

A.M. BAIRD

ENGINEERING & SURVEYING, INC.

1257 Main Street • P.O. Box 396 • Fortuna, CA. 95540 • (707) 725-5182 • Fax (707) 725-5581

CONSULTING - LAND DEVELOPMENT - DESIGN - SURVEYING

SOILS ENGINEERING

Geologic R-2

SOILS REPORT

PREPARED FOR

Lost Creek Farms, LLC

APN: 211-183-008

**Cabin & Recreation Room
West Area of Panther Gap**

HUMBOLDT COUNTY, CA

PREPARED BY:

ALLAN M. BAIRD, RCE 23681



January 21, 2021
Job# 15-4310-6

January 21, 2021

Building Official
County of Humboldt Building Department
3015 H Street
Eureka, California 95501

Humboldt County R2 Report: AP# 211-183-008
Panther Gap Road
Section 31 2S 2E, CA
Client: Lost Creek Farms, LLC; Job# 15-4310-6

INTRODUCTION

At the request of Lost Creek Farms, LLC, A.M. Baird Engineering has reviewed the above referenced lot in Panther Gap between Myers Flat and Honeydew, south of Bull Creek State Park, California for a soil's suitability report. This report is furnished to satisfy the soils criteria as required by Humboldt County for an "R2" Geological Report as pertaining to residential construction. Observations of this inspection regarding the site soils and topography are the contents of this report. As-built construction plans have been developed by this office.

SITE LOCATION AND DESCRIPTION

Panther Gap is located on Point Delgada on the Pacific Ocean some 44± road miles south-southeast of Eureka, and approximately 30± road miles northwest of Garberville. The site is located at approximately 2000 feet in elevation above the Pacific Ocean. The parcel is designated as AP# 211-183-008 and is approximately 56 acres. Access to the parcel is provided via Panther Gap Road. This lot slopes downward from Panther Gap Road, with a generally southern exposure. See Enclosed Site Map

SOIL CONDITIONS

Soil sampling on the parcel revealed approximately 3 feet of light yellowish brown (Munsell color 10 YR 6/4) with no discernable topsoil layer. Analysis revealed Class 2 Sandy Loam (TH#2) and Class 2 Loam (TH#3), consisting of approximately 60% and 54% coarse content by weight, respectively. There is no indication in the surrounding area of any slumps, faults, or springs that would be detrimental to the building site.

GROUNDWATER

No groundwater or soil mottling was encountered during this soil's investigation.

SLOPE STABILITY AND SURFACE DRAINAGE HAZARDS

A significant portion of this parcel is within an historic landslide area according to Humboldt County GIS. However, the nature of the property in the project vicinity appears to be stable and should remain stable provided the recommendations given in this report are followed. Areas disturbed during construction activities should be re-vegetated prior to the rainy season. Impermeable surfaces such as driveways and rooftops should be designed to uniformly diffuse runoff away from structures, and significant quantities of concentrated runoff should not be discharged over slopes greater than 20%.

GEOLOGICAL HAZARDS

This area of California is seismically very active and is subject to earthquakes of large magnitude, which can produce significant ground shaking. This high to very high level of risk of seismic hazard is typical for the Panther Gap area.

This parcel is located within 1 mile of the Briceland Fault. In general, there are many sources of large magnitude earthquakes that could potentially affect this project area. These sources include but are not limited to the *Garberville Fault located through the Benbow and Garberville area, the Maacama Fault (north) located approximately 8 kilometers south of Benbow, the Lake Mountain Fault, the San Andreas Fault (north coast),* and the complex northwesterly oriented fault systems surrounding the Humboldt Bay area (including the Little Salmon, Mad River, Freshwater, and Gorda Fault Zones), and the Cascadia Subduction Zone near Cape Mendocino.

The San Andreas Fault has produced major earthquakes in this area at intervals of approximately 75-150 years. Earthquakes with average magnitudes of 5.8 occur on average every 2 years at varying locations in or near Humboldt County, and geological evidence suggests that the San Andreas Fault is capable of generating magnitudes much higher (7+). This high to very high level of risk of seismic hazard is typical for Northern California, and residents assume this risk when they choose to build in this area. Earthquakes capable of causing intense ground shaking and structural damage can be expected to occur within the design life of the proposed structure (40+ years). Residents should be aware of this inherent risk and should understand that these risks cannot be fully eliminated with engineered design. As required, all structural design should be in conformance with the 2019 California Building Code (CBC) Seismic Design Category (SDC) E (Section 1613A, 2019 CBC). Latitude and Longitude values were taken from the Humboldt County Web GIS website (County of Humboldt, 2021). Site-specific soil parameters were calculated using the USGS U.S. Seismic Design Maps (Table 1) (USGS, 2021):

Latitude	40.25572
Longitude	-124.00086
Occupancy Category	II (normal buildings)
Importance Factor, I	1.0
Site Class	D (stiff soil) (default)

	F _a =1.2
Site Coefficients	F _v = NULL-SEE SECTION 11.4.8
Mapped Spectral Response Acceleration Parameters	S _s =1.942 g (0.2-second spectral response)
	S ₁ =0.976 g (1-second spectral response)
Design Spectral Response Acceleration Parameters	S _{MS} =2.331g (0.2-second period)
	S _{M1} = NULL-SEE SECTION 11.4.8
Design Spectral Response Acceleration Parameters (five-percent damped design spectral response)	S _{DS} =1.554 g (0.2-second period)
	S _{D1} = NULL-SEE SECTION 11.4.8
Seismic Design Category (SDC)	E (S ₁ >0.75g)
Peak Ground Acceleration (S _s /2.5)	0.7768

FLOOD HAZARDS

The site is not within a Federal Emergency Management Agency (FEMA) mapped flood zone nor the Department of Water Resources (DWR) awareness floodplain. The site is not considered to be within a flood prone area. The hazard for flooding is considered low in the project area. This office cannot make specific guarantee against damages due to natural acts of nature, such as river course shifting, landslides, and flash flooding.

