



Prevent • Promote • Protect

Environmental Health Division

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Conventional (Non-Engineered) On-site Wastewater Treatment System (OWTS)
Design Worksheet

Property Address: \_\_\_\_\_ City and Zip: \_\_\_\_\_

Number of bedrooms: \_\_\_\_\_ Wastewater Design Flow (Table 6-1) \_\_\_\_\_

Work will be done by: [ ] Owner [ ] Licensed Installer \_\_\_\_\_

Note: - Homeowner installation requires the individual installing the system be the listed as the individual on the permit.

Water source:

[ ] Well [ ] Municipal [ ] Cistern

Note: - Wells must be located 50' from septic tank and 100' from STA.
- The well must be installed and verified before final signoff will occur.
- An additional trip fee will be charged if EPCPH must return to verify the well location.

Soil Report:

Note: Report MUST stamped by Professional Engineer

Soil Type: \_\_\_\_\_ LTAR: \_\_\_\_\_

Note: - Most limiting layer found within wither profile pit must be used

Was a limiting layer of Bedrock or Groundwater found within 8 feet? [ ] Yes [ ] No

Groundwater found at \_\_\_\_\_ inches. Bedrock found at \_\_\_\_\_ inches.

Septic Tank Requirements

Septic Tank Material: [ ] Concrete [ ] Plastic

Tank Size (Table 9-1): \_\_\_\_\_ Pump Tank size (if applicable): \_\_\_\_\_

Note: - Inlet side must have a sanitary "T" that extends 5" above and 8" below inlet or a baffle.
- Tank must have risers to grade and outlet side must have an effluent filter.

Clean outs

Distance from structure to clean out: \_\_\_\_\_ (no further than 5' from structure)

Note: - There must also be a cleanout at least every 100' from structure to the septic tank

**Proposed Soil Treatment Area (STA):**

What is the installation depth range for the STA? \_\_\_\_\_ inches.

*Depth of limiting layer: \_\_\_\_\_ inches.*

*Must maintain appropriate separation*

- |                            |  |  |
|----------------------------|--|--|
| Application of wastewater: | <input type="checkbox"/> Gravity                     | <input type="checkbox"/> Pump-to-gravity       |
| Distribution Layout:       | <input type="checkbox"/> Trench(s)                   | <input type="checkbox"/> Bed                   |
| Distribution Media:        | <input type="checkbox"/> Chambers                    | <input type="checkbox"/> Rock and Pipe         |
| Distribution Type:         | <input type="checkbox"/> Distribution box            | <input type="checkbox"/> Serial distribution   |
| Diverter Valve:            | <input type="checkbox"/> Yes                         | <input type="checkbox"/> No                    |
| Inspection Ports:          | <input type="checkbox"/> Beginning & End of trenches | <input type="checkbox"/> 4 corners of each bed |

Calculate the size of the STA:

Soil Treatment Area in square feet required =  $\frac{\text{Design Flow (in gallons per day)}}{\text{LTAR (in gallons per day per square foot)}}$

Soil Treatment area X (Reduction from table 10-2) X (Reduction from table 10-3) = Final STA size

Design Flow: \_\_\_\_\_ GPD,

LTAR: \_\_\_\_\_

Reductions: Table 10-2: \_\_\_\_\_

Table 10-3: \_\_\_\_\_

Show calculations here:

*Sample calculation: 3-bedroom home: 450gpd, LTAR 0.8, gravity fed (1.0) chambers in trenches (0.7) system:  $450 / 0.8 = 562.5 \text{ Sq Ft} * 1.0 = 562.5 \text{ Sq ft} * 0.7 = 394$  (393.75 rounds up to 394) Sq ft*

For Chamber systems:

Chamber Type:  Quick4 (12 ft<sup>2</sup>)

Arc36 (15 ft<sup>2</sup>)

Number of rows: \_\_\_\_\_ Chambers per row: \_\_\_\_\_ Total ft<sup>2</sup>: \_\_\_\_\_

For Rock and Pipe Systems:

Depth of Rock (under pipe): \_\_\_\_\_

Depth of Rock (over pipe): \_\_\_\_\_

Width of each trench/bed: \_\_\_\_\_

Total Pipe Length: \_\_\_\_\_

Total ft<sup>2</sup>: \_\_\_\_\_

Type of Cover on Rock: \_\_\_\_\_

**Design Document**

A legible drawing *shall* be provided with each permit application (see attached example design documents):

- Must be minimum 8.5"x11" and show then entire property boundary
- Reference locations including street names, building structures, and any other permanent physical features.
- Layout of the entire OWTS and all components from structure to soil treatment area
  - To include dimensions of trenches or beds, distribution method and equipment (including distribution boxes, drop boxes, valves, or other components used.)
- A legible drawing showing location of each OWTS component and distances to all applicable physical features, on both the subject and adjacent properties requiring setbacks (Table 7-1).
- Elevation or depth of infiltrative surface of the soil treatment area, the septic tank invert, and all other components of the OWTS.
- Location of the soil profile test pit excavations. (Must also be clearly marked on site).
- Location of the alternate STA site.
- North direction arrow.
- Contours, OR slope direction and % slope.
- Location of proposed well or existing well.

