Section 7 Site Evaluation Methods and Investigation Requirements

7.1 Site Evaluations

A. Site evaluations are required for new or replacement OWTS.

B. Site evaluations shall be conducted by Qualified Consultants experienced in OWTS. Qualified Consultants shall coordinate site evaluations with the Permit Authority.

C. Site evaluations shall be conducted in accordance with regulations and Permit Authority policies.

7.2 General Site Criteria

A. General site criteria include, but are not limited to, the following:

1. Land area available for primary dispersal area
2. Land area available for replacement area
3. Ground Slope
4. Soil Depth
5. Depth to Groundwater
6. Soil Percolation Rates (Tables 7.2a, 7.2b and 7.9)
7. Setback Distances (Table 7.2c)
8. Location of cut banks, fills, or evidence of past grading activities, natural bluffs, sharp changes in slope, soil landscape formations, rock outcrops, trees and unstable land forms within 50 feet of the dispersal and replacement areas
9. Location of wells, intercept drains, streams, springs and other bodies of water on the property in question and within 100 feet on adjacent properties
10. Other information may be necessary to evaluate the suitability of the proposed

OWTS

B. Altered Terrain

1. OWTS shall not be placed in areas that have been filled, excavated, ripped, plowed altered, modified, or in areas of flooding, drainage problems, or geologic instability.

2. Such areas that have been excavated, ripped, plowed, altered, and/or modified may be acceptable if the soil is stable and soil evaluation indicates characteristics acceptable for installation of an OWTS such as approved structure, texture, consistency, pore space, percolation rate.

C. Potential Land Instability

1. If the Permit Authority determines the OWTS may cause a land instability concern, a soils report, prepared at the applicant's expense, by a California licensed engineering geologist, geotechnical engineer or registered geologist shall be required.

D. Setback Requirements

1. All new and replacement OWTS shall conform to the setback distances detailed in Table 7-2a below.

7.3 Soil Profile/Groundwater/Percolation Test Notification

A. An appointment shall be made with the Permit Authority to schedule the preliminary soil profile evaluation, percolation test and/or groundwater determination. The property owner or Qualified Consultant shall make the appointment with the Permit Authority. A Sonoma County Request for Service Form shall be filled out and the filing fee shall be submitted at this time. A copy of the Assessor's Parcel Map, one plot plan and a vicinity map shall be submitted with the Request for Service form and the parcel shall be clearly marked in the field.

B. The Permit Authority shall be notified a minimum of 24 hours in advance to schedule (on a normal working day before 12:00 noon) of profile hole preparation, any percolation testing, backhoe excavations, ground water determination testing and/or other exploratory work that is being attempted.

C. The Qualified Consultant is responsible to request the soil percolation test.

Table 7.2a Sewage Application/Soil Loading Rates (gal/sq ft/day)

1-3 MPI = 1.200 gal/sq ft/day	47 MPI = 0.437 gal/sq ft/day
4 MPI = 1.143 gal/sq ft/day	48 MPI = 0.430 gal/sq ft/day
5 MPI = 1.086 gal/sq ft/day	49 MPI = 0.423 gal/sq ft/day
6 MPI = 1.029 gal/sq ft/day	50 MPI = 0.417 gal/sq ft/day
7 MPI = 0.971 gal/sq ft/day	51 MPI = 0.410 gal/sq ft/day
8 MPI = 0.914 gal/sq ft/day	52 MPI = 0.403 gal/sq ft/day
9 MPI = 0.857 gal/sq ft/day	53 MPI = 0.397 gal/sq ft/day
10 MPI = 0.800 gal/sq ft/day	54 MPI = 0.390 gal/sq ft/day
11 MPI = 0.786 gal/sq ft/day	55 MPI = 0.383 gal/sq ft/day
12 MPI = 0.771 gal/sq ft/day	56 MPI = 0.377 gal/sq ft/day
13 MPI = 0.757 gal/sq ft/day	57 MPI = 0.370 gal/sq ft/day
14 MPI = 0.743 gal/sq ft/day	58 MPI = 0.363 gal/sq ft/day
15 MPI = 0.729 gal/sq ft/day	59 MPI = 0.357 gal/sq ft/day
16 MPI = 0.714 gal/sq ft/day	60 MPI = 0.350 gal/sq ft/day
17 MPI = 0.700 gal/sq ft/day	61 MPI = 0.345 gal/sq ft/day
18 MPI = 0.686 gal/sq ft/day	62 MPI = 0.340 gal/sq ft/day
19 MPI = 0.671 gal/sq ft/day	63 MPI = 0.335 gal/sq ft/day
20 MPI = 0.657 gal/sq ft/day	64 MPI = 0.330 gal/sq ft/day
21 MPI = 0.643 gal/sq ft/day	65 MPI = 0.325 gal/sq ft/day
22 MPI = 0.629 gal/sq ft/day	66 MPI = 0.320 gal/sq ft/day
23 MPI = 0.614 gal/sq ft/day	67 MPI = 0.315 gal/sq ft/day
24 MPI = 0.600 gal/sq ft/day	68 MPI = 0.310 gal/sq ft/day
25 MPI = 0.593 gal/sq ft/day	69 MPI = 0.305 gal/sq ft/day
26 MPI = 0.587 gal/sq ft/day	70 MPI = 0.300 gal/sq ft/day
27 MPI = 0.580 gal/sq ft/day	71 MPI = 0.295 gal/sq ft/day
28 MPI = 0.573 gal/sq ft/day	72 MPI = 0.290 gal/sq ft/day
29 MPI = 0.567 gal/sq ft/day	73 MPI = 0.285 gal/sq ft/day
30 MPI = 0.560 gal/sq ft/day	74 MPI = 0.280 gal/sq ft/day
31 MPI = 0.553 gal/sq ft/day	75 MPI = 0.275 gal/sq ft/day
32 MPI = 0.545 gal/sq ft/day	76 MPI = 0.270 gal/sq ft/day
33 MPI = 0.538 gal/sq ft/day	77 MPI = 0.265 gal/sq ft/day
34 MPI = 0.531 gal/sq ft/day	78 MPI = 0.260 gal/sq ft/day
35 MPI = 0.523 gal/sq ft/day	79 MPI = 0.255 gal/sq ft/day
36 MPI = 0.516 gal/sq ft/day	80 MPI = 0.250 gal/sq ft/day
37 MPI = 0.509 gal/sq ft/day	81 MPI = 0.245 gal/sq ft/day
38 MPI = 0.501 gal/sq ft/day	82 MPI = 0.240 gal/sq ft/day
39 MPI = 0.494 gal/sq ft/day	83 MPI = 0.235 gal/sq ft/day
40 MPI = 0.487 gal/sq ft/day	84 MPI = 0.230 gal/sq ft/day
41 MPI = 0.479 gal/sq ft/day	85 MPI = 0.225 gal/sq ft/day
42 MPI = 0.472 gal/sq ft/day	86 MPI = 0.220 gal/sq ft/day
43 MPI = 0.465 gal/sq ft/day	87 MPI = 0.215 gal/sq ft/day
44 MPI = 0.457 gal/sq ft/day	88 MPI = 0.210 gal/sq ft/day
45 MPI = 0.450 gal/sq ft/day	89 MPI = 0.205 gal/sq ft/day
46 MPI = 0.443 gal/sq ft/day	90-120 MPI = 0.200 gal/sq ft/day

