

TECHNICAL INFORMATION PACKET



**FOR CONVENTIONAL ON-SITE
SEWAGE DISPOSAL SYSTEM DESIGN**

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INTRODUCTION

This manual is a two section document. The first section contains general information on septic systems, including a glossary of terms, a typical septic system layout, and some important specifications. The second section is a step by step guide to help you design your septic system.

SECTION ONE – GENERAL INFORMATION

GLOSSARY OF TERMS USED ON DESIGN FORMS:

ABSORPTION AREA – The soil surface area of a drain field (trench, bed, subsurface injector area, etc.) that treats and absorbs wastewater. Usually the trench bottom.

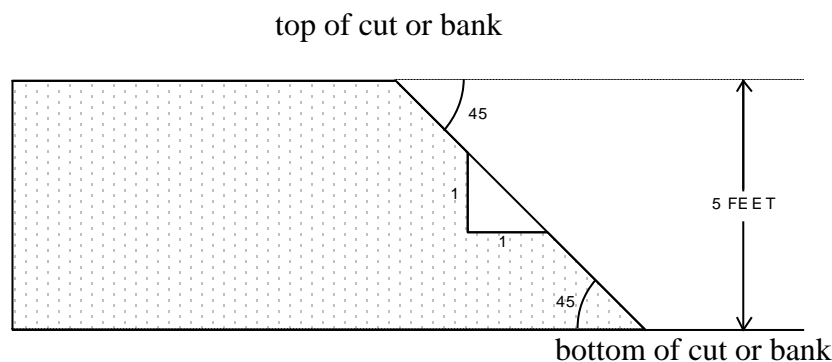
APPLICATION RATE – The rate, in gallons of effluent per day, that is applied to one square foot of soil.

BUILDING SEWER – That part of the horizontal piping of a drainage system extending from the building drain, which collects sewage from all the drainage pipes inside a building, to an on-site sewage system. It begins two feet outside the building wall and conveys sewage from the building drain to the remaining portions of the on-site sewage system.

BUILDING SITE – The real property on which a proposed structure will be built or placed. It may include the entire parcel of land.

CLEAN OUT – A plumbing device that provides access to and is used for inspecting and cleaning building sewers and tight lines.

CUTS and/or BANKS – Any naturally occurring or artificially formed slope greater than 100 percent (forty-five degrees) and extending vertically at least five feet from the toe of the slope to the top of the slope as follows:



D-BOX (DISTRIBUTION BOX) – A concrete or plastic container used to equally divide the wastewater flow from a single inlet to between 3 to 6 (or more) outlets. Usually the outlets distribute the flows to different parts of a drain field system.

DEPTH OF COVER – The amount of soil (usually expressed in inches) placed over the absorption area of a drain field.

DRAINROCK – Clean washed gravel or crushed rock ranging in size from three-quarters inch to two and one-half inches, and containing no more than two percent by weight passing a US No. 8 sieve and no more than one percent by weight passing a US No. 200 sieve.

EFFLUENT – Liquid discharged from a septic tank or other on-site sewage system component.

END CAP – A plug attached to the end of the perforated drainpipe. It forces the sewage to go out holes in the drainpipe.

GRAVEL DEPTH BELOW PIPE – Inches of gravel between the bottom of the pipe and the bottom of the trench.

GRAVELLESS INFILTRATION CHAMBER – A chamber which is usually laid in line in a trench to provide absorption area.

GRAY WATER – Sewage from bathtubs, showers, bathroom sinks, washing machines, dishwashers and kitchen sinks. It includes sewage from any source in a residence or structure that has not come into contact with toilet wastes.

GROUND WATER – A subsurface water occupying the zone of saturated soil, permanently or seasonally, or as the result of tides. Indications of groundwater may include:

- (A) Water seeping into or standing in an open excavation from the soil surrounding the excavation or monitoring ports.
- (B) Spots or blotches of different color or shades of color interspersed with a dominant color in soil, caused by reduction and oxidation of iron. These color patterns are redoximorphic features, commonly referred to as mottling. Redoximorphic features often indicate the intermittent presence of ground water and may indicate poor aeration and impeded drainage.

HARD PAN – Soil that will not absorb significant amounts of effluent. It may be found in one or more layers. This soil can not be counted as absorption area.

PERFORATED DRAINPIPE – Also known as drain tile. Four-inch plastic pipe with holes specifically located to permit even dispersal of sewage throughout a drain field.

PERMEABLE SOILS – Soils that will absorb and treat wastewater. These are the useful soils for wastewater treatment and disposal.

PLUMBING STUB OUT – The pipe (or pipes) that exit the perimeter of a building. It is essential that the plumber know the proper elevation (or height) for the stub-out in order to avoid placement too low to reach the drain field by gravity. If the stub-out is too low, a pump (or replumbing) must be used to lift the sewage up to the proper level.

PIPE AND GRAVEL COVER DEPTH – The distance (inches) between the bottom of the drainpipe to the top of the gravel. Two inches minimum gravel is required over the pipe.

REPLACEMENT AREA – An area of the building site reserved for a future drain field when the original drain field fails to function. An area equal in size to the original drain field, without any size reductions from other parts of the regulation, is required.

SEPTIC TANK – A watertight treatment receptacle receiving the discharge of sewage from a building sewer or sewers, designed and constructed to permit separation of settleable and floating solids from the liquid, detention and anaerobic digestion of the organic matter, prior to discharge of the liquid (into the drain field).

SEWAGE –Any urine, feces, and water carrying human wastes, including kitchen, bath, and laundry wastes from residences, buildings, industrial establishments or other places.

