Department of Safety and Professional Services
Division of Industry Services
Plumbing Product Review
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May 17, 2022

Dept. of Safety and Professional Services
Bureau of Technical Services
Division of Industry Services
Brad Johnson - Section Chief
4822 Madison Yards Way
Madison WI 53705

Re:
Description:	POWTS Component Manual
Manufacturer:	Dept. of Safety and Professional Services
Product Name:	At-Grade Component Manual for Private Onsite Wastewater Treatment Systems Version 3.0 (May 2022-2027)
Model Number(s):	v. 3.0
eSLA PTO No.:	PP-081700082-PTOVPCR

The specifications and/or plans for this plumbing product have been reviewed and determined to comply with chapters SPS 382 through 384, Wisconsin Administrative Code, and Chapters 145 and 160, Wisconsin Statutes.

The Department hereby issues an approval based on the Wisconsin Statutes and the Wisconsin Administrative Code. This approval is valid until the end of May 2027.

This approval is contingent upon compliance with the following stipulation(s):

1. A copy of this approval letter shall be submitted with all plans using the At-Grade Component Manual for Private Onsite Wastewater Treatment Systems Version 3.0 (May 2022-2027).

   Plans submitted without a copy of this approval letter may be denied.

2. This approval recognizes that POWTS systems designed, installed and maintained in accordance with this manual will provide treatment and dispersal of domestic wastewater that is acceptable in the context of ch. 383 Wis. Adm. Code.

3. Systems installed in accordance with this POWTS Component Manual shall use wastewater tanks approved by the department. If a given tank is approved and meets the published specifications contained in the manual, then redundant approval of the tank is not required. The installation shall not compromise the structural integrity of the tank.

4. Systems installed in accordance with this POWTS Component Manual shall be installed, maintained and used in strict accordance with the manufacturer's published instructions, Chapters 381-387 Wis. Adm. Code and this product approval. If there is a conflict between the manufacturer's instructions and the Wis. Adm. Code or this Plumbing Product Approval, then the Wis. Adm. Code and this Plumbing Product Approval shall take precedence.

5. Complete operation and maintenance instructions POWTS systems designed in accordance with this manual shall be provided to each system owner and remain onsite.

6. Systems designed in accordance with this manual shall be installed by persons holding the proper license or registration in accordance with Wis. Stats. § 145.

7. Drain, waste and vent piping used to install these systems shall conform to s. SPS 384.30 (1), (2) and (3) Wis. Adm. Code.

8. Cleanouts shall be installed in drain piping associated with the installation of these systems in accordance with s. SPS 382.35 Wis. Adm. Code.

9. Commercial food processing, food production, food service, restaurants, taverns and similar establishments which may generate greases, fats, oils or similar substances; shall have state-approved grease interceptors installed upstream of POWTS systems designed in accordance with this manual in accordance with s. SPS 382.34 Wis. Adm. Code.

10. DSPS POWTS plan approval shall be obtained from the department's Private Sewage Section, or the appropriate agent county, for:

    a. each installation of POWTS systems designed in accordance with this manual; and
    b. high-strength and/or commercial POWTS systems designed in accordance with this manual.

11. A sanitary permit shall be obtained, in accordance with s. SPS 383.21 Wis. Adm. Code, from the county, or other local authority having jurisdiction, for each proposed installation of systems designed in accordance with this manual.

12. A complete and acceptable soil evaluation report, conforming to s. SPS 385.40 Wis. Adm. Code, shall be performed for all proposed systems designed in accordance with this manual.

Technical notations:

a. This approval supersedes the approval issued August 15, 2017 under product file no. 20170217.

he department is in no way endorsing this product or any advertising and is not responsible for any situation which may result from its use.

Sincerely,

Brad Johnson – Section Chief
Department of Safety and Professional Services
Bureau of Technical Services
Division of industry Services
Phone: 920 492-5605
Email: Bradley.Johnson@Wisconsin.gov

AT-GRADE COMPONENT MANUAL FOR
PRIVATE ONSITE WASTEWATER TREATMENT SYSTEMS

(VERSION 3.0)
May 2022
Exp. end of May 2027

State of Wisconsin
Department of Safety & Professional Services
Division of Industry Services

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Publication SBD-10854

"**Standard Plan Pages**" for most POWTS components are available in fillable *.pdf* format on the department website at: **dsps.wi.gov/Pages/Programs/POWTS/Default.aspx**
At the bottom of the website, click the black box titled "POWTS Standard Plan Pages".

ADA Statement
The Department of Safety and Professional Service is an equal opportunity service provider and employer. If you need assistance to access services or need material in an alternate format, please contact the Department at (608) 266-2112 or TTY Contact Through Relay.

I. INTRODUCTION & SPECIFICATIONS

This Private Onsite Wastewater Treatment System (**POWTS**) component manual provides design construction, inspection, operation, and maintenance specifications for an at-grade system. Detailed plans and specifications must be developed and submitted for review and approval to the department or a plan review agent authority where the project is located. In addition, a state sanitary permit must be obtained from the department or governmental unit having jurisdiction. See Section VIII for more details.

Design variations of this manual will constitute an “Individual Site Design” which require exclusive plan review conducted by state staff. Violations of this manual constitute a violation of chs. SPS 383 and 384, Wis. Adm. Code.

A detailed project description must also be submitted with all commercial plans. Any facility creating non-domestic wastewater may require concurrence approval from the WI DNR. Please check with a state plan reviewer if there are any questions.

II. DESCRIPTION & PRINCIPLES OF OPERATION

The at-grade component must receive influent flows and loads less than or equal to those specified in Table 1 or 2 of this manual. When designed, installed and maintained in accordance with this manual, the at-grade provides treatment and dispersal of domestic wastewater in conformance with ch. SPS 383 of the Wis. Adm. Code.

The operation of the at-grade component is a two-stage process involving both wastewater treatment and dispersal into the underlying soil. Treatment is accomplished predominately by physical and biochemical processes within the soil. These processes are affected by the physical characteristics of the effluent wastewater, influent application rate, temperature, and the nature of the receiving soil.

Physical entrapment, increased retention time, and conversion of pollutants in the wastewater are important treatment objectives accomplished under unsaturated conditions. Pathogens contained in the wastewater are eventually deactivated through filtering, retention, and adsorption by the soil. In addition, many pollutants are converted to other chemical forms by oxidation processes.

The at-grade component contains a distribution cell consisting of stone aggregate and a distribution network on top of a plowed in-situ soil dispersal area and is covered by soil. Effluent is distributed into the distribution cell where it flows into the soil where it undergoes biological, chemical, and physical treatment and dispersal into the environment.

Cover material, consisting of fertile soil provides frost protection and moisture retention sufficient to maintain a good vegetative cover. The in-situ soil serves as the treatment medium and disperses the effluent into the environment.

III. DEFINITIONS

Definitions not found in this section are located in ch. SPS 381 of the Wisconsin Administrative Code or the terms use the standard dictionary definition.

A. "At-grade" means an on-site wastewater treatment system. The component contains a distribution cell consisting of aggregate and a distribution network placed on top of a plowed in situ soil and then covered by topsoil.

B. "Contour" means a line of equal elevation drawn on a scaled map.

C. "Concave Site" means a slope shape where surface drainage may converge into a limited area.

D. "Cover Material" means the fertile layer of soil placed on the distribution cell. This layer of the component shall contain < 15% gravel by volume with no rock fragments with > 3 in. diameter to sustain grasses that prevent erosion.

E. "Distribution Cell" means a layer of stone aggregate that receives effluent from a distribution network that spreads the effluent onto a plowed layer of in-situ soil.

F. "Distribution Box" is a concrete or heavy weight plastic container with a flat bottom and a watertight removable lid. It has one inlet near the top of the box and multiple outlets near the beneath so it can deliver the same amount of effluent to all distribution lines.

G. "Effluent" means wastewater that discharges from a septic tank or other treatment component.

H. "Effective Absorption Area" means the part of the distribution cell with a layer ≥ 6 in. deep of 1/2 to 2-1/2 in. aggregate that receives the effluent from the distribution network.

I. "Header Pipe" means a solid-wall pipe connected to the sewer line coming from the septic/pump tank. The pipe is a conduit that transfers wastewater within the distribution network. It does not discharge any liquid. The pipe material shall be per Table SPS 384.30-2 Wis. Adm. Code.

J. "Individual Site Design" (ISD) means a system that does not fully comply with the design standards of this component manual.

K. "Linear Loading Rate" means loading rate per linear foot of the system, (gals/day/linear foot).

L. "Lateral Segment" means a lateral used in configuring a gravity or pressure piping network that distributes wastewater equally to the entire effective area of an At-grade cell.

M. "Slowly Permeable/Restrictive Soil" means soil with a soil loading rate ≤ 0.3 gpd/ft.

N. "Toe of Effective Absorption Area" means the point where the ends of the effective absorption area tie back into the original grade.

O. "Unsaturated Flow" means liquid flowing through a soil media under a negative pressure potential. Liquids containing pathogens and pollutants come in direct contact with soil or fill material that enhance wastewater treatment by physical, biological, and chemical means.

P. "Vertical Flow" means the downward flow of water or effluent through soil that involves travel along soil surfaces or thorough soil pores.

IV. SOIL & SITE REQUIREMENTS

Every at-grade design is ultimately matched to the given soil and site characteristics.

The design approach is based on criteria that all applied wastewater is successfully transported away from the component, in a manner that will not influence later wastewater additions, and that the effluent is ultimately treated.

A. Minimum Soil Depth Requirements

The minimum soil factors required for successful at-grade component performance are listed in Tables 1 and 2. Soil evaluations must be in accordance with ch. SPS 385, Wis. Adm. Code. In addition, soil application rates must be in accordance with ch. SPS 383, Wis. Adm. Code.

B. Other Site Considerations

1. Slopes: On a crested site the distribution cell can be situated such that the effluent can move laterally down both slopes. A level site allows lateral flow in all directions but may present problems as the water table may rise higher beneath the distribution cell in slowly permeable soils. Sloping sites allow the liquid only to move in one direction away from the distribution cell.

