

ALL MEETINGS ARE RECORDED

**OROVILLE UNION HIGH SCHOOL DISTRICT
BOARD OF TRUSTEES**

SPECIAL MEETING AGENDA

Thursday, January 27, 2022, 5:00 p.m. at the District Office, located at 2211 Washington Avenue, Oroville, CA 95966 (mask required)

CALL TO ORDER

ROLL CALL

Scott Damon, Amber Englund, Bonnie King, Ray Sehorn and Nannette Walker

PLEDGE OF ALLEGIANCE

RECOGNITION OF INDIVIDUALS WHO WISH TO SPEAK ON NON-AGENDA ITEMS

At this time, the President will invite anyone in the audience wishing to address the Board on a matter not listed on the agenda to step to the podium, state their name for the record and make their presentation. The President will also read aloud any comments or questions received by 2:00 p.m. on the board meeting date. Presentations are **limited to three (3) minutes per person and fifteen (15) minutes per subject**. The Board is prohibited by State law from taking action on any item not listed on the agenda, except under special circumstances as defined in the Government Code.

NEW BUSINESS

1. Adopt Geologic Hazard Report (Willenberg)

The District is seeking approval of a Geologic Hazard Report, completed by Construction Testing Services, as part of the process to purchase the property located behind the District Office.

Recommend

Enclosure

2. Adopt Resolution Pertaining to School District Governing Board Determinations and One Quarter Mile/500 Foot Findings for School Site Acquisition (Willenberg)

The District is seeking approval of a resolution required by the California Department of Education in order for them to sign off on the purchase of the property located behind the District Office.

Recommend approval of Resolution #12-21/22

Enclosure

ADJOURNMENT

The meeting will be adjourned to a regular board meeting scheduled for Wednesday, **February 16, 2022** **2021**, at 5:30 p.m. at the Transportation Department Conference Room, located at 2139 Washington Avenue, and on YouTube.

**School District Governing Board Determinations and One Quarter Mile/500 Foot Findings for
School Site Acquisition
(Education Code Section 17213 and Public Resources Code Section 21151.8)**

Resolution #12-21/22

Per *Education Code* Section 17213 and/or *Public Resources Code* Section 21151.8(a)(1), and based upon information included in the Environmental Impact Report or in the CEQA document referenced Geologic Hazard report or investigation for the Oroville Union High School District proposed school site the Board hereby determines that the school site:

- a. Is not the site of a current or former hazardous waste disposal or solid waste disposal site (or unless a former solid waste disposal site which the district board has concluded that the wastes have been removed), and
 - b. Is not a hazardous substance release site identified by the Department of Toxic Substances Control in a current list adopted pursuant to Section 25356 for removal or remedial action pursuant to Chapter 6.8 of Division 20 of the *Health and Safety Code*, and
 - c. Is not a site that contains one or more pipelines, situated underground or aboveground, that carries hazardous substances, extremely hazardous substances, or hazardous wastes, unless the pipeline is a natural gas line which is used only to supply natural gas to that school or neighborhood or other nearby schools, and
 - d. Is (or is not) within 500 feet of the edge of the closest traffic lane of a freeway or other busy traffic corridor as defined in *Education Code* Section 17213(d)(9) and *Public Resources Code* 21151.8(c)(9).
2. Per *Education Code* Section 17213(b), (c), and (d) and/or *Public Resources Code* Section 21151.8(a)(2) and (3), both the Butte County Air Quality Management District (or Air Pollution Control District) and the City of Oroville were notified in writing and consulted by the Oroville Union High School District acting as lead agency with regard to identifying both permitted and non-permitted facilities within one quarter mile of the Oroville Union High School District's proposed school site which might be reasonably anticipated to emit hazardous emissions or handle hazardous or extremely hazardous materials, substances, or waste.

The Board hereby finds that the above-mentioned consultation (and any other survey work done)

- a. Identified none of the facilities or other significant pollution sources, as specified in *Education Code* Section 17213 and *Public Resources Code* Section 21151.8, within one quarter mile of the proposed school site.
 - i. The health risks from the facilities or other pollution sources do not and will not constitute an actual or potential endangerment of public health to persons who would attend or be employed at the proposed school site.
- b. The Board finds that facilities or other pollution sources specified do exist, but the conditions set forth in *Education Code* sections 17213(c)(2)(b) or (C) or *Public Resources Code* sections 21151.8(a)(3)(B)(i), (ii), or (iii) cannot be met, and the school district is unable to locate an alternative site that is suitable due to a severe shortage of sites that meet the requirements of *Education Code* Section 17213(a), and the Board shall adopt a statement of Overriding Considerations pursuant to Section 15093 of Title 14 of the California *Code of Regulations*.

The foregoing Resolution was passed and adopted at an emergency meeting of the Governing Board of the Oroville Union High School District on January 27, 2022, by the following vote:

AYES :

NOES :

ABSENT :

ABSTAIN :

Board President

Attest:

Secretary to the Board



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3842 E. Post Road - Las Vegas, NV - (702) 257-4747
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CONSTRUCTION TESTING SERVICES

GEOLOGIC HAZARD REPORT

OROVILLE UNION HIGH SCHOOL DISTRICT
2500 AND 2600 MITCHELL AVENUE
OROVILLE, CALIFORNIA

DECEMBER 20, 2021



Field Exploration	Earth Retention
Observation	Liquefaction Analysis
Hazard Mitigation	Foundation Design
Seismic Evaluation	Pavement Studies
Geohazard Assessment	Forensic Analysis
Settlement Evaluation	GPR
Soil Treatment	Corrosion Analysis
Labratory Testing	Special Inspection
Geotechnical Analysis	Landslide Mitigation





**CONSTRUCTION
TESTING SERVICES**

GEOLOGIC HAZARD REPORT

**2500 AND 2600 MITCHELL AVENUE
OROVILLE, CA
APNs 013-250-062 AND 013-250-063**

December 30, 2021

Prepared for

*Mr. Jim LaGrone
Facilities, Technology, and Transportation Director
Oroville Union High School District*

CTS Job 18111

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**CONSTRUCTION
TESTING SERVICES**

DRAFT

CTS Job 18111
2500 and 2600 Mitchell Ave.
Oroville, CA 95965

December 30, 2021

Mr. Jim LaGrone
Facilities, Technology, and Transportation Director
Oroville Union High School District
2211 Washington Avenue
Oroville, California. 95966

**Subject: Geologic Hazard Report
 2500 AND 2600 Mitchell Avenue
 Oroville, CA 95965
 APNs 013-250-062 and 013-250-063**

Dear Mr. LaGrone,

Construction Testing Services (CTS) is pleased to present this Geologic Hazard Report for the subject parcels located at 2500 and 2600 Mitchell Avenue in Oroville, California. The purpose of our scope of services was to assess the geohazards present at and in the vicinity of the Subject property as well as to evaluate the geotechnical characteristics of the surface soils present at the site for potential acquisition of the site by the Oroville Union High School District (District).

A discussion of the surface conditions, our conclusions, and recommendations for geohazard-related design considerations are presented in the following report.

We appreciate the opportunity to be of service to you over the course of this project. If you have any questions regarding the contents of this report, or if we could provide further assistance, please contact the undersigned.

Sincerely,
CONSTRUCTION TESTING SERVICES

Mike Turner, CEG
Associate Geologist

Bradford Quon, GE
Geotechnical Engineer



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Appendix A Laboratory Testing

B-1	Summary of Laboratory Results
B-2	Atterberg Limits Plots
B-3	Particle Size Distribution Curves
B-4	Expansion Index Data
B-5	Soil Corrosion Potential (NOT INCLUDED IN DRAFT REPORT)

Appendix B Phase I Environmental Site Assessment

(Prepared by Essel Environmental)



1 INTRODUCTION

1.1 GENERAL

Presented herein is a Geohazard Report for the Subject property located at 2500 and 2600 Mitchell Avenue in Oroville, California, See Plate 1, Vicinity Map. The purpose of our scope of services was to evaluate the surface conditions at the Subject property and provide an assessment of the geohazards present at and in the vicinity.

1.2 PROJECT DESCRIPTION

Based on our discussions with you, we understand the District is interested in purchasing the two parcels for future development of administrative buildings and associated improvements; however, there are no site-specific plans at this time.

1.3 SCOPE OF SERVICES

Our scope of services is outlined in our Proposal dated December 1, 2021 (CTS Proposal P20882) and authorized by you on December 7, 2021. Our scope of services generally included the following:

- Review of readily available background materials, including geologic maps, aerial photographs, topographic maps, and geologic hazard maps.
- Site reconnaissance by a California Certified Engineering Geologist to observe the site and geologic conditions. (Conducted on December 16, 2021)
- Surface observation and exploration consisting of the collection of two (2) sets of bulk samples collected at two (2) separate locations. A Certified Engineering Geologist from CTS collected the surface samples.
- Laboratory testing on the samples collected to evaluate the in-situ moisture content, grain size distribution, Atterberg Limits, Expansion Index, and soil corrosion potential.
- Review of compliance with the California Geologic Survey – Note 48, Check list for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals and Essential Services Buildings.
- Engineering and Geologic analysis and compilation of the field and laboratory data collected, and our findings from the background research; and
- Preparation of this report presenting our findings, conclusions, and recommendations related to the geologic hazards observed at and in the vicinity of the site.