*Note: It is recommended that the design document is completed by a professional in the OWTS industry. EPCPH does not complete or alter design documents. Contact EPCPH with any questions.*

**Check list for submittal (initial each section):**

\_\_\_\_\_ Completed application page  
 \_\_\_\_\_ Completed calculation sheet

\_\_\_\_\_ Soil report (PE stamped)  
 \_\_\_\_\_ Design document

**Certification:**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Address

\_\_\_\_\_  
Date

\_\_\_\_\_  
Phone

\_\_\_\_\_  
Property Address

\_\_\_\_\_  
Email

*Note: Please find attached the necessary tables and example design documents for your convenience.*

**Table 6-1      Single-Family Residential Design Flows**

<b># Bedrooms</b>	<b>Occupancy (# of Persons)</b>	<b>Wastewater Flow Per Person (gallons/day)</b>	<b>Design Flow (gallons/day)</b>
2	4	75	300
3	6	75	450
4	7	75	525
5	8	75	600
6	9	75	675

**Table 7-1 Minimum Horizontal Distances in Feet between Components of an On-Site Wastewater Treatment System Installed After November 15, 1973 and Water, Physical and Health Impact Features**

	Spring, Well, <sup>1</sup> Suction Line, Potable Water Supply Cistern <sup>4</sup>	Potable Water Supply Line <sup>2</sup>	Structure w/basement, crawl space or footing drains	Structure without basement, crawl space or footing drains	Property Lines, Piped or Lined Irrigation Ditch, upslope curtain drain	Subsurface Drain, Intermittent Irrigation Lateral, Drywell, Stormwater Structure	Lake, Water Course, Irrigation Ditch, Stream, Wetland	Dry Gulch, Cut Bank, Fill Area (from Crest)	Septic Tank, Higher level treatment Unit, Dosing Tank, Vault or Privy
Septic Tank, Higher Level Treatment Unit, Dosing Tank, Vault or Vault Privy	50 <sup>2</sup>	10 <sup>2</sup>	5	5	10	10	50	10	--
Building Sewer or Effluent Lines	50 <sup>2</sup>	5 <sup>6</sup>	0	0	10 <sup>2</sup>	10 <sup>2</sup>	50 <sup>2</sup>	10 <sup>2</sup>	--
STA Trench, STA Bed, Unlined Sand Filter, Sub-surface Dispersal System, Seepage Pit	100 <sup>3</sup>	25 <sup>2</sup>	20	10	10	25	50 <sup>3</sup>	25	5
Lined Sand Filter	60	10 <sup>2</sup>	15	10	10	10	25	10	5
Lined Evapo-transpiration Field or Outside of Berm of	60	10 <sup>2</sup>	15	15	10	10	25	10	5

Lined Wastewater Pond									
Unlined Sand Filter in Soil With a Percolation Rate Slower than 60 Minutes per Inch, Unlined or Partially Lined Evapotranspiration System, Outside of Berm of Unlined Wastewater Pond, or System Not Relying on STA for Treatment Other than Aerosol	100	25 <sup>2</sup>	15	15	10	25	25	15	10
Slit Trench Latrine, Pit Privy	100	50 <sup>2</sup>	25	25	25	25	100	25	N/A
System Not Relying on STA for Dispersal	100 <sup>3</sup>	10 <sup>2</sup>	125	25 <sup>5</sup>	10	0	25 <sup>3</sup>	10	10

**Table 9-1 Minimum Septic Tank Size Based on Number of Bedrooms**

Number of Bedrooms	Tank Capacity (gallons)
2 or 3	1,000
4	1,250
Each Additional	250

**Table 10-1 Soil Treatment Area Long-term Acceptance Rates by Soil Texture, Soil Structure, Percolation Rate and Treatment Level**