Table 7.2b Illustrative Table for Sizing Absorption Area

Texture	Structure		Hydraulic loading (Gal/ft^2/day)	
	Shape	Grade	STE[1]	PTE1.2
Coarse sand, sand, loamy coarse sand	Single grain	Structureless	1.2	1.6
Fine sand, loamy fine sand	Single grain	Structureless	0.6	1.0
Sandy loam, loamy sand	Massive Platy	Structureless Weak	0.35 0.35	0.5 0.5
	Prismatic, blocky, granular	Weak	0.5	0.75
		Moderate, strong	0.8	1.0
Loam, silt loam, sandy clay loam, fine sandy loam	Massive Platy	Structureless Weak		
	Prismatic, blocky, granular	Weak, moderate	0.5	0.75
		Strong	0.8	1.0
Sandy clay, silty clay loam, clay loam	Massive Platy	Structureless Weak, moderate, strong		
	Prismatic, blocky, granular	Weak, moderate	0.35	0.5
		Strong	0.6	0.75
Clay, silty clay	Massive Platy	Structureless Weak, moderate, strong		
	Prismatic, blocky, granular	Weak		
		Moderate, strong	0.2	0.25

1: STE=septic tank effluent; PTE=pre-treated effluent

2: Higher hydraulic loading rates for pretreated effluent may only be used when pretreatment is not used for one foot of vertical separation credit.

Table 7.2c Setback Requirements

Minimum horizontal distance required from:	Septic Tank (All Systems) (feet)	Dispersal Area (Standard)	Dispersal Area (Non Standard)
Building or structures (including driveways, parking areas and paved areas) Upgradient Laterally Downgradient	5 5 5	8 8 8	10 10 25
Property line and/or easements Upgradient Laterally Downgradient	5 5 5	5 5 5	10 10 25
Water supply wells and springs	50 (Note 1)	100	100
Public water Supply Wells: Dispersal depth <= 10 ft Dispersal depth > 10 ft	50 (Note 1) 50 (Note 1)	150 200	150 200
Public Water Supply Surface Intake: Less than 1200 ft to OWTS Less than 2500 ft to OWTS	50 (Note 1) 50 (Note 1)	400 200	400 200
Perennially flowing streams (as measured from the edge of the waterbody's natural or levied bank)	50	100	100
Ephemeral streams (as measured from the edge of the watercourse) and ephemeral water bodies	25	50	50
Drainage ways > 18" in depth	25	50	50
Drainage ways <= 18" in depth	15	15	25
Intercept Drains – Perforated Upgradient Laterally Downgradient	15 25 25	15 50 50	15 50 50
Non-Perforated / Solid Drain Pipes Upgradient Laterally Downgradient	5 10 10	10 15 15	10 15 15
Ocean, lakes, ponds or reservoir (as measured from the high waterline)	50	100	100
Large trees	10	Considered on a case by case basis	Considered on a case by case basis
Dispersal field	5	----	----
Domestic water pipe*	5	5	5

Minimum horizontal distance required from:	Septic Tank (All Systems) (feet)	Dispersal Area (Standard) (feet)	Dispersal Area (Non Standard) (feet)
Pressure Public Water Main*	5	10	10
Distribution box	5	4	----
Fill areas	------	15	15
Cut banks (manmade excavation of the natural terrain >3 feet), natural bluffs, sharp changes in slope.			
Soil or groundwater depth below dispersal area is ≥ 5 ft	25	25	25
Soil or groundwater depth below dispersal area is < 5 ft	25	50	50
Title 22 recycled water dispersal area	5	Per RWQCB requirements	Per RWQCB requirements
Swimming pools (down gradient)	5	8	25
Note 1: Septic tank and sump shall be watertight.			
Note *: Bottom of water pipe shall be ≥ 12" above top of sewer/drain line. Water pipe placed on a solid shelf excavated at one side of the common trench with a minimum horizontal distance of ≥ 12" (2007 CA Plumbing Code Table K-1)			

D. The Qualified Consultant may choose to perform the soil percolation test at the same time as the soil profile evaluation. Combining of these two steps must be authorized by the Permit Authority in advance of the work.

