



Onsite Wastewater Treatment System Design Report

For

Karuk Housing
Portion of Section 31, T11N, R6E, H.B.M.
APN: 529-111-007
Orleans, Humboldt County, California

Report Provided For:

Karuk Tribe Housing Authority
635 Jacobs Way, Happy Camp, CA 96039

Report Provided By:

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

January 2020
Project Number: 236.02

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1. Location Map
2. Assessor Parcel Map & Humboldt GIS Map
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5. Sewage Disposal System Submittal
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8. North Coast Region Water Quality Control Board Table 4-1

Introduction:

Trinity Valley Consulting Engineers (TVCE) was secured by the Karuk Tribe Housing Authority (KTHA) to evaluate the potential for developing Housing on a recently procured property. The following report is a summary of our investigation, findings, and recommendations.

Site Description:

The project site is located on property described as the southwesterly quarter of Section 31, of Township 11 North, Range 6 East of the Humboldt Base Meridian in the town of Orleans, County of Humboldt, State of California (see attachment 1 for the Location Map). The Assessor Parcel Number (APN) for the property is 529-111-007. The total lot contains approximately 1.72 acres (according to County Records).

Proposed Project:

Project includes evaluation of the property for the development of concentrated residential, single-family homes. The subject property will most likely be developed based on the topographic, water availability, and septic limitations. The single-family homes may be developed with single onsite wastewater systems or perhaps a single centralized system depending on space availability, concentrated housing layout concept, cost, and other varying factors.

Field Investigation:

TVCE personnel investigated the site on Wednesday, January 29, 2020. During the site investigation six sample pits were dug using a E35 excavator to depths of nine feet below existing grade. Soil samples were harvested from each pit at three, six, and nine-foot depths. Each soil sample harvested was processed in our laboratory for textural determination, percolation suitability, application rating, zoning, and soils classification. No ground water or bedrock was encountered in any of the test pits.

A Percolation test was also performed on site with the bobcat excavator being used to dig a test pad approximately 2 feet below existing grade, 3 test holes were then dug using a post hole digger. The holes were approximately 8 inches in diameter and 12 inches deep. Percolation testing was performed in strict conformance with county Wet Weather Testing of Soils protocols.

Limitations:

During the field investigation there were no obvious signs of limitation. Test pits # 2,3,4, and 5 mainly consisted of a river silt-like material throughout the excavation from existing grade down to 9' in depth. Test pits # 1 and # 6 had a wider variety of material throughout excavation going from clay-like dirt for approximately the first 6', then transitioned into a fine, sand-like material for the remaining 3'. No bedrock or large rock outcroppings were encountered during exploration. Minor concentrations of slightly denser material were encountered during digging but was such that when force was applied by the excavator the soil would give and break apart. Excavation on the



site was fairly fast and easy digging. The Karuk Tribe provided a Cultural Monitor to be on site during excavation. No culturally significant items were encountered.

Proposed Onsite Wastewater Treatment System:

Due to the fact that this report is being developed during the preliminary stages of determining the development potential of the site a base model home consisting of three bedrooms has been used as the default model for the purpose of calculating applicable septic system component minimum requirements (see Attachment 5 for Sewage Disposal System Submittal Details):

Traditional Leachate Field:

Required Area	643	SF
Area per Linear Foot	3	SF/LF
Percent Reqd Area	100%	
Minimum Total Length	214	LF
No. of Laterals	3	
Minimum Lateral Length	72	LF
Depth to Trench Bottom	5	LF

Interceptor Leachate Field:

Required Area	643	SF
Area per Linear Foot	2.83	SF/LF
Percent Reqd Area	100%	
Minimum Total Length	227	LF
No. of Laterals	3	
Minimum Lateral Length	76	LF
Depth to Trench Bottom	5	LF

Maximum and Minimum Leachate Field Quantities per UPC:

	MAXIMUM	MINIMUM
No. of Drain Lines per Field	1	-
Length of Each Line	-	100 ft.
Bottom Width of Trench	18 in.	36 in.
Spacing of Lines (center to center)	6 ft.	-
Depth of Earth Cover	12 in.	-
Grade of Lines	level	3 in./ 100 ft.
Filter Material Under Drain Lines	12 in.	-
Filter Material Over Drain Lines	2 in.	-

Septic Holding Tank:

The holding tank should be a minimum of fifteen hundred (1,500) gallon capacity (per Humboldt County requirements), dual chamber tank system, and should be installed with access ports to finish grade.



Evaluation:

The property was previously used as a recreational vehicle park. There are buried utilities onsite including power, water, and sewer. The existing onsite wastewater system is not known and would require additional investigation of the site in order to determine what exists and in what condition. It is assumed that the new development will include new wastewater facilities and that the existing system will be demolished or abandoned in place either in whole or in part depending on the final design and layout of the proposed development.

Conclusion:

Review of the site grades and soil stratigraphy has supported that the site is acceptable for development of a conventional onsite wastewater treatment system contingent on the limitations outlined herein and in accordance with the design criteria identified and presented in this report based on the information obtained from the site investigation, soil laboratory testing, and percolation testing.



References:

California Water Quality Control Plan, North Coast Region

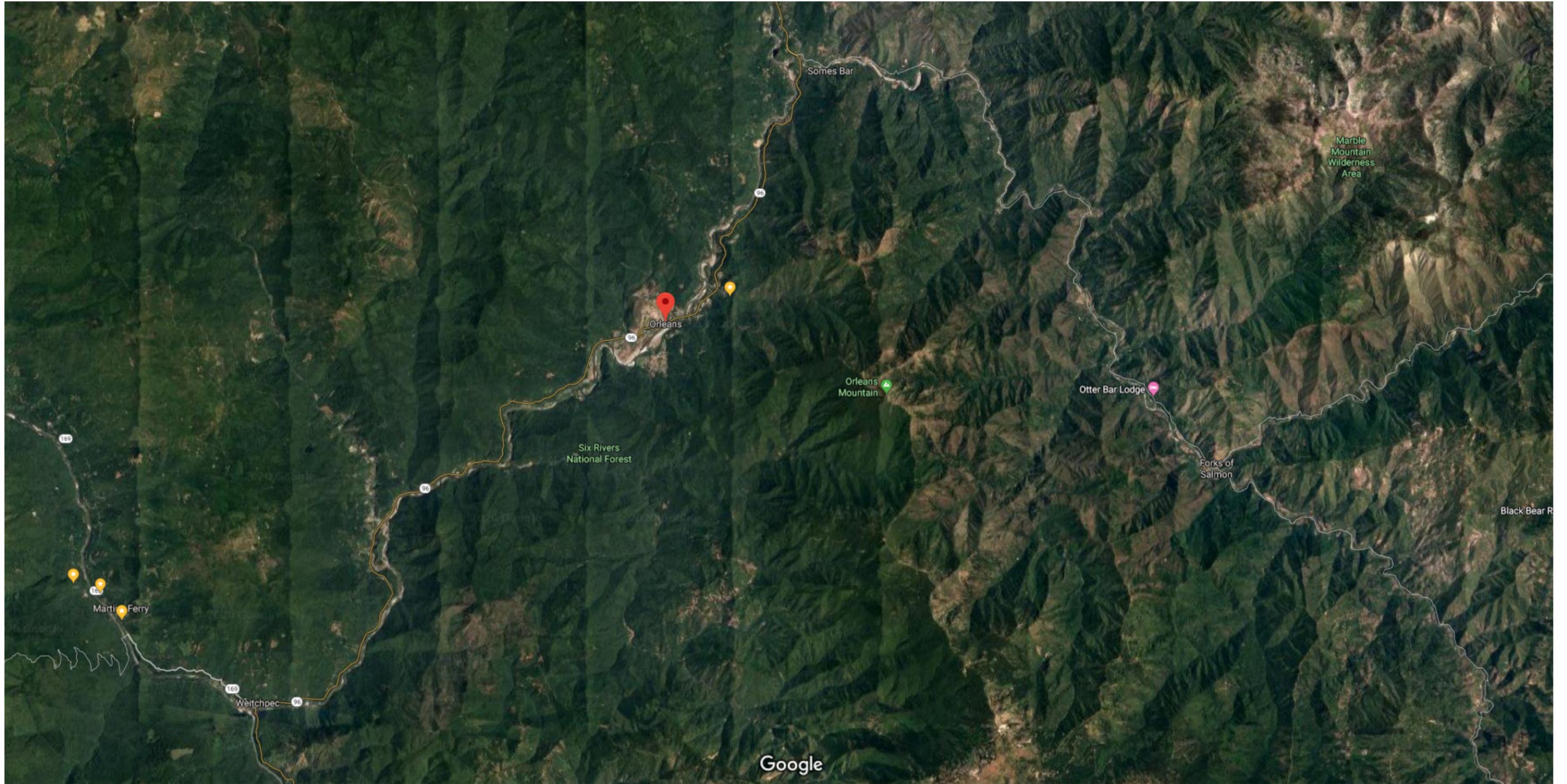
Environmental Protection Agency Onsite Wastewater Treatment Manual

Uniform Plumbing Code (UPC)