   On sloping sites and sites with slowly permeable soils, at-grade components rely on lateral effluent movement through the upper soil horizons. Lateral movement becomes more important as soil permeability decreases.

   Concave sloping sites are sites that have convergence of surface and subsurface drainage. Landscape topography that retains or concentrates subsurface flows such as swales, depressions or potholes, is considered an unacceptable at-grade location. However, the maximum deflection allowed is 10%, (see page 12). Over land surface flow is to be diverted away from these site or other methods employed to allow surface flow around the component.

2. At-grade location: Open areas and exposure to sun and wind increase the assistance of evaporation and transpiration in the dispersal of wastewater.

3. Sites with trees and large boulders: Generally, sites with large trees, numerous smaller trees or large boulders are less desirable for installing an at-grade component. These sites create difficulty in preparing the surface and reduce the infiltration area beneath the at-grade. Rock fragments, tree roots stumps and boulders occupy an area, thus reducing the amount of soil available for proper treatment. If no other site is available, trees in the component area of the at-grade must be cut off at ground level and boulders that are setting on the ground surface removed. A larger infiltrative area is necessary when any of the above conditions are encountered, to provide sufficient effective distribution cell area.

4. Setback distances: The setbacks specified in ch. SPS 383, Wis. Adm. Code for soil subsurface treatment and distribution components apply to at-grade components. The distances are measured from the perimeter of the effective distribution cell area.

Table 1 INFLUENT FLOWS AND LOADS FOR PRESSURE DISTRIBUTION	
Design wastewater flow (DWF)	≤ 5,000 gal/day
Vertical distance between the component infiltration surface and a limitation defined by redoximorphic features, groundwater, or bedrock	Minimum vertical distance required by s. SPS 383 Table 383.44-3, Wis. Adm. Code.
Monthly average concentrations of BOD5, TSS, and FOG	In accordance with s. SPS 383.44(2)(a), Wis. Adm. Code.
Design wastewater flow (DWF) from one and two-family dwellings	In accordance with s. SPS 383.43(2), (3), (4) and (5), Wis. Adm. Code.
Design wastewater flow (DWF) from public facilities	In accordance with s. SPS 383.43(2), (6) and (7), Wis. Adm. Code.
Effluent distribution method	Refer to Pressure Distribution Component Manual for POWTS
Effluent distribution lateral orifice spacing	≥ 1 orifice per 2 linear ft of distribution cell
Volume of a single dose volume	≥ 5 times the void volume of the lateral(s) but ≤ 20 percent of the design wastewater flow.
Linear loading rate restriction	≤ 4.5 gal/ft if in situ soils have a soil application rate ≤ 0.3 gal/sf/day within 12 in. of the ground surface.
Wastewater particle size	Maximum 1/8 in.

Table 2 INFLUENT FLOWS AND LOADS FOR GRAVITY DISTRIBUTION	
Design wastewater flow (DWF) from one and two-family dwellings	≤ 600 gals/day (4 bedrooms or per capita).
Design wastewater flow (DWF) from public buildings	Individual Site Design (ISD) requiring project description & supporting documentation.
POWTS with combined wastewater from domestic and non-domestic sources	Contact DSPS POWTS review staff to verify DNR concurrency requirements.
Vertical distance between the component infiltration surface and a limitation defined by redoximorphic features, groundwater, or bedrock	Minimum vertical distance required by s. SPS 383 Table 383.44-3, Wis. Adm. Code.
Monthly average concentrations of BOD5, TSS, and FOG	In accordance with s. SPS 383.44(2)(a), Wis. Adm. Code.

Table 3 DISTRIBUTION COMPONENT REQUIREMENTS FOR GRAVITY SYSTEMS	
Distribution box installation and access	- The box shall be securely placed at the highest point of the system to allow complete drainage to the dispersal cell. - It is recommended the box be placed on a level concrete pad or a pad of ½ to 2-½ in. aggregate. The aggregate shall extend down ≥ 6 in. below the surface to help provide a stable footing. - The box shall be thoroughly insulated to prevent freezing in cold weather months. - The box shall be provided with a permanent above grade marker. If box is buried, access shall be provided within 12 in. of final grade. - Also see page 8.
Header pipe construction	- When a header pipe is used, it shall be secured in place and bedded in ½ to 2-½ in. aggregate upslope of the effective area. The lateral pipes leaving the header pipe shall be sloped downward to allow full drainage to the distribution cell. - The header pipe shall be thoroughly insulated to prevent freezing in cold weather months.
Segmented lateral lengths	≤ 30 ft per cell; ends shall be capped.
Weirs, outlet levelers or other devices	Install per manufacturer instructions.
Maintenance frequency	Distribution boxes and header pipes shall be checked for proper function after the frost leaves the ground in the spring or at least once every 13 months.
Maintenance	Outlet pipe leveling devices for quick leveling adjustments shall be used to compensate for distribution boxes that have shifted out of place.

Distribution Boxes: A distribution box shall be constructed of sound and durable material that will resist to any type of damage from the installation process or weather conditions. Boxes shall be set perfectly level, on a firm base and carefully backfilled to prevent uneven settling of the box. When possible, the distribution box should be installed directly on top of the dispersal cell aggregate to minimize frost disturbance.

A separate outlet must be provided for each distribution line. All inverts of the box outlets shall be set at the same elevation lower than the inlet opening invert. When the installation is complete, the box shall be filled with water and tested to make sure it is functioning properly by delivering water equally to all of the outlets. The box shall be re-leveled or use the installed leveling devices to compensate a box that needs adjusting.

Distribution boxes shall be large enough to allow removal of accumulated solids and to inspect all inlet(s) & outlet(s). It shall be provided with a means of access through a secure and removable lid. The access opening shall be within 12 in. of the finished grade and thoroughly insulated to protect it during cold weather months. A permanent marker shall be provided at the surface to help identify where the box is located.

Header pipe configurations: The same installation method shall be used when installing a header pipe to provide an equivalent means for effluent distribution to the entire effective area of the cell.

Table 4 SIZE, DESIGN, & ORIENTATION OF DISPERSAL CELLS FOR GRAVITY AND PRESSURE DESIGNS	
General design requirements	In accordance with s. SPS 383.43(8), Wis. Adm. Code
Maximum effective absorption area width of the infiltration area (A)	10 ft
Maximum effective absorption area width on level sites	10 ft
Maximum Total width of aggregate on sloping sites (TW)	(A) + 2 ft
Effective absorption area length (B)	Minimum aggregate length of the Effective Absorption area required along a single contour
Total width of component area (W)	Effective area width + 10 ft (5 ft-wide plowed perimeter up & down slope of aggregate)
Total length of the absorption area (L)	Effective Absorption area length + 10 ft (5 ft-wide plowed perimeter beyond each end of aggregate)
Total effective absorption area (A x B)	Design wastewater flow ÷ soil application rate of infiltrative surface. Soil application rates are listed in Tables 383.44-1 & 2, WAC.
Depth of aggregate above the distribution pipe (covering pipe only)	≥ 2 in.
Depth of topsoil cover over aggregate	≥ 12 in.
Pipe material in pressure distribution networks	Meets requirements of Table SPS 384.30-5, Wis. Adm. Code.
Pipe material in gravity distribution networks	Meets requirements of Table SPS 384.30-4, Wis. Adm. Code.
Pipe material for observation and vent pipes	Meets requirements of Table SPS 384.30-1, Wis. Adm. Code.

Table 4 SIZE, DESIGN, & ORIENTATION OF DISPERSAL CELLS FOR GRAVITY AND PRESSURE DESIGNS	
Number and position of observation pipes	- A minimum of 2 capped pipes extending from the aggregate/soil interface at the toe of the effective absorption area up to or above finished grade. A mid-cell pipe is optional. - Located to provide a representative indication of hydraulic performance of the cell. - Pipes shall have (4) ¼" slots placed 90° apart to a height of 6" from the bottom.
Location of distribution lateral(s) (level site)	Equally spaced from the center of the distribution cell.
Location of distribution lateral(s) (sloping site)	Most upslope lateral to be placed at 2 ft from upslope edge of distribution cell. If more than one lateral, no lateral may be installed in the lower half of distribution cell.
Synthetic aggregate products	Individual Site Design
Slope of original grade	≤ 25% slope
Maximum deflection of effective area on concaved slopes	10%
Multiple cells	Allowed for pressure designs but requires ISD for gravity systems.
Cell spacing	≥ 3 ft between toe of upper cell effective area and start of lower cell aggregate.
Cover material (topsoil)	- Capable of supporting sod cover to preclude erosion. - Porosity shall be able to allow atmospheric diffusion. - Clay content shall be ≤ 25% by weight. - Coarse fragment content shall be ≤ 15%.
Limited activities during component construction	Sites with slowly permeable/restrictive soil: vehicular traffic, excavation, and soil compaction are prohibited: - in the plowed area within 15 ft down-slope of the component area on sloping sites. - within 10 ft of both sides of the component area on level sites
Erosion and frost protection	Graded to divert surface water around the component. POWTS Dispersal Area needs to be sodded or seeded and mulched. Non-topsoil options may also be utilized.
Management	In accordance with subchapter V of ch. SPS 383, Wis. Adm. Code, and this manual.

V. COMPONENT DESIGN

Detailed plans and specifications must be developed and then reviewed and approved by the governing unit having authority to approve the plan.

Design of the at-grade component is based on the design wastewater flow and soil characteristics. It must be sized such that it can accept the daily flows and loads without causing surface seepage or groundwater pollution. The effective distribution cell area must be sufficiently large enough to absorb the effluent into the underlying soil.

Design of the at-grade component is based on the following 3 steps: 1) calculate design wastewater flow, 2) design the distribution cell(s), and 3) design the entire component.

1. Design Wastewater Flow Calculations

a. One and two-family dwellings: Effective distribution cell size for one and two-family dwellings is determined by first calculating the design wastewater flow (DWF). To calculate DWF use Formula 1.