SEWAGE FLOW – The amount of sewage discharged from a structure, measured in gallons per day. Estimates of sewage flow are made based upon the occupancy of the structure (i.e. number bedrooms).

SOIL BARRIER – A material used to prevent soil from filtering into the drain rock in gravel drain fields. It is placed over the gravel before soil cover is installed. Soil barrier materials must allow air and water to pass freely.

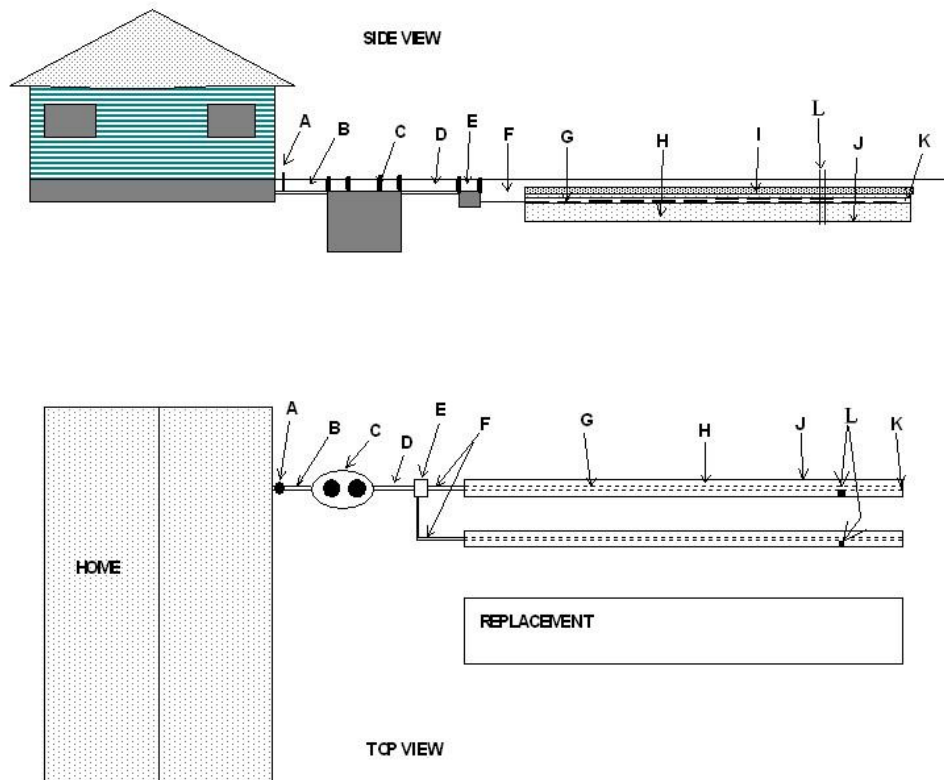
TIGHT LINE – Also known as solid pipe; 4” plastic (PVC) pipe without holes. Used to transport sewage between the septic tank and the drain field.

TOTAL DEPTH – Depth of drain field from top of the original ground surface to bottom of drain field trench.

TRENCH SPACING – The distance between trenches usually measured from trench center to trench center.

VERTICAL SEPARATION – The depth of unsaturated, original, undisturbed soil of soil types 1-6 between the bottom infiltrative surface of a soil dispersal component and the highest seasonal water table, a restrictive layer, or soil type 7.

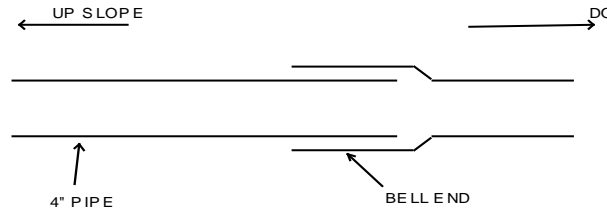
TYPICAL HOUSE AND SEWAGE SYSTEM



- A - Clean out.
- B - Building sewer: Carries all sewage to the septic tank.
- C - Septic tank: Provides initial treatment of household sewage (retains solids).
- D - Tight Line (No perforations): Carries septic tank effluent (liquid only) to the distribution box.
- E - Distribution box: Equally distributes liquid effluent to each line of the drain field.
- F - Tight Line (No perforations): Carries liquid to the beginning of each perforated drain pipe or gravel less infiltration chamber trench, thus providing a dry, solid base for the distribution box.
- G - Perforated DrainPipe: Distributes liquid effluent throughout the drain field for final treatment and disposal. Gravelless infiltration chambers may be used in lieu of gravel and drain pipe.
- H - Gravel: Surrounds perforated pipe to promote aerobic conditions for bacteria which play an important part in the treatment of the septic tank effluent.
- I - Soil Barrier: Separates earth backfill from the gravel thus preventing the filling of the airspace between the gravel; filter fabric only. This is not required for gravelless infiltration chamber systems.
- J - Drain field trench: The excavated soil trench in which gravel and pipe or gravelless infiltration chambers are laid.
- K - End Cap: To prevent uncontrolled flow of effluent out the end of the perforated drain field pipe.
- L - Observation Ports.

IMPORTANT SPECIFICATIONS

Building Sewer: Building sewer must be 4 inches in diameter.
 $\frac{1}{8}$ inch fall per foot run, minimum.
 Plastic pipe stamped with ASTM #D 3033, D 3034, or equivalent.
 All pipes must be installed so that the bell end is up-slope.



No tees or 90° elbows allowed. Use 45° elbows with cleanouts or sweep 90° elbows.

