



TRINITY VALLEY CONSULTING ENGINEERS, INC

Engineering – Surveying – Land Planning – Construction Management

Soils Report

For:

**Burnt Ranch Estates Mutual Water Company
Burnt Ranch, CA 95527**

Report Provided For:

**Burnt Ranch Estates Mutual Water Company
PO Box 102
Burnt Ranch, CA 95527**

Report Provided By:

**Trinity Valley Consulting Engineers, Inc.
67 Walnut Way, PO Box 1567
Willow Creek, California 95573
(530) 623-3000 Fax: (530) 629-3011**

December 2023

Job #1754

**Main Office
67 Walnut Way
Willow Creek CA 95573
(530) 629.3000**

**Weaverville Office
2200 Main Street
Weaverville CA 96093
(530) 623.4446**



TRINITY VALLEY CONSULTING ENGINEERS, INC

Engineering – Surveying – Land Planning – Construction Management

Table of Contents

INTRODUCTION	2
PROJECT SITE LOCATION.....	2
PROJECT SITE GEOLOGY.....	3
PROPOSED PROJECT	3
SOIL AND SITE CONDITIONS	3
SITE SOIL EVALUATION.....	3
SEISMIC AND HAZARDS CONSIDERATIONS	4
CONCLUSION	4
RECOMMENDATIONS	5
Site Preparation	5
Fills	5
Compaction Standards	6
Drainage and Landscaping.....	6
Setback Requirements.....	7
Foundational Design Recommendations.....	7
Grading	8
Erosion Control	8
LIMITATIONS	9
REFERENCES	11

ATTACHMENTS:

- ATTACHMENT 1: LOCATION MAP
- ATTACHMENT 2: SITE MAP
- ATTACHMENT 3: GEOLOGY MAP
- ATTACHMENT 4: SOILS EXAMINATION
- ATTACHMENT 5: SOILS LOG
- ATTACHMENT 6: ASCE SEISMIC HAZARD DATA

Introduction

Trinity Valley Consulting Engineers, Inc. (TVCE) was secured by The Burnt Ranch Estates Mutual Water Company - BREMWC (client) to evaluate the existing conditions for the Burnt Ranch Estates. The client is proposing domestic water treatment, storage, and distribution upgrades within the Burnt Ranch Estates Community.

The proposed Burnt Ranch Estates Community Water System Improvement Project will mainly provide upgrades and increased capacity to the existing water treatment, storage and distribution system. The goal is to add two additional water storage tanks, replace the entire distribution system, replace all fire hydrants and replace all water meters. This project will not increase the number of water service connections. Furthermore, this project does not alter the existing water right held by the Burnt Ranch Estates Mutual Water Company BREMWC. McDonald Creek is the source of water for BREMWCO and is gathered from a dam on BREMWC property. The proposed activities do not involve disturbance of the water inlet nor the riparian corridor through which the creek flows.

The following is an outline of our findings and recommendations.

Project Site Location

Upper Water Tank:

The existing main tank is located on assessor parcel number (APN) 008-790-003-000. The existing tank is rectangular and is constructed of concrete blocks. It is approximately 20' x 15' and sits on a flat area cut into on a moderately steep hillside, which was excavated and constructed on in the mid-1970s. The plan is to extend this flat to the north by extending the excavated area into the same hillside to bring its new angle of repose to a stable condition. The area to be excavated into is part of the cut slope created during the original construction and part the native hillside. The existing slope ranges from 30-50% in steepness. The area to be excavated occupies about 0.25 acres. It is presently covered with a moderately dense mixture of brush and trees. The proposed water tank will be 80,000-gallon bolted steel tank with concrete foundation.

Lower Water Tank:

The lower tank is located on APN: 008-800-005-000 and is approximately 0.25-acre lot owned by the BREMWC, about 1 mile from Highway 299 on Pony Express Way. Like the upper tank, the existing lower tank is comprised of concrete blocks and was constructed in the 1970s. The old tank will be removed and the new tank located on the same site. The new tank will be approximately 40,000 gallon and constructed from bolted steel with a concrete foundation. The site is clear of all vegetation. This area is naturally flat and was graded to accept the current tank in the 1970s. Very little new grading will be necessary in order to accommodate the new tank.

Water Mains:

The length of the main water line is approximately 10,000 feet. It largely runs underneath the main access roads, Horseshoe Lane, Pony Express Way, and Stage Coach Drive. These

roads are County maintained. The plan is to replace the aging water line, which is a combination of galvanized and plastic pipe, with new HDPE water lines, to the start of each domestic inlet, including shut off valves and cross connection prevention devices. Existing water mains will be removed where encountered and abandoned in place otherwise.

Project Site Geology

The site is located in Burnt Ranch. The site lies within Klamath Mountain Geomorphic Province (Irwin, 1966), and geologically, within the Rattlesnake Creek Terrane (Irwin, 1972). The site is mapped as being underlain by a large dormant-old Quaternary landslide deposit (Qls) that flanks from the eastern terminus of a northeasterly spur that originates from South Foothill Mountain. The pond site appears to lie within the highly rounded scarp of this dormant slide body. Subjacent to the landslide deposit, Middle Jurassic to Permian age Broken formation of volcanic rocks (JTRPrc) and mélange of the Rattlesnake Creek Terrane are present. Irwin (2010) describes this formation as dominantly sheared and dislocated mafic volcanic rocks, including pillow basalt, flows, tuffs, volcanic breccia, and volcanoclastic rocks that containing locally interbedded red and gray to black, thin bedded radiolarian chert, minor amounts of intermediate and silicic volcanic rocks, and lenses and knickers of serpentinite (um) which is dominantly serpentinitized peridotite but includes metasomatized mafic rocks of uncertain origin as well as minor amounts of sheared-in volcanic rocks and chert.

Proposed Project

The proposed project for this site is to perform a general soils investigation to evaluate present-day site conditions and provide general recommendations for the developments associated with the project. The developments will mainly consist of constructing water tanks, retaining walls, and installation of water lines.

Soil and Site Conditions

A field investigation was conducted by TVCE on May 21, 2023 for visual observation and soil sample collection. This investigation consisted of site observations, general observations of the location of the proposed development, and collection of soil samples (see attachment 4). In addition, a desktop reconnaissance was conducted utilizing available public databases.

Site Soil Evaluation

Conservatively, site soils will yield a bearing pressure of one thousand five hundred (1,500) pounds per square foot (psf) for vertical bearing and one hundred (100) psf for lateral bearing (2022 California Building Code, Table 1806.2).

Seismic and Hazards Considerations

The parcel is located near the Mad River fault zone which is located approximately 22 miles to the west of the project site. The Mad River Fault Zone (Fault ID # 13) is considered active by the State of California, with the last surface rupture within the last 15,000 years.

The following coefficients shall be used for seismic design (See Attachment 6 for Seismic Hazard Data):

Site Class	D
Mapped Spectral Response Acceleration (short), S_s :	1.94 g
Mapped Spectral Response Acceleration (1-sec), S_1 :	0.73 g
Site Coefficient, F_a :	1.2
Site Coefficient, F_v :	1.5
Acceleration Spectral Response (short), S_{DS} :	1.54 g
Acceleration Spectral Response (1-sec), S_{D1} :	1.06 g
Seismic Design Category:	D
Risk Category:	IV
Importance Factor:	1.5

Based on the location and geographical setting, the project site lies outside any flood prone areas. The <https://amplify.asce.org/project> parcel has not been mapped within a FEMA flood area (FIRM Panel 750 of 2075).

Non-engineered fill soils are not present on-site within the anticipated building footprints. However, if encountered during excavation of foundation elements, undocumented and/or non-engineered fill soil should be considered unsuitable as foundational load bearing soils due to the potential for excessive total and differential settlement. It will be required to over-excavate (approximately 3' to 8') so foundational elements be founded on suitably-dense, in-place and undisturbed native granular soils. A qualified professional shall inspect the subgrade of all foundational elements.

Due to the site soils, depth to groundwater, and distance to the nearest known quaternary fault, the potential for liquefaction, surface rupture, soil strength loss, or faulting at this site is Low. Mitigations to hazards associated with the proposed development are those described in the section above and in the following recommendations prescribed within the following *Recommendations* Section.

Conclusion

This report documents the history, present conditions and subsurface materials, as well as the geologic hazards associated with the site. Included in this report are design and construction recommendations based on the site conditions encountered, the requirements of the 2022 CBC and County of Trinity grading ordinance. Based on our review of

historical data, site exploration and observations, it is in our opinion that if our site-specific recommendations are implemented as intended, then no further actions will be necessary.

Recommendations

The following recommendations are general recommendations for any future grading activities to be performed:

Site Preparation

All earthwork, including but not limited to, site clearing, grubbing, and stripping should be conducted during dry weather conditions, generally mid-April through mid-October.

Strip and remove all topsoil and vegetation from the project area, and for a minimum of three feet to the outside of the working area.