Formula 1 DWF = 150 gallons/day/bedroom

b. Public Facilities: Effective distribution cell size for a public facility is determined by calculating the DWF using Formula 2. Public facility estimated daily wastewater flows are found in the appendix of SPS 383, Wis. Adm. Code. Facilities not listed in the appendix can be discussed with the state plan reviewer to establish an acceptable daily flow rate volume. Many commercial facilities have high BOD_5, TSS and FOG (fats, oils and grease), which must be pretreated in order to bring their values down to an acceptable range before entering into the at-grade component described in this manual.

Formula 2 DWF = Sum of estimated wastewater flows per source per day (see SPS 383 appendix) x 1.5

2. Design of the Distribution cell: This section determines the required effective cell area of the distribution cell as well as the dimensions for the soil cover material.

a. The design loading rate equals the soil application rate of the soil horizon in contact with the distribution cell, (top horizon). Use ch. 383, Table 383.44-1 or 2, Wis. Adm. Code to determine the soil application rate. Note that s. SPS 383.44(4)(c), Wis. Adm. Code requires designers to consider more restrictive subsoil horizons for design purposes.

b. Determine the effective absorption area of the distribution cell by dividing the design wastewater flow (DWF) by the design loading rate (DLR).

c. Choose an effective distribution cell credit width (A) ≤ 10 ft.

d. Determine the distribution cell length (B) by dividing the effective absorption area of the distribution cell by the effective width (A) of the distribution cell.

e. Determine the Linear Load Rate, (LLR) by dividing the design wastewater flow (DWF) by the effective absorption area cell length “B”.

For systems that have in situ soil application rate of ≤ 0.3 gals/sf/day within 12 in. of the surface, the linear loading rate (LLR) shall be ≤ 4.5 gpd/linear ft.

If the LLR exceeds 4.5 gpd/linear ft, the component must be lengthened to reduce the LLR to ≤ 4.5 gpd/linear ft.

f. Concave at-grade cell configuration.

The maximum deflection of a concave distribution cell of an at-grade system is 10%. The effective distribution cell length of the concave distribution cell is the distance between the furthest points along the contour line of the down slope edge of the concave distribution cell.

3. <u>Design the entire at-grade component:</u> This includes sizing the total width and length of the distribution cell, component height, location of the distribution lateral, and the observation pipes.

a. To determine the total width of the distribution cell for level sites, the total width of the distribution cell (TW) is equal to or greater than the effective distribution cell credit width (A). TW ≥ A

b. For sloping sites, the total width of the distribution cell is equal to or greater than the effective distribution cell credit width (A) plus 2 ft. TW ≥ A + 2 ft

c. To determine the overall width (W) of the component. The minimum width of component must be equal to or greater than the total of the distribution cell plus 10 ft for soil cover. W ≥ TW + 10 ft min.

d. To determine the overall length (L) of the component:

Minimum overall length of the component must be equal to or greater than the distribution cell length (B) plus 10 ft for soil cover. L ≥ B + 10 ft min.

NOTE: Greater widths for landscaping purposes are satisfactory.

e. Horizontal location of distribution lateral in the distribution cell:

1) Level site with one effluent distribution lateral; the lateral is located in the center of distribution cell.

2) Level site with more than one effluent distribution lateral; the laterals are equally spaced apart with the center two laterals the same distance from center of the cell and the distance from the outside laterals to the edge of the cell being one half the lateral spacing.

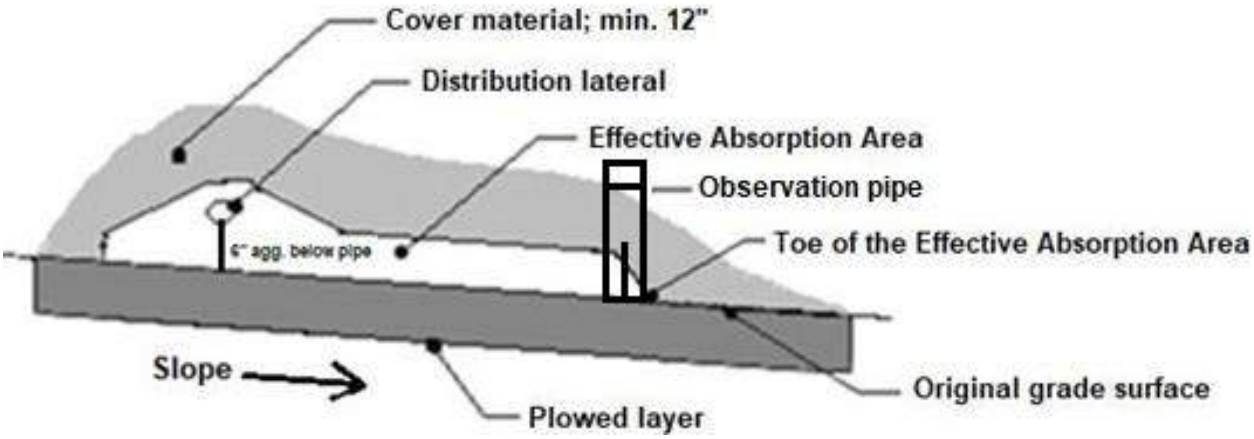
3) Sloping site with one lateral; the effluent distribution lateral is located 2 ft down slope from up slope edge of the distribution cell.

4) Sloping site with more than one effluent distribution lateral; one lateral is located 2 ft down slope from the upslope edge of the distribution cell and the other(s) is (are) down slope of the upper lateral and up slope of the midpoint of the distribution cell effective width.

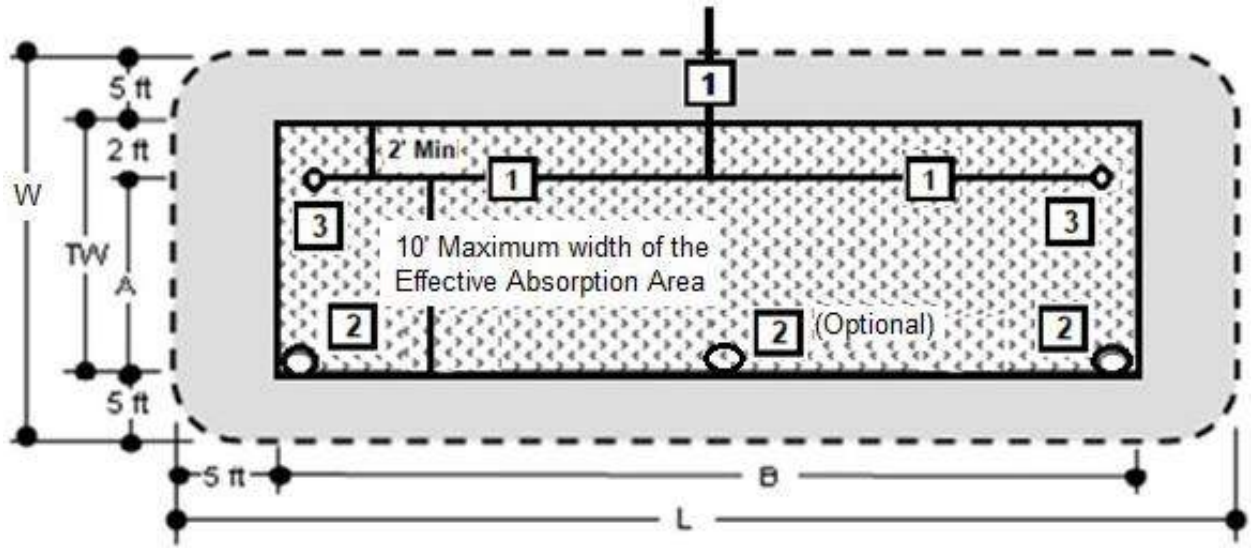
f. Vertical location of distribution lateral in the distribution cell:

The distribution lateral shall be ≥ 6 in. above the elevation of original grade before plowing.