Tight Lines: Must be sloped so effluent will flow.
 4" plastic pipe, NSF approved, stamped with ASTM #D 3033, D 3034, or equivalent.
 All pipes must be installed so that the bell end is up-slope.

Septic Tanks:

Listed below are those sizes of septic tanks that are available in Yakima County. The tank sizes are listed with the maximum use allowed for each tank.

Tank Size	Bedrooms	Occupants in the Home
900	≤ 3	0 - 6
1,000	4	7 - 8
1,250	5	9 - 10
1,500	6	11 - 12

Contact Yakima Health District staff for tank sizes for larger or other uses.

Septic tanks are available in precast concrete and plastic. Metal and fiberglass septic tanks are not allowed. Septic tanks must be watertight without cracks or holes. Septic tanks must be 2 compartment.

Septic tanks should be installed on original, undisturbed soil. They should be level. Risers must be installed to keep access lids at finished grade. The top of a septic tank may be above original or finished grade (except for plastic tanks).

Generally: inlet – 10” below top
 outlet – 3” lower than inlet
 width – 5 feet
 length – 8 – 12 feet
 Check with your dealer for specifications of the tank you plan to use.

D-Boxes: For use on any site where there is more than one trench. The flow from each outlet must be equal.

Inlet 1” higher than outlets
Outlets at same elevation (adjust with “Dial-a-Flows”, “Speed Levelers”, etc.)
3 – 6 outlets on pre manufactured D-boxes
Set level on undisturbed soil

Drain tile: Level Grade: - 0” fall per 100 feet
 Pipe in drain field must be NSF approved perforated drain pipe stamped with ASTM standard # D 3033, D 3034, or equivalent. Cap open ends.
 Drain tile (or perforated pipe) is not required in conventional gravity flow systems using gravelless infiltration chambers.

SECTION TWO – DESIGN GUIDE

WHAT YOU NEED TO DO A DESIGN

Below is a list of items that will be needed to do a design:

Paperwork

- Site and Soil Report
- Code Enforcement Plot Plan
- Drain field Calculations sheet (attachment A)
- Table 1 – Minimum Horizontal Separations (attachment B)
- Trench Cross Sections (attachment D)
- Standard Notes and Specifications For On-Site Disposal Systems (attachment E)

Tools

- Graph Paper
- Pencil
- Ruler (“engineer scaled” is useful)
- Calculator
- Compass

The rest of this design manual is organized in two columns. The first column is a step by step list of how to design a septic system. The second column provides information that may help you with that particular step.

DRAIN FIELD CALCULATIONS (attachment A)

STEP 1 – CALCULATE THE MAXIMUM DAILY SEWAGE FLOW	
Calculate the sewage flow based on the number of occupants	Occupants are the number of people who live in the house
Calculate the sewage flow based on the number of bedrooms	
Estimated flow from EPA design manual (for non-residential sites)	If your development is not a home, you will need to contact the Yakima Health District to determine this design flow
Estimated Peak flow	Choose the largest of the above flows
STEP 2 – CALCULATE THE ABSORPTION AREA NEEDED ON THIS SITE	
Enter the estimated peak flow	Get the estimated peak flow from step 1 above
Enter the application rate	Get the application rate from the site and soil report
Divide the estimated peak flow by the application rate to get the square feet of absorption area needed	

STEP 3 – CALCULATE THE MAXIMUM TRENCH DEPTH	
Enter the depth to hardpan or water in inches	Get this depth from the Site and Soil Report
Enter 36 inches for the vertical separation	Set by regulation. Applies to gravity flow systems only.
Subtract the vertical separation (36) from the depth to get the total allowable depth of the drain field	36 inches is the maximum depth allowed by regulation. Maximum depths are measured from the uphill side of the trench.
STEP 4 – SELECT SYSTEM OPTION	
Based on the above information, select the type of system best suited for your site	<p>The Yakima Health District suggests you use the first of the following that meets your criteria:</p> <p>Standard absorption trench (18” to 36” total depth) Shallow absorption trench (12” minimum total depth) Bed option (beds can only be used in soil types 1, 2, or 3)</p> <p>(Graveless chamber systems may be used in any of the above configurations and in some soils you reduce the total square footage of the system)</p>

TRENCH/BED CALCULATIONS
(attachment D)

FOR STANDARD GRAVEL TRENCHES:	
Locate the trench cross section you are going to use based on step 4 above	
Enter the square feet of absorption area needed	Get this from the drain field calculation sheet (attachment A)
Enter the width of the trench or bed (in feet)	The maximum trench width is 3 feet. The maximum bed width is 10 feet.
Divide the square feet needed by the width to get the total length of the trench/bed needed	
FOR GRAVELESS INFILTRATION CHAMBERS:	
Locate the trench cross section you are going to use based on step 4 above	
Enter the square feet of absorption area needed	Get this from the drain field calculation sheet (attachment A)
Multiply the square feet of absorption area needed by the reduction factor to get the total square footage needed	If your percent reduction (from the site and soil report) is 40%, multiply the length by 0.6. If your percent reduction is 20%, multiply the length by 0.8.
Enter the width of the trench (in feet)	The maximum trench width is 3 feet. Most gravelless chambers are 3 feet wide.
Divide the square footage needed by the width to get the total length of trench needed	

THE DESIGN
(graph paper)