E. All percolation tests, groundwater determination tests, and information obtained related to the percolation test procedures shall be submitted to the Well and Septic Section within 90 days of the completion of all on-site testing. This includes any test information data or results that may not prove acceptable for sewage dispersal design (extensions may be requested on a case by case basis).

7.4 Soil Profile Evaluations

A. Soil profile holes for the Preliminary Site Survey Soil Profile Evaluation typically are constructed prior to any soils percolation testing and/or groundwater determination tests.

1. Wet weather percolation testing and/or groundwater determination tests prior to soil profile evaluations are allowed; however, the tests are considered incomplete, pending approval of the soil profile investigation.

B. Profile holes must be adequately covered to prevent entrance if left unattended and backfilled immediately after completion of test procedures. Note: Work is permissible on sites to locate potentially acceptable areas prior to the preliminary evaluation.

C. Soil profiles holes are for the purpose of observing soil structures, texture, formations; the presence of seasonal groundwater; impervious rock formations, etc. Profiles are essential in the evaluation of any parcel for soil suitability for private sewage dispersal systems.

D. A minimum of two (2) soil profile holes will be excavated with a backhoe. One profile hole shall be excavated in the primary effluent dispersal area and one in the reserve replacement area shall be required to demonstrate the suitability of soil conditions. More soil profile holes may be required to demonstrate suitable soil conditions for both the primary dispersal area and the reserve replacement area if the initial two profiles show dissimilar conditions.

E. The profile holes shall be dug to a depth of at least three feet below the proposed absorption surface (trench bottom or two feet below the basal area of a mound).

   1. Soil depth is measured vertically to the point where bedrock, hardpan, impermeable soils, rock content greater than 50%, or saturated soils are encountered.

   2. For soils having less than 15% silt and clay, a minimum depth to groundwater below the leaching trench shall be five (5) feet.

   3. For soils having greater than 15% silt and clay, the minimum soil depth and depth to groundwater below the leaching trench shall be three feet.

      a. Lesser soil depths may be granted only as a variance or for Non-Standard Alternative OWTS.

F. Augured profile holes are an acceptable alternative only (1) where use of a backhoe is impractical because of access, (2) when necessary to verify conditions expected on the basis of prior soils investigations, or (3) when done with geologic investigations (the extracted soils shall be arranged for evaluation so that corresponding depths can be determined). Where this method is employed, three profile holes in the primary area and three in the expansion area are required, the same as percolation test hole requirements).

G. The classification of soils into zones as shown in the USDA Soils Classification Triangle will be the primary reference on acceptability of soils for OWTS. (see Figure 7.4)

H. The following factors are to be observed and reported from ground surface to a depth corresponding to the groundwater determination and soil percolation test requirements:

   1. Thickness and coloring of soil layers, structure and texture using the United States Department of Agriculture (USDA) classification.

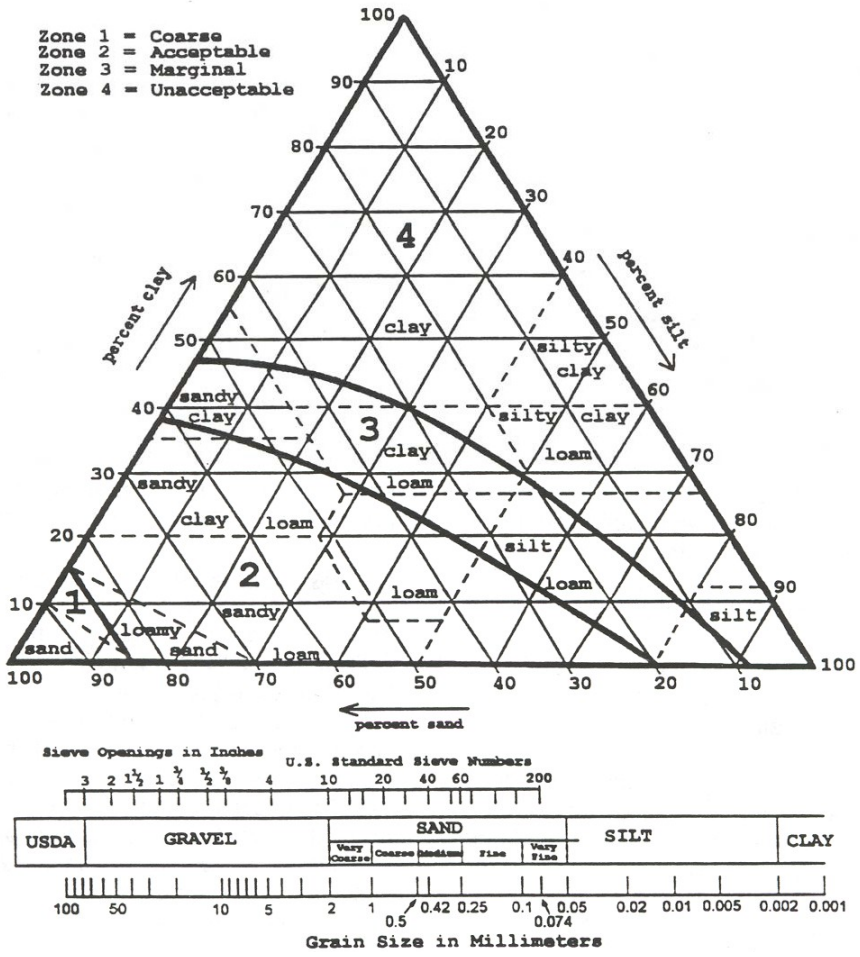
   2. Depth to and type of bedrock, hardpan, or impermeable soil layer.

