



GEOTECHNICAL CONSULTANTS

December 10, 2021 - DRAFT
Job No. 3964.0

Lake County Development Co., LLC
Attention: Mr. Richard Lavelle
12762 Highway 29
Lower Lake, CA 95457

Geotechnical Consultation
Proposed Development
Highland Farms
Highland Springs Road
Lakeport, California

This report presents the results of our geotechnical reconnaissance for the subject site. The purpose of this work, as outlined in our agreement dated November 9, 2021, was to provide general comments regarding feasibility of the project from a geotechnical engineering viewpoint.

We understand that the project consists of constructing processing, nursery, and cultivation (greenhouse) buildings. In addition, bioretention facilities, and vehicle driveway and parking areas are to be constructed. Further, four cultivation areas are planned. The structures are anticipated to be one story, metal framed with concrete slab-on-grade floors. Actual foundation loads are not known at this time; however, we expect that the loads will be typical for the type of construction indicated. The vehicle parking and driveway areas are generally planned to be gravel only. However, some portions will likely be asphalt paved. We anticipate that cuts and fill may range to about 22 and 14 feet high, respectively. Retaining walls may be needed.

WORK PERFORMED

We reviewed selected geologic data and maps from our files, *Google Earth*, *LiDAR* imagery, and maps and information provided by others. A listing of the literature reviewed is presented in the *Bibliography* at the end of this report.

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Highland Springs Road
Job No. 3964.0
December 10, 2021 - Draft
Page 2

On November 24, 2021, our engineering geologist performed a surface reconnaissance of site. During our reconnaissance, we observed the topography, the surface soils, rock outcroppings, and nearby cutbanks. No subsurface exploration was performed during this phase of work.

Our scope of work did not include an evaluation of any potential hazardous waste contamination of soil or groundwater at the site. Further, our work did not include an evaluation of areas beyond the described proposed improvements (i.e. existing structures or other undeveloped land).

Literature Research

The published geologic map by McLaughlin, et al. (2018) indicates that the site is underlain by sandstone and shales of the Franciscan Mélange. The Franciscan bedrock in this area is typically moderately hard to very hard, strong and little to deeply weathered.

The geologic maps reviewed do not indicate the potential presence of landsliding near the planned development area.

Interactive geologic maps of the area prepared by the California Geological Survey (CGS, 2018 revision) do not show the subject parcel to be located within current Alquist-Priolo Earthquake Fault Zone boundaries. The nearest faults considered to be 'Holocene-active' (experiencing surface rupture within about the last 11,000 years) are the: 1) Wright Way fault, located about 1-¼ miles to the south; 2) the Adobe Creek fault located about 2 miles to the east; 3) the Collayomi fault zone located about 4-½ miles to the east; 4) the Maacama fault zone, located about 6-¼ miles to the southwest; 5) the Bartlett Springs Fault, located about 20-½ miles to the northeast; 6) and the San Andreas fault zone located about 31 miles to the southwest.

SITE CONDITIONS

The proposed development area is located about 1 mile west of the Highland Springs Reservoir (approximate site coordinates: 38.941523° N; -122.929765° W). The proposed development area are shown on Plate 1.

The natural topography of the area gently slopes to the east from about 8:1 to about 12:1 (horizontal to vertical) with some isolated steeper areas. The proposed development is within a small valley that opens to the southeast. The road enters the area from the east into crossing the valley to the proposed improvement area. The site is generally covered with grasses, with scattered fir trees and chaparral at the perimeters of the valley.

Higland Springs Road
Job No. 3964.0
December 10, 2021 - Draft
Page 3

Exposed soils are typically clayey, sandy and gravelly. The surface soils are often porous. Porous soils are prone to collapse when saturated and under load. The soils are visually estimated to exhibit moderate to high expansion potential. Expansive soils, when encountered, are typically detrimental to lightly loaded, shallow foundations and slabs due to their erratic volume changes with seasonal moisture variations.

We did not observed groundwater seepage in the proposed improvement area.

DISCUSSIONS AND CONCLUSIONS

Based on the results of our work, we conclude that the proposed development is feasible from a geotechnical engineering standpoint. The primary geotechnical concern is the presence of relatively weak surface soils, near surface moderately to highly expansive soils, variable density old fills, if encountered, and variable bedrock conditions with the potential for difficult excavations in bedrock.

Upon saturation, porous surface soils will lose strength and consolidate rapidly under loads of fill or structural elements. Due to exposed hard and strong bedrock, we anticipate difficult excavation may be encountered.

We did not observe impacts to the improvement areas due to surface water. Surface runoff should be diverted away from structures, roadways and leachfield areas. The surface drainage improvements should be constructed in accordance with the recommendations of the project civil engineer.

The results of our literature review did not reveal active faults passing through the site. Since future fault rupture is generally considered more likely to follow the trace of the most recent fault rupture, we estimate the risk of future surface rupture during earthquakes to be low.

SUPPLEMENTAL SERVICES

For any future site development, a detailed geotechnical investigation with subsurface exploration should be performed to provide recommendations for engineered grading, foundation types and design, concrete slabs-on-grade, retaining walls, geotechnical drainage improvements and other supplemental services. Upon request, we would be pleased to prepare a proposal for such supplemental services.

Higland Springs Road
Job No. 3964.0
December 10, 2021 - Draft
Page 4

LIMITATIONS

Our work has been performed in accordance with generally accepted standards of engineering practices. Our conclusions are based on a limited review of published geologic literature and a brief review of surface features at the site. Additional review and subsurface exploration could reveal conditions not evident at this time. Therefore, the information in this report should be considered preliminary and subject to modification as subsurface information and/or more detailed information is available. We are unable to guarantee the stability of any hillside construction.

