INSTRUCTIONS FOR PERFORMING SITE EVALUATIONS

- Only Qualified Professionals (Civil Engineer, EIT under the direction of a Civil Engineer, Geologist, R.E.H.S., Soil Scientist) may schedule and perform site evaluations.
- Site evaluations shall be performed when the soil conditions are dry. Soil shall be considered dry
 when soil particles pass freely through a #10 sieve and a clear visual identification of the soil
 structure in the test pit sidewall can be observed. If the soil moisture content does not allow for
 these criteria, a site evaluation cannot be performed. Site Evaluators shall be responsible for
 assuring soil conditions are dry enough to perform the site evaluation prior to inspection by the
 Department of Environmental Management.
- Test pits shall be dug by a backhoe or excavator. Test pits shall be excavated to a depth of five (5) feet or bedrock, whichever occurs first. Test pits shall be gently sloped or stepped and shall not be excavated so as to require the use of a ladder for entry. Test pits shall not be less than twenty-four (24) inches wide. The test pits shall be sufficient in number and adequately spaced to encompass and represent the soil conditions of the entire area of the proposed primary and reserve areas.
- The excavated sidewall is then picked away with a sharp instrument to expose the natural soil structure.
- Identify each soil horizon and record all of its characteristics on the site evaluation form using the abbreviations provided with these instructions.
- A U.S.D.A. soil texture classification must be identified for each horizon from ground surface to a depth of three (3) feet below the effective infiltrative area by using the attached field texture method. In addition to the field texture analysis, a hydrometer test and bulk density test performed by a laboratory approved by the administrative authority is highly recommended to confirm the field results.
- Hydrometer and bulk density testing may also be required by the administrative authority to verify field textural results.
- Groundwater shall be defined as the highest seasonal level of the water table in the soil. Groundwater levels shall be estimated by the extent of soil redoximorphic features observed in the soil profile. Direct observation of stabilized groundwater levels is highly recommended and may be required by the administrative authority.
- Direct observation of groundwater shall be done with monitoring wells. Monitoring wells sufficient in number and adequately spaced to encompass and represent the entire primary area and reserve area shall be constructed to a minimum depth of three (3) feet below the proposed effective infiltrative area. The monitoring shall be performed during the rainfall year (October 1 through September 30) and after fifty (50) percent of the expected average rainfall has occurred for that particular area of the county, as determined by rainfall data from an approved source. Three (3) separate sets of monitoring data shall be collected all within ten (10) days after separate rainfall events of one half (½) inch of rain or greater. In areas that experience high groundwater due to flood irrigation, monitoring shall be done when flooding is at its maximum. The Qualified Professional must notify this office a minimum of twenty-four hours prior to collecting the monitoring data. An Environmental Health Specialist may be present at the time the data is collected.
- Please attach an 8.5" x 11" plot map showing the locations of all test pits and/or monitoring wells triangulated from permanent landmarks or known property corners. The map must be drawn to scale and include a North arrow, surrounding geographic and topographic features, direction and % slope, distance to all drainages, water bodies, potential areas for flooding, unstable landforms, existing or proposed roads, structures, utilities, domestic water supplies, wells, ponds, existing wastewater treatment systems and facilities.
- Submit the completed Site Evaluation Report, Test Pit Log/Percolation Test Results and Test Pit Map to the Napa County Department of Environmental Management, in person, by mail or email (.pdf format only). Only complete submissions will be accepted.

DETERMINING SOIL TEXTURE BY THE FEEL METHOD

Take a sample of soil from the horizon you wish to texture and pass it through a #10 sieve (2mm mesh) by crushing the peds with your fingers and agitating the sieve. The soil should pass freely through the mesh. If clay balls develop in the sieve when agitated or the mesh clogs, the soil may be too wet and you may get incorrect results.