EXISTING GRADING (CUT/FILL)

The structure has been placed on a graded area where all topsoil has been removed and the ground appears to be stable.

EARTHQUAKE MOTION HAZARDS

Slope instability, liquefaction, and surface rupture due exclusively to faulting or lateral spreading are not considered consequential as to require specific analysis. For retaining walls supporting more than 6 feet of retained soils, peak ground acceleration for design purposes shall be S_s/2.5 and ASCE 7-16 Figure 22-7, unless additional site-specific analysis is provided beyond the scope contained herein.

RECOMMENDATIONS

No expansive soils were encountered during this investigation that require specific recommendations. The soil on this lot is capable of supporting a load of 1,500 pounds per square foot (psf). Single or multilevel structures are suitable uses for this site, and settlement is not anticipated to be detrimental provided considerations are given to the recommendations presented herein:

- 1) Foundations for any residence should be reinforced and be contained in firm, undisturbed native soil. The foundation should be extended a minimum of 12" **past any topsoil or fill** and into natural undisturbed ground for single-story structures, a minimum

of 18" for two-story structures and 24" for three-story structures. Spread footings and foundation walls should be reinforced and be at minimum 15" wide for one-story structures, 18" wide for two-story structures, and 24" for three-story structures. Foundation walls should be a minimum of 7.5" thick for single-story structures, a minimum of 8" for two-story structures, and a minimum of 10" for three-story structures.

2) All surface runoff from developed or paved areas of the lot should be controlled to flow and drain away or be routed in such a manner as to not affect slope stability or the integrity of the foundation soil. Erosion control dissipation devices shall be installed at all locations where water is discharged over slopes greater than 20%.

3) All excavation shall be completed in conformance with Section 1804 of the 2019 CBC. Additionally, earthwork grading/excavation shall be conducted during the dry season, unless constructed in conformance with a grading and erosion control plan and with Humboldt County codes and the recommendations in this report.

4) All existing and proposed fill and cut slopes are to be re-vegetated to prevent erosion. This is to be done to the satisfaction of local building officials. Existing vegetation beyond the construction area should be left undisturbed if feasible.

5) If cutting or grading is to be done at a depth greater than 5 feet, it is recommended that this office be contacted for specific comments and recommendations. Cut and fill under 5 feet should be limited to 2:1 max slope.

6) Gutters are to extend along all roof lines and lead to down spouts. In turn, down spouts should lead to pipes carrying roof runoff away from the building site, as well as any fill or foundations that may adversely affect the site soil or adjacent slopes.

7) Floor slabs should be reinforced by #3 reinforcing bars at 18" o.c. or #4 reinforcing bars at 24" o.c. each way and be underlain by at least 4" of class 2 aggregate bases with limited fines to act as a capillary moisture break and a vapor barrier. The vapor barrier shall be in direct contact with concrete. Contractor and owner are responsible for determining the extent of waterproofing methods necessary and implementing the appropriate measures as described in recommendation #9 and shall be aware of the current recommendations and guidelines for slabs below grade according to the American Concrete Institute.

8) All foundation design and construction shall be in conformance with Chapter 18 of the 2019 CBC. All footings are to meet local requirements for seismic criteria, as required by the 2019 CBC. Seismic design parameters have been included in this report based on latitude and longitude values taken from the Humboldt County Web GIS website (County of Humboldt, 2021).

9) Any floor space at or below existing grade level that will be used as inhabitable areas or for storage shall be appropriately damp-proofed or waterproofed as described in Section 1805 of the 2019 CBC. These appropriate measures at minimum will constitute installation of 6-mil vapor barrier or equivalent against the foundation or retaining wall, along with drain rock a minimum of 12" thick to the bottom of the footing and made to drain by 4" perforated pipe tight-lines to daylight away from the foundation soils. It is recommended that slabs below grade used for living space be underlain with a minimum of 6" of open graded aggregate instead of 4" as described in recommendation #7 for an

increased protection from capillary water infiltration. Additional or superior measures may include installation of sub-slab drainage pipes or geo-textile membranes and should be installed according to current standards of practice.

CLOSURE

Based upon the review conducted by this office of the site and surrounding terrain no further geological evaluation is required; therefore, no geotechnical engineer consultation is warranted. This office shall be contacted if subsurface conditions differ significantly from those stated in this report, or if further investigation or inspection is requested by involved agencies.

It has been assumed that observed soils are representative of the entire subsurface conditions on the property in question. If it is found during construction that subsoil conditions differ from those described, the conclusions and recommendations of this report should be considered invalid unless the changes are reviewed, and the conclusions and recommendations are modified or approved in writing. This analysis was conducted in accordance with the standards maintained by professionals in the engineering field, and the findings presented herein are reasonably representative of site conditions and probable site behavior based on this investigation. Due to the inexact nature of many engineering analyses, including those employed during the preparation of this report, there is no guarantee or warranty expressed or implied. Enclosed in this report are site maps, Assessor's Parcel Maps, and geologic maps as referenced.

If you have any questions regarding this report, or to schedule an inspection, please feel free to contact this office at (707) 725-5182.