   3. Depth to observed ground water, saturated soil layers and areas of water infiltration.

   4. Depth to soil mottling.

   5. Other prominent soil features such as structure, stoniness, roots and pores, dampness, soil boundaries, etc.

Figure 7.4 Soil Percolation Suitability Chart for OWTS



Instructions:

1. Plot texture on triangle based on percent sand, silt, and clay as determined by hydrometer analysis.
2. Adjust for coarse fragments by moving the plotted point in the 100 percent sand direction an additional 2% for each 10% (by volume) of fragments greater than 2mm in diameter.
3. Adjust for compactness of soil by moving the plotted point in the 100 percent clay direction an additional 15% for soils having a bulk-density greater than 1.7 gm/cc.

Note: For soils falling in sand, loamy sand, or sandy loam classification bulk density analysis will generally not affect suitability, and analysis is not necessary.

7.5 Groundwater Table Determination

A. General Provisions:

Groundwater table determinations are required for lands having slopes of 0 to 5% in a basin area. Groundwater determinations on lands greater than 5% slope may be required if high seasonal groundwater is suspected.

B. Groundwater Table Determination Methods

Groundwater table determination can be made by one of following methods:

1. Direct observations via backhoe pits or auger holes;

2. Direct observation via existing water wells or monitoring wells;

3. Indirect observation via soil mottling; or

4. Compilation of approved readings or observations from any of the first three methods from adjacent or neighboring parcels and/or projects.

5. Other alternate methods as approved by the Permit Authority.

C. Direct Groundwater Table Determination Calendar

1. Direct groundwater table determinations shall be conducted between January 1 and March 1, after having received 50% of the average seasonal rainfall for each defined geographic area, as listed in Table 7.5 and depicted in Map 7.5, and within 10 days of receipt of 0.8 inch or more of rainfall within a 48-hour period as reported by the officially recognized reporting stations as published in the Press Democrat.

2. Time extensions for direct groundwater table determinations may be authorized by the Permit Authority based on extended periods of rainfall before January 1 and/or after March 1.

D. Direct Groundwater Table Observation Construction Methods

1. Backhoe excavated profile holes shall remain open a minimum of 24 hours, adequately supervised or barricaded until observed by the Permit Authority.

2. An alternative to leaving the holes open for 24 hours, is to insert a perforated pipe in the hole and place native backfill around the pipe (the backfill may not be compacted).

3. Another acceptable alternative is to hand dig or bore a hole to at least 36 inches below the proposed percolation test depth, insert a perforated pipe, and fill the annular space with gravel covered with two feet of native soil. This hole may then be used to monitor groundwater levels 24 or more hours later. Note: Additional holes at lesser depths to augment the data or prove multiple water table depths are encouraged, as is recordation of water levels throughout the wet-weather period.

4. Groundwater holes shall be protected to prevent sheet flow runoff, rainfall or other sources of non-groundwater from entering the observation hole.

5. The minimum depth to the anticipated highest level of groundwater that occurs over an extended period of time below the bottom of the leaching trench shall be determined according to soil texture and percolation rate. Where groundwater is determined to be non-usable, e.g. cannot reasonably be expected to be used for withdrawal and beneficial use due to quantity and/or quality, a minimum depth to groundwater of three feet below the leaching trench bottom may be permitted without need for a variance, if soils contain greater than 15% silt and clay as demonstrated by hydrometer analysis, or soils having a percolation rate slower than 5 mpi. This depth may be waived to no less than two feet if variance is justified or for an approved Non-Standard System.

E. Direct Groundwater Table Determination

1. The observation hole shall remain in place and undisturbed for a minimum of 24 hours to allow infiltration of groundwater.

2. Qualified Consultant shall measure and record the depth to groundwater from the undisturbed or pre-existing ground surface.

3. The observation hole(s) shall be labeled and labelling shall be consistent with associated map(s) and/or submittals to the Permit Authority.

F. Indirect Groundwater Table Determination Method

1. Soil mottling observations may be utilized as an alternative to direct wet-weather groundwater table determinations in the following circumstances.

    a. Replacement dispersal systems.
    b. Soil characteristics, primarily the presence of iron and/or manganese, that lend themselves to redoximorphic processes.
    c. Soil sampling shall be required if soil mottling is not observable to both the Qualified Consultant and Permit Authority staff.
    d. Existing, legally established parcels.

2. Soil mottling observations shall not be utilized for properties with failed or canceled groundwater determinations on file.

3. A soil profile evaluation of sufficient means to determine the observable depth of soil mottling is required for this procedure.