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- A Phase I ESA was also prepared for the Subject property in general compliance with ASTM E1527, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process. The Phase I ESA is used to identify actual and potential environmental concerns and potential contamination at the site. The Phase I ESA is provided in Appendix B.

1.4 SITE DESCRIPTION

The Subject property is located at 2500 and 2600 Mitchell Avenue in Oroville, California. The two parcels are also identified as Assessor's Parcel Numbers 013-250-062 and 013-250-063. The Subject property fronts on the east side of Washington Avenue and the northwest side of Mitchell Avenue. The parcels are currently vacant and support volunteer grasses and weeds and a few trees. The property is bordered to the north by the current Oroville Union School District offices, district maintenance facilities, and the Oroville Adult Education and Career & Technical Center. Baseball and Track fields are located north of these facilities. The parcels are bordered to the west, south, and east by established residential neighborhoods.

The property is composed of two relatively flat pads with elevations on the order of 239 feet and 244 feet above mean sea level (MSL), shown on Plate 2. (Google Earth, 2021; USGS 1970). We observed hummocky soils on the eastern parcel (2600 Mitchell Avenue), which may be indicative of fill material. The hummocky soils were covered in volunteer weeds and grasses, similar to the remainder of the site.

The project coordinates near the center of the planned improvements referenced from Google Earth are provided below in Table 1-1:

Table 1-1 – Site Coordinates

Latitude	39.509114°
Longitude	-121.546484°

The Phase I ESA, provided in Appendix B, provides a comprehensive history of the site including a review of aerial photographs and topographic maps; however, based on a cursory review of available aerial photographs and topographic maps (<https://www.historicaerials.com>), the two parcels appear to have supported up to four (4) small residential structures as far back as the 1940s with at least one small structure mapped on the 1922 and 1912 topographic maps. The parcels appear to have been vacant since the 1990s. We assume the former structures included onsite septic disposal systems; however, none were observed during our site visit.



2 INVESTIGATION

2.1 FIELD EXPLORATION

We collected two (2) sets of bulk samples at two (2) separate locations during our site visit on December 16, 2021, using a shovel and pickaxe. The samples were collected by a California Certified Engineering Geologist from CTS. The approximate locations where the bulk samples were taken are shown on Plate 3.

2.2 LABORATORY TEST RESULTS

Laboratory testing was performed to quantify and evaluate the geotechnical characteristics of the soil samples obtained at the site. The following laboratory tests were performed:

- Moisture Content (ASTM D 2216)
- Atterberg Limits (ASTM D 4318)
- Particle Size Distribution (ASTM D6913 and D1140)
- Expansion Index (ASTM D4829)
- pH and Electrical Resistivity (CT 643)
- Sulfate and Chloride Content (CT17 and CT422)

The results of the tests performed above are discussed in the Surface Conditions section of the report (Section 3.4). They are also presented as summaries and reports provided in Appendix A.



3 FINDINGS

3.1 REGIONAL GEOLOGIC SETTING

The site is located at the eastern edge of the Great Valley Geomorphic Province of California, adjacent to the Sierra Nevada Geomorphic Province. According to the California Geologic Survey Note 36, the Great Valley is an alluvial plain about 50 miles wide and 400 miles long in the central part of California. Its northern portion is the Sacramento Valley, drained by the Sacramento River and its southern portion is the San Joaquin Valley drained by the San Joaquin River. The Great Valley is a trough in which sediments have been deposited almost continuously since the Jurassic (about 160 million years ago). Great oil fields have been found in the southernmost San Joaquin Valley and along anticlinal uplifts on its southwestern margin. In the Sacramento Valley, the Sutter Buttes, the remnants of an isolated Pliocene volcano, rise above the valley floor.

The Sierra Nevada Geomorphic Province is a tilted fault block nearly 400 miles long. Its east face is a high, rugged multiple-scarp, contrasting with the gentle western slope (about 2°) that disappears under sediments of the Great Valley. Deep river canyons are cut into the western slope. Their upper courses, especially in massive granites of the higher Sierra, are modified by glacial sculpturing, forming such scenic features as Yosemite Valley. The high crest culminates in Mount Whitney with an elevation of 14,495 feet above sea level near the eastern scarp. The metamorphic bedrock contains gold-bearing veins in the northwest-trending Mother Lode. The northern Sierra boundary is marked where bedrock disappears under the Cenozoic volcanic cover of the Cascade Range.

Regional and local geology are shown on Plates 4 through 6.

3.2 GEOLOGIC LITERATURE REVIEW

The following available published geologic maps and websites pertinent to the site and vicinity were reviewed for the project. Summaries of the maps and websites reviewed are provided below.

- Helly, E. J. and Harwood, D. S., Geologic Map of the Late Cenozoic Deposits of The Sacramento Valley and Northern Sierrian Foothills, California; 1985.
- Saucedo, G. J. and Wagner, D. L.; Geologic Map of the Chico Quadrangle, California, 1:250,000; 1992.
- Bryant, W.A., Jennings, C.W.; Fault Activity Map of California, California Geologic Survey; 2010.
- U.S. Geological Survey; Quaternary Fault and Fold Database of the United States; (website: https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1&section_id=c)



- California Geologic Survey, Earthquake Zones of Required Investigation; (Website: <https://maps.conservation.ca.gov/cgs/EQZApp/app/>)

3.2.1 Helly and Harwood – 1985

Sheet 3 of the 1985 Geologic Map of the Late Cenozoic Deposits of The Sacramento Valley and Northern Sierran Foothills, shows the two parcels just north of the contact between the Pliocene Laguna Formation (Tla) and Dredge Tailings (t) of the Feather River basin. The Pliocene aged Laguna Formation is described as interbedded alluvial gravel, sand, and silt. Pebbles and cobbles of quartz and metamorphic rock fragments generally dominate the gravels, but the matrix of the gravelly units are finer sediments and invariable arkosic. In the City of Oroville, volcanic rocks may comprise as much as 20 percent of the gravels.

3.2.2 Saucedo and Wagner – 1992

The 1992 Geologic Map of the Chico Quadrangle shows the parcels mapped as Pliocene Tuffs of Oroville (QPto) which include interbedded volcanoclastic deposits of gravel, sand, and tuff. Even though Helly and Harwood identify the site mapped as the Laguna Formation, both materials are described as Pliocene aged gravel, sand, and silt. Thus, it can be assumed both sets of authors are referencing the same formation.

3.2.3 Bryant and Jennings – 2010 / Quaternary Fault and Fold Database

The 2010 Fault Activity Map of California, California Geologic Survey (CGS) and the Quaternary Fault and Fold Database do not show any faults mapped crossing the Subject property. See Plate 7. The database and map show several faults in the vicinity and region including:

- The Foothill fault system – mapped approximately 4-3/4 miles to the east.
- The Chico Monocline fault – mapped approximately 12-1/2 miles to the northwest,
- The Corning fault – mapped approximately 32 miles to the west; and
- The Great Valley thrust fault system – mapped approximately 40 miles to the west.

3.2.4 Website: CGS Earthquake Zones of Required Investigation

The CGS website, Earthquake Zones of Required Investigation shows the boundaries of the Subject property. The Subject property is not mapped within an earthquake fault zone; however, the Subject property has not been evaluated by the CGS for liquefaction or seismic hazards.

3.2.4.1 Cleveland Hills Fault

An approximately 4-mile-long section of the Foothill fault system (Cleveland Hills Fault), located approximately 4-3/4 miles southeast of the site, is identified as a Special Studies zone. In 1975, the



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magnitude (M) 5.8 Oroville earthquake occurred along this section of the Foothill fault system. Ground rupture was observed and mapped at the ground surface following the earthquake. The cause of the earthquake is believed to be induced by the lowering and subsequent filling of Lake Oroville seven years after the dam's completion. From July 1974 to January 1975, the Lake's water level was lowered by approximately 130 ft, and then quickly raised again (Lahr et al., 1976). This rapid fluctuation in water level is believed to have triggered the earthquake.

Seismic induced earthquakes are believed to be caused by a rapid change in pore pressure. When a dam is filled, water slowly diffuses into the bedrock, finding its way into faults and fractures, where it increases the pore pressure. This increase reduces the friction along existing fault planes, lowering the Factor of Safety and thus making the fault zone more susceptible to failure.

3.3 SITE GEOLOGY

Review of the above geologic literature and surface investigation indicates the property is located within the Pliocene Laguna Formation. These deposits are reported to consist of interbedded alluvial gravel, sand, and silt. The cobbles and gravels are composed of quartz and metamorphic rock fragments with a matrix of finer arkosic sediments. These arkosic sediments weather to silts and clays.

Our subsurface investigation was consistent with these findings.