Decide which direction is north and put it on the design	An "N" with an arrow indication north
Decide which scale to use	30 or 40 feet to 1 inch are the most commonly used scales. However, based on the distance of the drain field to the house, adjacent important items (such as ponds, wells, etc.), the scale may need to be adjusted.
Draw the property lines (as shown on the permit services plot plan)	On a larger parcel of ground, it may not be necessary to show all property lines. (If anything is farther than 200' from the septic system, it probably doesn't need to be shown.)
Draw any easements that may be on the property	The easements should be shown on the permit services plot plan. Not all lots have easements on them.
Draw any improvements (existing or proposed) and physical features that may affect your septic system or its location, even if they are not on your lot	Buildings, wells, driveways, waterlines (domestic and irrigation), open water (creeks, ponds, swamps, ditches, canals, etc.), etc. These things only need to be shown if they are within 100' of the septic system.
Draw the septic tank and clean out in the proper location on the design	A "normal" septic tank is about 5' wide and 10' long. The septic tank is normally put next to the house, but this isn't necessary. The septic tank must be 5' minimum from the house (see attachment B, "Minimum Horizontal Separations").
Draw in the setbacks	You should put in the setbacks for the drain field to: the septic tank, property lines & easements: 5'; houses & water lines: 10'; wells and open water: 100'.
Look at the area where the drain field is going to be located and decide how many trenches are needed and determine their length	The trenches can have 100' maximum length; all trenches must be of equal length; the trenches must run level across/perpendicular to the slope (each trench must be level with itself, but different trenches can be at different elevations); 10' centers on the trenches is recommended, but 7' centers are the minimum. Remember that driveways can not run over the drain field or replacement area.
Draw in the trenches	Check Minimum Horizontal Separations (attachment B) for the setbacks. Remember to include a D-box and that the D-box must be 5' minimum from the house and 5' minimum from the trenches.
Draw in the replacement area	The replacement area is a reserved area that is big enough to replace the initial drain field when it fails. It must meet the same setbacks as the drain field and must be 7' minimum (10' recommended) from the drain field.
Draw in the risers over the septic tank and D-box and draw in the inspection ports in the drainfield trenches	The law requires access to finished grade for these items.
Label everything you have drawn	Include the distances to the property lines for houses, outbuildings, wells, etc.
Look the design over carefully	Look for missing items, (anything that may affect the installation of the drain field). Refer to attachment B (Table 1 – Minimum Horizontal Separations).

**WHAT NEEDS TO BE SUBMITTED
TO THE YAKIMA HEALTH DISTRICT FOR REVIEW**

Calculations

Trench cross section

Design

Approved and stamped Code Enforcement (building permit) plot plan

Standard Notes (with stub out depth filled out if needed).

ATTACHMENT A

DRAIN FIELD CALCULATIONS

STEP ONE: CALCULATE THE MAXIMUM DAILY SEWAGE FLOW:

_____ occupants x 60 gallons/person/day = _____

_____ bedrooms x 120 gallons/bedroom/day = _____

For Non-Residential Sites:

Estimated flow from EPA design manual = _____
(contact YHD for this flow)

Choose the largest of the above flows and enter below:

Estimated Peak Flow = _____

STEP TWO: CALCULATE THE ABSORPTION AREA NEEDED ON THIS SITE:

_____ -:- _____ = _____
estimated peak flow application rate square feet of
(from step one above) (from site/soil report) absorption area
needed

STEP THREE: CALCULATE THE MAXIMUM TRENCH DEPTH

_____ - $\frac{36}{\text{vertical separation}}$ = _____
Depth of test hole or vertical separation total depth
depth to water or
depth to hardpan
(whichever is shallower)
from site/soil report)

STEP FOUR: SELECT SYSTEM OPTION:

Standard absorption trench/graveless chamber system (requires 18" minimum to 36" maximum depth).

Shallow absorption trench/graveless chamber system (requires 12" total depth).

Eight-inch absorption trench (requires 8" total depth).

Bed Option - same total depth as above. Needs a trench cross section and an absorption bed plan view form. (May only be used in soil types 2 and 3).