4. Soil mottling shall be observed by the Qualified Consultant and Permit Authority. The field procedure will be similar to a Pre-Perc where the Qualified Consultant shall schedule a time to meet onsite with the Permit Authority and shall coordinate the excavation and backfilling of soil profile pits.

G. Compilation Method

The compilation method may be used provided the following criteria are met:

1. Soil profile readings or observations are within 500 feet of the proposed OWTS; and,

2. Area conditions lend themselves towards using off-site data or data not directly associated with the proposed OWTS. Area conditions include, but are not limited to, topography, slope, geology, geography, cut banks, natural bluffs, rock outcrops, landslides, springs, streams, roads; and,

3. Soil profile readings or observations were made by both a Qualified Consultant and the Permit Authority within the past three years; and,

4. Soil profile readings or observations have been submitted and approved by the Permit Authority.

H. Conflicts Between Methods

Where a conflict in the above methods exists, the Permit Authority shall decide the appropriate method. Considerations shall include soil characteristics, rainfall and/or drought conditions, historical records and written reports.

I. Table 7.5, below, presents fifty percent (50%) of the average annual rainfall by Wet Weather Zone.

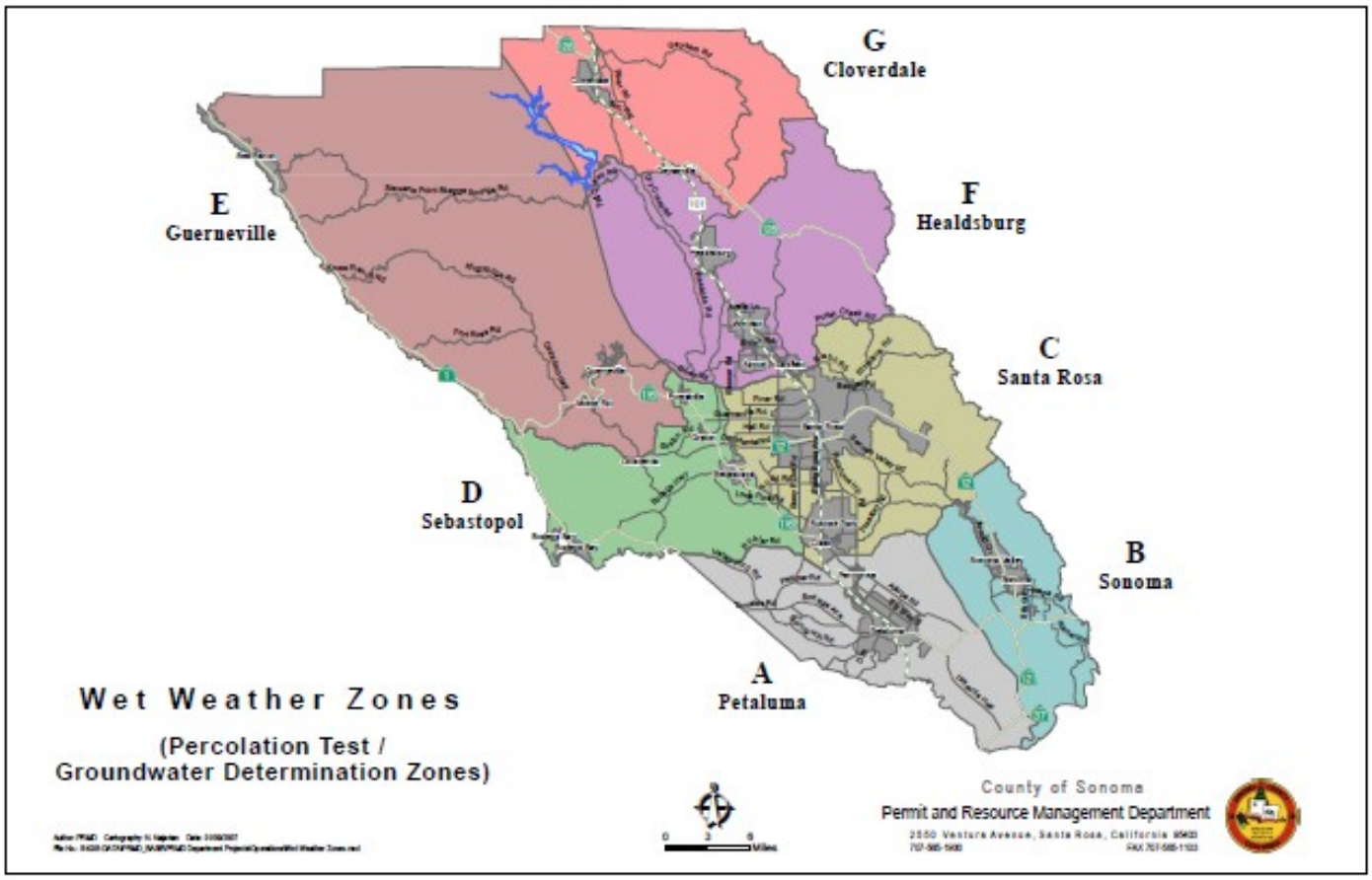
Table 7.5

50% of Average Annual Rainfall by Zone

Wet Weather Zone	50% of Annual Rainfall
Petaluma (Area A)	12.5 inches
Sonoma (Area B)	15 inches
Santa Rosa (Area C)	15 inches
Sebastopol (Area D)	17.5 inches
Guerneville (Area E)	25 inches
Healdsburg (Area F)	20 inches
Cloverdale (Area G)	20 inches

J. Map 7.5, below, shows the Wet Weather / Groundwater Determination Zones.

Map 7.5 Wet Weather/Groundwater Determination Zones



7.6 Percolation Test Suitability

A. Site suitability for effluent dispersal for an undeveloped parcel shall be determined by a percolation test. Site suitability for effluent dispersal for a developed parcel shall be determined by a percolation test or soil analysis.