3.4 SURFACE SOILS

The bulk samples collected in the area encountered native materials consisting of reddish-brown to yellowish-brown Silty and Clayey Gravel with Sand and Cobbles. The cobbles were observed up to 8 inches in maximum dimension. These materials are consistent with the Laguna and Tuffs of Oroville Formations described above.

3.5 GROUNDWATER CONDITIONS

3.5.1 Regional Conditions

The Department of Water Resources Water Data Library was reviewed for wells and related depths to groundwater in the vicinity of the Subject property. Table 3-1 below summarizes these findings.



Table 3-1 – Regional Groundwater Conditions (lowest site elevation = 239 feet, msl)

Well ID	Ground Surface Elevation (ft, msl)	Distance/Direction from Site	Reported Range in Depth to Groundwater/ Record Dates
19N04E31F001M	261	3.5 miles Southwest	135' to 141' 2019 to 2021
19N04E32P001M	188	3.5 miles South	54' to 62' 2019 to 2021
19N03E16Q001M	180	5 miles west	39' to 42' 2019 to 2021

Source: <http://wdl.water.ca.gov/waterdatalibrary/>

3.5.2 On-Site Conditions

Perched groundwater was encountered in Bulk Sample S2, taken in the eastern portion of the property. This perched water was observed seeping into the 1-foot-deep excavation while the sample was collected.

Variations in groundwater levels may occur due to variations in ground surface topography, subsurface geologic conditions and structure, seasonal rainfall, local irrigation practices, new construction, and/or other factors beyond our control.



4 GEOLOGIC HAZARDS

This investigation considered the geologic hazards relevant to the proposed construction, including seismic hazards, flood hazards, landsliding, slope instability, natural-occurring asbestos, soil corrosion, expansive soils, and radon gas. These hazards are discussed in the following subsections.

4.1 SEISMIC HAZARDS

The seismic hazards considered for this investigation include the potential for ground rupture due to faulting, seismic ground shaking, liquefaction, slope stability, and tsunamis. These potential hazards are discussed below.

4.1.1 Historic Seismicity

The site is in a historically seismic region. Plate 8 presents data developed by the CGS and presented on the Epicenters of and Areas Damaged by $M \geq 5$ California Earthquakes, 1800-1999 map (Topozada, 2000). The map presents the location of the site relative to the epicenters of historic earthquakes with magnitudes of 5 or greater from 1800 to 1999. Records of historic ground effects related to seismic activity (liquefaction, sand boils, lateral spreading, and ground cracking) as compiled by Knudsen, 2000 indicate that no adverse ground effect related to historic activity has been recorded for the site or vicinity.

The closest known Holocene faults (i.e., faults that may have ruptured in the past 11,000 years) to the site is the Cleveland Hills Fault, discussed above in Section 3.2.4.1.

4.1.2 Faulting and Ground Rupture

The site is not located within an Alquist-Priolo Earthquake Fault Zone (formally known as Special Studies Zone) established by the State Geologist. Alquist-Priolo earthquake fault zones are regulatory zones surrounding the surface traces of active faults in California. A trace is a line on the earth's surface defining a fault. Wherever an active fault exists on a property, if it has the potential for surface rupture, a structure for human occupancy cannot be placed over the fault and must be a minimum distance of 50 feet from the fault. An active fault, per the Alquist-Priolo Act, is one that has ruptured in the last 11,000 years.

The Cleveland Hills Special Studies fault zone is the nearest fault zone of required investigation and is mapped approximately 4-3/4 miles southeast of the property.

Based on review of the referenced geologic maps and websites, no known faults are mapped crossing the property and the property is not located in a fault zone. **Therefore, we conclude the probability of damage due to surface rupture of a fault is considered low and not a future design consideration.**



4.1.3 Strong Ground Motion

The project is in a seismically active region with nearby faults capable of producing strong ground motions in the event of an earthquake. **Therefore, we conclude the probability of damage due to strong ground shaking would be a future design consideration.**

4.1.4 Liquefaction

Soil liquefaction results from loss of strength during cyclic loading, such as imposed by earthquakes. Soils most susceptible to liquefaction are clean, loose, saturated, uniformly graded sand below the groundwater table. Empirical evidence indicates that low plasticity silt and clay are also potentially liquefiable, though this phenomenon is commonly referred to as cyclic softening. When seismic ground shaking occurs, the soil is subjected to cyclic shear stresses that can cause excess hydrostatic pressures to develop. This can lead to lateral spreading of sloping or unconfined ground. Sand boils can also develop and lead to subsidence of the ground surface.

The CGS has not evaluated the area or stie for liquefaction hazards; **however, based on the characteristics of the mapped geologic formation at the site and depth to recorded groundwater in the area we conclude the potential for liquefaction-induced settlement is considered low and not a future design consideration.**

4.1.5 Tsunamis and Seiches

Tsunamis are large ocean waves, generated by displacements of vertical faulting beneath the ocean floor, which can reach great heights when they encounter shorelines. The Subject property is located over 120 miles from the Pacific Ocean. **We conclude tsunamis are not likely to affect the site and not a future design consideration.**

Seiches result when earthquake ground motion causes an enclosed or restricted body of water, such as a lake, bay, reservoir, or river to oscillate and generate large waves. Lake Oroville is located approximately 3-3/4 miles northeast of the site and drains into the Feather River. The nearest portion of the Feather River is located approximately 1/2 mile northwest of the Subject property at Table Mountain Boulevard. The river surface elevation at Table Mountain Boulevard is on the order of 140 feet above msl (USGS, 1970). **Based on the lowest site elevation of approximately 239 feet above msl, we conclude the risk of seiches at the site is considered low and not a future design consideration.**

4.2 FLOOD HAZARD

Review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for the property addresses (Map #06007C0795E, dated 01/06/2011) indicates the site is located in Zone X, which is defined as an area outside the 0.2% annual chance floodplain. **We conclude flooding is not a future design consideration.**



4.3 LANDSLIDING AND SLOPE STABILITY

The site is relatively flat with elevations ranging between 239 feet and 244 feet above msl. (Google Earth, 2021). **We conclude landsliding or slope stability are not a future design consideration.**

4.4 NATURALLY OCCURRING ASBESTOS

Naturally Occurring Asbestos (NOA) is hazardous to humans. Asbestos includes six regulated naturally occurring minerals (actinolite, amosite, anthophyllite, chrysotile, crocidolite, and tremolite). In California, asbestos minerals are most associated with ultramafic rocks and their derivatives, including Serpentine rock. Ultramafic rocks are igneous rocks composed mainly of iron-magnesium silicates minerals that crystallize deep in the earth's interior. By the time they are exposed at the Earth's surface, ultramafic rocks have typically undergone metamorphism, a process in which the mineralogy or the rock changes in response to the changing chemical and physical conditions. Asbestos is classified as a known human cancer-causing substance by local, State, and Federal health agencies and is known to cause chronic respiratory diseases. Asbestos fibers may be released into the air because of activities that disturb NOA-containing rocks or soils. Asbestos minerals can fragment into small fibers that readily suspend in the air and are of a size visible only under a microscope. Breathing these small fiber fragments may result in an increased risk of respiratory disease or cancer in exposed individuals.

The Department of Toxic Substances Control (DTSC) has developed the Interim Guidance, Naturally Occurring Asbestos at School Sites, revised 9/24/2004. The guidance document provides a four-step process to assist school districts and their consultants in conducting environmental assessments, investigations, and response actions (if needed) at new or expanding school sites with potential NOA. Step 1 is the potential identification of NOA through the performance of a Phase I Environmental Site Assessment (Phase I ESA). If NOA is potentially identified, environmental sampling and analysis will be needed as part of the development of a Preliminary Environmental Assessment (PEA.) The guidance document continues to a mitigation phase and long-term operation and maintenance of the site.

Based on the review of the geologic maps and literature discussed above in Section 3, no ultramafic rocks are mapped within proximity to the Subject property. **We conclude NOA is not a future design consideration.**

4.5 EXPANSIVE SOILS

Expansive soils are common in the area and have the potential to impact future development where fluctuations in the moisture contents can cause unacceptable shrinkage and/or swell beneath buildings and/or flatwork. The Mediterranean climate in Northern California, with dry summers and wet winters, causes these clays to cyclically shrink as they dry and then swell as they become wetter. Controlling this moisture change will reduce this shrink-swell capability. The surface soils encountered in the upper 1 foot are classified as Silty and Clayey Gravel with Sand and Cobble. Atterberg Limits testing was performed on both bulk samples and show a range of Liquid Limits of between 30 and 38 and Plasticity Indices of 13, indicating low to medium plasticity. Expansive Index testing was performed on Bulk S2, in the



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eastern portion of the site, and indicates the surface soils have some expansion potential. Higher expansive potential clay may be exposed elsewhere onsite that was not initially identified or observed.

Based on our laboratory testing, we conclude expansive soils are a future design consideration for the project.