Attachment 1:
Location Map

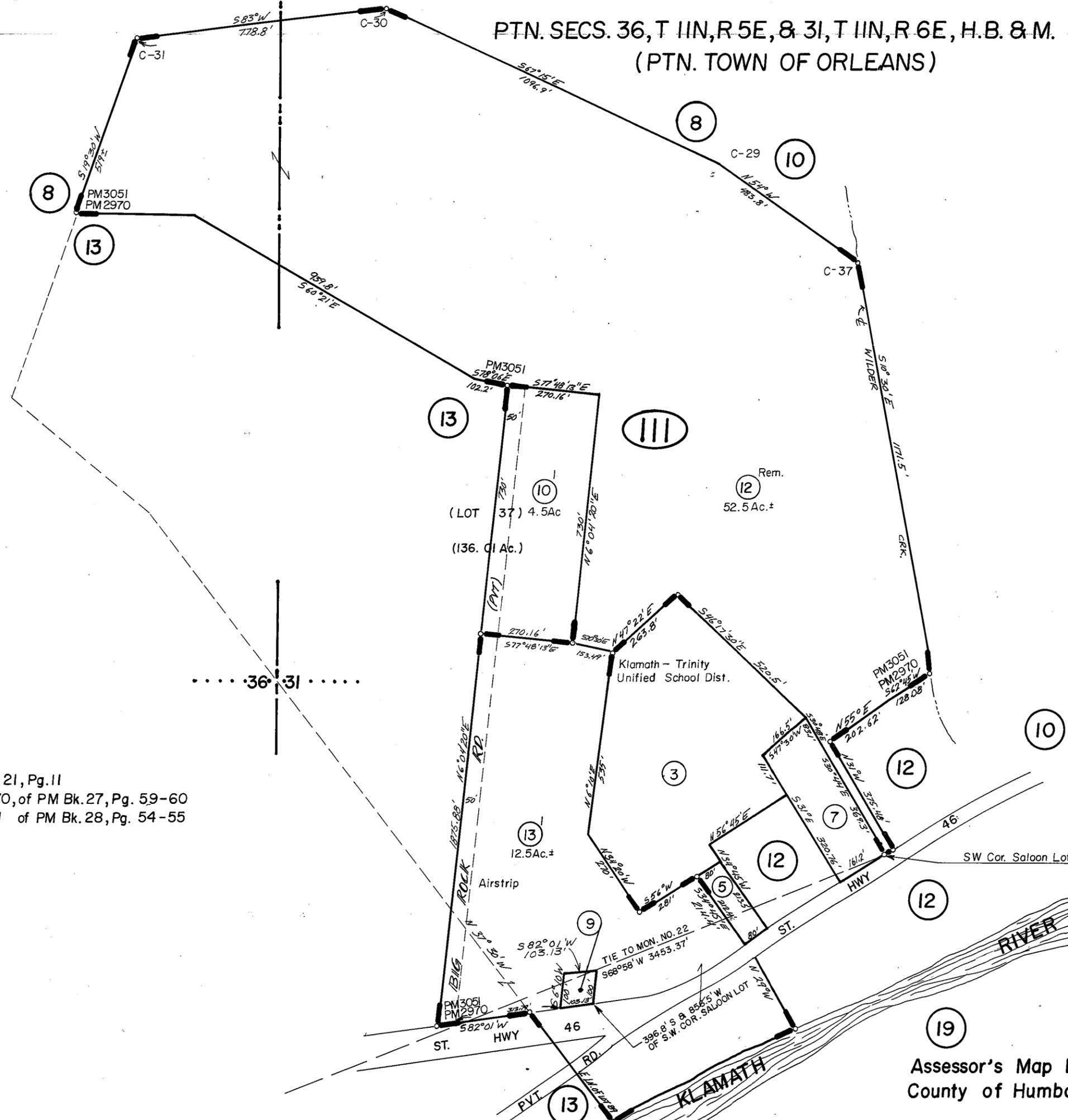




Attachment 2:
Assessor Parcel Map
&
Humboldt GIS Map



PTN. SECS. 36, T 11N, R 5E, & 31, T 11N, R 6E, H.B. & M.
(PTN. TOWN OF ORLEANS)



R.S. Bk. 21, Pg. 11
 PM. 2970, of PM Bk. 27, Pg. 59-60
 PM 3051 of PM Bk. 28, Pg. 54-55



ArcGIS Web Map

Humboldt County Planning and Building Department

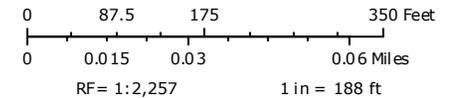
Printed: February 19, 2020

Web AppBuilder 2.0 for ArcGIS

Map Disclaimer:

While every effort has been made to assure the accuracy of this information, it should be understood that it does not have the force & effect of law, rule, or regulation. Should any difference or error occur, the law will take precedence.

-  City Boundary
-  Counties
-  Parcels (no APN labels)



Sources: Humboldt County GIS
 Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Attachment 3:
Sample Pit Location Map



Attachment 4:
Textural Analysis Report





Date: 02/11/2020

Report to: Karuk Tribe Housing Authority
Post Office Box 1159
Happy Camp, CA 96039

RE: Orleans Housing Development
38030 Highway 96
Orleans, CA 95556

APN: 529-111-007 TP #'s: 1 Depth: 3', 6', 9' Sample Description: Soil

Sampled By: J. McKnight Date Tested: 02/07/2020 Date Sampled: 01/29/2020

SOILS EXAMINATION FOR SOIL PERCOLATION SUITABILITY

Textural Analysis	TP-1A	TP-1B	TP-1C
Sand:	70%	84%	84%
Clay:	08%	05%	06%
Silt:	22%	11%	10%
Zone Classification:	2	1	1

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

Name: Karuk-Orleans Housing Development

Job No.: 236.02

APN: 529-111-007

Performed By: J. McKnight

Hole #	1A	1B	1C	
Depth (ft)	3'	6'	9'	
Oven Dry Weight (g)	100	100	100	
Starting Time	945	950	930	
Temp @ 40 Sec	65	65	65	
Hydrometer Reading @ 40 sec	37	23	23	
Composite Correction	7.1	7.1	7.1	
True Density @ 40 sec	29.9	15.9	15.9	
Temp @ 2 Hours	68	69	68	
Hydrometer Reading @ 2 Hours	15	11	13	
Composite Correction	6.5	6.3	6.5	
True Density @ 2 hours	8.5	4.7	6.5	
% Sand	70	84	84	
% Clay	8	5	6	
% Silt	22	11	10	
Soil Zone	2	1	1	
Classification	Sandy Loam	Loamy Sand	Loamy Sand	

Name: Karuk-Orleans Housing Development
Job No.: 236.02

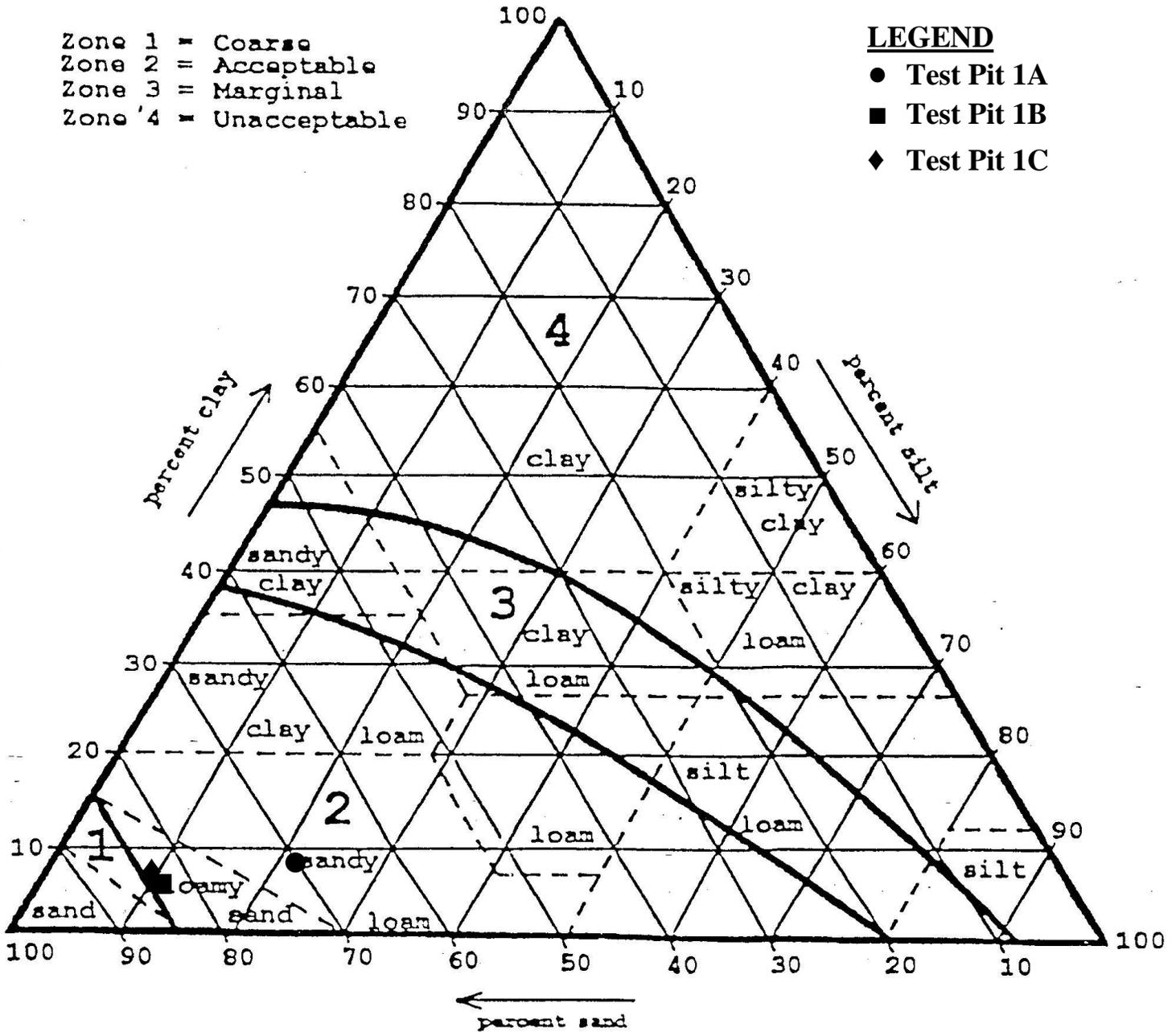
Test Pit Number	1A	1B	1C	
Percolation Rate (minutes per inch)	16	15	15	
Application Rate (gallons per day per square foot)	0.7	0.8	0.8	