Sincerely,



Allan M. Baird
Principal, RCE# 23681



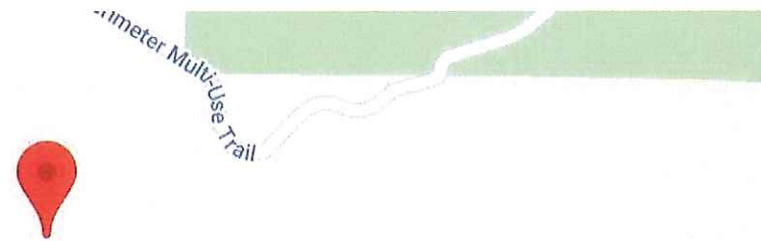
References

- American Society of Civil Engineering (ASCE). (2016). *Minimum Design Loads for Buildings and Other Structures*. ASCE/SEI 7-10.
- California Department of Conservation, Division of Mines and Geology. (1998). *Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada*. International Conference of Building Officials. Whittier, CA.
- County of Humboldt. (2021). *Humboldt County Web GIS Planning and Building Mapping*. Available Online
[<http://gis.co.humboldt.ca.us/Freeance/Client/PublicAccess1/index.html?appconfig=podgis>]
- Part 2. California Building Code (2019) Volume 2 (Chapters 16-34):
<https://codes.iccsafe.org/content/CABCV22019EOCT20/cove>
- United States Geological Survey (USGS). (2021). *U.S. Seismic Design Maps*. Available Online [<https://earthquake.usgs.gov/designmaps/us/application.php?>].
- Title III, Land Use and Development Division 3. Building Regulations Section 331-12. Grading, Excavation, and Erosion Control and Sedimentation Ordinance (Humboldt County). (2021).
- "U.S. Seismic Design Maps." U.S. Seismic Design Maps, SEAOC/OSHPD, 2021, seismicmaps.org/.



ESTER-CABIN

Latitude, Longitude: 40.25572, -124.00086



Map data ©2021

Date	1/21/2021, 8:37:34 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S _S	1.942	MCE _R ground motion. (for 0.2 second period)
S ₁	0.976	MCE _R ground motion. (for 1.0s period)
S _{MS}	2.331	Site-modified spectral acceleration value
S _{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S _{DS}	1.554	Numeric seismic design value at 0.2 second SA
S _{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F _a	1.2	Site amplification factor at 0.2 second
F _v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.912	MCE _G peak ground acceleration
F _{PGA}	1.2	Site amplification factor at PGA
PGA _M	1.095	Site modified peak ground acceleration
T _L	12	Long-period transition period in seconds
S _{sRT}	2.314	Probabilistic risk-targeted ground motion. (0.2 second)
S _{sUH}	2.539	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
S _{sD}	1.942	Factored deterministic acceleration value. (0.2 second)
S _{1RT}	0.976	Probabilistic risk-targeted ground motion. (1.0 second)
S _{1UH}	1.093	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S _{1D}	1.001	Factored deterministic acceleration value. (1.0 second)
PGA _d	0.912	Factored deterministic acceleration value. (Peak Ground Acceleration)
C _{RS}	0.911	Mapped value of the risk coefficient at short periods
C _{R1}	0.893	Mapped value of the risk coefficient at a period of 1 s

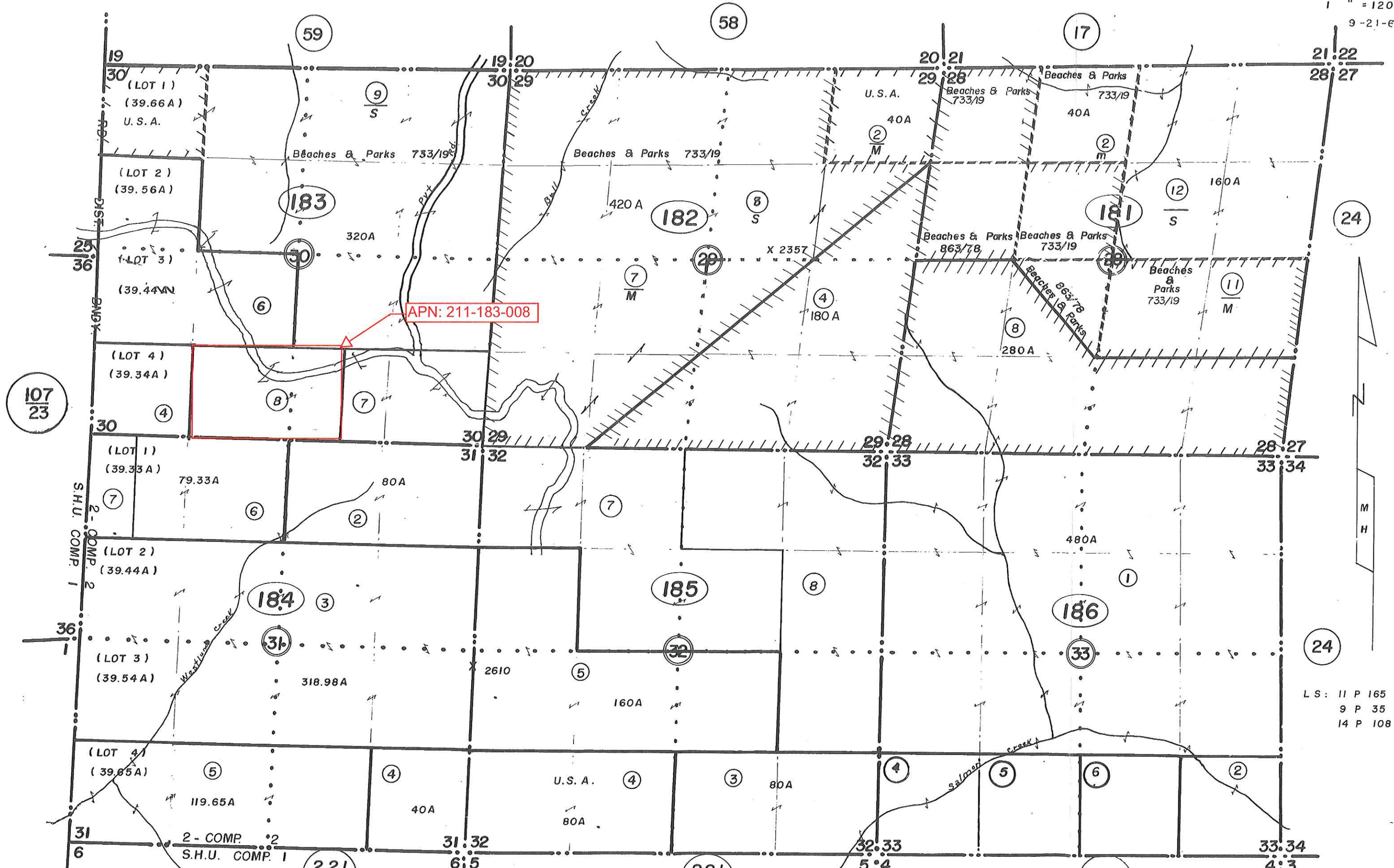
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SECS 28, 29, 30, 31, 32 & 33, 2S 2E