4.6 RADON – 222 GAS

Radon is produced naturally as Radon-222 in gas form. Radon is a byproduct of the natural decay of uranium that is present in small quantities in several rock types such as granitic rocks of the Sierra Nevada and sediment derived rocks in the Sacramento Valley. Radon is soluble and can be transported in groundwater. When water-containing radon is exposed to air (by pumping or through a tap), radon can diffuse into the air where it can be inhaled.

The U.S. Environmental Protection Agency (EPA) lists Butte County in Zone 3, the lowest potential radon hazard (less than 2 pCi/L) (U.S. EPA, n.d.). **Based on the zone assignment, we conclude naturally occurring radon would not be considered a future health hazard for this site.**



5 CONCLUSIONS AND RECOMMENDATIONS

5.1 GENERAL

Based on the results of our findings and analysis, a future project is feasible for design and construction from a geologic hazard perspective. Our bulk samples show the near-surface soils are classified as low to medium plasticity with some expansion potential. The site is also located in an area subject to strong ground shaking. Preliminary recommendations to accommodate the expansive soils and strong ground shaking are presented below.

5.2 STRONG GROUND SHAKING

The Subject property is located in a seismically active region with nearby faults capable of producing strong ground motions in the event of an earthquake. Future development of the site will need to be designed in accordance with the most recent California Building Code and ASCE 7 criteria under the direction of Geotechnical and Structural Engineers licensed in California. Seismic design parameters will be based on the Site Class.

5.3 EXPANSIVE SOILS

Expansive soils are common in the area and have the potential to impact future development where fluctuations in the moisture contents can cause unacceptable shrinkage and/or swell beneath buildings and/or flatwork. The Mediterranean climate in Northern California, with dry summers and wet winters, causes these clays to cyclically shrink as they dry and then swell as they become wetter. Controlling this moisture change will reduce this shrink-swell capability. The surface soils encountered in the upper 1 foot are classified as Silty and Clayey Gravel with Sand and Cobble. Atterberg Limits testing was performed on both bulk samples and show a range of Liquid Limits of between 30 and 38 and Plasticity Indices of 13, indicating low to medium plasticity. Expansive Index testing was performed on Bulk S2, in the eastern portion of the site, and indicates the surface soils have some expansion potential.

Acceptable methods to address expansive soils include specific earthwork construction guidelines or use of structural alternatives for structures as summarized below:

- Earthwork solutions:
 - Strict moisture conditioning and compaction control; or
 - Use of non-expansive fill in the upper portions of building pads, concrete flatwork, or pavements to reduce the expansion potential.
 - Use of high calcium quicklime in the upper 12 inches of soils in building pads, concrete flatwork, or pavements. Prior to lime treating the subgrade soils, chemical testing may be performed to determine the suitability of lime treatment and the actual percentage of lime required.



5.4 FORMATION EXCAVABILITY

The laboratory testing and visual observations of the surface bulk samples collected indicate the surficial site soils consist of Silty and Clayey Gravel with Sand and Cobble with cobbles observed during the site reconnaissance up to 10-inches in maximum dimension. Based on this, it is anticipated that excavation at the site may generally be accomplished with earthwork grading equipment appropriate for gravelly and cobbly soils. Ripping of the gravelly and cobbly soils may be required.

5.5 CORROSIVITY

(DATA NOT AVAILABLE AT THE TIME THE DRAFT REPORT WAS PUBLISHED)

Laboratory testing was performed on a representative sample of the on-site materials to evaluate pH and electrical resistivity, as well as chloride and sulfate contents. These laboratory test results are summarized below and presented in Appendix A.

Table 5-1 – Evaluation for Soil Corrosion

Corrosion Property	Test Result	Test Method
Soil pH	X.XX	CA DOT Test #643
Minimum Resistivity	XXX ohm-cm	CA DOT Test #643
Chloride	X.X ppm (0.00018%)	CA DOT Test #422
Sulfate	X.X ppm (0.00232%)	CA DOT Test #417

Based on the Caltrans Highway Design Manual corrosion criteria (Caltrans, 2018), corrosive soils are defined as soils with an electrical resistivity of 1,000 ohm-cm or less, more than 500 ppm chlorides, more than 0.2 percent sulfates, and a pH less than 5.5. Based on the results of the testing listed above, the on-site soils xxxxx be classified as corrosive.

5.6 CGS NOTE 48 COMPLIANCE

We prepared this report in general compliance with CGS *Note 48*, Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings, dated November 2019. However, since the intent of this report is to provide an understanding of the potential geohazards present at and in the vicinity of the Subject property for the purpose of property acquisition determination, additional information will need to be gathered for CGS and DSA submittal and approval. These include:

- Subsurface investigation at a frequency of one boring or exploration per 5,000 square foot of building, with a minimum of two for any one building (CBC §1803A.3.1).



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- Two or more interpretive geologic cross-sections, based on site exploration data with pertinent foundation and site grading.
- A broad suite of geotechnical testing of the samples collected during the exploration phase.
- A discussion of the engineering geologic aspects of excavation/grading/fill activities, foundations, and support of structures. Including geologic and geotechnical inspections and problems anticipated during grading. Providing the information as required by CBC §1803A.7, including special design and construction provisions for settlement and bearing capacity failure of foundations bearing on weak/soft, collapsible, liquefiable, or expansive soils. Consideration of seismic compression of fills; and cut/fill differential settlement.
- Classification of the Geologic Subgrade (Site Class) per ASCE 7, Chapter 20 based on the subsurface investigation. This may require the performance of non-invasive geophysical testing at the site to supplement the subsurface exploration and obtain seismic velocities to determine Site Class.
- Depending on the Site Class, building design, and estimated fundamental period of vibration of the future structures (provided by the Structural Engineer) a Site-Specific Ground Motion Hazard (SHA) and Site Response Analyses (SRA) may be required for the structure design. However, there are exceptions to these requirements, as follows:
 - For structures on Site Class F (sites susceptible to liquefaction), if the fundamental period of vibration of a structure is equal to or less than 0.5 seconds.
 - For Structures on Site Class D (medium stiff soil) sites with S_1 greater than or equal to 0.2, provided the value of the seismic response coefficient C_s is determined by Eq. (12.8-2) for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Eq. (12.8-3) for $T_L \geq T > 1.5T_s$ or Eq. (12.8-4) for $T > T_L$.

The structural design professional should verify if the project meets the allowable exceptions.
- Liquefaction and Seismic Settlement Analysis, not likely applicable.
- Slope Stability Analysis, not likely applicable.



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6 ADDITIONAL SERVICES

6.1 GEOTECHNICAL INVESTIGATION

To provide project continuity, we recommend CTS be retained to perform a geotechnical investigation at the site once you are in the design phase. The geotechnical investigation will comprise a field exploration, laboratory testing, engineering analyses, and preparation of a design level geotechnical report that will also include the necessary updates to this geohazard assessment required for Division of the State Architect (DSA) and CGS approval. The design level Geotechnical Investigation and Geohazard Report would be prepared in accordance with the CGS Note 48 requirements and under the direction of a California Registered Geotechnical Engineer and Certified Engineering Geologist.



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7 LIMITATIONS

The conclusions and recommendations provided in this report are based on our understanding of the project and the District's interest in acquiring the Subject property and data developed from the results of the field and laboratory testing program laboratory testing. The bulk sampling locations were approximated in the field by pacing from available landmarks as surveying was not part of our work scope. Actual surface conditions can vary between the points of exploration provided during this investigation. If this is found to be the case, CTS should be notified and requested to review the changes and provide appropriate modifications to our recommendations if needed.

We have strived to prepare this report in substantial accordance with generally accepted geotechnical engineering and engineering geologic practices as they exist in the local area at the time of the work. No warranty, express or implied, is made. This report may be used by the Client, for the purposes stated, for a reasonable time from issuance. CTS shall be released from any liability resulting from any misuse of the report by the authorized party.



8 REFERENCES

ASTM International, American Society for Testing and Materials, annual books of standards, current edition.

Bryant, W.A., Jennings, C.W.; Fault Activity Map of California, California Geologic Survey; 2010.

California Geologic Survey; Note 36, California Geomorphic Provinces; 2002.

Website: https://www.coastal.ca.gov/coastalvoices/resources/California_Geomorphic_Provinces.pdf.

Google Earth™

California Department of Conservation; Map Sheet 49: Epicenters and Areas Damaged by M>5 California Earthquakes, 1800-1999; 2000.

California Geologic Survey, Earthquake Zones of Required Investigation.

Website: https://maps.conservation.ca.gov/californka_geologic_survey/EQZApp/app/.

Helly, E. J. and Harwood, D. S.; Geologic Map of the Late Cenozoic Deposits of The Sacramento Valley and Northern Sierrian Foothills, California; Plate 3; 1985.

K.M. Lahr, J.C. Lahr, A.G. Lindh, C.G. Bufe, and F.W. Lester; The August 1975 Oroville Earthquakes, Bulletin of the Seismological Society of America. Vol. 66, No. 4, pp. 1085-1099; August 1976.

Saucedo, G. J. and Wagner, D. L.; Geologic Map of the Chico Quadrangle, California, 1:250,000; 1992.