B. Private sewage dispersal sites require a minimum of six or more holes spaced uniformly throughout the area chosen for the proposed leaching field and leaching field expansion area.

C. The location of test holes must take into consideration the minimum distances which will govern construction of an OWTS.

D. Additional requirements, determined on an individual basis, may be required for specially designed or non-standard on-site sewage dispersal systems when permitted.

7.7 Percolation Test Hole Construction

A. Percolation test hole construction requirements are as follows

1. Dig or bore holes four, six or eight inches in diameter, to the vertical depth of the proposed trench and at least 12 inches below any proposed effluent pipe (refer to Tables 7.8a and b and Figures 7.8a and b).

2. After holes are dug, remove all loose material possible after carefully scraping the bottom and sides to remove any smeared soil surfaces. Add clean pea-gravel (maximum of 1 inch) to stabilize the hole, insert a perforated pipe (3 or 4 inch diameter) and place pea-gravel around exterior of pipe at least 12 inches, or up to ground surface. At the bottom of any backhoe excavations used, a secondary 6 or 8 inch diameter hole is to be bored to the depth of the proposed trench in *undisturbed* soil, providing that the depth shall not be less than 12". Do not back fill soil around pipe in backhoe holes. Measure and record the length of the pipe on the report form.

Table 7.8a

Percolation Test Hole Depth Requirements (Standard OWTS)

Standard OWTS Slope at Hole	Standard OWTS Depth of Holes
Standard 0-12.5% [1]	30” (Minimum)
Standard 12.5%-30% [1]	36” (Minimum)
Filled Land (0-20%)	24”
Shallow Sloping (12.5-30%)	36”
[1]Deeper percolation testing may be required if there is dissimilar soil types below the bottom of the trench.	

Table 7.8b

Percolation Test Hole Depth Requirements (Non-Standard OWTS)

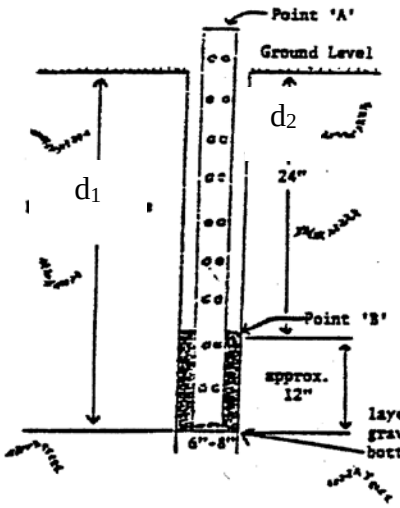
Non-Standard OWTS Slope at Hole	Non-Standard OWTS Depth of Holes
Mound (0-20%)	24” (Minimum)
STPD (0-20%)	24” (Minimum)
STPD (20-25%)	30” (Minimum)
STPD (25-30%)	36” (Minimum)
STPD (up to 30%)	60” (Maximum)
At-Grade	12, 24, and 36”
Drip Dispersal	6-12” and 24” below pipe depth
Shallow In Ground	10-14” and 24” below pipe depth
Gravel-less Pressurized Dispersal Channel (GPDC)	10-14” and 24” below pipe depth

Figure 7.8a Percolation Test Hole Requirements

Example A

EXAMPLE

TYPICAL PERCOLATION TEST HOLE ON 12% SLOPE



Materials needed to conduct a percolation test:

1. 3 or 4 inch diameter perforated pipe
2. Fine gravel (pea)
3. Metal tape measure
4. 6" or 8" soil auger
5. water supply

Measurements:

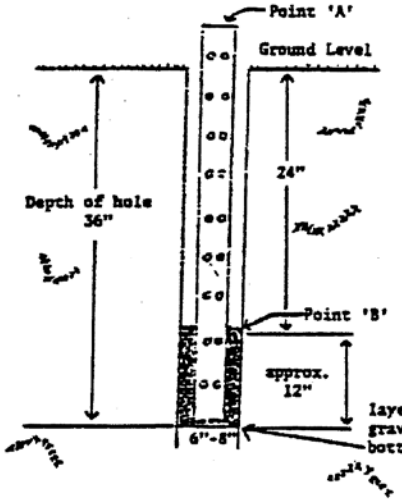
1. Record length of pipe and depth of hole
2. Record presoak remaining to the nearest 1/8 inch
3. Record measurements from Point 'A' to Point 'B' (from top of pipe to top of water)
4. Adjust water level to 12 inches above gravel at bottom of hole

NOTE: The depth of the percolation hole will vary according to slopes on site, and whether the system proposed is a standard, innovative or alternative system.