211-18
T.C.A. 156-04

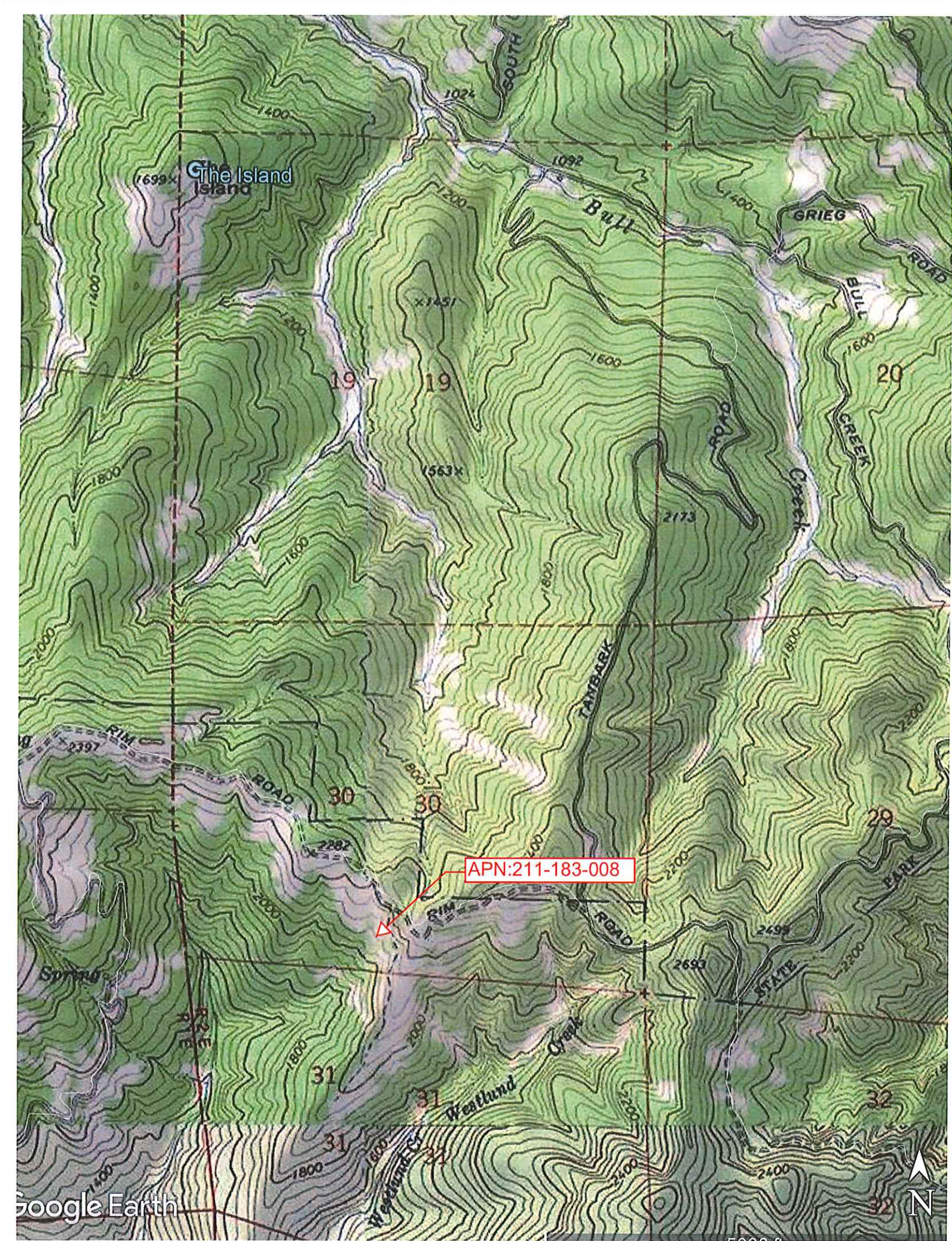
1" = 1200'
9-21-62



APN: 211-183-008

107
23

LS: 11 P 165
9 P 35
14 P 108



NOTES

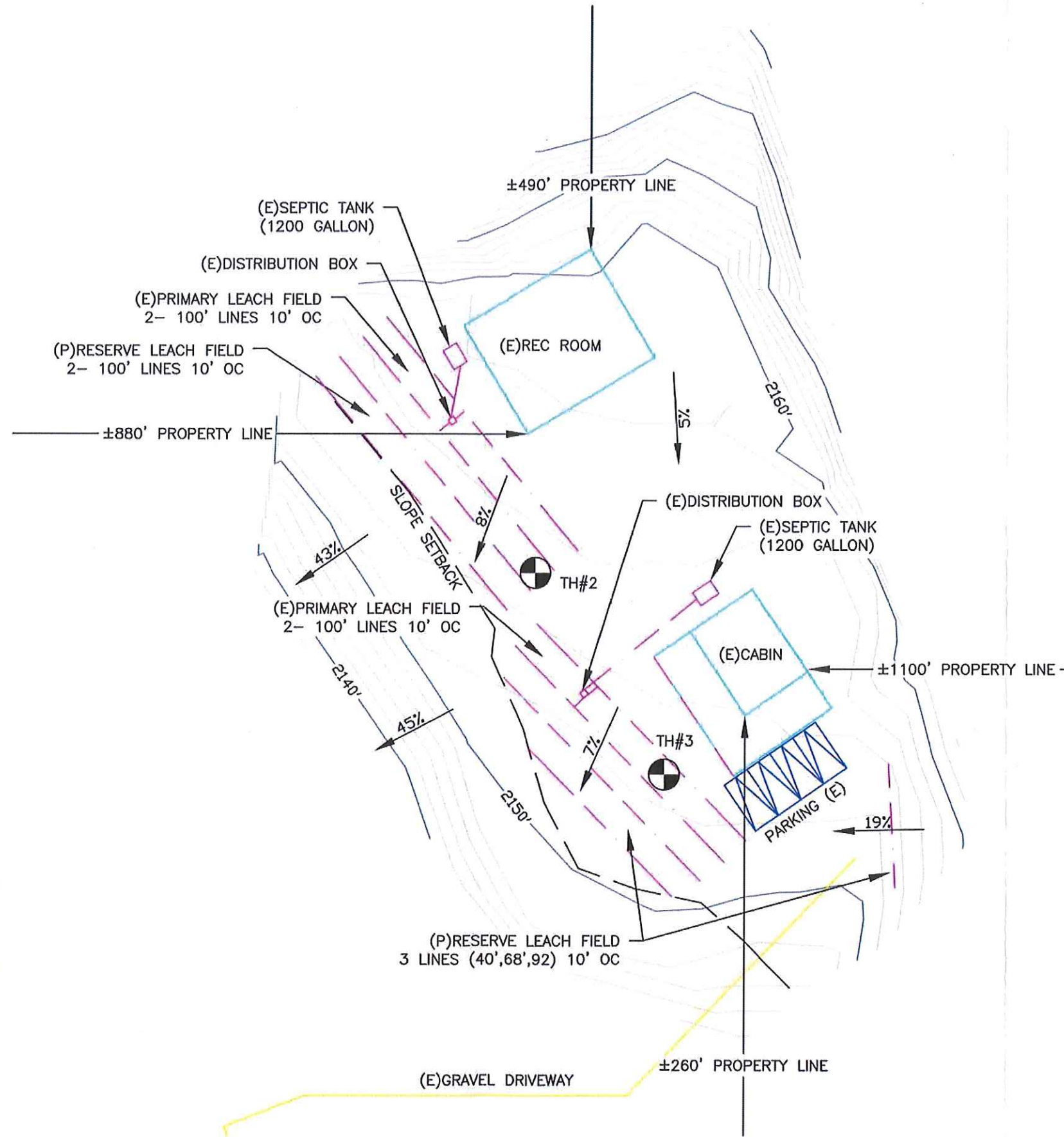
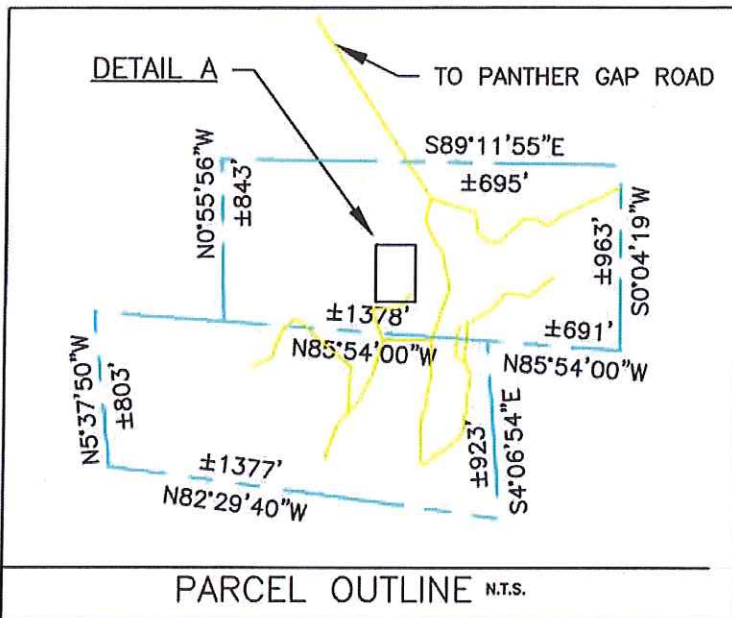
1. PROPERTY LINES WERE SURVEYED
2. BUILDING SETBACKS: 30' PERIMETER
3. NO EASEMENT
4. NO TREES TO BE REMOVED
5. STREAMS DO NOT EXIST WITHIN DEVELOPMENT AREA
6. SEPTIC FIELDS MUST BE AT LEAST 50 FT FROM ALL PROPERTY LINES, 100 FT FROM ALL STREAMS, SPRINGS, AND WELLS, 25 FT FROM SLOPES GREATER THAN 30%, AND 10 FEET FROM BUILDING FOUNDATIONS