U. S. Environmental Protection Agency; EPA Map of Radon Zones Including State Radon Information and Contacts; Website: <https://geopub.epa.gov/Radon/>.

U.S. Geological Survey; 7-1/2 Minute Oroville Quadrangle; 1970.

U.S. Geological Survey; Quaternary Fault and Fold Database of the United States; Website: https://earthquake.usgs.gov/cfusion/qfault/show_report_AB_archive.cfm?fault_id=1&section_id=c).



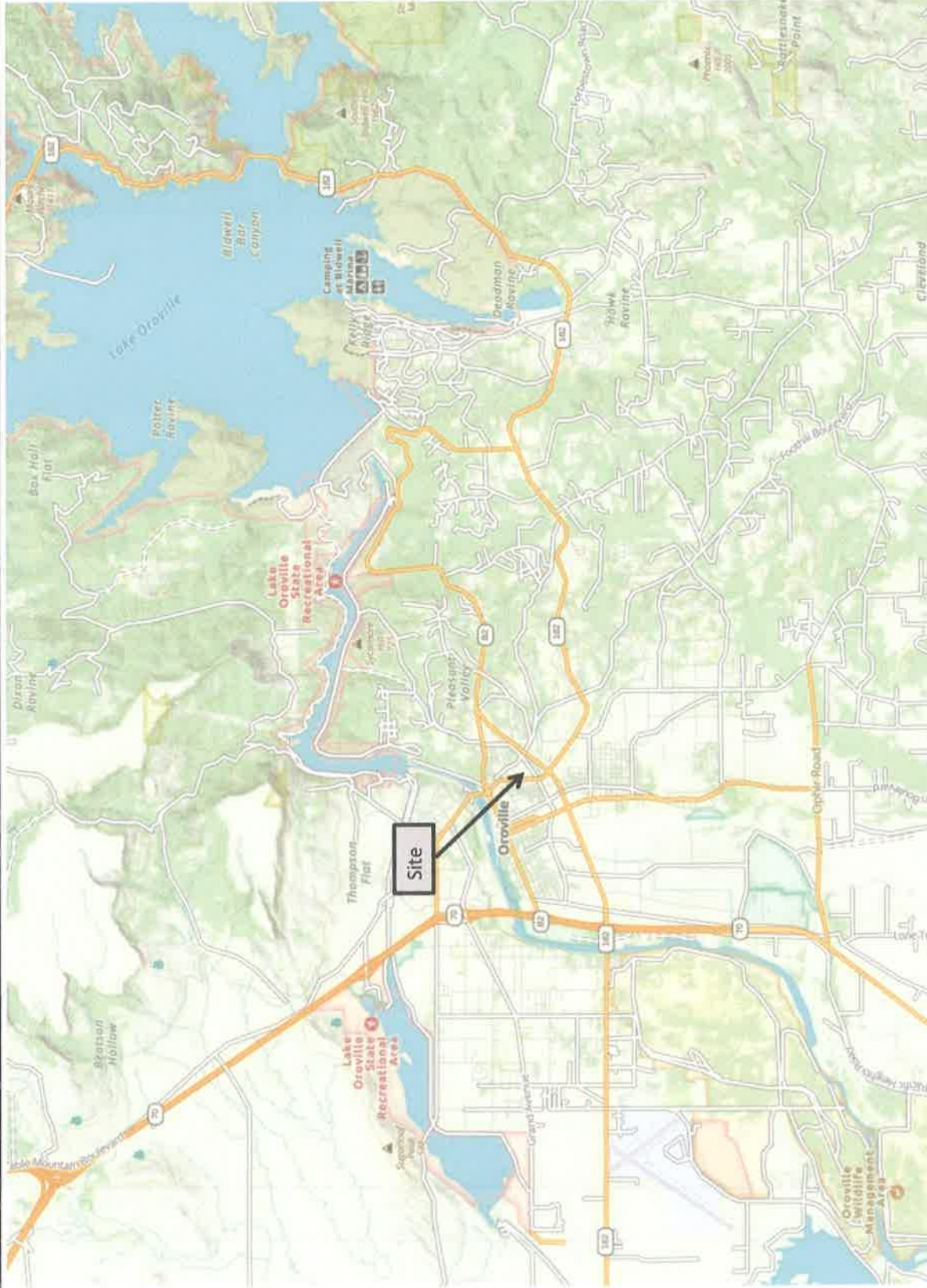
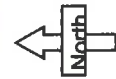
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PLATES

**Vicinity Map
1970 Oroville Quadrangle
Sample Location Map
1985 Geology Map
1992 Geology Map – Regional
1992 Geology Map – Local
Regional Fault Map
Epicenters of $M \geq 5$ Earthquakes**



Reference:
Gaia GPS - Gaia Streets



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TESTING SERVICES**

Drawn by: M. Turner
CTS Job: 18111

Date: 12/15/2021
File: Vicinity

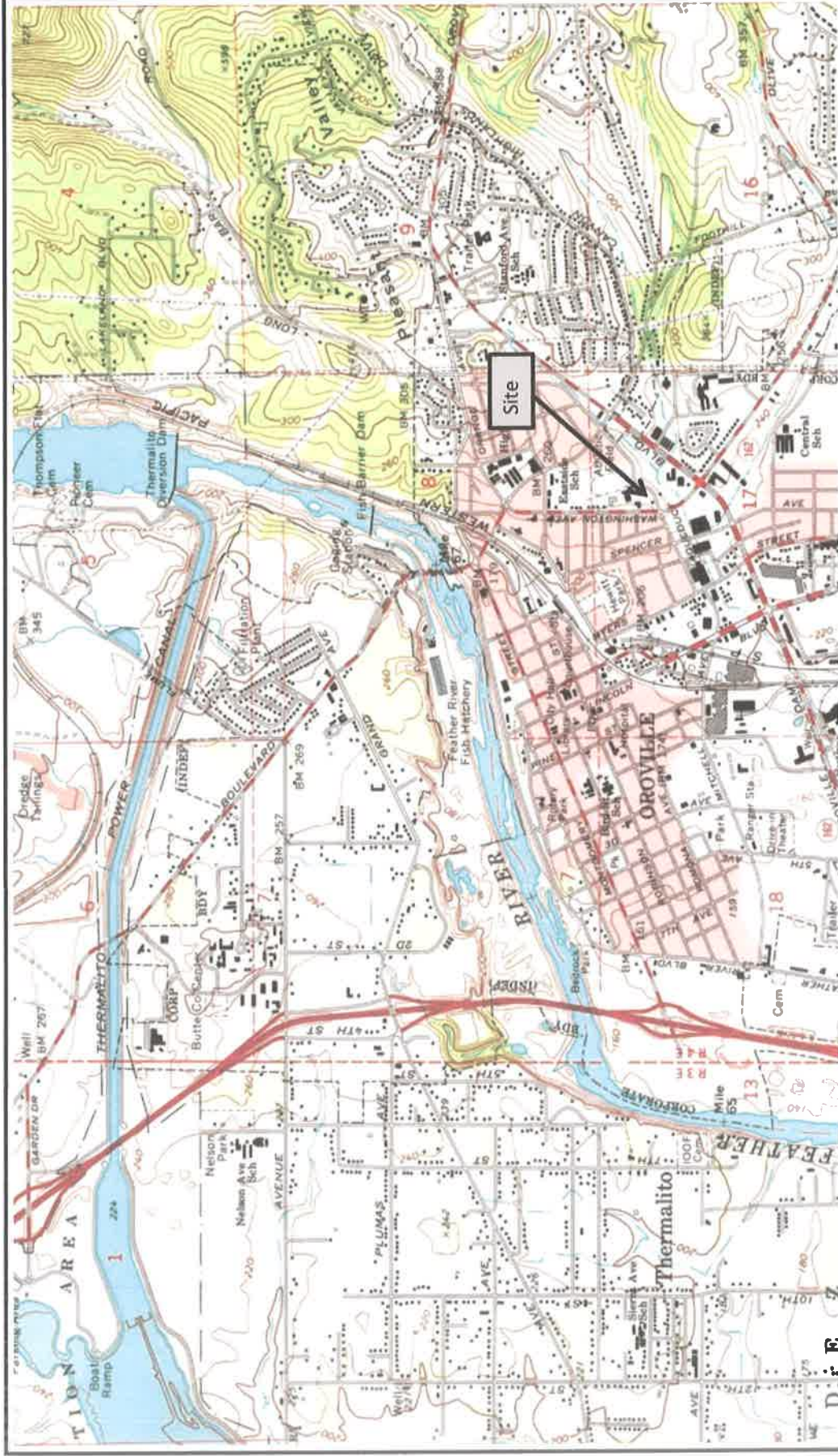
VICINITY MAP

OUSD PARCEL ACQUISITION
2500 AND 2600 MITCHELL AVE.,
OROVILLE, CA

PLATE

1

DRAFT



SCALE: Approx. 1-Mile



Reference:
U.S. Geological Survey; 7-1/2 Minute
Oroville Quadrangle; 1970.