Any undocumented fill soils, fine-grained residual soils, and any other debris encountered at or below the existing ground surface shall be removed at the locations receiving any potential fills.

Fills

Fills shall be constructed as controlled and compacted engineered fills and fillslopes graded to no steeper than 2:1 (h:v) without written approval of a qualified design professional.

Fills should be free of: 1) organics, 2) rocks larger than 3-inches in diameter, and 3) other deleterious materials.

Fill material should be placed in loose lifts no more than 8-inches thick, at uniform moisture content at or near optimum, and compacted mechanically.

Sufficient testing and inspection should be performed to monitor the suitability of fill materials and assure compliance with the recommended compaction standards.

Fill, if required, may be imported for use as non-expansive structural fill beneath floor slabs and for pavement subgrade. Select fill should be a soil/rock mixture free of organic material and other deleterious material. The select fill material should contain low plasticity clay, well-graded sand, and/or gravel. Select fill should contain no rocks larger than 3 inches in greatest dimension, nor more than 15 percent larger than 2 inches. Additionally, the material should meet the following specifications:

Plasticity index: <12

Liquid Limit: <30

Percent passing No. 200 sieve: 50 maximum, 5 minimum

Aggregate base material may be used for pavement subgrade, placed beneath footings or floor slabs, used as trench backfill, or used as roadway surfacing. This material should meet the requirements in the Caltrans Standard Specifications for Class 2 Aggregate Base (3/4-inch maximum particle size).

Compaction Standards

Fills shall be compacted in 8-inch loose lifts with clean native materials at optimum moisture content as determined by testing and approved by the engineer. Non-structural fills shall be compacted to a firm unyielding surface as approved by engineer.

It is recommended that any materials proposed for structural fill material to support any foundations or structural building elements, and associated utilities be compacted as specified below:

Fill Placement Location	Compaction Recommendations (ASTM D 1557-Modified Proctor)	Moisture Content (Percent Optimum)
Structural fill supporting footings	95%	-1 to +3 percent
Structural fill supporting slabs-on-grade	90%	-1 to +3 percent
Structural fill placed within 3 feet beyond the perimeter of the building pad	90%	-1 to +3 percent
Utility trenches within building and any pavement areas	95%	-1 to +3 percent
Utility trenches beneath landscape and grass areas	90%	-1 to +3 percent

Drainage and Landscaping

The site should be graded to provide drainage such that no water is allowed to: 1) pond anywhere on the site, 2) migrate beneath the proposed developments, or 3) pond at the base of cuts.

Site drainage/run-off should be directed away from all fill slopes. Impermeable surfaces should be minimized to encourage infiltration.

Roadways – Gravel Surface

The upper six inches of graveled roadways supporting vehicle loadings should be compacted to a firm and unyielding surface that is stable under construction traffic prior to placement of aggregate base. Aggregate base rock supporting vehicle traffic shall be a minimum of 4 inches of ¾" minus and a maximum of 1-1/2" minus.

Roadways – Paved Surface

The upper six inches of pavement subgrades supporting vehicle loadings should be scarified, moisture conditioned to at least the optimum moisture content and uniformly compacted to at least 95 percent of the ASTM D1557 maximum dry, and must be stable under construction traffic prior to placement of aggregate base. Final subgrade processing and compaction should be performed just prior to placement of aggregate base, after construction of underground utilities is complete.

Setback Requirements

We recommend that the face of the footings be set back at least twenty feet (20') from a break in top of slopes. Given the minimal setback from the break in slope, the greater embedment is recommended to provide vertical and lateral support for the foundation without detrimental settlement. Where slope is steeper than 1:1, the required setback shall be measured from an imaginary plane at 45 degrees to the horizontal, projected upwards from the toe of the slope.

Foundational Design Recommendations

All foundations should be constructed of reinforced concrete. The following foundation recommendations assume a one-story commercial structure will be constructed on this site. In our opinion, the proposed structure can be supported by mat slab or a stiffen slab on grade provided that the foundation is designed to resist differential settlement of the underlying soil. A foundation of this type is suitable for site conditions provided that it is constructed in accordance with our recommendations and specifications and designed to meet the standards of the 2019 CBC.

Below are additional recommendations associated with the foundation development:

Footings

- Foundations are not anticipated to be located in areas of undocumented fill or fill soils of varying depth. A foundation system for this site should be rigid to limit potential structural damage due to differential settlement resulting from liquefaction;
- If necessary to mitigate undocumented fill soils excavate and replace with suitable engineered fill, placed and compacted as recommended. Alternately, footings may be built on controlled low strength material (CLSM, e.g., concrete slurry) backfilled footing trenches, excavated into the bearing soil indicated in this report;
- Foundations should be embedded a minimum of 12 inches into suitably dense, undisturbed native bearing soils. Based on the soil profile observed in the building footprint, the base of footings should therefore be approximately 18 inches below existing grade, at minimum; or engineered for differential settlement

- Footings within 20 feet (at minimum) of the top of slope should be embedded approximately 2 feet below finished grade;
- Minimum width of footings should be 12 inches, and the minimum thickness should be 6 inches, per CBC Section 1809.

Floor Slab Design

- The stiffened concrete floor slab-on-grade or mat slab should have a minimum thickness as specified by the engineer, and should be reinforced and underlain by at least 6 inches of compacted select fill consisting of 4 inches of Class 1, Type A permeable material (per Caltrans), or an approved equivalent, to act as a capillary moisture break, and 1 inch of sand as described below;
- To reduce the possibility of moisture migration through any floor slab-on-grade, a minimum 6 mil plastic membrane (vapor retarder) should be placed on the prepared of Class 1, Type A gravel subgrade;
- Joints between the sheets and utility piping openings should be lapped and taped;
- Care should be taken during construction to protect the plastic membrane against punctures. To protect the membrane during steel and concrete placement, and to provide for a better concrete finish, cover the membrane within at least 1 inch of clean sand;
- The difference, if any, between the 6 inches of select fill and sand under the slab and the depth to firm undisturbed native soil may be made up with additional select fill or engineered fill that is placed as specified in the Structural Fill section of this report.
- If bearing on undisturbed / native soil is not obtained, slab shall be designed with sufficient stiffness so as to resist differential settlement.

Grading

Grading must meet compliance with the California Building Code (2019) Appendix J, County of Trinity Grading Ordinance and ASTM regulations.

All cuts and fills shall be setback at a minimum of ten (10) feet from all ascending and descending slopes greater than 30%.

Any grading or structures shall be in conformance with the most recent version of the California Building Code (CBC).

Final site grading shall not create areas of concentrated flow over the existing fill slopes. An inspection of the subgrade must be inspected by a qualified professional. Subsequent visits during and at project termination will be required for quality assurance and control.

Erosion Control

Site-specific erosion/sediment control and stabilization recommendations are presented in the bulleted list below. As used herein, *exposed soil areas* and *disturbed areas* include all grading and excavation work performed in connection with the proposed project.

- Storm water erosion and pollution prevention measures should be taken as soon as possible prior to the onset of the winter rains.
- Trinity County Erosion Control Standards should be viewed as *minimum* standards for erosion and sediment control at this site.
- Revegetate all disturbed areas immediately by seeding with Caltrans erosion control mix (or equivalent).
- To protect against erosion, heavily mulch all exposed soil areas with straw, or an approved alternate material.
- Poke the straw mulch into the upper 2 inches of the soil to limit loss of straw.
- Stake straw wattles parallel to slope contours into any side cast fills.
- Install silt fencing at toes of any new side cast fill slopes.
- Replant the site with trees and shrubs native to the area.
- Cover any soil stockpiles with 6-mil (min) plastic sheeting, securely anchored to prevent wind disturbance.
- Native gravel-surfaced roadways to the proposed residence and other areas where vehicle traffic may occur; should be maintained in good condition.
- Drive and park vehicles only on gravel-paved areas during wet weather.
- Monitor the site before and after runoff-generating rainfall events to verify suitable and appropriate functioning of all erosion-control measures.
- Promptly repair all erosion-control measures as needed.

Limitations

This report, recommendations, and conclusions are solely intended for the site discussed above. The information contained in this report is only intended for use at the stated site using the stated uses. This report should not be used as justification for any other project or site, and only be used for information purposes if referenced and reviewed for other projects. TVCE recognize that the site is in a dynamically active area and conditions can and will change. TVCE has used the best professional judgment to assess the present and future risks and assist the landowner in proposing development that does not increase the risk to the resources present in the project area or subject the landowner to untenable hazards. If conditions different from those described in this report are encountered during construction, the project engineer/builder/owner should contact this office to review the new conditions and evaluate their bearing on the validity of any recommendations provided herein.

The opinions presented herein have been developed using a degree of care and skill ordinarily exercised, under similar circumstances, by reputable civil engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report.