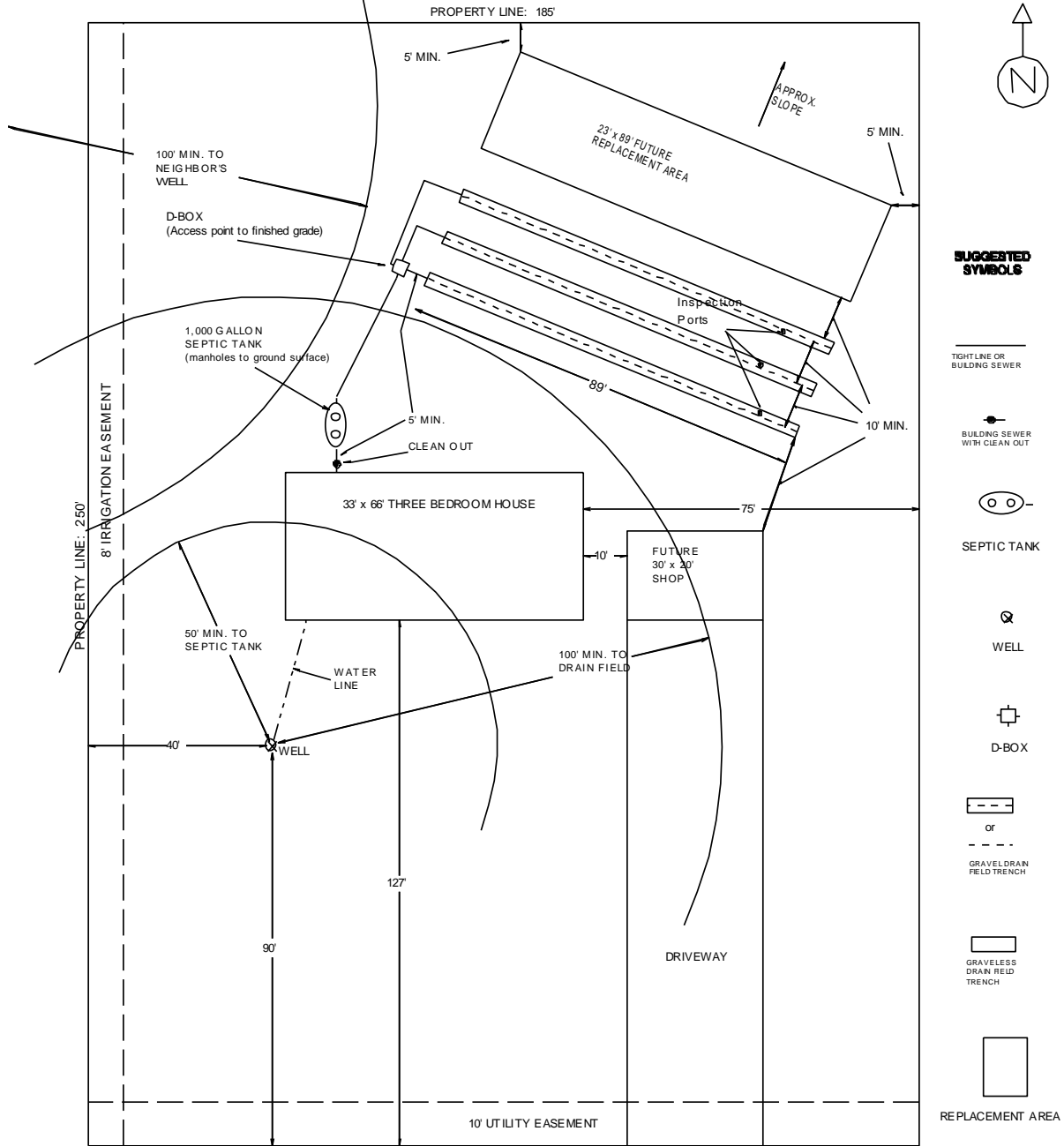
Name: _____ Date: _____ Parcel #: _____

ATTACHMENT B

TABLE 1
Minimum Horizontal Separations

Items Requiring Setback	From edge of dispersal component and reserve area	From sewage tank and distribution box	From building sewer and non-perforated distribution pile ¹
Well or suction line	100 ft.	50 ft.	50 ft.
Public drinking water well	100 ft.	100 ft.	100 ft.
Public drinking water spring measured from the ordinary high-water mark	200 ft.	200 ft.	100 ft.
Spring or surface water used as drinking water source measured from the ordinary high-water mark ¹	100 ft.	50 ft.	50 ft.
Pressurized water supply line	10 ft.	10 ft.	10 ft.
Decommissioned well (decommissioned in accordance with chapter 173-160 WAC)	10 ft.	N/A	N/A
Surface Water measured from the ordinary high water mark	100 ft.	50 ft.	10 ft.
Building Foundation/ in-ground swimming pool	10 ft. ²	5 ft. ⁶	2 ft.
Property or easement line ⁶	5 ft.	5 ft.	N/A
Interceptor/curtain drains/foundation drains/drainage ditches			
Down-gradient ²	30 ft.	5 ft.	N/A
Up-gradient ²	10 ft.	N/A	N/A
Other site features that may allow effluent to surface			
Down-gradient ²	30 ft.	5 ft.	N/S
Up-gradient ²	10 ft.	N/A	N/A
Down-gradient cuts or banks with at least 5 ft. of original, undisturbed soil above a restrictive layer due to a structural or textural change	25 ft.	N/A	N/A
Down-gradient cuts or banks with less than 5 ft. of original, undisturbed soil above a restrictive layer due to a structural or textural change	50 ft.	N/A	N/A
Other adjacent soil dispersal components/subsurface storm water infiltration systems	10 ft.	N/A	N/A