ABBREVIATIONS

Boundary	Texture	Structure	Consistence			Pores	Roots	Mottling
A=Abrupt	S=Sand	W=Weak	Side	Ped	Wet	Quantity:	Quantity:	Quantity:
<1"	LS=Loamy	M=Moderate	Wall					
C=Clear 1"-	Sand	S=Strong	L=Loose	L=Loose	NS=NonSticky	F =Few	F =Few	F =Few
2.5"	SL=Sandy	G=Granular	S=Soft	VFRB=Very	SS=Slightly Sticky	C=Common	C=Common	C=Common
G=Gradual	Loam	PI =Platy	SH=Slightly	Friable	S =Sticky	M=Many	M=Many	M=Many
2.5"-5"	SCL=Sandy	Pr=Prismatic	Hard	FRB=Friable	VS=Verv	Size:	-	-
D =Difuse	Clay Loam	C=Columnar	H=Hard	F =Firm	Sticky		Size:	Size:
>5"	SC=Sandy	AB=Angular	VH=Very Hard	VF=Very Firm				F=Fine
	Clay	Blocky	ExH=Extremely	ExF=Extremely	NP=INOnPlastic	VF=Very	F =Fine	M=Medium
	CL=Clay	SB=Subangular	Hard	Firm	SP =Slightly	Fine	M=Medium	C=Coarse
	Loam	Blocky			Plastic	F =Fine	C=Coarse	
	L=Loam	M=Massive			P =Plastic	M=Medium	VC=Very	Contrast:
	C=Clay	SG=Single			VP=Very Plastic	C=Coarse	Coarse	Ft=Faint
	SiC=Silty	Grain				VC=Very	ExC=Extremely	D=Distinct
	Clay	C=Cemented				Coarse	Coarse	P=Prominent
	SiCL=Silty							
	Clay Loam							
	SiL=Silt							
	Loam							
	Si=Silt							

U.S.D.A. SOIL CLASSIFICATION TRIANGLE



IDENTIFYING SOIL STRUCTURE

The distinctness of the peds may be Weak, Moderate, or Strong.

Weak Structure:

- Individual peds are barely observable in the test pit sidewall.
- When removed, the soil breaks easily into barely observable peds.

Moderate Structure:

- Individual peds are moderately well formed and can be seen in the sidewall.
- When removed, many well-formed peds are observable.

Strong Structure:

- Individual peds are well formed and very easily seen in the sidewall.
- When removed, the soil remains in very evident peds.







Granular: In granular structure,	BIOCKY: In blocky structure,	Prismatic: In prismatic structure,
the structural units are	the structural units are block-	the individual units are bounded by
approximately spherical or	like or polyhedral. They are	flat to rounded vertical faces. Units
polyhedral and are bounded by	bounded by flat or slightly	are distinctly longer vertically, and
curved or very irregular faces that	rounded surfaces that are casts	the faces are typically casts or
are not casts of adjoining peds. In	of the faces of surrounding	molds of adjoining units. Vertices
other words, they look like cookie	peds. Typically, blocky	are angular or sub rounded; the
crumbs. Granular structure is	structural units are nearly	tops of the prisms are somewhat
common in the surface soils of	equidimensional. The structure	indistinct and normally flat.
rich grasslands and highly	is described as angular blocky	Prismatic structures are
amended garden soils with high	if the faces intersect at	characteristic of the B horizons or
organic matter content.	relatively sharp angles; as sub-	subsurface soils. The vertical
	angular blocky if the faces are	cracks result from freezing and
	a mixture of rounded and plane	thawing and wetting and drying as
	faces and the corners are	well as the downward movement of
	mostly rounded. Blocky	water and roots.
	structures are common in	
	subsoil but also occur in	
	surface soils that have high clay	
	content. The strongest blocky	
	structure is formed as a result	
	of swelling and shrinking of the	
	clay minerals, which produce	
	cracks.	

IDENTIFYING SOIL STRUCTURE (CONT.)





Columnar: In columnar structure, the units are similar to prisms and are bounded by flat or slightly rounded vertical faces. The tops of columns, in contrast to those of prisms, are very distinct and normally rounded. Columnar structure is common in the subsoil of sodiumaffected soils. Columnar structure is very dense and it is very difficult for plant roots to penetrate these layers.