7. SEPTIC TANK MUST BE AT LEAST 25 FT FROM ALL PROPERTY LINES, 100 FT FROM ALL STREAMS, SPRINGS, AND WELLS, 25 FT FROM SLOPES GREATER THAN 30%, AND 5 FEET FROM BUILDING FOUNDATIONS
8. BUILDING PLANS AND PARKING ASSUMED FOR SEPTIC DESIGN PURPOSES ONLY. AS-BUILT CONSTRUCTION PLANS UNDER DEVELOPMENT AS OF THE DATE OF THIS SEPTIC DESIGN

Legend:

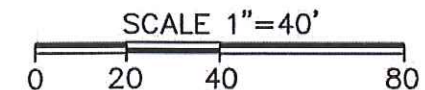
PROPERTY LINE	
SETBACK	
SEPTIC	
SLOPEBREAK	
TEST HOLE LOCATION	
PROPOSED	(P)
EXISTING	(E)

DIRECTIONS:

EXIT US-HWY 101 (633) CA-HWY 254 SOUTH
 FORK/HONEYDEW
 MERGE ONTO BULL CREEK FLATS ROAD
 CONTINUE ONTO LOWER BULL CREEK FLATS ROAD
 RIGHT MATTOLE ROAD
 LEFT PANTHER GAP ROAD
 LEFT ONTO PERIMETER MULTI-USE TRAIL