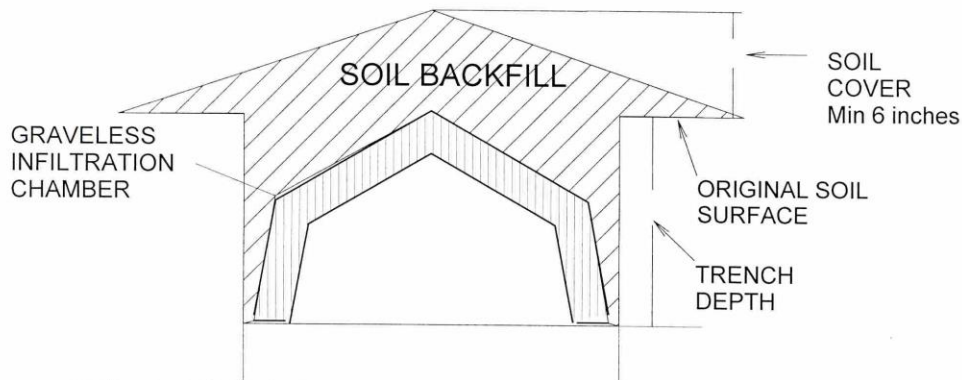
ATTACHEMENT C - SAMPLE DESIGN



1 INCH = 30 FEET

FOR: JOE HOMEOWNER	PARCEL NUMBER	
LOCATION: 123 NEW LANE WAY	123456-12345	
PREPARED BY: MRS. JOE HOMEOWNER	DATE: 1-1-98	

SHALLOW GRAVELESS INFILTRATION CHAMBER CROSS SECTION

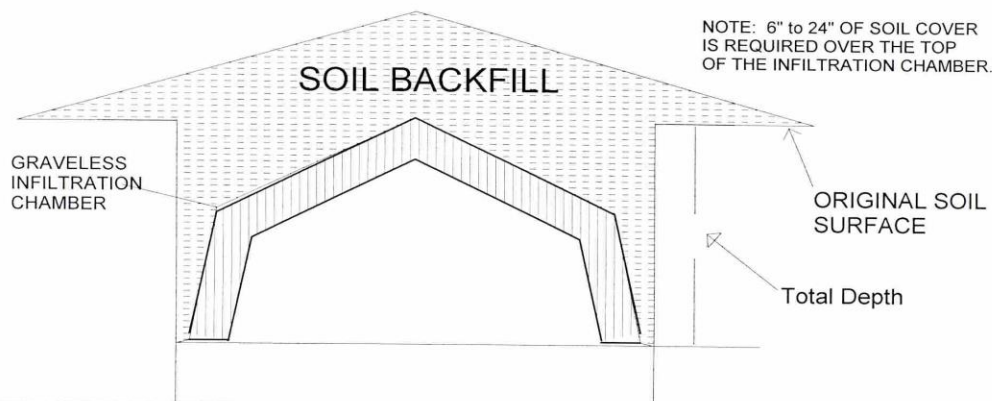


Product / Model	Length	Infiltrative Surface per unit (sq. ft.)
BioDiffuser Chamber Leach Field System		
ARC 36	5'	14.38
ARC 36HC	5'	14.38
ARC 24	5'	9.38
14" High Capacity	6.25'	17.9
11" Standard	6.25'	17.9
Bio 2	7.24'	9
Bio 3	7.24'	13.2
Infiltrator Chamber Leach Field System		
Standard	6.25'	17.69
High Capacity	6.25'	17.69
Equalizer 36	8.33'	15.24
Equalizer 24	8.33'	10.41
Quick4 Standard	4'	11.32
Quick4 Plus Standard	4'	11.32
Quick4 Plus Standard Low Profile (LP)	4'	11.32
Quick4 Plus All-In-One Endcap at end of trench	1.08'	1.6
Quick4 Plus All-In-One Endcap in-line within a trench	.83'	1.3
Quick4 Plus Endcap	.33'	0.6
Quick4 Standard MultiPort End Cap	1.33'	2.43 (average per unit)
Quick4 HCap	4'	11.32
Quick4 HCap MultiPort End Cap	1.58'	3.00 (average per unit)
Quick4 EQ36	4'	7.32
Quick4 EQ36 MultiPort End Cap	1.33'	1.65 (average per unit)
Quick4 EQ24	4'	5.32
Quick4 EQ24 MultiPort End Cap	1.16'	1.20 (average per unit)

DRAINFIELD CALCULATIONS

$$\begin{array}{c}
 \text{square feet} \\
 \text{of absorption} \\
 \text{area needed}
 \end{array}
 \times .6 = \frac{\text{infiltrative Surface}}{\text{per chamber. From chart above}} = \begin{array}{c} \text{total number} \\ \text{of chambers} \\ \text{needed} \end{array}$$

GRAVELESS INFILTRATION CHAMBER CROSS SECTION

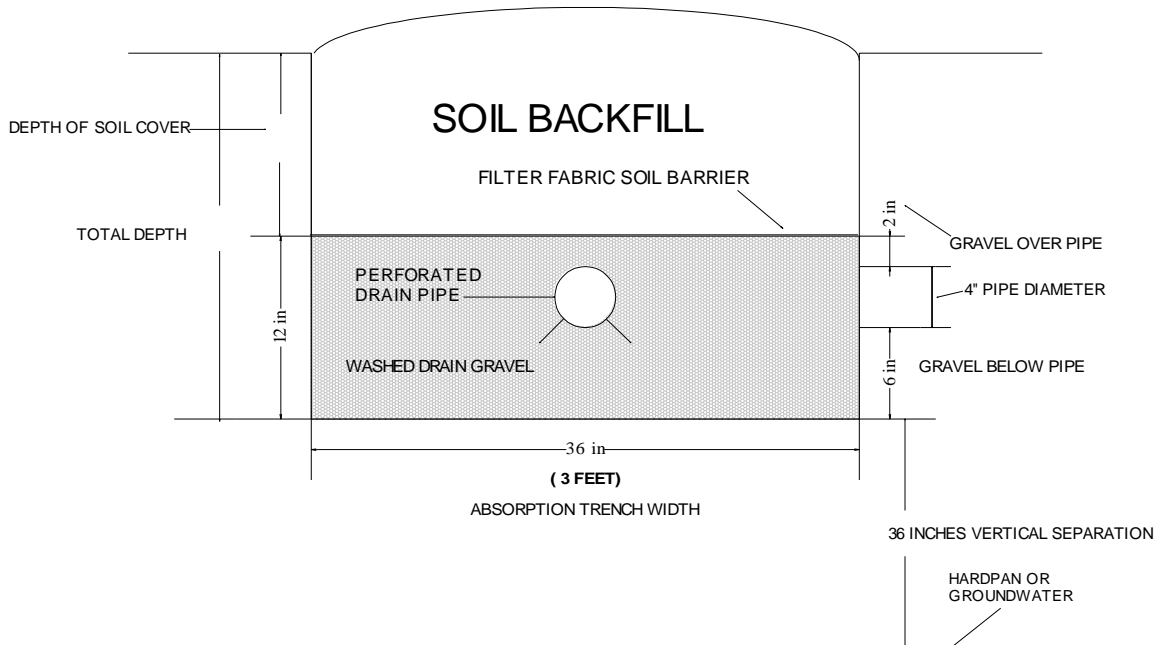


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Quick4 Plus Standard	4'	11.32
Quick4 Plus Standard Low Profile (LP)	4'	11.32
Quick4 Plus All-In-One Endcap at end of trench	1.08'	16
Quick4 Plus All-In-One Endcap in-line within a trench	.83'	13
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DRAINFIELD CALCULATIONS

$$\begin{array}{c}
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STANDARD ABSORPTION TRENCH