Example B

EXAMPLE

TYPICAL PERCOLATION TEST HOLE ON 12% SLOPE



Materials needed to conduct a percolation test:

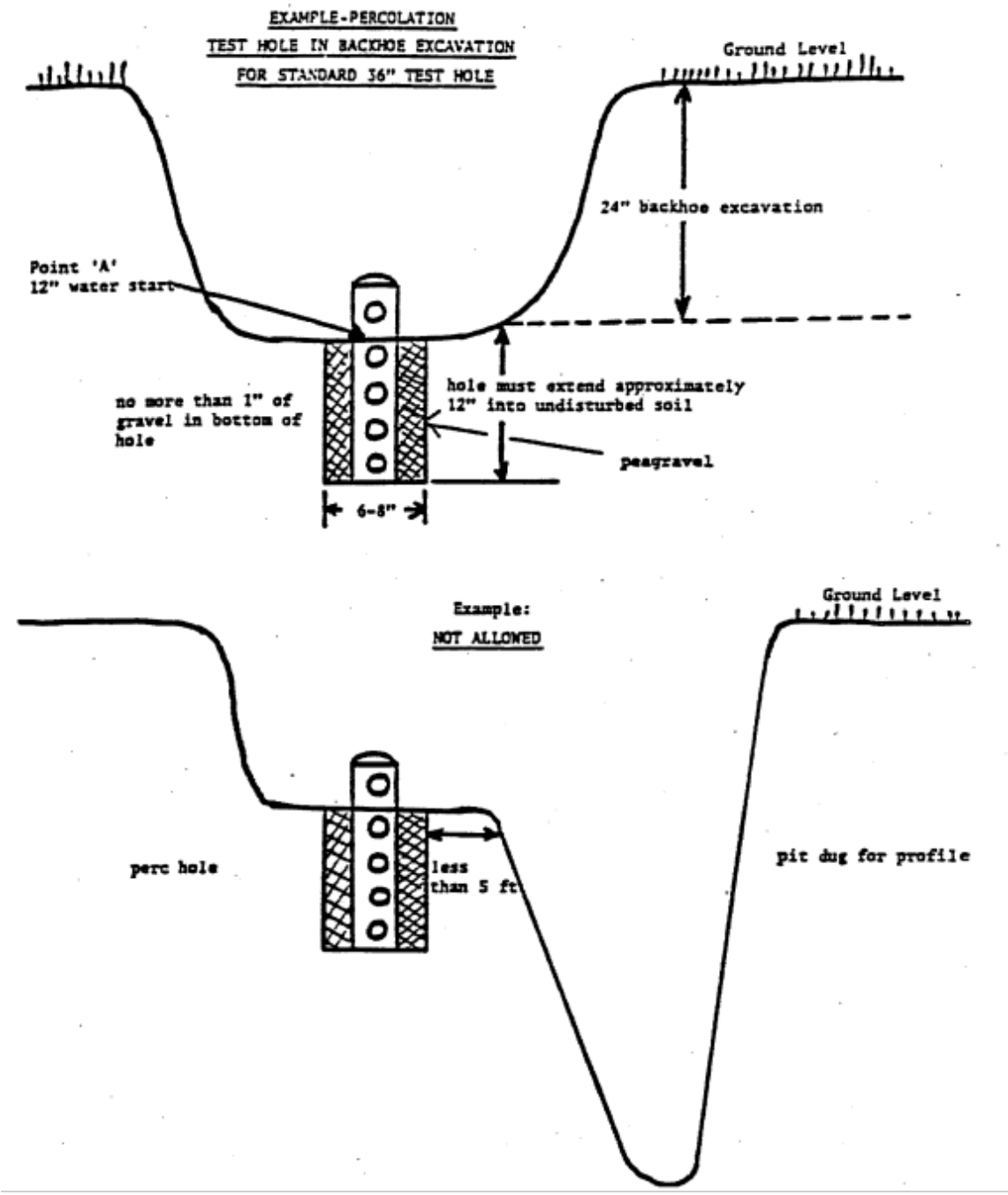
1. 3 or 4 inch diameter perforated pipe
2. Fine gravel (pea)
3. Metal tape measure
4. 6" or 8" soil auger
5. water supply

Measurements:

1. Record length of pipe and depth of hole
2. Record presoak remaining to the nearest 1/8 inch
3. Record measurements from Point 'A' to Point 'B' (from top of pipe to top of water)
4. Adjust water level to 12 inches above gravel at bottom of hole

NOTE: The depth of the percolation hole will vary according to slopes on site, and whether the system proposed is a standard, innovative or alternative system.

Figure 7.8b Percolation Test Hole



7.8 Percolation Test Procedures

A. Presoak on the day prior to conducting the tests, fill the holes completely with clear water to which no substances have been added and refill at least four (4) times. An alternate procedure is a continuous 12-hour presoaking employing a reservoir and continuous head device. Presoaking for wet-weather tests is not necessary if the tests are performed during the 10 day period in which wet-weather groundwater determinations are allowed.

B. Percolation Rate Measurements Percolation-rate measurements shall be made on the day following the presoaking of test holes.

   1. When water remains from presoaking, record the inches of water remaining on the report form and adjust the water level to 12 inches over the gravel base. Measurements are then taken from a fixed point at the top of the pipe to the top of the water and like measurements taken each hour for six hours. Record measurements accurately, vertically, and to the nearest 1/8 inch.

   2. When no water remains from presoaking, gently add clear water to the hole to a depth of 12 inches over the gravel base. Measure the drop in the water level from a fixed point at the top of the pipe to the top of the water each hour for six hours. Additional water may be added to 12 inches above the gravel when the hole is empty, or after any reading that indicates the water is less than 2 inches above the gravel. Record the new water elevation and continue measurements for duration of initial six-hour test. Record measurements to the nearest 1/8 inch.