Karuk Tribe Housing Authority
APN: 529-111-007
Job No. 236.02

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

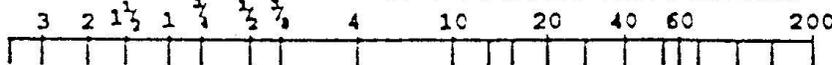
LEGEND

- Test Pit 1A
- Test Pit 1B
- ◆ Test Pit 1C

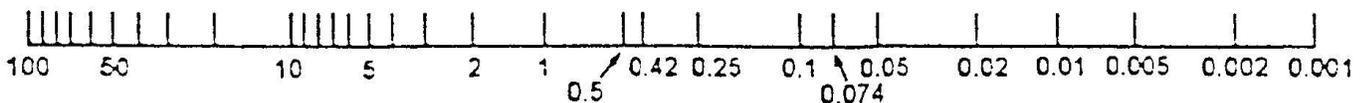


Sieve Openings in Inches

U.S. Standard Sieve Numbers



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



Grain Size in Millimeters



Date: 02/11/2020

Report to: Karuk Tribe Housing Authority
Post Office Box 1159
Happy Camp, CA 96039

RE: Orleans Housing Development
38030 Highway 96
Orleans, CA 95556

APN: 529-111-007 TP #'s: 2 Depth: 3', 6', 9' Sample Description: Soil

Sampled By: J. McKnight Date Tested: 02/11/2020 Date Sampled: 01/29/2020

SOILS EXAMINATION FOR SOIL PERCOLATION SUITABILITY

Textural Analysis	TP-2A	TP-2B	TP-2C
Sand:	69%	71%	77%
Clay:	04%	10%	12%
Silt:	27%	19%	11%
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.

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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: Karuk - Orleans Housing Development

Job No.: 236.02

APN: 529-111-007

Performed By: J. McKnight

Hole #	2A	2B	2C	
Depth (ft)	3'	6'	9'	
Oven Dry Weight (g)	100	100	100	
Starting Time	1035	1040	1045	
Temp @ 40 Sec	64	64	64	
Hydrometer Reading @ 40 sec	38	36	30	
Composite Correction	7.3	7.3	7.3	
True Density @ 40 sec	30.7	28.7	22.7	
Temp @ 2 Hours	68	68	68	
Hydrometer Reading @ 2 Hours	10	17	18	
Composite Correction	6.5	6.5	6.5	
True Density @ 2 hours	3.5	10.5	11.5	
% Sand	69	71	77	
% Clay	4	10	12	
% Silt	27	19	11	
Soil Zone	2	2	2	
Classification	Sandy Loam	Sandy Loam	Sandy Loam	

Job Name: Karuk - Orleans Housing Development
Job No.: 236.02

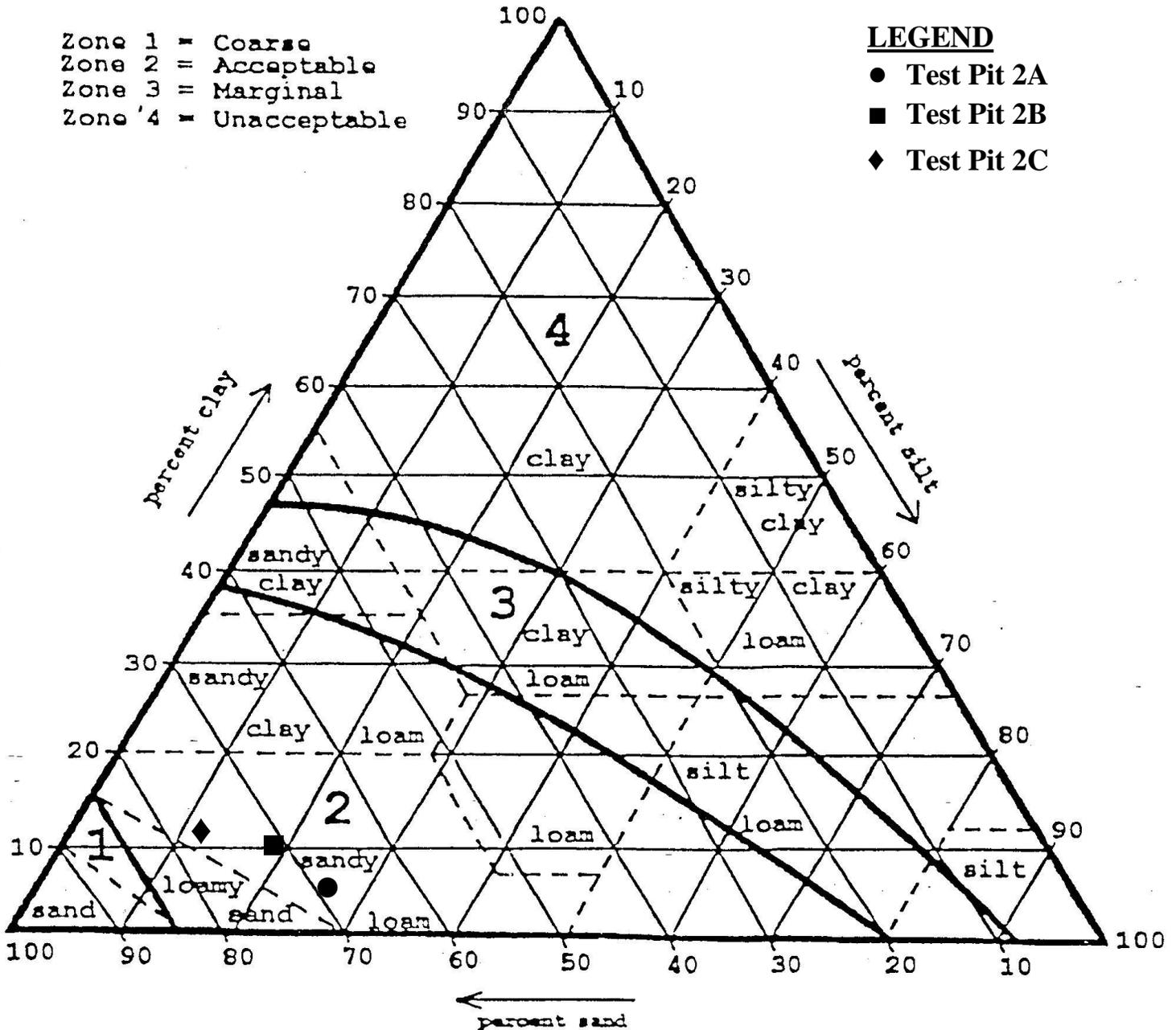
Test Pit Number	2A	2B	2C	
Percolation Rate (minutes per inch)	16	16	16	
Application Rate (gallons per day per square foot)	0.7	0.7	0.7	

Karuk Tribe Housing Authority
APN: 529-111-007
Job No. 236.02

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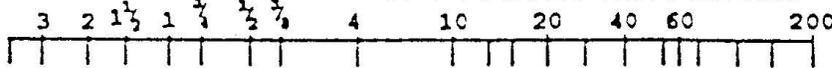
LEGEND

- Test Pit 2A
- Test Pit 2B
- ◆ Test Pit 2C

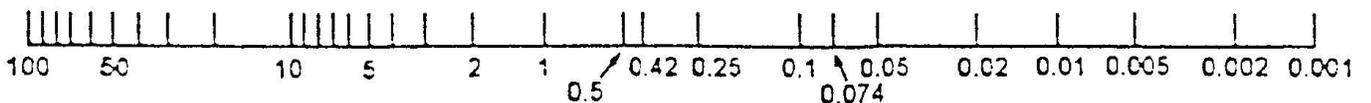


Sieve Openings in Inches

U.S. Standard Sieve Numbers



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



Grain Size in Millimeters



Date: 02/11/2020

Report to: Karuk Tribe Housing Authority
Post Office Box 1159
Happy Camp, CA 96039