Cross-section of an At-grade with a single pressure lateral on a sloping site



Plan view of an At-grade with a single pressure lateral on a sloping site

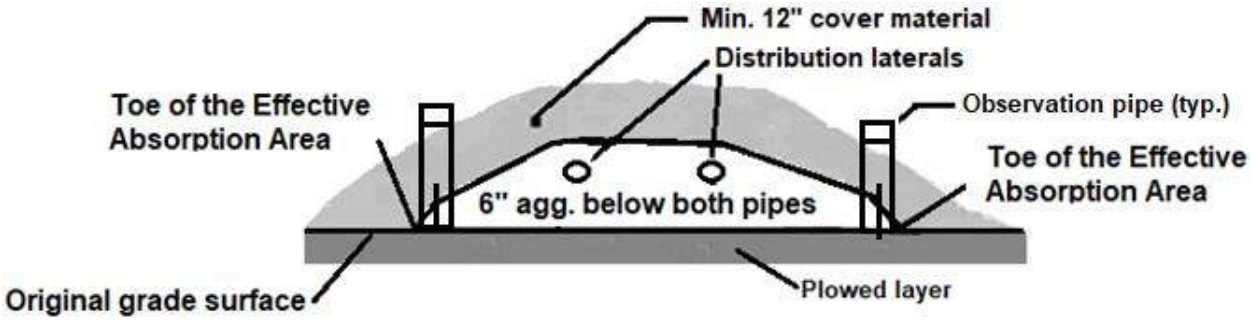


1 Pressure rated piping using material listed in Table 384.30-5, Wis. Adm. Code

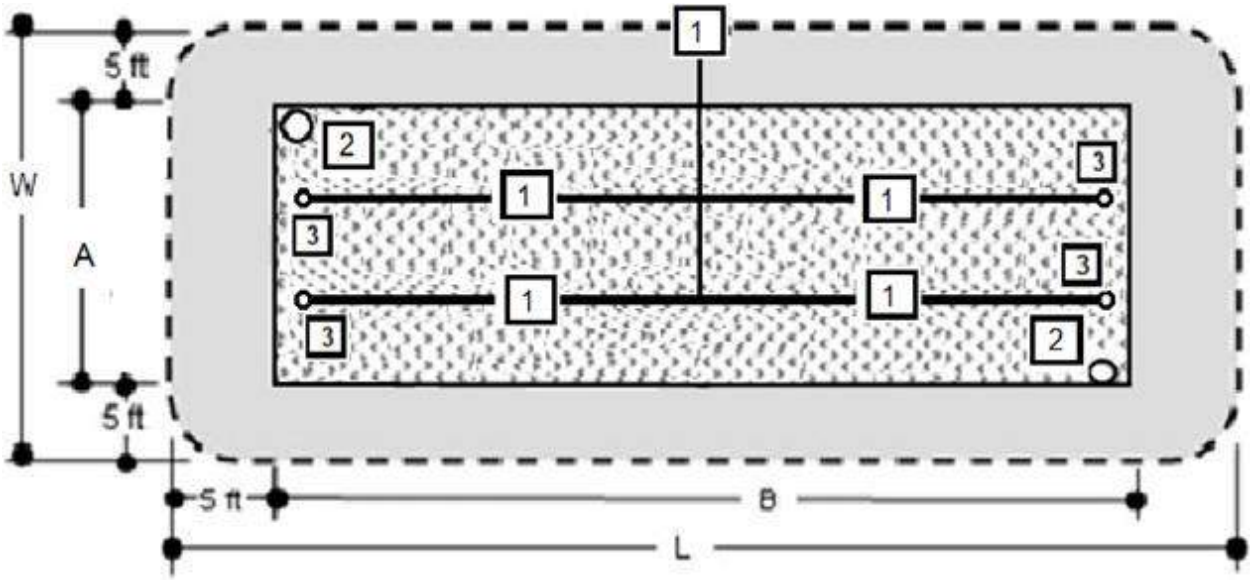
2 4" dia. PVC Observation pipe using material specified in Table 384.30-1, Wis. Adm. Code

3 Latcral turn-up (see Pressure Component Manual - Ver. 2.1)

Cross-section of an At-grade with a pressure network on a level site



Plan view of an At-grade with a pressure network on a level site

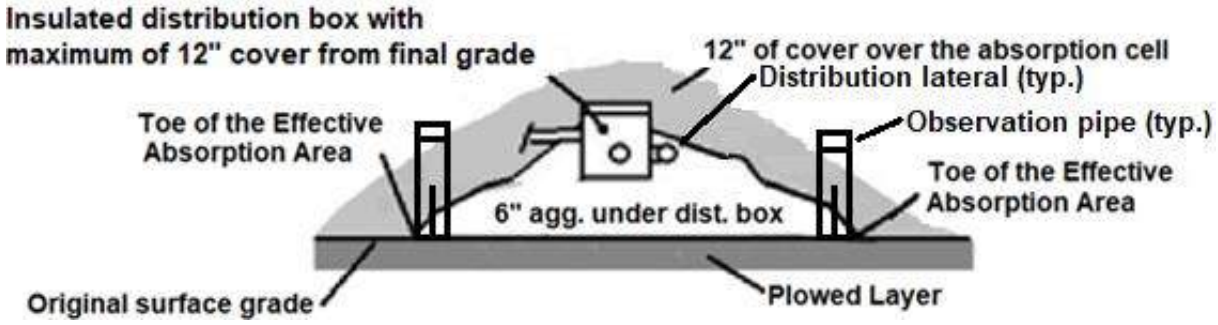


1 Pressure rated piping using material listed in Table 384.30-5, Wis. Adm. Code

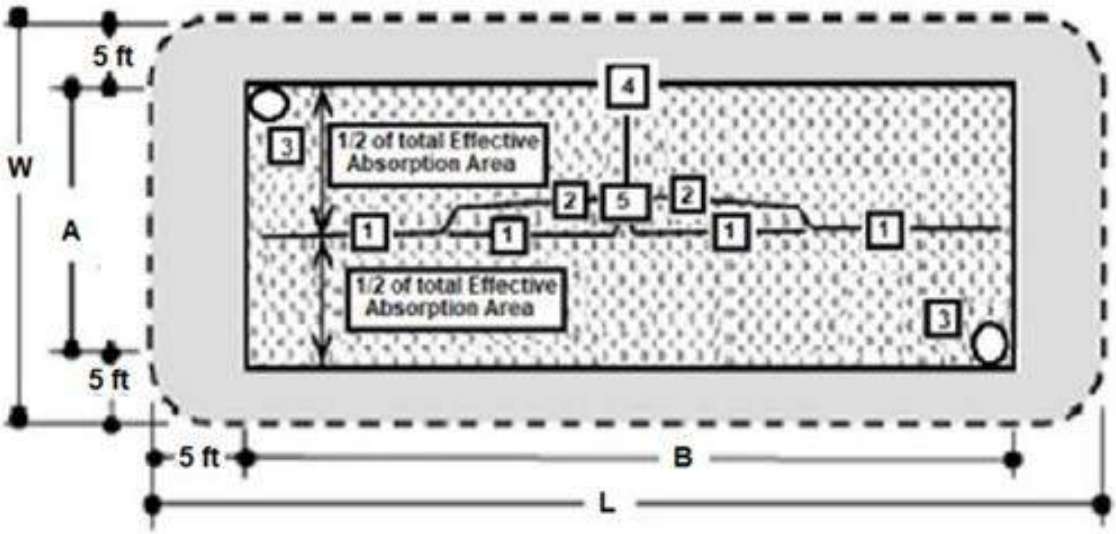
2 4" dia. PVC Observation pipe using material specified in Table 384.30-1, Wis. Adm. Code

3 Lateral turn-up (see Pressure Component Manual - Ver. 2.1)

Cross-section of a Gravity At-grade with a distribution box on a level site



Plan-view of a Gravity At-grade on a level site



1 4" dia. perforated PVC piping material per Table 383.30-4, Wis. Adm. Code

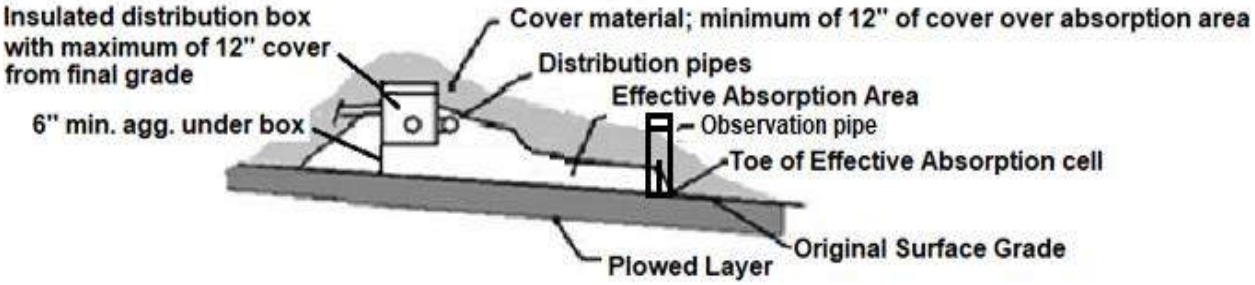
2 4" dia. solid-wall PVC piping material per Table 383.30-2, Wis. Adm. Code

3 4" dia. solid-wall PVC piping material per Table 383.30-1, Wis. Adm. Code

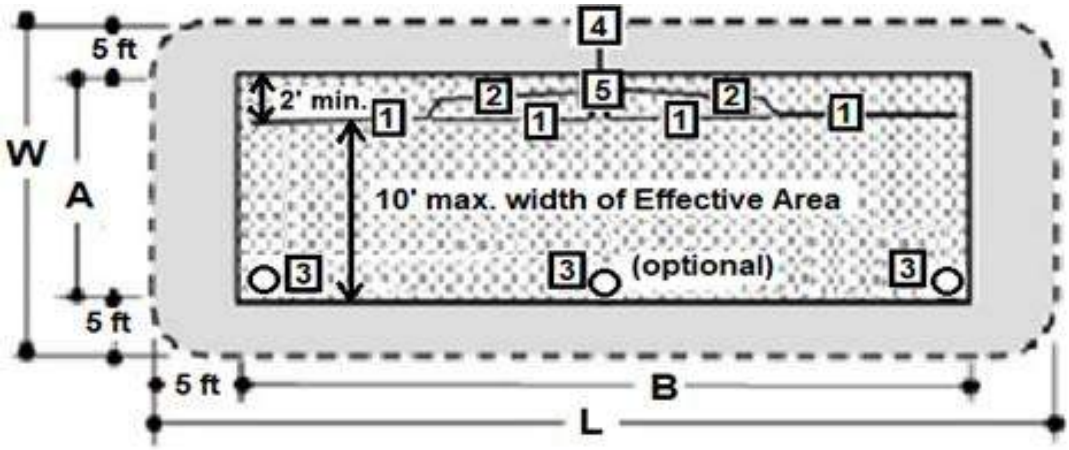
4 4" dia. solid-wall PVC piping material per Table 383.30-3, Wis. Asd. Code