   3. When hole is dry before the first 60 minutes upon start of test measurements, add clear water to 12 inches over the gravel base and take measurements every ten minutes for two hours. The 12 inches of water is to be replaced at any time the hole is empty or the water depth is less than 2 inches.

7.9 Percolation Rate Interpretation

A. An average stabilized percolation rate of at least one inch per hour is required for the installation of a standard OWTS. Stabilized rates slower than one inch per hour or less than one minute per inch may be considered for inclusion within the Experimental or Alternative Non-Standard OWTS Program (Sections 12 and 13). Refer to Table 7.2a.

B. The drop in the water level that occurs between the fifth and sixth measurements on six-hour tests is considered to be the stabilized percolation rate. The drop in water

level that occurs between the eleventh and twelfth measurements is considered to be the stabilized rate for the two-hour test. The readings during prior periods provide information for modification of the interpretation of the average stabilized percolation rate. Prior readings will be evaluated where refilling of test holes has occurred in the last two hours of the test or when rates show significant inconsistency during the course of the tests.

C. Average percolation rates less than 5 minutes per inch will require that a soil texture analysis (hydrometer method) be performed to determine the necessary clearance from proposed trench bottom to elevated seasonal water table, unless well logs demonstrate the distance to water table to be 40 feet or greater. If soil texture analysis is performed, required clearance to water table shall be as specified in Section 7.5.

D. An average Percolation rate less than one minute per inch (<1mpi) is not suitable for the installation of an OWTS with the exception of a pretreatment and disinfection to a drip system.

Table 7.10
Percolation Rate Conversion Chart

Inches per Hour	Rate Min per Inch	Inches per Hour	Rate Min per Inch
1/8	480	2 3/4	22
1/4	240	3	20
3/8	160	3 1/4	18
1/2	120	3 1/2	17
5/8	96	3 3/4	16
3/4	80	4	15
7/8	69	5	12
1	60	6	10
1 1/8	53	7	9
1 1/4	48	8	8
1 3/8	44	9	7
1 1/2	40	10	6
1 5/8	37	12	5
1 3/4	34	15	4
1 7/8	32	20	3
2	30	39	2
2 1/4	27	60	1
2 1/2	24		

7.10 Wet Weather Percolation Tests

A. If a soil is determined to be within Zones 3 and 4 of the soils suitability chart, “wet weather” percolation testing is automatically required, unless Plasticity Index is less than 20 (ASTM D 4318-84). (See Figure 7.4 soil suitability chart.)

B. Wet-Weather soils percolation tests are percolation tests conducted between January 1 and March 1 after having received 50% of actual seasonal rainfall for each defined geographic area. (See Section 7.5, Table 7.5 and, Map 7.5).

C. Extensions beyond the time limits of the above criteria may be made by the Engineering Program Manager of the Permit Authority based on an evaluation of rainfall and groundwater monitoring and within the parameters of this section. Extensions beyond April 30 are not allowed.

D. Presoaking for wet-weather tests is not necessary if the tests are performed during the 10-day period in which wet-weather groundwater determinations are allowed.

7.11 Percolation Test Submittal of Results

A. Percolation test information shall be submitted within 90 days to the Permit Authority on the County form provided for all tests conducted including preliminary tests, failing holes and exploratory holes which were not tested.

B. All percolation test records submitted for approval of a site must be complete and shall include a written evaluation attesting to the validity of all tests by a Registered Civil Engineer, Registered Geologist, Soil Scientist or Registered Environmental Health Specialist experienced in on-site sewage dispersal systems. Records and evaluations submitted are to include at a minimum:

   1. Data on all excavations, including failing holes and exploration holes within a 100-foot radius of the proposed septic area which were not tested.

   2. Size of land area available for primary dispersal system and required replacement area, including a scaled plot plan showing the location of test holes dimensioned to property lines and delineating the area for the dispersal fields as calculated from the established percolation rate.

   3. Accurate ground slope in the primary and expansion dispersal field, and areas within 50 feet.

4. Location of cut banks, natural bluffs and sharp changes in slope within 50 feet of the primary and expansion field.

5. Location of wells, springs, intercept drains, streams and other bodies of water on the property and within 150 feet of primary and expansion areas.

6. Location of existing houses, structures, rock outcrops and large trees in the area of the test.

7. Depth to groundwater when required, per Section 7.5.

8. Special area standards.

9. The person verifying the validity of the tests must describe the soils encountered in the profile holes as outlined in Section 7.4, as well as attest to the fact that required presoak was performed, that the test was set up in accordance with County standards, that he/she personally observed the site and a portion of the tests, and that it is a true and accurate indication of the suitability of the site for on-site sewage dispersal as measured by the standards of the Permitting Authority and the County of Sonoma.

7.12 Cumulative Impact Studies

A. Cumulative Impact Studies maybe required for those projects that propose a potential groundwater mounding and or nitrate loading condition that has potential to effect groundwater and/or surface waters.

B. The study may be required for subdivisions, commercial, multifamily and individual proposed OWTS.

C. The study shall be conducted by a qualified professional.

D. The study shall include both the detailed methodology used and the principles of groundwater hydraulics.

E. Groundwater Mounding Study shall be done to determine the highest extent the water table will rise during wet weather season.

F. Nitrate Loading Study shall include the annual chemical-water mass balance.