RE: Orleans Housing Development
38030 Highway 96
Orleans, CA 95556

APN: 529-111-007 TP #'s: 3 Depth: 3', 6', 9' Sample Description: Soil

Sampled By: J. McKnight Date Tested: 02/11/2020 Date Sampled: 01/29/2020

SOILS EXAMINATION FOR SOIL PERCOLATION SUITABILITY

Textural Analysis	TP-3A	TP-3B	TP-3C
Sand:	70%	79%	79%
Clay:	06%	06%	04%
Silt:	24%	15%	17%
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: Karuk-Orleans Housing Development

Job No.: 236.02

APN: 529-111-007

Performed By: J. McKnight

Hole #	3A	3B	3C	
Depth (ft)	3'	6'	9'	
Oven Dry Weight (g)	100	100	100	
Starting Time	1030	1050	1050	
Temp @ 40 Sec	64	64	65	
Hydrometer Reading @ 40 sec	37	28	28	
Composite Correction	7.3	7.3	7.1	
True Density @ 40 sec	29.7	20.7	20.9	
Temp @ 2 Hours	68	68	68	
Hydrometer Reading @ 2 Hours	12	12	10	
Composite Correction	6.5	6.5	6.5	
True Density @ 2 hours	5.5	5.5	3.5	
% Sand	70	79	79	
% Clay	6	6	4	
% Silt	24	15	17	
Soil Zone	2	2	2	
Classification	Sandy Loam	Loamy Sand	Loamy Sand	

Job Name: Karuk-Orleans Housing Development
Job No.: 236.02

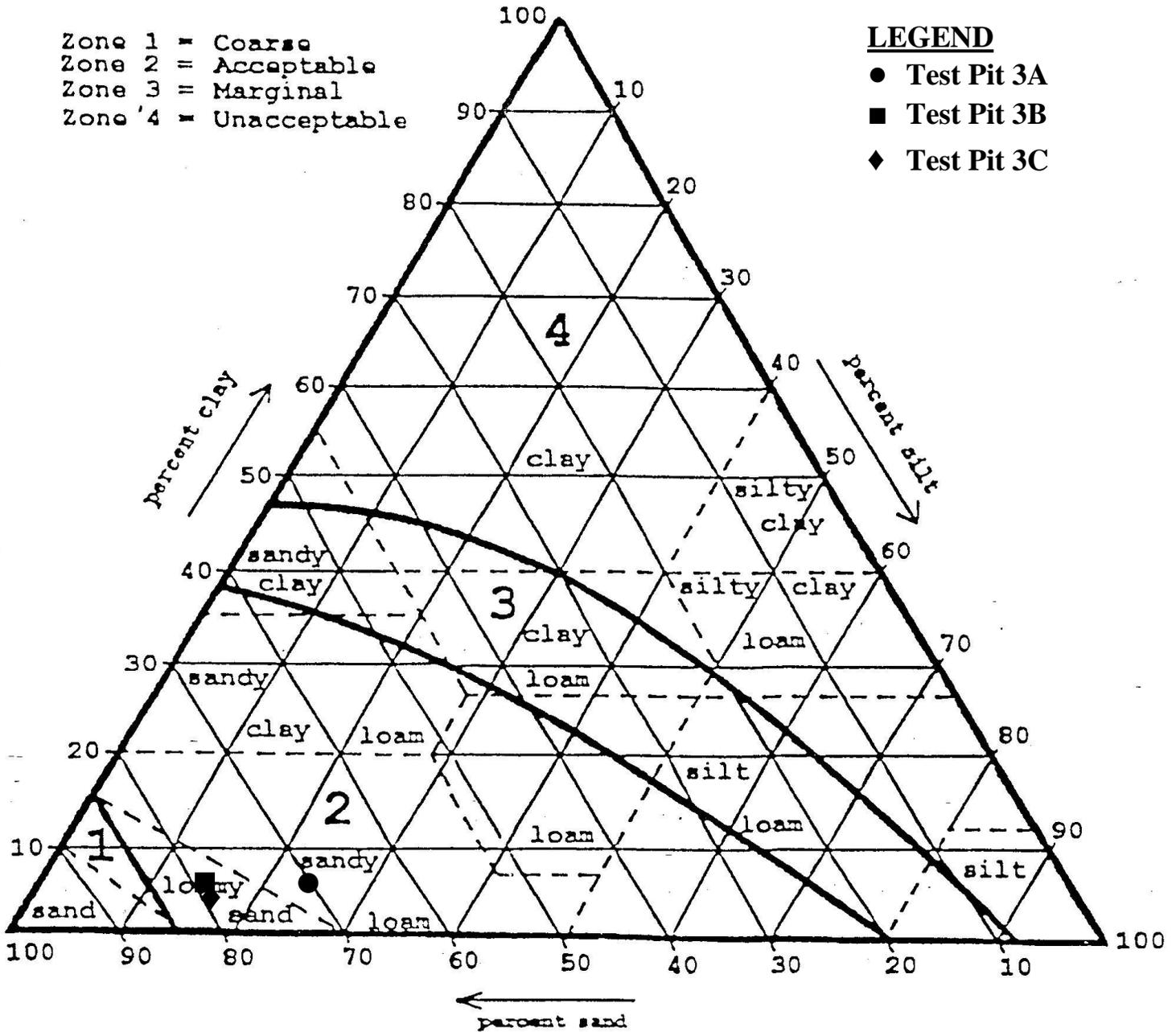
Test Pit Number	3A	3B	3C	
Percolation Rate (minutes per inch)	16	15	15	
Application Rate (gallons per day per square foot)	0.7	0.8	0.8	

Karuk Tribe Housing Authority
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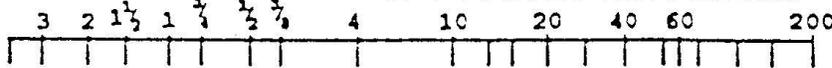
LEGEND

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

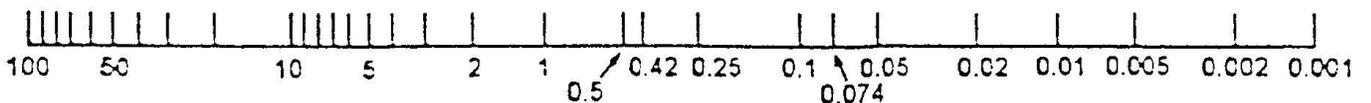


Sieve Openings in Inches

U.S. Standard Sieve Numbers



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



Grain Size in Millimeters



Date: 02/12/2020

Report to: Karuk Tribe Housing Authority
Post Office Box 1159
Happy Camp, CA 96039

RE: Orleans Housing Development
38030 Highway 96
Orleans, CA 95556

APN: 529-111-007 TP #'s: 4 Depth: 3', 6', 9' Sample Description: Soil

Sampled By: J. McKnight Date Tested: 02/12/2020 Date Sampled: 01/29/2020

SOILS EXAMINATION FOR SOIL PERCOLATION SUITABILITY

Textural Analysis	TP-4A	TP-4B	TP-4C
Sand:	76%	80%	71%
Clay:	08%	06%	07%
Silt:	16%	14%	22%
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.

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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: Karuk-Orleans Housing Development

Job No.: 236.02

APN: 529-111-007

Performed By: J. McKnight

Hole #	4A	4B	4C	
Depth (ft)	3'	6'	9'	
Oven Dry Weight (g)	100	100	100	
Starting Time	1055	1100	1105	
Temp @ 40 Sec	64	64	65	
Hydrometer Reading @ 40 sec	31	27	36	
Composite Correction	7.3	7.3	7.1	
True Density @ 40 sec	23.7	19.7	28.9	
Temp @ 2 Hours	68	68	69	
Hydrometer Reading @ 2 Hours	14	12	13	
Composite Correction	6.5	6.5	6.3	
True Density @ 2 hours	7.5	5.5	6.7	
% Sand	76	80	71	
% Clay	8	6	7	
% Silt	16	14	22	
Soil Zone	2	2	2	
Classification	Sandy Loam	Loamy Sand	Sandy Loam	