5 Concrete/Heavy plastic distribution box

Cross-section of a Gravity At-grade with a distribution box on a sloping site



Plan view of a Gravity At-grade with a distribution box on a sloping site



1 4" dia. perforated PVC piping material per Table 383.30-4, Wis. Adm. Code

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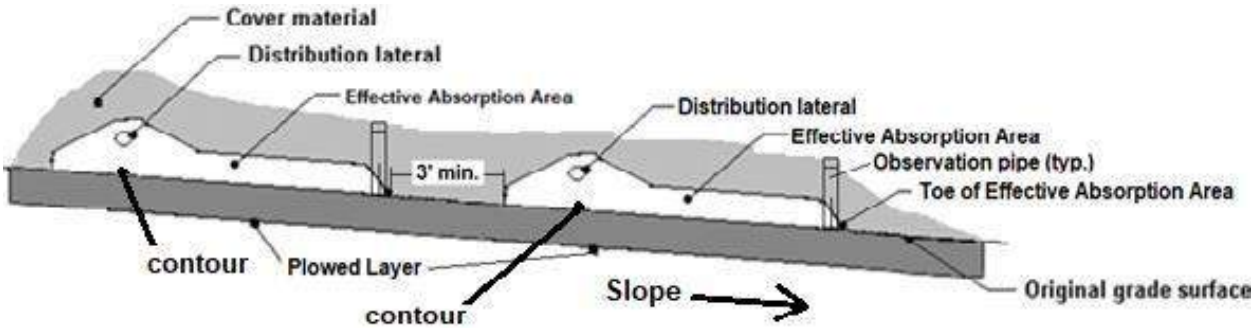
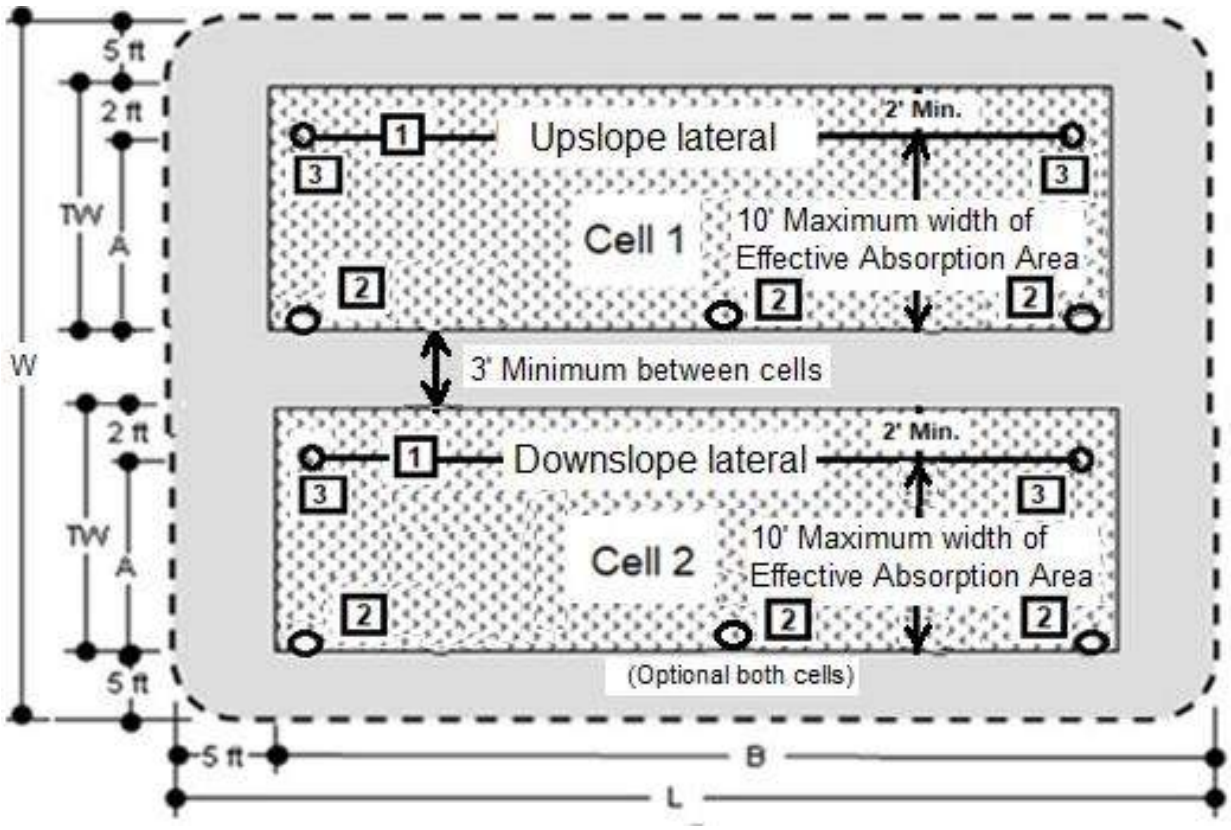
4 4" dia. solid-wall PVC piping material per Table 383.30-3, Wis. Asd. Code

5 Concrete/Heavy plastic distribution box

Cross-section of a 2-celled At-grade on a sloping site on different contours



Plan view of a 2-celled At-grade on a sloping site on different contours



1 Pressure rated piping using material listed in Table 384.30-5, Wis. Adm. Code

2 4" dia. PVC Observation pipe using material specified in Table 384.30-1, Wis. Adm. Code

3 Lateral turn-up (see Pressure Component Manual - Ver. 2.1)

VI. SITE PREPARATION & CONSTRUCTION

Procedures used in the construction of an at-grade component are just as critical as the design of the component. A good design with poor construction results in component failure. It is emphasized that the soil at the designated site only be plowed when it is not frozen or after a rain event so that the moisture content is low to avoid compaction and puddling. Consequently, installations are to be made only when the soil is dry as required. **All vehicular traffic is prohibited on the plowed area of slowly permeable/restrictive soils**. The construction plan to be followed includes:

A. Equipment:

Proper equipment is essential. Track type tractors or other equipment that will not compact the at-grade area or the down slope area are required.

B. Sanitary Permit:

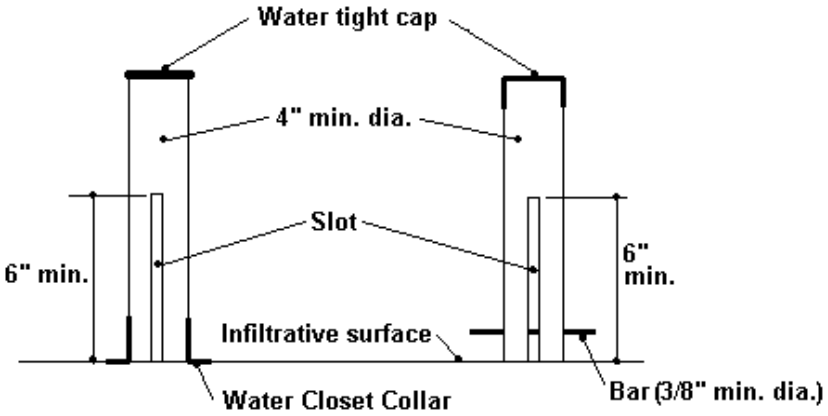
Prior to construction of the component, a state sanitary permit shall be obtained from, and arrangements for inspection(s) shall be made with, the governmental unit. The permit shall be posted in a clearly visible location on the site. [NOTE: When a POWTS is or will be located on state owned property, the sanitary permit shall be obtained from, and arrangements for inspections(s) shall be made with, the department.]

C. Construction Procedures:

1. Check the moisture content of the soil to a depth of 8 in. or to the anticipated plow depth, whichever is greater. Smearing and compacting wet soil will result in reducing the infiltration capacity of the soil.
2. Proper soil moisture content can be determined by rolling a soil sample between the hands. If it rolls into a 1/4 in. wire, the site is too wet to prepare; do not proceed until it dries. If it crumbles, site preparation can proceed.
3. Lay out the distribution cell area on the site so that the upslope edge of the effective distribution cell is level or on a contour line (points of equal elevation).
4. Lay out the distribution cell area on the site so that the upslope edge of the effective distribution cell is level or on a contour line (points of equal elevation).
5. For components in open areas, measure the average ground elevation along the upslope edge of the distribution cell. For components on uneven sites (rough terrain), plow the surface, before the average ground elevation along the upslope edge of the distribution cell is measured. The average elevation is referenced to a benchmark for future use. This is necessary to determine the bottom elevation of the distribution cell. Note that the entire component area (L x W) is plowed.
6. Determine where the force main from the dosing chamber will connect to the distribution system in the distribution cell. Place the pipe either before or after plowing. If the force main is to be installed in the down slope area, the trench for the force main shall be ≤ 12 in. wide.
7. Cut trees as close as possible to the ground surface and leave stumps, remove surface boulders that can be easily rolled off, remove vegetation over 6 in. long by mowing and removing cut vegetation. Prepare the site by plowing the surface soil

perpendicular to the direction of the slope, to and to a depth of 7-8 in. so as to eliminate any surface mat that could impede the vertical flow of liquid into the in-situ soil. Plowing with a Moldboard plow is done along contours. Chisel plowing is the preferred method especially in finer textured soils. Rototilling or other means that pulverize the soil is not acceptable. The important point is that an uncompacted rough, unsmeared surface be left.

8. The required observation pipes shall have vertical slots on the bottom 6 in. and include a suitable means of anchoring.



9. Immediately after plowing, aggregate shall be placed to a uniform minimum depth of ≥ 6 in. above the original grade. All vehicular traffic is prohibited on the plowed area. On sloping sites, vehicle traffic is also prohibited for 15 ft down slope and 10 ft on both sides of level sites. If it rains after the plowing is completed, wait until the soil dries out before continuing construction, and contact the local inspector for a determination on the damage done by rainfall.
10. Place the distribution lateral(s) on the aggregate. Connect the lateral(s) using the needed fittings and piping to the force main pipe from the dosing chamber. Slope the piping from the lateral(s) to the force main pipe or lay the effluent distribution lateral(s) level, with the perforations down. All pipes shall drain after dosing.
11. Place ≥ 2 in. of aggregate over the lateral(s).
12. Place geotextile fabric conforming to requirements of ch. SPS 384, Wis. Adm. Code, over the aggregate.
13. Place soil cover material on top of the geotextile fabric and extend the soil cover to the boundaries of the overall component.
14. Complete final grading to divert surface water drainage away from the at-grade. Sod or seed and mulch the entire at grade component.
15. If a distribution box or header pipe is proposed when constructing a gravity system, see Table 3 for placement and installation instructions.

Double Cell Dispersal Areas:

When a (2) cell At-grade is constructed, the entire lower cell shall be constructed first, followed by the upper cell. The solid-walled sewer piping connecting the 2 lateral networks together shall be bedded with aggregate and covered with topsoil material.

VII. OPERATION, MAINTENANCE, & PERFORMANCE MONITORING

A. Owner is Responsible

The POWTS owner is responsible for the operation and maintenance of the component. The county, department, or POWTS service provider may make periodic inspections of the components to check for surface discharge, ponded effluent levels in the observation pipes, etc. The owner or the owner's agent is required to submit necessary maintenance reports to the governmental unit or designated agent.