The analyses and recommendations contained in this report are based on the data obtained from subsurface exploration. The methods used indicate subsurface conditions only at the specific locations where soils were observed, and only to the depths penetrated, and cannot always be relied on to accurately reflect stratigraphic heterogeneity that commonly exist between sampling locations.

Do not apply any of this report's conclusions or recommendations if the nature, design, or location of the project changes. If changes are contemplated, the author of this report should be consulted to review the impact on the applicability of the recommendations in this report. The author of this report is not responsible for any claims, damages, or liability associated with any other party's interpretation or the subsurface data or reuse this report for other projects or at other locations without written consent.

Please contact TVCE at (530) 629-3000 if any questions may arise.

Eric Keyes
Professional Engineer, P.E. C 90533

References

- California Building Code, 2019, California Code of Regulations. Title 24, Part 2, Volume 2, California Building Standards Commission.
- County of Trinity Transportation Department, 2021, Trinity County Parcel Viewer, accessed 12/6/2023, from website: <https://www.trinitycounty.org/Trinity-County-Parcel-Viewer>
- Irwin, W.P., 1966, Geology of the Klamath Mountains Province. P. 19-28 in E.H. Bailey (ed.), Geology of northern California. California Division of Mines and Geology, Sacramento, CA, Bulletin 190.
- Irwin, W.P., 2010, Reconnaissance geologic map of the Hyampom 15' quadrangle, Trinity County, California: U.S. Geological Survey, Scientific Investigations Map SIM-3129, scale 1:50,000.
- Irwin, W.P., 1972, Terranes of the Western Paleozoic and Triassic Belt in the Southern Klamath Mountains, California: U.S. Geological Survey, Professional Paper 800-C, pg. C103-C111.
- Structural Engineers Association of California, 2019, Seismic Design Map Tool, accessed 8/6/2021, from website: <https://seismicmaps.org/>.
- U.S. Department of Agriculture, 2021, Web Soil Survey, accessed 12/6/2021, from <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>.
- U.S. Department of Homeland Security Federal Emergency Management Agency, 2019, FEMA Flood Map Service Center, accessed 8/6/2021, from website: <https://msc.fema.gov/portal/search>.
- U.S. Geological Survey and California Geological Survey, 2023, Quaternary fault and fold database for the United States, accessed 12/6/2023, from website: <http://earthquake.usgs.gov/hazards/qfaults/>.
- Weaver, W.E., Weppner, E.M., and Hagens, D.K., 2015, Handbook for Forest, Ranch and Rural Roads: A Guide for Planning, Designing, Constructing, Reconstructing, Upgrading, Maintaining and Closing Wildland Roads (Rev.1st ed.)

ATTACHMENT 1:

Location Map

ATTACHMENT 2:

Site Map

ATTACHMENT 3:

Geology Map

ATTACHMENT 4:

Soil Exploration

ATTACHMENT 5:

Soil Log

ATTACHMENT 6:

ASCE Seismic Hazards

BURNT RANCH ESTATES MUTUAL WATER COMPNAY - OVERALL SITE PLAN



BURNT RANCH ESTATES MUTUAL WATER COMPNAY – TANKS SITE EXPANDED VIEW

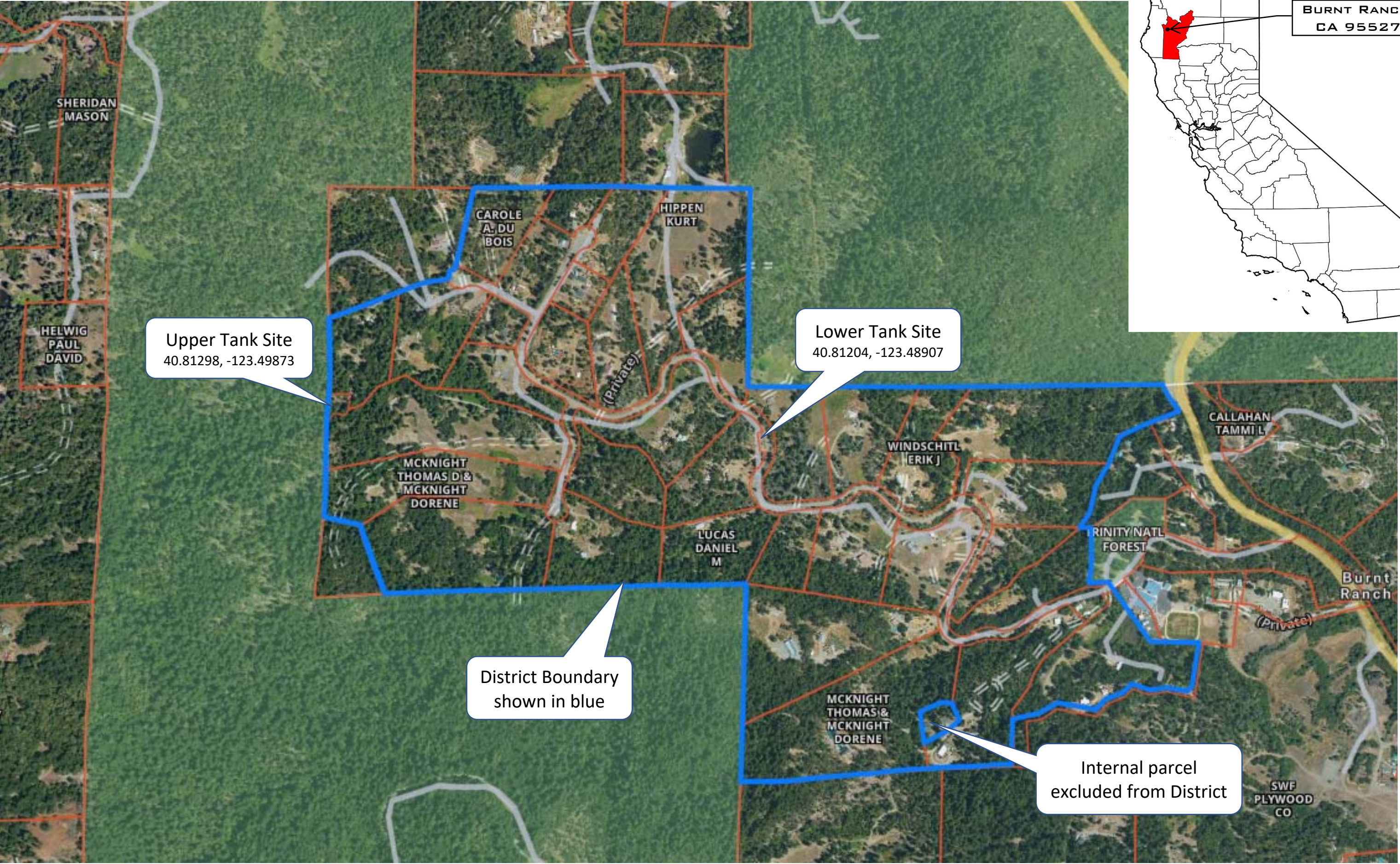


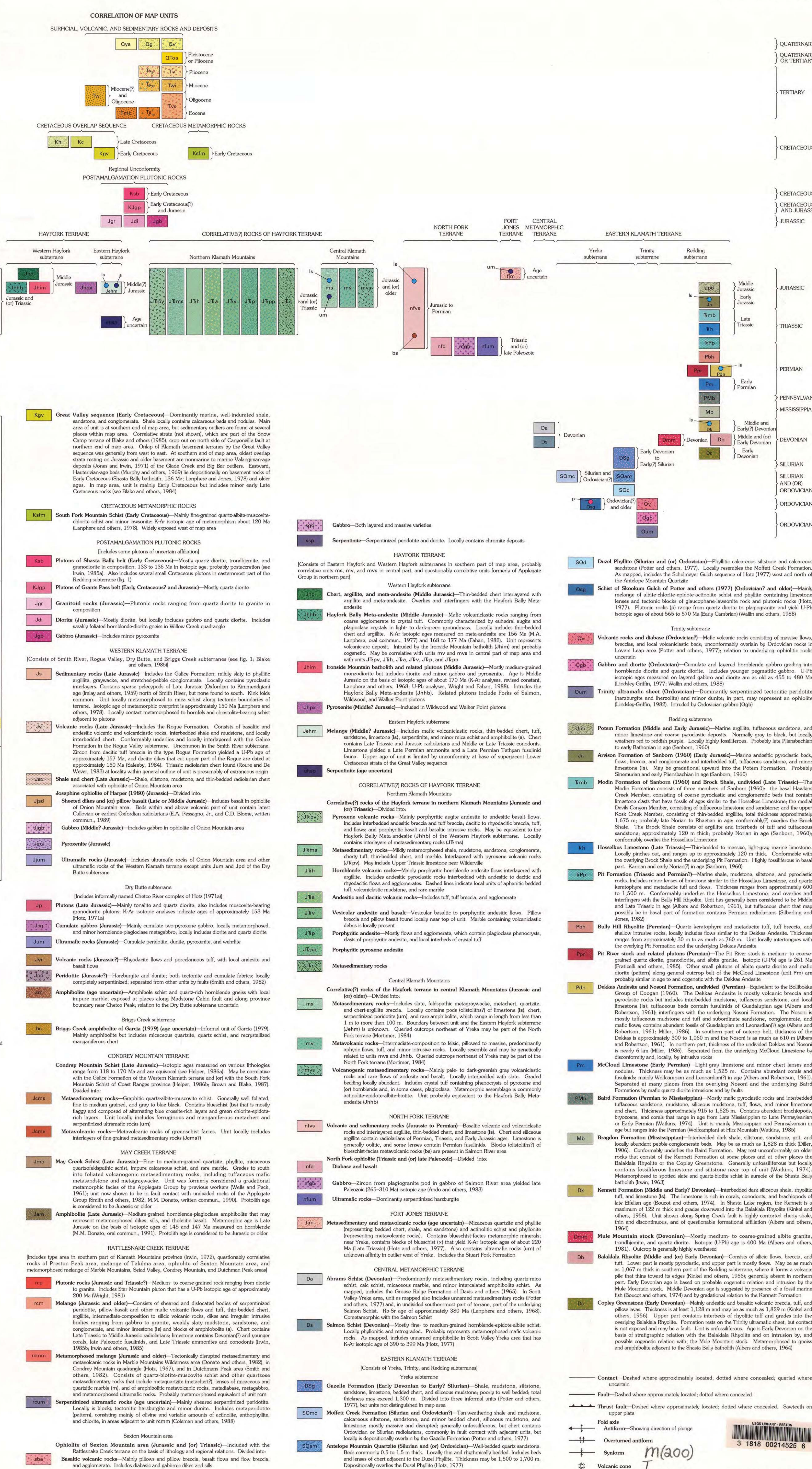
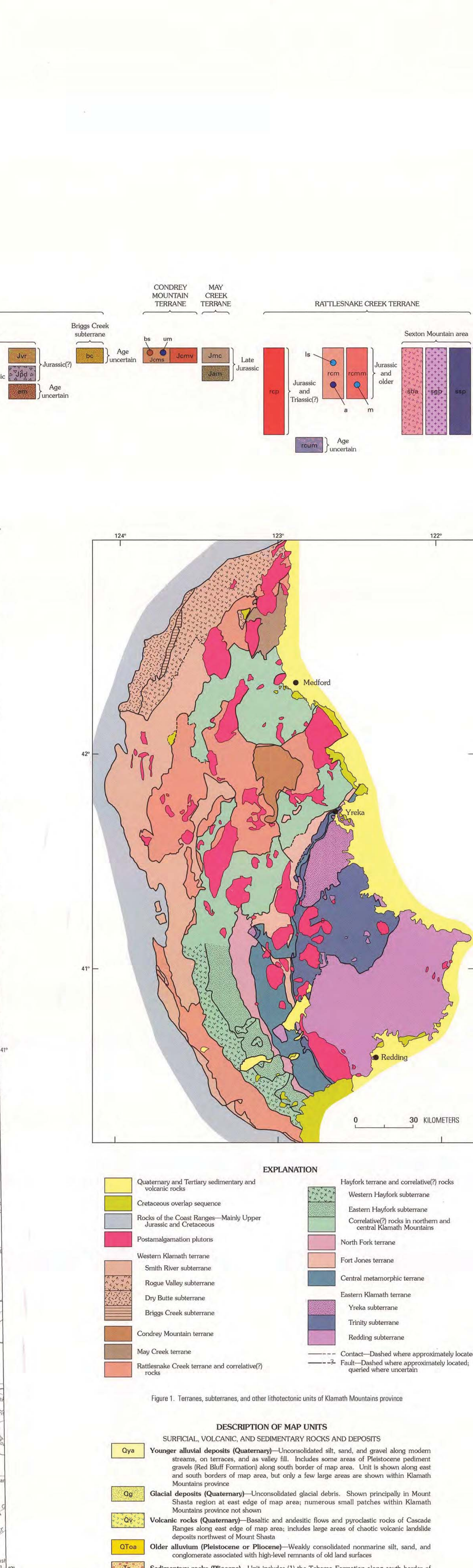
UPPER TANK SITE



LOWER TANK SITE

BURNT RANCH ESTATES MUTUAL WATER COMPNAY – DISTRICT BOUNDARY







TRINITY VALLEY CONSULTING ENGINEERS, INC.

Engineering - Surveying - Land Planning - Construction Management

Job No. 1754.04

Page 1 of 4

Date: 06/19/2023

Report to: Burnt Ranch Estates Mutual Water
PO Box 102
Burnt Ranch, CA 95527

RE: APN: N/A

TP #: 1A, 1B, 1C

Depth: 2', 5', 9'

Sample Description: Soil

Sampled By: J. McKnight

Date Tested: 06/16/2023

Date Sampled: 05/21/2023

SOILS EXAMINATION FOR SOIL PERCOLATION SUITABILITY

Textural Analysis

	TP-1A	TP-1B	TP-1C
Sand:	74%	66%	62%
Clay:	14%	14%	17%
Silt:	12%	20%	21%
Zone Classification:	2	2	2

Bulk Density: N/A


Comments:

Zone 1 - Soils in this zone are very high in sand content. They readily accept effluent, but because of their low silt and clay content, they provide minimal filtration. These soils demand greater separation distances from ground water.

Zone 2 - Soils in this zone provide adequate percolation rates and filtration to effluent. They are suitable for use of a conventional system without further testing.

Zone 3 - Soils in this zone are expected to provide filtration of effluent, but their ability at a suitable rate is questionable. These soils require wet-weather percolation tests to verify their suitability for effluent disposal by conventional leachfield methods.

Zone 4 - Soils in this zone are unsuitable for a conventional leach field because of their severe limitations for accepting effluent.


Josh McKnight, P.E.

Soil Texture Analysis Worksheet

Job Name: BREMW - Drought Resilience

Job No.: 1754.04

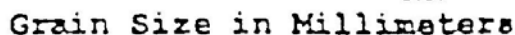
Performed By: J. McKnight

Hole #	TP-1A	TP-1B	TP-1C	
Depth (ft)	2	5	9	
Oven Dry Weight (g)	100	100	100	
Starting Time	1435	1430	1455	
Temp @ 40 Sec	62	62	64	
Hydrometer Reading @ 40 sec	34	42	45	
Composite Correction	7.7	7.7	7.3	
True Density @ 40 sec	26.3	34.3	37.7	
Temp @ 2 Hours	73	73	74	
Hydrometer Reading @ 2 Hours	19	19	22	
Composite Correction	5.5	5.5	5.3	
True Density @ 2 hours	13.5	13.5	16.7	
% Sand	74	66	62	
% Clay	14	14	17	
% Silt	12	20	21	
Soil Zone	2	2	2	
Classification	Sandy Loam	Sandy Loam	Sandy Loam	

Job Name: BREMW - Drought Resilience
Job No.: 1754.04

Test Pit Number	TP-1A	TP-1B	TP-1C	
Percolation Rate (minutes per inch)	16	16	16	
Application Rate (gallons per day per square foot)	0.7	0.7	0.7	

Job No. 1754.04





TRINITY VALLEY CONSULTING ENGINEERS, INC
Engineering - Surveying - Land Planning - Construction Management

Job No. 1754.04
Page 1 of 4

Date: 06/19/2023

Report to: Burnt Ranch Estates Mutual Water
PO Box 102
Burnt Ranch, CA 95527

RE: APN: N/A

TP #: 2A, 2B, 2C Depth: 2', 5', 9' Sample Description: Soil
Sampled By: J. McKnight Date Tested: 06/16/2023 Date Sampled: 05/21/2023

SOILS EXAMINATION FOR SOIL PERCOLATION SUITABILITY

Textural Analysis	TP-2A	TP-2B	TP-2C
Sand:	69%	73%	69%
Clay:	12%	9%	11%
Silt:	19%	18%	20%
Zone Classification:	2	2	2

Bulk Density: N/A


Comments:

Zone 1 - Soils in this zone are very high in sand content. They readily accept effluent, but because of their low silt and clay content, they provide minimal filtration. These soils demand greater separation distances from ground water.

Zone 2 - Soils in this zone provide adequate percolation rates and filtration to effluent. They are suitable for use of a conventional system without further testing.

Zone 3 - Soils in this zone are expected to provide filtration of effluent, but their ability at a suitable rate is questionable. These soils require wet-weather percolation tests to verify their suitability for effluent disposal by conventional leachfield methods.

Zone 4 - Soils in this zone are unsuitable for a conventional leach field because of their severe limitations for accepting effluent.


Josh McKnight, P.E.