Job Name: Karuk-Orleans Housing Development
Job No.: 236.02

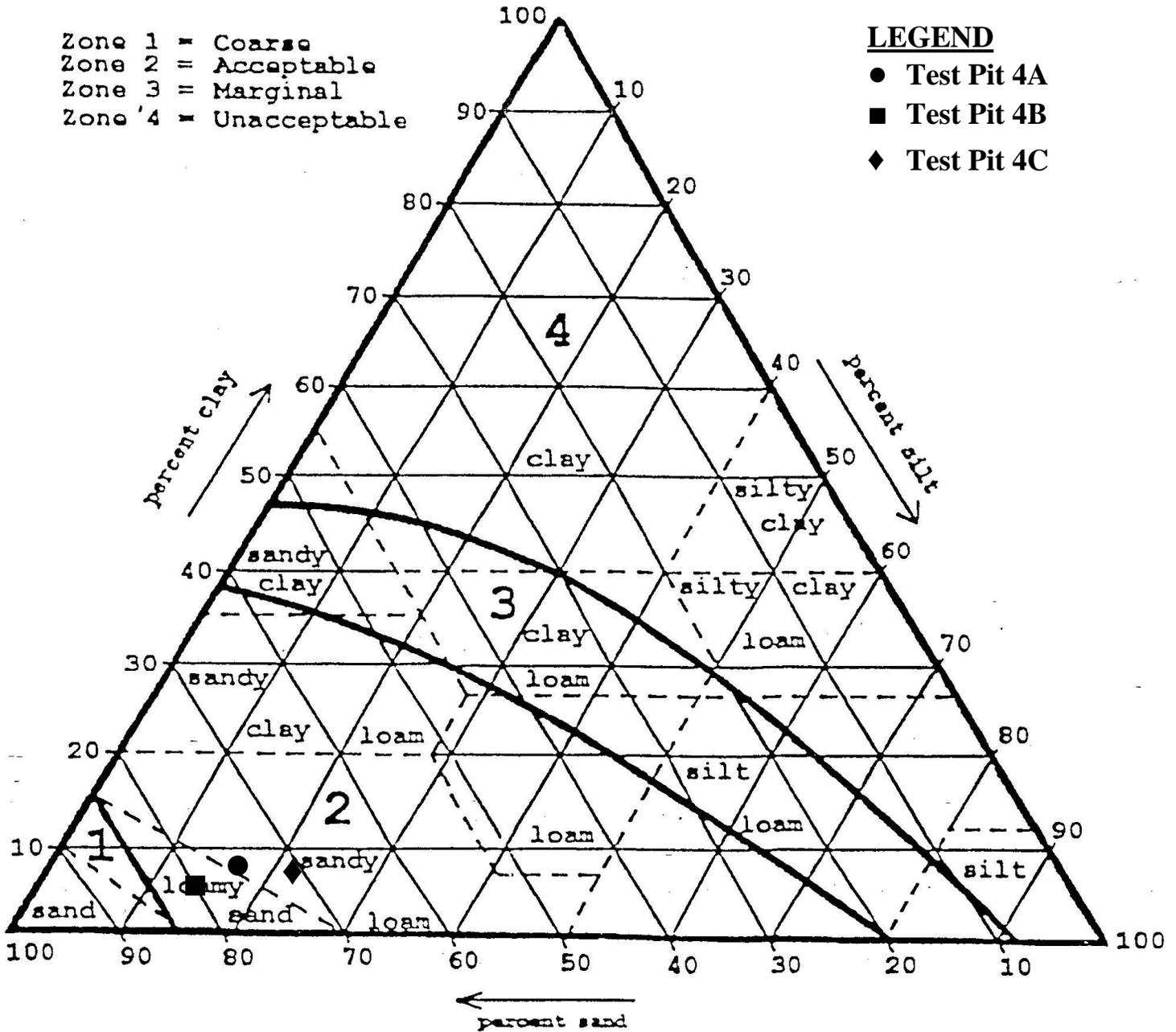
Test Pit Number	4A	4B	4C	
Percolation Rate (minutes per inch)	16	15	16	
Application Rate (gallons per day per square foot)	0.7	0.8	0.7	

Karuk Tribe Housing Authority
APN: 529-111-007
Job No. 236.02

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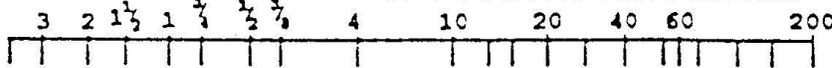
LEGEND

- Test Pit 4A
- Test Pit 4B
- ◆ Test Pit 4C

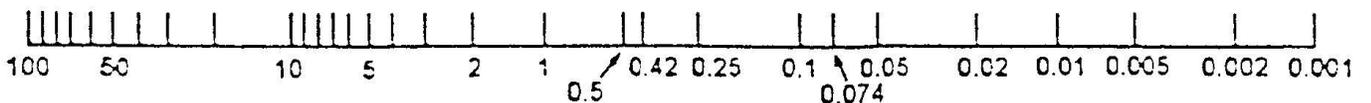


Sieve Openings in Inches

U.S. Standard Sieve Numbers



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



Grain Size in Millimeters



Date: 02/13/2020

Report to: Karuk Tribe Housing Authority
Post Office Box 1159
Happy Camp, CA 96039

RE: Orleans Housing Development
38030 Highway 96
Orleans, CA 95556

APN: 529-111-007 TP #'s: 5 Depth: 3', 6', 9' Sample Description: Soil

Sampled By: J. McKnight Date Tested: 02/13/2020 Date Sampled: 01/29/2020

SOILS EXAMINATION FOR SOIL PERCOLATION SUITABILITY

Textural Analysis	TP-5A	TP-5B	TP-5C
Sand:	80%	64%	83%
Clay:	06%	05%	04%
Silt:	14%	31%	13%
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.

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Soil Texture Analysis Worksheet

Job Name: Karuk-Orleans Housing Development

Job No.: 236.02

APN: 529-111-007

Performed By: J. McKnight

Hole #	5A	5B	5C	
Depth (ft)	3'	6'	9'	
Oven Dry Weight (g)	100	100	100	
Starting Time	1030	1035	1045	
Temp @ 40 Sec	66	67	64	
Hydrometer Reading @ 40 sec	27	42	24	
Composite Correction	6.9	6.5	7.3	
True Density @ 40 sec	20.1	35.5	16.7	
Temp @ 2 Hours	68	69	68	
Hydrometer Reading @ 2 Hours	13	11	10	
Composite Correction	6.5	6.3	6.5	
True Density @ 2 hours	6.5	4.7	3.5	
% Sand	80	64	83	
% Clay	6	5	4	
% Silt	14	31	13	
Soil Zone	2	2	2	
Classification	Loamy Sand	Sandy Loam	Loamy Sand	

Job Name: Karuk-Orleans Housing Development
Job No.: 236.02

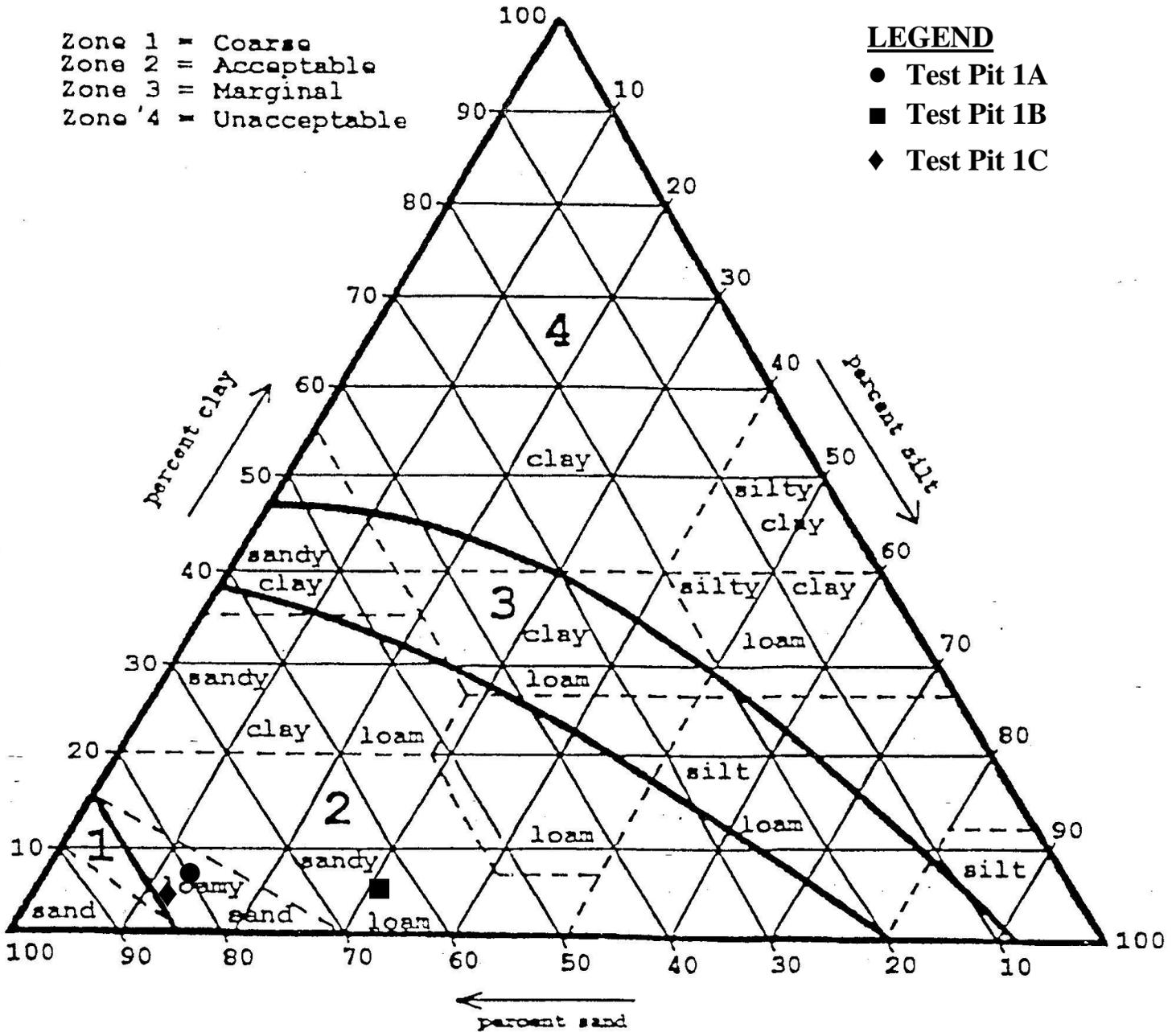
Test Pit Number	5A	5B	5C	
Percolation Rate (minutes per inch)	15	16	15	
Application Rate (gallons per day per square foot)	0.8	0.7	0.8	