Platy: In platy structure, the units are flat and plate like. They are generally oriented horizontally. A special form, lenticular platy structure, is recognized for plates that are thickest in the middle and thin toward the edges. Platy structure is usually found in subsurface soils that have been subject to leaching or compaction by animals or machinery. The plates can be separated with a little effort by prying the horizontal layers with a penknife. Platy structure tends to impede the downward movement of water and plant roots through the soil.



<u>Structureless</u>: Some soils lack structure and are referred to as structureless. In structureless layers or horizons, no peds are observable in the sidewall or after the soil has been removed. When structureless soils are ruptured, soil fragments, single grains, or both results. <u>Structureless soil material may be</u> <u>either <u>SINGLE GRAIN or MASSIVE</u></u>. Soil material of single grains lacks structure. In addition, it is loose.

ROOTS, PORES AND MOTTLES

SIZE CLASSES OF ROOTS	DIAMETER IN MM
Fine	<2
Medium	2 to < 5
Coarse	5 to <20
Very Coarse	20 to < 76
Extremely Coarse	<u>></u> 76

QUANTITY CLASSES OF	QUANTITY PER	
ROOTS	UNIT AREA*	
Few	1	
Common	2-5	
Many	> 5	

SIZE CLASSES OF PORES	DIAMETER IN MM	
Very Fine	< 1	
Fine	1 to < 2	
Medium	2 to < 5	
Coarse	5 to < 10	
Very Coarse	<u>></u> 10	

QUANTITY CLASSES OF PORES	QUANTITY PER UNIT AREA**
Few	<1
Common	1 to 5
Many	> 5



MOTTLES						
QUANTITY SIZE				CONTRAST		
Few	<2%	Fine	<5mm	Faint	Hard to see	
Common	2 to 20%	Medium	5 to 15mm	m Distinct Readily seen		
Many	> 20%	Coarse	> 15mm	Prominent	Obvious, strong contrasting color	

*	**
For Fine, Use 1 square cm.	For Very Fine and Fine, Use 1 square cm.
For Medium and Coarse, Use 10 square cm.	For Medium and Coarse, Use 10 square cm.
For Very Coarse and Extremely Coarse, Use 1 square meter.	For Very Coarse, Use 1 square meter.

HYDROMETER TESTING

Hydrometer testing is a widely used method for particle size analysis of soils. The weight percentages of sand, silt, and clay are calculated from the density of an aqueous soil suspension measured by a hydrometer. There are many versions of the procedure, differing in the type of dispersing solution, the volume of the suspension, the time of settling before taking hydrometer readings, or in the method of correcting the raw readings.

BULK DENSITY

Bulk density is a measure of the weight of the soil per unit volume (g/cc), usually given on an ovendry (110° C) basis. Variation in bulk density is attributable to the relative proportion and specific gravity of solid organic and inorganic particles and to the porosity of the soil. Most mineral soils have bulk densities between 1.0 and 2.0. A very compacted soil perhaps due to tractor compaction would have a bulk density of 1.4 to 1.6 g cm⁻³. An open friable soil with good organic matter content will have a bulk density of < 1.0 g cm⁻³.

CONVENTIONAL SEWAGE TREATMENT SYSTEM SOIL APPLICATION RATES				
TEXTURE	STRU	CTURE	Application Rate (Gal/ft ² /day)	
	Shape	Grade	STE	
Coarse Sand, Sand, Loamy Coarse Sand	Single grain	Structureless		
	Massive	Structureless		
Sandy Loam, Loamy Sand	Platy	Weak, mod, strong		
	Prismatic,	Weak	0.33	
	blocky, granular	Moderate, strong	0.5	
Loam, Silt Loam, Sandy Clay Loam, Fine	Massive	Structureless		
Sandy Loam	Platy	Weak, mod, strong		
	Prismatic,	Weak	0.25	
	blocky,	Moderate,		
	granular	strong	0.33	
	Massive	Structureless		
	Platy	Weak, mod,		
Clay loam		strong		
	Prismatic,	Weak, moderate	0.25	
	blocky, granular			
		Strong	0.33	
	Massive	Structureless		
	Platy	Weak, moderate,		
Sandy Clay, Silty Clay Loam		strong		
	Prismatic, blocky,	Weak, moderate		
	granular	Strong	0.25	
	Massive	Structureless		
Clay, Silty Clay	Platy	Weak, mod, strong		
	Prismatic, blocky,	Weak		
	granular	Moderate, strong		