DRAINFIELD CALCULATIONS

square feet of
absorption area
needed

÷

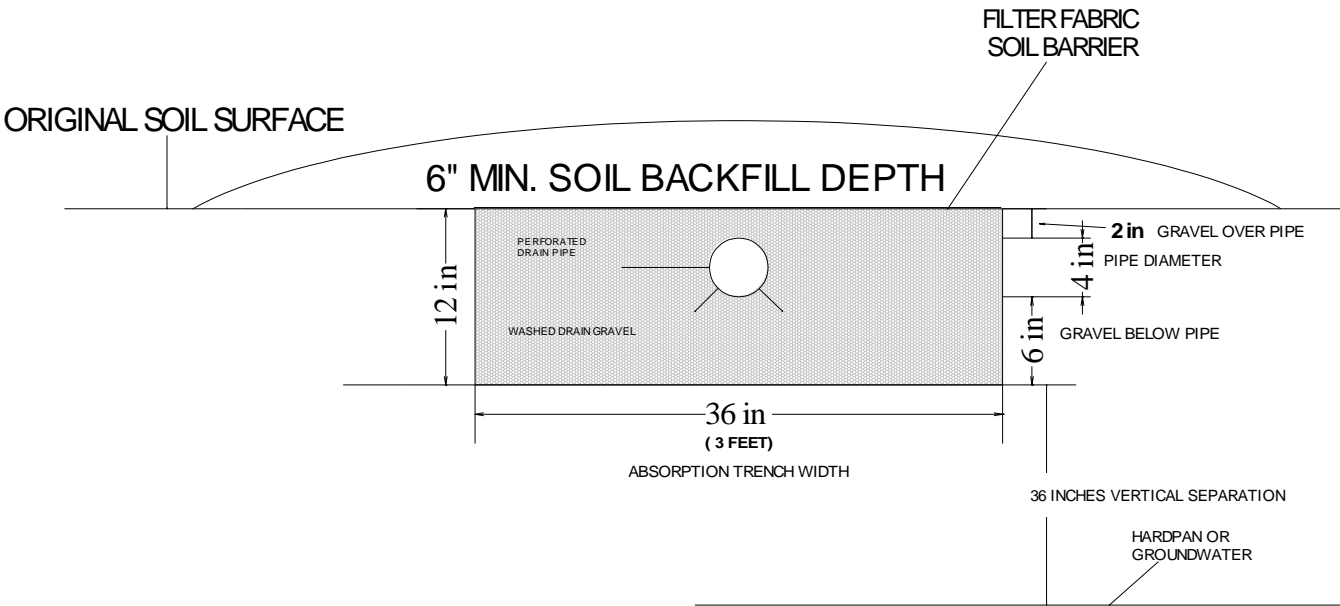
width of trench
in feet

=

total length of
trench needed

feet

SHALLOW ABSORPTION TRENCH



DRAINFIELD CALCULATIONS

square feet of
absorption area
needed

÷

width of trench
in feet

=

total length of
trench needed

feet

ON-SITE SEWAGE SYSTEMS

CONSTRUCTION GUIDE AND SPECIFICATION SHEET

GENERAL NOTES

1. Shoot elevation grades and stake drainfield location prior to excavating. Start from drainfield towards structure to determine exact elevation to set tank and stub-out for plumbing.
2. All shallow systems, 18 inches or less, will require concrete septic tanks without exception.
3. Roof and surface water runoff or discharge must be directed away from or down slope from the sewage disposal system by means of footing and/or foundation floor drains or surface diversion ditches.
4. All pipe used in the sewage disposal system must be National Sanitation Foundation (NSF) approved.
5. Only 4 inch plastic pipe or pvc (polyvinylchloride) is permitted. This pipe must meet or exceed ASTM standards that are printed on our list which include: D 3033, D 3034, or schedule 40. All pipes must be bedded with ASTM readings turned up. If pipe other than those listed are used, written verification of standards must be provided by installer. This standard also applies to pipe used to case tight lines when it is required.
6. All pipe joints, including those in drainfield, must be glued and water tight with no exceptions. It is recommended that the bells be on the upgrade side when possible.
7. All or any portions of the sewage disposal system must be inspected and approved before it is covered with soil, otherwise we will require it to be uncovered for visual verification that standards have been met.