Karuk Tribe Housing Authority
APN: 529-111-007
Job No. 236.02

- Zone 1 = Coarse
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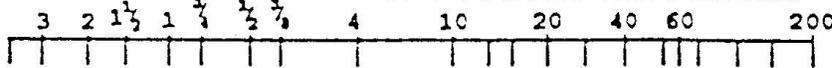
LEGEND

- Test Pit 1A
- Test Pit 1B
- ◆ Test Pit 1C

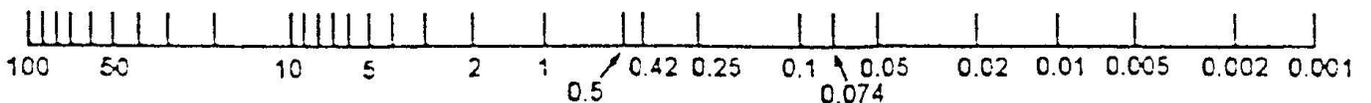


Sieve Openings in Inches

U.S. Standard Sieve Numbers



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



Grain Size in Millimeters



Date: 02/13/2020

Report to: Karuk Tribe Housing Authority
Post Office Box 1159
Happy Camp, CA 96039

RE: Orleans Housing Development
38030 Highway 96
Orleans, CA 95556

APN: 529-111-007 TP #'s: 6 Depth: 3', 6', 9' Sample Description: Soil

Sampled By: J. McKnight Date Tested: 02/13/2020 Date Sampled: 01/29/2020

SOILS EXAMINATION FOR SOIL PERCOLATION SUITABILITY

Textural Analysis	TP-6A	TP-6B	TP-6C
Sand:	67%	80%	96%
Clay:	06%	04%	01%
Silt:	27%	16%	03%
Zone Classification:	2	2	1

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: Karuk-Orleans Housing Development

Job No.: 236.02

APN: 529-111-007

Performed By: J. McKnight

Hole #	6A	6B	6C	
Depth (ft)	3'	6'	9'	
Oven Dry Weight (g)	100	100	100	
Starting Time	1050	1040	1055	
Temp @ 40 Sec	66	67	67	
Hydrometer Reading @ 40 sec	40	27	10	
Composite Correction	6.9	6.5	6.5	
True Density @ 40 sec	33.1	20.5	3.5	
Temp @ 2 Hours	69	69	69	
Hydrometer Reading @ 2 Hours	12	10	7	
Composite Correction	6.3	6.3	6.3	
True Density @ 2 hours	5.7	3.7	0.7	
% Sand	67	80	96	
% Clay	6	4	1	
% Silt	27	16	3	
Soil Zone	2	2	1	
Classification	Sandy Loam	Loamy Sand	Sand	

Job Name: Karuk-Orleans Housing Development
Job No.: 236.02

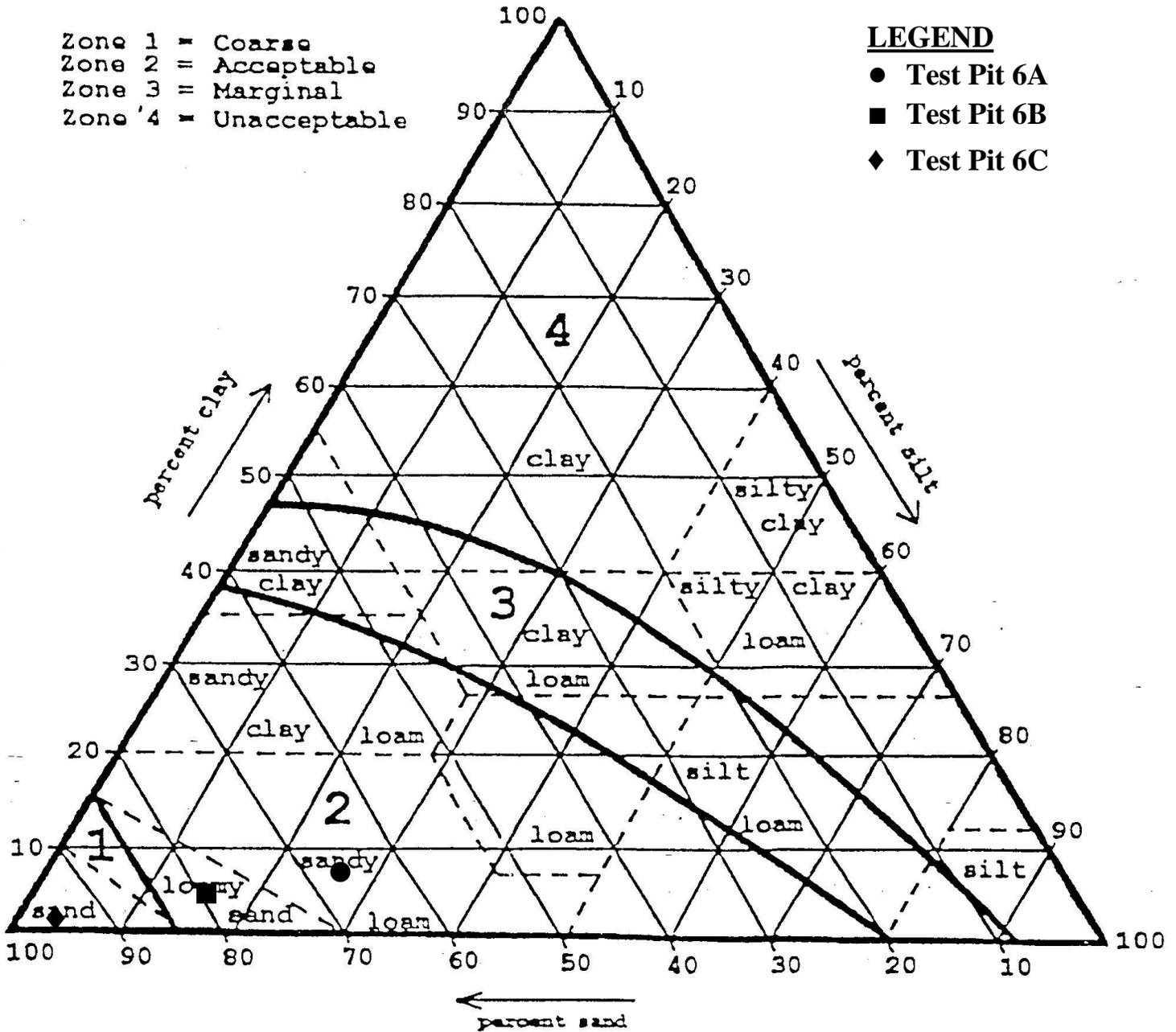
Test Pit Number	6A	6B	6C	
Percolation Rate (minutes per inch)	16	15	6	
Application Rate (gallons per day per square foot)	0.7	0.8	1.1	

Karuk Tribe Housing Authority
APN: 529-111-007
Job No. 236.02

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

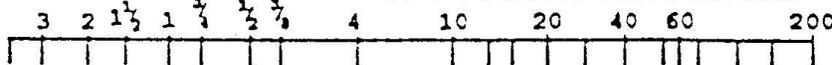
LEGEND

- Test Pit 6A
- Test Pit 6B
- ◆ Test Pit 6C

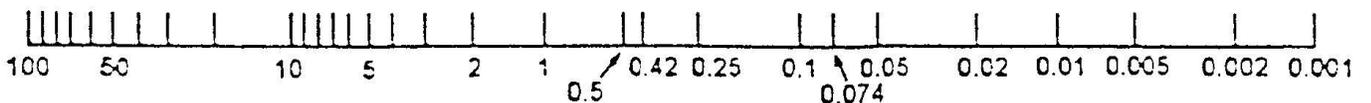


Sieve Openings in Inches

U.S. Standard Sieve Numbers



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



Grain Size in Millimeters

Attachment 5:
Sewage Disposal System Submittal





TRINITY VALLEY CONSULTING ENGINEERS INC.