B. Approvals and Inspections

Design approval and site inspection before, during, and after construction is accomplished by the governmental unit or other appropriate jurisdiction(s) in accordance with ss. SPS 383.22 and 383.26, Wis. Adm. Code.

C. Routine Precautionary Measures

1. Inspect treatment and dose tanks along with related mechanical components routinely and maintain when necessary.
2. Wheel traffic, except for lawn maintenance equipment, on the at-grade component is not permitted to avoid frost penetration in winter and to minimize compaction during other times.
3. Conserve water within the structure to assure that the at-grade component will not be hydraulically overloaded.

D. User Manual

A user manual is to accompany the at-grade component plan. Copies of the user manual and the component plan shall be provided to the owner following installation. The manual and the plan shall contain the following information:

1. Diagram(s) of all components and their location. This should include the location of the reserve area if one is provided.
2. Names and phone numbers of local governmental unit authority, component manufacturer, or POWTS service provider to be contacted in the event of component failure or malfunction.
3. A management plan that contains inspection schedules, maintenance or servicing of the component, including electrical/mechanical components.
4. A list of activities that can or cannot occur on the reserve area if one is provided.

In the event of power failure, the pump chamber should be pumped by a certified septage servicing operator before restoring power to the pump, or other measures shall be used to dose the at- grade component without exceeding its design flow capacity. This may include manual operation of the pump controls until the pump chamber has reached its normal level.

E. Performance Monitoring

1. System periodic inspection and monitoring must be completed on at-grade components installed in accordance with this manual. The frequency of inspection must be:
   a) At least once every three years after installation, and
   b) At times of a problem, a complaint, or a failure.
   c) Per manufacturer's requirements if pretreatment components require more frequent management.
   d) Distribution boxes and header pipes shall be checked for proper function after the frost leaves the ground in the spring or at least once every 13 months.
2. The minimum criteria addressed in periodic inspection and monitoring of at-grade components are:
   a) Type of use.
   b) Age of component.
   c) Nuisance factors, such as odors or user complaints.
   d) Mechanical malfunction of the system including problems with valves or other mechanical or plumbing components.
   e) Material fatigue or failure, including durability or corrosion as related to construction or structural design.
   f) Neglect or improper use, such as exceeding the approved design flow, poor maintenance of vegetative cover, inappropriate cover over the at-grade, or inappropriate activity over the at-grade component.
   g) Installation problems such as soil compaction, improper orientation or location.
   h) Pretreatment component maintenance, including dosing frequency, structural integrity, groundwater intrusion or improper sizing.
   i) Pump or siphon chamber maintenance, including improper maintenance, infiltration, structural problems, or improper sizing.
   j) Ponding in distribution cell, prior to the pump cycle. Ponding may be evidence of development of a clogging mat or reduced infiltration rates.
   k) Siphon or pump malfunction including dosing volume problems, pressurization problems, breakdown, burnout, or cycling problems.
   l) Sewage on the ground surface or sewage backup into the structure served.

VIII. PLAN SUBMITTAL CHECKLIST

The following checklist has been developed to help make sure all the information is Included so the plan reviewer to make an informed decision if an At-grade plan can be approved without the need of additional information. All DSPS submittals are uploaded to our website and do not require multiple copies.

General Submittal Information:

- Legible scans/copies of reports, forms, plans, and other documents are acceptable. A submitter's signature is required on certain documents (i.e. index page).

Forms and Fees:

- Plans submitted to a designated county plan review agent, the agent should be contacted to obtain the acceptable submittal process regarding application form, number of plans and proper review fee.

Soils Information:

- A completed Soils Evaluation Report form, (SBD-8330) signed and dated by a certified soil tester, with credential number.
- Separate sheet showing the location of all borings. The location of all borings and observation pits must be able to be identified on the plot plan.

Documentation:

- Architects, engineers or designers shall sign, seal and date each page of the submittal or sign, seal and date index page, which is attached to the bound set.
- Master Plumbers and Master Plumbers Restricted Service shall sign, date and include their license number on each page of the submittal or sign and date an index page, which is attached to each bound set.
- A detailed project description must be submitted with all commercial plans. Any facility creating non-domestic wastewater may require concurrence approval from the WI. DNR. Please check with a state plan reviewer if there are any questions.

Plot Plan Information:

- Dimensioned plans or plans drawn to scale, scale line indicated on plans, property lines, parcel size and property boundaries shall be clearly marked.
- Slope directions and percent in component area.
- Benchmark and North arrow.
- Pertinent setbacks distances as per appropriate code.
- Two-foot contours or other appropriate contour interval within the system area.
- Location information; legal description down to 40 acres and /or subdivision, block and lot number of platted lands.
- Pertinent existing and proposed buildings, wells water lines, swimming pools, flood plain location and elevation and OHWM designations of navigable waters.

Plan View:

- Dimensions for distribution cell(s).
- Location of observation pipes.
- Pipe lateral layout, which includes the number of laterals, pipe material, diameter, length, location and size of orifices.
- Manifold/force main locations, with materials, length and diameter of each.

Cross Section of Component:

- Include plowing requirement, distribution cell details, and cover material.
- Lateral elevation, position of observation pipes, dimensions of distribution cell, and geotextile fabric barrier.

Component Sizing:

- For one- and two-family dwellings, the number of bedrooms shall be included.
- For public buildings, the sizing calculations and project description shall be included.

Tank and Pump / Siphon Information:

- Construction details for site-constructed tanks. (Note: site constructed tanks that do not have a valid plumbing product approval are not included within the scope of this manual and must be submitted as individual site designs.)
- Size, model number and manufacturer information for prefabricated tank(s).
- Installation information must include vent and access opening locations, depth to inlet; and height/elevation of freeboard, if applicable.
- Anchoring information shall be provided whenever a tank is located within the 100-year floodplain and/or the depth to seasonal soil saturation indicates anchoring is necessary to prevent flotation of the tank.
- Notation of pump or siphon model, pump performance curve, friction loss for force main and calculation for total dynamic head.
- Notation of high-water alarm manufacturer and model number.
- Cross section of tank / chamber to include storage volumes; connections for piping, vents, and power; pump “off” setting; dosing cycle and volume; high-water alarm setting and storage volume above the high-water alarm.
- Cross section of two compartments tanks or tanks installed in series shall include information listed above.

IX. AT-GRADE WORKSHEET

A. SITE CONDITIONS:

Evaluate the site and soils report for the following:

a) Surface water movement.

b) Measure elevations and distances on the site so that slope, contours and available areas can be determined.

c) Description of several soil profiles where the component will be located.

d) Determine the limiting conditions such as bedrock, high groundwater level, soil permeability, and setbacks.

Slope - ____ %

Occupancy: One- or Two-family Dwelling, # of bedrooms - ____

Public Facility ____

Depth to limiting factor - ____ in.

In situ soil application rate used - ____ gal/sf/day

B. DESIGN WASTEWATER FLOW (DWF):

1. One- or Two-family Dwelling:

DWF = 150 gal/day/bedroom x # of bedrooms

DWF = 150 gal/day/bedroom x ____ bedrooms

DWF = _____ gal/day

2. Public Facilities:

DWF = Sum of each wastewater flow per source per day x 1.5

DWF = _____ gal/day x 1.5

DWF = _____ gal/day

C. EFFECTIVE WIDTH AND LENGTH OF THE DISTRIBUTION CELL:

1. Determine the design loading rate (DLR) for the site:

From Table 383.44-1 or -2, Wis. Adm. Code, select the soil application rate for the most restrictive soil horizon that may affect treatment and dispersal. The soil application rate selected from Table 383.44-1 or -2, Wis. Adm. Code, is the design-loading rate (DLR) for the site.

DLR = _____ gal/sf/day

2. Determine the distribution cell area.

   Calculate the distribution cell area by dividing the daily design wastewater flow (DWF) by the design-loading rate (DLR).

   Distribution cell area = DWF ÷ DLR

   Distribution cell area = _____ gal/day ÷ ____ gal/sf/day

   Distribution cell area = _____ sf

3. Select an effective distribution cell width (A). The effective width shall be ≤ 10 ft.

   A = ____ ft

4. Determine the distribution cell length.

   Calculate the distribution cell length (B) by dividing the required distribution area by the effective distribution cell width (A).

   B = Distribution cell area ÷ A

   B = _____ sf ÷ ____ ft

   B = _____ ft

5. Determine the linear loading rate (LLR) if the soil application rate of any horizon within 12 in. below the distribution cell has a soil application rate of ≤ 0.3 gal/sf/day.

   If the LLR exceeds 4.5 gal/ft/day for such soils, the component must be lengthened to reduce the LLR to 4.5 gal/ft/day or less.

   LLR = DWF ÷ B

   LLR = _____ gal/day ÷ ____ ft

   LLR = _____ gal/day/ft

D. DESIGN OF ENTIRE AT-GRADE COMPONENT:

1. Determine the total width of distribution cell.

   For level site, the total width of the distribution cell (TW) is equal to or greater than the effective distribution cell credit width (A).

   TW ≥ A

   TW = _____ ft

   For sloping site, the total width of the distribution cell (TW) is equal to or greater than the effective distribution cell credit width (A) + 2 ft.

   TW ≥ A + 2 ft

   TW ≥ _____ ft + 2 ft = _____ ft

2. Determine the overall width (W) of the component.

   $W \geq TW + 10$ ft

   $W \geq$ _____ ft + 10 ft = _____ ft

3. Determine the overall length (L) of the component.

   $L \geq B + 10$ ft

   $L \geq$ _____ ft + 10 ft = _____ ft

4. Horizontal location of distribution lateral in the distribution cell.

   ___ Level site with one effluent distribution lateral; the lateral is located in the center of distribution cell.

   ___ Level site with more than one effluent distribution lateral; the laterals are equally spaced apart with the center two laterals the same distance from center of the cell and the distance from the outside laterals to the edge of the cell being one half the distance between laterals.

