

Appendix D: Preliminary Geotechnical Report

QUANTUM GEOTECHNICAL, INC.

Project No. D047.G2
October 5, 2018

Mr. Cory Kusich
Land Acquisition Executive
SCS Development
404 Saratoga Avenue, Ste. 100
Santa Clara, CA 95050

Subject: Proposed Residential Development
Catalina 2
1433 - 1493 El Camino Real
APNs 224-48-004, 224-48-005, 224-48-006
Santa Clara, California
PRELIMINARY GEOTECHNICAL ASSESSMENT

Dear Mr. Kusich,

At your request, we are pleased to submit herein our preliminary geotechnical findings for the proposed project at the subject site. The purpose of this work is to evaluate the main geotechnical factors of the site that may impact the design and construction of the project.

PROJECT DESCRIPTION AND SITE CONDITIONS

It is our understanding that the proposed project consists of developing the site for the construction of a 39 unit townhome development. Grading details are not known but are anticipated to consist of cuts and fills of the order of 2 feet or less. The building structures are expected to be 3 stories in height of wood frame construction, and supported on a post-tensioned slab foundation.

SITE DESCRIPTION

The site is located in the central part of Santa Clara, within level terrain, The project is rectangular in shape and consists of three parcels totalling approximately 1.70 acres in size. The parcels are occupied by active commercial auto related business, concrete and asphalt pavements, and an open field on the northern part of the parcel.

GEOLOGIC SETTING

Regionally, the subject property lies within Coast Ranges Geomorphic Province of California. This province consists of a series of mountain ranges separated by northwest trending valleys, subparallel to branches of the San Andreas and Hayward fault zones. The Coast Ranges Geomorphic Province extends from the Transverse Ranges Geomorphic Province to the south to the Klamath Mountain Geomorphic Province near the border with Oregon. It is bound on the west by the Pacific Ocean and to the east by the Great Valley basin Geomorphic Province. Major fault zones and subordinate fault zones found in the Coast Ranges Province typically trend in a northwest-southeast direction.

Specifically, the site resides within the northern Santa Clara Valley. This valley is a broad, level terrain consisting predominantly of the fine grained sediments being shed off of the Santa Cruz Mountains to the west and the Diablo Range to the east, and into major drainage systems like the northwest flowing Coyote Creek. The alluvial sediments that compose the upper several tens of feet throughout much of the valley tend to be younger, of Holocene age. As such, these sediments will tend to be finer grained and less consolidated.

The nearest active fault is the south east extension of the Hayward Fault, and is located approximately 5 miles southeast of the site. Our review indicates that there are no known active faults crossing the site and the site is not mapped within a State of California Earthquake Fault Zone.

The California Geological Survey (CGS), Seismic Hazard Zones Map, for the San Jose West Quadrangle (2002), and Santa Clara County Liquefaction Hazard Zone Map (2002) indicates the site is located within an area of potential liquefaction.

PREVIOUS GEOTECHNICAL WORK

A preliminary Geotechnical Investigation was performed for a larger site for 1399-1493 El Camino Real, by Cornerstone Earth Group., dated December August 25, 2015. A total of two borings and two Cone Penetrometer Test (CPT) soundings were advanced to a maximum 30 to 35 foot depth. Only boring EB-2 and CPT-2 were advanced within the north east corner of the subject site (1375 El Camino Real).

The subsurface conditions encountered in the borings and CPTs varied and consisted of 2 to 3 feet of non-engineered fill over variable sequences and layers of clays, silts and sands, but predominantly clays. The consistency of the clays was very stiff to hard in the upper 10 feet and became generally firm to stiff with some soft zones. Plasticity Index (PI) testing in the upper 3 feet of soil revealed the material to have a PI of 24 which assesses the material as highly expansive.

No groundwater was encountered in the borings, however, the CPTs assessed a groundwater level at approximately 25 feet. Given the historic high groundwater level from CGS report, a design groundwater level of 10 feet was used.

The report assessed the project area to be susceptible to settlement from consolidation, liquefaction and dry compaction, with total estimated settlements of the order of 2 to 2.5 inches.

2017 SUBSURFACE INVESTIGATION

In October 2017, Quantum Geotechnical, Inc. advanced four soil borings by hollow stem auger throughout the site to depths ranging 16.5 ft. to 45 ft. The subsurface conditions encountered consisted generally of 4 to 9 feet of highly expansive silty clay (Plasticity Index values of 24 to 29), underlain by a layer of sandy silt over variable sequences of medium dense to dense sand and gravel, silts, sandy clay and silty clay to the maximum depth explored of 45 feet. At depth approximately 18 to 27 feet, a layer of soft and firm was encountered.

Groundwater was encountered in each boring at a range of depths from 11 to 14.5 feet below existing grade.

The combined liquefaction settlements within the medium dense sand and consolidation induced settlements of the soft clay were estimated to be of the order of 2.5 to 3 inches, with differential settlement of 1.5 inches over 100 feet.

PRELIMINARY GEOTECHNICAL FINDINGS

Based on our research, review of available data, site reconnaissance, and subsurface investigation development of the site appears feasible from a geotechnical viewpoint.

The prominent geotechnical features of the site are the presence of a layer of old non-engineered fill (in the Cornerstone borings), near surface expansive clay, the potential for settlement due to liquefaction and potential for settlement due to consolidation of the underlying soft clay layer (between 18 to 27 feet). In the 2017 report, the total settlements due to liquefaction and consolidation were estimated to be of the order of 2.5 to 3 inches.

Due to the proximity of the site area to several nearby active faults, including but not limited to the Hayward, Calaveras, and the San Andreas fault zones, strong ground shaking could occur at the site as a result of an earthquake on any one of the faults. The structures can be properly designed using the current standard of practice for seismic loading criteria.


Standard grading practices are expected for mass grading and underground utility construction. Where encountered, the undocumented non-engineered fill will need to be sub-excavated until native ground is encountered and could be reused and recompacted engineered fill. In addition, gravity utility lines will need to be designed to incorporate the anticipated settlements stated above

The near surface highly expansive soil material is prone to heave and shrink movements with changes in moisture content and must be carefully considered in the design and construction of foundations, drainage, hardscape and pavements. The near surface expansive soil can be accounted for in the design and construction of foundations, miscellaneous concrete flatwork and pavements.

A post-tensioned slab foundation is the preferred foundation system to support the residential townhome structures, and is acceptable for the site. The slab is to incorporate the anticipated settlements from liquefaction and consolidation.

We trust these comments are sufficient for your purposes. Should you have any questions or require additional information, please contact our office at your convenience.

Sincerely,
Quantum Geotechnical, Inc.


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