BUILDING SEWER

(pipe from structure to the septic tank):

1. The plumbing stub out must be high enough to allow the system to gravity flow to the septic tank and drain field without exceeding the maximum allowable trench depth. Otherwise a pump may be required. **THIS INFORMATION MUST BE PROVIDED TO THE PLUMBER TO ASSURE PROPER STUB OUT DEPTH.**
2. The grade on all parts of the building sewer must be 1/8 inch minimum fall per foot, and the last 10 foot section of pipe can be 1/4 inch maximum fall per foot.
3. At least one clean-out must be installed on this line outside of the structure. If the building sewer exceeds 50 feet in length, clean-outs must be installed at 50 foot intervals. Two way clean-outs are recommended. This pipe must be brought to within two feet of the structure or be hooked up to it.
4. **If there are elbows or bends in the building sewer, they shall be no greater than a 45 degree angle, or a sweep 90 degree may be used. It is recommended to install a clean out at any such elbow.**
5. **Any pipe under driving/parking or vehicular encroachment areas must be bedded and enclosed in 5 or 6 inch pvc, steel, or concrete pipe which meets or exceeds the crush strength of ASTM 3034. The pipe length must exceed the drive width. Using astm 3034 grade or better is another option.**
6. **If the building sewer crosses any water line, the crossing must be perpendicular or at right angles (90 degrees) to the water line. No joints are allowed within 10 feet in any direction of where these lines cross. When possible, cross the sewer line under the waterline. Waterlines include domestic and irrigation.**
7. **The building sewer must be connected watertight (sealed/grouted) to the inlet side of the tank.**
8. **The building sewer must be 50 feet minimum from any well or open surface water such as canals, streams, ponds, etc.**

SEPTIC TANK

1. **The inlet and outlet are to be bedded and braced underneath the pipe in such a manner as to provide vertical support. Use of a 2 x 4 or equivalent is suggested.**
2. The septic tank must be set on undisturbed soil, or by manufacturer's standards if other than concrete tank.
3. **All pipe connections to the tank must be watertight with proper grade.**
4. All access points to the septic tank must be brought to ground surface with risers. All lids must be secured.
5. **Again, bed with soil (don't cover), all pipe connected to and from the tank.**
6. The septic tank must be at least 50 feet from any well or open surface water such as weir boxes, canals, streams, ponds, etc. The tank must be 5 feet minimum from property lines, easements, driveways, and buildings. It must be 10 feet from any domestic/irrigation water line.

LINE FROM SEPTIC TANK TO DRAINFIELD OR DISTRIBUTION BOX

- 1. The pipes must be bedded with ASTM readings face up and have glued and water tight joints.**
- 2. The grade on the pipes must be 1 inch minimum downward fall per 100 feet from the tank outlet.**
- 3. If the pipe crosses any water line (domestic/irrigation), the crossing must be perpendicular or at right angles (90 degrees) to the water line. No joints are allowed within 10 feet in any direction from where they cross. When possible the sewer line shall cross under the waterline.**
- 4. Any pipe under driving/parking or vehicular encroachment areas must be bedded and enclosed in 5 or 6 inch pvc, steel, or concrete pipe which meets or exceeds the crush strength of ASTM 3034. The pipe length must exceed the drive width. Using astm 3034 grade or better is another option.**
- 5. When using a distribution box, the pipe must have a watertight connection (sealed, grouted, or manufactured fittings).**
- 6. The pipe must be 50 feet minimum from any well or open surface water such as: canals, streams, ponds, etc.**

DISTRIBUTION BOX (D-BOX)

- 1. The D-box must be set on undisturbed soil 5 feet minimum from the beginning of trench, gravel, and perforated pipe.**
- 2. All outlets in use must be equipped with flow equalizers (such as dial-a-flow inserts). The flow equalizers must be set to allow liquid to enter all lines with equal flow simultaneously.**
- 3. All unused outlets must be water tight.**
- 4. The D-box must be 5 feet minimum from the beginning of the drain field infiltration area, property lines, easement lines, and driveway. It shall be a minimum of 50 feet from any well (domestic/irrigation) and open surface water (ditches, weir boxes, ponds, canals, lakes, streams, etc.)**
- 5. The inlet of the D-box must be equipped with a vented baffle (90 degree sweep with hole drilled or a PVC "t"; this prevents airlock).**

DRAINFIELDS, ABSORPTION BEDS, SSAS (SUB-SURFACE ABSORPTION SYSTEMS)

- 1. Drainfields must run perpendicular to the slope (across/right angles or 90 degrees) and may need to be contoured or curved to accomplish this.**
- 2. The trench bottom must be level. The perforated pipe in the trench must have a grade of 0 inches to 3 inches per 100 feet. (Use of metal security pins, grade boards, etc. is recommended).**
- 3. The ends of all perforated pipes must be capped and exposed for inspection.**
- 4. Drainfields must be 100 feet minimum from wells (domestic/irrigation) and open surface water; 5 feet minimum from the tank, property lines, driveways, and easement lines. It shall be 50 feet minimum from weir boxes and concrete lined canals, and 10 feet minimum from any water lines (domestic/irrigation), and building foundation.**
- 5. The soil barrier over the drainfield must be filter fabric (for example, tyvar 3301 & 3341 or approved equivalent, 3.0 to 4.0 oz/square yard and spun-bonded (not woven) material without petroleum/oil properties).**
- 6. If your drainfield is designed as a 12 inch deep trench, the sod and soil in the drainfield area must be broken up before the trenches are installed (this includes area between trenches). Go over the drainfield area across the slope once with a plow, or disc. Do not use backhoe teeth or rototillers.**
- 7. Drainfield and replacement area must be protected from encroachment or damage by: vehicular and equipment traffic; concentrated livestock; heavy weights or objects, impervious coverings (such as asphalt or concrete), or anything which can obstruct aeration of the system.**
- 8. No cutting or filling with soil is allowed in the drainfield area (replacement area included). The drainfield must be in original undisturbed soil, otherwise permit may be void unless alternative suitable location is found.**