We trust this provides the information you require at this time. If you have questions or wish to discuss this further, please call.

Very truly yours,

BAUER ASSOCIATES, INC.

Steven J. Klick
Engineering Geologist

Arthur H. Graff
Geotechnical Engineer

SJK/AHG (cnslt/highland springs)
Attachments: Plate 1
Email only

Higland Springs Road
Job No. 3964.0
December 10, 2021 - Draft
Page 5

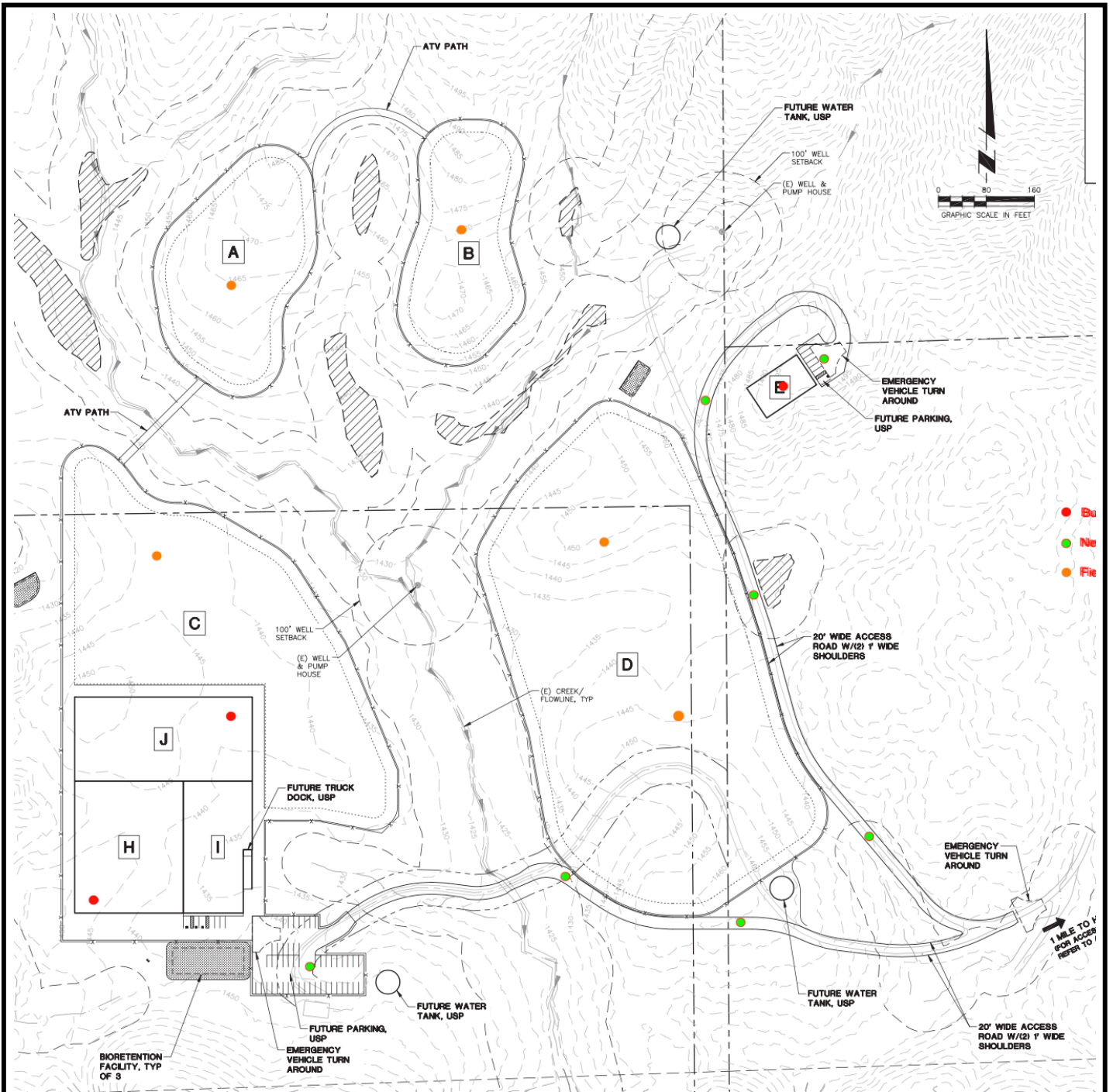
BIBLIOGRAPHY

Sheet C2.0, prepared by Summit Engineering, Inc., dated July 26, 2021

McLaughlin, R. J., et. al., 2018, Framework Geologic Map and Structure Sections along the Bartlett Springs Fault Zone, Northern Coast Ranges, California, Scientific Investigations Map 3395, US Geological Survey, Scale 1:100,000.

McNitt, J.R., 1968, Geology of the Kelseyville Quadrangle, Sonoma, Lake and Mendocino Counties, California, California Division of Mines and Geology, Map Sheet 10, Scale 1:62,500.

California Geological Survey, 2018, revision, Earthquake Fault Zones, A Guide for Government Agencies, Property Owners/Developers, and Geoscience Practitioners for Assessing Fault Rupture Hazards in California: Special Publication 42,
http://www.conservation.ca.gov/cgs/Documents/CGS_SP42_2018.pdf



Reference: Sheet C2.0, dated July 26, 2021, prepared by Summit Engineering, Inc.
 Note: The locations of all features are approximate and may vary.

BAUER ASSOCIATES, INC. GEOTECHNICAL CONSULTANTS	Job No: 3964.0	SITE MAP HIGHLAND SPRINGS ROAD Lakeport, California	PLATE
	Date: 12/21 By: SJK		1