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TESTING SERVICES

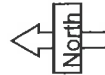
Drawn by: M. Turner
CTS Job: 18111

Date: 12/19/21
File: Topographic Map

1970 USGS TOPOGRAPHIC MAP
OUSD PARCEL ACQUISITION
2500 AND 2600 MITCHELL AVE.,
OROVILLE, CA

PLATE

2



SCALE: Approx. 100 feet

REF: Google Earth, 2021



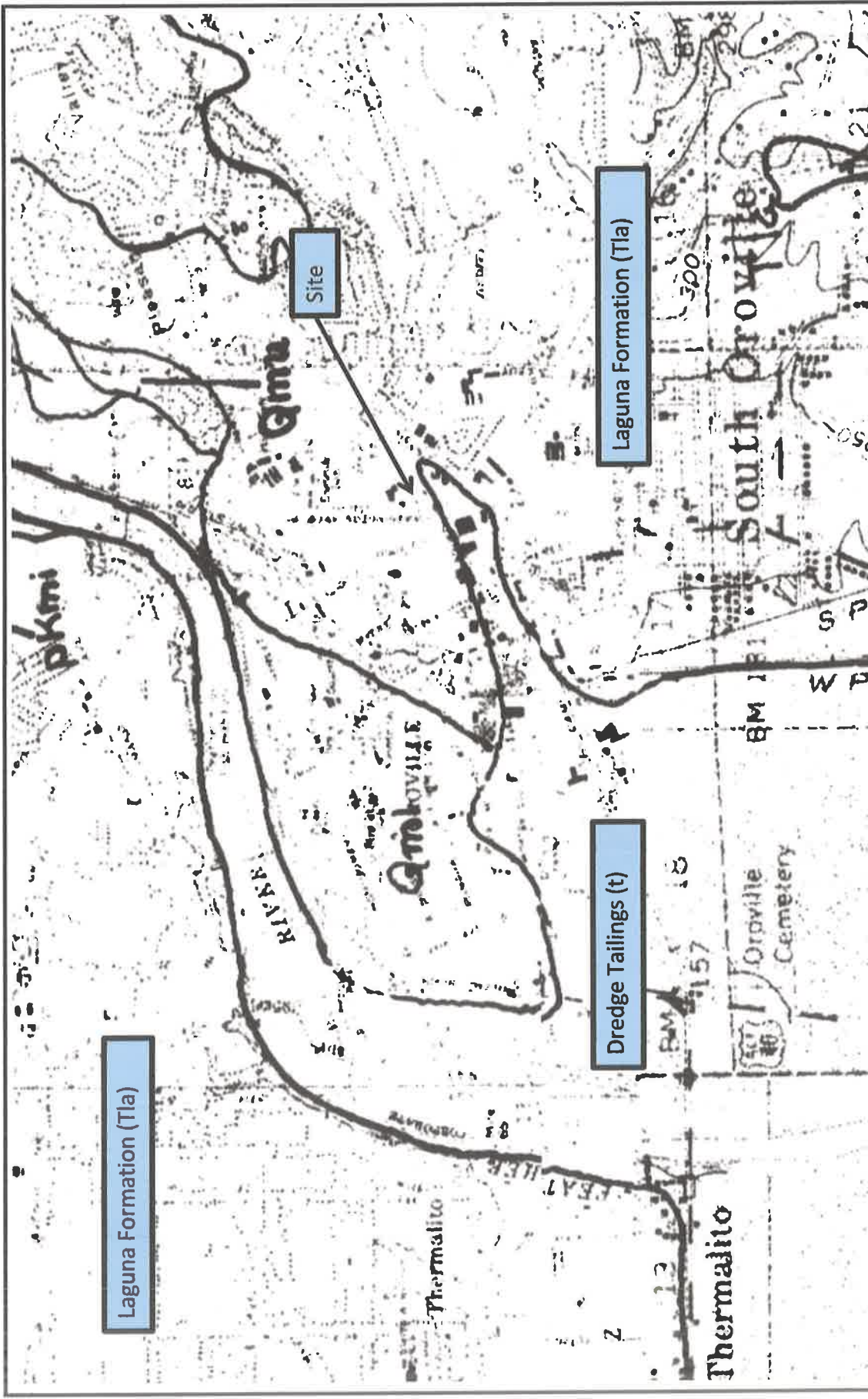
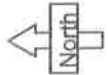
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Drawn by: M. Turner
CTS Job: 18111

Date: 12/19/21
File: Exp Locations Plan

SAMPLE LOCATION MAP
OUSD PARCEL ACQUISITION
2500 AND 2600 MITCHELL AVE..
OROVILLE, CA

PLATE
3



SCALE: Approx. 1-Mile

REF: Helly, E. J. and Harwood, D. S.;
Geologic Map of the Late Cenozoic Deposits
of The Sacramento Valley and Northern
Sierran Foothills, California; Plate 3; 1985.



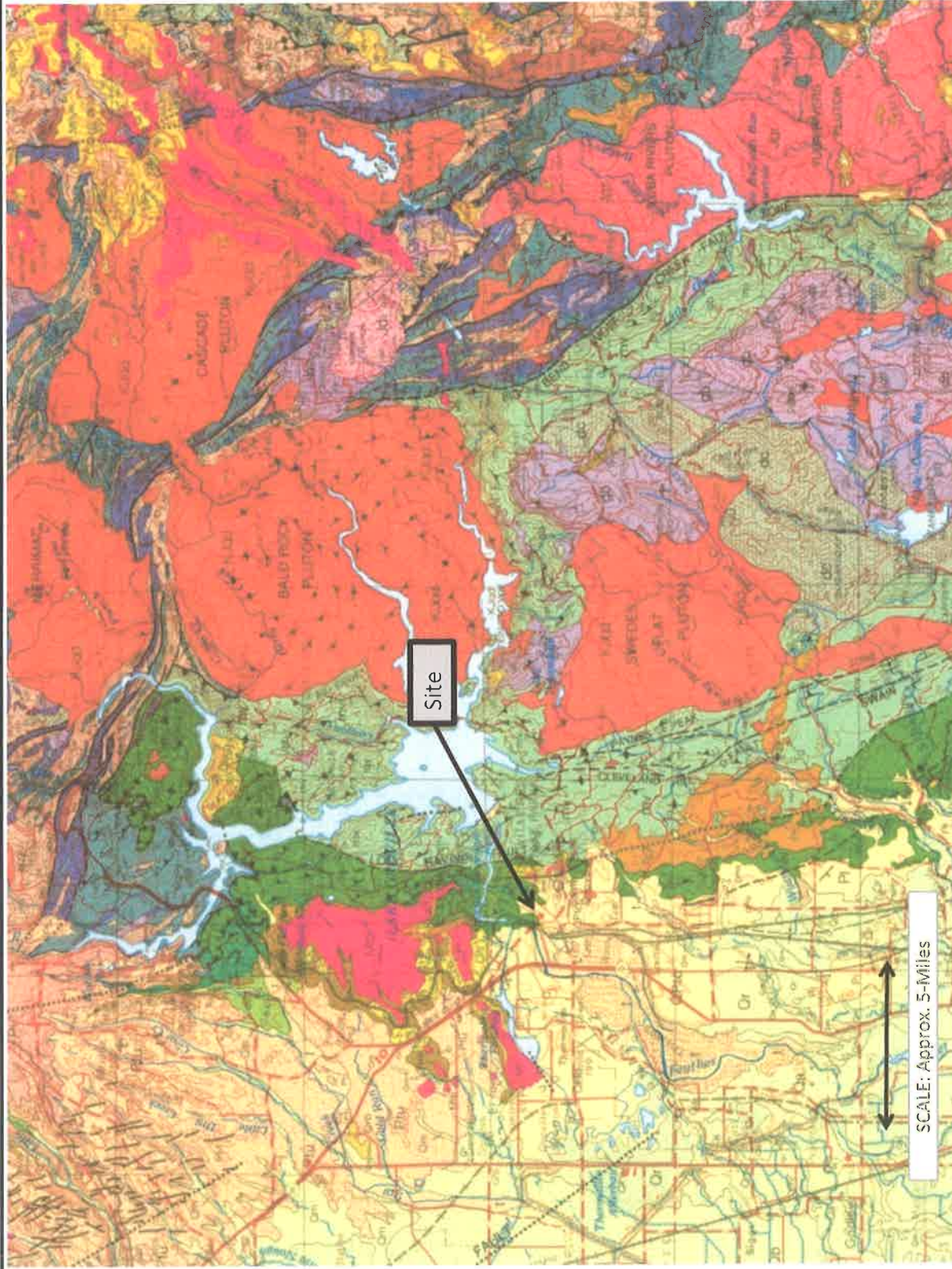
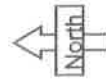
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TESTING SERVICES

Drawn by: M. Turner
CTS Job: 18111
Date: 12/19/21
File: 1985 Geo Map

1985 GEOLOGIC MAP
OUSD PARCEL ACQUISITION
2500 AND 2600 MITCHELL AVE..
OROVILLE, CA

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REF: Saucedo, G. J. and Wegner, D. L.;
Geologic Map of the Chico Quadrangle,
California, 1:250,000; 1992.