R-2 SITE PLAN (DETAIL A)



LEGAL	
ADDRESS:	PANTHER GAP HONEYDEW, CA
ASSESSOR'S PARCEL NUMBER:	211-183-008
OWNER:	GREG ESTER 600 F ST. #3 BOX 208 ARCATA, CA 95521 PHONE: 707-599-7705
SETBACK:	30' PERIMETER
AREA ANALYSIS	
LOT SIZE:	±56 AC

DISCLAIMER:
 MAPPING INFORMATION PROVIDED IS FOR DESIGN PURPOSES ONLY.
 THIS SITE PLAN REFLECTS MANY MAPPING DETAILS THAT ARE USEFUL TO ASSURE THAT THE DESIGN IS LOCATED APPROPRIATE TO ITS SURROUNDINGS. HOWEVER, NONE OF THE INFORMATION SHOWN IS IMPLIED TO SUGGEST OR SUBSTITUTE FOR A CONTRACTED ACTUAL LAND SURVEY.
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 A.M. Baird Engineering & Surveying, Inc. 1257 Main Street, P.O. Box 396, Fortuna, CA 95540, (707) 725-5182	
SCALE:	1" = 40'
DRAWN BY:	MJN
CHKD:	A.M.B.
DATE:	5/25/2016
LOST CREEK FARMS, LLC AP# 211-183-008 PANTHER GAP, HONEYDEW CA CABIN AND RECREATION ROOM R-2 SITE PLAN	
JOB #	15-4310-6
SHEET #	1 OF 1

REVISIONS

NO. DATE DESCRIPTION



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CONSULTING - LAND DEVELOPMENT - DESIGN - SURVEYING

WORKSHEET FOR SOIL TEXTURE

Project: Lost Creek Farms, LLC

by: PDS

AP#: 211-183-008

Lab Test Date: 10/12/2015

1	2	SAMPLE NUMBER
2	2	TEST HOLE
3	5	Depth (ft)
883.5	888.1	TOTAL SAMPLE WEIGHT (gm)
523.2	531.3	Coarse Weight (gm)
75	75	A. Owendry Weight (gm)
10:00	10:03	B. Starting Time (hr:min:sec)
70	70	C. Temp @ 40 sec. (°F)
43	45	D. Hydrometer Reading @ 40 sec. (gm/l)
-6.1	-6.1	E. Composite Correction (gm/l)
36.9	38.9	F. True Density @ 40sec. (gm/l), (D-E)
71	70	G. Temp @ 2 hrs. (°F)
23	23	H. Hydrometer Reading @ 2hrs. (gm/l)
-5.9	-6.1	I. Composite Correction (gm/l)
17.1	16.9	J. True Density @ 2 hrs. (gm/l), (H-I)
50.8	48.1	K. % Sand = $100 - [(F/A) \times 100]$
22.8	22.5	L. % Clay = $(J/A) \times 100$
26.4	29.3	M. % Silt = $100 - (K + L)$
SANDY LOAM	SANDY LOAM	N. USDA Texture
2	2	O. Soil Percolation Suitability Chart Zone
49.2	51.9	P. Combined % Silt and Clay
59.2	59.8	Q. Coarse % by weight
8.7	8.8	R. % Coarse Adjustment*

* $[(.2)(.00003Q^3 + .0006Q^2 + .5968Q - .0941)]$



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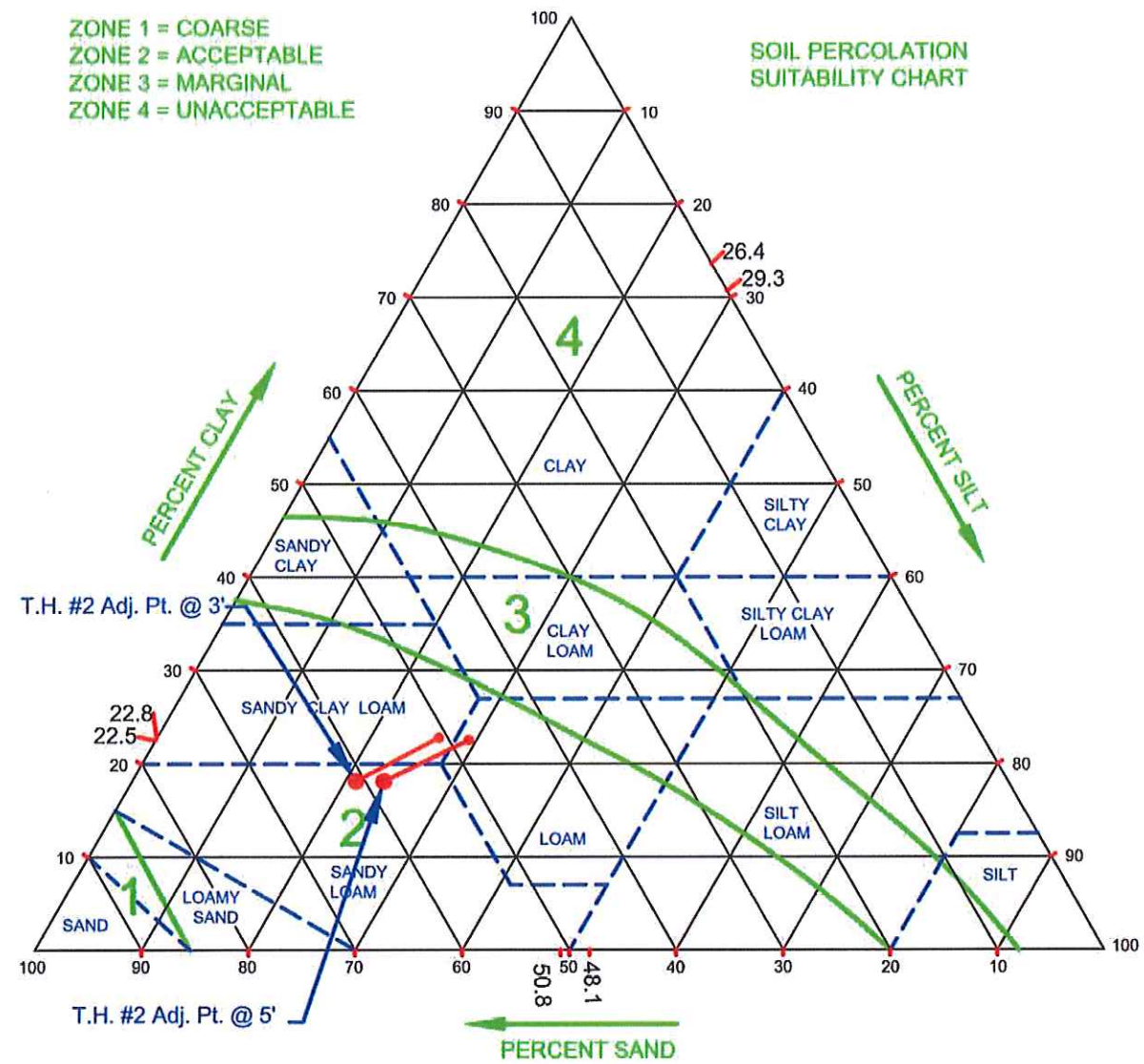
CLIENT: Lost Creek Farms, LLC