   ___ Sloping site with one effluent distribution lateral; the effluent distribution lateral is located 2 ft in from up slope edge of total distribution cell.

   ___ Sloping site with more than one effluent distribution lateral; one lateral is located 2 ft down slope from the upslope edge of the distribution cell and the others are down slope of the upper lateral and up slope of the midpoint of the distribution cell credit width.

5. Vertical location of distribution lateral in the distribution cell.

   Elevation of distribution lateral invert ≥ elevation of original contour directly under distribution lateral + 6 in.

   Elevation of distribution lateral invert ≥ _____ ft + 0.5 ft

   Elevation of distribution lateral invert = _____ ft

6. Determine the location of observation pipes along the length of distribution cell.

   Distance from end of distribution cell to <u>end</u> observation pipes = B÷5 to B÷10

   Distance from end of distribution cell to <u>end</u> observation pipes = ____ft

REFERENCE

J.C. Converse, E. Jerry Tyler, and James O. Petersen, 1990, “Wisconsin At-grade Soil Absorption System Siting, Design, and Construction Manual” Small Scale Waste Management Project #15.21.

Do your Part—
Be SepticSmart!

A Homeowners' Guide to Septic Systems

septicsmart™

U.S. Environmental Protection Agency

EPA

Maintaining Your Septic System:

Good for your wallet. Good for your health. Good for the environment.

Did you know that one-quarter of all U.S. homes have septic systems? Yours may be one of them. If you're not properly maintaining your septic system, you're not only hurting the environment, you're putting your family's health at risk—and may be flushing thousands of dollars down the drain!

First Things First:

What Is a Septic System?

Common in rural areas without centralized sewer systems, septic systems are underground wastewater treatment structures that use a combination of nature and time-tested technology to treat wastewater from household plumbing produced by bathrooms, kitchen drains, and laundry.

Do You Have a Septic System?

You may already know you have a septic system. If you don't know, here are tell-tale signs that you probably do:

- You use well water.
- The waterline coming into your home doesn't have a meter.
- You show a "$0.00 Sewer Amount Charged" on your water bill.
- Your neighbors have a septic system.

How To Find Your Septic System

Once you've determined that you have a septic system, you can find it by:

- Looking on your home's "as built" drawing.
- Checking your yard for lids and manhole covers.
- Contacting a septic inspector/pumper to help you locate it.

Why Should You Maintain Your Septic System?

Maintaining Your Septic System…

Saves You Money

Regular maintenance fees of $250 to $300 every three to four years is a bargain compared to the cost of repairing or replacing a malfunctioning system, which can cost between $3,000 and $7,000. The frequency of pumping required for your system depends on how many people live in your home and the size of the system.

Protects Your Property Value

An unusable septic system or one in disrepair will lower your property value, not to mention pose a potentially costly legal liability.

Keeps You and Your Neighbors Healthy

Household wastewater is loaded with disease-causing bacteria and viruses, as well as high levels of nitrogen and phosphorus. If a septic system is well-maintained and working properly, it will remove most of these pollutants. Insufficiently treated sewage from septic systems can cause groundwater contamination, which can spread disease in humans and animals.

Improperly treated sewage also poses the risk of contaminating nearby surface waters, significantly increasing the chance of swimmers contracting a variety of infectious diseases, from eye and ear infections to acute gastrointestinal illness and hepatitis.

Service provider coming? Here's what you need to know.

When you call a septic service provider, he or she will inspect for leaks and examine the scum and sludge layers in your septic tank.

Your septic tank includes a T-shaped outlet which prevents sludge and scum from leaving the tank and traveling to the drainfield area. If the bottom of the scum layer is within six inches of the bottom of the outlet, or if the top of the sludge layer is within 12 inches of the outlet, your tank will need to be pumped. Remember to note the sludge and scum levels determined by the septic professional in your operation and maintenance records, as this will help determine how often pumping is necessary.

The service provider should note any repairs completed and the tank condition in your system's service report. If additional repairs are recommended, be sure to hire someone to make them as soon as possible.

The National Onsite Wastewater Recycling Association (NOWRA) website has a septic locator that makes it easy to service professionals in your area. Visit **www.septiclocator.com** and enter your ZIP code to get started!

Beware of septic tank additives!

Some makers of septic tank additives claim their products break down septic tank sludge in order to eliminate the need for pumping. But the effectiveness of additives has not been determined; in fact, many studies show that additives have no significant effects on a tank's bacterial populations.

Septic tanks already contain the microbes they need for the effective breakdown of household wastewater pollutants. Periodic pumping is the only true way to ensure that septic systems work properly and provide many years of service.

Protects the Environment

More than four billion gallons of wastewater is dispersed below the ground's surface every day. That's a lot of water! Groundwater contaminated by poorly or untreated household wastewater doesn't just pose dangers to drinking water—it poses dangers to the environment. Malfunctioning septic systems release bacteria, viruses, and chemicals toxic to local waterways. When these pollutants are released into the ground, they eventually enter streams, rivers, lakes, and more, harming local ecosystems by killing native plants, fish, and shellfish.

Maintaining Your Septic System:

The Basics

Septic system maintenance isn't complicated, and it doesn't need to be expensive. Upkeep comes down to four important elements:

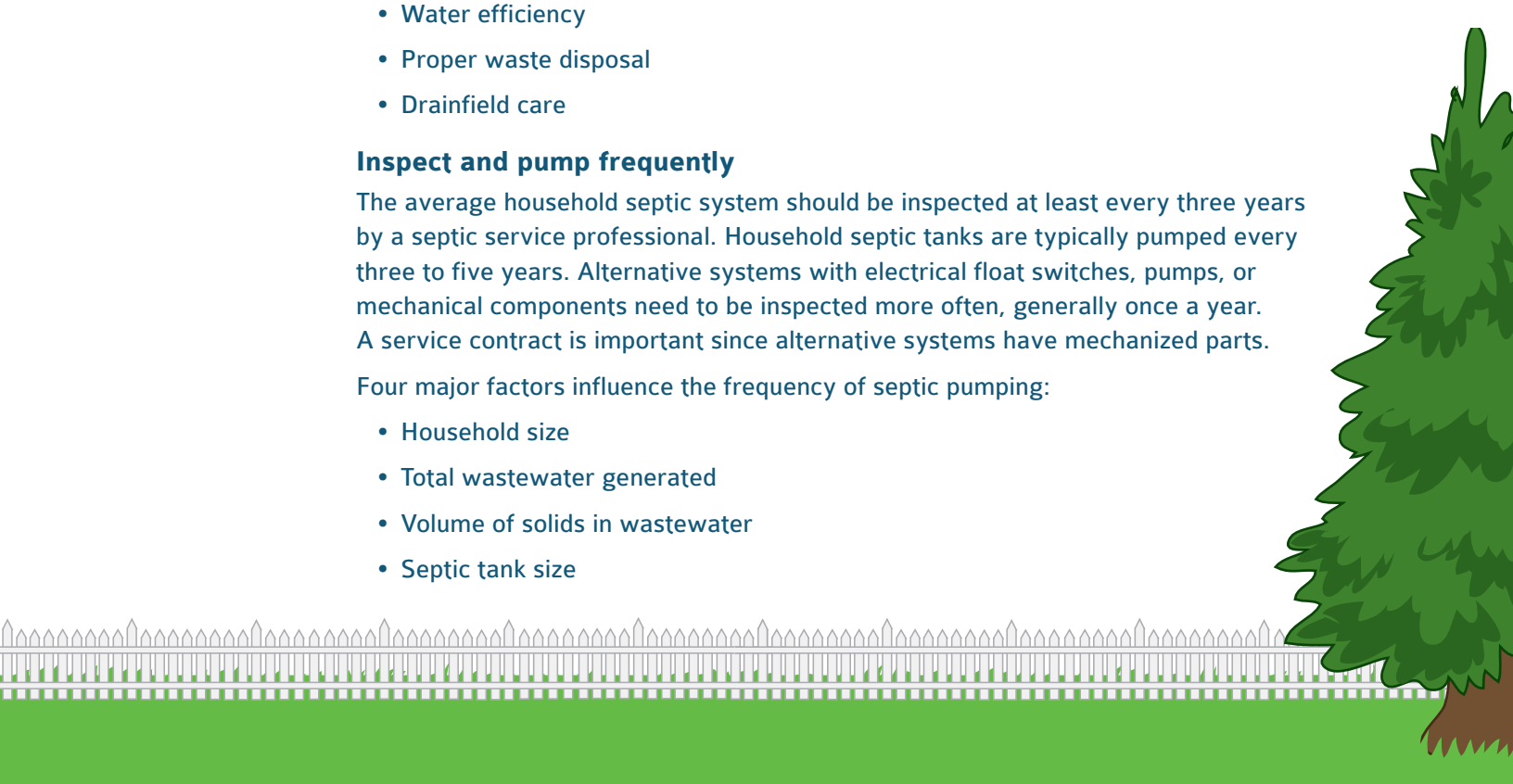
- Inspection and pumping
- Water efficiency
- Proper waste disposal
- Drainfield care

Inspect and pump frequently

The average household septic system should be inspected at least every three years by a septic service professional. Household septic tanks are typically pumped every three to five years. Alternative systems with electrical float switches, pumps, or mechanical components need to be inspected more often, generally once a year. A service contract is important since alternative systems have mechanized parts.

Four major factors influence the frequency of septic pumping:

- Household size
- Total wastewater generated
- Volume of solids in wastewater
- Septic tank size



Use water efficiently

Did you know that average indoor water use in a typical single-family home is nearly 70 gallons per individual, per day? And just a single leaky toilet can waste as much as 200 gallons of water per day?

All of the water a household sends down its pipes winds up in its septic system. This means that the more water a household conserves, the less water enters the septic system. Efficient water use can not only improve the operation of a septic system, but it can reduce the risk of failure as well. Learn more about simple ways to save water and water-efficient products by visiting EPA's WaterSense Program at **www.epa.gov/watersense**.