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Drawn by: M. Turner
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Date: 12/19/21
File: 1992 Geo Map Reg

1992 REGIONAL GEOLOGIC MAP
CUSD PARCEL ACQUISITION
2500 AND 2600 MITCHELL AVE..
OROVILLE, CA

PLATE

5



Qm

OPLO



mv

Volcanic rocks

SCALE: Approx. 1-Mile

SCALE: Approx. 1-Mile

REF: Saucedo, G. J. and Wagner, D. L.;
Geologic Map of the Chico Quadrangle,
California, 1:250,000; 1992.



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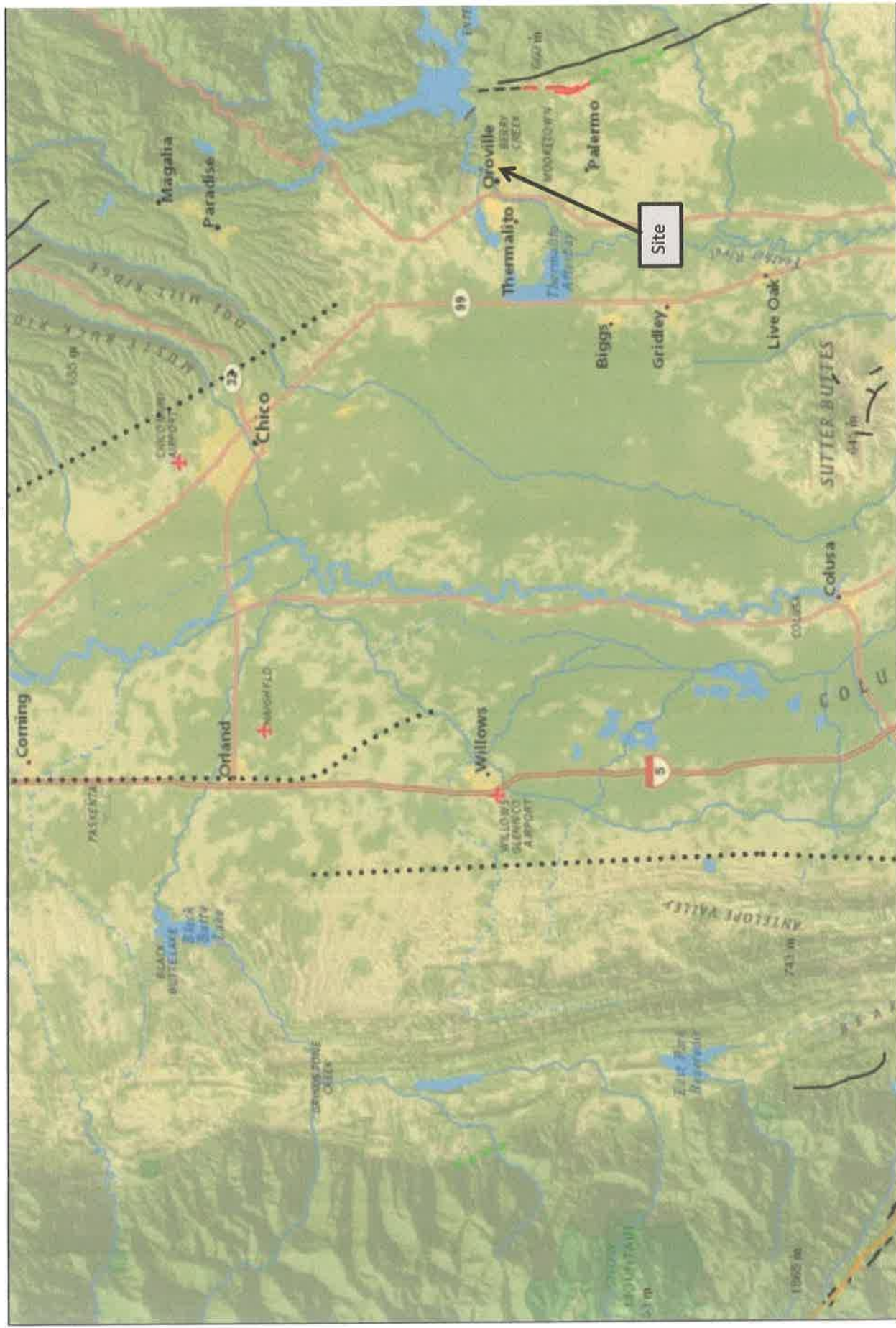
Drawn by: M. Turner
CTS Job: 18111

1992 LOCAL GEOLOGIC MAP
 OUSD PARCEL ACQUISITION
 2500 AND 2600 MITCHELL AVE..
 OROVILLE, CA

PLATE

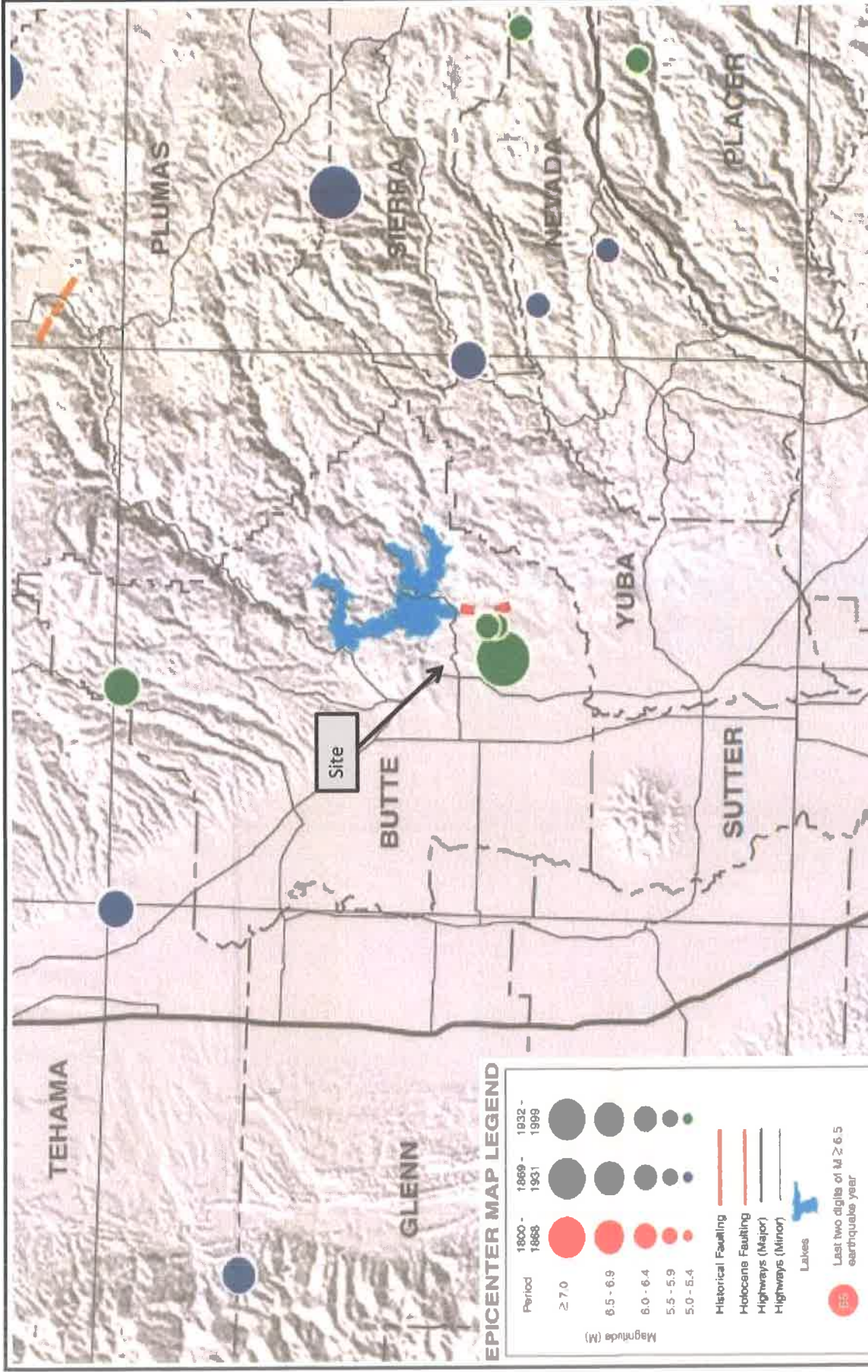
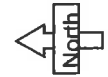
60

U.S. Geological Survey Quaternary Fau



12/19/2021, 4:48:15 PM

- Historic (< 150 years), moderately constrained location
- Historic (< 150 years), inferred location
- Latest Quaternary (< 15,000 years), well constrained location
- Late Quaternary (< 150,000 years), inferred location
- Middle and late Quaternary (< 750,000 years), well constrained location
- Middle and late Quaternary (< 750,000 years), moderately constrained location



REF: California Department of Conservation; Map Sheet 49; Epicenters and Areas Damaged by M₅ California Earthquakes, 1800-1999; 2000



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Drawn by: M. Turner
CTS Job: 18111

Date: 12/19/21
File: EQ Epicenters

M>5 EQ EPICENTERS MAP
 OUSD PARCEL ACQUISITION
 2500 AND 2600 MITCHELL AVE..
 OROVILLE, CA

PLATE

8



APPENDIX A LABORATORY TESTING

Classification

Soils were classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488 and modified as necessary in general accordance with ASTM D 2487 based on laboratory results. The classifications are indicated on the boring logs in Appendix A.