Soil Type, Texture, Structure and Percolation Rate Range					Long-term Acceptance Rate (LTAR); Gallons per day per square foot				
Soil Type	USDA Soil Texture	USDA Soil Structure-type	USDA Soil Structure-Grade	Percolation Rate (MPI)	Treatment Level 1 <sup>1</sup>	Treatment Level 2 <sup>1</sup>	Treatment Level 2N <sup>1</sup>	Treatment Level 3 <sup>1</sup>	Treatment Level 3N <sup>1,*</sup>
R	>35% Rock (>2mm): See Table 10-1A				>35% Rock (>2mm): See Table 10-1A				
1	Sand, Loamy Sand	-Single Grain	0 (Structureless)	5-15	0.80	1.40	1.40	1.55	1.55
2	Sandy Loam, Loam, Silt Loam	PR (Prismatic) BK (Blocky) GR (Granular)	2 (Moderate) 3 (Strong)	16-25	0.60	1.0	1.0	1.1	1.1
2A	Sandy Loam, Loam, Silt Loam	PR, BK, GR 0 Massive	1 (Weak) (Structureless)	26-40	0.50	0.80	0.80	0.90	0.90
3	Sandy Clay Loam, Clay Loam, Silty Clay Loam	PR, BK, GR	2, 3	41-60	0.35	0.55	0.55	0.65	0.65
3A	Sandy Clay Loam, Clay Loam, Silty Clay Loam	PR, BK, GR 0 Massive	1 (Structureless)	61-75	0.30	0.45	0.45	0.55	0.55
4	Sandy Clay, Clay, Silty Clay	PR, BK, GR	2, 3	76-90	0.20	0.30	0.30	0.30	0.30
4A	Sandy Clay, Clay, Silty Clay	PR, BK, GR 0 Massive	1 (Structureless)	91-120	0.15	0.20	0.20	0.20	0.20
5	Soil Types 2-4A	Platy	1, 2, 3	121+	0.10	0.15	0.15	0.15	0.15

NOTE: Shaded areas require system design by a professional engineer.

**Table 10-2 Size Adjustment Factors for Methods of Application in Soil Treatment Areas Accepting Treatment Levels 1, 2, 2N, 3 and 3N Effluent**

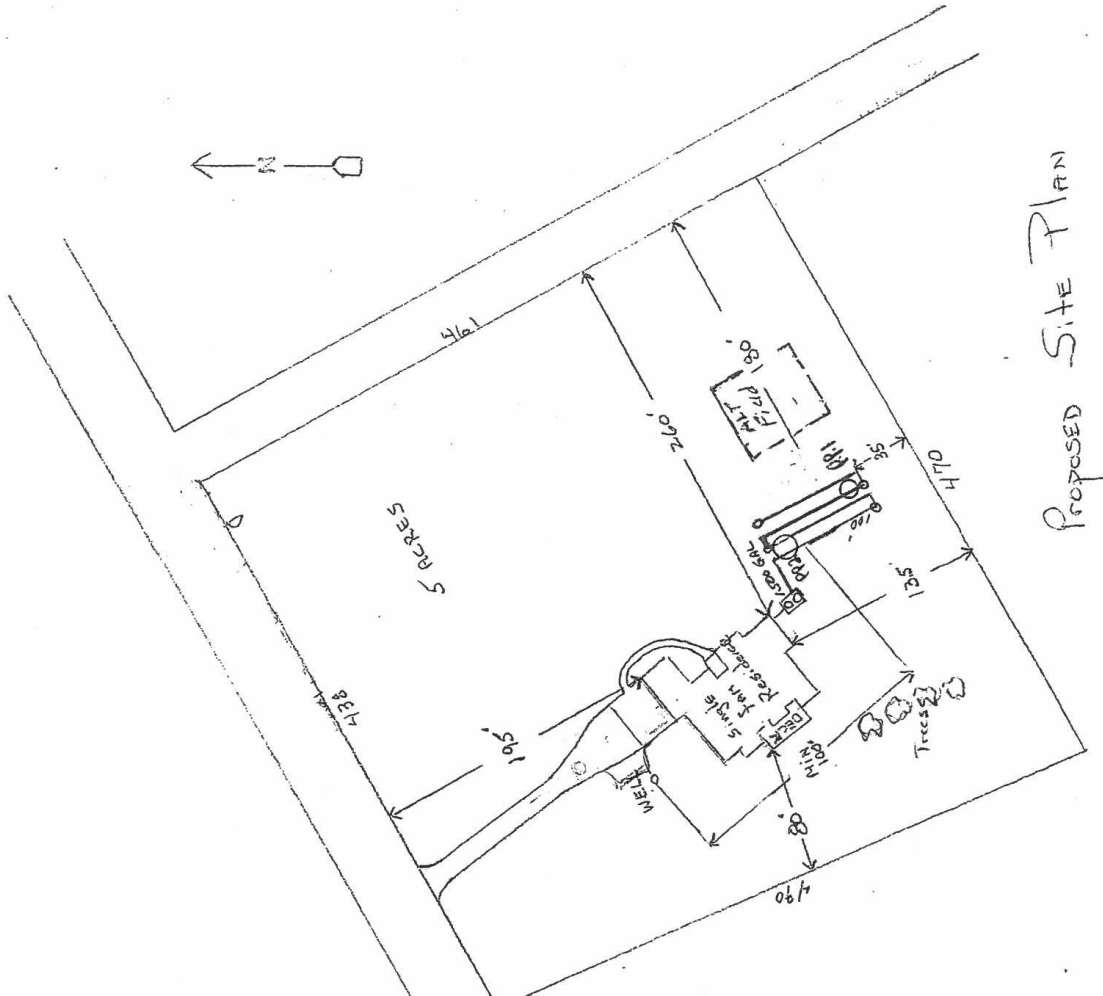
Type of Soil Treatment Area	Method of Effluent Application from Treatment Unit Preceding Soil Treatment Area		
	Gravity	Dosed (Siphon or Pump)	Pressure Dosed
Trench	1.0	0.9	0.8
Bed	1.2	1.1	1.0