Soil Texture Analysis Worksheet

Job Name: BREMW - Drought Resilience

Job No.: 1754.04

Performed By: J. McKnight

Hole #	TP-2A	TP-2B	TP-2C	
Depth (ft)	2	5	9	
Oven Dry Weight (g)	100	100	100	
Starting Time	1440	1445	1500	
Temp @ 40 Sec	65	66	64	
Hydrometer Reading @ 40 sec	38	34	38	
Composite Correction	7.1	6.9	7.3	
True Density @ 40 sec	30.9	27.1	30.7	
Temp @ 2 Hours	73	74	74	
Hydrometer Reading @ 2 Hours	17	14	16	
Composite Correction	5.5	5.3	5.3	
True Density @ 2 hours	11.5	8.7	10.7	
% Sand	69	73	69	
% Clay	12	9	11	
% Silt	19	18	20	
Soil Zone	2	2	2	
Classification	Sandy Loam	Sandy Loam	Sandy Loam	

Job Name: BREMW - Drought Resilience

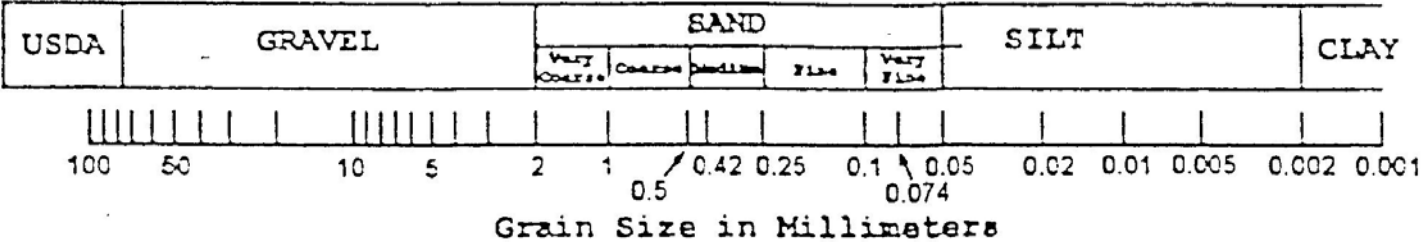
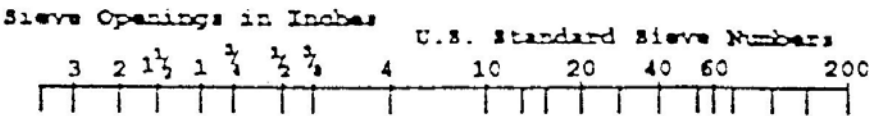
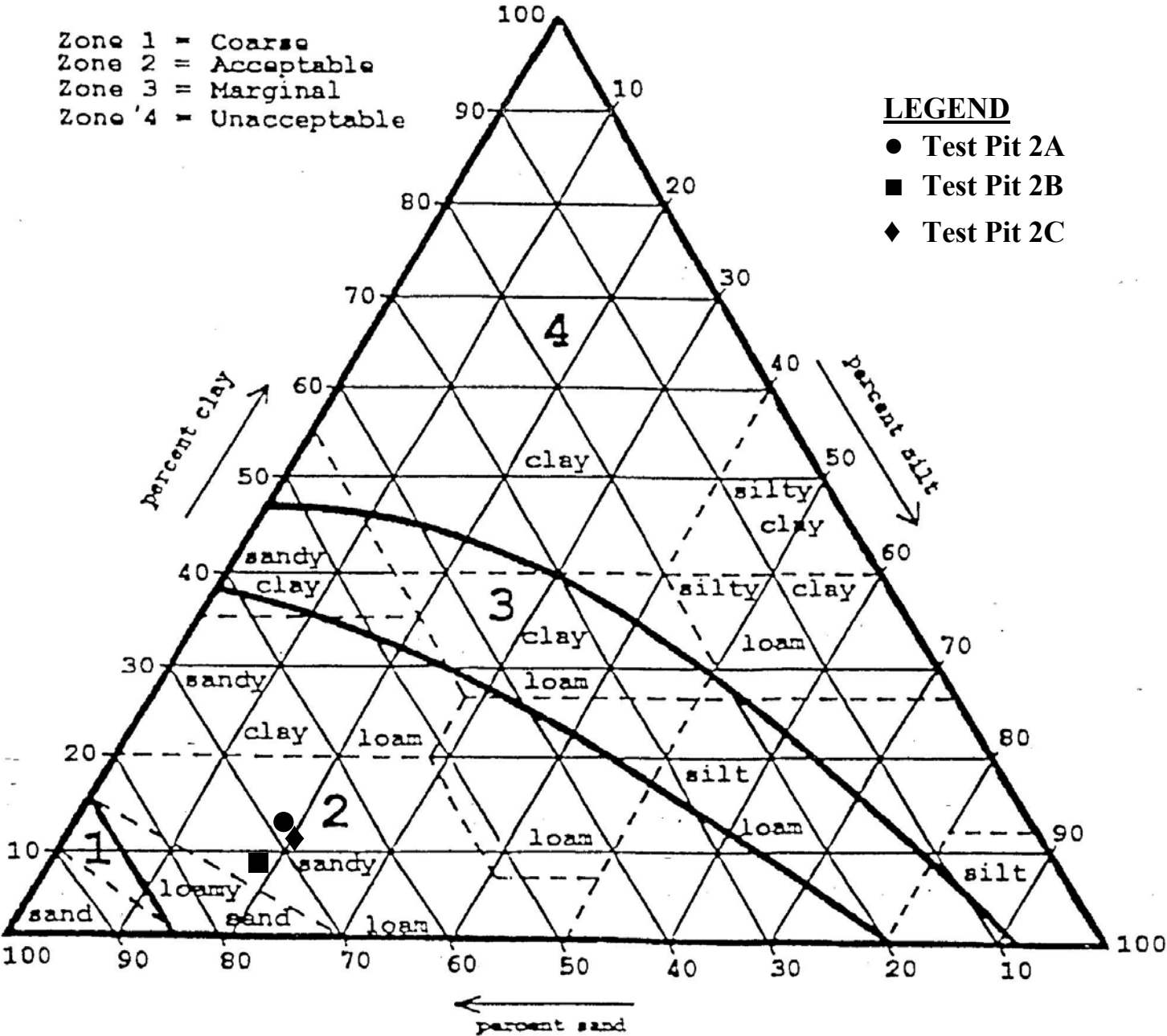
Job No.: 1754.04

Test Pit Number	TP-2A	TP-2B	TP-2C	
Percolation Rate (minutes per inch)	16	16	16	
Application Rate (gallons per day per square foot)	0.7	0.7	0.7	

BREMW – Drought Resilience Project
APN: N/A
Job No. 1754.04

Zone 1 = Coarse
Zone 2 = Acceptable
Zone 3 = Marginal
Zone 4 = Unacceptable

LEGEND
● Test Pit 2A
■ Test Pit 2B
◆ Test Pit 2C





TRINITY VALLEY CONSULTING ENGINEERS, INC.
Engineering - Surveying - Land Planning - Construction Management

Job No. 1754.04
Page 1 of 4

Date: 06/19/2023

Report to: Burnt Ranch Estates Mutual Water
PO Box 102
Burnt Ranch, CA 95527

RE: APN: N/A

TP #: 3A, 3B, 3C

Depth: 2', 5', 8'

Sample Description: Soil

Sampled By: J. McKnight

Date Tested: 06/12/2023

Date Sampled: 05/21/2023

SOILS EXAMINATION FOR SOIL PERCOLATION SUITABILITY

Textural Analysis	TP-3A	TP-3B	TP-3C
Sand:	79%	61%	62%
Clay:	9%	13%	13%
Silt:	12%	26%	25%
Zone Classification:	2	2	2

Bulk Density: N/A

Comments:

Zone 1 - Soils in this zone are very high in sand content. They readily accept effluent, but because of their low silt and clay content, they provide minimal filtration. These soils demand greater separation distances from ground water.

Zone 2 - Soils in this zone provide adequate percolation rates and filtration to effluent. They are suitable for use of a conventional system without further testing.

Zone 3 - Soils in this zone are expected to provide filtration of effluent, but their ability at a suitable rate is questionable. These soils require wet-weather percolation tests to verify their suitability for effluent disposal by conventional leachfield methods.

Zone 4 - Soils in this zone are unsuitable for a conventional leach field because of their severe limitations for accepting effluent.


Josh McKnight, P.E.