DATE: 10/12/2015

APN: 211-183-008

ZONE 1 = COARSE
ZONE 2 = ACCEPTABLE
ZONE 3 = MARGINAL
ZONE 4 = UNACCEPTABLE

SOIL PERCOLATION
SUITABILITY CHART



1. COARSE ADJUSTMENT: T.H. #2 @ 3' = 8.7%; T.H. #2 @ 5' = 8.8%

2. BULK-DENSITY ADJUSTMENT: NOT TESTED



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WORKSHEET FOR SOIL TEXTURE

Project: Lost Creek Farms, LLC

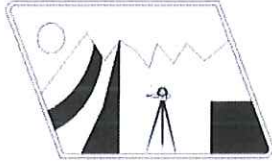
by: PDS

AP#: 211-183-008

Lab Test Date: 10/12/2015

1	2	SAMPLE NUMBER
3	3	TEST HOLE
4	5	Depth (ft)
846.5	834.4	TOTAL SAMPLE WEIGHT (gm)
456.7	405.7	Coarse Weight (gm)
75	75	A. Owendry Weight (gm)
10:06	10:09	B. Starting Time (hr:min:sec)
70	70	C. Temp @ 40 sec. (°F)
53	52	D. Hydrometer Reading @ 40 sec. (gm/l)
-6.1	-6.1	E. Composite Correction (gm/l)
46.9	45.9	F. True Density @ 40sec. (gm/l), (D-E)
72	70	G. Temp @ 2 hrs. (°F)
28	27	H. Hydrometer Reading @ 2hrs. (gm/l)
-5.7	-6.1	I. Composite Correction (gm/l)
22.3	20.9	J. True Density @ 2 hrs. (gm/l), (H-I)
37.5	38.8	K. % Sand = $100 - [(F/A) \times 100]$
29.7	27.9	L. % Clay = $(J/A) \times 100$
32.8	33.3	M. % Silt = $100 - (K + L)$
LOAM	LOAM	N. USDA Texture
2	2	O. Soil Percolation Suitability Chart Zone
62.5	61.2	P. Combined % Silt and Clay
54.0	48.6	Q. Coarse % by weight
7.7	6.8	R. % Coarse Adjustment*

* $[(.2)(.00003Q^3 + .0006Q^2 + .5968Q - .0941)]$



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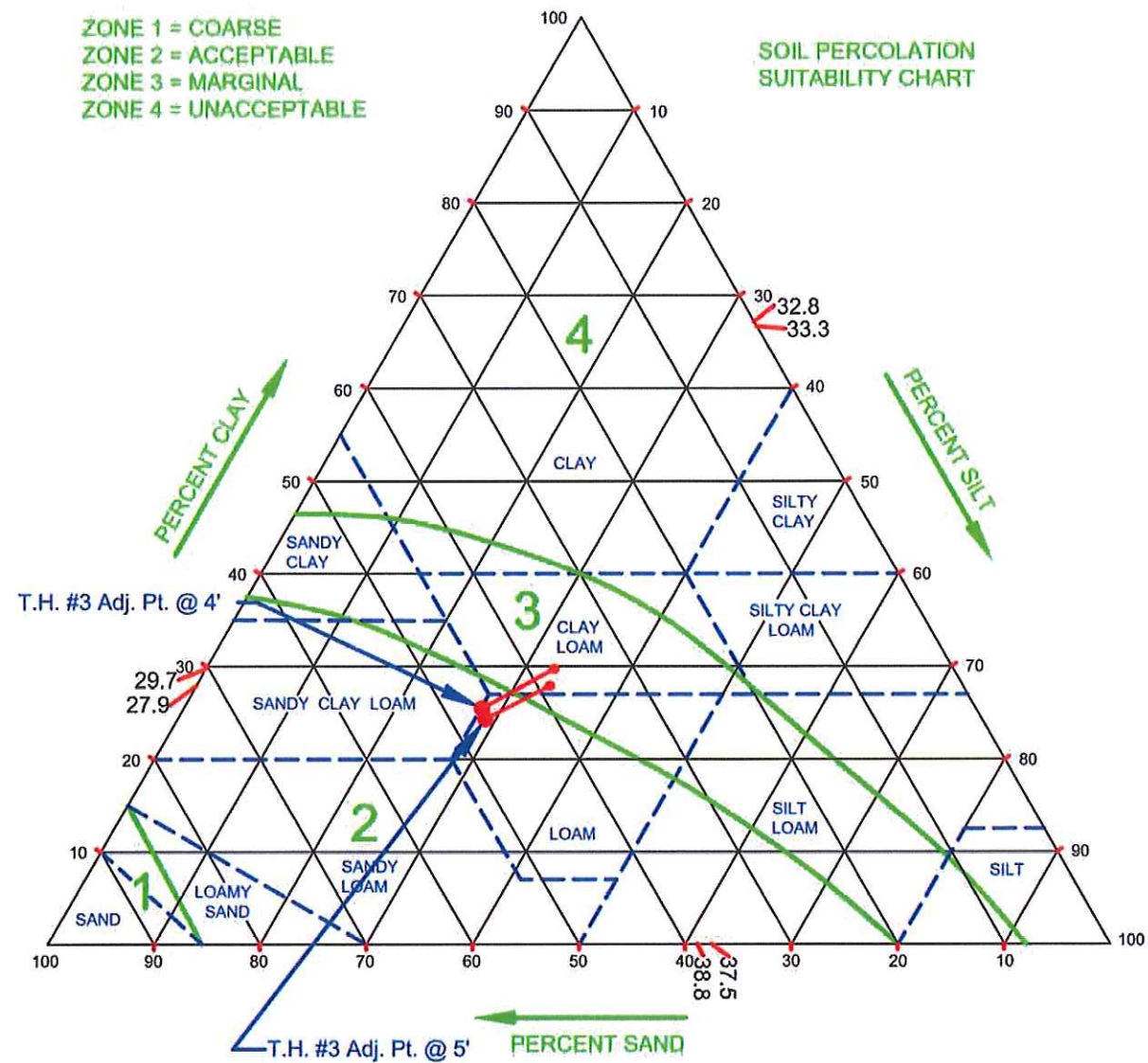
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CLIENT: Lost Creek Farms, LLC