In-Place Moisture Tests

The moisture content of relatively undisturbed samples obtained from the exploratory borings were evaluated in general accordance with ASTM D 2216. The test results are indicated on the boring logs in Appendix A.

Atterberg Limits

Tests were performed on selected representative fine-grained soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318.

Particle Size Distribution

Gradation analysis testing was performed on selected representative soil samples in general accordance with ASTM D 422.

Expansion Index

Expansion index testing was performed on a selected representative soil sample in general accordance with ASTM D 4829.

Evaluation for Soil Corrosion

Evaluation for soil corrosion was performed on a selected representative soil sample in general accordance with CA DOT Test #643 for pH and minimum resistivity, CA DOT Test #417 for sulfate, and CA DOT Test #422 for chloride.



Expansion Index

Test Performed in General Accordance with

☒ ASTM D 4829

☐ UBC 29-2

Project Name:	Oroville Union High School District	CTS Job No.	18111
Project Location:	Oroville	Client:	
Date Sampled:	12/16/2021	Report Date:	12/30/2021
Date Tested:	12/27/2021	Sampled by:	Mike Turner
Lab Log:	238518	Description	Reddish-Brown Clayey Gravel

Measured

Expansion Index (EI) 2
Molding Water Content (%) 10.3
**Final Water Content (%) 19.6
Sample ID: Bulk S2

Comments

Expansion Index determined by adjusting water content to achieve a degree of saturation of 48-52%.

Classification of Potentially Expansive Soil

<u>Expansion Index, EI</u>	<u>Potential Expansion</u>
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High

Limitations

Testing results presented are for samples collected by CTS personnel at the times and location(s) shown.

Testing was performed in accordance with the applicable test methods by qualified personnel.

Pursuant to applicable building codes and/or specifications, the results presented in this report are for the items listed herein and for the exclusive use of the Client and the registered design professional in responsible charge. The results apply only to the samples tested and are not to be considered as a guarantee or warranty, express or implied. In the event changes to the specifications were made and not communicated to CTS, then CTS assumes no responsibility for the accuracy of pass/fail statements (meets/did not meet), if provided.

Tested by: Cory Blue

Reviewed by: Mike Turner, CEG

Title: Lab Technician

Title: Project Manager

Date: 12/27/2021

Date: 12/30/2021



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APPENDIX B

PHASE I ENVIRONMENTAL SITE ASSESSMENT

(ESSEL ENVIRONMENTAL)

The Phase I ESA report was provided separately for the draft Geologic Hazard Report

ENVIRONMENTAL SITE ASSESSMENT QUESTIONNAIRE

Please complete this questionnaire to the best of your knowledge. For those questions that are not applicable, please respond with an "N/A". For questions with unknown answers please respond with "unknown".

1. PROPERTY INFORMATION:

Property Name: <u>N/A Land</u>		
Property Address: <u>2500 and 2600 Mitchell Ave</u>		
City <u>Oroville</u>	State <u>CA</u>	Zip <u>95966</u>
Assessor's Parcel Number <u>013-250-062-000</u> <u>013-250-063-000</u>		
Property Owner Name & Contact Information: <u>Gablamovin, LLC</u>		
Date Property Owner Purchased: <u>3/12/2021</u>		
Key Site Manager Name & Contact Information: <u>Lance Lee</u>		

2. PROPERTY DESCRIPTION

Property Size: 0.77 + 0.9 = 1.67 Number of Building(s): 0

Size of Building(s): N/A Date of Construction: N/A

Property Type: (please circle)

☒ Multi-Family ☐ Hotel ☐ Mobile Home Park ☒ Retail/Commercial ☐ Industrial ☒ Office

Other: mixed use

Previous/Historical Use of Property: N/A

3. PREVIOUS INVESTIGATIONS

What, if any, previous environmental assessments or investigations been performed at the property:

Phase I ESAs: YES ☐ NO ☒ Date(s): _____

Phase II Subsurface Investigations: YES ☐ NO ☒ Date(s): _____

Remediation Work: YES ☐ NO ☒ Date(s): _____

Asbestos or Lead-Based Paint surveys: YES ☐ NO ☒ Date(s): _____

Essel Environmental & Engineering Consulting

If yes to any, please provide copies of the environmental assessments and/or investigation reports

4. SURROUNDING PROPERTY USES

DIRECTION	LAND USE
North	School Admin / Bus
South	Apartments
East	School Bus Yard
West	Housing: Single family

5. ENVIRONMENTAL ISSUES

5.1 Are you aware of any potential environmental concerns associated with surrounding properties?

YES ☐

NO ☒

If yes, please describe: _____

5.2 Please describe your knowledge on the past uses of the property

None

5.3 Are you aware of any Activity and Use Limitations (AULs), such as engineering controls, land use restrictions, or institutional controls that are in place at the subject property and/or have been filed or recorded in a registry under federal, tribal, state or local law? Please describe No

5.4 Please describe your current and historical knowledge on:

a) Chemicals used/stored at the property: None

b) Spills or other chemical releases that have taken place at the property: None

c) Environmental cleanups that have taken place at the property

None

6. UTILITIES & SERVICES

Please provide the name of the utility or contractor providing the following:

Electric N/A
Gas N/A
Potable Water N/A

Sanitary Sewer N/A
Bio-hazardous Waste N/A
Elevator Maintenance N/A

Used Grease N/A
Hazardous Waste N/A

7. ON SITE OPERATIONS

Are you aware of any of the following conditions, either past or present, on the property?		
Condition	Response	If yes, please describe
1. Stored Chemicals	☐ Yes ☒ No	
2. Underground Storage Tanks	☐ Yes ☒ No	
3. Aboveground Storage Tanks	☐ Yes ☒ No	
4. Spills or Releases	☐ Yes ☒ No	
5. Dump Areas/Landfills	☐ Yes ☒ No	
6. Waste Treatment Systems	☐ Yes ☒ No	
7. Clarifiers/Separators	☐ Yes ☒ No	
8. Vents/Odors	☐ Yes ☒ No	
9. Floor Drains/Sumps	☐ Yes ☒ No	
10. Stained Soil	☐ Yes ☒ No	
11. Electrical Transformers	☐ Yes ☒ No	
12. Hydraulic Lifts/Elevators	☐ Yes ☒ No	
13. Dry Cleaning Operations	☐ Yes ☒ No	
14. Oil/Gas/Water/Monitoring Wells	☐ Yes ☒ No	
15. Environmental Permits	☐ Yes ☒ No	

8. ENVIRONMENTAL LIENS AND LIMITATIONS

7.1	Are there any environmental liens filed or recorded against the property (40 CFR 312.25)	YES ☐	NO ☒
7.2	Are you aware of any environmental cleanup liens against the property that have been filed or recorded under federal, tribal, state or local law?		
	If yes, please provide details and copies of supporting documents:	YES ☐	NO ☒

<p>7.3 Are you aware of any Activity and Use Limitations, such as engineering controls, land use restrictions or institutional controls in place at the property and/or have been filed or recorded in a registry under federal, tribal, state or local law?</p> <p>If yes, please provide details and copies of supporting documents:</p>	<p>YES ☐</p>	<p>NO ☒</p>
<p>7.4 Do you have any specialized knowledge or experience related to the handling, storage and or use of hazardous materials and/or hazardous waste at the subject property and/or nearby properties?</p> <p>If yes, please provide details and copies of supporting documents:</p>	<p>YES ☐</p>	<p>NO ☒</p>
<p>7.5 Does the purchase price being paid for the property reflect the fair market value of the property?</p> <p>If not, have you consider that the lower purchase price is because the presence of contamination is unknown, or believed to be present at the property?</p> <p>If you determine that the presence of contamination is believed to be the reason for the low purchase price, please provide details and copies of supporting documents.</p>	<p>YES ☒</p>	<p>NO ☐</p>
	<p>YES ☐</p>	<p>NO ☐</p>
	<p>YES ☐</p>	<p>NO ☐</p>

9. COMMONLY KNOWN OR REASONABLY ASCERTAINABLE INFORMATION ABOUT THE PROPERTY

<p>8.1 Are you aware of commonly known or reasonably ascertainable information (i.e. former land uses) about the property that would help an environmental professional identify conditions that indicate a release or threatened release of hazardous materials?</p> <p>If yes, please provide details and if possible copies of supporting documents:</p>	<p>YES ☐</p>	<p>NO ☒</p>
--	---	---