Soil Texture Analysis Worksheet

Job Name: BREMW - Drought Resilience

Job No.: 1754.04

Performed By: J. McKnight

Hole #	TP-3A	TP-3B	TP-3C	
Depth (ft)	2	5	8	
Oven Dry Weight (g)	100	100	100	
Starting Time	0915	0925	0910	
Temp @ 40 Sec	65	66	65	
Hydrometer Reading @ 40 sec	28	46	45	
Composite Correction	7.1	6.9	7.1	
True Density @ 40 sec	20.9	39.1	37.9	
Temp @ 2 Hours	74	74	75	
Hydrometer Reading @ 2 Hours	14	18	18	
Composite Correction	5.3	5.3	5.1	
True Density @ 2 hours	8.7	12.7	12.9	
% Sand	79	61	62	
% Clay	9	13	13	
% Silt	12	26	25	
Soil Zone	2	2	2	
Classification	Sandy Loam	Sandy Loam	Sandy Loam	

Job Name: BREMW - Drought Resilience

Job No.: 1754.04

Test Pit Number	TP-3A	TP-3B	TP-3C	
Percolation Rate (minutes per inch)	16	16	16	
Application Rate (gallons per day per square foot)	0.7	0.7	0.7	

BREMW – Drought Resilience Project

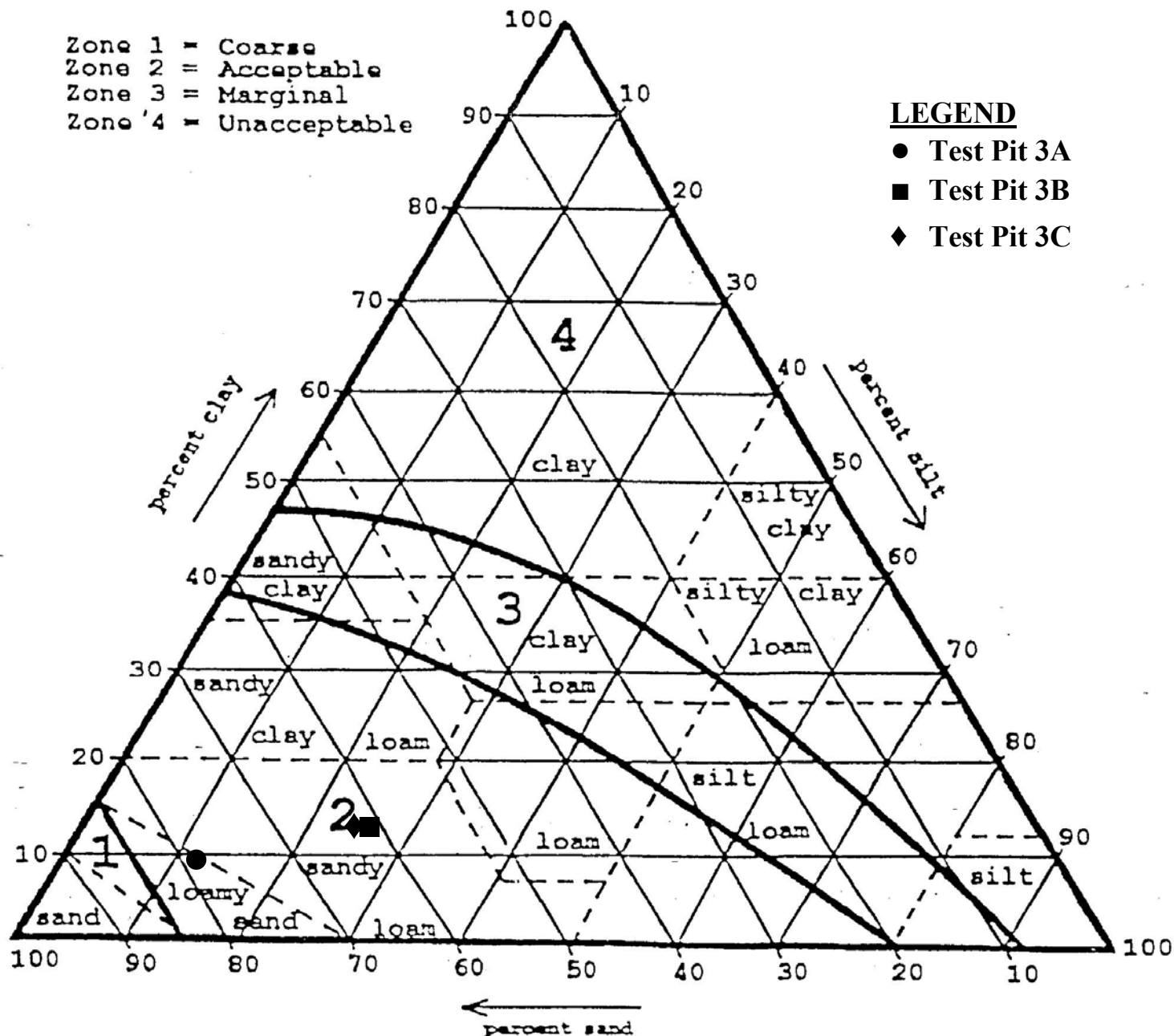
APN: N/A

Job No. 1754.04

Zone 1 = Coarse
Zone 2 = Acceptable
Zone 3 = Marginal
Zone 4 = Unacceptable

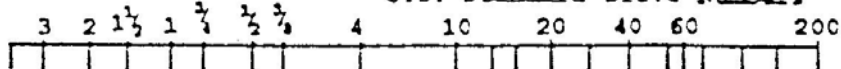
LEGEND

- Test Pit 3A
- Test Pit 3B
- ◆ Test Pit 3C

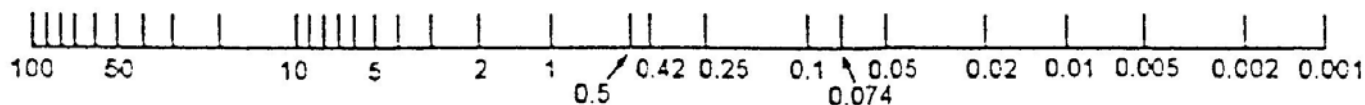


Sieve Openings in Inches

U.S. Standard Sieve Numbers



USDA	GRAVEL	SAND					SILT	CLAY
		Very Coarse	Coarse	Medium	Fine	Very Fine		



Grain Size in Millimeters



TRINITY VALLEY CONSULTING ENGINEERS, INC.
Engineering - Surveying - Land Planning - Construction Management

Job No. 1754.04
Page 1 of 4

Date: 06/19/2023

Report to: Burnt Ranch Estates Mutual Water
PO Box 102
Burnt Ranch, CA 95527

RE: APN: N/A

TP #: 4A, 4B, 5A, 5B Depth: 2', 5' Sample Description: Soil
Sampled By: J. McKnight Date Tested: 06/16/2023 Date Sampled: 05/21/2023
06/12/2023

SOILS EXAMINATION FOR SOIL PERCOLATION SUITABILITY

Textural Analysis	TP-4A	TP-4B	TP-5A	TP-5B
Sand:	58%	67%	42%	62%
Clay:	15%	12%	23%	16%
Silt:	27%	21%	35%	22%
Zone Classification:	2	2	2	2

Bulk Density: N/A


Comments:

Zone 1 - Soils in this zone are very high in sand content. They readily accept effluent, but because of their low silt and clay content, they provide minimal filtration. These soils demand greater separation distances from ground water.

Zone 2 - Soils in this zone provide adequate percolation rates and filtration to effluent. They are suitable for use of a conventional system without further testing.

Zone 3 - Soils in this zone are expected to provide filtration of effluent, but their ability at a suitable rate is questionable. These soils require wet-weather percolation tests to verify their suitability for effluent disposal by conventional leachfield methods.

Zone 4 - Soils in this zone are unsuitable for a conventional leach field because of their severe limitations for accepting effluent.


Josh McKnight, P.E.

Soil Texture Analysis Worksheet

Job Name: BREMW - Drought Resilience

Job No.: 1754.04

Performed By: J. McKnight

Hole #	TP-4A	TP-4B	TP-5A	TP-5B
Depth (ft)	2	5	2	5
Oven Dry Weight (g)	100	100	100	100
Starting Time	1450	1505	0935	0930
Temp @ 40 Sec	63	64	65	65
Hydrometer Reading @ 40 sec	50	40	65	45
Composite Correction	7.5	7.3	7.1	7.1
True Density @ 40 sec	42.5	32.7	57.9	37.9
Temp @ 2 Hours	72	73	74	74
Hydrometer Reading @ 2 Hours	21	17	28	21
Composite Correction	5.7	5.5	5.3	5.3
True Density @ 2 hours	15.3	11.5	22.7	15.7
% Sand	58	67	42	62
% Clay	15	12	23	16
% Silt	27	21	35	22
Soil Zone	2	2	2	2
Classification	Sandy Loam	Sandy Loam	Loam	Sandy Loam

Job Name: BREMW - Drought Resilience

Job No.: 1754.04

Test Pit Number	TP-4A	TP-4B	TP-5A	TP-5B
Percolation Rate (minutes per inch)	16	16	30	16
Application Rate (gallons per day per square foot)	0.7	0.7	0.6	0.7