DATE: 10/12/2015

APN: 211-183-008



1. COARSE ADJUSTMENT: T.H. #3 @ 4' = 7.7%; T.H. #3 @ 5' = 6.8%

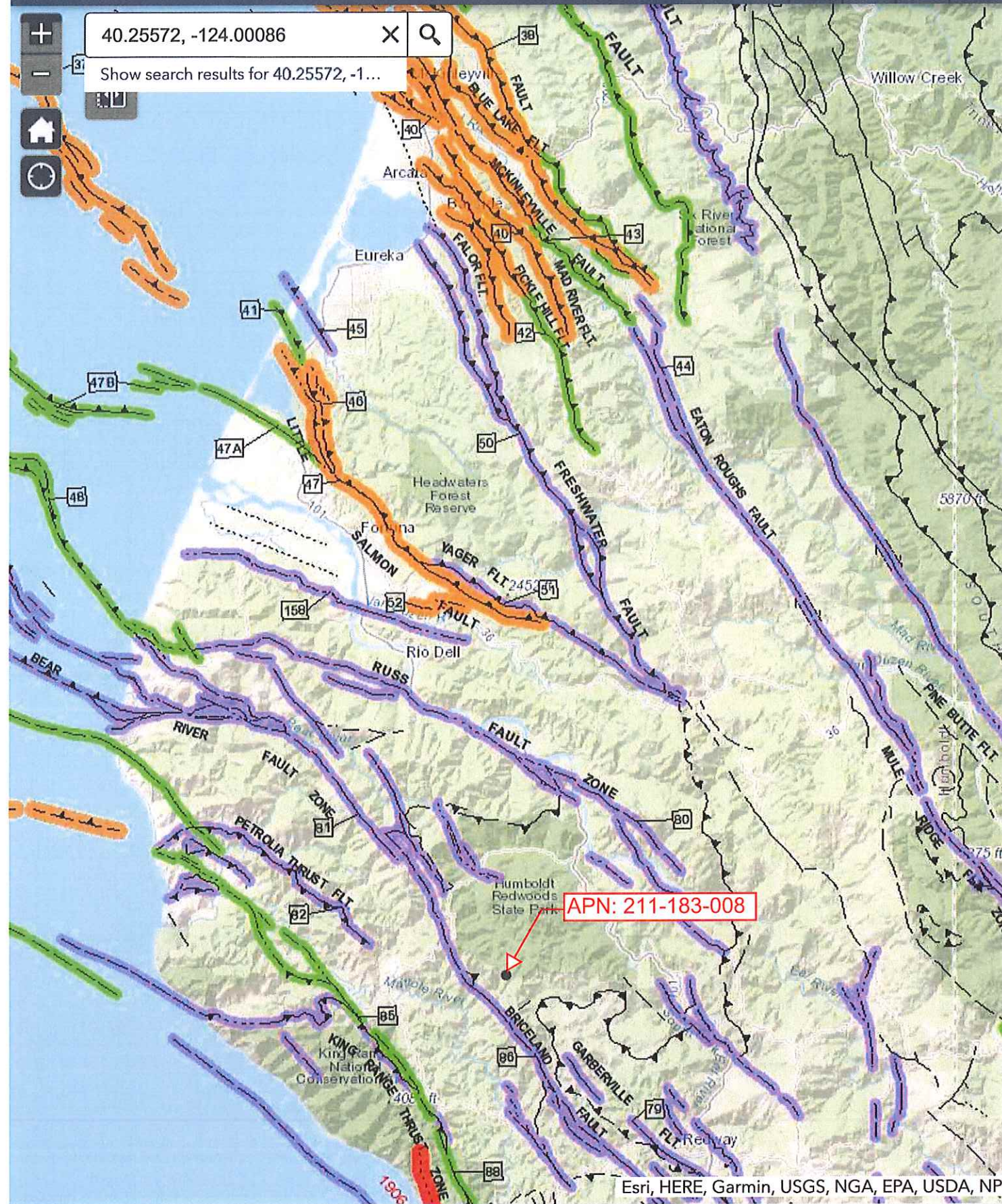
2. BULK-DENSITY ADJUSTMENT: NOT TESTED

Fault Activity Map of California

California Geological Survey



40.25572, -124.00086
Show search results for 40.25572, -1...



6mi
-123.750 40.659 Degrees

Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NP