= Conventional system prohibited

CONVENTIONAL SEWAGE TREATMENT SYSTEM SOIL APPLICATION RATES BASED ON PERCOLATION RATES				
Percolation Rate (mpi)	Application Rate (STE)			
<5 MPI	Prohibited			
5 to 10 MPI	0.5			
10-20 MPI	0.33			
20-60 MPI	0.25			
> 60 MPI	Prohibited			

ALTERNATIVE SEWAGE TREATMENT SYSTEM SOIL APPLICATION RATES					
TEXTURE	STRUC	Application Rate (Gal/ft ² /day)			
	Shape	Grade	STE ¹	PTE ^{,1,2}	
Coarse sand, sand, loamy coarse sand	Single grain	Structureless	1.0	1.2	
Fine Sand Joamy fine sand	Single grain	Structureless	0.6	1.0	
Sandy Loam, Loamy Sand	Massive	Structureless	0.35	0.5	
	Platy	Weak	0.35	0.5	
	Prismatic,	Weak	0.5	0.75	
	blocky, granular	Moderate, strong	0.8	1.0	
	Massive Platy	Structureless Weak mod			
Loam, Silt Loam, Sandy Clay	i icity	strong			
Loam, Fine Sandy Loam	Prismatic,	Weak, Moderate	0.5	0.75	
	blocky, granular	Strong	0.8	1.0	
	Massive	Structureless			
Sandy clay, Silty clay loam, Clay	Platy	Weak, moderate, strong			
Loam	Prismatic, blocky, granular	Weak, Moderate	0.35	0.5	
		Strong	0.6	0.75	
	Massive	Structureless			
Clay, Silty clay	Platy	Weak, mod, strong			
	Prismatic, blocky, granular	Weak			
		Moderate, strong	0.2	0.25	

 See Table 1 in the Design, Construction, and Installation of Alternative Sewage Treatment Systems.
 A higher application rate for pretreated effluent may only be used when pretreatment is not used for one foot of vertical separation credit.

MINIMUM SURFACE AREA GUIDELINES TO DISPOSE OF 100 GPD OF SECONDARY TREATED							
EFFLUENT FOR SUBSURFACE DRIP DISPERSAL SYSTEMS							
Soil Absorption Rates Design Total							
Soil	Soil Type	Est. Soil	Hydraulic	Application Rate	Area Required		
Class		Perc. Rate	Conductivity	(Gal/ft²/day)	Sq. ft. /100		
		minutes/in.	inches/hr.		gallons per day		
	Coarse sand	1-5	>2	1.400	71.5		
	Fine sand	5 - 10	1.5 - 2	1.200	83.3		
	Sandy loam	10 - 20	1.0 - 1.5	1.000	100.0		
	loam	20 - 30	0.75 - 1.0	0.700	143.0		
	Clay loam	30 – 45	0.5 - 0.75	0.600	167.0		
	Silt - clay loam	45 - 60	0.3 - 0.5	0.400	250.0		
IV	Clay non-swell	60 - 90	0.2 - 0.3	0.200	500.0		
IV	Clay - swell	90 - 120	0.1 - 0.2	0.100	1000.0		

For design purpose, the "Soil Type" category to be used in the above table shall be based on the most restrictive soil type encountered within two feet below the bottom of the drip line. Dispersal field area calculation: Total square feet area of dispersal field = Design flow divided by loading rate. 1.

2.