BREMW – Drought Resilience Project

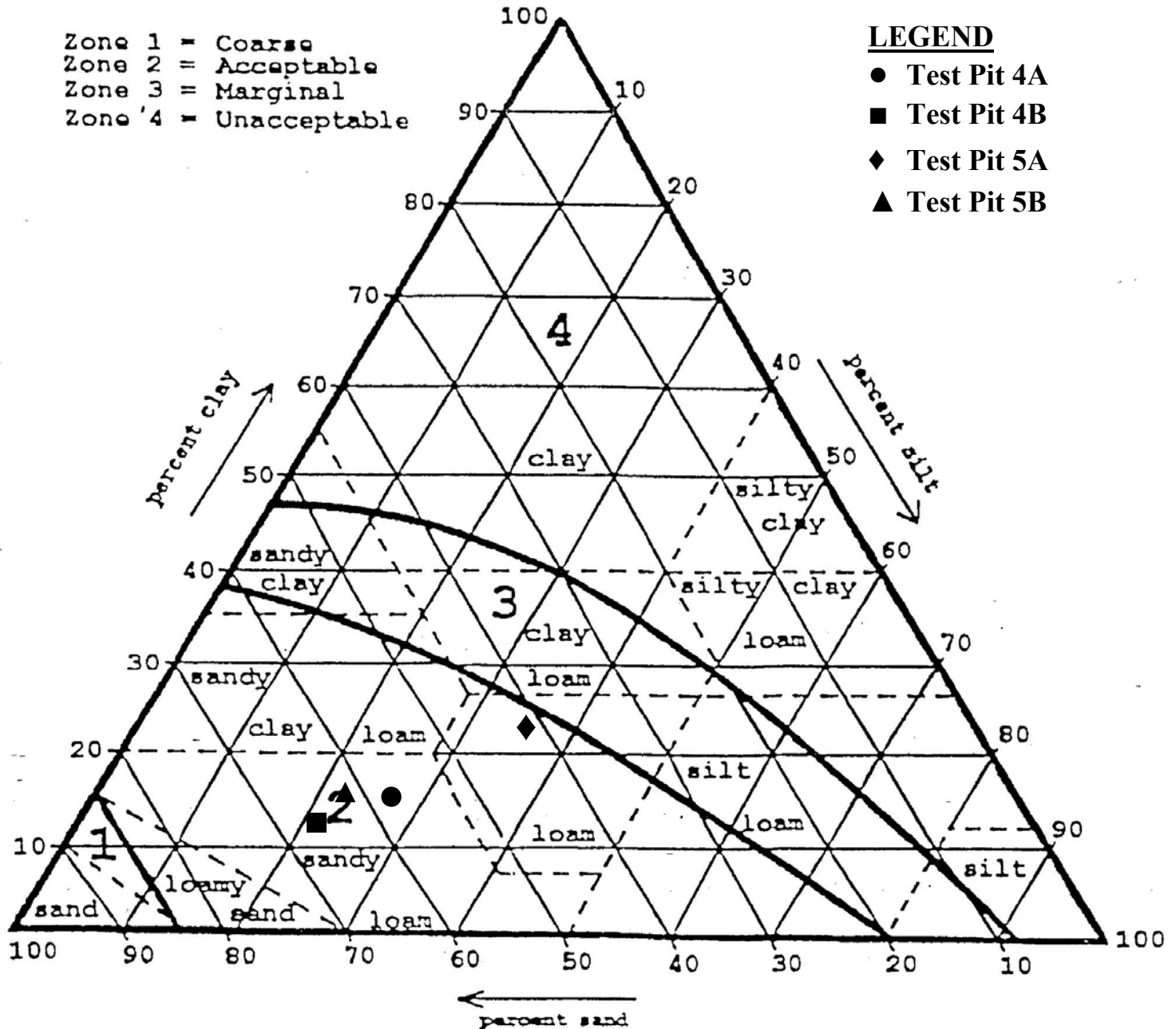
APN: N/A

Job No. 1754.04

Zone 1 = Coarse
Zone 2 = Acceptable
Zone 3 = Marginal
Zone 4 = Unacceptable

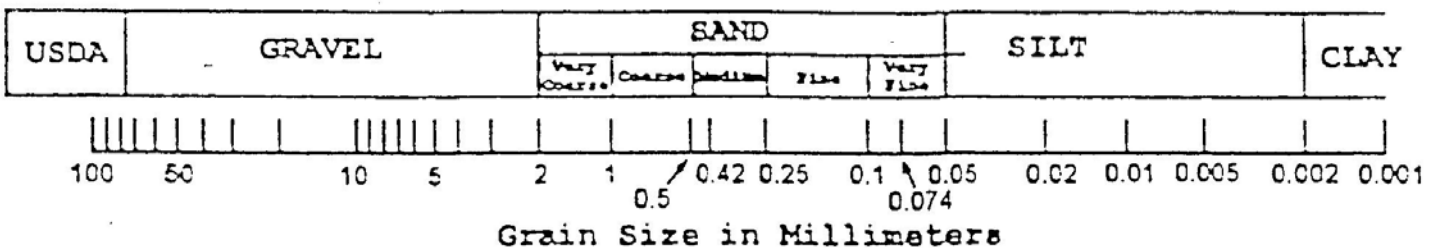
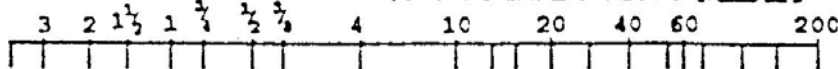
LEGEND

- Test Pit 4A
- Test Pit 4B
- ◆ Test Pit 5A
- ▲ Test Pit 5B



Sieve Openings in Inches

U.S. Standard Sieve Numbers



SOIL EXPLORATION LOG

Project Name:
BREMWC

Project No: 1754

Date: 5/21/23

Test Pit #: TP-1

Hole Depths: 3' x 6' x 9'

Excavation Method: Backhoe

Burnt Ranch, CA 95527

Groundwater Elevation: N/A

Logged by: E. Keyes

DESCRIPTION & REMARKS	COLOR	MOISTURE	CONSIST.	SOIL TYPE - USCS	DEPTH	PROFILE	SAMPLE TYPE / NUMBER	BLOWS / FT	WATER CONTENT %	UNIT DRY WEIGHT, PSF
Light Brown with small amounts of clay pockets; medium plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam)	BRN	Damp	FIRM	SC	-1					
					-2					
					-3		TP-1A			
					-4					
Light Brown with small amounts of clay pockets; medium plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam)	BRN	Damp	FIRM	SC	-5		TP-1B			
					-6					
					-7					
					-8					
Light Brown with small amounts of clay pockets; medium plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam)	BRN	Damp	FIRM	SC	-9		TP-1C			
					-10					
Maximum depth of Test Pit (9ft)/ No Bedrock/Groundwater Encountered										

TRINITY VALLEY CONSULTING ENGINEERS, INC.

Sheet 1 of 4

Post Office Box 1567 / Willow Creek, CA 95573 (530) 629-3000

SOIL EXPLORATION LOG

Project Name:
BREMWC

Project No: 1754

Date: 5/21/23

Test Pit #: TP-2

Hole Depths: 3' x 6' x 9'

Excavation Method: Backhoe

Burnt Ranch, CA 95527

Groundwater Elevation: N/A

Logged by: E. Keyes

DESCRIPTION & REMARKS	COLOR	MOISTURE	CONSIST.	SOIL TYPE - USCS	DEPTH	PROFILE	SAMPLE TYPE / NUMBER	BLOWS / FT	WATER CONTENT %	UNIT DRY WEIGHT, PSF
Light Brown with small amounts of clay pockets; medium plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam)	BRN	Damp	FIRM	SC	-1					
					-2					
					-3		TP-2A			
					-4					
Light Brown with small amounts of clay pockets; medium plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam)	BRN	Damp	FIRM	SC	-5		TP-2B			
					-6					
					-7					
					-8					
Light Brown with small amounts of clay pockets; medium plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam)	BRN	Damp	FIRM	SC	-9		TP-2C			
					-10					
Maximum depth of Test Pit (9ft)/ No Bedrock/Groundwater Encountered										

SOIL EXPLORATION LOG

Project Name:
BREMWC

Project No: 1754

Date: 5/21/23

Test Pit #: TP-3

Hole Depths: 3' x 6' x 8'

Excavation Method: Backhoe

Burnt Ranch, CA 95527

Groundwater Elevation: N/A

Logged by: E. Keyes

DESCRIPTION & REMARKS	COLOR	MOISTURE	CONSIST.	SOIL TYPE - USCS	DEPTH	PROFILE	SAMPLE TYPE / NUMBER	BLOWS / FT	WATER CONTENT %	UNIT DRY WEIGHT, PSF
Light Brown with small amounts of clay pockets; medium plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam)	BRN	Damp	FIRM	SC	-1					
					-2					
					-3		TP-3A			
					-4					
Light Brown with small amounts of clay pockets; medium plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam)	BRN	Damp	FIRM	SC	-5		TP-3B			
					-6					
					-7					
					-8		TP-3C			
					-9					
					-10					
Maximum depth of Test Pit (8ft)/ No Bedrock/Groundwater Encountered										

SOIL EXPLORATION LOG

Project Name:
BREMWC

Project No: 1754

Date: 5/21/23

Test Pit #: TP-4 & 5

Hole Depths: 3' x 6' x 5'

Excavation Method: Backhoe

Burnt Ranch, CA 95527

Groundwater Elevation: N/A

Logged by: E. Keyes

DESCRIPTION & REMARKS	COLOR	MOISTURE	CONSIST.	SOIL TYPE - USCS	DEPTH	PROFILE	SAMPLE TYPE / NUMBER	BLOWS / FT	WATER CONTENT %	UNIT DRY WEIGHT, PSF
Light Brown with small amounts of clay pockets; medium plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam)	BRN	Damp	FIRM	SC	-1		TP-4A TP-5A			
Light Brown with small amounts of clay pockets; medium plasticity; mixture of sand, silt, and clay (USDA Classification - Sandy Loam)	BRN	Damp	FIRM	SC	-2		TP-4B TP-5B			
					-3					
					-4					
					-5					
					-6					
					-7					
					-8					
					-9					
Maximum depth of Test Pit (5ft)/ No Bedrock/Groundwater Encountered					-10					

TRINITY VALLEY CONSULTING ENGINEERS, INC.