- **High-efficiency toilets:** Toilet use accounts for 25 to 30 percent of household water use. Most older homes have toilets with 3.5- to 5-gallon reservoirs, while newer, high-efficiency toilets use 1.6 gallons of water or less per flush. Replacing existing toilets with high-efficiency models is an easy way to quickly reduce the amount of household water entering your septic system.
- **Faucet aerators and high-efficiency showerheads:** Faucet aerators help reduce water use as well as the volume of water entering your septic system. High-efficiency showerheads or shower flow restrictors also reduce water use.
- **Washing machines:** Washing small loads of laundry on your washing machine's large-load cycle wastes water and energy. By selecting the proper load size, you'll reduce water waste. If you're unable to select a load size, run only full loads of laundry.

  Another tip? Try to spread water use via washing machine throughout the week. Doing all household laundry in one day might seem like a time-saver, but it can be harmful to your septic system, as it doesn't allow your septic tank time to adequately treat waste and could potentially flood your drainfield.

  Consider purchasing an ENERGY STAR® clothes washer, which uses 35 percent less energy and a whopping 50 percent less water than a standard model. Learn more about ENERGY STAR appliances by visiting **www.energystar.gov**.

Small leaks can lead to big problems!

When it comes to water fixtures, a couple of quick fixes can save you serious problems down the road!

Check to see if your toilet's reservoir is leaking into your toilet bowl by adding five drops of liquid food coloring to the toilet reservoir before bed. If the dye is in the toilet bowl the next morning, the reservoir is leaking and repairs are needed.

Think a leaky faucet is no big deal? Think again. A small drip from a faucet adds gallons of unnecessary water to your septic system every day.

To see how much a leak adds to your water usage, place a cup under the drip for 10 minutes. Multiply the amount of water in the cup by 144 (the number of minutes in 24 hours, divided by 10). Just one cup of leaky faucet water every 10 minutes equals 36 wasted gallons of water a day—and they all end up in your septic system.

New faucets and toilet reservoirs are easily accessible and inexpensive. Choose to make a small investment for a big difference in your septic system.

- **Proper waste disposal:** Whether you flush it down the toilet, grind it in the garbage disposal, or pour it down the sink, shower, or bath, everything that goes down your drains ends up in your septic system. And what goes down the drain can have a major impact on how well your septic system works.

Toilets Aren't Trash Cans!

Your septic system is not a trash can. An easy rule of thumb? Don't flush anything besides human waste and toilet paper.

Never flush:

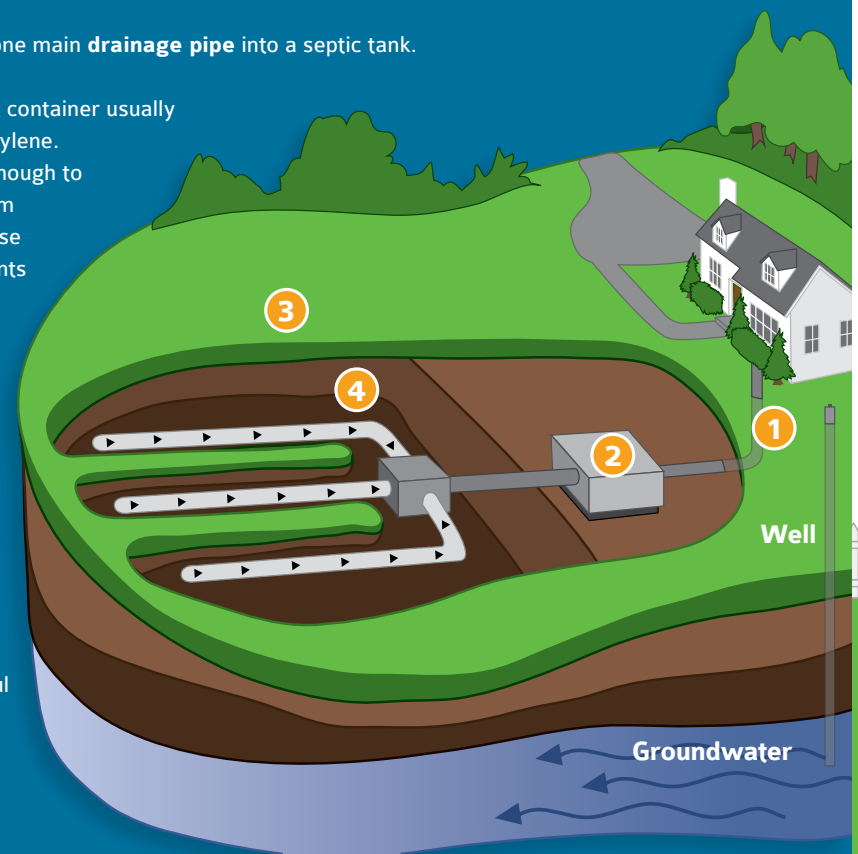
- Feminine hygiene products
- Condoms
- Dental floss
- Diapers
- Cigarette butts
- Coffee grounds
- Cat litter
- Household chemicals like gasoline, oil, pesticides, antifreeze, and paint
- Pharmaceuticals

For a complete list, visit **water.epa.gov/septicsmart**.

How does a septic system work?

This is a simplified overview of how a septic system works.

1. All water runs out of your house from one main **drainage pipe** into a septic tank.
2. The **septic tank** is a buried, water-tight container usually made of concrete, fiberglass or polyethylene. Its job is to hold the wastewater long enough to allow solids to settle down to the bottom (forming sludge), while the oil and grease floats to the top (as scum). Compartments and a T-shaped outlet prevent the sludge and scum from leaving the tank and traveling into the drainfield area.
3. The liquid wastewater then exits the tank into the **drainfield**. If the drainfield is overloaded with too much liquid, it will flood, causing sewage to flow to the ground surface or create backups in toilets and sinks.
4. Finally, the wastewater percolates into the **soil**, naturally removing harmful bacteria, viruses, and nutrients.



Own an RV, boat or mobile home?

If you spend any time in a recreational vehicle (RV) or boat, you probably know of the problem of odors from sewage holding tanks. Learn more about proper and safe wastewater disposal—download EPA's factsheet at **www.epa.gov/region9/water/groundwater/uic-pdfs/rv-wastewater.pdf** or call The National Small Flows Clearinghouse's Septic System Care hotline toll-free at 1-800-624-8301.

Take care at the drain

Your septic system contains a collection of living organisms that digest and treat household waste. Pouring toxins down your drain can kill these organisms and harm your septic system. Whether you're at the kitchen sink, bathtub, or utility sink:

- Avoid chemical drain openers for a clogged drain. Instead, use boiling water or a drain snake.
- Never pour cooking oil or grease down the drain!
- Never pour oil-based paints, solvents, or large volumes of toxic cleaners down the drain. Even latex paint waste should be minimized.
- Eliminate or limit the use of a garbage disposal, which will significantly reduce the amount of fats, grease, and solids that enter your septic tank and ultimately clog its drainfield.

Maintain your drainfield

Your drainfield—a component of your septic system that removes contaminants from the liquid that emerges from your septic tank—is an important part of your septic system. Here are a few things you should do to maintain it:

- Never park or drive on your drainfield.
- Plant trees the appropriate distance from your drainfield to keep roots from growing into your septic system. A septic service professional can advise you of the proper distance, depending on your septic tank and landscape.
- Keep roof drains, sump pumps, and other rainwater drainage systems away from your drainfield area, as excess water slows down or stops the wastewater treatment process.

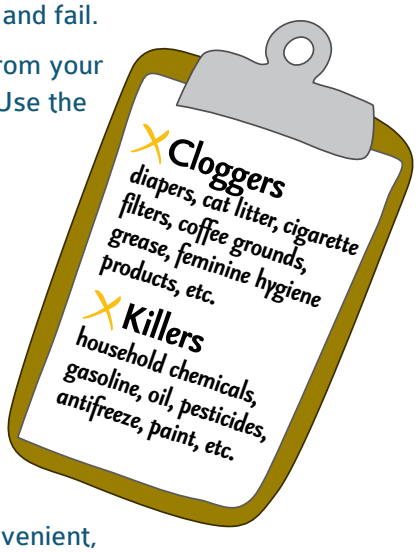
Failure Causes

Pouring household and home improvement chemicals down your drains, flushing garbage down toilets, excessive water use, and failure to provide proper maintenance aren't the only culprits for septic system failure. Take note of these additional causes of septic failure:

Hot tubs

Hot tubs may be a great way to relax, but when it comes to emptying them, your septic system should avoided. Emptying a hot tub into your septic system stirs the solids in the tank, pushing them into the drainfield, causing it to clog and fail.

Drain cooled hot tub water onto turf or landscaped areas far away from your septic tank and drainfield, and in accordance with local regulations. Use the same caution when draining swimming pools.



Water purification and softening systems

Some freshwater purification systems, including water softeners, unnecessarily pump water into septic systems. Such systems can send hundreds of gallons of water to septic tanks, causing agitation of solids and excess flow to drainfields. When researching water purification and softening systems, check with a licensed plumbing professional about alternative routing for such treatment systems.

Garbage disposals

Consider eliminating or limit the use of garbage disposals. While convenient, frequent use of garbage disposals significantly increases the accumulation of sludge and scum in septic tanks, resulting in the need for more frequent pumping.

Improper design or installation

The proper design and installation of a septic system is essential for it to correctly function. A home's groundwater table, soil composition, and a properly leveled drainfield are just a few factors to ensure a well-functioning septic system. Be sure to do your research when hiring septic professionals.

Failure symptoms: Mind the signs!

A foul odor isn't always the first sign of a malfunctioning septic system. Call a septic professional if you notice any of the following:

- Wastewater backing up into household drains.
- Bright green, spongy grass on the drainfield, even during dry weather.
- Pooling water or muddy soil around your septic system or in your basement.
- A strong odor around the septic tank and drainfield.

Mind the signs of a failing system. One call to a septic professional could save you thousands of dollars!

U.S. Environmental Protection Agency

For more information on how you can be SepticSmart, please visit:

www.epa.gov/septicsmart

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