67 WALNUT WAY. PO BOX 1567. WILLOW CREEK. CA 95573

P: 530.629.3000 F: 530.629.3011

SEWAGE DISPOSAL SYSTEM SUBMITTAL

Client: Karuk Tribe Housing Authority 635 Jacobs Way, Happy Camp, CA 96039	Sheet No. : 1 of 4 Job No. : 236.02
Project: Orleans Home Development	Designed By: FAM Date: 1/29/20
Location: Orleans, Humboldt Co., California	Checked By: JTM Date: 1/29/20
Type of Application: Public Disposal System	
Owner: Karuk Tribe Housing Authority	
APN: 529-111-007	
Location: Lat 41.301768, Long -123.541227	

Disposal Field Location (Minimum Offsets):

Springs / Streams: 100' +	Buildings: 10'	Top of Bank: 15'+
Property Line: 10'+	Wells: 100'	Average Slope: 2%

Soil Analysis:

Pit No.	Bulk Density	Sample Depth	Zone	USDA Texture	Field	RWQCB-NCBP		Orenco
						Perc Rate (min/in)	App Rate (GPD/SF)	
TP-1A	NR	3	2	Sandy Loam		16	0.7	
TP-1B	NR	6	1	Loamy Sand		15	0.8	
TP-1C	NR	9	1	Loamy Sand		15	0.8	
TP-2A	NR	3	2	Sandy Loam		16	0.7	
TP-2B	NR	6	2	Sandy Loam		16	0.7	
TP-2C	NR	9	2	Sandy Loam		16	0.7	
TP-3A	NR	3	2	Sandy Loam		16	0.7	
TP-3B	NR	6	2	Sandy Loam		15	0.8	
TP-3C	NR	9	2	Sandy Loam		15	0.8	
TP-4A	NR	3	2	Sandy Loam		16	0.7	
TP-4B	NR	6	2	Loamy Sand		15	0.8	
TP-4C	NR	9	2	Sandy Loam		16	0.7	
TP-5A	NR	3	2	Loamy Sand		15	0.8	
TP-5B	NR	6	2	Sandy Loam		16	0.7	
TP-5C	NR	9	2	Loamy Sand		15	0.8	
TP-6A	NR	3	2	Sandy Loam		16	0.7	
TP-6B	NR	6	2	Loamy Sand		15	0.8	
TP-6C	NR	9	1	Sand		6	1.1	

NOTES:

1. Test Hole Location(s): Shown on attached layout
2. Textural Analysis - see attached
3. RWQCB-NCBP: Regional Water Quality Control Board - North Coast Basin Plan
4. Soil Profiles: See attached log(s)

SEWAGE DISPOSAL SYSTEM SUBMITTAL

Client: Karuk Tribe Housing Authority 635 Jacobs Way, Happy Camp, CA 96039	Sheet No. : 2 of 4 Job No. : 236.02
Project: Orleans Home Development	Design By: FAM Date: 1/29/20
Location: Orleans, Humboldt Co., California	Check By: JTM Date: 1/29/20

DESCRIPTION	COUNT	UNIT	NOTES
-------------	-------	------	-------

SOILS

Zone	2		
Limiting Condition			None
Depth to Limiting Condition		ft	N/A
Percolation Rate	16	min/inch	Percolation Test Results & Textural Analysis
Application Rate	0.70	gpd/sf	Table 4-2, North Coast Basin Plan - RWQCB
	3.33		Orengo

DESIGN FLOW

Residential - Single Family	450	gpd	(8) Three Bedroom @ 450 gpd
Total Loading (TL)	3600	gpd	
Average Loading	1800	gpd	

INCOMING WASTE STRENGTH

cBOD ₅	300	mg/L	
TSS	150	mg/L	

EFFLUENT REQUIREMENTS

cBOD ₅	10	mg/L	
TSS	10	mg/L	

TANK SIZING

Minimum Primary Required	7,200	gallons	2xTL
Trash Tank	1,500	gallons	
Primary Tank	8,700	gallons	based on Xerxes 8'x34'-4" (diameter x length) std tank
Pre-Anoxic Tank	3,600	gallons	100% TL (based on Xerxes 8'x20'-6 1/2" std tank)
Recirculation Tank	2,700	gallons	75% min. of Total GPD
Disposal Field Dosing Tank	1,440	gallons	20% of Total GPD

ADVANTEX SIZING

Primary BOD Reduction	150	mg/L	Assuming 50% reduction by Primary Treatment
Rnox BOD Reduction	30	mg/L	Assuming 10% reduction by Rnox Return
Reduced BOD (rBOD)	120	mg/L	
Filter TSS Reduction	120	mg/L	Assuming 80% reduction by commercial size effluent filter
Reduced TSS	30	mg/L	
Hydraulic Loading Rate	72	sf media	50 gpd/sf of media at design flow
AX100	100	sf media	per pod
minimum pod count	1	ea	
design recommended sf media	100	sf media	
Organic Calculation	4	lbs/day	rBODxTLx(3.78541 L/gal)/(453592 mg/lbs)
	0.04	lbs/day/sf	0.08 lbs/day/sf AdvanTex recommended max

DISPOSAL FIELD SIZING

Minimum Required Area	5,143	SF	Design Flow Loading/Application Rate
Area per linear foot	3	ft	given 3' on center spacing
Required Area Percent	100	%	
Minimum Total Length	1,714	ft	
Max lateral length	100	ft	
Minimum Lateral Count	18	EA	17 - 100' and 1 - 20'

Attachment 6:
Soil Exploration Logs



SOIL EXPLORATION LOG - SEWAGE DISPOSAL

Project Name: KTHA-Orleans Home Development Project No: 236.02

Date: 1/29/2020

Test Hole #: TP-1

Hole Diameter: 24"x72"

Excavation Method: H&E35 Exc

Hole Elevation: NA

Groundwater Elevation: NA

Logged by: F. Masten

DESCRIPTION & REMARKS	COLOR	MOISTURE	CONSIST.	SOIL TYPE - USCS	DEPTH	PROFILE	SAMPLE TYPE / NUMBER	BLOWS / FT	WATER CONTENT %	UNIT DRY WEIGHT, PSF
Sandy Loam	Brwn	Dry		SM	-1 -2 -3		TP-1A			
Loamy Sand	Brwn	Dry		SM	-4 -5 -6		TP-1B			
Loamy Sand	Brwn	Dry		SM	-7 -8 -9		TP-1C			
					-10					

TRINITY VALLEY CONSULTING ENGINEERS

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

SOIL EXPLORATION LOG - SEWAGE DISPOSAL

Project Name: KTHA-Orleans Home Development Project No: 236.02

Date: 1/29/2020

Test Hole #: TP-2

Hole Diameter: 24"x72"

Excavation Method: H&E35 Exc

Hole Elevation: NA

Groundwater Elevation: NA

Logged by: F. Masten

DESCRIPTION & REMARKS	COLOR	MOISTURE	CONSIST.	SOIL TYPE - USCS	DEPTH	PROFILE	SAMPLE TYPE / NUMBER	BLOWS / FT	WATER CONTENT %	UNIT DRY WEIGHT, PSF
Sandy Loam	Brwn	Dry		SM	-1 -2 -3		TP-2A			
Sandy Loam	Brwn	Dry		SM	-4 -5 -6		TP-2B			
Sandy Loam	Brwn	Dry		SM	-7 -8 -9		TP-2C			
					-10					

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SOIL EXPLORATION LOG - SEWAGE DISPOSAL

Project Name: KTHA-Orleans Home Development Project No: 236.02

Date: 1/29/2020

Test Hole #: TP-3

Hole Diameter: 24"x72"

Excavation Method: H&E35 Exc

Hole Elevation: NA

Groundwater Elevation: NA

Logged by: F. Masten

DESCRIPTION & REMARKS	COLOR	MOISTURE	CONSIST.	SOIL TYPE - USCS	DEPTH	PROFILE	SAMPLE TYPE / NUMBER	BLOWS / FT	WATER CONTENT %	UNIT DRY WEIGHT, PSF
Sandy Loam	Brwn	Dry		SM	-1 -2 -3		TP-3A			
Loamy Sand	Brwn	Dry		SM	-4 -5 -6		TP-3B			
Loamy Sand	Brwn	Dry		SM	-7 -8 -9		TP-3C			
					-10					

SOIL EXPLORATION LOG - SEWAGE DISPOSAL

Project Name: KTHA-Orleans Home Development Project No: 236.02

Date: 1/29/2020

Test Hole #: TP-4

Hole Diameter: 24"x72"

Excavation Method: H&E35 Exc

Hole Elevation: NA

Groundwater Elevation: NA

Logged by: F. Masten

DESCRIPTION & REMARKS	COLOR	MOISTURE	CONSIST.	SOIL TYPE - USCS	DEPTH	PROFILE	SAMPLE TYPE / NUMBER	BLOWS / FT	WATER CONTENT %	UNIT DRY WEIGHT, PSF
Sandy Loam	Brwn	Dry		SM	-1 -2 -3		TP-4A			
Loamy Sand	Brwn	Dry		Sm	-4 -5 -6		TP-4B			
Sandy Loam	Brwn	Dry		SM	-7 -8 -9		TP-4C			
					-10					

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SOIL EXPLORATION LOG - SEWAGE DISPOSAL

Project Name: KTHA-Orleans Home Development Project No: 236.02

Date: 1/29/2020

Test Hole #: TP-5

Hole Diameter: 24"x72"

Excavation Method: H&E35 Exc

Hole Elevation: NA

Groundwater Elevation: NA

Logged by: F. Masten

DESCRIPTION & REMARKS	COLOR	MOISTURE	CONSIST.	SOIL TYPE - USCS	DEPTH	PROFILE	SAMPLE TYPE / NUMBER	BLOWS / FT	WATER CONTENT %	UNIT DRY WEIGHT, PSF
Loamy Sand	Brwn	Dry		SM	-1 -2 -3		TP-5A			
Sandy Loam	Brwn	Dry		SM	-4 -5 -6		TP-5B			
Loamy Sand	Brwn	Dry		SM	-7 -8 -9		TP-5C			
					-10					

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SOIL EXPLORATION LOG - SEWAGE DISPOSAL

Project Name: KTHA-Orleans Home Development Project No: 236.02

Date: 1/29/2020

Test Hole #: TP-6

Hole Diameter: 24"x72"