**Table 10-3 Size Adjustment Factors for Types of Distribution Media in Soil Treatment Areas for Treatment Level 1 Systems**

Type of Soil Treatment Area	Type of Distribution Media Used in Soil Treatment Area <sup>1</sup>		
	Category 1	Category 2	Category 3
	Rock or Tire Chips	Other Manufactured Media	Chambers or Enhanced Manufactured Media
Trench or Bed	1.0	0.9	0.7



Example Site Plan (New System)



PROPOSED SITE PLAN

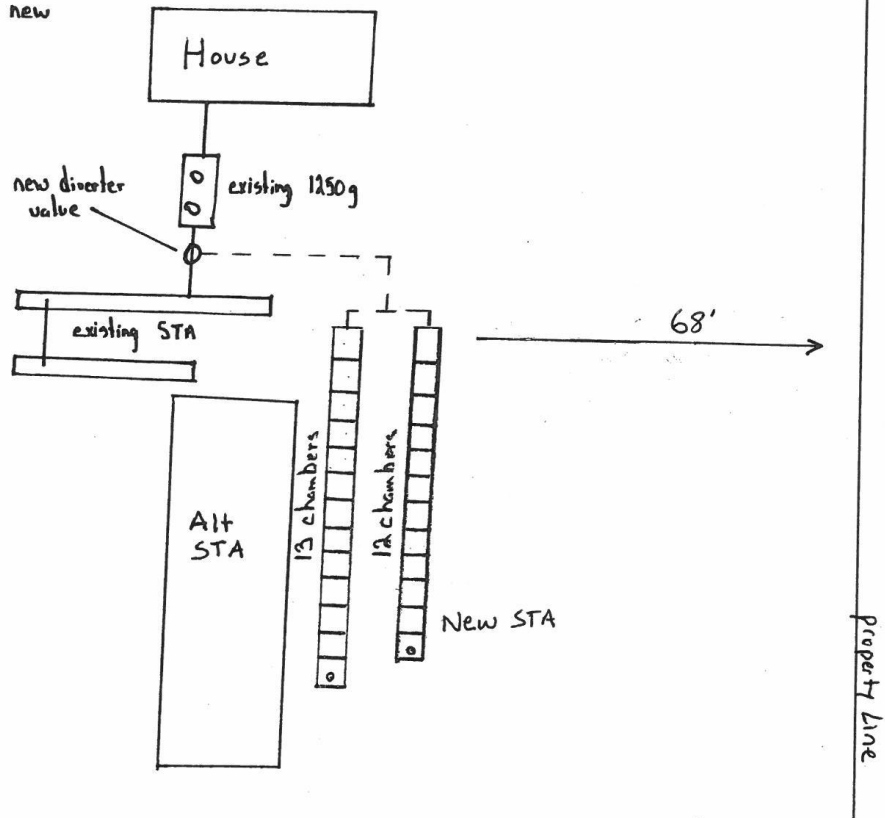
Septic Specs

- 4 rows - 20 chambers ARC 36
- 1 row - 14 Chambers ARC 36
- 6' Separation between Rows
- 4" Sch 40 Pipe from House to Tank
- 4" Sch 35 Pipe from Tank to field
- 1500 GAL TANK
- GPD = 600 gal (5 bedroom)
- LTAR = .35
- 1200 sq ft STA Required

Example Site Plan (Repair)



- Install diverter valve
- Install 375 g/ft of new leach field
- 2 trenches:
  - 1 row of 13 AR236 chambers
  - 1 row of 12 AR296 chambers
- Trenches can be no deeper than 48"
- Install inspection ports at end of each trench



3 bedroom house  
 450 G.P.D.  
 $450 \div .6 = 750$   
 $750 \times .5 (\text{diverter}) = 375$   
 2 trenches  
 1 row of 12 chambers  
 1 row of 13 chambers