Post Office Box 1567 / Willow Creek, CA 95573 (530) 629-3000

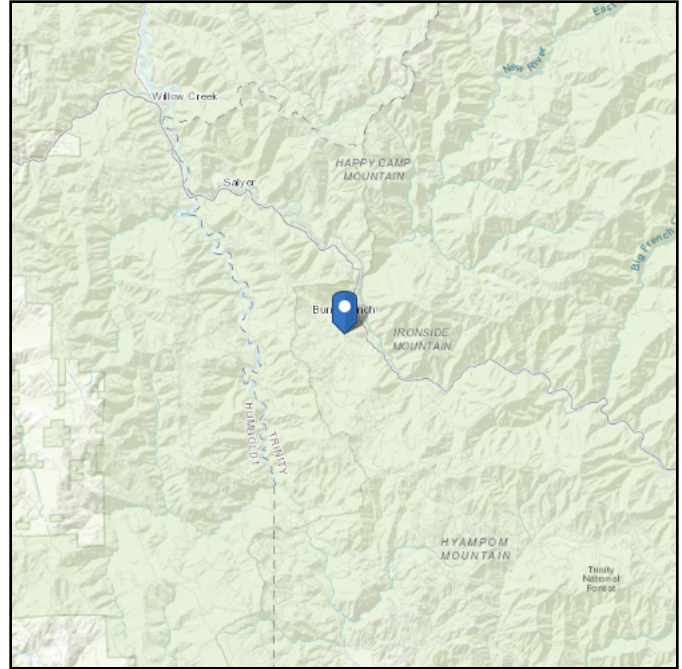
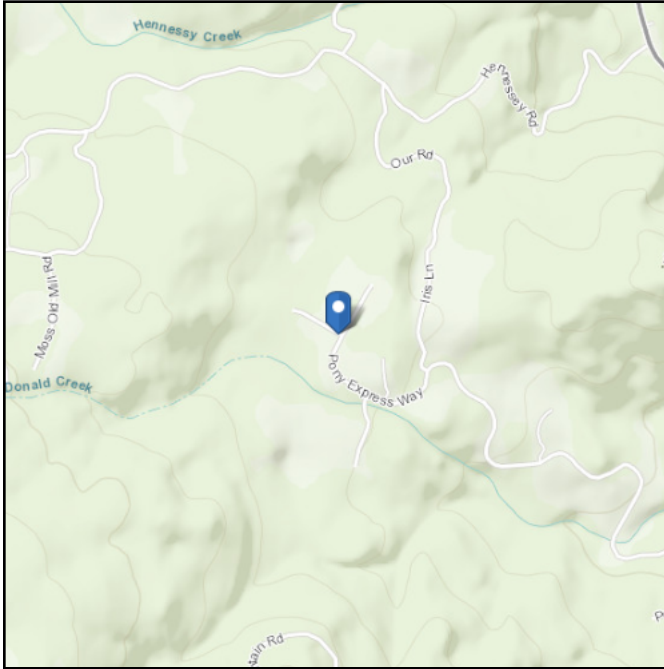
Sheet 4 of 4

ASCE Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-22
Risk Category: IV
Soil Class: Default

Latitude: 40.814244
Longitude: -123.494544
Elevation: 1975.6349810319973 ft
(NAVD 88)

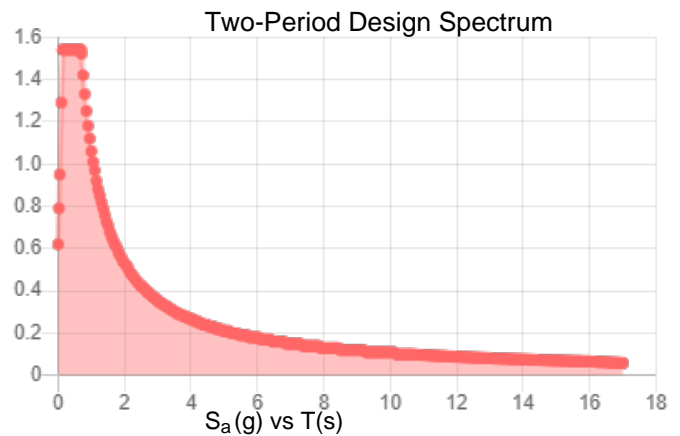
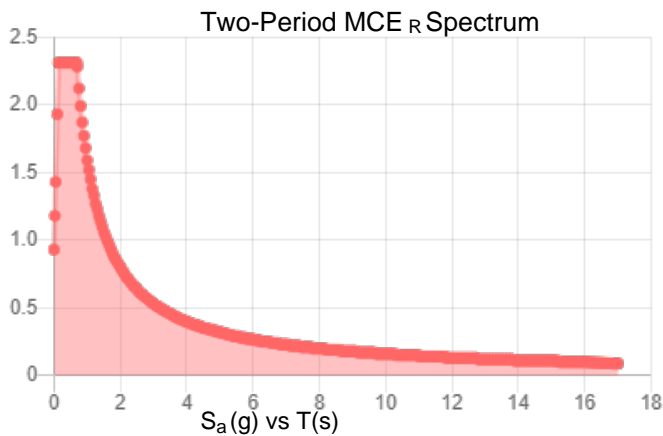
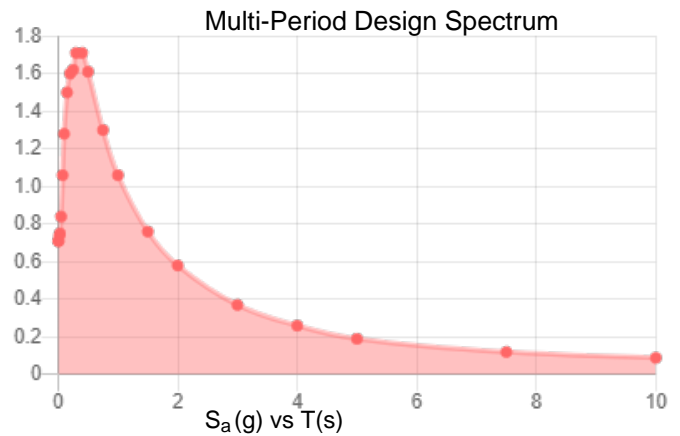
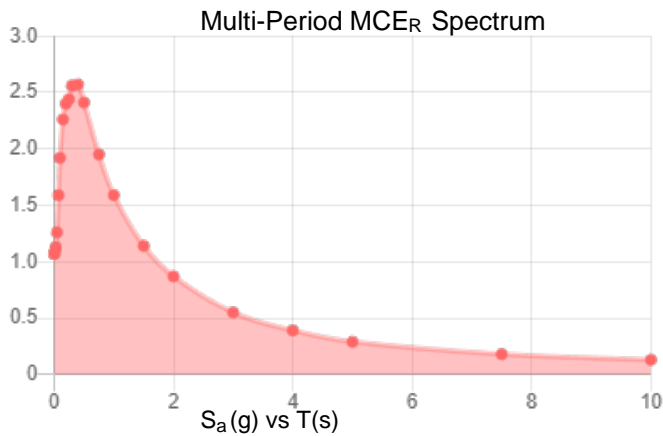


Site Soil Class: Default

Results:

PGA _M :	0.99	T _L :	16
S _{MS} :	2.31	S _S :	1.94
S _{M1} :	1.59	S ₁ :	0.73
S _{DS} :	1.54	V _{S30} :	260
S _{D1} :	1.06		

Seismic Design Category: D



MCE_R Vertical Response Spectrum
Vertical ground motion data has not yet been made available by USGS.

Design Vertical Response Spectrum
Vertical ground motion data has not yet been made available by USGS.

Data Accessed: Tue Apr 09 2024

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-22 and ASCE/SEI 7-22 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-22 Ch. 21 are available from USGS.

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE Hazard Tool.