Excavation Method: H&E35 Exc

Hole Elevation: NA

Groundwater Elevation: NA

Logged by: F. Masten

DESCRIPTION & REMARKS	COLOR	MOISTURE	CONSIST.	SOIL TYPE - USCS	DEPTH	PROFILE	SAMPLE TYPE / NUMBER	BLOWS / FT	WATER CONTENT %	UNIT DRY WEIGHT, PSF
Sandy Loam	Brwn	Dry		SM	-1 -2 -3		TP-6A			
Loamy Sand	Brwn	Dry		SM	-4 -5 -6		TP-6B			
Sand	Brwn	Dry		SW	-7 -8 -9 -10		TP-6C			

Attachment 7:
Percolation Testing Logs



PERCOLATION TEST DATA

TEST NO: 01

JOB NAME: Karuk Housing JOB NO.: 236.02 DATE: 1/29/20
 A.P. NO: 529-111-007 COUNTY Humboldt BY: Frank M.
 WATER SUPPLY IS: PUBLIC: X PRIVATE: _____
 TESTING PERIOD IS: DRY WEATHER _____ WET WEATHER X

HOLE DATA

DEPTH (FEET)	EXCAVATION DATE	EXCAVATION METHOD	HOLE SIZE
0 to -3'	1/29/20	post hole digger	8"x12"
to _____	_____	_____	_____
to _____	_____	_____	_____

TEST DEPTH: 24"-36"

PRESOAKING DATA

X NOT REQUIRED - WET WEATHER CONDITIONS
 _____ TWELVE HOUR CONTINUOUS PRESOAKING
 _____ FOUR COMPLETE REFILLINGS - SEE FOLLOWING TABLE

	1	2	3	4
START TIME				
START DATE				

SATURATION DATA

START TIME AND DATE 1/29/2020 14:05
 END TIME AND DATE 1/29/2020 14:25

TEST DATA

		TIME	READING	ELAPSED TIME	DROP		TIME	READING	ELAPSED TIME	DROP
START		2:05								
READ	1	2:10		5 min	12	7				
START		2:10								
READ	2	2:15		5 min	8.5	8				
START		2:15								
READ	3	2:20		5 min	8	9				
START		2:20								
READ	4	2:25		5 min	5.5	10				
START										
READ	5					11				
START										
READ	6					12				

*TP #1 VOIDED DUE TO INCOSISTENCY

PERCOLATION TEST DATA

TEST NO: 02

JOB NAME: Karuk Housing JOB NO.: 236.02 DATE: 1/29/20
A.P. NO: 529-111-007 COUNTY Humboldt BY: Frank M.
WATER SUPPLY IS: PUBLIC: X PRIVATE: _____
TESTING PERIOD IS: DRY WEATHER _____ WET WEATHER X

HOLE DATA

DEPTH (FEET)	EXCAVATION DATE	EXCAVATION METHOD	HOLE SIZE
0 to -3'	1/29/20	post hole digger	8"x12"
to _____	_____	_____	_____
to _____	_____	_____	_____

TEST DEPTH: 24"-36"

PRESOAKING DATA

X NOT REQUIRED - WET WEATHER CONDITIONS
____ TWELVE HOUR CONTINUOUS PRESOAKING
____ FOUR COMPLETE REFILLINGS - SEE FOLLOWING TABLE

	1	2	3	4
START TIME				
START DATE				

SATURATION DATA

START TIME AND DATE 1/29/2020 14:05
END TIME AND DATE 1/29/2020 14:45

TEST DATA

		TIME	READING	ELAPSED TIME	DROP		TIME	READING	ELAPSED TIME	DROP
START READ	1	2:05				7	2:35			
		2:10		5 min	1.5		2:40 AM		5 min	0.75
START READ	2	2:10				8				
		2:15		5 min	1					
START READ	3	2:15				9				
		2:20		5 min	0.5					
START READ	4	2:20				10				
		2:25		5 min	0.5					
START READ	5	2:25				11				
		2:30		5 min	0.75					
START READ	6	2:30				12				
		2:35		5 min	0.75					

STABILIZATION RATE: 0.75

PERCOLATION TEST DATA

TEST NO: 03

JOB NAME: Karuk Housing JOB NO.: 236.02 DATE: 1/29/20
 A.P. NO: 529-111-007 COUNTY Humboldt BY: Frank M.
 WATER SUPPLY IS: PUBLIC: X PRIVATE: _____
 TESTING PERIOD IS: DRY WEATHER _____ WET WEATHER X

HOLE DATA

DEPTH (FEET)	EXCAVATION DATE	EXCAVATION METHOD	HOLE SIZE
0 to -3'	1/29/30	post hole digger	8"x12"
to _____	_____	_____	_____
to _____	_____	_____	_____

TEST DEPTH: 24"-36"

PRESOAKING DATA

X NOT REQUIRED - WET WEATHER CONDITIONS
 _____ TWELVE HOUR CONTINUOUS PRESOAKING
 _____ FOUR COMPLETE REFILLINGS - SEE FOLLOWING TABLE

	1	2	3	4
START TIME				
START DATE				

SATURATION DATA

START TIME AND DATE 1/29/2020 14:20
 END TIME AND DATE 1/29/2020 14:40

TEST DATA

		TIME	READING	ELAPSED TIME	DROP		TIME	READING	ELAPSED TIME	DROP
START		2:20								
READ	1	2:25		5 min	1.5	7				
START		2:25								
READ	2	2:30		5 min	1	8				
START		2:30								
READ	3	2:35		5 min	1	9				
START		2:35								
READ	4	2:40		5 min	1	10				
START										
READ	5					11				
START										
READ	6					12				

STABILIZATION RATE: 1

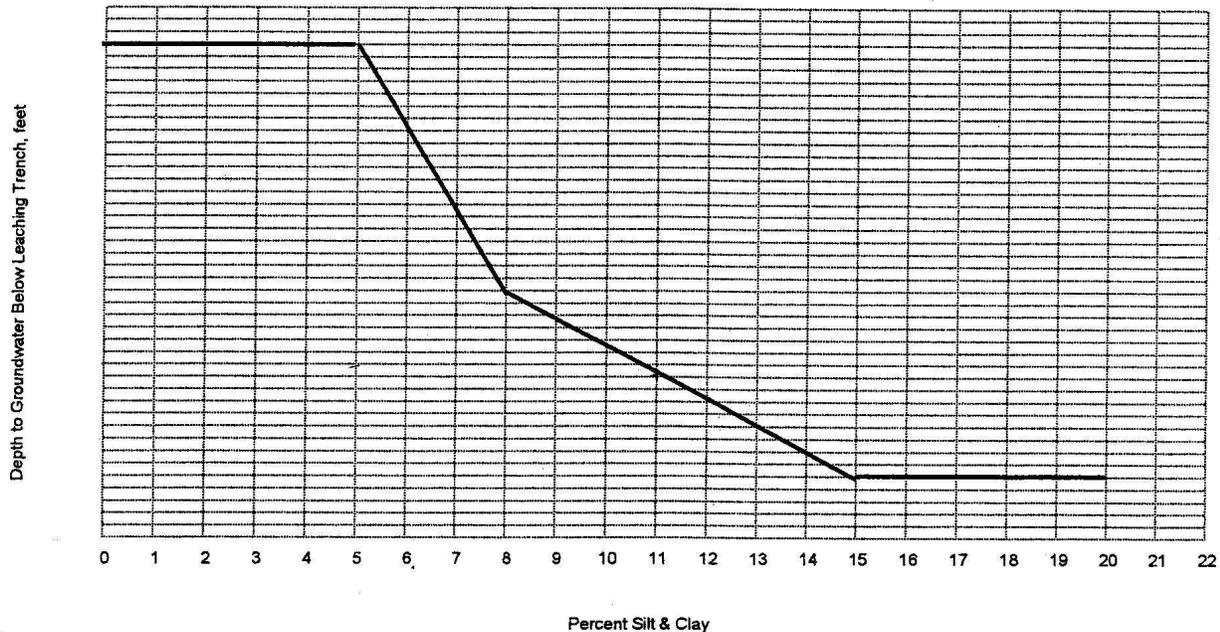
Attachment 8:

North Coast Region Water Quality Control Board

Table 4-1



FIGURE 4-1 MINIMUM DEPTH TO GROUNDWATER BELOW LEACHING TRENCH



Notes:

1. The Silt & Clay content shall be determined after adjustment for coarse fragments as indicated in the method set forth in Figure 4-2, and must exist for a minimum of three feet between the bottom of the leaching trench and groundwater.
2. For percolation rates slower than 5 mpi, a minimum depth to groundwater below the leaching trench shall be five feet.
3. For soils having greater than 15% Silt & Clay, lesser depths to groundwater, to a minimum depth of two feet below the leaching trench, may be granted only as a waiver or for alternative systems.

TABLE 4-1

MINIMUM SETBACK DISTANCES (FEET)

Facility	Well	Perennially Flowing Stream ¹	Ephemeral Stream ²	Ocean Lake or Reservoir ³	Cut Banks, Natural Bluffs and Sharp Changes in Slope	Unstable Land Forms
Septic Tank/Sump	100	50	25	50	25	50
Leaching Field	100	100	50	100	25 ⁴	50

¹ As measured from the line which defines the limit of 10 year frequency flood.

² As measured from the edge of the water course.

³ As measured from the high-water line.

⁴ Where soil depth or depth to groundwater below the leaching trench are less than five feet, a minimum set back distance of 50 feet shall be required.