 29, 2000.

3. Kleinfelder (2003) Geotechnical Investigation, Lowe's HIW and Cotati Commons Shopping Center, Cotati, California, Kleinfelder Job No.: 34639, Dated October 10, 2003

SITE PLAN

QUANTUM GEOTECHNICAL, INC.

Proposed Commercial Development Cotati A Redwood Drive, Cotati Sonoma County, California	Project No. J014.G	Drawn by: D.T.	Figure No. 1